Link-OS™
Virtual Device-I

User Guide

ZEBRA TECHNOLOGIES

P1069056-001 Rev. A

Part Number: P1069056-001

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<EOT>*n* *71*
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About This Document

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Who Should Use This Document

This manual describes the Virtual Device-I 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
QLn™ Series	SI68-002625A* or later
ZT210™/ZT220™/ZT230™	SI72-002625x* or later
iMZ™ Series	Contact your Zebra representative.

* This is based on firmware VXX.19.6Z

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

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

How This Document Is Organized

The User Guide is set up as follows:

Section	Description
Introduction on page 15	This section describes the features and functions of a Zebra printer that is running the Virtual Device-I application. The Virtual Device-I application enables Zebra mobile and tabletop printers to work with many host systems that are using INTERMEC® 3400D 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.
Install, Register, and Enable Virtual Device-I on page 17	This section provides you with instructions on how to install and enable the Virtual Device-I application on one or more Zebra printers.
Commands on page 41	This section provides a detailed listing of commands for use on your Zebra printer with the Virtual Device-I app.
Download the ZDownloader Application on page 119	Zebra recommends that you use the ZDownloader application to download a Virtual Device app to your printers. This section provides you with the instructions for downloading and installing this application.

Introduction

This section describes the features and functions of a Zebra printer that is running the Virtual Device-I application. The Virtual Device-I application enables Zebra mobile and tabletop printers to work with many host systems that are using INTERMEC® 3400D 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.

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Virtual Device-I Features

The Virtual Device-I 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®, RS-232, 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 121*).
- Provides support of INTERMEC® 3400D commands (see *Commands* on page 41).

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

Install, Register, and Enable Virtual Device-I

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

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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/us/en/products-services/software/link-os/virtual-devices.html.
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:

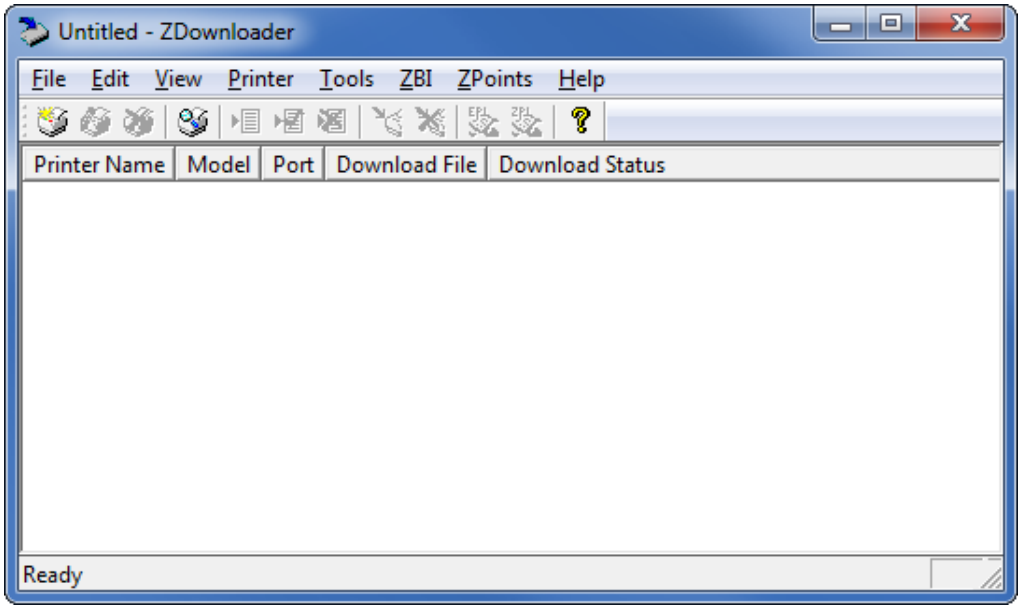
   - A printer firmware `.ZPL` file to be downloaded to a Zebra printer.
   - A `.txt` file that contains the SGD command for immediately activating the Virtual Device app.
8. Extract the files from the archive to your computer.

Downloading the Virtual Device-I Application Using ZDownloader

Note • Zebra recommends that you use the Zebra Downloader to download the Virtual Device-I app. For instructions on how to download the Zebra Downloader, see *Download the ZDownloader Application* on page 119.

The ZDownloader application can update Virtual Device-I files in Zebra printers connected by RS-232, 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 RS-232, Parallel, or IP Ethernet interfaces)

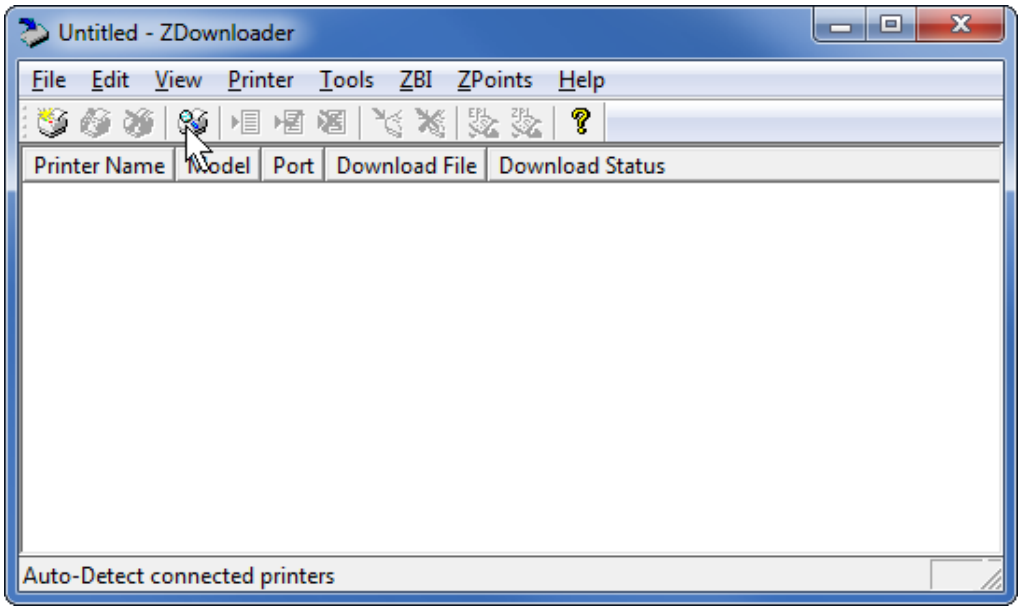
If your printer is connecting via the serial or parallel interfaces, or is not detected by using the Auto-Detect method, use the Manual Add method.

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 program 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 program can support as many USB printers as your computer can support (most computers typically can support up to 255).



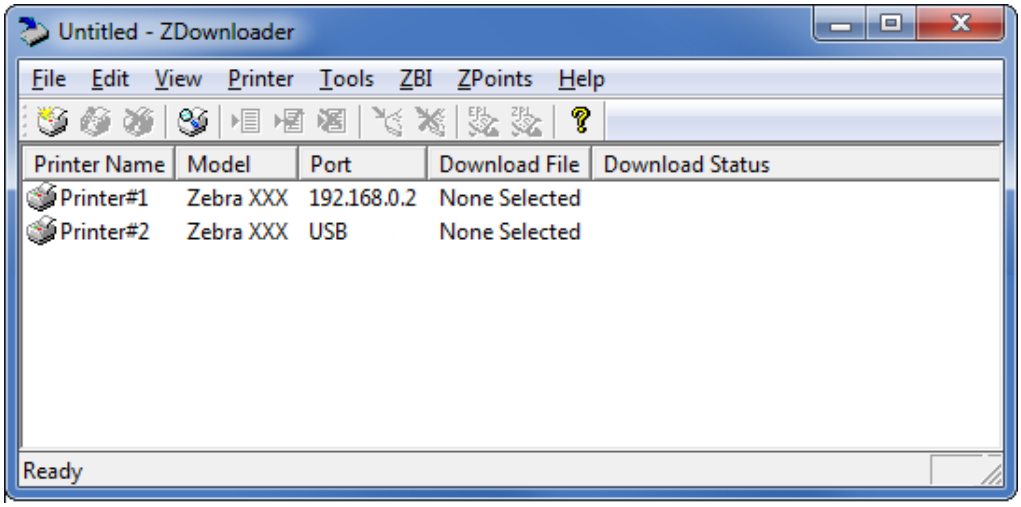
To Auto-Detect printers connected via the USB or IP Ethernet interfaces, perform the following steps:

1. In the ZDownloader toolbar, click the "Auto-Detect" button .

   OR

   Right-click in the ZDownloader window and select "Auto-Detect Printers."

   The printers detected are added to the printer list.



Manually Add Printers

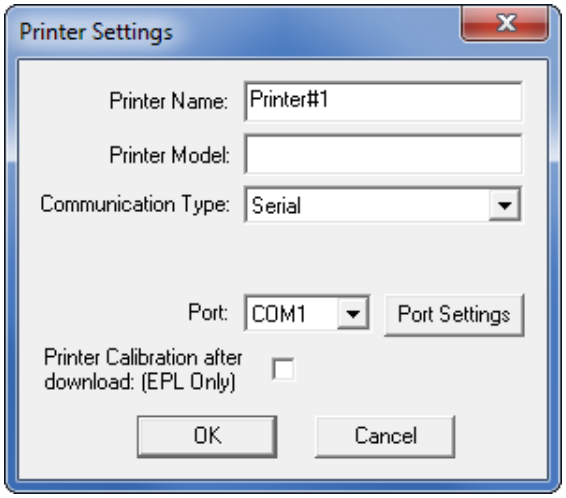
To manually add printers connected via the RS-232, Parallel, or IP Ethernet interfaces, perform the following steps:

1. In the ZDownloader toolbar, click the "Add Printer" button .

   OR

   Right-click in the ZDownloader window and select "Add Printer…".

   The following window appears.

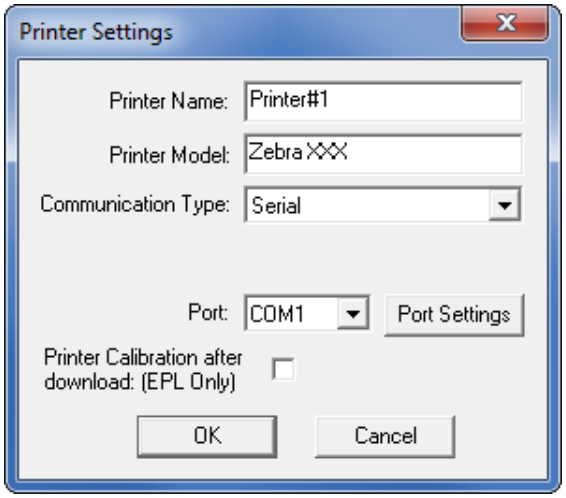


2. Add a printer name and your printer model in the appropriate fields.

Adding an RS-232 Printer

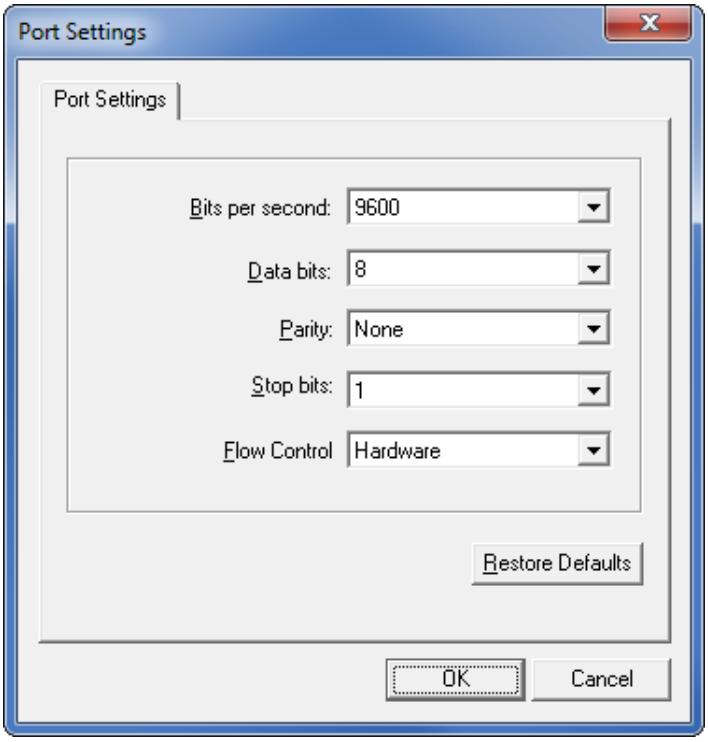
If you will not be adding a serial printer, skip to step 8 to install a parallel printer or step 11 to install a network printer.

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.

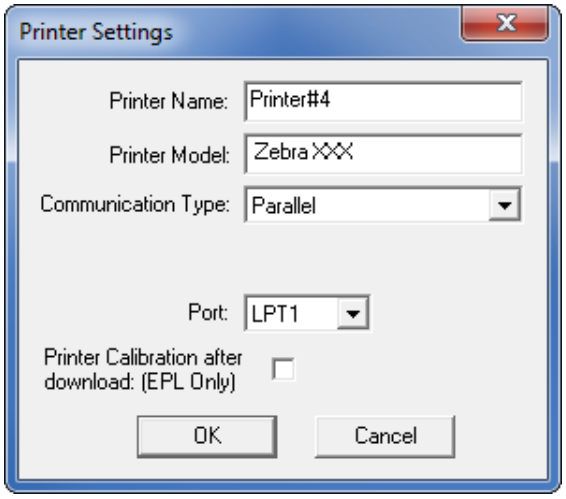
6. Click OK to save the port settings.

7. Click OK to add the printer.

Adding a Parallel Printer

If you will not be adding a parallel printer, skip to step 11 to install a network printer.

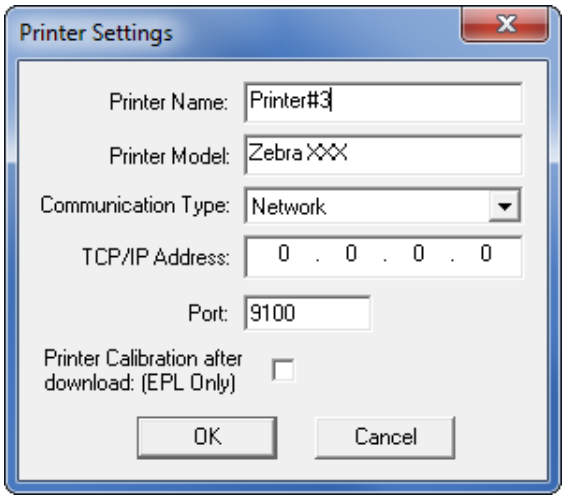
8. Select the Parallel Communication Type.
   The available parallel ports will be shown in the Port drop-down box.



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. Select the Network Communication Type.
12. Click Port Settings.
    The following window appears.



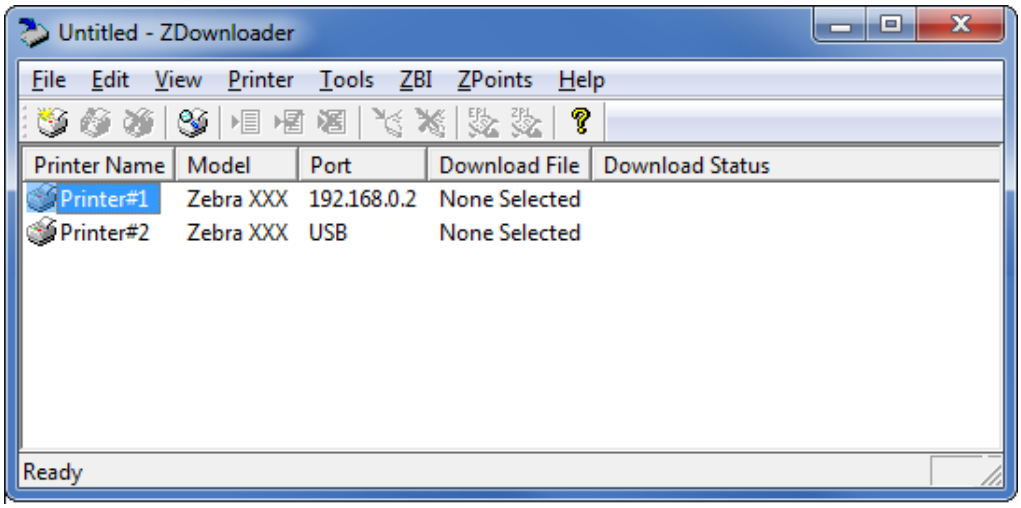
13. Enter the printer's IP address.

14. Click OK to save the network settings.
15. Click OK to add the printer.

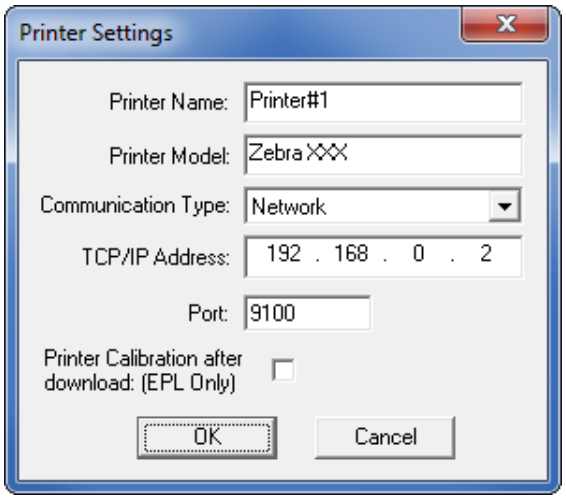
Modifying Printers in the List

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

1. Select the printer to modify.



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

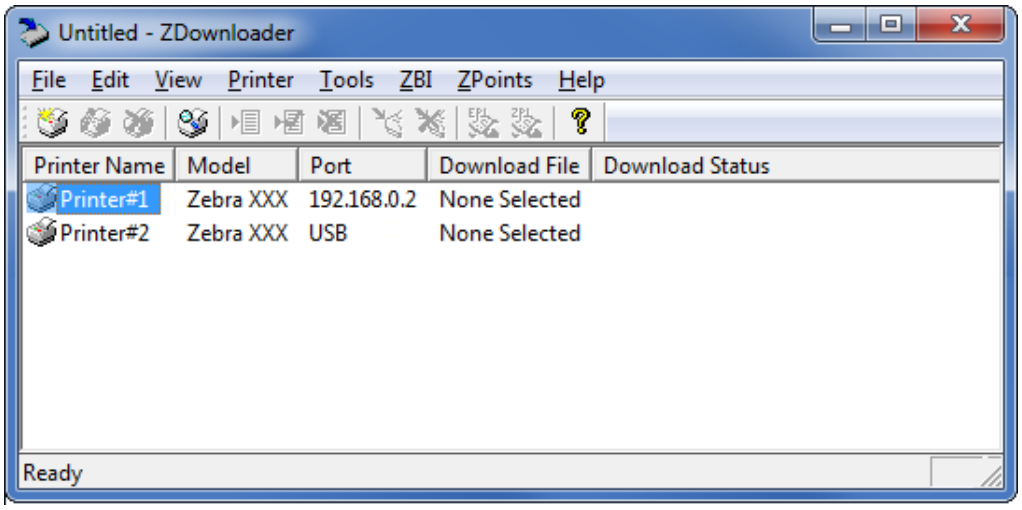


3. Modify the settings as desired.
4. Click OK to save the settings.

Deleting Printers from the List

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

1. Select one or more printers to delete.

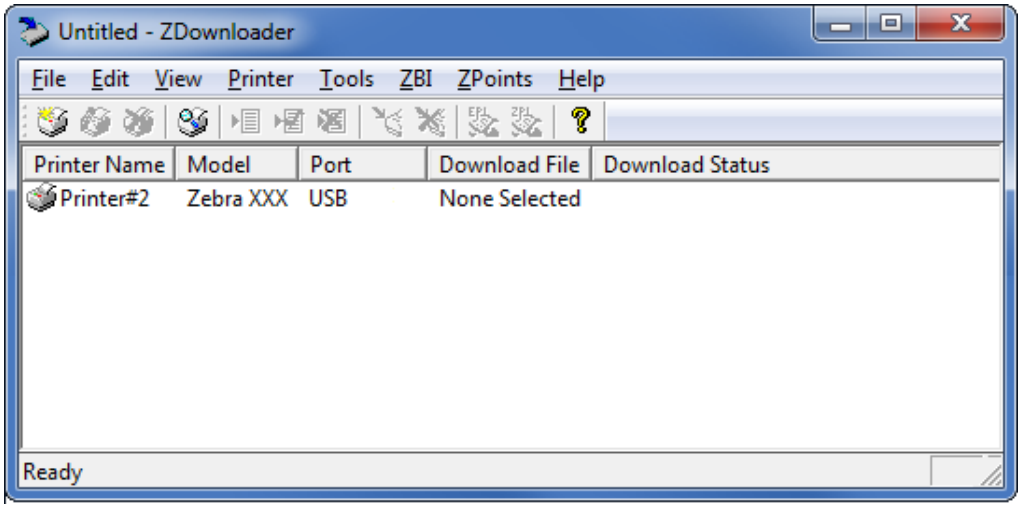


2. Click the "Delete Printer(s)" toolbar button .

   OR

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

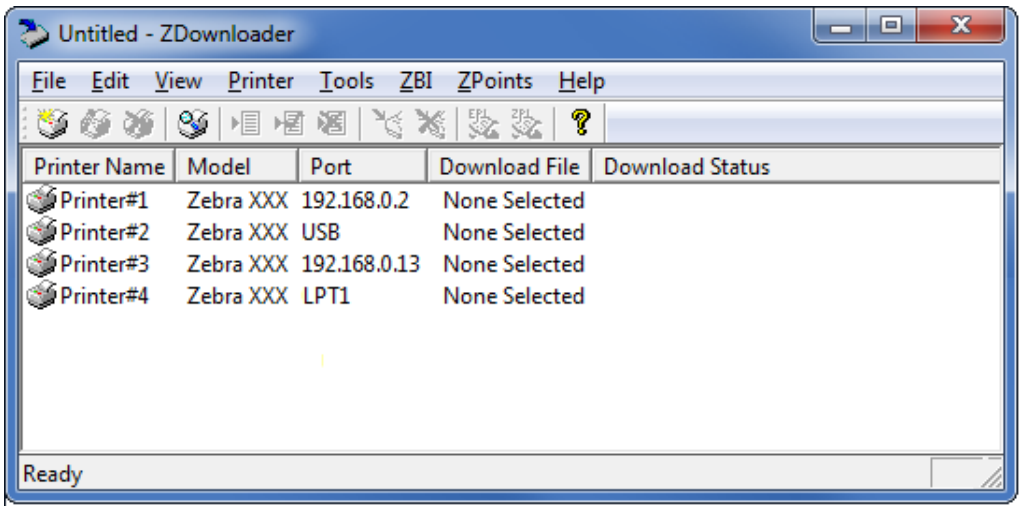
   The printer is removed from the list.



Downloading the Virtual Device App to Selected Printers

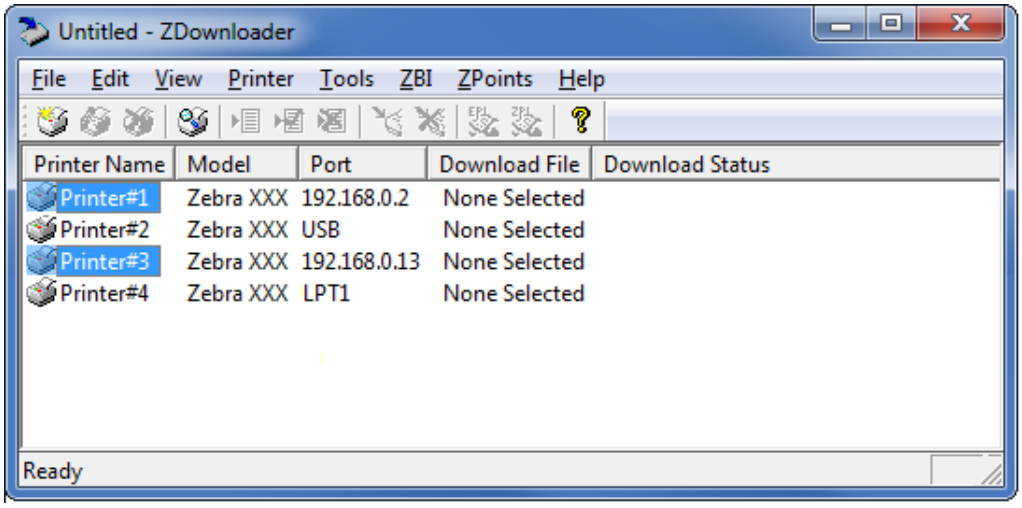
In order to download the Virtual Device-I app to your printer(s), you must select the file to send to each printer.

Figure 2 • ZDownloader Screen with Multiple Printers Added



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-I app file. To select multiple files, hold down the Ctrl or Shift key, and then click on the desired printers.



2. Click the "Select Firmware" toolbar button .

   OR

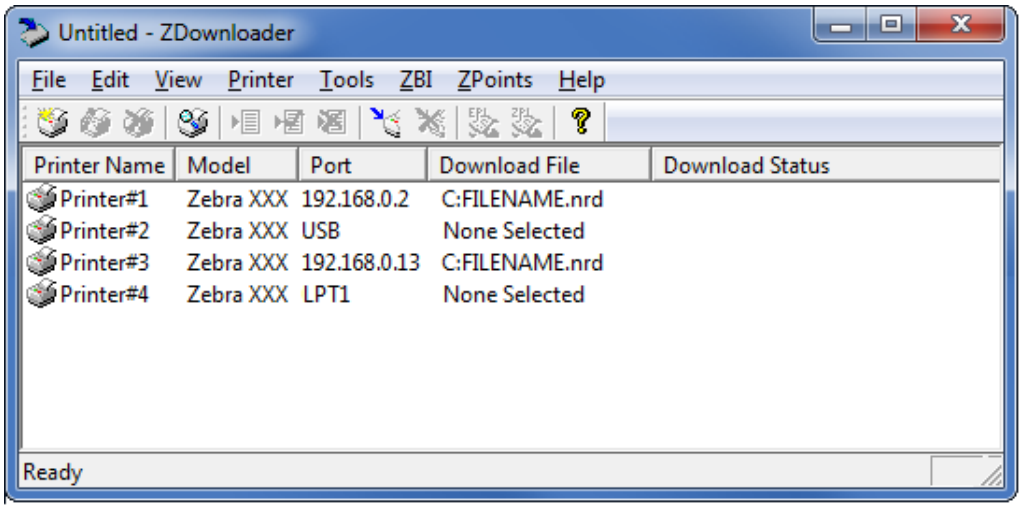
   Right-click on one of the selected printers and select "Select Firmware File."

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 do not have a file selected will be ignored when Downloading starts.



5. Click the "Download to All Printers" toolbar button .

   OR

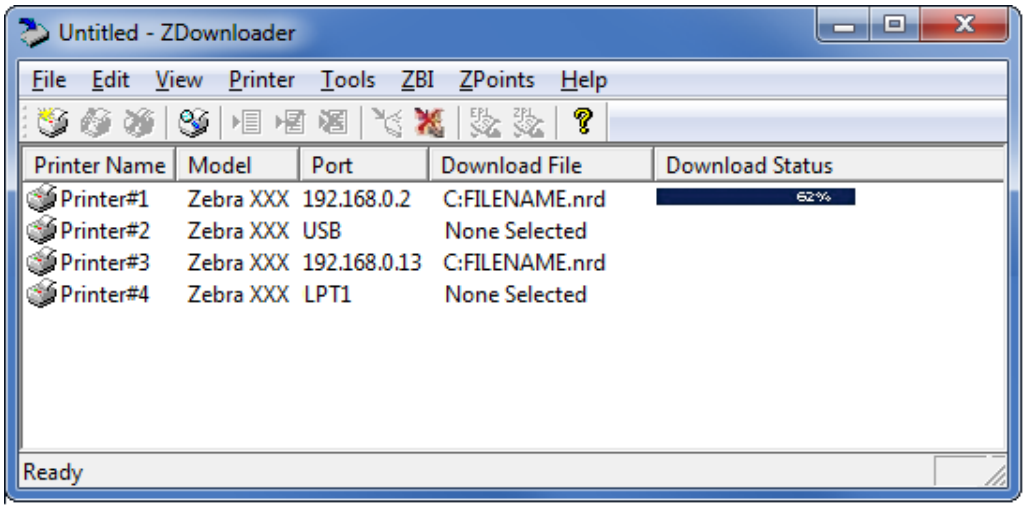
   Select the printer(s) of interest and select "Printer > Download To Selected."

6. Click the "Download All" toolbar button .

   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 the “Cancel Download” toolbar button  .

   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.”

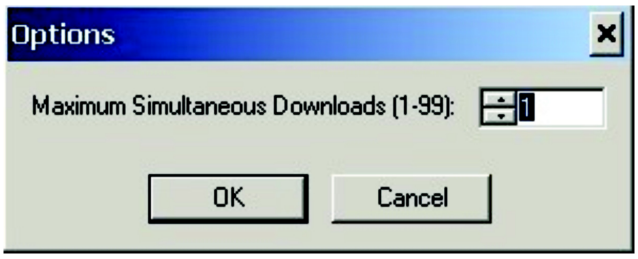
Allowing Simultaneous Downloads

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.

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.

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.

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
     `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-I by sending a Set/Get/Do (SGD) command to the printer or by selecting the option through the printer's menus.

Note • ZPL and CPCL may not function normally when a Virtual Device is enabled.

Using an SGD Command

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

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

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 117.

Using the User Menus

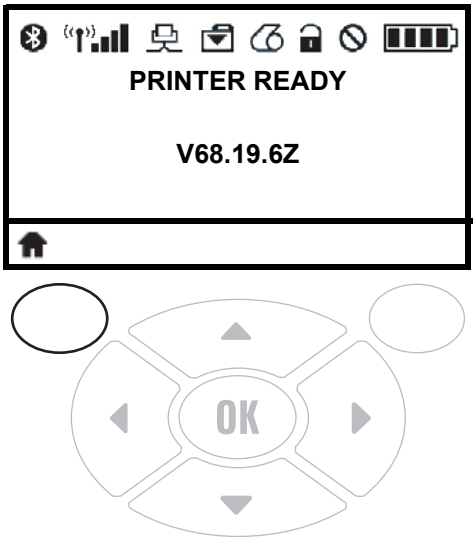
This section includes instructions for the following printers:

- *QLn420 Printers* on page 31
- *QLn320 and QLn220 Printers* on page 34
- *ZT230 Printers* on page 37

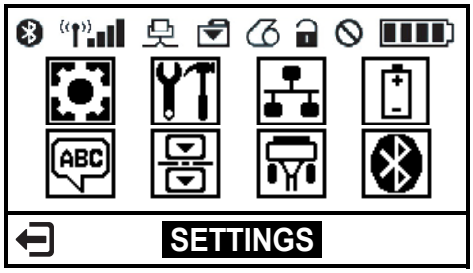
If necessary, refer to the User Guide for your printer for additional information about your printer's control panel.

QLn420 Printers

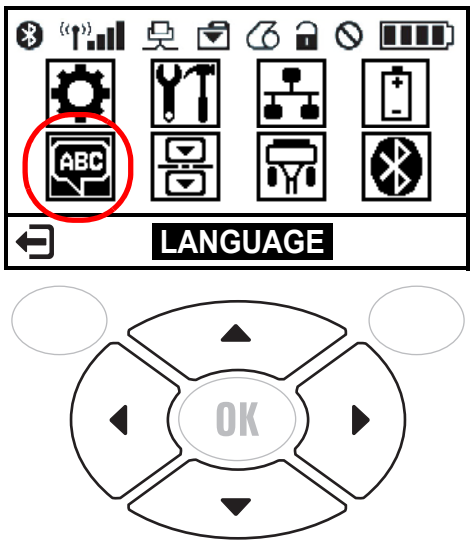
1. From the printer's idle display screen, press the LEFT SOFT KEY to select the Home icon.



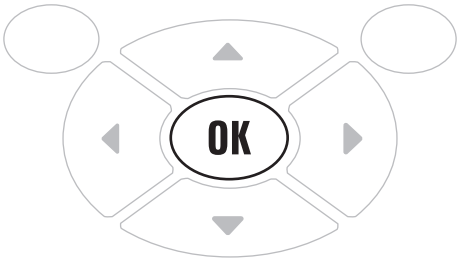
The printer displays the Home Menu.



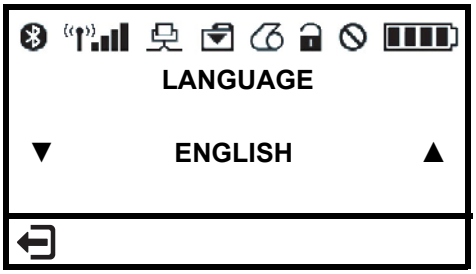
2. Use the ARROWS to navigate to the LANGUAGE menu.



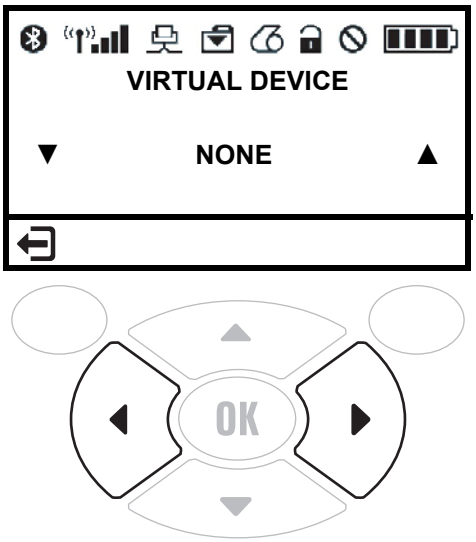
3. Press the OK button.



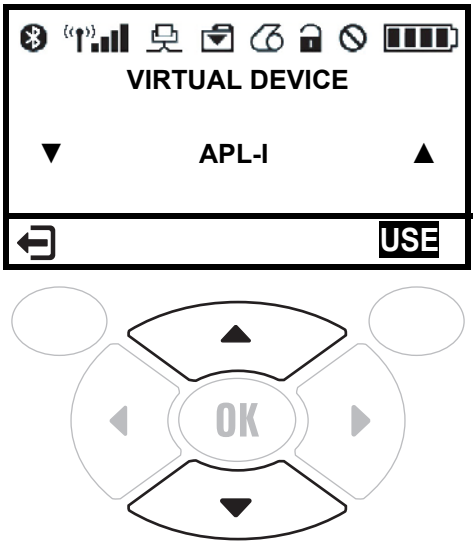
The printer displays the LANGUAGE selection screen.



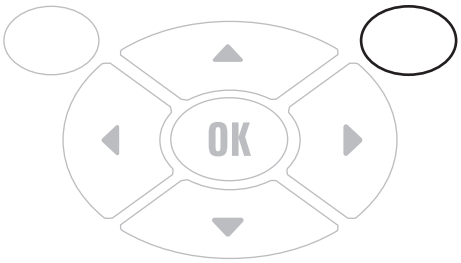
4. Use the LEFT or RIGHT ARROW to navigate to the VIRTUAL DEVICE selection screen.



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



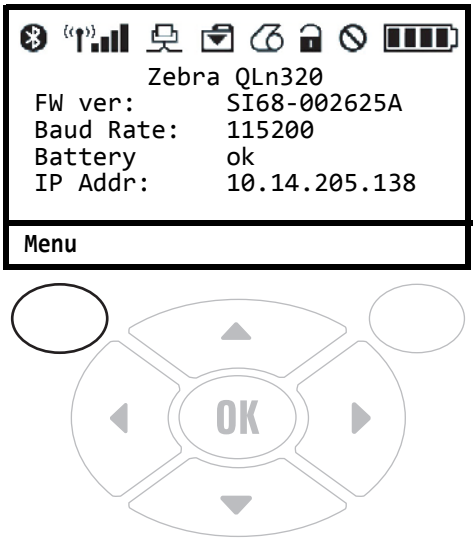
6. Press the RIGHT SOFT KEY to select USE.



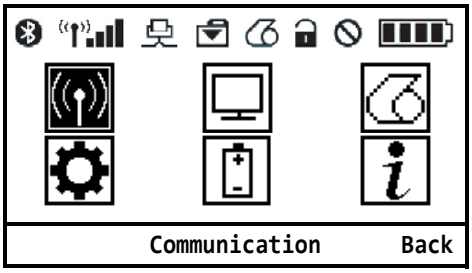
The printer restarts and uses the Virtual Device that you selected.

QLn320 and QLn220 Printers

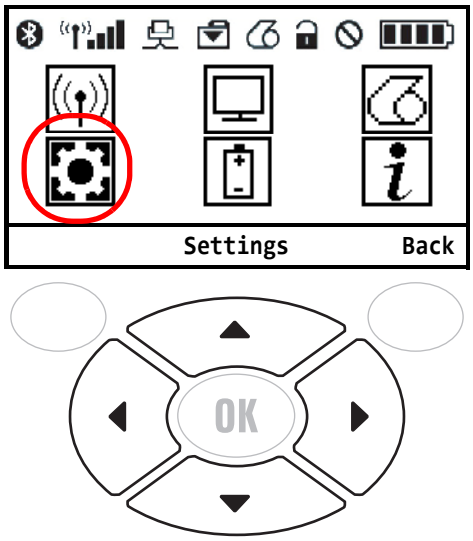
1. From the printer's idle display screen, press the LEFT SOFT KEY to select the Home icon.



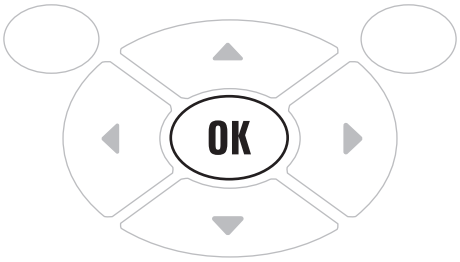
The printer displays the Home Menu.



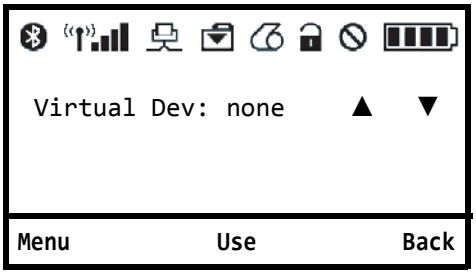
2. Use the ARROWS to navigate to the SETTINGS menu.



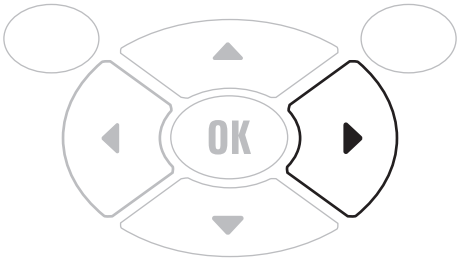
3. Press the OK button.



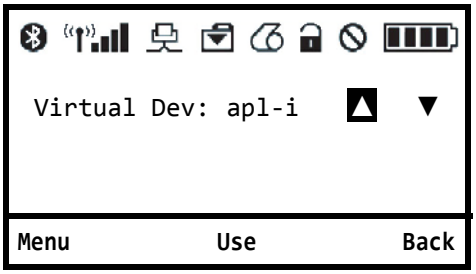
The printer displays the VIRTUAL DEVICE selection screen.

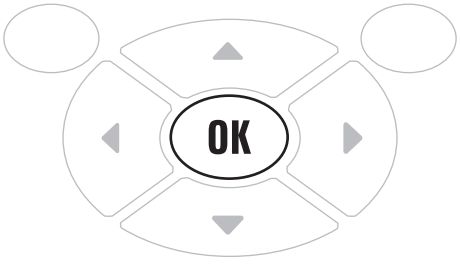


4. Press the RIGHT ARROW to highlight the up arrow on the display.

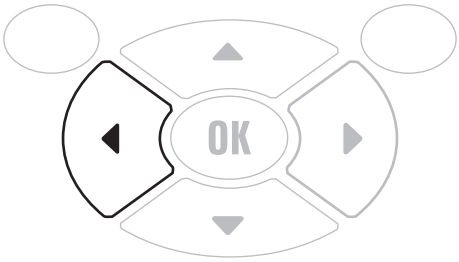


5. With the up arrow highlighted, press the OK button until you scroll to the apl-i option.

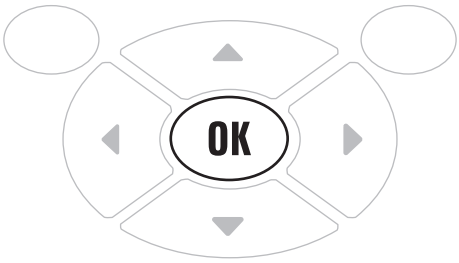




6. Press the LEFT ARROW to highlight apl-i.



7. Press OK to select USE.

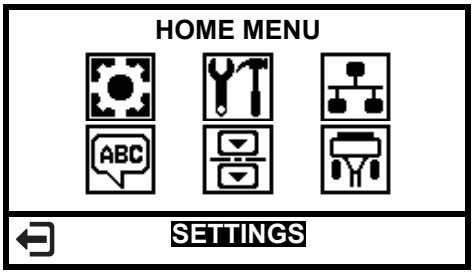


The printer restarts and uses the Virtual Device that you selected.

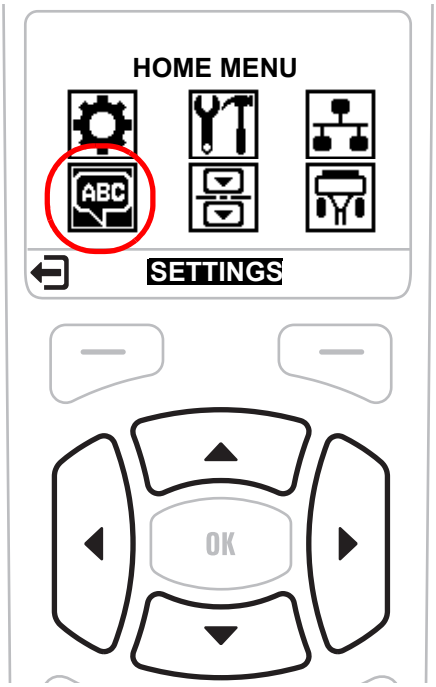
ZT230 Printers

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

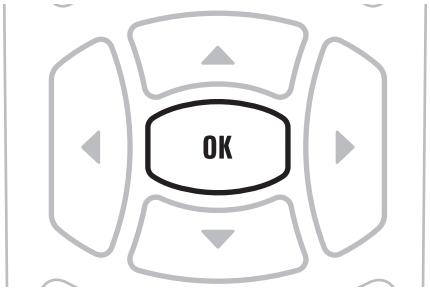
The printer displays the Home Menu.



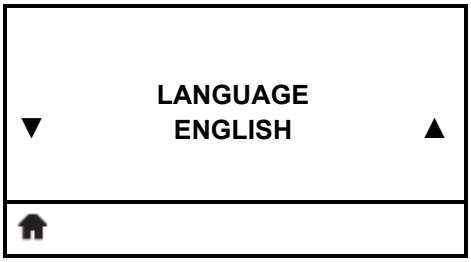
2. Use the ARROWS to navigate to the LANGUAGE menu.



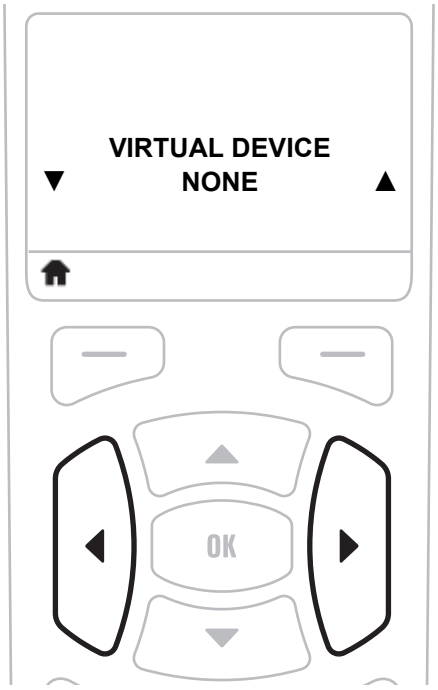
3. Press the OK button.



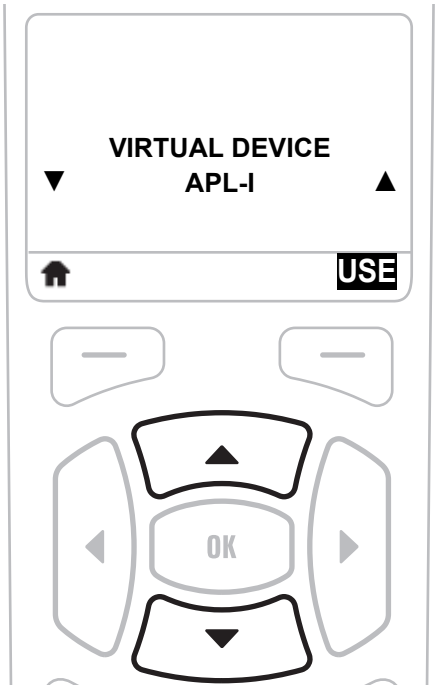
The printer displays the LANGUAGE selection screen.



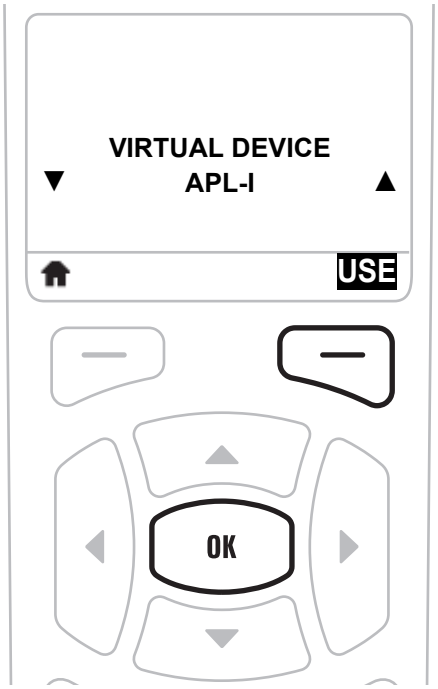
4. Use the LEFT or RIGHT ARROW to navigate to the VIRTUAL DEVICE selection screen.



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

Contents

Table of Supported Commands 42
Immediate Commands 47
Print Commands 50
Configuration Commands 64
Program Mode Commands 74
Test and Service Commands 110
Set/Get/Do (SGD) Commands 117

Table of Supported Commands

Command	Function
Immediate Commands	
<*EM*> on page 47	Abort Print Job
<*BEL*> on page 47	Error Code, Request
<*ESC*>*L* on page 47	Label and Gap Length, Transmit
<*ESC*>*Q* on page 48	Remaining Quantity and Batch Count, Transmit
<*DLE*> on page 48	Reset
<*VT*> on page 48	Status Dump
<*ENQ*> on page 49	Status Inquiry
Print Commands	
<*ESC*>*Cn* on page 50	Advanced Mode, Select
<*GS*> on page 50	Alphanumeric Field Separator
<*US*>*n* on page 50	Batch Count, Set
<*CAN*> on page 51	Clear All Data
<*DEL*> on page 51	Clear Data From Current Field
<*NUL*> on page 51	Command Terminator 1
<*LF*> on page 51	Command Terminator 2
<*ESC*>*p* on page 52	Configuration Parameters, Transmit
<*SO*> on page 52	Cut
<*SUB*> *or* <*DLE*> on page 52	Data Shift – International Characters
<*ESC*>*gm* on page 53	Direct Graphics Mode, Select
<*ESC*>*cn* on page 53	Emulation Mode, Enter
<*ESC*>*Fn* on page 54	Field, Select
<*ESC*>*Dn* on page 54	Field Decrement, Set
<*ESC*>*In* on page 54	Field Increment, Set
<*ACK*> on page 55	First Data Entry Field, Select
<*ESC*>*vn* on page 55	Font, Transmit
<*FF*> on page 55	Form Feed
<*ESC*>*En,m* on page 56	Format, Select
<*ESC*>*xn* on page 57	Format, Transmit
<*ESC*>*N* on page 57	Increment and Decrement, Disable
<*ESC*>*mn* on page 57	Memory Usage, Transmit
<*CR*> on page 58	Next Data Entry Field, Select
<*FS*> on page 58	Numeric Field Separator
<*ESC*>*O* on page 59	Options Selected, Transmit

Command	Function
<*ESC*>*Gn* on page 59	Page, Select
<*ESC*>*yn* on page 60	Page, Transmit
<*ETB*> on page 60	Print
<*ESC*>*H* on page 60	Printhead Parameters, Transmit
<*ESC*>*P* on page 61	Program Mode, Enter
<*ESC*>*Mn* on page 61	Program Number, Transmit
<*RS*>*n* on page 61	Quantity Count, Set
<*ESC*><*SP*> on page 62	Start and Stop Codes (Code 39), Print
<*ESC*>*T* on page 62	Test and Service Mode, Enter
<*ESC*>*u* on page 62	User-Defined Characters, Transmit
<*ESC*>*Z* on page 62	User-Defined Tables, Transmit
<*BS*> on page 63	Warm Boot
Configuration Commands	
<*SI*>*N* on page 64	Amount of Storage, Define
<*ESC*>*j* on page 64	Auto-Transmit 1, Enable
<*ESC*>*d* on page 64	Auto-Transmit 2, Enable
<*ESC*>*e* on page 65	Auto-Transmit 3, Enable
<*ESC*>*k* on page 65	Auto-Transmit 1, 2, and 3, Disable
<*SI*>*cn* on page 65	Cutter, Enable or Disable
<*SI*>*dn* on page 66	Dark Adjust, Set
<*SI*>*Cn* on page 66	Emulation or Advanced Mode on Power-Up
<*SI*>*Dn* on page 66	End-of-Print Skip Distance, Set
<*SI*>*in* on page 67	IBM Language Translation, Enable or Disable
<*SYN*>*n* on page 67	Intercharacter Delay, Set
<*SI*>*fn* on page 68	Label Rest Point, Adjust
<*SI*>*Rn* on page 68	Label Retract, Enable or Disable
<*SI*>*rn* on page 68	Label Retract Distance, Set
<*SI*>*Tn* on page 69	Label Stock Type, Select
<*SI*>*Wn* on page 69	Label Width, Set
<*SI*>*L* on page 69	Maximum Label Length, Set
<*SI*>*gn,m* on page 70	Media Sensitivity, Select
<*ESC*><*SYN*>*n* on page 70	Message Delay, Set
<*SI*>*I* on page 70	Number of Image Bands, Set
<*EOT*>*n* on page 71	Postamble, Set
<*SOH*>*n* on page 71	Preamble, Set
<*SI*>*Sn* on page 72	Print Speed, Set

Command	Function
<SI>ln on page 72	Printer Language, Select
<SI>hn,m on page 72	Printhead Loading Mode, Select
<SI>tn on page 73	Self-Strip, Enable or Disable
<SI>Fn on page 73	Top of Form, Set
Program Mode Commands	
cn,m1,m2,m3 on page 74	Barcode, Select Type
c0m on page 75	Code 39
c1 on page 75	Code 93
c2,m on page 76	Interleaved 2 of 5
c3,m on page 76	Code 2 of 5
c4,m on page 77	Codabar
c5,m on page 77	Code 11
c6,m1,m2 on page 78	Code 128
c7,m1,m2 on page 79	UPC/EAN
c8,m1,m2 on page 80	HIBC Code 39
c9 on page 81	Code 16K
c10 on page 81	Code 49
c11 on page 82	POSTNET
c12,m1,m2,m3 on page 83	PDF417
c14,m1 on page 86	MaxiCode
c15,m1 on page 87	JIS-ITF
c16,m1,m2 on page 88	HIBC Code 128
c17,m1,m2,m3,m4,m5,m6 on page 89	Data Matrix Symbology Versions ECC-100 and ECC-200
c18,m1,m2,m3 on page 90	QR Code
c19,m1,m2 on page 91	MicroPDF417
Bn,name on page 92	Barcode Field, Create or Edit
yn on page 92	Bitmap Cell Height for Graphic or UDF, Define
xn on page 92	Bitmap Cell Width for Graphic or UDF, Define
Tn on page 93	Bitmap User-Defined Font, Clear or Define
bn on page 93	Border Around Human-Readable Text, Define
Wn,name on page 94	Box Field, Create or Edit
Xn on page 94	Character Bitmap Origin Offset, Define
rn on page 95	Character Rotation or Barcode Ratio, Define
p,n1,n2,n3,n4 on page 95	Code 39 Prefix Character, Define
C on page 96	Command Tables, Load

Command	Function
N on page 96	Current Edit Session, Save
en,m1,m2 on page 96	Data Source for Format in a Page, Define
Dn on page 97	Field, Delete
dn,m1,m2 on page 97	Field Data, Define Source
f on page 98	Field Direction, Define
on,m on page 98	Field Origin, Define
Zn on page 99	Font Character Width, Define
cn,m on page 99	Font Type, Select
A or F on page 99	Format, Create or Edit
qn on page 100	Format Direction in a Page, Define
En on page 100	Format, Erase
On,m on page 101	Format Offset Within a Page, Define
mp on page 101	Format Position From Page, Delete
Mp,n on page 101	Format Position in a Page, Assign
cn on page 102	Graphic, Select
u on page 102	Graphic or UDC, Define
hn on page 102	Height Magnification of Bar, Box, or UDC, Define
Hn on page 103	Human-Readable Field, Create or Edit
zn on page 103	Intercharacter Space for UDF, Define
In on page 104	Interpretive Field, Edit
in on page 104	Interpretive Field, Enable or Disable
ln on page 105	Length of Line or Box Field, Define
Ln on page 105	Line Field, Create or Edit
J on page 105	Outline Font, Clear or Create
j on page 106	Outline Font, Download
Sn on page 106	Page, Create or Edit
sn on page 106	Page, Delete
gn on page 107	Pitch Size, Set
kn on page 107	Point Size, Set
v on page 107	Print Line Dot Count Limit, Set
R on page 108	Program Mode, Exit
Gn on page 108	User-Defined Character, Clear or Create
Un on page 108	User-Defined Character Field, Create or Edit
tn on page 109	User-Defined Font Character, Create
wn on page 109	Width of Line, Box, Bar, or Character, Define

Command	Function
Test and Service Commands	
A on page 110	Ambient Temperature, Transmit
; on page 110	Command Terminator
K on page 110	Dark Adjust
D on page 110	Factory Defaults, Reset
f on page 111	Formats, Print
h on page 111	Hardware Configuration Label, Print
T on page 112	Label Taken Sensor Value, Transmit
p on page 112	Pages, Print
C on page 112	Pitch Label, Print
Q on page 113	Print Quality Label, Print
p on page 114	Printhead Temperature Sensor Value, Transmit
M on page 114	Reflective Sensor Value, Transmit
s on page 114	Software Configuration Label, Print
R on page 116	Test and Service Mode, Exit
G on page 116	Transmissive Sensor Value, Transmit
g on page 116	User-Defined Characters (UDC) and Graphics, Print
t on page 116	User-Defined Fonts, Print

Immediate Commands

Immediate commands are executed when the printer receives them. The printer mode does not matter.

<EM>

Description Abort Print Job

Purpose To abort the current print job.

Syntax <EM>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The printer stops printing the current batch, but continues processing the other commands in the buffer. The batch count is reset.

<BEL>

Description Error Code, Request

Purpose To check the printer for errors and warnings.

Syntax <BEL>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The error code is either a command syntax error or a RAM usage error. A returned ASCII number represents the latest error.

Important • If no error has occurred since the last power up, the printer returns a zero. When this command is sent, the error code is always reset to 00.

<ESC>L

Description Label and Gap Length, Transmit

Purpose To send the label length and gap length to the host.

Syntax <ESC>L

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes If you are using continuous media, the printer sends the length identified by the Maximum Label Length, Set command. Label length is the length of the current label. If the current label is longer than the distance between the printhead and the sensor, then the previous label's length is used.

<ESC>Q

Description Remaining Quantity and Batch Count, Transmit

Purpose To send the remaining quantity and batch counts to the host.

Syntax <ESC>Q

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command transmits the batch and quantity counts for the active print job.

<DLE>

Description Reset

Purpose To start a printer power-up reset immediately.

Syntax <DLE>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command erases all data in the input buffer and causes the printer to cycle power.

<VT>

Description Status Dump

Purpose To upload the current status to the printer.

Syntax <VT>

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

- **Error messages not supported:** The **`printhead test fail`** and **`takeup reel full`** errors are not transmitted by this command, but all other error messages are.

<ENQ>

Description Status Inquiry

Purpose To send the current printer status to the host.

Syntax `<ENQ>`

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

- **Error messages not supported:** The **`printhead test fail`** and **`takeup reel full`** errors are not transmitted by this command, but all other error messages are.

Print Commands

<ESC>C*n*

Description Advanced Mode, Select

Purpose To switch the printer to Advanced Mode.

Syntax <ESC>C*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes When switching between Advanced Mode (default) and Emulation Mode, all entered data is lost. Page 0 is the default page, and the field pointer selects the first field in format 0.

<GS>

Description Alphanumeric Field Separator

Purpose To increase/decrease alphanumeric characters in a field separated domain.

Syntax <GS>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes It is possible to have numerous data regions in one field as long as they do not overlap. Each region separately increments or decrements depending on the value entered for the specific field. Data length remains the same when setting values of increments or decrements. Values increase or decrease in a circular motion, that is, 9 increases to 0. The command identifies the areas of character to increase or decrease without actual changes.

Important • The printer does not recognize non-alphanumeric values.

<US>n

Description Batch Count, Set

Purpose To identify the amount of labels to print in the next batch.

Syntax <US>n

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes When it is used the printer, it prints a certain amount of the same label. The amount is calculated by multiplying the number of batches by the amount in each batch.

Important If the amount is out of range, an error code 21 is generated.

<CAN>

Description Clear All Data

Purpose To clear data from previous format.

Syntax <CAN>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes After you select:

- a format—the pointer specifies the first field
- a page—the pointer specifies the first data field in the format.

<DEL>

Description Clear Data From Current Field

Purpose To clear data from present field.

Syntax <DEL>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes After clearing the data, the field pointer continues to specify the current field.

<NUL>

Description Command Terminator 1

Purpose To stop the present command.

Syntax <NUL>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

<LF>

Description Command Terminator 2

Purpose To stop the present command.

Syntax <LF>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

<ESC>p

Description Configuration Parameters, Transmit

Purpose To send the present printer configuration commands to the host.

Syntax <ESC>p

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

- **Parameters not supported:** Security level, audible alarm, power up mode, top position, printhead pressure, number of image bands, amount of storage, online power up test parameters, and printhead test are not supported by the printer. The values transmitted for them are static default values.

<SO>

Description Cut

Purpose To move the label to the cutter and cut.

Syntax <SO>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes To run the Cut command, the cutter device must be present and not yet enabled. Send this command after printing stops.

<SUB> or <DLE>

Description Data Shift – International Characters

Purpose To enter certain command characters in a data field.

Syntax <SUB> or <DLE>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command enables you to use command characters as data characters in Advanced and Emulation modes. It shifts the next character into the upper data bank. As a result, to print international characters, the eighth bit is set to 1.

<ESC>g*m*

Description Direct Graphics Mode, Select

Purpose To enable faster image printing by not saving the graphic with the Virtual Device-I format.

Syntax `<ESC>gm`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The *m* argument specifies the type of the user-defined graphic data.

Default Value: m = 0

Accepted Values:

`0` = 8 bits per byte

`1` = 8 bits per byte, nibblized

<ESC>c*n*

Description Emulation Mode, Enter

Purpose To switch the printer to Emulation mode.

Syntax `<ESC>cn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command allows you to print labels with barcodes in multiples of 10 or 15 mil that were designed on an 86XX printer.

Default Value: n = `0`

Values for n:

`0` = 10 mil dot size

`1` = 15 mil dot size for barcodes only.

Everything else is 10 mil.

<ESC>F*n*

Description Field, Select

Purpose To choose a data field for data entry.

Syntax <ESC>F*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes You **must** set the parameter for this command to the field number or the field name.

Things to be aware of:

- If you do not set the 3parameter, the printer defaults it to 0.
- If you choose the field number, the printer enters data into field *n*.
- If you enter a field name, the printer enters the data into a field with a particular name.
- You must enclose the field name in quotation marks.
- Entering an invalid field code generates error code 38.

<ESC>Dn

Description Field Decrement, Set

Purpose To set the field decrement value.

Syntax <ESC>Dn

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes In order to decrement the values in data entry fields, sections of data must be separated by <FS> or <GS>. The printer decrements by a previously specified amount.

Important If the amount is out of range, error code 22 is generated.

<ESC>I*n*

Description Field Increment, Set

Purpose To set the field increment value.

Syntax <ESC>In

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes To use this command, you must create a format in programming mode. In order to increment the values in data entry fields, sections of data must be separated by <FS> or <GS>.

<ACK>

Description First Data Entry Field, Select

Purpose To set the first data entry field to receive print mode data.

Syntax <ACK>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes If you do not want to use a number to select a data field, this command ensures that the data prints in the lowest numbered field.

<ESC>v*n*

Description Font, Transmit

Purpose To upload printer fonts.

Syntax <ESC>v*n*

Not Supported This command does not work on the Zebra printer with Virtual Device-I, or it has significant deviations from the 3400D printer.

<FF>

Description Form Feed

Purpose To feed a label.

Syntax <FF>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

- When printing on *non-continuous* media, the label is appropriately fed to the tear bar at its mark, gap, or web.
- When using *continuous* media, the printer feeds the label by the specified amount. When printing on self-strip media, the printer feeds one blank label.

<ESC>E*n*,*m*

Description Format, Select

Purpose To choose a format for either data entry or output.

Syntax <ESC>E*n*,*m*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default: *n* = 0
Values for n: *, 0 – 19
Values for m: not available

Notes Things to be aware of:

- *n* represents the numeric format ID, and *m* dictates to only re-image the changed fields.
- If any page is selected other than 0, *n* becomes an alphanumeric format position ranging from a–z.
- After a format is selected, the field pointer directs you to the lowest numbered data entry field.
- For the re-imaging command to work successfully and retain the image, the printer must be able to fully image a label within the range of available image bands.
- The printer erases all host entered/variable data from the format.

Important If an invalid format number is entered, error code 36 is generated.

<ESC>x*n*

Description Format, Transmit

Purpose To send a printer format to the host.

Syntax `<ESC>x`*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

- If `<ESC>x` is sent to the printer without specifying the value for *n*, the printer uploads the complete format directory. The format directory is in the following format:
- `[Idnumber][name][type][storage size]<CR><LF>`. `[Idnumber]` is the value identified by *n*. `[name]` is the name set out in the command that created the format. `[type]` is `0`. `[storage size]` is the amount of memory necessary to store the format.
- If you enter an incorrect number, an error code 25 is generated.
- The printer **must** stay in Advanced mode.

<ESC>N

Description Increment and Decrement, Disable

Purpose To clear the present field's increment or decrement settings.

Syntax `<ESC>N`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Both the decrement and increment flags are reset for the selected field.

<ESC>mn

Description Memory Usage, Transmit

Purpose To display the amount of printer memory being used.

Syntax `<ESC>mn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Initially, the printer sends the amount of total storage available. Then the printer sends the amount of available RAM that is not being used and the amount of total RAM, for example: 32,10.

<CR>

Description Next Data Entry Field, Select

Purpose To move the field pointer to the next data entry field.

Syntax `<CR>`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Important Things to be aware of:

- If you have not selected a page and the pointer is in the last field, it moves to the first data entry field.
- If you have selected a multi-format page, the pointer moves from the last field in the first format to the first field in the next format.

<FS>

Description Numeric Field Separator

Purpose To identify numeric data in a field to increase or decrease.

Syntax `<FS>`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes It is possible to have numerous data regions in one field as long as they do not overlap. Depending on the value entered for the specific field, each data region separately increments or decrements. The data length remains the same when setting values of increments or decrements.

Important Values increase or decrease in a circular motion. For example, `9` increases to `0`. The printer does not recognize non-alphanumeric values.

<ESC>O

Description Options Selected, Transmit

Purpose To transmit the selected options list.

Syntax `<ESC>O`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Values returned by printer:

`0` = No options selected
`1` = Cutter
`2` = Self Strip

<ESC>G*n*

Description Page, Select

Purpose To choose a page for either data entry or output.

Syntax `<ESC>Gn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes If you select a type of page, the pointer designates the first entry field in the lowest numbered format.

Important • Things to be aware of:

- All user-entered data is erased.
- If an invalid page number is entered, an error code 36 is generated.

<ESC>y*n*

Description Page, Transmit

Purpose To upload a printer page and show commands that create a format.

Syntax <ESC>y*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

- Sending <ESC>y without designating a value for *n* causes the printer to upload the complete page directory.
- The page directory is in this format:

  [Idnumber][name][type][storage size]<CR><LF>

  [Idnumber] is the value identified by *n*. [name] is the name set out in the command that created the page. [type] is 1. [storage size] 0.
- If you enter an invalid number, error code 26 is generated.
- The printer must remain in Advanced mode.

<ETB>

Description Print

Purpose To print the present page or format.

Syntax <ETB>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Prints the format with the data that was previously entered.

<ESC>H

Description Printhead Parameters, Transmit

Purpose To send the number of dots and dot size in the printhead to the host.

Syntax <ESC>H

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Example This is an example of a transmitted printhead parameter value: 895.5.0.

<ESC>P

Description Program Mode, Enter

Purpose To switch to Program mode.

Syntax <ESC>P

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Using this command erases all previously entered data.

<ESC>Mn

Description Program Number, Transmit

Purpose To send program and version number.

Syntax <ESC>Mn

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command uploads the program number and software version to the host computer. The data is represented as an ASCII alphanumeric character string.

<RS>n

Description Quantity Count, Set

Purpose To set the number of printed label batches.

Syntax <RS>n

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Data increments and decrements occur between batches of labels.

Important If the quantity is out of range, error code 21 is generated.

<ESC><SP>

Description Start and Stop Codes (Code 39), Print

Purpose To print a Code 39 barcode with no data.

Syntax <ESC><SP>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The printer erases all data in the current field.

<ESC>T

Description Test and Service Mode, Enter

Purpose To switch to Test and Service mode.

Syntax <ESC>T

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes If this command is sent, any previously sent host data is erased. The printer enters Test and Service mode after the printer completes all jobs.

<ESC>u

Description User-Defined Characters, Transmit

Purpose To send a graphic to the host.

Syntax <ESC>u

Not Supported This command does not work on the Zebra printer with Virtual Device-I, or it has significant deviations from the 3400D printer.

<ESC>Z

Description User-Defined Tables, Transmit

Purpose To send the user-defined command and protocol tables so that the printer gets to download a new command set.

Syntax <ESC>Z

Not Supported This command does not work on the Zebra printer with Virtual Device-I, or it has significant deviations from the 3400D printer.

<BS>

Description Warm Boot

Purpose To reset the printer after other commands in the buffer are executed.

Syntax <BS>

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command is executed after all previous commands are completed. Any information sent after this command is lost. When configuration commands require a printer reset, use this command.

Configuration Commands

<SI>N

Description Amount of Storage, Define

Purpose To determine the amount of RAM that is allocated for storage.

Syntax <SI>N

Partially Supported Based on testing, this is a partially supported command with the following differences and outputs:

- This command does not define the amount of memory in the printer because this is done by the hardware. However, when this command is executed, user-defined formats, fonts, and graphics are erased from memory.

<ESC>j

Description Auto-Transmit 1, Enable

Purpose To enable auto-transmit 1.

Syntax <ESC>j

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

- **Error messages not supported:** The **takeup reel full** error is not transmitted by this command, but all other error messages are.

<ESC>d

Description Auto-Transmit 2, Enable

Purpose To enable auto-transmit 2.

Syntax <ESC>d

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes With auto transmit level 2 enabled, the printer transmits the status code indicating there is room in the input buffer:

<DC1> = when using Virtual Device-I handshaking protocol

<DC2> = when using XON/XOFF handshaking protocol

Without level 2 enabled, the host must determine the status using alternate commands (<*VT*> on page 48 or <*ENQ*> on page 49).

<ESC>e

Description Auto-Transmit 3, Enable

Purpose To enable auto-transmit 3.

Syntax `<ESC>e`

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

- **Error messages not supported:** The **`imager overrun`**, **`printing complete`,** and **`buffer empty`** errors are not transmitted by this command, but all other error messages are.

<ESC>k

Description Auto-Transmit 1, 2, and 3, Disable

Purpose To disable auto-transmit 1, 2, and 3.

Syntax `<ESC>k`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command turns off the auto transmit status responses.

<SI>c*n*

Description Cutter, Enable or Disable

Purpose To enable or disable the cutter option.

Syntax `<SI>cn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes With the cutter option installed, this command turns the cutter on or off.

Default Value: n = `0`

Values for n:

`0` = Turns cutter off

`1` = Turns cutter on

<SI>d*n*

Description Dark Adjust, Set

Purpose To set printer darkness.

Syntax `<SI>dn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

Default: *n* = `0`
Values for n:
+10 is the darkest setting and –10 is the lightest setting, in increments of 1.

<SI>C*n*

Description Emulation or Advanced Mode on Power-Up

Purpose To choose Emulation or Advanced mode when printer is turned on.

Syntax `<SI>Cn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value: *n* = `1`
Values for n:
`0` = Emulation mode (10 mil)
`1` = Advanced mode (5 mil)
`2` = Emulation mode (15 mil)

Important This command takes effect after power has been cycled on the printer.

<SI>D*n*

Description End-of-Print Skip Distance, Set

Purpose To determine the end-of-print skip distance.

Syntax `<SI>Dn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command is not usable in self-strip purposes. In order to advance the media to the tear bar, you have to enter a value for *n*. This value applies to continuous media and label stock media. Without entering a value for *n*, the printer uses the default setting.

<SI>i*n*

Description IBM Language Translation, Enable or Disable

Purpose To enable and disable the IBM language translation.

Syntax `<SI>in`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command overrides the language translation on the printer. This allows IBM compatible characters to be used instead of ASCII characters derived from the printer's language.

Default Value: `n` = `0`
Values for n:
`0` = disable IBM
`1` = enable IBM

<SYN>*n*

Description Intercharacter Delay, Set

Purpose To determine the intercharacter delay for transmissions.

Syntax `<SYN>n`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command sets the delay time in milliseconds between characters in a printer transmitted message.

Default: n = `0`
Values for n: `0` – `9999`

<SI>f*n*

Description Label Rest Point, Adjust

Purpose To adjust where labels stop for removal when the printer is configured for non-continuous media.

Syntax `<SI>fn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes You can enable this control through the control panel.

Default: `n` = `0`
Values for n: `-30` (backwards) to `+30` (forward) in 5 mil increments

<SI>R*n*

Description Label Retract, Enable or Disable

Purpose To turn on or off the label retract feature when the printer is configured for continuous media.

Syntax `<SI>Rn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

Default: `n` = `1`
Values for n:
`0` = disables label retract
`1` = enables label retract

<SI>r*n*

Description Label Retract Distance, Set

Purpose To set the label retract distance.

Syntax `<SI>rn`

Not Supported This command does not work on the Zebra printer with Virtual Device-I, or it has significant deviations from the 3400D printer.

<SI>T*n*

Description Label Stock Type, Select

Purpose To set the media type.

Syntax <SI>T*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The *n* argument specifies the media type.

Default: *n* = 1
Values for n:

n = continuous media
1 = non-continuous media with web or gaps separating labels
2 = non-continuous media with marks separating labels

<SI>W*n*

Description Label Width, Set

Purpose To determine the label width.

Syntax <SI>W*n*

Not Supported This command does not work on the Zebra printer with Virtual Device-I, or it has significant deviations from the 3400D printer.

<SI>L

Description Maximum Label Length, Set

Purpose To identify the maximum label length.

Syntax <SI>L

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command is primarily used for detecting media errors.

<SI>g*n*,*m*

Description Media Sensitivity, Select

Purpose To choose the printers media sensitivity.

Syntax <SI>g*n*,*m*

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

- The first argument sets the media type; when *n* = 0, direct thermal media is selected, and when *n* = 1 thermal transfer media is selected.
- The second argument of this command is not used.

<ESC><SYN>*n*

Description Message Delay, Set

Purpose To determine the delay between transmissions.

Syntax <ESC><SYN>*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command determines the delay in milliseconds before all printer transmissions begin.

Default: n = 0
Values for n: 0 – 9999

<SI>I

Description Number of Image Bands, Set

Purpose To determine the number of image bands.

Syntax <SI>I

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

- the number of image bands does not need to be set with this command since this quantity is automatically calculated while printing a label.

<EOT>*n*

Description Postamble, Set

Purpose To determine the character that is sent before every transmission.

Syntax <EOT>*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Assigns the Postamble character.

Default: n = <NUL>
Values for n: Any ASCII character

With *n* equal to default value, a postamble character is not sent by the printer.

<SOH>*n*

Description Preamble, Set

Purpose To determine the character that is sent before every transmission.

Syntax <SOH>*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Assigns the Postamble character.

Default: n = <NUL>
Values for n: Any ASCII character

With *n* equal to default value, a preamble character is not sent by the printer.

<SI>S*n*

Description Print Speed, Set

Purpose To determine the print speed.

Syntax <SI>S*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Defines the print speed.

Default: n = 30
Values for n: 20, 30, 40, 50, or 60
20 = 2 inches per second (ips), 30 = 3 ips, et cetera.

<SI>l*n*

Description Printer Language, Select

Purpose To determine the printer language.

Syntax <SI>l*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default: n = 0
Values for n: 0 to 10

Notes Only one language can be used for a print job. If it is necessary to use more than one language, you can either bitmap the TrueType fonts or create your own bitmap font. The default language selection should supply you with the necessary characters for a bitmap. However, if you are using a TrueType font, it is imperative that you match code to the language. If you downloaded a scalable font, you must first download the correct code.

<SI>h*n*,*m*

Description Printhead Loading Mode, Select

Purpose To determine the printhead loading mode.

Syntax <SI>h*n*,*m*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Printing batches of labels in inverse mode is not recommended due to wear on the printhead.

<SI>t*n*

Description Self-Strip, Enable or Disable

Purpose To enable or disable the self-strip feature.

Syntax `<SI>tn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Activates or deactivates the peel sensor.

Default: `n` = 0
Values for n:
`0` = Peel Sensor Off
`1` = Peel Sensor On

<SI>F*n*

Description Top of Form, Set

Purpose To set the form top position.

Syntax `<SI>Fn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Sets the label top position in 5 mil increments from the position to the lead edge of the label.

Default: `n` = `20`
Values for n: `-10` to `4000`

Negative values allow you to minimize the distance between the print and edge of the label.

Program Mode Commands

cn,m1,m2,m3

Description Barcode, Select Type

Purpose To choose the barcode field type.

Syntax *cn,m1,m2,m3*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command defines the Symbology of the barcode.
Values for n:

0 = Code 39
2 = Interleaved 2 of 5
3 = Code 2 of 5
4 = Codabar
5 = Code 11
8 = HIBC Code 39
10 = Code 49
15 = JIS-ITF
16 = HIBC Code 128
17 = Data Matrix

If you use the Null character in the Barcode data stream, you will lose that character as well as any following data. If using any of the following control characters (<RS>, <GT>, <EOT>, et cetera), you have to precede it with a <SUB> character.

c0*m*

Description Code 39

Purpose To specify a Code 39 barcode field.

Syntax `c0m`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command has one argument, *m* for mode, which defaults to `0`.

These are the types of Code 39 that are supported:

- Full ASCII
- 43 Character
- 8646 compatible

8646 Compatible is the same as full ASCII with the exception of four characters (the "`+`", "`/`", "`%`", "`$`" are used as single characters rather than used as "`/K`", "`/O`", "`/E`", "`/D`"). This version makes it backward compatible with the 86XX printers.

These are the supported Code 39 barcode modes:

m = Code 39 Mode
- `0` = No check digit, 8646 compatible barcode type.
- `1` = Printer provides check digit, 8646 compatible type.
- `2` = User provides check digit, which is verified by printer 8646 compatible type.
- `3` = No check digit, full ASCII type.
- `4` = Printer provides check digit, full ASCII type.
- `5` = User provides check digit, which is verified by printer, full ASCII type.
- `6` = No check digit, 43 character type.
- `7` = Printer provides check digit, 43 character type.
- `8` = User provides check digit, which is verified by printer, 43 character type.

c1

Description Code 93

Purpose To specify a Code 93 barcode field.

Syntax `c1`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

- There are no arguments for the Code 93 barcode.
- If a string has an odd number of characters, the printer automatically adds a zero.

c2,*m*

Description Interleaved 2 of 5

Purpose To specify an Interleaved 2 of 5 barcode field.

Syntax `c2,m`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

- The `c2` command has one argument, *m* for mode, which defaults to `0`.
- The Interleaved 2 of 5 barcode supports these modes:
  m = Interleaved 2 of 5 Mode
  `0` = No check digit.
  `1` = Printer provides check digit.
  `2` = User provides check digit.
- Zeros are added to any odd length strings.

c3,*m*

Description Code 2 of 5

Purpose To specify a Code 2 of 5 barcode field.

Syntax `c3,m`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

- The `c3` command has one argument, *m* for mode, which defaults to `0`.
- The Code 2 of 5 barcode supports these modes:
  m = Interleaved 2 of 5 Mode
  `0` = Start/stop code size is 3 bars.
  `1` = Start/stop code size is 2 bars.

c4,*m*

Description Codabar

Purpose To specify a Codabar barcode field.

Syntax `c4,m`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

- The `c4` command has one argument, *m* for mode, which defaults to 0.

Default: m - 0

Values for m: `m` = 0

- The Codabar barcode supports these modes:
  `m` = Codabar Mode
  `0` = User provides start/stop codes, which are verified by printer.
  `1,x,y` = Printer provides start code `x` and stop code `y`, where `x` and `y` are values with ranges of `A` to `D` and `a` to `d`.
- You can send the start/stop characters as part of the human readable field of the barcode or as a separate text field (print data). Characters sent down as printer data override start/stop characters defined by the barcode field.

c5,*m*

Description Code 11

Purpose To specify a Code 11 barcode field.

Syntax `c5,m`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

- The `c5` command has one argument, m for mode, which defaults to 0.

Default: `m` = 0

Values for m:

- The Code 11 barcode supports these modes:
  `m` = Code 11 Mode
  `0` = Printer provides two check digits.
  `1` = Printer provides one check digit.
  `2` = User provides two check digits, which are verified by the printer.
  `3` = User provides one check digit, which is verified by the printer.

c6,*m1*,*m2*

Description Code 128

Purpose To specify a Code 128 barcode field.

Syntax `c6,m1,m2`

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

- The `c6` command has one argument, m for mode, which defaults to `0`.
- When more than 19 characters are specified as data, the first 19 are used as data
- When fewer than 19 are specified, data is zero-filled up to 19 characters. The first two characters are not forced to be zeros.

The Code 128 barcode supports these modes:

m = Code 128 Mode

`0` = Printer provides two check digits.

`1` = Printer provides one check digit.

`2` = User provides two check digits, which are verified by the printer.

`3` = User provides one check digit, which is verified by the printer.

c7,*m1*,*m2*

Description UPC/EAN

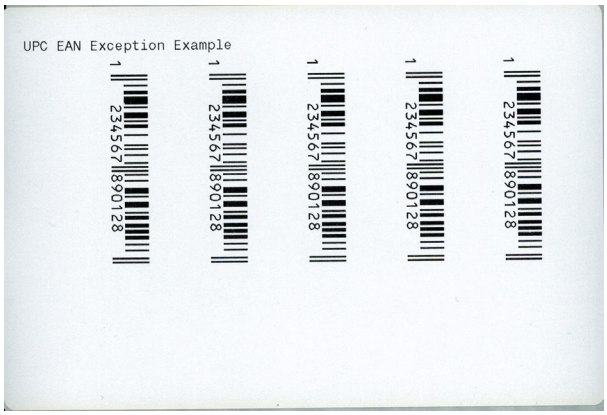
Purpose To specify a UPC/EAN barcode field.

Syntax *c7,m1,m2*

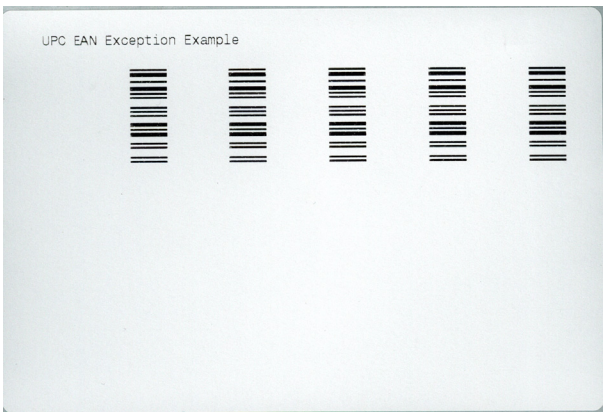
Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

These label examples show the difference between labels when entered data is too long:

Virtual Device-I Printer Label



Intermec 3400D Printer Label



Barcodes not implemented: version D1-D5. When data entered is too long, an EAN-13 barcode is printed.

c8,*m1*,*m2*

Description HIBC Code 39

Purpose To specify an HIBC Code 39 barcode field.

Syntax `c8,m1,m2`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The `c8` command has two arguments, *`m1`* and *`m2`*, and *`m1`* defaults to `0`.

Default: *`m1`* = 0

Values for m1 Supplier Std.:

`0` = Primary format

`1` = Backup Primary format

`2,m2` = Second Data format. The linking character comes from the field identifier (*`m2`* value)

Values for m1 Provider Std.:

`3` = Single format

`4` = 1st data format

`5,m2` = Second Data Format

The linking character comes from the field identifier (*`m2`* value).

The HIBC Code 39 barcode supports these modes:

m1	HIBC Code 39 Mode
0	Primary format.
1	Alternate Primary format.
2,*m2*	Secondary format with *`m2`* as the linkage character and field identifier.
3	Single format.
4	First data format.
5,*m2*	Second data format with *`m2`* as the linkage character and field identifier.
6	Multiple data format.

c9

Description Code 16K

Purpose To specify a Code 16K barcode field.

Syntax `c9`

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

- The Zebra printer with Virtual Device-I firmware does not support linked barcodes, or using a set of barcodes to print a single data string too large for one barcode.

c10

Description Code 49

Purpose To specify a Code 49 barcode field.

Syntax `c10`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Things to be aware of:

- The c10 command has no arguments.
- Use a `<SUB>` 1 command to symbolize the function 1 character in Emulation mode. If using Advanced mode, you can symbolize the function 1 character by using the `<SUB><SUB>` 1. The same holds true for function characters 2, 3, and 4.
- To call up a square symbol in Advanced mode, use a height magnification of 1. While in Emulation mode, use a magnification of 250.

Important Only Alphanumeric (`0`) and numeric (`2`) modes are supported by the printer.

c11

Description POSTNET

Purpose To specify a POSTNET barcode field.

Syntax `c11`

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

These label examples show that the interpretive field commands have no effect on the barcode positioning, spacing, and sizing:

Virtual Device-I Printer Label

Intermec 3400D Printer Label

Notes The `c11` command has no arguments.

Even if specified, an interpretive field is disabled by the command and does not print.

Origin difference y-direction.

c12,*m1*,*m2*,*m3*

Description PDF417

Purpose To specify a PDF417 barcode field.

Syntax `c12,m1,m2,m3`

`m1`, `m2`, and `m3` are the three arguments of the `c12` command.

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

These label examples show a slight difference in dot pattern, barcodes with non-standard characters print slightly smaller, and difference in magnification ranges.

Virtual Device-I Printer Label

Intermec 3400D Printer Label

Using ,m1 to Select the Number of Columns

Purpose To set the number of columns in the PDF417 barcode.

Syntax This parameter, which defaults to `0`, is the number of columns of data characters; the range of values is `0` to `30`.

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes `,m1` represents the number of columns needed to create a symbol. The range is 0 (default) to 30. If you select 0, the printer automatically uses the number of columns necessary for the symbol that is closest to the shape of a square.

Using ,m2 to Select an Error Correction Level

Purpose To set an error correction level for a PDF417 barcode.

Syntax This parameter, which defaults to `9`, is the error correction level; the range of values is `0` to `9`.

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The error correction level should be set according to the number of code words (compressed data) generated from the PDF417 barcode's data. The table below shows a list of the values of m2, the corresponding suggested number of code words, and the error detection characters that will be generated at that setting.

m2	Number of Code words	Error Detection Characters Generated
0	<not recommended>	2 (no error recovery)
1	<not recommended>	4
2	1-40	8
3	41-160	16
4	161-320	32
5	321-863	64
6	<reserved for special applications>	128
7	<reserved for special applications>	256
8	<reserved for special applications>	512
9	<printer automatically determines error correction level> varies	

Using ,m3 to Set the Truncate Flag

Purpose This is an argument for the c12 command that customizes the PDF417 barcode.

Syntax This parameter, which defaults to `0`, is the truncate flag. When set, the barcode will print without right row indicators and with a one-module wide stop character.

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes It enables you to enable printing the symbol in truncated form or to disable printing in truncated form.

Default: `m3` = `0`
Values for ,m3,
`0` = disables truncating
`1` = enables truncating

It is highly recommended that you use the default setting for `,m3` in order to reduce errors and maintain a better reading performance.

This shows the maximum allowable characters for the 3 character sets.

Character Set	Data Capacity
Full ASCII	1108
Alphanumeric	1850
Numeric	2725

Important Use these guidelines. Due to the fact that 2-dimensional symbols encode data by compressing it, the capacity varies due to the data being encoded.

c14,*m1*

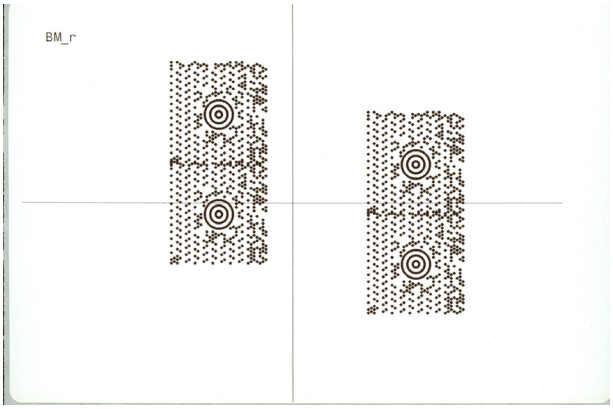
Description MaxiCode

Purpose To specify a Code MaxiCode barcode field.

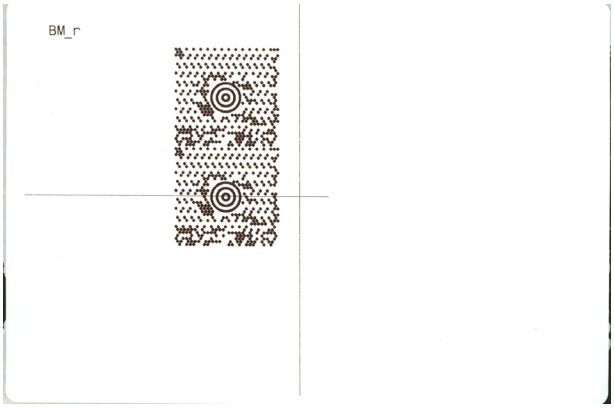
Syntax `c14,m1`

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

Virtual Device-I Printer Label



Intermec 3400D Printer Label



Notes The `c14` command has one argument, *m* for mode, which auto defaults between modes 2 through 4.

See the labels examples to see the differences between printers.

- Interpretive field fonts could be different.
- Barcodes might print. They do not print on 3400D printers.

The MaxiCode barcode supports these modes:

m	MaxiCode Mode
2	Structured Carrier Message format to be used with postal codes up to 9 digits long.
3	Structured Carrier Message format to be used with alphanumeric postal codes up to 6 digits or characters long.
4	Standard barcode.
5	Full EEC or enhanced error correction.
6	Reader programming mode.

c15,*m1*

Description JIS-ITF

Purpose To specify a JIS-ITF barcode field.

Syntax c15,*m*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The c15 command has one argument, m for mode, which defaults to 0.

Default Value: m = 0
Values for n,m

0 = 5 dot narrow magnification
1 = 8 dot narrow magnification
2 = 10 dot narrow magnification

The next command specifies the data source and how many characters are in the current field.

Default Value: 0,14
Values for n:

D0,*m*	This field acquires data from a host. The value for ,m is the data length: 6 (Condensed), 14 (Standard), or 16 (Extended).
D2,*m*	This field is a slave field and acquires its data from the ,*m* field.
D3,*m*	The printer specifies the data during program mode (fixed). The ,*m* value dictates the JIS-ITF type. If the length of the data is not exactly 6, 14, or 16, it will round up to the next highest value (JIS-ITF type) and pad with zeros.

Important The JIS-ITF barcode always includes an interpretive field located underneath the barcode field. This symbology cannot achieve a true 2.5 to 1 ratio due to the printhead dot size limitations. The actual ratio is 2.4 to 1.

c16,*m1*,*m2*

Description HIBC Code 128

Purpose To specify an HIBC Code 128 barcode field.

Syntax `c16,m1,m2`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The `c16` command has two arguments, *m1* and *m2*, and *m1* defaults to `0`.

The HIBC Code 128 barcode supports these modes:

m1	**HIBC Code 128 Mode**
`0`	Primary format.
`1`	Alternate Primary format.
`2,m2`	Secondary format with *m2* as the linkage character and field identifier.
`3`	Single format.
`4`	First data format.
`5,m2`	Second data format with *m2* as the linkage character and field identifier.
`6`	Multiple data format.

c17,*m1*,*m2*,*m3*,*m4*,*m5*,*m6*

Description Data Matrix Symbology Versions ECC-100 and ECC-200

Purpose To specify a Data Matrix Symbology Versions ECC-100 and ECC-200 barcode field.

Syntax `c17,m1,m2,m3,m4,m5,m6`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command selects the Data Matrix symbology. Data Matrix is a 2d symbology consisting of square modules arranged within a finder pattern. The two versions of Data Matrix that are supported are ECC-100 and ECC-200.

The names, purposes, and default values of these parameters are listed below:

Argument	Purpose	Default Value
m1	Enhanced error correction 200	200
m2	Square mode	0
m3	Position of current symbol in group	0
m4	Total number of symbols in group	*m3* parameter
m5	File ID number	1
m6	File ID number	1

c18,*m1*,*m2*,*m3*

Description QR Code

Purpose To specify a QR Code barcode field.

Syntax `c18,m1,m2,m3`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The `c18` command has three arguments.

You can only produce QR symbols up to 3550 characters.

The names, purposes, and default values of these parameters are listed here:

Argument	Purpose	Default/Possible Values
m1	Enhanced error correction 200	2/1,2 for Model 1,2 resp.
m2	Square mode	M/L,M,Q,H for 7,15,25,30% error correction, resp.
m3	Mask number	8/0-7 for mask type, 8 for auto-selection of mask

c19,*m1*,*m2*

Description MicroPDF417

Purpose To specify a MicroPDF417 barcode field.

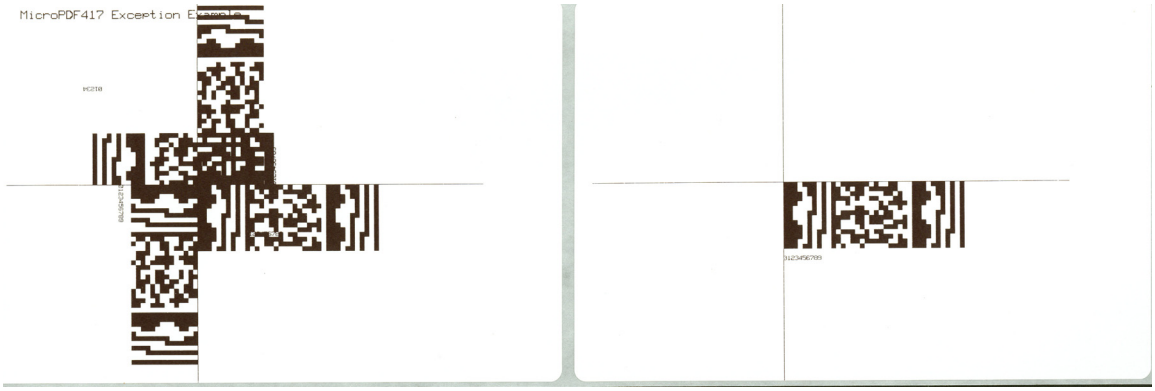
Syntax `c19,m1,m2`

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

These label examples show the barcode position might differ when the barcode is rotated 180 degrees:

Virtual Device-I Printer Label

Intermec 3400D Printer Label



The c19 command has 2 arguments.

When rotated 180 degrees, barcode position could differ.

The names, purposes, and default values of these parameters are listed below:

Argument	Description	Default Value
m1	Number of columns of data in barcode; possible values of `0`–`4`, where `0` lets the printer set the best-fitting value.	`0`
m2	Number of rows of data in barcode; possible values depend on the value of m1, and 0 lets the printer set the best-fitting value.	`0`

B*n*,*name*

Description Barcode Field, Create or Edit

Purpose To edit or create a barcode field.

Syntax *Bn,name*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes By creating a barcode field and enabling the interpretive parameter, you consequentially create an interpretive field.

Important If the field number is out of range, an error code 38 is generated.

y*n*

Description Bitmap Cell Height for Graphic or UDF, Define

Purpose To determine the height of a graphic or user-defined font.

Syntax *yn*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Sets the graphic or user-defined font height.

Default:

n = 1 Bitmap Fonts
n = 10 Outline fonts
n = 50 graphics

Values for n: 1 to 799

Note • Things to be aware of:

- *n* represents the number of rows for the graphic or font bitmap.
- If an invalid height is entered, an error code of 52 is generated.

x*n*

Description Bitmap Cell Width for Graphic or UDF, Define

Purpose To determine the max width of a graphic or user-defined font.

Syntax *xn*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

T*n*

Description Bitmap User-Defined Font, Clear or Define

Purpose To clear or create a user-defined bitmap font set.

Syntax T*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes You can recreate an existing font, but in order to edit the characters you must transmit the complete font. Defining a font previously sent erases all previous characters in the font.

b*n*

Description Border Around Human-Readable Text, Define

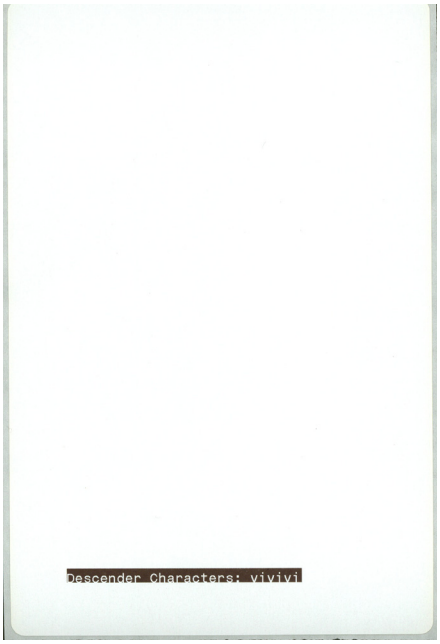
Purpose To add a border around a human-readable field.

Syntax b*n*

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

These label examples show that when used with smooth fonts, the border does not enclose character descenders.

Virtual Device-I Printer Label



Intermec 3400D Printer Label

Wn,*name*

Description Box Field, Create or Edit

Purpose To edit or create a box field.

Syntax `Wn,name`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command is used to design a box field.

Default: `n` = `0`
Values for n: `0` – `199`; `name` is optional

Names can be up to 8 characters but cannot start with a number.

Box field command parameters are as follows:

Field Origin	0
Default	0,0
Field Direction	f Default = 0 degrees
Box Length	l Default = 100
Box Height	h Default = 100
Box Width	w Default = 1

X*n*

Description Character Bitmap Origin Offset, Define

Purpose To determine the offset, to the right, of all characters in a font.

Syntax `Xn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes This command specifies the offset (to the right) of all characters in a font. The value for `n` = the number of columns to the right that the character origins shift.

Default: `n` = `0`
Values for n: `0` – `800`

Important You can use this command only with bitmapped fonts.

r*n*

Description Character Rotation or Barcode Ratio, Define

Purpose To determine the character rotation for human-readable fields, or the barcode ratio for a barcode field.

Syntax `rn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Character Rotation Default

`n` = 0
`1` = horizontal
`2` = 90º counterclockwise

Bar Code Ratio Default: `n` = 1

Barcode fields, ratio of wide to narrow bar
Accepted values for n:

`0` = 2.5 to 1
`1` = 3.0 to 1
`2` = 2.0 to 1
`3` = 3.0 to 1
`n` = 3 is used for Code 39 and creates a ratio of 7 dots to 3 dots.

p,*n1*,*n2*,*n3*,*n4*

Description Code 39 Prefix Character, Define

Purpose To determine the prefix for a Code 39 field.

Syntax `p,n1,n2,n3,n4`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default is for No prefix
Accepted values for n: `A` - `Z` (case sensitive) and `0` – `9`

After selecting the prefix, enter Code 39.

Example `c0,3;pABC4;` not `pABC4;c0,3;`. Use the `@` character for `n1` to clear all prefixes. Prefix characters are not represented in the interpretive field.

C

Description Command Tables, Load

Purpose To download a command table.

Syntax C

Not Supported This command does not work on the Zebra printer with Virtual Device-I, or it has significant deviations from the 3400D printer.

New commands take effect when the printer is turned off and then on, or when the printer is reset. If you wish to only change a few commands use the <ESC>Z command, acquire the output, alter it, and then send it back to the printer. When you wish to change the contents of a table you must send the complete table to the printer in ASCII characters in hexadecimal form. Values that are not changed remain the same.

N

Description Current Edit Session, Save

Purpose To save the current page, format, UDC, or UDF being edited.

Syntax N

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The current page, format, or UDC is automatically saved when you call a new one or when you exit Program mode.

e*n*,*m1*,*m2*

Description Data Source for Format in a Page, Define

Purpose To define a data source for a format assigned to a page position.

Syntax e*n*,*m1*,*m2*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value:

n = 0

m = a

m2 = 0

Accepted values for n:

0 = formats receive their data while in Print mode

1 = format is slave to another format on this page.

D*n*

Description Field, Delete

Purpose To delete field *n* from the format.

Syntax Dn

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value: n = 0
Accepted values for n: 0 – 199

Notes It is not allowable to delete the last field within a format. If the current field is deleted, the field pointer will point to the next field. If the master field is deleted, all slave fields of the master are deleted.

d*n,m1,m2*

Description Field Data, Define Source

Purpose To determine a data source for the current field and how many characters are in the field.

Syntax dn,m1,m2

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default values bar code fields: 0,20,0

Default values human-readable fields: 0,30,0
Accepted values for n:

0 = Data entered while in Print mode
1 = Data entered while in Print mode
2 = Data from field, m1
3 = Fixed data

Accepted values for m1 (d0 or d1): 0 - 3550

f

Description Field Direction, Define

Purpose To determine the field rotation.

Syntax `fn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value: `n` = `0`

Accepted values for n:

`0` = Horizontal (all are rotated counterclockwise from horizontal)

`1` = 90°

`2` = 180°

`3` = 270°

o*n*,*m*

Description Field Origin, Define

Purpose To determine the origin of a field.

Syntax `on,m`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value:

`n` = `0`

`m` = `0`

Accepted values for n and m:

`n` = `0` – `19999`

`m` = `0` – `19999`

Zn

Description Font Character Width, Define

Purpose To determine the amount of space from the origin of one letter to the origin of the next.

Syntax Z*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Accepted for bitmap characters only. Intercharacter space command (zn) is ignored by the printer if this command is used.

Default: Bitmap width of characters, minus font character offset (Xn) plus intercharacter space (zn)
Accepted values for n: *n* = 1 – 799

c*n*,*m*

Description Font Type, Select

Purpose To choose a font type for human-readable fields.

Syntax c*n*,*m*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Depending on what human-readable fonts your printer supports, you can set *n* from 0 to 56.

A or F

Description Format, Create or Edit

Purpose To create or edit a format.

Syntax A or F

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes If the format number is out of range, an error code 36 is generated.

q*n*

Description Format Direction in a Page, Define

Purpose To determine the direction of a format on a page.

Syntax *qn*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value: n = 0

Accepted values for n:

0 = Horizontal (all are rotated counterclockwise from horizontal)

1 = 90°

2 = 180°

3 = 270°

E*n*

Description Format, Erase

Purpose To erase a format.

Syntax E*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value: NONE

Accepted values for n: 1 – 19

Important Cannot erase format 0.

O*n*,*m*

Description Format Offset Within a Page, Define

Purpose To determine the format offset within a page.

Syntax `On,m`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value:

`n` = `0`
`m` = `0`

Accepted values for n and m:

`n` = `0` – `19999`
`m` = `0` – `19999`

m*p*

Description Format Position From Page, Delete

Purpose To delete a format from within a page.

Syntax `mp`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value: `p` = `a`
Accepted values for p: `a` – `z`

M*p*,*n*

Description Format Position in a Page, Assign

Purpose To assign a format to a page position.

Syntax `Mp,n`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Important If the format ID is out of range, an error code of 36 is generated. A format can be in several locations within a page.

Notes `n` is the numeric format ID, and `p` is the page position.

c*n*

Description Graphic, Select

Purpose To choose a graphic for graphic fields.

Syntax c*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value: *n*
Accepted values for n: 0 – 99

Important • Valid for graphic fields only.

u

Description Graphic or UDC, Define

Purpose To map a column of bitmap for a graphic or a font character.

Syntax u

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

h*n*

Description Height Magnification of Bar, Box, or UDC, Define

Purpose To determine box, barcode, or UDC height magnification.

Syntax h*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes *n* corresponds to the vertical magnification of the character bitmap for human-readable fields, POSTNET symbology, and graphics. The printer uses the highest value possible when *n* is set too large. For a 200 dpi printer in Advanced mode, a dot is 5 mil; for a 400 dpi printer a dot is 2.5 mil.

H*n*

Description Human-Readable Field, Create or Edit

Purpose To edit or create a human-readable field.

Syntax Hn

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value: n
Values for n: 0 – 199

Notes *n* corresponds to the vertical magnification of the character bitmap for human-readable fields, POSTNET symbology, and graphics. The printer will use the highest value possible when n is set too large. For a 200 dpi printer in Advanced mode, a dot is 5 mil; for a 400 dpi printer a dot is 2.5 mil.

z*n*

Description Intercharacter Space for UDF, Define

Purpose To determine spacing that is added to the default intercharacter gap length for a bitmap font.

Syntax z*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value: n = 2
Accepted values for n: 0 – 199

Notes *n* represents the number of dots per pixels. For a 200 dpi printer in Advanced mode, a dot is 5 mil; for a 400 dpi printer a dot is 2.5 mil.

Important • If an invalid lengths occurs, an error code 52 is generated.

I*n*

Description Interpretive Field, Edit

Purpose To edit an interpretive field.

Syntax `I`*`n`*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default Value: *n* = `0`
Accepted values for n: `1` – `199`

Notes You cannot create interpretive fields when using this command. You can only create or delete them when you enable the interpretive of the barcode field. Every interpretive field is counted as a separate field in the maximum number of 200 fields.

i*n*

Description Interpretive Field, Enable or Disable

Purpose To determine if the interpretive field of the current barcode field prints.

Syntax `in`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Use the `I` command when you want to edit an interpretive field. In the interpretive field, the human-readable font prints 2 dots left aligned under the barcode.

Default: *n* = `0`
Accepted values for n:

`0` = disabled
`1` = enable with start and stop characters
`2` = enable without start and stop characters

l*n*

Description Length of Line or Box Field, Define

Purpose To determine the length of a line or box.

Syntax `ln`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes When in Advanced mode, a dot for a 200 dpi printer is 5 mil, and a dot for a 400 dpi printer is 3.3 mil.

Default Value: n = `100`
Accepted values for n: `1` – `9999`

L*n*

Description Line Field, Create or Edit

Purpose To edit or create a line field.

Syntax `Ln`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The name parameter is optional and can consist of 8 ASCII characters

Default Value: n = `0`
Accepted values for n: `0` – `199`

J

Description Outline Font, Clear or Create

Purpose To clear or create an outline font or graphic.

Syntax `J`

Not Supported This command does not work on the Zebra printer with Virtual Device-I, or it has significant deviations from the 3400D printer.

j

Description Outline Font, Download

Purpose To download outline font descriptions.

Syntax j

Not Supported This command does not work on the Zebra printer with Virtual Device-I, or it has significant deviations from the 3400D printer.

When you choose the j command, the printer stores the received font description.

S*n*

Description Page, Create or Edit

Purpose To edit or create a page.

Syntax S*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Default page (page 0) cannot be altered.

Default Value: NONE
Accepted values for n: 1 – 9

s*n*

Description Page, Delete

Purpose To delete a page.

Syntax s*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes Default page (page 0) cannot be altered.

Default Value: NONE
Accepted values for n: 1 – 9

g*n*

Description Pitch Size, Set

Purpose To set the pitch size for a human-readable field.

Syntax g*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes To scale outline fonts smoothly, use the pitch size command.

Default Value: n = 12
Accepted values for n: 1 – 50

k*n*

Description Point Size, Set

Purpose To set the point size for a human-readable field.

Syntax k*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes One point size is equivalent to 1/72 inch. The higher the point size, the larger the characters.

Default Value: n = 12
Accepted values for n: 4 – 288

v

Description Print Line Dot Count Limit, Set

Purpose To limit the print line dot count limit.

Syntax v

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The printer ignores this because it is a null command.

R

Description Program Mode, Exit

Purpose To switch from program mode to print mode and save the format or page currently being edited.

Syntax R

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

G*n*

Description User-Defined Character, Clear or Create

Purpose To clear or create graphic bitmaps.

Syntax G*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The printer erases and redefines a graphic after you define it.

Default Value: NONE
Accepted values for n: 0 – 99

U*n*

Description User-Defined Character Field, Create or Edit

Purpose To create or edit a graphical field.

Syntax U*n*

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes The name parameter is optional and can consist of 8 ASCII characters (excluding the semicolon) and cannot start with a number.

Default Value: *n* = 0
Accepted values for n: 0 – 199

t*n*

Description User-Defined Font Character, Create

Purpose To identify the next font to be defined.

Syntax `tn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Notes *n* is a decimal representation of an ASCII character. Existing characters are erased by the printer.

Default Value: NONE
Accepted values for n: 0 – 255

w*n*

Description Width of Line, Box, Bar, or Character, Define

Purpose To determine the width magnification of a line, box, barcode, or character.

Syntax `wn`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Default value for line, box, bar code fields, and graphics: n = 1
Accepted values for n:

Line and box fields: 1 – 9999

Barcode fields: 1 – 99

Graphics: 1 – 999

Default value for human-readable fields and POSTNET: n = 2
Accepted values for human-readable fields and POSTNET: 1 – 250

Test and Service Commands

A

Description Ambient Temperature, Transmit

Purpose Transmits the ambient temperature sensor output back to the host.

Syntax A

Partially Supported Based on testing, this command is partially supported on the Zebra printer with APL-I firmware with the following difference and output:

The Zebra printer transmits the Fahrenheit temperature back to the host.

The 3400D printer transmits the A/D sensor output back to the host.

;

Description Command Terminator

Purpose To end all commands in Test and Service mode.

Syntax ;

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

K

Description Dark Adjust

Purpose To change the darkness of the print on labels.

Syntax K

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

D

Description Factory Defaults, Reset

Purpose To set the printer configuration to the factory defaults.

Syntax D

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

f

Description Formats, Print

Purpose To print all stored formats.

Syntax `f`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

h

Description Hardware Configuration Label, Print

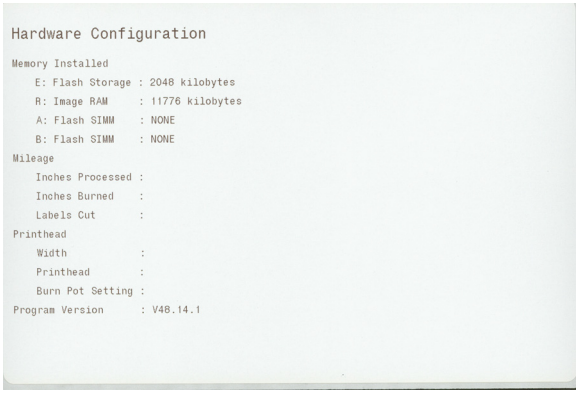
Purpose To print a hardware configuration label.

Syntax `h`

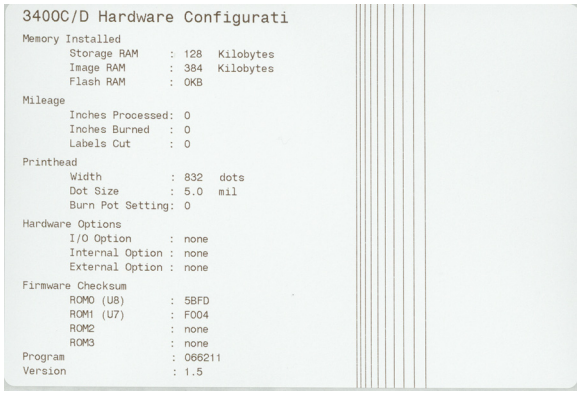
Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

The label examples show how unsupported values on the label could differ, but the overall format is the same:

Virtual Device-I Printer Label



Intermec 3400D Printer Label



T

Description Label Taken Sensor Value, Transmit

Purpose To send the label taken sensor and output back to the host.

Syntax `T`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

p

Description Pages, Print

Purpose To print the pages stored on the printer.

Syntax `p`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

C

Description Pitch Label, Print

Purpose To print the pitch label.

Syntax `C`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

Q

Description Print Quality Label, Print

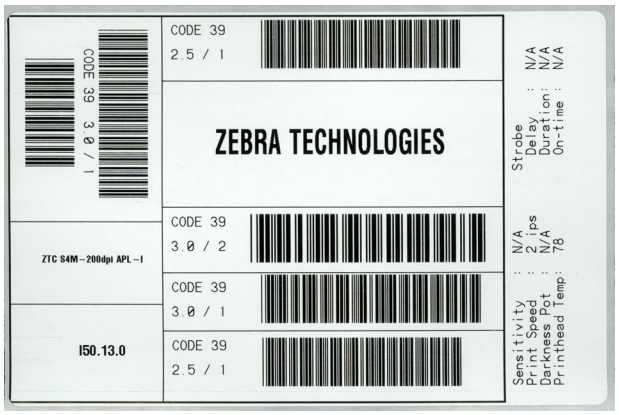
Purpose To print the print quality program and model number label.

Syntax `Q`

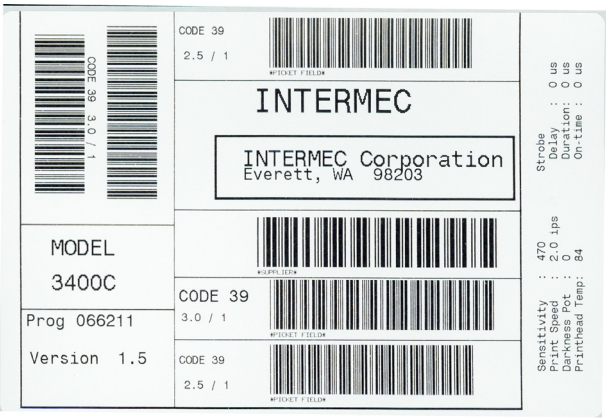
Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

The label examples show that the data on the format differs slightly:

Virtual Device-I Printer Label



Intermec 3400D



p

Description Printhead Temperature Sensor Value, Transmit

Purpose To send the printhead thermistor A/D output back to the host.

Syntax `p`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

M

Description Reflective Sensor Value, Transmit

Purpose To send the label mark reflective sensor A/D output back to the host.

Syntax `M`

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

s

Description Software Configuration Label, Print

Purpose To print a software configuration label.

Syntax `s`

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

The label examples show how the unsupported values on the label could differ, but overall the format is the same.

Virtual Device-I Printer Label

Intermec 3400D Printer Label

R

Description Test and Service Mode, Exit

Purpose To make the printer exit Test and Service mode.

Syntax R

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

G

Description Transmissive Sensor Value, Transmit

Purpose To send the label gap transmissive sensor and output back to the host.

Syntax G

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

g

Description User-Defined Characters (UDC) and Graphics, Print

Purpose To print the user-defined characters and graphics stored on the printer.

Syntax g

Supported Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

t

Description User-Defined Fonts, Print

Purpose To print the user-defined fonts stored on the printer.

Syntax t

Partially Supported Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

Notes There are slight differences in spacing, and it is optimized for 4 in. x 6 in. label.

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

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

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

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

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

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"`

Notes •

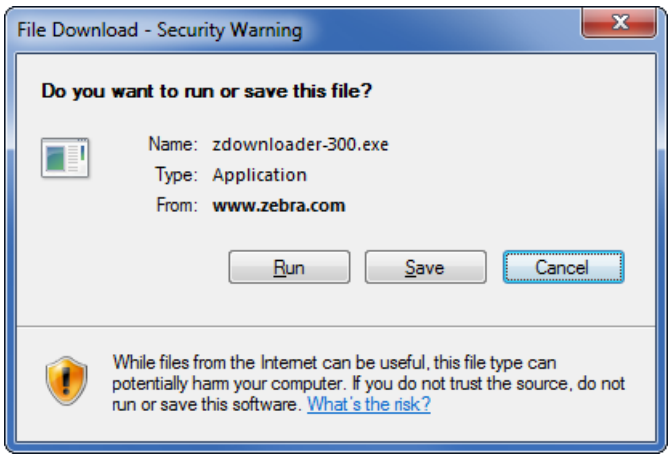
Download the ZDownloader Application

Zebra recommends that you use the ZDownloader application to download a Virtual Device app to your printers. This section provides you with the instructions for downloading and installing this application.

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

1. Open a web browser and navigate to http://www.zebra.com/us/en/products-services/services/development-services/custom-app.html. Click the link for ZDownloader.

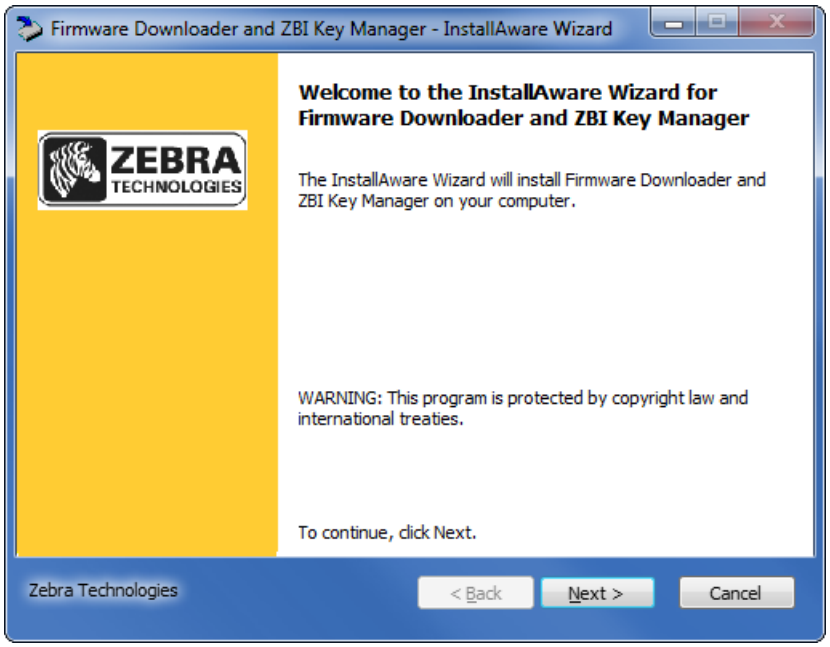
   The following prompt appears:



2. Click Run to run the file without downloading it, or click Save to save it your hard drive and then run it from there.

3. If you are prompted to allow the application to make changes to your computer, click Yes.

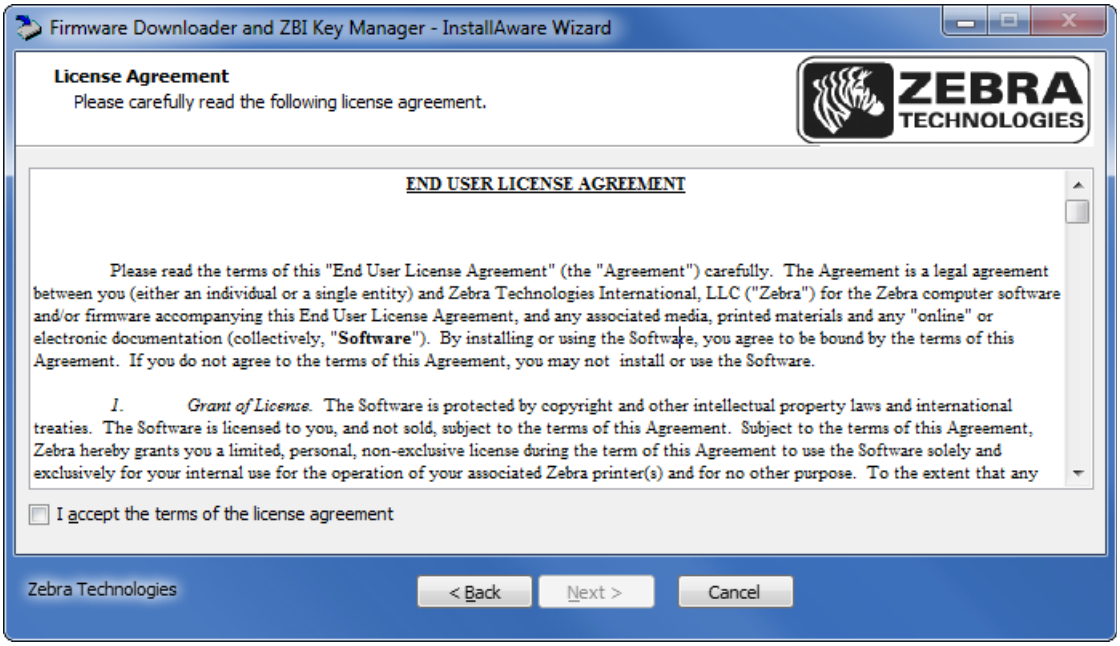
   The program installs on your computer. When installation is complete, the Firmware Downloader and ZBI Key Manager installation wizard appears:



4. Click Next.

   The End User Licence Agreement appears.

5. Read the terms of the agreement.

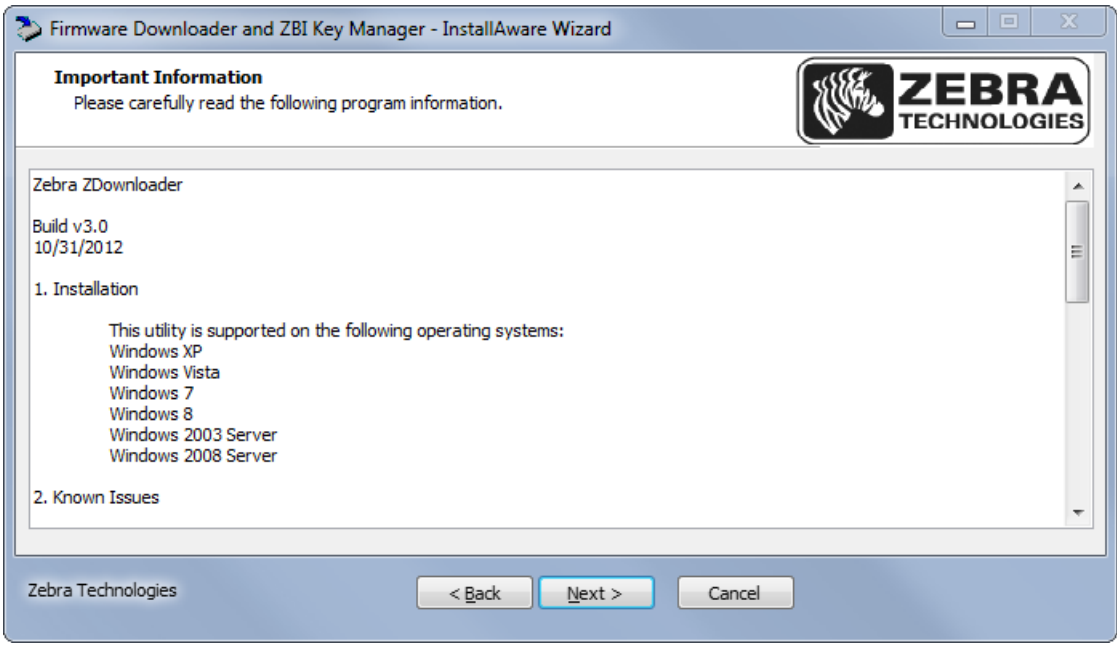


6. Click the box to accept the terms.

7. Click Next.

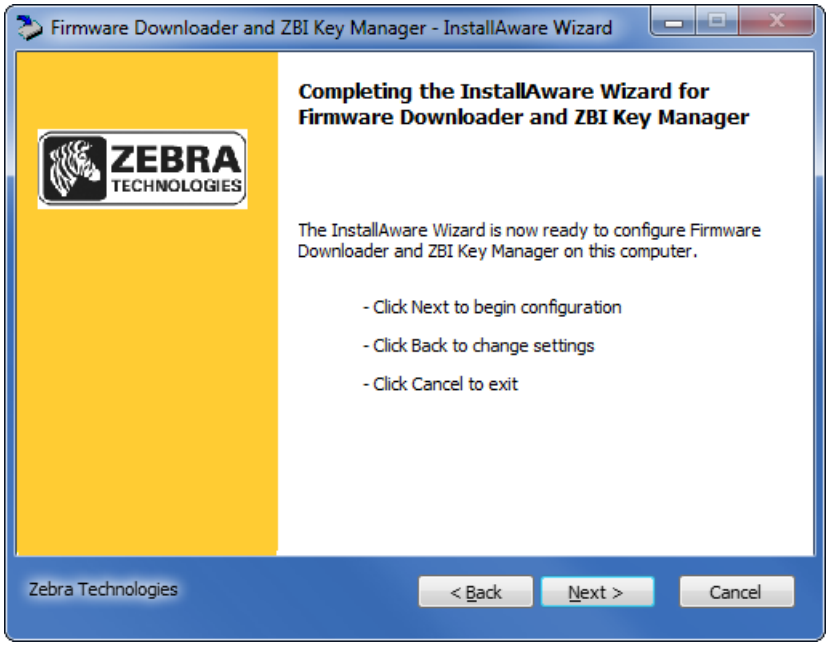
   The installation wizard displays information about the installation.

8. Read the installation information.



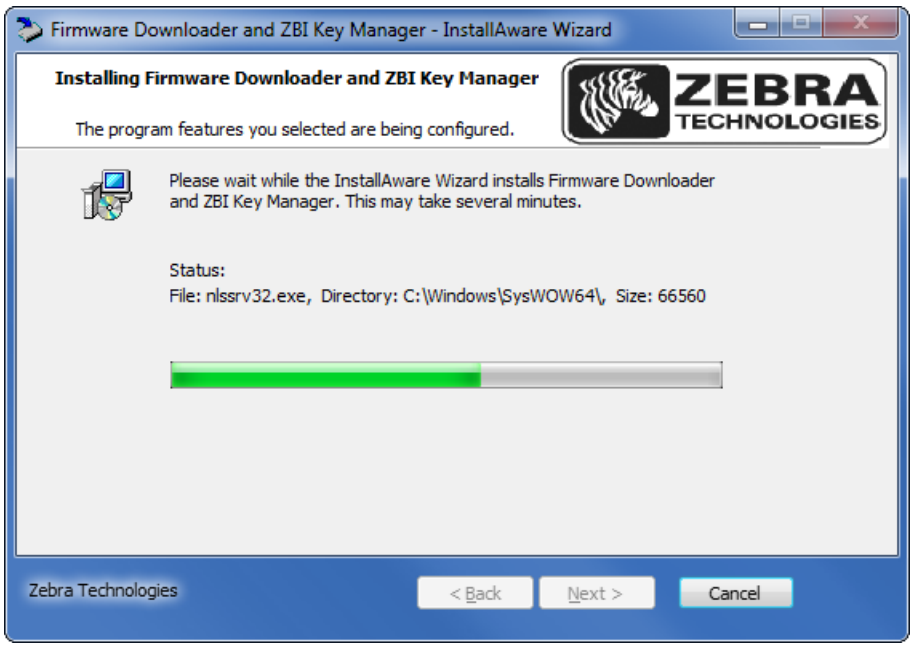
9. Click Next.

   The installation wizard displays information about the installation.

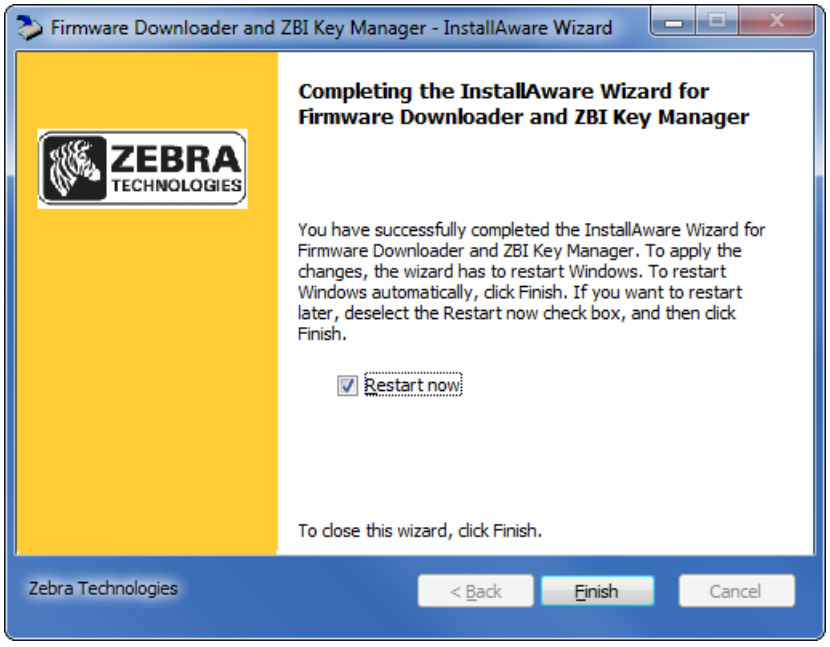


10. Click Next.

The installation wizard installs the application.



When installation is complete, the installation wizard prompts you to restart your computer.



11. To finish and restart your computer, click Finish.

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