

Link-OS™ Virtual Device-O

User Guide



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Notes • _____

About This Document

This section provides you with contact information, document structure and organization, and additional reference documents.

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Who Should Use This Document

This manual describes the Virtual Device-O 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	V68.19.6Z and later
iMZ™ Series	V73.19.6Z and later



Note • The Virtual Device-O 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 13	This section describes the features and functions of a Zebra printer that is running the Virtual Device-O application. The Virtual Device-O application enables Zebra mobile and tabletop printers to work with many host systems that are using Datamax-O'Neil® 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-O on page 17	This section provides you with instructions on how to install and enable the Virtual Device-O application on one or more Zebra printers.
Commands on page 37	This section provides a detailed listing of commands for use on your Zebra printer with Virtual Device-O app.
Supported Fonts on page 71	This section provides you with available fonts on the Zebra printers with Virtual Device-O.
Download the ZDownloader Application on page 77	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-O application. The Virtual Device-O application enables Zebra mobile and tabletop printers to work with many host systems that are using Datamax-O'Neil® 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-O Features

The Virtual Device-O 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 [Table 1](#)).
- Provides support of Datamax-O'Neil[®] commands (see [Supported Commands on page 39](#)).
- Offers PK80[™] and MF8i[™] compatibility (see [Supported Commands on page 39](#)).

Supported Fonts, Barcodes, and Commands

Table 1 • Fonts, Barcodes & Commands

Command	Supported	Comments
Model 4t/4te standard fonts: 5.5 CPI, 7.2 CPI, 10.2 CPI, 10.7 CPI, 18.5 CPI, 20.4 CPI, 22.6 CPI, 34.0 CPI	Yes	Fonts are stored on the printer in CPF format.
Optional fonts: 4 CPI, 5 CPI, 6 CPI, 8 CPI	Yes	—
Asian fonts	No	—
Linear barcodes: Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, Interleaved 2 of 5, MSI/Plessey, UCC/EAN-128, UPC-A, UPC-E	Yes	—
2D barcodes: PDF417, AZTEC and QR	Yes	—
Line Print language	Yes	—
Easy Print language	Yes	—
Magnetic Card Reader commands	No	—
Smart Card Reader commands	No	—
Run-time status commands: status, print job status, battery	Yes	—
Run-time configuration commands: printing (includes paper movement, contrast, and timeout)	Yes	—
All other Configuration commands	—	See Supported Commands on page 39 .
All other “Query” commands	—	See Supported Commands on page 39 .

Configuring Network Connectivity

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

- 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

- Font name translations are done internally using either the 5-character or 1-character font designators.
- Custom or hidden commands may not be supported.
- Smart card data exchange is not supported.
- Other command languages are disabled when running Virtual Device-O. However, Set/Get/Do (SGD) commands and file download all operate properly with Virtual Device-O enabled.
- Virtual Device-O fonts can only be used with Virtual Device-O commands. They cannot be used with other languages.
- The Virtual Device-O mode application will not respond to CPCL, ZPL, or EPL commands. Instead, commands will be processed by the Virtual Device-O application.

Glossary

Term	Definition
Easy Print	A method of printing used to print labels and receipts which allows placing barcode, text, or graphics fields at desired locations.
Easy Print Configuration	A method of printer configuration used to configure printer parameters. A configuration session typically starts with Escape character, open brace, two or three letter text designator of the specific configuration command, colon character, followed by a list of sub-configuration items and their related values, and finally a closed brace.
Line Print	A method of printing used to print receipts in a continuous top-down format. Field position is controlled by using space and carriage return, line feed sequence characters.
Query	A method used to obtain printer parameters from the printer. Query sessions typically start with Escape character, open brace ('{'), two-letter text designator of the specific query, a question or exclamation mark, and a closed brace ('}'). A response to a query is in the same format, except that the exclamation mark is followed by specific parameter values and separated by semicolons.

Install, Register, and Enable Virtual Device-O

This section provides you with instructions on how to install and enable the Virtual Device-O 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:
 - The Virtual Device **.NRD** file to be downloaded to a Zebra printer.
 - A **.txt** file that contains the SGD command for immediately activating the Virtual Device app.
8. Extract the files from the archive to your computer.

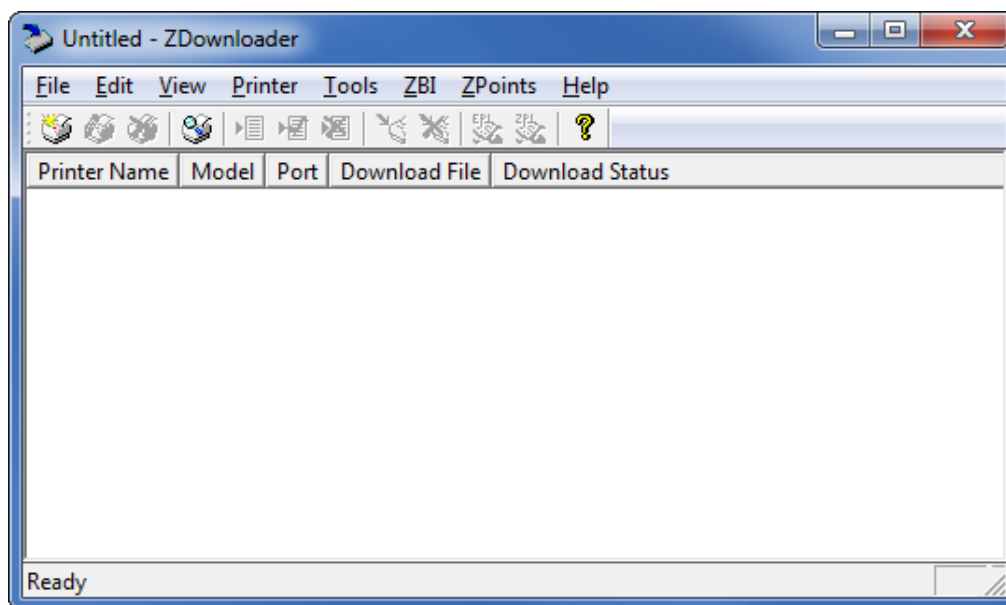
Downloading the Virtual Device-O Application Using ZDownloader



Note • Zebra recommends that you use the Zebra Downloader to download Virtual Device-O app. For instructions on how to download the Zebra Downloader, see [Download the ZDownloader Application on page 77](#).

The ZDownloader application can update Virtual Device-O 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.

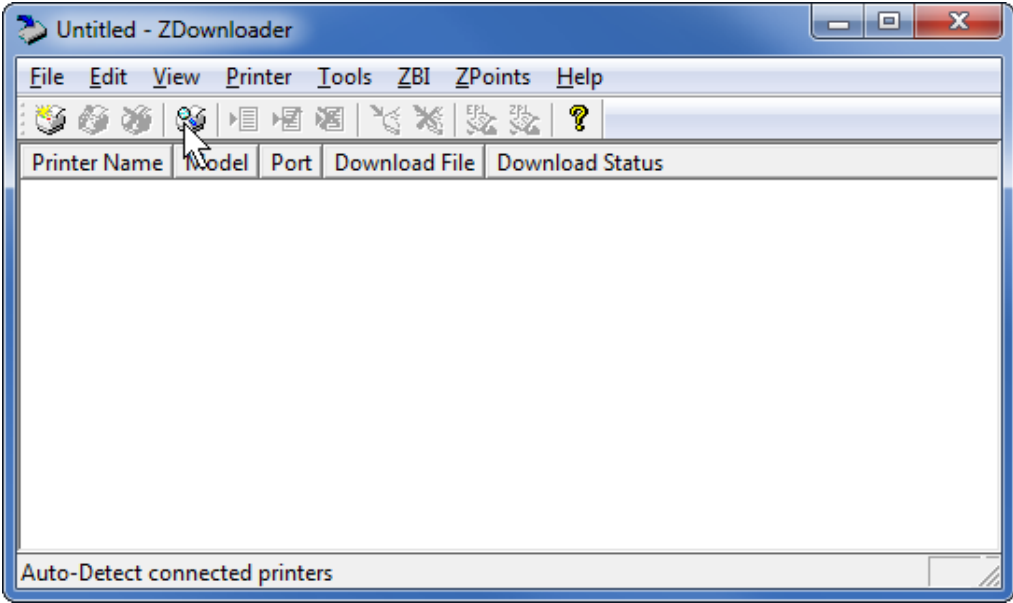
Auto-Detect Printers

Use Auto-Detect for USB or IP Ethernet interfaces.




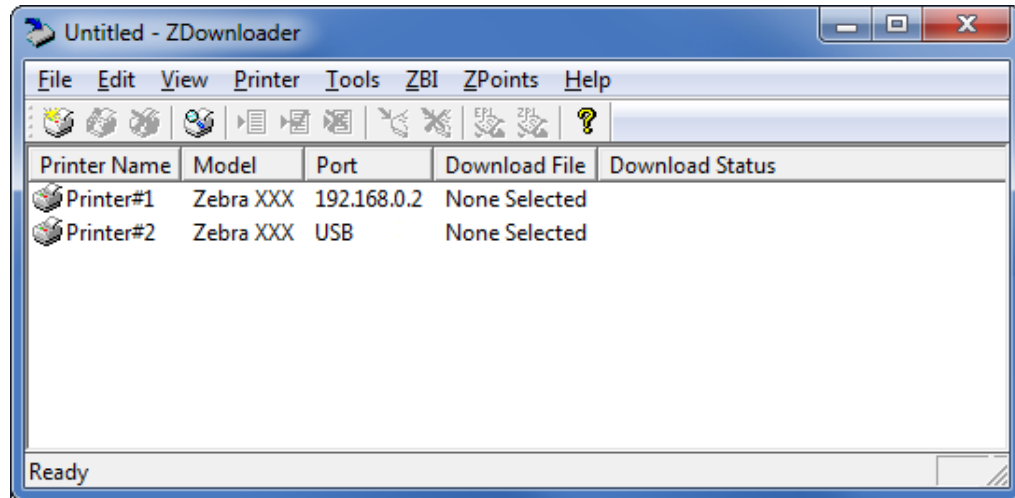
Note • Ethernet connected printers are detected by the application broadcasting a UDP packet out onto the network. UDP port number 4201 is used for the discovery process. Some networks filter out UDP packets. This means that the ZDownloader program may not be able to detect all of the printers on your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

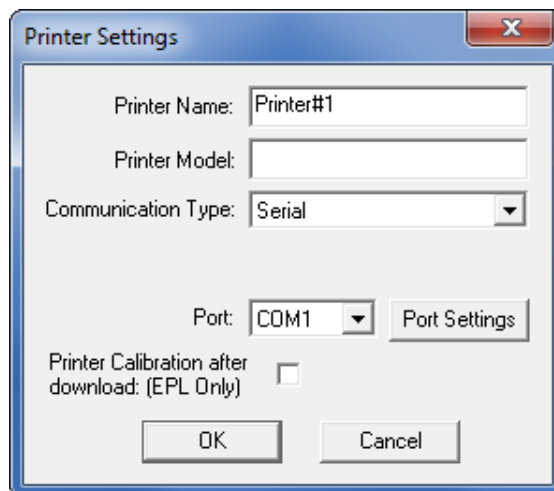
1. In the ZDownloader toolbar, click the “Auto-Detect” button .
- OR
- Right-click in the ZDownloader window and select “Auto-Detect Printers.”
- The printers detected are added to the printer list.



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.

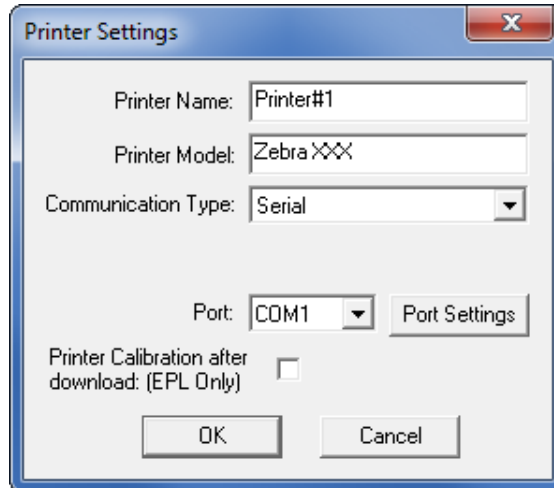


2. Add a printer name and your printer model in the appropriate fields.

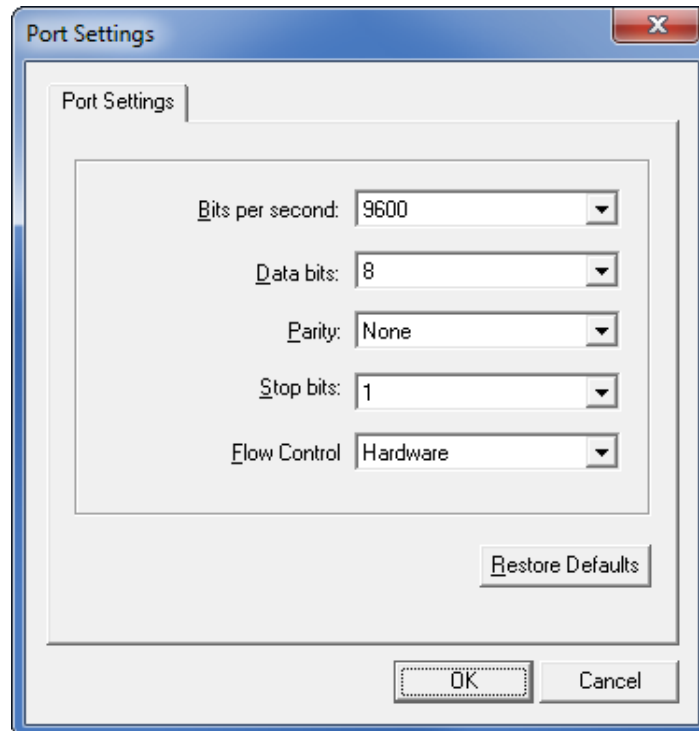
Adding an RS-232 Printer

If you will not be adding a serial printer, skip to [step 8](#) or [step 11](#).

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



4. Click Port Settings.
The following window appears.



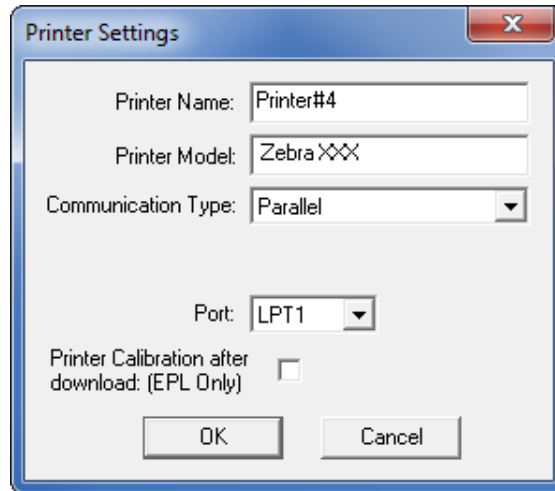
5. Adjust the settings as necessary. The printer's serial port settings must match the computer's serial port settings. For more information about the settings, refer to the User Guide for your printer.
6. Click OK to save the port settings.
7. Click OK to add the printer.

Adding a Parallel Printer

If you will not be adding a parallel printer, skip to [step 11](#).

8. Select the Parallel Communication Type.

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

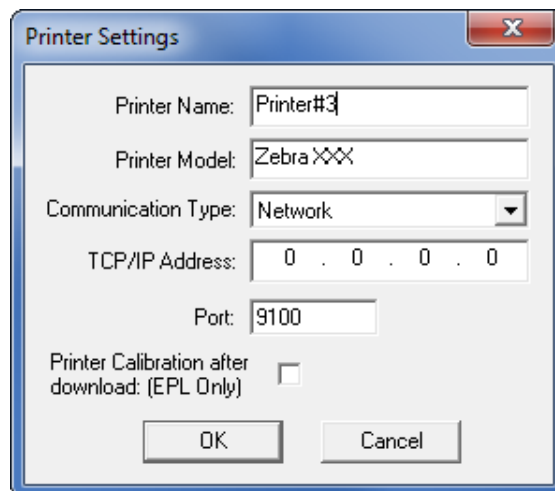


9. Select the port to which the printer is connected. No additional configuration is necessary.
10. Click OK to add the printer.

Adding a Network Printer

11. Select the Network Communication Type.
12. Click Port Settings.

The following window appears.

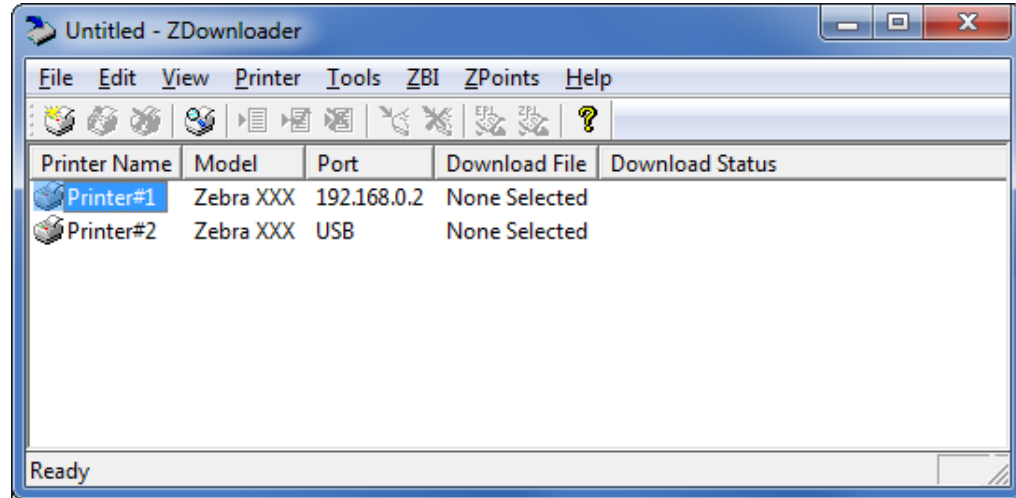



13. Enter the printer's IP address.
14. Click OK to save the network settings.
15. Click OK to add the printer.

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.

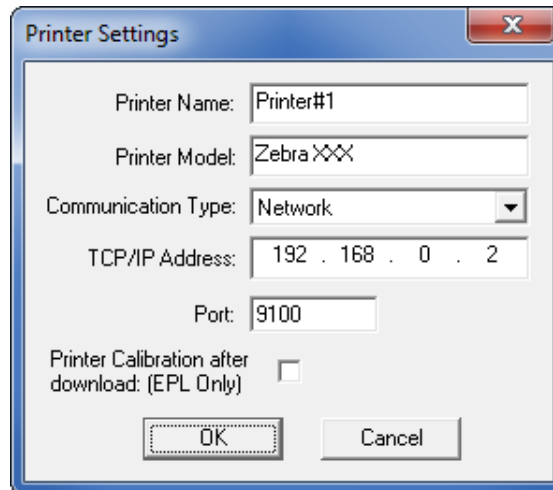


2. In the toolbar, click the “Modify Printer” button .

OR

Right-click on the printer and select “Modify Printer...”.

The printer settings for the selected printer are displayed.

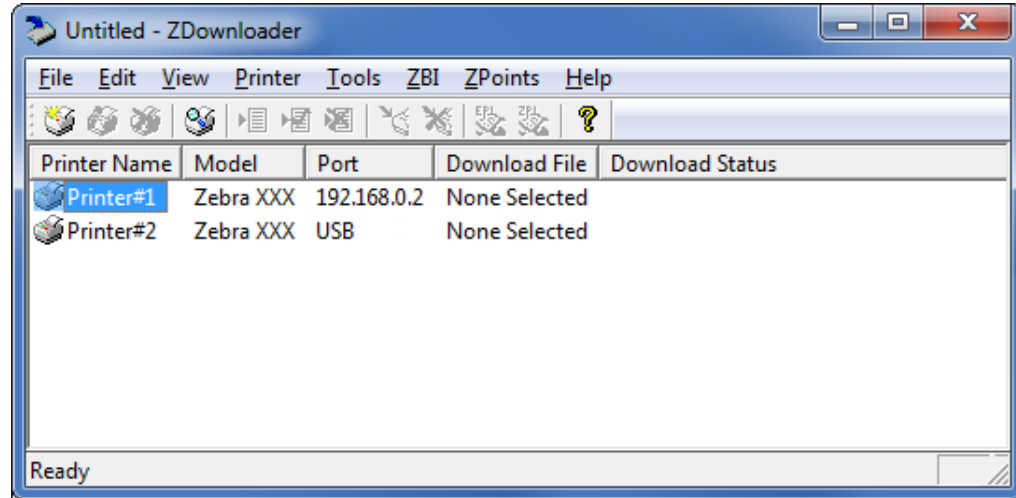



3. Modify the settings as desired.
4. Click OK to save the settings.

Deleting Printers from the List

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

1. Select one or more printers to delete.

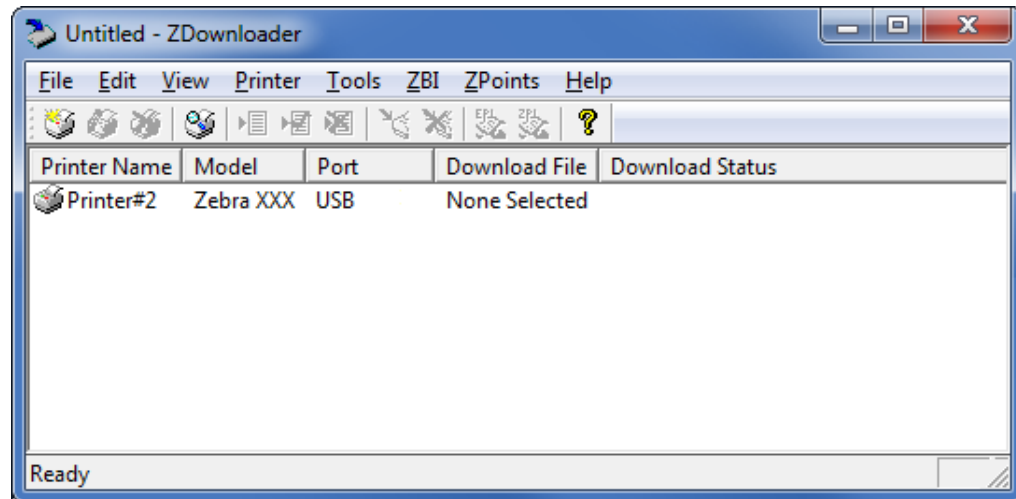


2. Click the “Delete Printer(s)” toolbar button .

OR

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

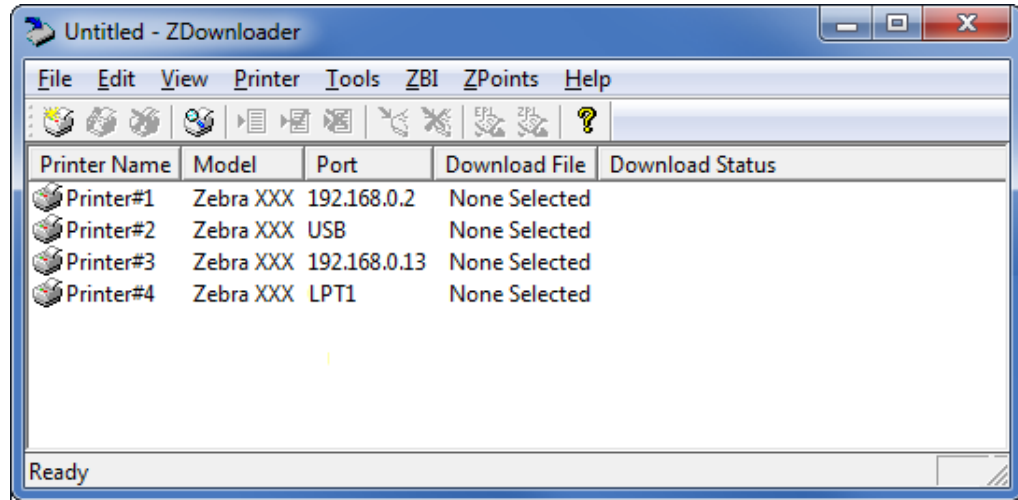
The printer is removed from the list.



Downloading the Virtual Device App to Selected Printers

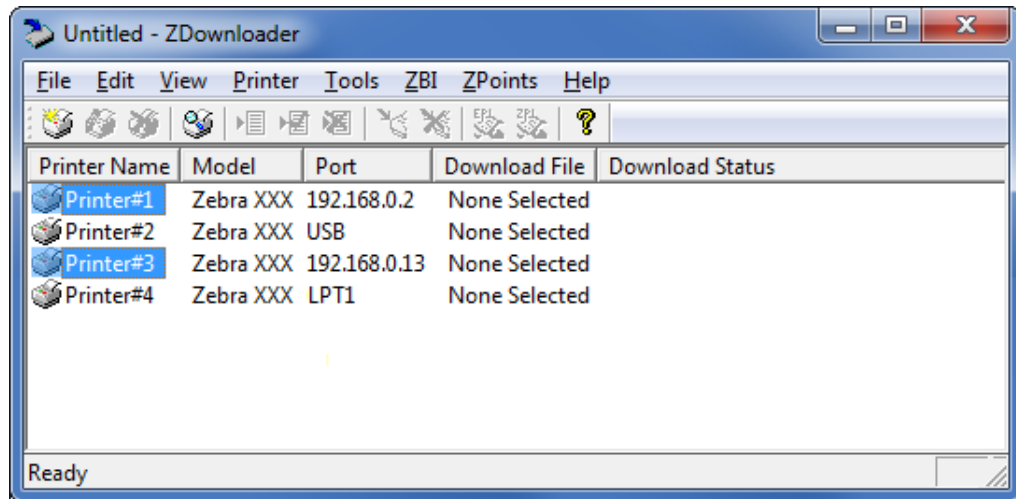
In order to download the Virtual Device-O app to your printer(s), you must select the file to send to each printer.


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

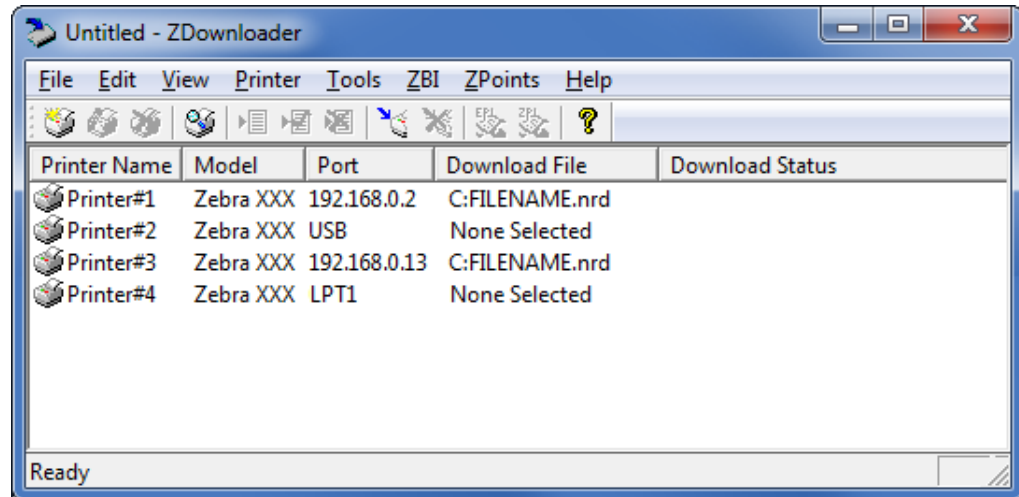


2. Click the “Select Firmware” toolbar button .
OR
Right-click on one of the selected printers and select “Select Firmware File.”
3. Navigate to the Virtual Device app file that you acquired previously.

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. Start the download process by doing one of the following:

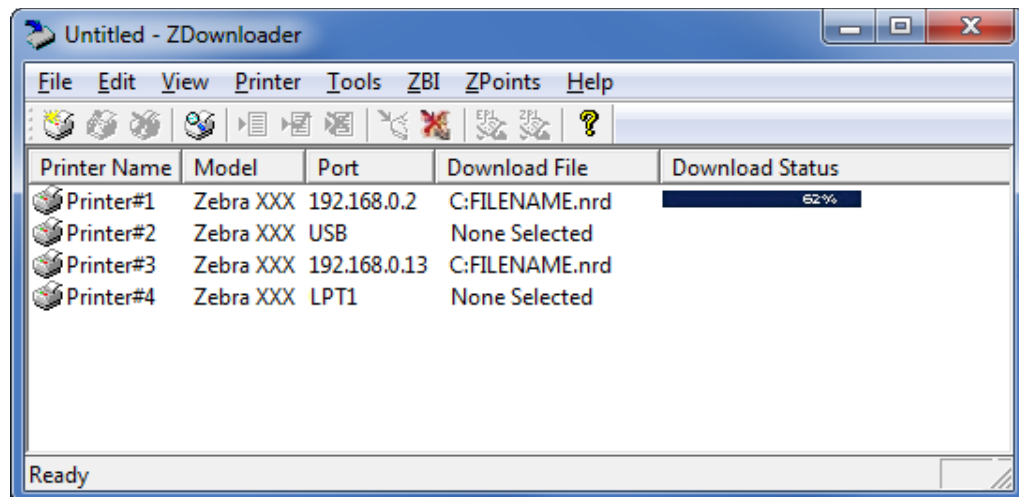
- Click the “Download to All Printers” toolbar button .
- Select the printer(s) of interest and select the Printer > Download To Selected.

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:

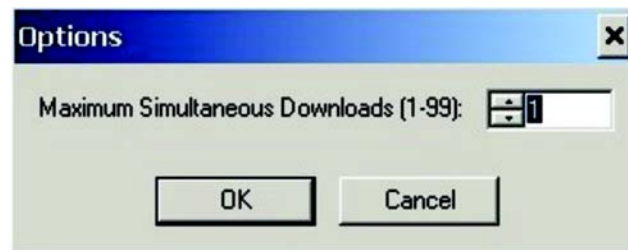
1. Select one or more printers with a download in progress.
 2. Click “Printer > Cancel Download.”
- OR
- Right-click on a selected printer and select “Cancel Download.”

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

The log file of all ZDownloader downloading transactions is stored on the C: drive of the computer used for downloading files to Zebra printers.

- Location: [C:/Program Files/Common Files/FirmwareDownloader](#)
- Log file name: [DownloadLog.txt](#)

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.

To send the log file, complete these steps:

1. Go to [C:/Program Files/Common Files/FirmwareDownloader](#).
2. Copy the file, and email to Zdownloader@zebra.com.

Enabling the Virtual Device

You can enable Virtual Device-O 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-O on your printer, send the following command:

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

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 69](#).

Using the User Menus

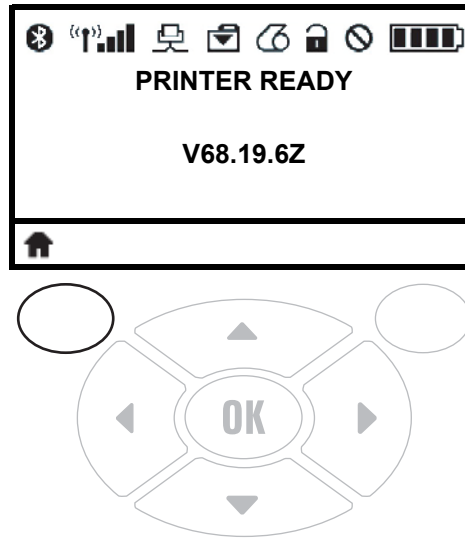
This section includes instructions for the following printers:

- [QLn420 Printers on page 31](#)
- [QLn320 and QLn220 Printers on page 34](#)

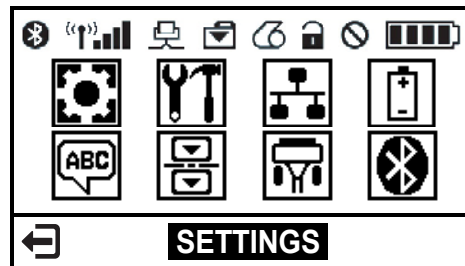
If necessary, refer to the User Guide for your printer for additional information about your printer's control panel.

QLn420 Printers

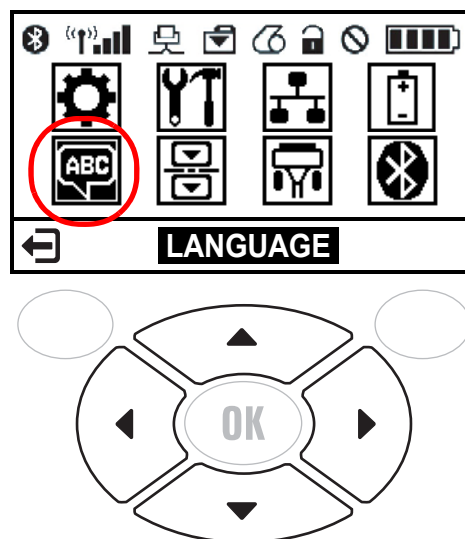
1. From the printer's idle display screen, press the LEFT SOFT KEY to select the Home icon.



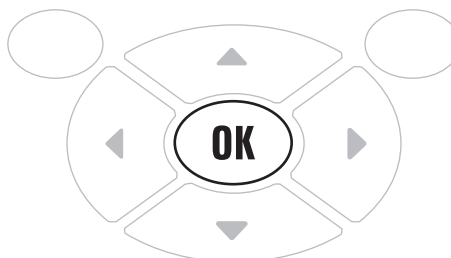
The printer displays the Home Menu.



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



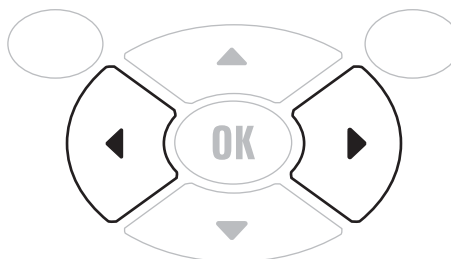
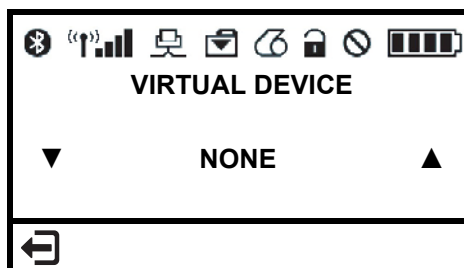
3. Press the OK button.



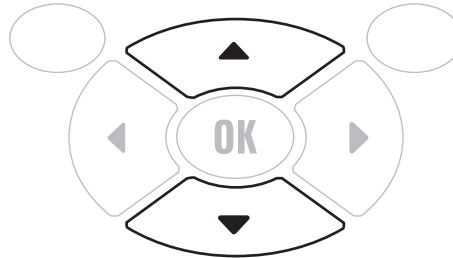
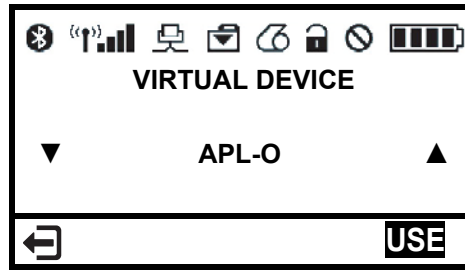
The printer displays the LANGUAGE selection screen.



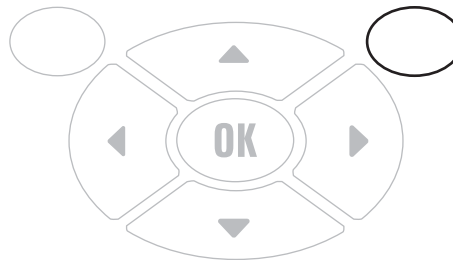
4. Use the LEFT or RIGHT ARROW to navigate to the VIRTUAL DEVICE selection screen.



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



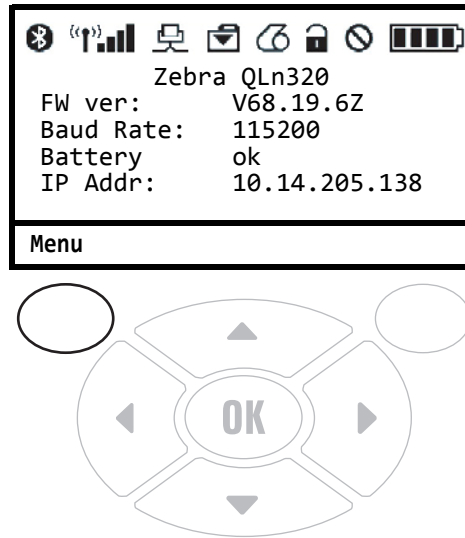
6. Press the RIGHT SOFT KEY to select USE.



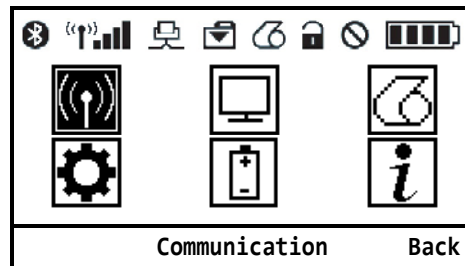
The printer restarts and uses the Virtual Device that you selected.

QLn320 and QLn220 Printers

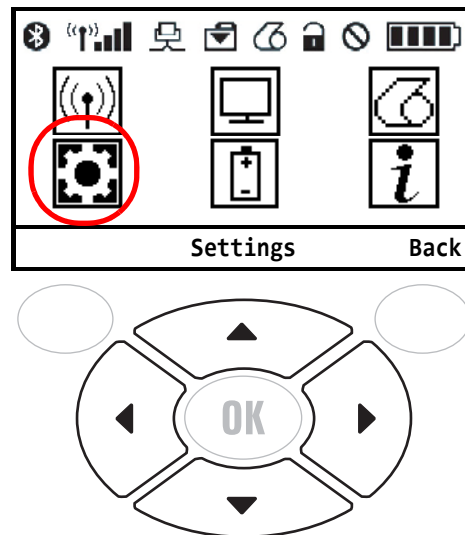
1. From the printer's idle display screen, press the LEFT SOFT KEY to select the Home icon.



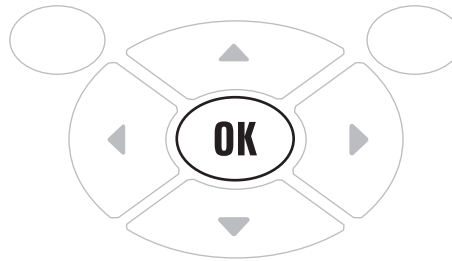
The printer displays the Home Menu.



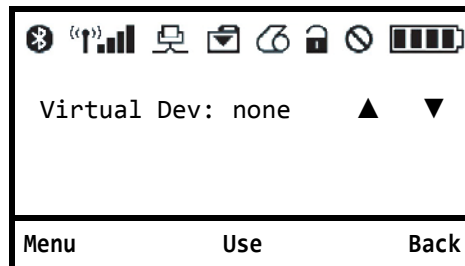
2. Use the ARROWS to navigate to the SETTINGS menu.



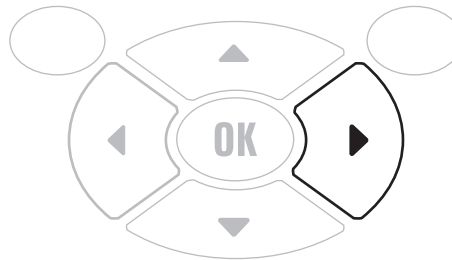
3. Press the OK button.



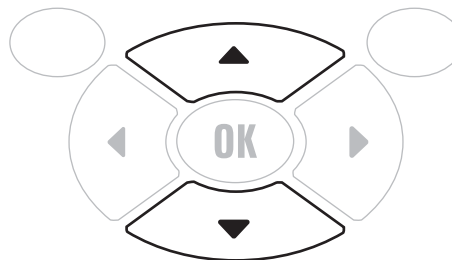
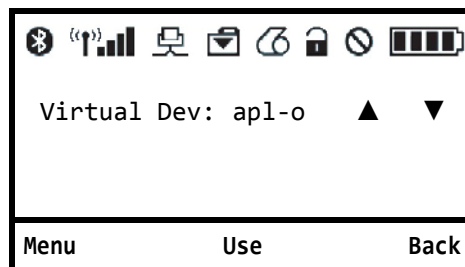
The printer displays the VIRTUAL DEVICE selection screen.



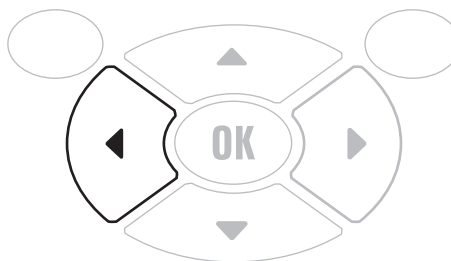
4. Press the RIGHT ARROW to highlight the up arrow.



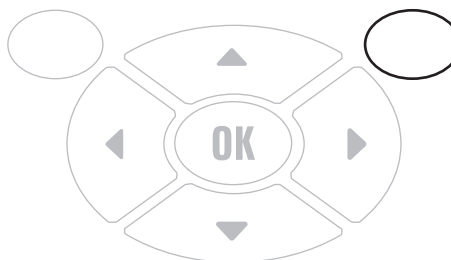
5. Use the UP or DOWN ARROW to scroll to the APL-O option.



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



7. Press the RIGHT SOFT KEY 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 Virtual Device-O app.

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Supported Commands

Line Print Commands

Table 2 • Supported Line Print Commands

Command	Description	Supported	Comments/See Also
CAN	Cancels a buffer line	No	N/A
CR	Enters a carriage return	Yes	CR on page 42
ESC ! n	Sets double-high or double-wide print mode for one line	Yes	ESC ! n on page 42
ESC @	Resets the printer	Yes	ESC @ on page 43
ESC A n	Sets interline spacing	Yes	ESC A n on page 43
ESC B	Begins acceptance of compressed graphics	Yes	ESC B, ESC E on page 44
ESC C n	Sets form length	Yes	Consumes, but does not process
ESC E	Ends acceptance of compressed graphics	Yes	ESC B, ESC E on page 44
ESC EZ	Goes to Easy Print [®] mode	Yes	ESC EZ on page 45
ESC Hn	Increases the height of the font n times.	Yes	ESC Hn on page 45
ESC Q n1n2	Advances the specified distance from the black mark	Yes	ESC Q n1n2 on page 45
ESC R n	Selects an international character set	Yes	ESC R n on page 46
ESC V n1 n2	Enters bitmapped graphics mode	Yes	ESC V n1 n2 on page 47
ESC w n	Selects a font	Yes	ESC w n on page 48
FF	Form feed (goes to top of form)	Yes	FF on page 49
LF	Line feed (advances paper)	Yes	LF on page 49
SI	Sets single-wide print mode	Yes	SI on page 49
SO	Sets double-wide print mode	Yes	SO on page 50

Easy Print Commands

Table 3 • Supported Easy Print Commands

Command	Description	Supported	Comments/See Also
{AHEAD:nnn}	Advances the paper	Yes	<i>Ahead Command</i> <i>{AHEAD:nnn}</i> on page 51
{BACK:nnn}	Moves the paper back	Yes	<i>Back Command</i> <i>{BACK:nnn}</i> on page 51
{IPL:0xAA55}	Initial program load	No	Consumes, but does not process
{LP}	Line printer mode	Yes	<i>Line Printer Mode {LP}</i> on page 51
{Print ...}	Print	Yes	<i>Print {Print...}</i> on page 52
{S}	Status	Yes	<i>Status {S}</i> on page 56
{TP}	Prints self-test results	Yes	<i>Self Test Printout {TP}</i> on page 56
{TP1}	Prints limited self-test results	Yes	<i>Limited Self Test Printout {TP1}</i> on page 56

Query Commands

Table 4 • Supported Query Commands

Command	Description	Supported	Comments/See Also
ESC {BT?}	Returns battery voltage and temperature	Yes	<i>ESC {BT?}</i> on page 57
ESC {CF?}	Returns information about configurable options	Yes	<i>ESC {CF?}</i> on page 58
ESC {CN!}	Cancels demand printing	No	Consumes, but does not process
ESC {DQ?}	Returns remaining quantity of images	No	Consumes, but does not process
ESC {FM?}	Returns a list of all formats currently saved to the printer	Yes	<i>ESC {FM?}</i> on page 60
ESC {FN?}	Returns a list of all available fonts	Yes	<i>ESC {FN?}</i> on page 61
ESC {GR?}	Returns a list of all graphics currently saved to the printer	Yes	<i>ESC {GR?}</i> on page 62
ESC {MR?}	Returns the magnetic card reader configuration	No	Consumes, but does not process
ESC {MY?}	Returns the amount of memory available, used, and remaining	Yes	<i>ESC {MY?}</i> on page 63

Table 4 • Supported Query Commands (Continued)

Command	Description	Supported	Comments/See Also
ESC {PH?}	Returns information about the printhead	Yes	ESC {PH?} on page 64
ESC {RE!}	Resets the printer	Yes	ESC {RE!} on page 64
ESC {RS?}	Returns data read for a swiped magnetic card	No	Consumes, but does not process
ESC {ST?}	Returns information about the printer's status	Yes	ESC {ST?} on page 65
ESC {VR?}	Returns the version number of the firmware, boot block, and downloaded files	Yes	ESC {VR?} on page 67

PK80 Commands

Table 5 • Supported PK80 Commands

Command	Description
DC2 (0x12)	Sets the pica pitch mode and cancels the double-wide, emphasized, and condensed modes.
DC4 (0x14)	Cancels the double-wide mode set by SO.
SO (0x0E)	Sets double-wide mode (if not in condensed mode) for one line only and cancels the condensed mode (if not in condensed mode).
SI (0x0F)	Sets condensed mode (if not in double-wide mode) and cancels the double-wide mode (if in double-wide mode).
Esc! (0x00)	Enables 10 cpi
Esc! (0x01)	Enables 12 cpi

MF8i Commands

Table 6 • Supported MF8i Commands

Command	Description
Esc W1	Double-wide printing on
Esc W0	Double-wide printing off
Esc e	End print job status report
Esc :	Set Elite pitch (12 cpi)

Line Print Commands

CR

Description Carriage Return

Syntax CR

ASCII equivalent	CR
Decimal equivalent	13
Hex equivalent	0D

Notes Like the Line Feed command (see [LF on page 49](#)), the Carriage Return command prints the line and advances the paper. Both commands are available for the convenience of programmers who may be used to using one or the other. To print and advance a number of lines, use that number of CR commands, LF commands, or a combination of the two.

ESC ! n

Description Sets double-high and double-wide print mode for one line.

Syntax <ESC>!n

ASCII equivalent	ESC	!	n
Decimal equivalent	27	33	n
Hex equivalent	1B	21	n

Range Set the value for **n** as described below:

n =		Description
10h	16d	Double High
20h	32d	Double Wide
30h	48d	Double High and Double Wide

Notes Changes the font height, font width, or both to double the size for one line. This command applies to the entire line.

ESC @

Description Resets the printer

Syntax <ESC>@

ASCII equivalent	ESC	@
Decimal equivalent	27	64
Hex equivalent	1B	40

Default 20.4 cpi font (*n* = 33 decimal, 21 hexadecimal)

Range 21–26 hex

Notes Resets the printer to defaults.

ESC A *n*

Description Sets the interline spacing

Syntax <ESC>A*n*

ASCII equivalent	ESC	A	<i>n</i>
Decimal equivalent	27	65	<i>n</i>
Hex equivalent	1B	41	<i>n</i>

Default *n* = 0

Range 1–155

Notes In the command syntax, *n* (an 8-bit binary number) represents the number of blank dot lines fed between character lines. After the completion of the current line, the *n* blank lines are added before the next line begins printing.

ESC B, ESC E

Description Accepts (ESC B) or ends acceptance of (ESC E) compressed graphics

Syntax <ESC>B

ASCII equivalent	ESC	B
Decimal equivalent	27	66
Hex equivalent	1B	42

Syntax <ESC>E

ASCII equivalent	ESC	E
Decimal equivalent	27	69
Hex equivalent	1B	45

Notes The printer accepts compressed graphics data, which is then uncompressed and printed.

After you send the command to accept graphics data (ESC B), each dotline must begin with one of the following letters:

- U** = uncompressed dotline
- G** = compressed dotline (using a run-length encoding scheme)
Compressed graphics mode requires a graphic image the same width as the printhead in use.
- A** = advance the specified number of dotlines
An **A** followed by a single byte count indicates the number of dotlines to advance.

When all data has been sent, the final bytes must be ESC E to end acceptance of compressed graphics data.

This command uses the SGD “apl.o.graphics_byte_width” to specify the byte width of the graphic. The default value for this setting is the width of the printhead.

Printhead Width	Dots Across	Bytes Across	Dots Per Inch
2 in.	384	48	203
3 in.	576	72	203
4 in.	832	104	203

ESC EZ

Description Goes to Easy Print mode.

Syntax <ESC>EZ

ASCII equivalent	ESC	E	Z
Decimal equivalent	27	69	90
Hex equivalent	1B	45	5A

Notes Places the printer in Easy Print mode. (You must use uppercase letters.)

ESC Hn

Description Increases the height of the font *n* times.

Syntax <ESC>H*n*

ASCII equivalent	ESC	H	<i>n</i>
Decimal equivalent	27	72	<i>n</i>
Hex equivalent	1B	48	<i>n</i>

Notes Multiply the height of the font by the number specified by *n*. This command applies to the entire line.

ESC Q n1n2

Description Advances the specified distance from the black mark

Syntax <ESC>Q *n1 n2*

ASCII equivalent	ESC	H	<i>n1n2</i>
Decimal equivalent	27	81	<i>n1n2</i>
Hex equivalent	1B	51	<i>n1n2</i>

Notes Advance the paper *n1n2* dot lines from the black mark (Q mark).

ESC R n

Description Selects an International character set.

Syntax <ESC>Rn

ASCII equivalent	ESC	R	n
Decimal equivalent	27	82	n
Hex equivalent	1B	52	n

Notes Set the value for n as described below:

n	Country
0	USA
1	France
2	Germany
3	UK
4	Denmark
5	Sweden
6	Italy
7	Spain

ESC V n1 n2

Description Enters bitmapped graphics mode.

Syntax <ESC>V n1n2

ASCII equivalent	ESC	V	n1n2
Decimal equivalent	24	86	n1n2
Hex equivalent	1B	56	n1n2

Notes In the command syntax, the next ($n1 * 254 + n2$) dot lines are printed as bitmapped graphics. The command is used to print user-generated bitmaps across the width of the printhead. After receipt of this command, the printer dumps the binary data supplied directly to the printhead. A bit set to **1** means the dot is on, and a bit set to **0** means the dot is off.

Graphics printed using this command must be the exact width of the printhead in bits. Bit 7 of the first byte of data received prints at the left-most dot on the printhead as you view the printhead with the paper feeding away from you. The printer remains in bitmapped graphics mode until the number of bytes necessary to fill the specified number of lines of print have been received by the printer.

This command uses the SGD command [apl.o.graphics_byte_width](#) to specify the byte width of the graphic. The default value for this setting is the width of the printhead.

Printhead Width	Dots Across	Bytes Across	Dots Per Inch
2 in.	384	48	203
3 in.	576	72	203
4 in.	832	104	203

ESC w n

Description Selects a font

Syntax <ESC>wn

ASCII equivalent	ESC	w	n
Decimal equivalent	27	119	n
Hex equivalent	1B	77	n

Default MF204, a 20.4 cpi font (n = 33 decimal or 21 hexadecimal)

Notes Selects a font (see [Table 7](#)), given n, a binary eight-bit number. The first three fonts in the table are permanent fonts. The next four may be removed.

Table 7 • Line Printer Mode Fonts

Name	Font Characters/Inch	ASCII	Dec	Hex	Dots Wide	Dots High	Description
MF055	5.5	#	35	23	37	39	96 chars large block
MF072	7.2	”	34	22	28	31	96 chars large block
MF102	10.2	(space) character	32	20	20	26	223 chars medium block bold
MF107	10.7	&	38	26	19	26	96 chars large block bold
MF185	18.5	\$	36	24	11	24	96 chars large block
MF204	20.4	!	33	21	10	24	224 chars block normal
MF226	22.6	%	37	25	9	24	97 chars small block
IM5X7	22.1	?	63	3F	5	7	96 chars impact 5×7
IM5X8	22.1	@	64	40	5	8	96 chars impact 5×8

Note: For more specific information about fonts, see [Table 8, Supported Fonts on page 72](#).

FF

Description Form feed (goes to top of form)

Syntax FF

ASCII equivalent	FF
Decimal equivalent	12
Hex equivalent	0C

Notes Prints the line and advances the paper to top of the next form.

LF

Description Line feed (advances paper)

Syntax LF

ASCII equivalent	FF
Decimal equivalent	10
Hex equivalent	0A

Notes Like the Carriage Return command (see [CR on page 42](#)), the Line feed command prints the line and advances the paper. Both commands are available for the convenience of programmers who may be used to using one or the other. To print and advance a number of lines, use that number of CR commands, LF commands, or a combination of the two.

SI

Description Sets single-wide print mode

Syntax SI

ASCII equivalent	SI
Decimal equivalent	15
Hex equivalent	0F

Notes Prints the current font in single width. Effectively cancels an [S0](#) (double-wide printing) command.

SO

Description Sets double-wide print mode

Syntax SO

ASCII equivalent	SO
Decimal equivalent	14
Hex equivalent	OE

Notes Prints the current font in double width until an **SI** (single-wide printing mode) command or a Carriage Return (**CR**) is received to cancel it.

Easy Print Commands

Easy Print commands have a unique syntax. The left bracket begins the command set, followed by the command. The right bracket ends the command set.



Example • For the Easy Print command `{Ahead:nnn}`, enter the following:

```
{
Ahead:nnn
}
```

Ahead Command `{AHEAD:nnn}`

Description `AHEAD:nnn` or `Ahead:nnn` or `A:nnn` advances the paper by `nnn` dotlines. The Ahead command is an alternative to manually advancing the paper.

Syntax `{AHEAD:nnn}`

Range 1–65,000

Notes The command must be enclosed in left and right brackets.

Back Command `{BACK:nnn}`

Description `BACK:nnn` or `Back:nnn` or `B:nnn` backs up the paper by `nnn` dotlines. The Back command repositions the edge of the paper for minimum paper waste.

Syntax `{BACK:nnn}`

Range 1–200

Notes The command must be enclosed in left and right brackets.

Line Printer Mode `{LP}`

Description `LP` places the printer in Line Printer mode.

Syntax `{LP}`

Notes The command must be enclosed in left and right brackets. `{LP}` is not a Line Printer Mode command. Execute this command only from the Easy Print Mode. If you execute this command from within Line Printer Mode by mistake, your label or receipt will include “{LP}” on it.

Print {Print...}

Description “Print...” initiates a limited self-test printout that includes all possible printer actions to stop the paper or rotate an image, all possible print images, and all possible options used to alter those images.

Syntax {Print,Global Options:@row,column:Name,Field Options|data|}

Parameter	Definition
{	A left bracket begins the command set.
Print,	Include a comma after the Print command if there are one or more global options. If there are no global options, follow the Print command with a colon.
Global Options:	See Names on page 54 . If more than one global option is used, separate them with commas. Follow the last global option with a colon.
@row,column:	@row,column : specifies the row and column where the text or graphic image will appear. Separate the row and column numbers with a comma (no spaces after the @ symbol or around the comma). The range for the rows is 1-65,000. In a typical print request, there may be five or more @row,column parameters for a single word Print .
Name,	Include the name of the text, barcode, line, or graphic to be printed. The name must always be five characters (no spaces), including graphics that you name yourself. See Names on page 54 for more information.
Field Options	See Field Options on page 55 . Specify the field options that will be used to increase the size of fonts, barcodes, graphics, or lines. If more than one field option is used, separate them with commas.
Data	Specify the data to be printed or turned into a barcode. Surround the data with vertical bars.
}	A right bracket ends the command set.

Notes

- The command must be enclosed in left and right brackets.
- You can use a single print command for multiple print lines (called a print request). This means that you do not have to repeat the word “Print” every time you want to print another line of text.

Print {Print...} (continued)

Global Options

AHEADnnn

nnn = 1–65,000

Advances the paper the specified number of dotlines before printing.

BACKnnn

nnn = 1–200

Backs up the paper the specified number of dotlines before printing.

QSTOPnnn

nnn = a number from 1–65,000

Stops printing nnn dotlines after sensing a black mark. The printer stops even if it has not completed the label or receipt image that it was printing.

ROTn

n = 0, 90, 180, 270

Rotates the printed image in 90-degree increments.

STOPnnn

nnn = a number from 1–65,000

Stops printing nnn dotlines after beginning printing a label or receipt image.

Print {Print...} (continued)

Names

Fonts Fonts and their 5-character names are listed in [Table 8 on page 72](#).

Barcodes

Barcode	5-Character Name
Codabar	COBAR
Code 39 (2:1 ratio)	BC39N
Code 39 (3:1 ratio)	BC39W
Code 93	BC093
Code 128	BC128
EAN-8	EAN08
EAN-13	EAN13
Interleaved 2 of 5 (ratio 2.5 to 1)	BC125
Interleaved 2 of 5 (ratio 2 to 1)	I2OF5
MSI/Plessey	PLESY
UCC/EAN-128	EN128
UPC-A	UPC-A
UPC-E	UPC-E
PDF417	PD417
Aztec	AZTEC
QR	QR_BC

Lines To draw a line, specify the type of line, the line length, and the line thickness using the parameters below. Follow the line specifications with a single vertical bar, such as

```
{PRINT: @50,20:HLINE,length 250,thick 2|}
```

HLINE or **H**

Draws a horizontal line.

VLINE or **V**

Draws a vertical line.

lengthnnn or **Lnnn**

Sets the line length to **nnn** dots

thickn or **Tn**

Sets the line thickness to **n** dots.

Print {Print...} (continued)

Field Options

HMULTn or **HMn**

n = 1–255

Enlarges text or graphics **n** times horizontally.

VMULTn or **Vn**

n = 1–255

Enlarges text or graphics **n** times vertically.

HIGHn or **Hn**

n = 1–255

Changes the height of a barcode in 5 dot intervals. Default is 5 dots.

WIDEn or **Wn**

n = 1–255

Multiplies the width of a barcode by **n**. Default is 1.

Status {S}

Description **S** returns a fixed status string, which includes paper status, head latch status, and power status.

Syntax {S}

Reply Syntax {U:1234;x;y;z;RDY}

where **x** = paper status (P for paper, N for no paper)

y = head latch (D for closed, U for open)

z = power status (O for Ok, V for voltage error)

Notes The command must be enclosed in left and right brackets.

Self Test Printout {TP}

Description **TP** initiates a self-test printout.

Syntax {TP}

Notes The command must be enclosed in left and right brackets.

Limited Self Test Printout {TP1}

Description **TP1** initiates a limited self-test printout. (Prints the same output as the {TP}, which is a two-key report.)

Syntax {TP1}

Notes The command must be enclosed in left and right brackets.

Query Commands

Query commands take the format **ESC {Query?}** where **Query** is replaced with a specific command.

ESC {BT?}

Description A BATTERY query returns the current battery voltage and temperature.

Query Syntax **ESC{BT?}**

Reply Syntax **{BT!V:x;T:x,CH:x}**



Example •

{BT!V:6.8;T:+25.8C,CH:C}

BT!	This reply is to a BATTERY query.
V:6.8	The current battery voltage is 6.8 Volts.
T:+26.0C	Battery temperature is 26.0 C.
CH:C	Complete charge.

Parameter	Reply	Definition
V = voltage	n.n	Volts
T = temperature	±nn.nC	Current temperature of the battery.
CH = charge	C	Complete
	F	Fast Charge
	I	Initialization
	N	No Charge
	T	Trickle Charge
	W	Wait to restart
SB00...SBnn = Reserved	TBD	Future option

ESC {CF?}

Description A CONFIGURATION query returns information about configurable options.

Query Syntax ESC{CF?}

Reply Syntax {CF!L:x;B:x;P:x;N:x;H:x;D:x;Y:x;S:x;T:x}



Example •

{CF!L:LP;B:096;P:N;N:8;H:B;D:+10%;Y:1;S:Y;T:0060}

CF!	This reply is to a CONFIGURATION query.
L:LP	Default mode = Line Printer mode.
B:096	Baud rate = 9600.
P:N	No parity.
N:8	8 data bits.
H:B	Hardware and software handshaking are enabled.
D:+10%	Darkness (burn time) = +10%
Y:1	Paper = single ply
S:Y	Sound = on
T:0060	Timeout = 60 seconds

Parameter	Reply	Definition
L = default mode	LP	Line Printer
	EZ	Easy Print (EZ)
B = baud rate	012, 024, 048, 096, 192, 384	1200, 2400, 4800, 9600, 19200, or 38400
P = parity	N	None
	E	Even
	O	Odd
N = number of data bits	7, 8	7 or 8 data bits
H = handshaking	N	None
	H	Hardware
	S	Software
	B	Both
D = darkness	-25% to +35%	-25%, -20%, -15%, -10%, -05%, 0%, +5%, +10%, +15%, 20%, +25%, +30%, +35%
	D	Down
Y = ply of paper	1	Single ply
	2	Double ply

Parameter	Reply	Definition
S = beeper (sound)	Y	Yes
	N	No
T = timeout value in seconds	nnnn	9999 = no timeout/always on

ESC {FM?}

Description A FORMAT query returns a list of the formats currently saved to the printer. Within a complete format definition, the query parameters are separated from each other by commas. Different formats are separated by a semicolon, carriage return, and line feed (; <CR> <LF>).

Query Syntax ESC{FM?}

Reply Syntax {FM!N5:x,L:x,UV:x,UD:x,US:x}



Example •

{FM!N5:LABEL,L:D,UV:1,UD:06/19/06,US:SHIPPING LABEL1}

FM!	This reply is to a FORMAT query.
N5:LABEL	The format's five-character name is LABEL.
L:D	This is a downloaded format.
UV:1	The user version is 1.
UD:06/19/06	The user date is 06/19/06.
US:SHIPPING LABEL1	The user descriptive summary is SHIPPING LABEL1.

Parameter	Reply	Definition
N5	xxxxx	Five-character format name
L	R = Resident	Location
	D = Downloaded	
UV	x	User version number
UD	mm/dd/yy	User date (month/day/year)
US	x...x (20 chars)	User description of format

ESC {FN?}

Description A FONT query returns a list of the available fonts (permanent and downloaded). Within a complete font definition, the query parameters are separated from each other by commas. Different fonts are separated by a semicolon, carriage return, and line feed (; <CR> <LF>).

Query Syntax ESC{FN?}

Reply Syntax {FN!N5:x,N1:x,L:x,UV:x,UD:x,US:x,CPI:x}



Example •

```
{FN!N5:MF107,N1:&(26),L:R,UV:1,UD:04/02/06,
US:96CHARS BLOCKBOLD,CPI:10.7;
```

```
N5:MF204,N1:!(21),L:D,UV:1,UD:04/02/06,
US:224 CHR BLOCK NORMAL,CPI:20.4}
```

FN!	This reply is to a FONT query.
N5:MF107	The first font has the name MF107.
N1:&(26)	The one-character name is &, which is 26 in hexadecimal.
L:R	The first font is a resident font.
UV:1	The user version is 1.
UD:04/02/06	The user date is 04/02/06.
US:96CHARS BLOCKBOLD	The font is a 96-character block bold font.
CPI:10.7	The font has 10.7 characters per inch.
N5:MF204	The next font begins and is read similarly.

Parameter	Reply	Definition
N5	xxxxx	Five-character font name
N1	x(nn)	One-character name followed by the hexadecimal value.
L	R = Resident	Location
	D = Downloaded	
UV	x	User version number
UD	mm/dd/yy	User date (month/day/year)
US	x...x (20 chars)	User description of font
CPI	nn.n	Number of font characters per inch

ESC {GR?}

Description A GRAPHICS query returns a list of the graphics that are currently downloaded to the printer. Within a complete graphic definition, the query parameters are separated from each other by commas. Different graphics are separated by a semicolon, carriage return, and line feed (; <CR> <LF>).

Query Syntax ESC{GR?}

Reply Syntax {GR!N5:x;N1:x,L:x,UV:x,UD:x,US:x}



Example •

{GR!N5:LOG01,N1:z(7A),L:D,UV:1,UD:06/19/96,US:LOG0}

GR!	This reply is to a GRAPHICS query.
N5:LOG01	The graphic has the five-character name, LOG01.
N1:z(7A)	The one-character name is z, which is 7A in hexadecimal.
L:D	This graphic was downloaded.
UV:1	The user version is 1.
UD:06/19/06	The user date is 06/19/06.
US:LOG0	The user descriptive summary is LOG0.

Parameter	Reply	Definition
N5	xxxxx	Five-character graphic name
N1	x(nn)	One-character name followed by the hexadecimal value.
L	R = Resident	Location
	D = Downloaded	
UV	x	User version number
UD	mm/dd/yy	User date (month/day/year)
US	x...x (20 chars)	User description of graphic

ESC {MY?}

Description A MEMORY query returns the size of all memory available in the printer, including the amount used and the amount remaining for the application.

Query Syntax ESC{MY?}

Reply Syntax {MY!FS:x;FM:x;RS:x;DT:x;DR:x}



Example •

{MY!FS:64M;FM:AMD;RS:8M;DT:065536;DR:063952}

MY!	This reply is to a MEMORY query.
FS:64M	The printer contains a 64 MB Flash memory.
FM:AMD	Flash manufacturer: response is always AMD.
RS:8M	RAM Size = 8M
DT:065536	Total Flash area available for download is 65,536 kilobytes.
DR:063952	Download Flash memory remaining.

Parameter	Reply	Definition
FS	nM	Flash size: n = size of the flash memory in megabytes
FM	AMD	Flash manufacturer
RS	nM	Ram size: n = size of the RAM in megabytes
DT	nnnnnn	Download total area: nnnnnn = size of Flash memory in kilobytes
DR	nnnnnn	Download Flash remaining: nnnnnn = size of the Flash memory that is free in kilobytes

ESC {PH?}

Description A PRINthead query returns information about the printhead used in the printer.

Query Syntax ESC{PH?}

Reply Syntax {PH!TD:x;DD:x;M:x;T:x}



Example •

{PH!TD:0384;DD:203;M:LPT3245;T:+31.0C}

PH!	This is a reply to a PRINthead query.
TD:0384	The print distance across the printhead is 384 dots.
DD:203	The dot density of the printhead is 203 dots per inch.
M:LPT3245	Response is always LPT3245.
T:+31.0C	The current printhead temperature is +31.0 C.

Parameter	Reply	Definition
TD	nnnn	Total number of dots across the printhead.
DD	nnn	Density of the printhead (dots per inch).
M	x...x (variable width)	Response is always LPT3245.
T	+nn.nC	Current temperature of the printhead.

ESC {RE!}

Description This command resets the printer.

Syntax ESC{RE!}

Reply Syntax ESC{RE!}

ESC {ST?}

Description A STATUS query shows whether the next print request can be done or returns information about errors from the previous print request.

Query Syntax ESC{ST?}

Reply Syntax {ST!E:x;L:x;P:x;R:x;B:x;H:x}



Example •

{ST!E:N;L:D;P:P;R:62;B:0;H:0}

ST!	This reply is to a STATUS query.
E:N	No errors were found.
L:	The printhead is latched, ready to print.
P:P	Media is present.
R:58	58K remains in the input buffer.
B:0	Battery voltage and temperature are acceptable.
H:0	The printhead temperature is acceptable.

Parameter	Reply	Definition
E = Error	N	No error *
	c	Command error (invalid command)
	d	Data error (such as a letter in a numeric-only barcode)
	f	Font not available
	g	Global parameter error
	o	Overrun of buffer *
	p	Field parameter error
	q	Black mark not found *
	r	Row/column error
	s	Syntax error
L = Lever	U	Up
	D	Down
P = Paper	P	Present
	N	Not present
R = RAM	nn	Buffer size remaining in kilobytes
B = Battery condition	O	Okay
	T	Out of temperature range
	V	Out of voltage range

* Rows marked with an asterisk apply to both Easy Print and Line Printer modes.
Rows without an asterisk apply only to Easy Print mode.

Parameter	Reply	Definition
H = Printhead temperature	O	Okay
	T	Out of range

* Rows marked with an asterisk apply to both Easy Print and Line Printer modes.
Rows without an asterisk apply only to Easy Print mode.

ESC {VR?}

Description A VERSION query returns the firmware, boot code, and download file versions.

Query Syntax ESC{VR?}

Reply Syntax {VR!F:x;C:x;B:x;D:x;H:x}



Example • {VR!F:6.65;C:5.40;B:5.10;D:1.3;H:5.08}

VR!	This reply is to a VERSION query.
F:6.65	Firmware version: response is always 6.65.
C:5.40	Communication controller version: response is always 5.40
B:5.10	Boot code version: response is always 5.10.
D:1.3	Download file version: response is always 1.3.
H:5.08	Response is always 5.08.

Parameter	Reply	Definition
F	n . nn	Firmware version
C	n . nn	Communication controller version
B	n . nn	Boot code version
D	n . n	Download (fonts, graphics, formats) version
H	n . nn	Response is always 5.08

Query Command Override

The query override command can be used to change the printer's response to an existing query or to have the printer respond to a new query. Note that, while the definition of the new response is arbitrary, the same value is sent each time the command is received. It is possible, though unlikely, that an application may require a variable response to a query command in order to function properly. If so, a modification to the printer firmware would be needed in that case.

Format: `Esc {ZQ0?} "{command?}" "{response}"`

Where:

`Esc` = 1B hex

`{ZQ0?}` = Command to create a new query/response

`"{command?}"` = the command to be overridden, such as QST, {QST}

`"{response}"` = the response to send in response to the above query, such as
`{QST:JB:1234}`



Example • Paragraph tag **x1_Example** brings up the singular word.

`Esc {ZQ0?} "{MD}" "{01/15/2008}"`

Instructs the printer to respond as follows to the MD query: `{01/15/2008}`.

Query override commands can be saved in an `autoexec.bat` or `config.sys` file.

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
<code>setvar</code>	<p>This command instructs the printer to set the RFID valid counter to zero.</p> <p><i>Format:</i> <code>! U1 setvar "apl.enable" "value"</code></p> <p><i>Values:</i></p> <p><code>"apl-o"</code> = enable Virtual Device O</p> <p><code>"none"</code> = disable any Virtual Device app (ZPL and CPCL function normally)</p>



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

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



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

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

apl.version

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

Type `getvar`

Commands	Details
<code>getvar</code>	<p><i>Format:</i> <code>! U1 getvar "apl.version"</code></p>

apl.framework_version

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

Type `getvar`

Commands	Details
<code>getvar</code>	<i>Format:</i> ! U1 <code>getvar "apl.framework_version"</code>

apl.o.graphics_byte_width

Description This command specifies the byte width of a graphic. The default value for this setting is the width of the printhead.

Printhead Width	Dots Across	Bytes Across	Dots Per Inch
2 in.	384	48	203
3 in.	576	72	203
4 in.	832	104	203

Type `setvar`

Commands	Details
<code>setvar</code>	<i>Format:</i> ! U1 <code>setvar "apl.o.graphics_byte_width" "value"</code> <i>Accepted Values:</i> 0 to the width of the printhead <i>Default Value:</i> the width of the printhead



Example • This example shows a byte width for a graphic being set at 35 bytes:

```
! U1 setvar "apl.o.graphics_byte_width" "35"
```

Supported Fonts

This section provides you with available fonts on the Zebra printers with Virtual Device-O.

Table 8 shows the standard fonts and associated character sets that are provided with Virtual Device-O.

Table 8 • Supported Fonts

5-Char Name	1-Char Name	CPI [†]	Height [‡]	Width [‡]	Character Set
MF055	# (0×23)	5.5	39	37	96 ASCII chars (0×20-0×7E) ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ' a b c d e f g h i j k l m n o p q r s t u v w x y z { } ~
MF072	" (0×22)	7.2	31	28	96 ASCII chars (0×20-0×7E) ! " # \$ % & ' () * + , . - / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ' a b c d e f g h i j k l m n o p q r s t u v w x y z { } ~

Notes

[†] CPI: Characters per inch

[‡] Height and Width: specified in dots (or pixels)

Table 8 • Supported Fonts (Continued)

[illegible]

Notes

[†] CPI: Characters per inch

[‡] Height and Width: specified in dots (or pixels)

Table 8 • Supported Fonts (Continued)

[illegible]

Notes

[†] CPI: Characters per inch

[‡] Height and Width: specified in dots (or pixels)

Table 8 • Supported Fonts (Continued)

5-Char Name	1-Char Name	CPI [†]	Height [‡]	Width [‡]	Character Set
PT06H	C (0×43)	25	12	8	96 ASCII chars (0×20-0×7E) !"#\$%&'()*+,-./0123456789:;<=>?@ ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_` abcdefghijklmnopqrstuvwxyz{ }~
PX004	a (0×61)	50	24	4	96 ASCII chars (0×20-0×7E) !"#\$%&'()*+,-./0123456789:;<=>?@ ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_` abcdefghijklmnopqrstuvwxyz{ }~ (Shown at twice its size for clarity.)
PX005	c (0×63)	40	24	5	96 ASCII chars (0×20-0×7E) !"#\$%&'()*+,-./0123456789:;<=>?@ ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_` abcdefghijklmnopqrstuvwxyz{ }~ (Shown at twice its size for clarity.)
PX007	d (0×64)	34	24	6	96 ASCII chars (0×20-0×7E) !"#\$%&'()*+,-./0123456789:;<=>?@ ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_` abcdefghijklmnopqrstuvwxyz{ }~ (Shown at twice its size for clarity.)

Notes

[†] CPI: Characters per inch[‡] Height and Width: specified in dots (or pixels)



Notes • _____

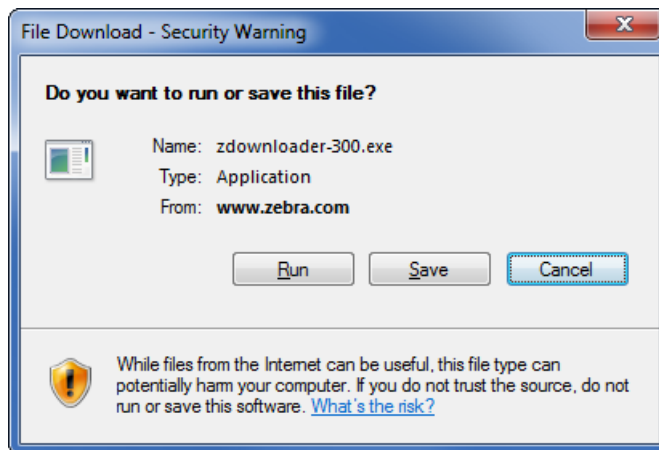
Download the ZDownloader Application

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 application, 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:

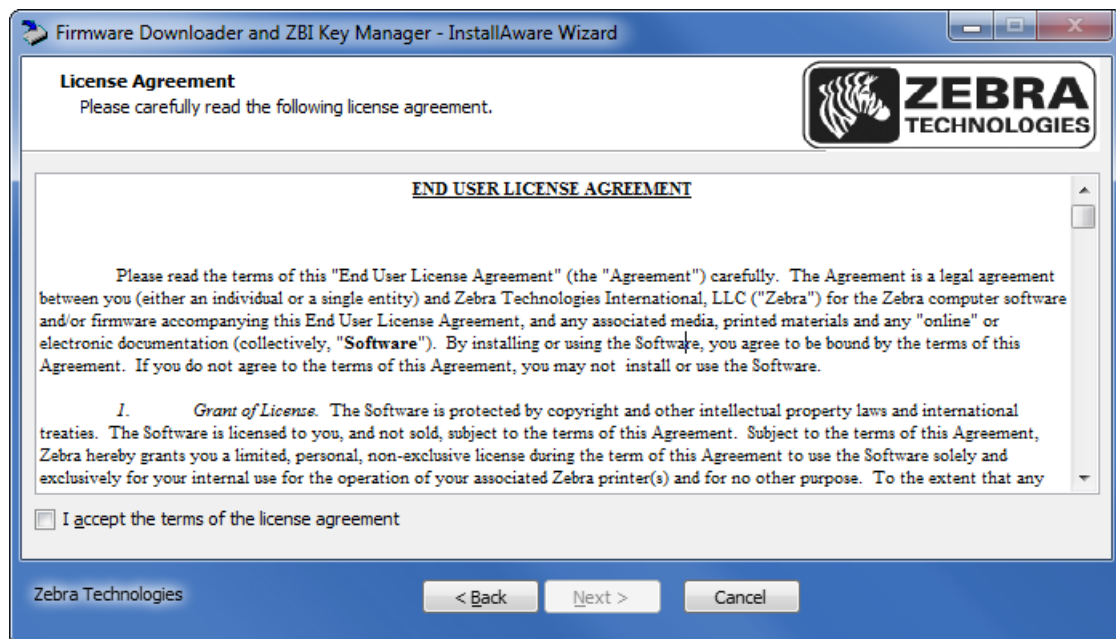


2. Click Run to run the file without downloading it, or click Save to save it your hard drive and then run it from there.

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:

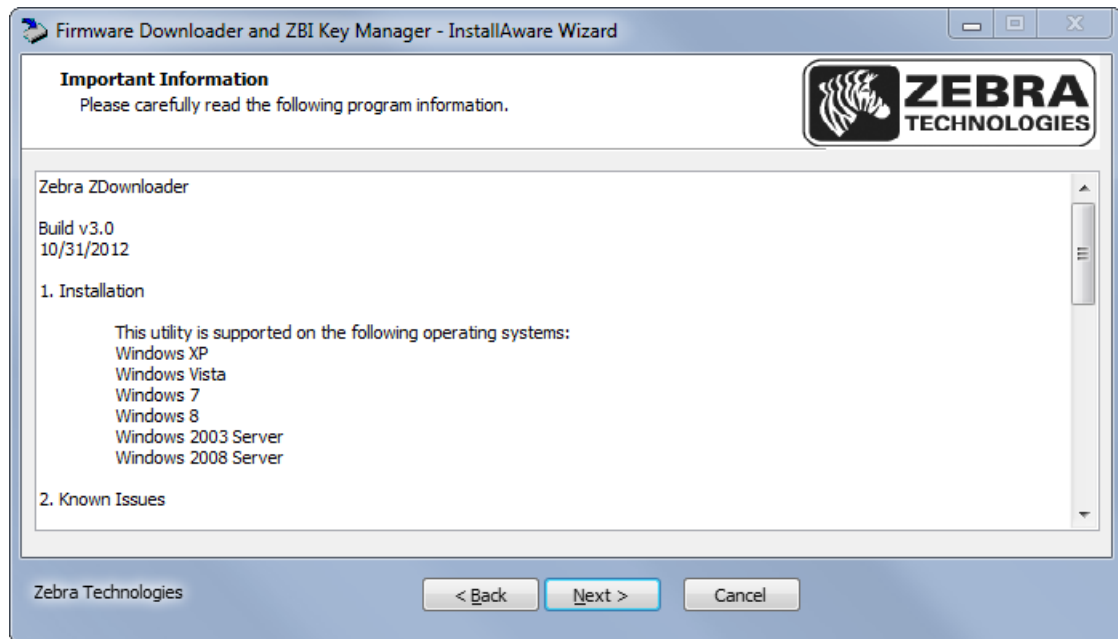


4. Click Next.
The End User Licence Agreement appears.
5. Read the terms of the agreement.



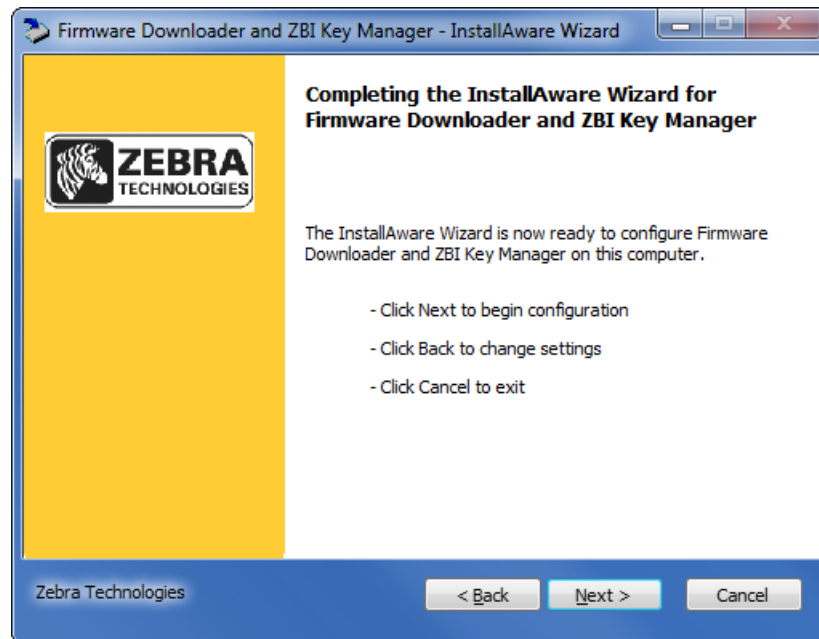
6. Click the box to accept the terms.
7. Click Next.
The installation wizard displays information about the installation.

8. Read the installation information.



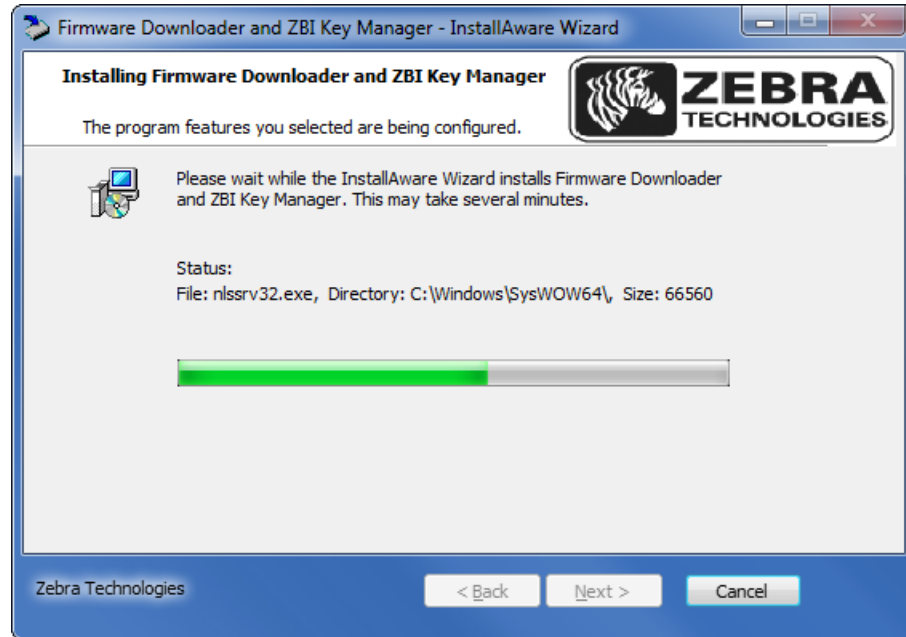
9. Click Next.

The installation wizard displays information about the installation.

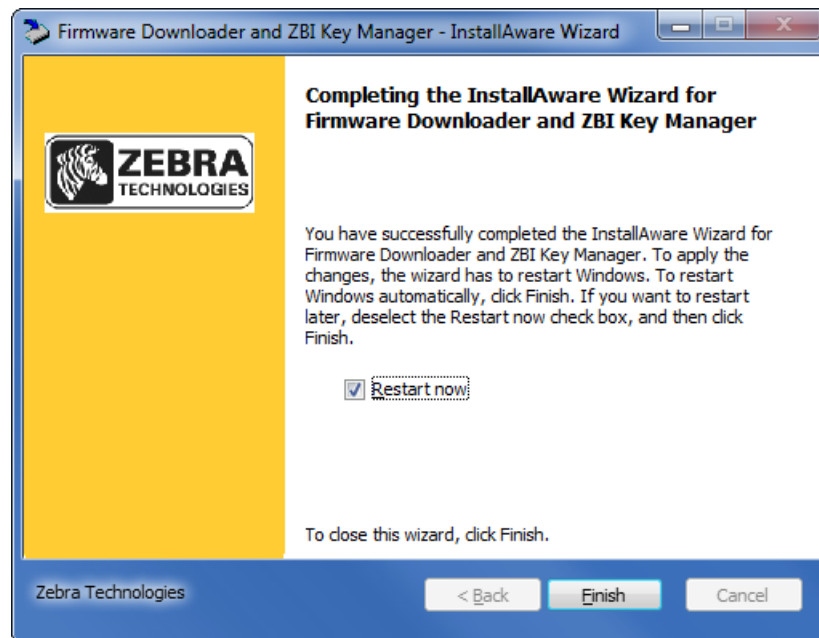


10. Click Next.

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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