Virtual Device-E

User Guide

ZEBRA

P1067298-003

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Part Number: P1067298-003 Rev. A

Contents

Introduction

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

Contents

Overview

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

Virtual Device-E Features

The Virtual Device-E application:

- Uses existing features of Zebra printers, when available.
- Offers fonts similar to the original device. These fonts will use 120 KB or more of memory space.
- Supports the Bluetooth®, Serial, Ethernet, WLAN, and USB interfaces.
- Offers many outline fonts, barcodes, and specific commands and features of target printer models (see *Supported Fonts* on page 137).
- Provides support of BIXOLON commands (see *Commands* on page 36).

Supported Printers

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

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

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

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

Configuring Network Connectivity

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

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

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

Notes

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

Install, Register, and Enable Virtual Device-E

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

Contents

Acquiring the Virtual Device Application

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

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

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

   The archive file contains the following:

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

Downloading the Virtual Device-E Application

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

- On a computer with the ZDownloader Utility

  The ZDownloader Utility is the only method shown in this manual. For instructions on how to download and install the ZDownloader Utility, see *ZDownloader Utility* on page 140.

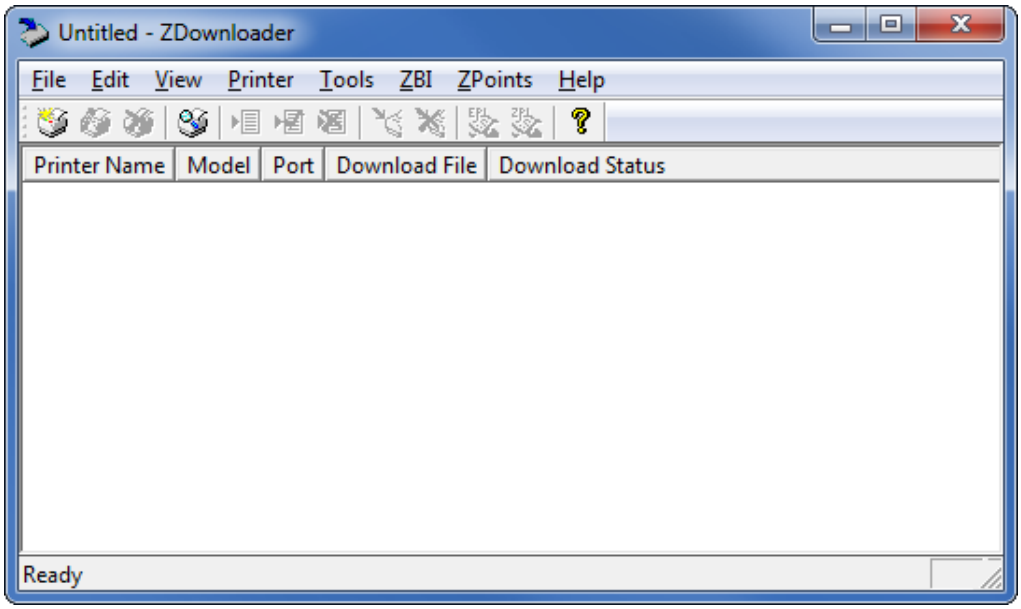
- On an Android device with the Zebra Printer Setup Utility for Android Devices (available for free on Google Play™)

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

Using ZDownloader

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

Figure 1 • Initial ZDownloader Screen



Adding Printers to the ZDownloader List

There are two ways to add printers to the list:

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

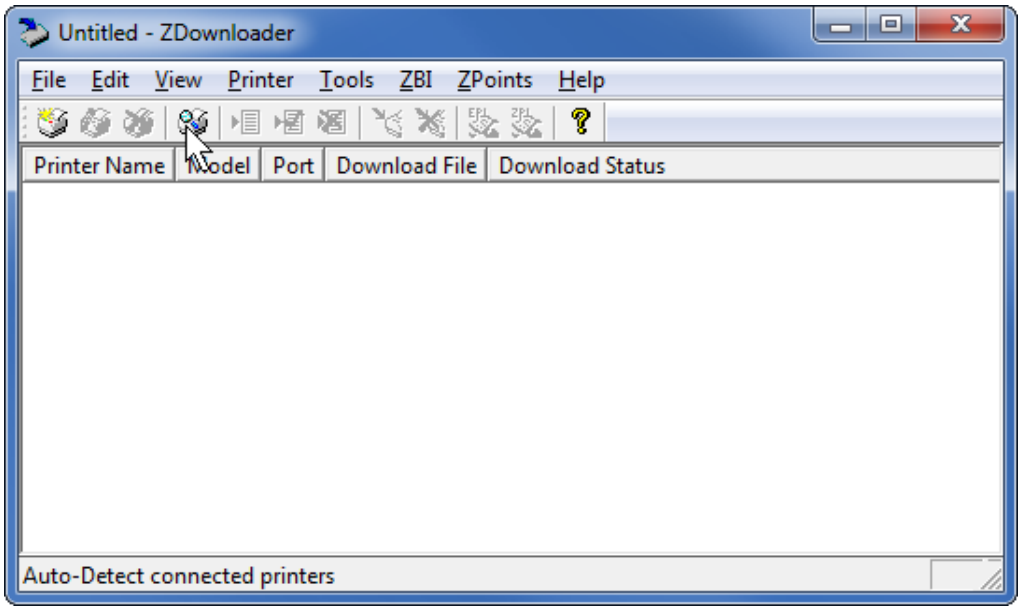
If your printer is connecting via the serial or parallel interfaces, or is not detected by using the Auto-Detect method, use the Manual Add method.

Auto-Detect Printers

Use Auto-Detect for USB or IP Ethernet interfaces.

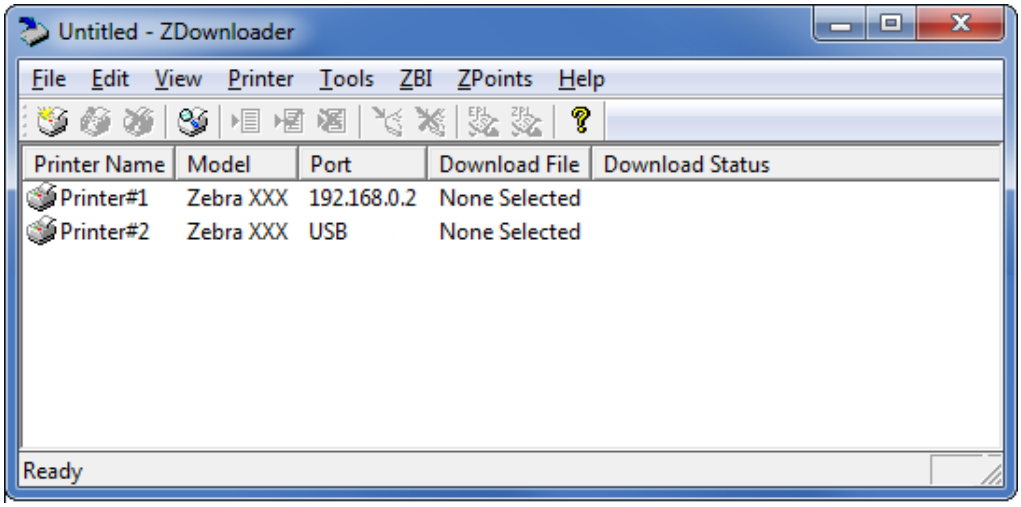
Note • Ethernet connected printers are detected by the application broadcasting a UDP packet out onto the network. UDP port number 4201 is used for the discovery process. Some networks filter out UDP packets. This means that the ZDownloader utility may not be able to detect all of the printers on your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

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



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

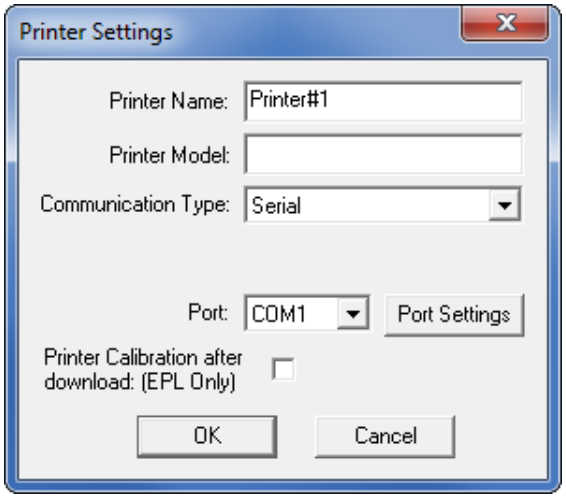
1. In the ZDownloader toolbar, select **Printer** > **Auto-Detect**.
   OR
   Right-click in the ZDownloader window and select **Auto-Detect Printers**.
   The printers detected are added to the printer list.



Manually Add Printers

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

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

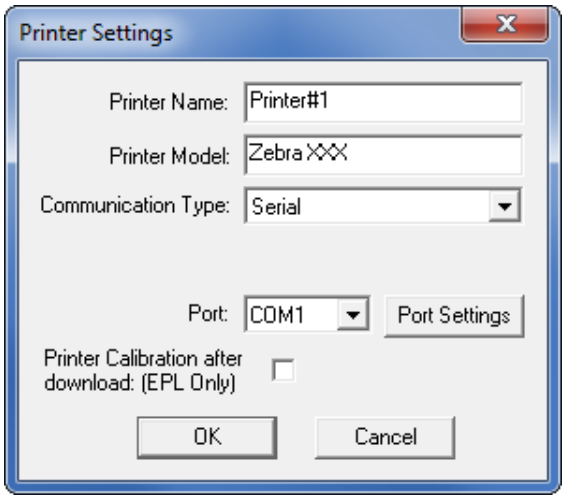


2. Add a printer name and your printer model in the appropriate fields.
3. What type of printer are you adding?

If you are adding a…	Then…
Serial Printer	Go to *Adding a Serial Printer*.
Parallel Printer	Go to *Adding a Parallel Printer* on page 18.
Network Printer	Go to *Adding a Network Printer* on page 19.

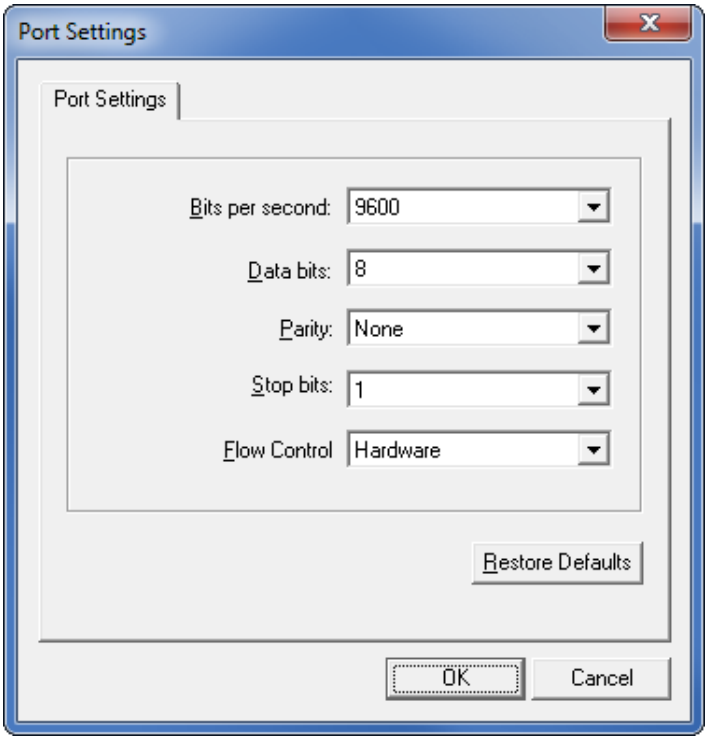
Adding a Serial Printer

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



5. Click **Port Settings**.

   The following window appears.



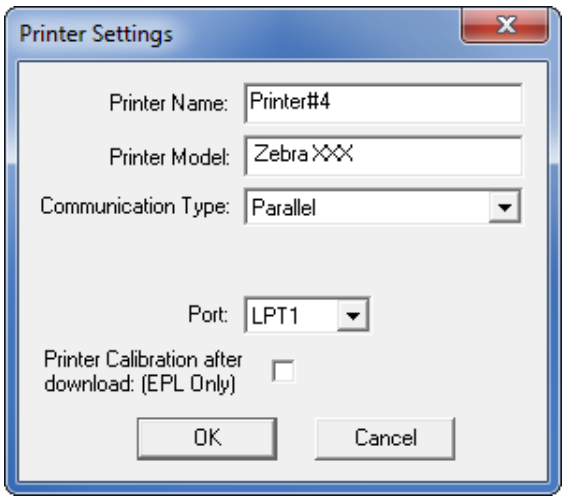
6. Adjust the settings as necessary. The printer's serial port settings must match the computer's serial port settings. For more information about the settings, refer to the User Guide for your printer.

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

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

Adding a Parallel Printer

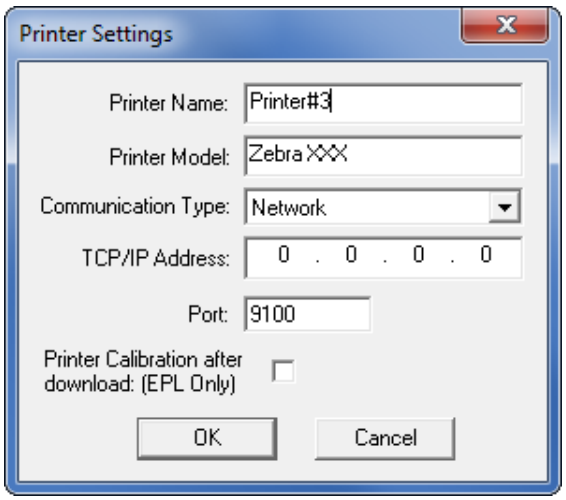
9. Set **Communication Type** to **Parallel**.
   The available parallel ports will be shown in the Port drop-down box.



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

Adding a Network Printer

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

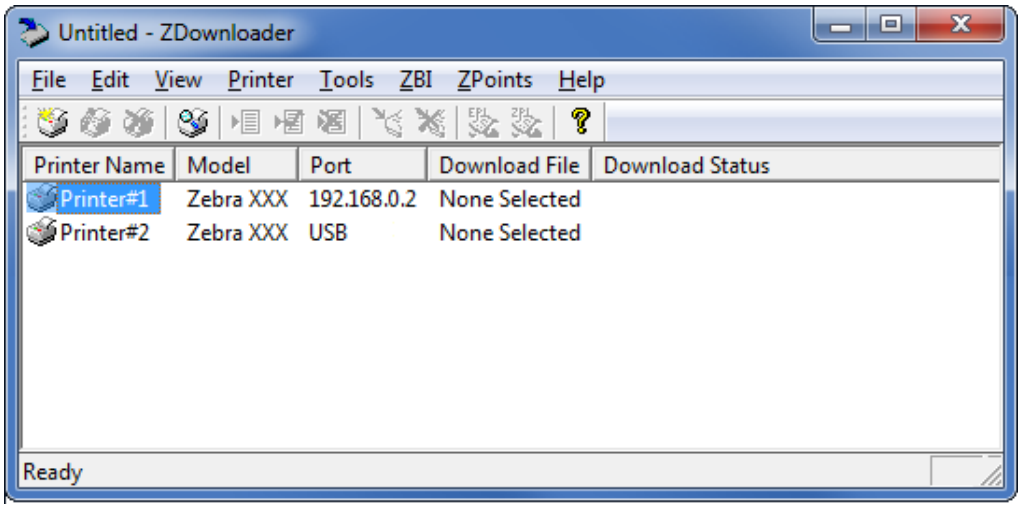


13. Enter the printer's IP address.
14. Click **OK** to save the network settings.
15. Click **OK** to add the printer.

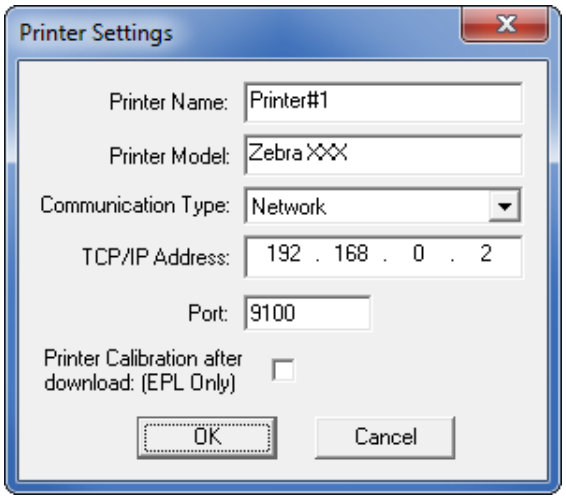
Modifying Printers in the List

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

1. Select the printer to modify.



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

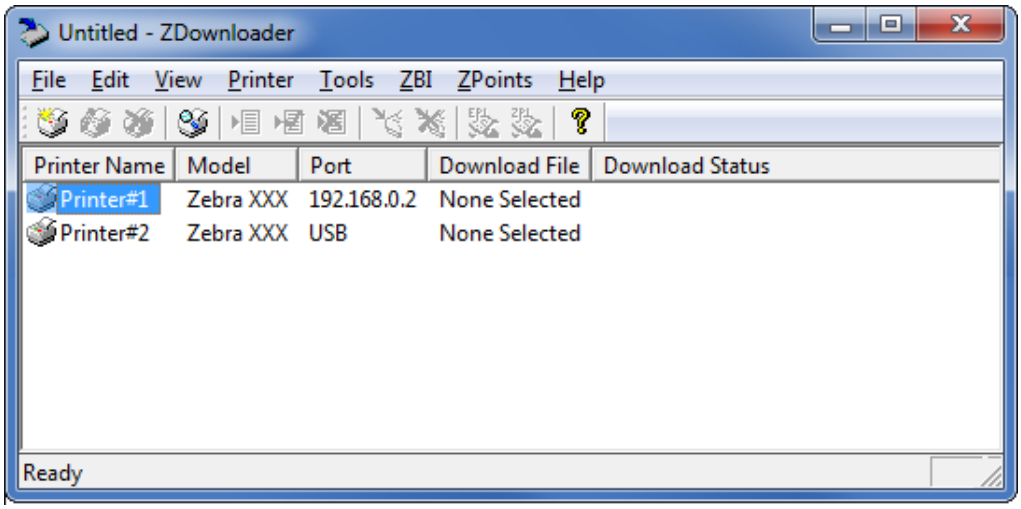


3. Modify the settings as desired.
4. Click **OK** to save the settings.

Deleting Printers from the List

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

1. Select one or more printers to delete.

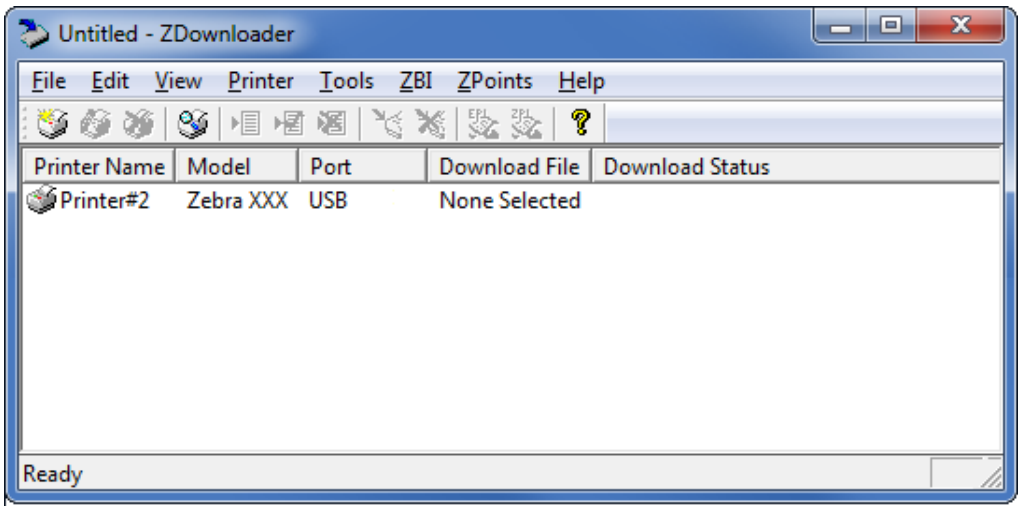


2. In the toolbar, select **Printer** > **Delete**.

   OR

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

   The printer is removed from the list.



Downloading the Virtual Device App to Selected Printers

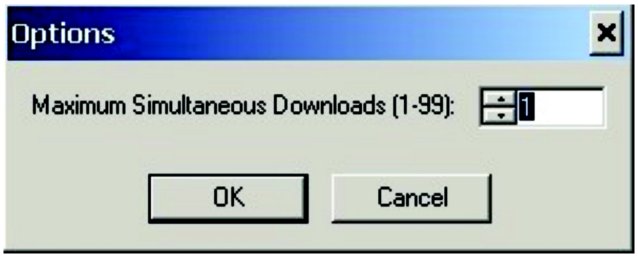
To download the Virtual Device-E app to your printer(s), you must select the file to send to each printer. ZDownloader, by default, downloads files to one printer at a time. If you have multiple printers to update and want to speed up the process, you can increase the number of simultaneous downloads.

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

To allow simultaneous downloads, perform the following step:

1. Click **Tools > Options…**.

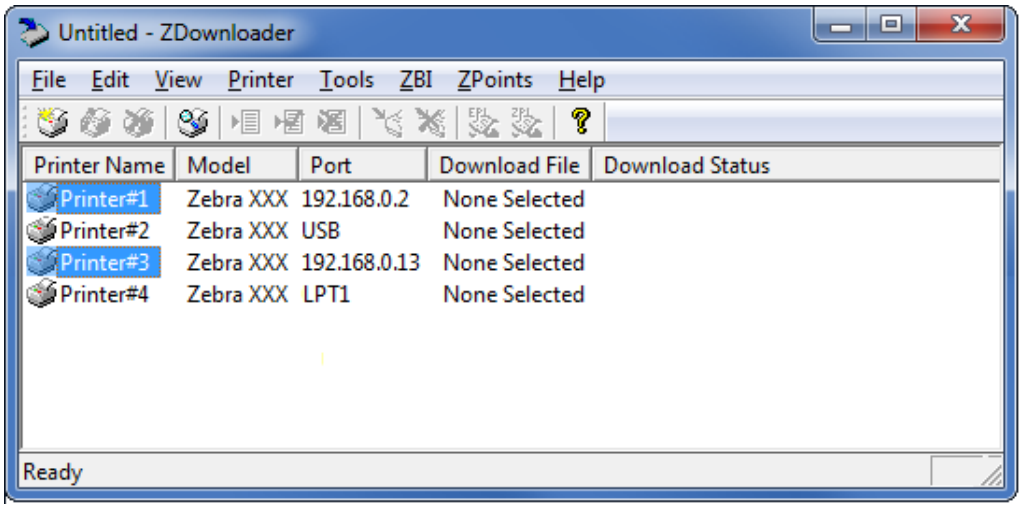
   The following prompt appears.



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

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

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



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

   OR

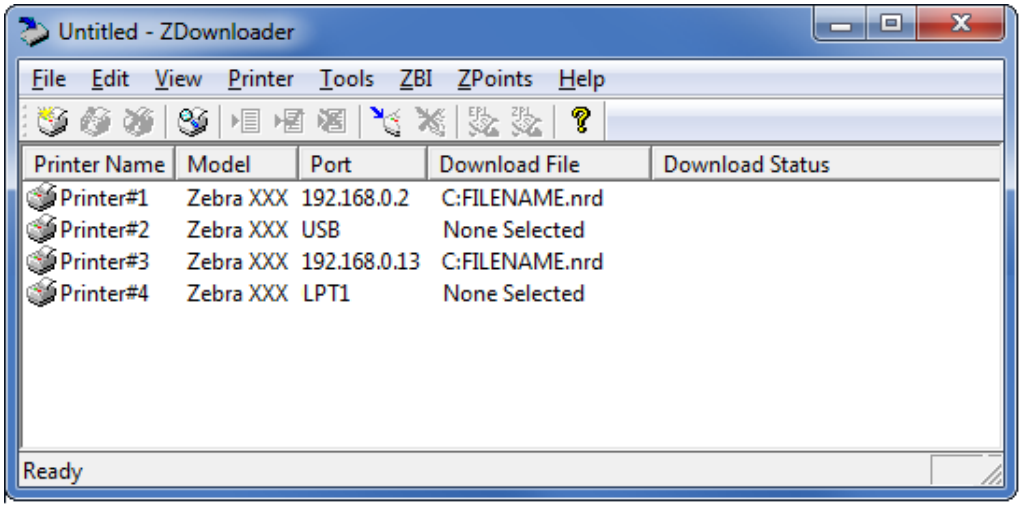
   Right-click on one of the selected printers and select **Select Firmware File…**.

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

4. Click Open.

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

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

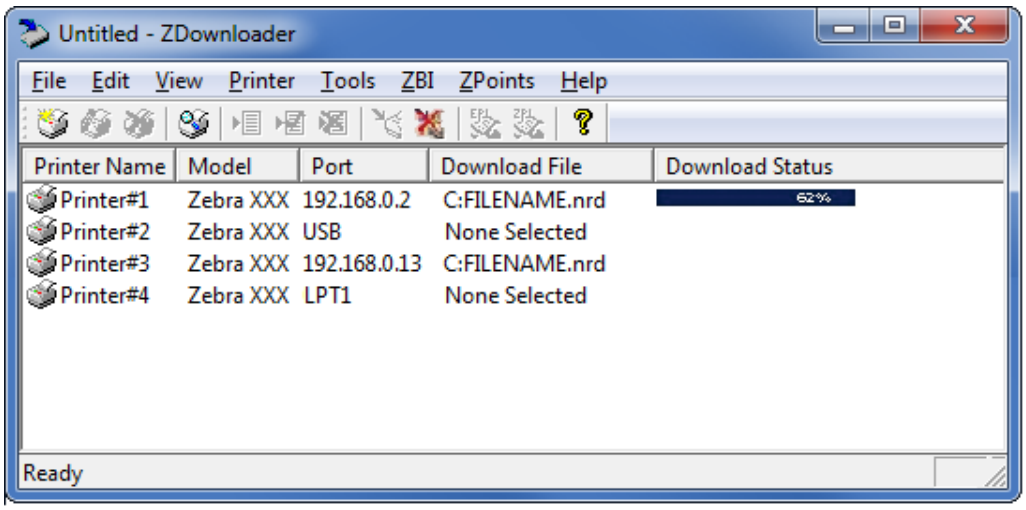


5. Start the download process by doing one of the following:
   - Select **Printer** > **Download to Selected**.
   - Select the printer(s) of interest and select the **Printer** and then select **Download To Selected**.
6. In the toolbar, select **Printer** > **Download All**.

   OR

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

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



Canceling a Download in Progress

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

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

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

   OR

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

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

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

   OR

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

Registering the Virtual Device

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

ZDownloader Log File

To send the log file, complete these steps:

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

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

Enabling the Virtual Device

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

Using an SGD Command

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

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

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 135.

Using the User Menus

This section includes instructions for the following printers:

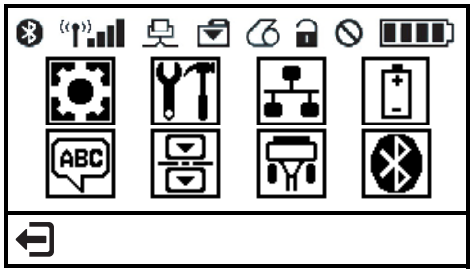
- *QLn420 Printers* on page 26
- *QLn320 and QLn220 Printers* on page 29
- *Supported ZTxxx and ZDxxx Printers with a Display* on page 32

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

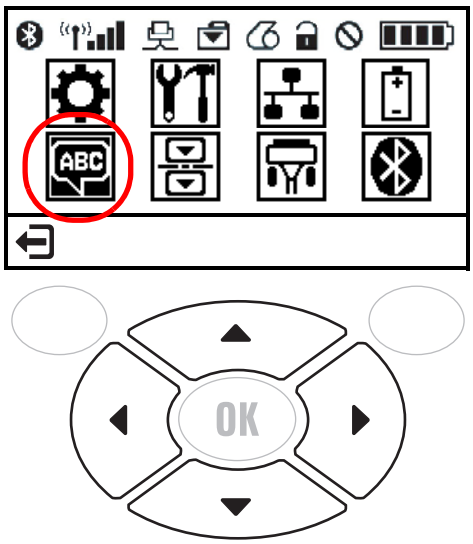
QLn420 Printers

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

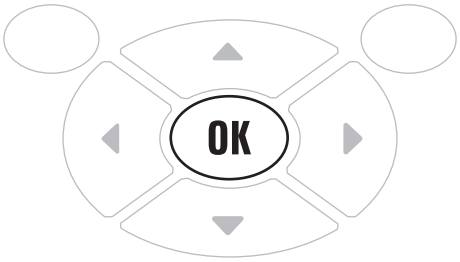
The printer displays the Home Menu.



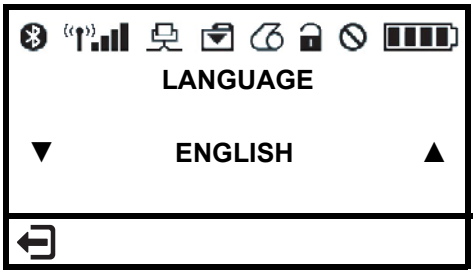
2. Use the **ARROWS** to navigate to the **LANGUAGE** menu.



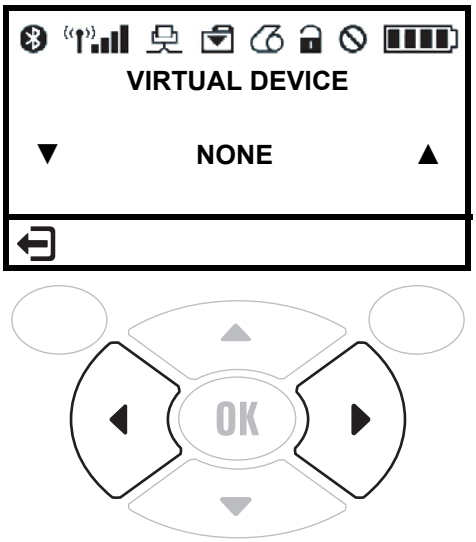
3. Press **OK**.



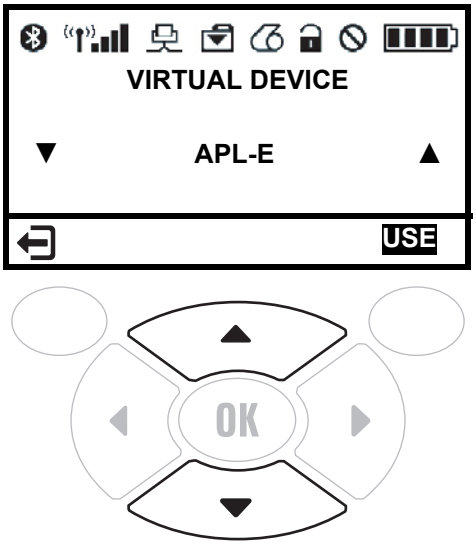
The printer displays the **LANGUAGE** selection screen.



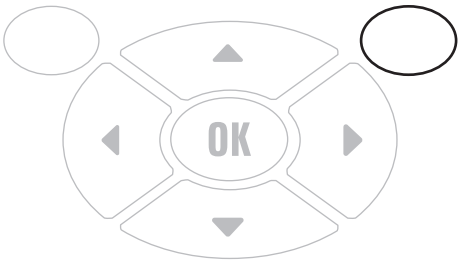
4. Use the **LEFT** or **RIGHT ARROW** to navigate to the **VIRTUAL DEVICE** selection screen.



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



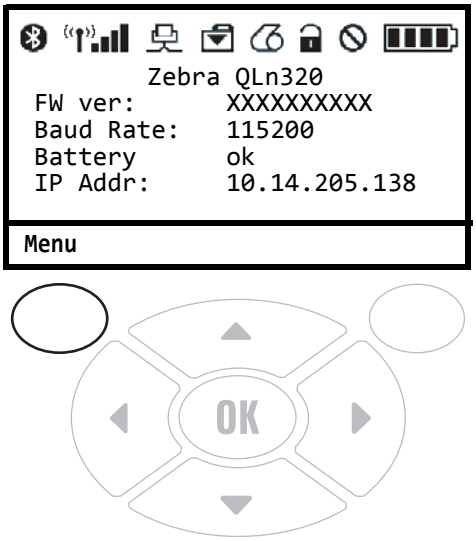
6. Press the **RIGHT SOFT KEY** to select **USE**.



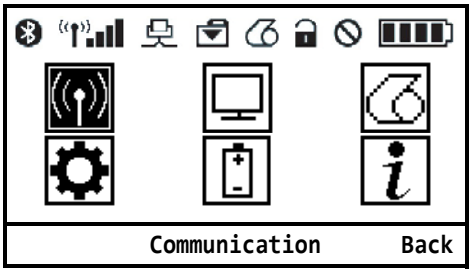
The printer restarts and uses the Virtual Device that you selected.

QLn320 and QLn220 Printers

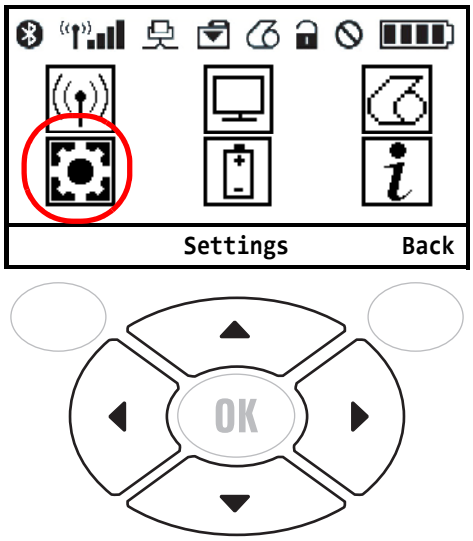
1. From the printer's idle display screen, press the **LEFT SOFT KEY** to select the Home icon.



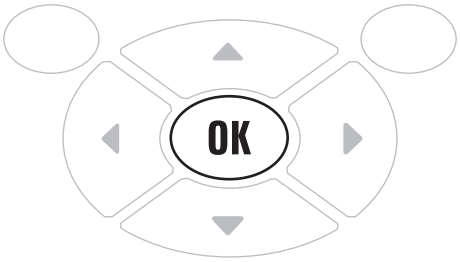
The printer displays the Home Menu.



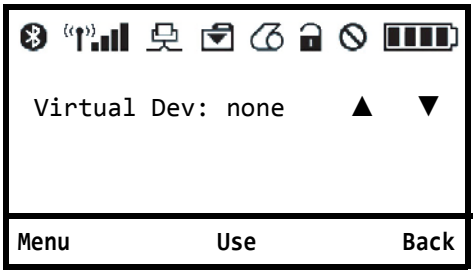
2. Use the **ARROWS** to navigate to the **SETTINGS** menu.



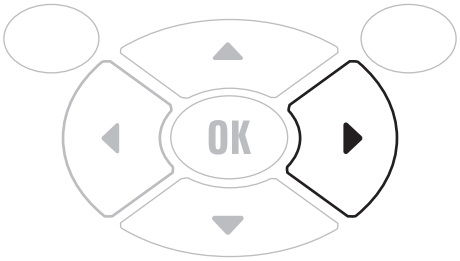
3. Press **OK**.



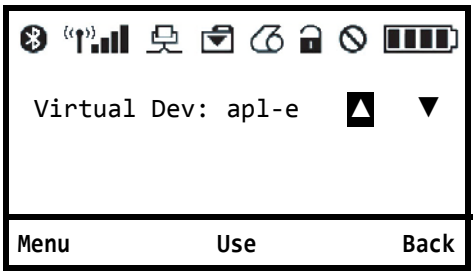
The printer displays the **VIRTUAL DEVICE** selection screen.

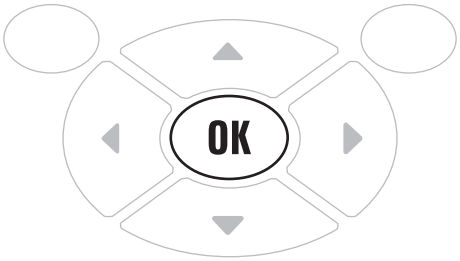


4. Press the **RIGHT ARROW** to highlight the up arrow on the display.

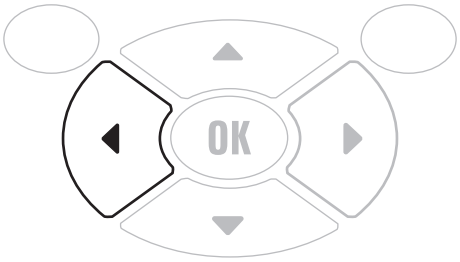


5. With the up arrow highlighted, press the **OK** button until you scroll to the **APL-E** option.

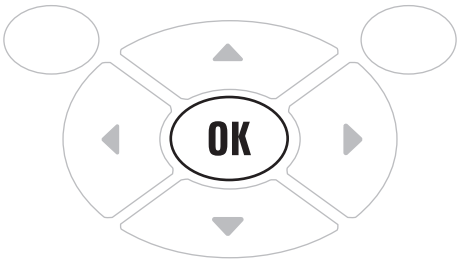




6. Press the **LEFT ARROW** to highlight **APL-E**



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



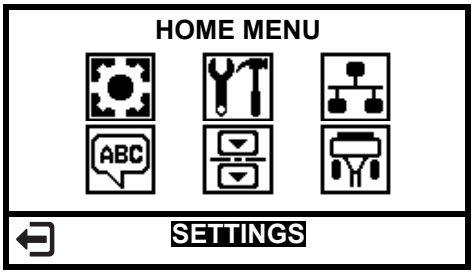
The printer restarts and uses the Virtual Device that you selected.

Supported ZTxxx and ZDxxx Printers with a Display

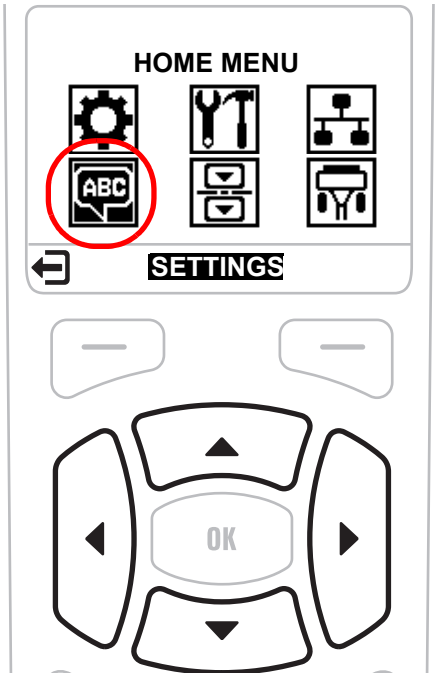
Note • The ZT230 control panel is shown in this procedure. The control panel for the other printers is similar.

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

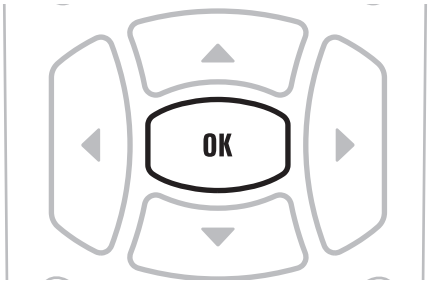
The printer displays the Home Menu.



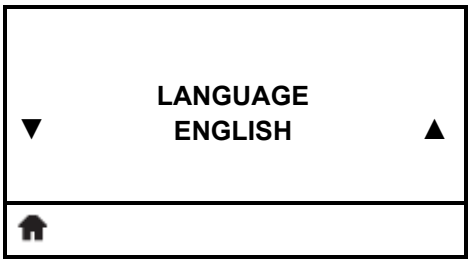
2. Use the **ARROWS** to navigate to the **LANGUAGE** menu.



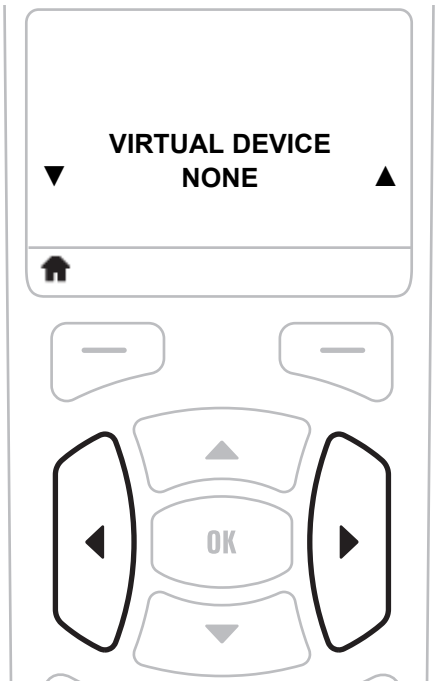
3. Press **OK**.



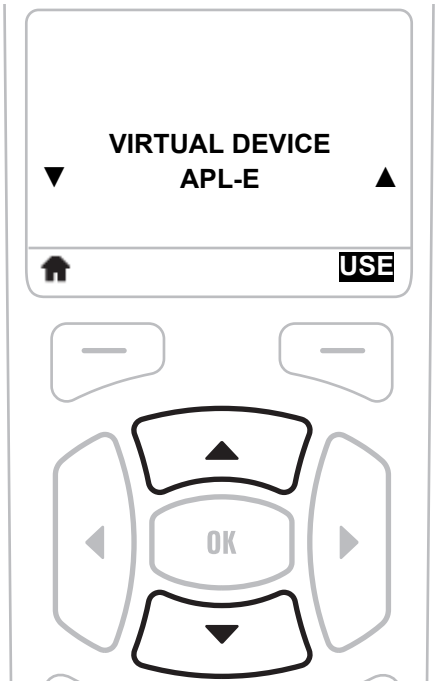
The printer displays the **LANGUAGE** selection screen.



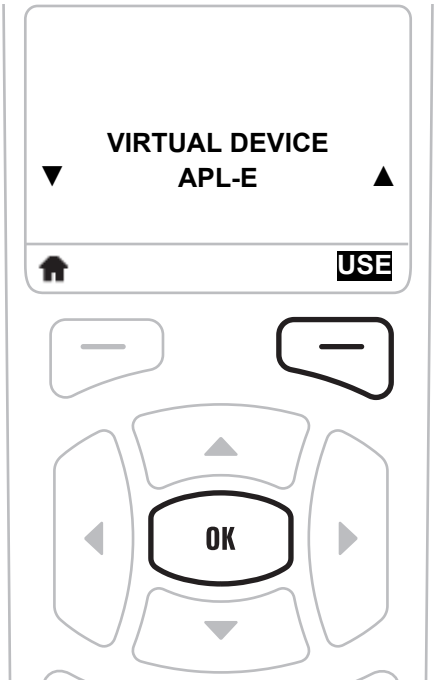
4. Use the **LEFT** or **RIGHT ARROW** to navigate to the **VIRTUAL DEVICE** selection screen.



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

Contents

Supported Commands

Command	Function
EOT on page 41	Transmit status
HT on page 43	Horizontal tab
LF on page 43	Print and line feed
FF on page 44	Form feed (in Page mode)
CR	Print and carriage return This command has no effect. Use *LF* on page 43.
DLE	Set real-time command mode Consumed, but not processed.
CAN on page 44	Cancel the print data (in Page mode)
ESC FF on page 44	Print data (in Page mode)
ESC SP on page 45	Set the character right space
ESC ! on page 45	Set print mode
ESC $ on page 46	Set absolute print position
ESC % on page 47	* Enable/disable a user-defined character set
ESC & on page 47	* Define user-defined characters
ESC ?	* Cancel the user-defined character Consumed but not processed.
ESC $	* Delete user-defined characters. Consumed but not processed.
*ESC ** on page 48	Specify bit image mode
ESC - on page 49	Turn underline mode on/off
ESC 2 on page 49	Select default line spacing
ESC 3 on page 50	Set line spacing
ESC =	Select peripheral device Consumed but not processed.
ESC @ on page 50	Initialize printer
ESC D on page 51	Set horizontal tab positions
ESC E on page 51	Turn emphasized mode on/off
ESC G on page 52	Turn double-strike mode on/off
ESC J on page 52	Print and feed paper
ESC L on page 53	Select Page mode
ESC M on page 54	Select character font
ESC R on page 55	Specify an international character set

* *Support for this command was added after the initial release. To use the command, download the latest version of the latest version of the app.*

Command	Function
ESC S on page 56	Select Standard mode
ESC T on page 57	Select print direction (in Page mode)
ESC W on page 58	Set print area (in Page mode)
ESC \ on page 59	Set relative print position
ESC a on page 60	Set position alignment
ESC d on page 60	Print and feed a specified number of lines
ESC t on page 61	Select character code table
ESC { on page 62	Select upside-down printing mode
FS p on page 63	Print the download nonvolatile bit images
FS q on page 64	Define the download nonvolatile bit image
GS ! on page 66	Select character size
GS $ on page 67	Set absolute vertical print position (in Page mode)
GS (A on page 68	Execute test print
GS (F on page 69	Set black mark control functions
GS (k on page 71	Specify and print the symbol
GS (E on page 97	Set nonvolatile user memory area
GS (L, GS 8 L on page 108	Select graphics data
GS : on page 116	Start/end macro definition
GS B on page 116	Turn reverse printing mode on/off
GS H on page 117	Select print position of HRI characters
GS I on page 118	Transmit printer ID
GS I b on page 119	Transmit battery status
GS L on page 120	Set left margin
GS T on page 121	Set print position to the beginning of print line
GS W on page 122	Set print area width
GS \ on page 123	Set relative vertical print position (in Page mode)
GS ^ on page 124	Execute macro
GS a	Enable/disable Automatic Status Back (ASB) Consumed, but not processed.
GS f on page 127	Select font for HRI characters
GS h on page 127	Specify barcode height
GS k on page 128	Print barcode
GS r on page 130	Transmit status
GS v 0 on page 131	Print raster bit image
GS w on page 132	Set barcode width
BS L A on page 133	Execute automatic calibration in Label mode

Command	Function
BS L L on page 133	Select Label mode
BS L R on page 134	Select Receipt mode
BS M on page 134	Specify font type
BS M S	Define Sentinel characters. Consumed but not processed.

Command Format

The commands in this section are presented in the following format.

Command

Description Command Function

Syntax Command format in ASCII followed by Hexadecimal and decimal equivalents (example below for EOT). Variable values are denoted by *n* (and sometimes other letters).

```
EOTn
```

ASCII	EOT	*n*
Hex	04	*n*
Decimal	4	*n*

Range The values that can be used for *n*

Default Initial value of *n* (if any)

Notes In-depth description of the command function

Differences Variations of the command, status, or results (if any)

Virtual Device-E Commands

EOT

Description Transmit Status

Syntax `EOTn`

ASCII	EOT	*n*
Hex	04	*n*
Decimal	4	*n*

Range 1 to 4

Default none

Notes Upon request, the printer status is transmitted to the host, which can check the printer operating conditions and take appropriate measures.

Based on the value of *n*, the printer transmits the following status information.

***n* = 1: Transmit printer status**

Bit	Binary	Hex	Decimal	Status
0	0	00	0	Not used. Fixed to Off
1	1	02	2	Not used. Fixed to On
2	0	00	0	Not used. Fixed to Off
	1	04	4	Not used. Fixed to Off
3	0	00	0	Not used. Fixed to Off
	1	08	8	Not used. Fixed to Off
4	1	10	16	Not used. Fixed to On
5	0	00	0	Not used. Fixed to Off
6	0	00	0	Not used. Fixed to Off
7	0	00	0	Not used. Fixed to Off

***n* = 2: Transmit offline status**

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Not used. Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	Cover is closed
	On	04	4	Cover is open
3	Off	00	0	Not used. Fixed to Off
	On	08	8	Not used. Fixed to Off
4	On	10	16	Fixed to On
5	Off	00	0	Paper is loaded in the printer.
	On	20	32	The printer is out of paper. (Media out)
6	Off	00	0	Not used. Fixed to Off
	On	40	64	Not used. Fixed to Off
7	Off	00	0	Not used. Fixed to Off

***n* = 3: Transmit error status**

Bit	Binary	Hex	Decimal	Status
0	0	00	0	Not used. Fixed to Off
1	1	02	2	Not used. Fixed to On
2	0	00	0	Not used. Fixed to Off
	1	04	4	Not used. Fixed to Off
3	0	00	0	Not used. Fixed to Off
	1	08	8	Not used. Fixed to Off
4	1	10	16	Not used. Fixed to On
5	0	00	0	Not used. Fixed to Off
	1	20	32	Not used. Fixed to Off
6	0	00	0	Not used. Fixed to Off
	1	40	64	Not used. Fixed to Off
7	0	00	0	Not used. Fixed to Off

n = 4: Transmit paper sensor status				
Bit	**Binary**	**Hex**	**Decimal**	**Status**
0	0	00	0	Not used. Fixed to Off
1	1	02	2	Not used. Fixed to On
2,3	00	00	0	Not used. Fixed to Off
	11	0C	12	Not used. Fixed to Off
4	1	10	16	Not used. Fixed to On
5,6	00	00	0	Paper end sensor: paper present
	11	60	96	Paper end sensor: paper not present
7	0	00	0	Not used. Fixed to Off

HT

Description Horizontal Tab

Syntax `HT`

ASCII	HT
Hex	09
Decimal	9

Notes This command moves the print position to the next horizontal tab position. If a horizontal tab position was not set using *ESC D* on page 51, the printer ignores this command.

When in underline mode, the printer does not underline the space created by this command.

LF

Description Print and Line Feed

Syntax `LF`

ASCII	LF
Hex	0A
Decimal	10

Notes In Standard mode, this command prints the data in the print buffer and feeds one line based on the current set line spacing. In Page mode, the printer does not print, but simply moves the print position to the beginning of the next line.

FF

Description Form Feed (Page mode)

Syntax `FF`

ASCII	FF
Hex	0C
Decimal	12

Notes This command works in Page mode, which is enabled by *ESC L* on page 53.

When `FF` is executed, the printer prints all data from the print buffer in Page mode, deletes the data, and then returns the print position to the beginning of the next line in Standard mode.

Differences After completion of printing, the printer does not clear the print buffer, and the print position moves to the beginning of the line.

CAN

Description Cancel Print Data (Page mode)

Syntax `CAN`

ASCII	CAN
Hex	18
Decimal	24

Notes `CAN` clears the print buffer.

This command works in Page mode, which is enabled by *ESC L* on page 53.

ESC FF

Description Print Data (Page mode)

Syntax `<ESC>FF`

ASCII	ESC	FF
Hex	1B	0C
Decimal	27	12

Notes `ESC FF` prints the data in the print buffer. After printing, the data in the print buffer and the setting values are not cleared, allowing the printer to print the data in the print buffer repeatedly using this command.

This command works in Page mode, which is enabled by *ESC L* on page 53. To return the printer to Standard mode, use *ESC S* on page 56 or *ESC @* on page 50.

ESC SP

Description Set the Character Right Space

Syntax <ESC>SP*n*

ASCII	ESC	SP	*n*
Hex	1B	20	*n*
Decimal	27	32	*n*

Range *n* = 0 to 255

Default *n* = 0

Notes This command sets the amount of space to the right of a character.

Right space = n × [horizontal motion units].

In a double-width mode, the right space is doubled.

Differences Horizontal motion unit varies depending on the printhead resolution.

For a 203 dpi printer, horizontal motion unit = 0.125 mm (1/203 inch)

ESC !

Description Set Print Modes

Syntax <ESC>!*n*

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

Range *n* = 0 to 255

Default *n* = 0

Notes As alternatives to this command, the following commands can be used:

- *ESC M* on page 54 to select character font
- *ESC E* on page 51 to select emphasized mode
- *ESC -* on page 49 to select underline mode. When in underline mode, the printer does not underline the space created by horizontal tabs.

Based on the value of *n*, the printer selects print mode(s) as follows.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A selected
	On	01	1	Character font B selected
1,2	Off	00	0	Reserved
3	Off	00	0	Emphasized mode not selected
	On	08	8	Emphasized mode selected
4	Off	00	0	Double-height mode not selected
	On	10	16	Double-height mode selected
5	Off	00	0	Double-width mode not selected
	On	20	32	Double-width mode selected
6	Off	00	0	Reserved
7	Off	00	0	Underline mode not selected
	On	80	128	Underline mode selected

Differences Character configuration (Font A, Font B): Font A (12 × 24), Font B (9 × 17)

ESC $

Description Set an Absolute Print Position

Syntax `<ESC>$nLnH`

ASCII	ESC	$	*nL*	*nH*
Hex	1B	24	*nL*	*nH*
Decimal	27	36	*nL*	*nH*

Range *nL* = 0 to 255
nH = 0 to 255

Default None

Notes This command specifies the next print starting position in reference to the left edge of the print area. The printing start position is calculated using:

(*nL* + *nH* × 256) × (vertical or horizontal motion units)

- In Standard mode, the horizontal motion unit is used for the calculation.
- In Page mode, the horizontal motion unit is used for the calculation when the print start position is defined to the upper right or lower right of print area (using *ESC T on page 57*). Otherwise, the vertical motion unit is used.

The printer ignores any setting values that would cause printing outside of the printable area.

Differences Horizontal and vertical motion units vary depending on the printhead resolution. For a 203 dpi printer, horizontal and vertical motion units = 0.125 mm (1/203 inch).

ESC %

Description Enable/disable a user-defined character set

Syntax <ESC % *n*

ASCII	ESC	%	*n*
Hex	1B	25	*n*
Decimal	27	37	*n*

Range *n* = 0 to 255

Default *n* = 0

Notes ESC % enables or disables a user-defined character set by assigning the Least Significant Bit (LSB) of parameter *n*. When the user-defined character set is disabled, the internal character set is enabled automatically.

- When *n* = 0, the user-defined character set is disabled
- When *n* = 1, the user-defined character set is enabled

ESC &

Description Define user-defined characters

Syntax <ESC & *y c1 c2 [x1 d1...d(y × x1)] ... [xk d1...d(y × xk)]*

ASCII	ESC	&	*y*	*c1*	*c2*	*x1 d1...d(y × x1)] ... [xk d1...d(y × xk)*
Hex	1B	26	*y*	*c1*	*c2*	*x1 d1...d(y × x1)] ... [xk d1...d(y × xk)*
Decimal	27	38	*y*	*c1*	*c2*	*x1 d1...d(y × x1)] ... [xk d1...d(y × xk)*

Range

y =

3	Font A (12x24)
2	Font B (8x16)

32 ≤ *c1* ≤ *c2* ≤ 126

x =

12	Font A (12x24)
8	Font B (8x16)

d1...d (y × xk) = 0 to 255

k = *c2* – *c1* + 1

Parameter *y* defines the number of bytes in the vertical direction while parameter x specifies the number of horizontal dots for the font of the user-defined character.

Parameters *c1* and *c2* specify the starting and ending code of the characters, respectively. If only one character is defined, *c1* = *c2*.

Parameters *d1*, *d2*, ... *d(y × xk)* are the dot data of the metrics of user-defined characters.To print a dot, *dn* = 1.

y × x bytes = the total length of the data of the user-defined characters. The maximum for Font A is 36 bytes and for Font B is 16 bytes.

Notes ESC & creates user-defined characters. This command can define user-defined characters of the same code for different fonts.

User-defined characters are cleared when the following occur:

- ESC @ is executed
- ESC ? is executed
- The printer is reset or power cycled.

Example ESC *

Description Specify Bit Image Mode

Syntax <ESC>*m*nLnH d1...dk*

ASCII	ESC	*	*m*	*nL*	*nH*	*d1...dk*
Hex	1B	2A	*m*	*nL*	*nH*	*d1...dk*
Decimal	27	42	*m*	*nL*	*nH*	*d1...dk*

Range *m* = 0, 1, 32, 33
nL = 0 to 255
nH = 0 to 3
d = 0 to 255

- *d* specifies the bit image data with 1 for printed data and 0 for not printed.
- *k* denotes the number of horizontal dots.

Default None

Notes ESC * specifies the bit image for the mode (*m*) as to the number of dots specified by *nL* and *nH*.

ESC -

Description Turn Underline Mode On/Off

Syntax <ESC>-*n*

ASCII	ESC	-	*n*
Hex	1B	2D	*n*
Decimal	27	45	*n*

Range *n* = 0, 1, 2, 48, 49, 50

Default *n* = 0

Notes This command enables the text following it to be underlined. Using bit 7 of *ESC !* on page 45 also activates/deactivates underline mode.

The underline style varies depending on the value of *n*:

n	Function
0, 48	Turns off underline mode
1, 49	Turns on underline mode, set at 1-dot thick
2, 50	Turns on underline mode, set at 2-dot thick

When in underline mode, the printer does not underline the space created by horizontal tabs.

ESC 2

Description Select Default Line Spacing

Syntax <ESC>2

ASCII	ESC	2
Hex	1B	32
Decimal	27	50

Notes This command changes the default line spacing, which can be set for Standard mode and Page mode independently of each other. The initial default line spacing is 3.75 mm (30 dots).

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

ESC 3

Description Set Line Spacing

Syntax <ESC>3*n*

ASCII	ESC	3	*n*
Hex	1B	33	*n*
Decimal	27	51	*n*

Range *n* = 0 to 255

Default 3.75 mm (30 dots) or the line spacing defined by *ESC 2* on page 49

Notes Line spacing can be set for Standard mode and Page mode independently of each other.

ESC @

Description Initialize Printer

Syntax <ESC>@

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

Notes This command cancels conditions previously set and resets the printer to the conditions that existed at power on:

- The data in the print buffer is cleared.
- The data in the receive buffer is not discarded.
- All settings, such as print mode and line feed, are cleared.
- Nonvolatile graphics and nonvolatile user memory are not cleared.

When the printer receives this command in Page mode, the printer removes the data in print areas, restores the initial settings, and returns to Standard mode.

ESC D

Description Set Horizontal Tab Position

Syntax <ESC>D*n*NUL

ASCII	ESC	D	*n*	NUL
Hex	1B	44	*n*	00
Decimal	27	68	*n*	0

Range *n* = 1 to 255

Default *n* = 8

Notes This command sets a horizontal tab position at *n*, which indicates the number of columns from the beginning of the line to the tab position. The horizontal tab position is stored as a value of [character width × *n*] measured form the beginning of the line.

- The data *n* signifies the set position and ends with a NUL code. The command reads until the NUL code, but only the first value is used for the horizontal tab position.
- ESC D NUL cancels all horizontal tab positions.
- Tab position is set at the value of [character width × *n*] from the beginning of the line. The character width includes the space to the right of the character. This width is doubled when double width characters are selected.
- The horizontal tab position remains unchanged if the character width changes.

ESC E

Description Turn Emphasized Mode On/Off

Syntax <ESC>E*n*

ASCII	ESC	E	*n*
Hex	1B	45	*n*
Decimal	27	69	*n*

Range *n* = 0 to 255

Default *n* = 0

Notes ESC E turns emphasized mode on or off by toggling the least significant bit (LSB) of *n* as follows.

- When the LSB of *n* is 0, emphasized mode is turned off.
- When the LSB of *n* is 1, emphasized mode is turned on.

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

ESC G

Description Turn Double-Strike Mode On/Off

Syntax <ESC>G*n*

ASCII	ESC	G	*n*
Hex	1B	47	*n*
Decimal	27	71	*n*

Range *n* = 0 to 255

Default *n* = 0

Notes ESC E turns double-strike mode on or off by toggling the least significant bit (LSB) of n as follows.

- When the LSB of *n* is 0, double-strike mode is turned off.
- When the LSB of *n* is 1, double-strike mode is turned on.

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

ESC J

Description Print and Feed Paper

Syntax <ESC>J*n*

ASCII	ESC	J	*n*
Hex	1B	4A	*n*
Decimal	27	74	*n*

Range *n* = 0 to 255 dots

Default None

Notes ESC J prints the data in the print buffer and feeds the paper by the number of dots specified by *n*.

ESC L

Description Select Page Mode

Syntax <ESC>L

ASCII	ESC	L
Hex	1B	4C
Decimal	27	76

Notes This command switches the printer from Standard mode to Page mode. For printing in Page mode, *ESC T* on page 57 defines the print direction and starting position within the print area specified by *ESC W* on page 58.

The following commands are defined independently in Standard mode and Page mode.

- *ESC SP* on page 45
- *ESC 2* on page 49
- *ESC 3* on page 50

The following commands are inactive in Page mode.

- *ESC L* on page 53
- *FS q* on page 64
- *GS (A* on page 68
- *GS (E* on page 97
- *GS T* on page 121

The following commands are ignored in Page mode. Any conditions set by these commands in Page mode are available when the printer returns to Standard mode.

- *ESC a* on page 60
- *ESC {* on page 62
- *GS L* on page 120
- *GS W* on page 122

The printer returns to Standard mode when you use the following commands:

- *FF* on page 44
- *ESC @* on page 50
- *ESC S* on page 56

In Page mode, the Form Feed command (*FF* on page 44) prompts printing of data in the print buffer. *LF* on page 43, *ESC D* on page 51, and *ESC J* on page 52 move the print position without actually printing.

ESC M

Description Select Character Font

Syntax <ESC>M*n*

ASCII	ESC	M	*n*
Hex	1B	4D	*n*
Decimal	27	77	*n*

Range *n* = 0, 1, 2, 48, 49, 50, 67, 68, 69, 70, 71, 72, 73

Default *n* = 0

Notes This command selects 1-byte character fonts as defined by *n*.

n	Function
0, 48	Character Font A (12 × 24) selected
1, 49	Character Font B (9 × 17) selected
2, 50	Character Font C (9 × 24) selected

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

Differences Configuration of Fonts A, B, and C: Font A (12 × 24), Font B (9 × 17), Font C (9 × 24)

ESC R

Description Specify International Character Set

Syntax <ESC>R*n*

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

Range *n* = 0 to 10

Default *n* = 0

Notes This command specifies international characters.

n	Character set	n	Character set
0	U.S.A.	5	Sweden
1	France	6	Italy
2	Germany	7	Spain I
3	U.K	9	Norway
4	Denmark I	10	Denmark II

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

ESC S

Description Select Standard Mode

Syntax <ESC>S

ASCII	ESC	S
Hex	1B	53
Decimal	27	83

Notes This command enables Standard mode.

The data in the print buffer is cleared, and any changes made by *ESC W* on page 58 return to the default.

The following commands are defined independently in Standard mode and Page mode.

- *ESC SP* on page 45
- *ESC 2* on page 49
- *ESC 3* on page 50

The following commands are ignored in Standard mode.

- *CAN* on page 44
- *ESC FF* on page 44
- *GS $* on page 67
- *GS * on page 123

ESC T

Description Select Print Direction (Page mode)

Syntax <ESC>T*n*

ASCII	ESC	T	*n*
Hex	1B	54	*n*
Decimal	27	84	*n*

Range *n* = 0 to 3, 48 to 51

n	Print Direction	Starting Print Position
0, 48	Left right	Upper left
1,49	Bottom to top	Lower left
2, 50	Right left	Lower right
3, 51	Top bottom	Upper right

Default *n* = 0

Notes In Page mode, ESC T specifies the print direction and the starting print position. In Standard mode, ESC T specifies the print direction but does not effect the starting print position. If the command is processed in Standard mode, any changes take effect when the printer changes to Page mode.

The starting print position set by this command determines whether the horizontal motion unit or vertical motion unit is used for some commands.

When the starting print position is the...	Horizontal motion unit is used for:	Vertical motion unit is used for:
upper left or lower right of the print area	• *ESC SP* on page 45 • *ESC $* on page 46 • *ESC * on page 59	• *ESC 3* on page 50 • *ESC J* on page 52 • *GS $* on page 67 • *GS * on page 123
upper right or lower left of the print area	• *ESC 3* on page 50 • *ESC J* on page 52 • *GS $* on page 67 • *GS * on page 123	• *ESC SP* on page 45 • *ESC $* on page 46 • *ESC * on page 59

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

ESC W

Description Set Print Area (Page mode)

Syntax <ESC>W *xL xH yL yH dxL dxH dyL dyH*

ASCII	ESC	W	*xL*	*xH*	*yL*	*yH*	*dxL*	*dxH*	*dyL*	*dyH*
Hex	1B	57	*xL*	*xH*	*yL*	*yH*	*dxL*	*dxH*	*dyL*	*dyH*
Decimal	27	87	*xL*	*xH*	*yL*	*yH*	*dxL*	*dxH*	*dyL*	*dyH*

Range

0 ? (*xL* + *xH* × 256) ? 65535 (0 ? *xL* ? 255, 0 ? *xH* ? 255)
0 ? (*yL* + *yH* × 256) ? 65535 (0 ? *yL* ? 255, 0 ? *yH* ? 255)
1 ? (*dxL* + *dxH* × 256) ? 65535 (0 ? *dxL* ? 255, 0 ? *dxH* ? 255)
1 ? (*dyL* + *dyH* × 256) ? 65535 (0 ? *dyL* ? 255, 0 ? *dyH* ? 255)

Default When paper width of 48mm is selected:

(*xL* + *xH* × 256) = 0 (*xL* = 0, *xH* = 0)
(*yL* + *yH* × 256) = 0 (*yL* = 0, *yH* = 0)
(*dxL* + *dxH* × 256) = 384 (*dxL* = 80, *dxH* = 1)
(*dyL* + *dyH* × 256) = 2400 (*dyL* = 60, *dyH* = 9)

Notes ESC W sets the position and the size of the printing area in Page mode as follows.

- Horizontal starting position = [(*xL* + *xH* × 256) × (horizontal motion units)]
- Vertical starting position = [(*yL* + *yH* × 256) × (vertical motion units)]
- Horizontal printing area width = [(*dxL* + *dxH* × 256) × (horizontal motion units)]
- Vertical printing area width = [(*dyL* + *dyH* × 256) × (vertical motion units)]

If the following condition exists...	**Then...**
The horizontal and vertical starting positions are out of the printable area	The ESC W command is ignored, and any data that follows is processed normally.
(Horizontal starting position + Horizontal printing area width) is outside of the printable area	The Horizontal printing area width is set to (Horizontal printing area - Horizontal starting position).
(Vertical starting position + Vertical printing area width) is outside of the printable area	The Vertical printing area width is set to (Vertical printing area - Vertical starting position).

In Standard mode, `ESC W` is ignored. If the command is processed in Standard mode, any changes take effect when the printer changes to Page mode.

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

Differences The maximum printable area varies by printer model.

ESC \

Description Set Relative Print Position

Syntax `<ESC>\nLnH`

ASCII	ESC	\	*nL*	*nH*
Hex	1B	5C	*nL*	*nH*
Decimal	27	92	*nL*	*nH*

Range *nL* = 0 to 255, *nH* = 0 to 255
0 ? (*nL* + *nH* × 256) ? 65535

Default None

Notes This command sets the print starting position based on the current position to [(*nL* + *nH* × 256) × horizontal or vertical motion unit]

The print starting position is moved to (*nL* + *nH* × 256) in the right direction based on the current position. The printer ignores this command when any setting exceeds the print area.

- In Standard mode, the vertical motion unit is used for the calculation.
- In Page mode, the horizontal motion unit is used for the calculation when the print start position is defined to the upper right or lower right of print area (using *ESC T* on page 57). Otherwise, the vertical motion unit is used.

When in underline mode, the printer does not underline the space created by this command.

ESC a

Description Set Position Alignment

Syntax <ESC>a*n*

ASCII	ESC	a	*n*
Hex	1B	61	*n*
Decimal	27	97	*n*

Range *n* = 0 to 2, 48 to 50

n	Alignment
0, 48	Left alignment
1, 49	Center alignment
2, 50	Right alignment

Default *n* = 0

Notes In Standard mode, ESC a specifies position alignment for all data in one line. In Page mode, ESC a is ignored. If the command is processed in Page mode, any changes take effect when the printer changes to Standard mode.

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

ESC d

Description Print and Feed a Specified Number of Lines

Syntax <ESC>d*n*

ASCII	ESC	d	*n*
Hex	1B	64	*n*
Decimal	27	100	*n*

Range *n* = 0 to 255

Default None

Notes This command feeds the paper by n lines after printing the data in the print buffer. In Page mode, the printer does not print, but simply moves the print position the specified number of lines. The amount fed for each line is based on the values set by the line spacing commands (*ESC 2* on page 49 and *ESC 3* on page 50).

If the feed amount is set to a value greater than the maximum feed value of 255 lines, the printer defaults to 255.

ESC t

Description Select a Character Code Table

Syntax <ESC>t*n*

ASCII	ESC	t	*n*
Hex	1B	74	*n*
Decimal	27	116	*n*

Range *n* = one of the following values:

n	Code page	
0	Page 0	437 (USA, Standard Europe)
2	Page 2	850 (Multilingual)
16	Page 16	1252 (Latin 1)
28	Page 28	1251 (Cyrillic)

For additional code page support, contact Zebra Technologies.

Default *n* = 0

Notes This command assigns the code page specified by *n*.

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

ESC {

Description Set Upside-Down Printing Mode

Syntax <ESC>{*n*

ASCII	ESC	{	*n*
Hex	1B	7B	*n*
Decimal	27	123	*n*

Range *n* = 0 to 255

Default *n* = 0

Notes In Standard mode, this command specifies upside-down printing mode according to the least significant bit (LSB). This command is valid only when entered at the beginning of the line.

In Page mode, ESC {is ignored. If the command is processed in Page mode, any changes take effect when the printer changes to Standard mode.

LSB	Upside-down mode	
0	Turned off (characters print right-side-up from left to right)	Example of non-rotated text
1	Turned on (characters print upside-down from right to left)	Example of rotated text

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

FS p

Description Print Nonvolatile Bit Images

Syntax `FSpnm`

ASCII	FS	p	*n*	*m*
Hex	1C	70	*n*	*m*
Decimal	28	112	*n*	*m*

Range *n* = 1 to 255
m = 0 to 3, 48 to 51

Default None

Notes This command prints the nonvolatile bit images (*n*) using the mode specified by *m*. The download nonvolatile bit image refers to the image that was defined by *FS q* on page 64 in the nonvolatile memory. If the image is not defined, this command is invalid.

m	Mode	Vertical dot density (DPI)	Horizontal dot density (DPI)
0, 48	Normal	203	203
1, 49	Double-width	203	203/2
2, 50	Double-height	203/2	203
3, 51	Quadruple	203/2	203/2

In Standard mode, this command is valid only when the print buffer is empty. In Page mode, this command is invalid. Printing modes other than upside-down printing are unaffected by this command.

When the print area set by the functions *GS L* on page 120 and *GS W* on page 122 is not enough for one vertical line of the download NV bit image, the line is dealt with as follows. One vertical line of the bit image is one dot in normal mode (*m* = 0, 48) and double height mode (*m* = 2, 50). It is two dots in double width mode (*m* = 1, 49) and quadruple size mode (*m* = 3, 51).

1. The printing area is extended to the right side within the limits of the printing area so that one vertical line of the download NV bit image can be printed.
2. When a sufficient printing area cannot be maintained even after executing number 1, the printing area is extended to the left side. (The left margin is reduced.)

When the size of a bit image exceeds the limits of the print area, the printer prints the data inside the limits of the print area, but not the parts exceeding the limit. When bit image printing is complete, the head of the line is used for the next printing position, and normal data processing takes place.

No matter what line feed distance is set with *ESC 2* on page 49 and *ESC 3* on page 50, normal mode and double width mode execute a paper feed equal to the height *n* of the nonvolatile bit image (in dots) while double height mode and quadruple size mode execute a paper feed equal to the height *n* of the nonvolatile bit image × 2 (in dots).

FS q

Description Define Nonvolatile Bit Images

Syntax `FSqn[xL xH yL yH d1...dk]1 ... [xL xH yL yH d1...dk]n`

ASCII	FS	q	*n*	*[xL xH yL yH d1...dk]1*	*[xL xH yL yH d1...dk]n*
Hex	1C	71	*n*	*[xL xH yL yH d1...dk]1*	*[xL xH yL yH d1...dk]n*
Decimal	29	33	*n*	*[xL xH yL yH d1...dk]1*	*[xL xH yL yH d1...dk]n*

Range *n* = 1 to 255 = the number of bit images to be defined
xL = 0 to 255
xH = 0 to 3, 1 ? (*xL* + *xH* × 256) ? 1023
yL = 0 to 255
yH = 0 to 1, 1 ? (*yL* + *yH* × 256) ? 288
d = 0 to 255 = the definition data. Bits that correspond to dots that are to be printed are designated as “1”, and those not to be printed as “0.”
k = (*xL* + *xH* × 256) × (*yL* + *yH* × 256) × 8
Total definition area = 2 Megabits (256 Kbytes)
xL, *xH* define the horizontal size of a bit image as (*xL* + *xH* × 256) × 8
yL, *yH* define the vertical size of a bit image as (*yL* + *yH* × 256) × 8

Default *n* = 0

Notes This command defines the specified nonvolatile bit image. A nonvolatile bit image refers to a bit image that is defined by this command in the nonvolatile memory and printed by *FS p* on page 63. Existing nonvolatile bit images are not erased by the `ESC @` command or when the printer is reset or power cycled.

This command deletes all of the nonvolatile bit images previously defined and stored by this command, meaning that it is not possible to retain any of the previously defined images. All of the data must be resent.

In Standard mode, this command is valid only when it is written at the head of a line. In Page mode, this command is invalid.

This command becomes valid after the 7 bytes of `<FS q n xL xH yL yH>` are processed as normal values.

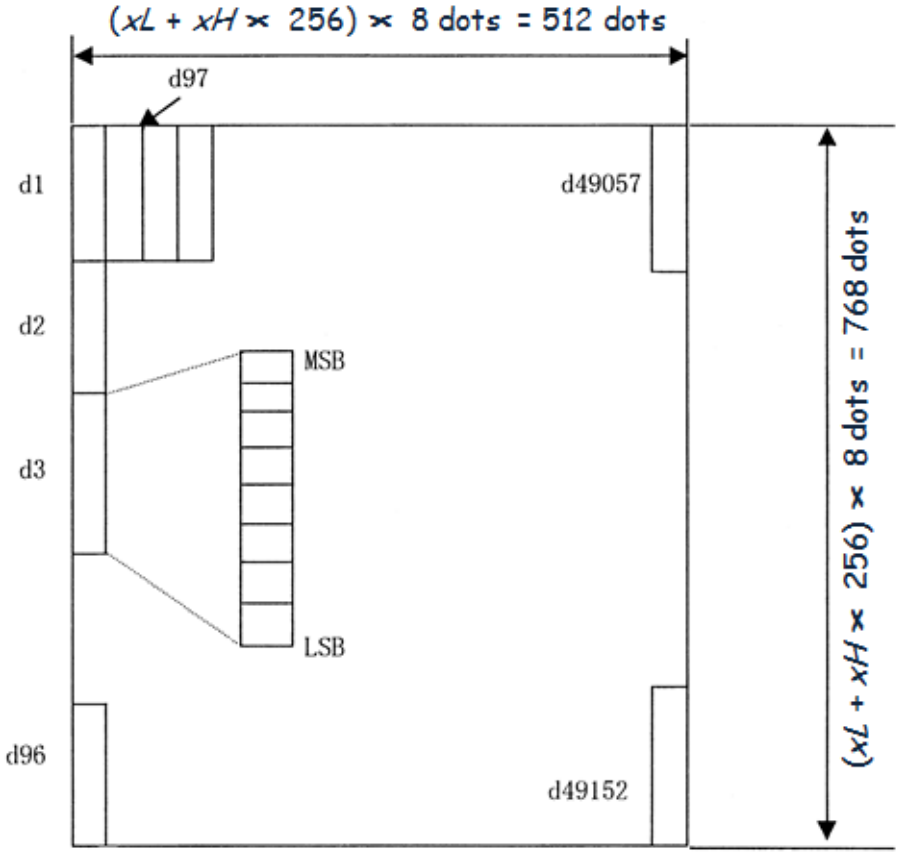
When data that exceeds the remaining capacity of the defined area is specified by *xL*, *xH*, *yL*, *yH*, outside-defined-area arguments are processed. When outside-defined-area arguments are processed for the first bit image data group, this command becomes invalid. If outside-defined-area arguments are processed for the second or subsequent nonvolatile bit image data groups, the printer stops processing this command and begins writing into the nonvolatile memory. At this time, the nonvolatile bit image being defined becomes invalid (undefined), but the preceding nonvolatile bit images remain valid.

The first data group, which is defined by `[xL xH yL yH d1…dk]`, becomes nonvolatile bit image number `01H`, and the last data group becomes nonvolatile bit image number `0nH`. The number *n* of nonvolatile bit images coincides with those specified by *FS p* on page 63. If only one nonvolatile bit image is defined (*n* = 1), the data group is manipulated once, and the following determines the number of bytes of non-volatile memory used to store it.

[Bit image data: ((*xL* + *xH* × 256) × (*yL* + *yH* × 256) × 8) + Header: (4 bytes)]

The maximum bit image size for this printer is 2 Mbits (256 Kbytes). Multiple nonvolatile bit images can be defined, but the total size of a bit image (Bit image data + Header) may not exceed 2 Mbits (256 Kbytes).

This example shows the bit image area defined when *xL* = 64, *xH* = 0, *yL* = 96, and *yH* = 0:



GS !

Description Specify Character Size

Syntax `GS ! n`

ASCII	GS	!	*n*
Hex	1D	21	*n*
Decimal	29	33	*n*

Range *n* = 0 to 255
(Vertical enlargement = 1 to 8, Horizontal enlargement = 1 to 8)

Default *n* = 0

Notes This command specifies the character height and width using bits 0 to 7 as follows:

<table>
<tr><th>Bit</th><th>Function</th><th>Setting</th></tr>
<tr><td>0
1
2
3</td><td>Specifies the number of times to enlarge the font size vertically</td><td>
<table>
<tr><th>Hex</th><th>Decimal</th><th>Enlargement</th></tr>
<tr><td>00</td><td>0</td><td>1 time (standard)</td></tr>
<tr><td>01</td><td>1</td><td>2 times</td></tr>
<tr><td>02</td><td>2</td><td>3 times</td></tr>
<tr><td>03</td><td>3</td><td>4 times</td></tr>
<tr><td>04</td><td>4</td><td>5 times</td></tr>
<tr><td>05</td><td>5</td><td>6 times</td></tr>
<tr><td>06</td><td>6</td><td>7 times</td></tr>
<tr><td>07</td><td>7</td><td>8 times</td></tr>
</table>
</td></tr>
<tr><td>4
5
6
7</td><td>Specifies the number of times to enlarge the font size horizontally</td><td>
<table>
<tr><th>Hex</th><th>Decimal</th><th>Enlargement</th></tr>
<tr><td>00</td><td>0</td><td>1 time (standard)</td></tr>
<tr><td>10</td><td>16</td><td>2 times</td></tr>
<tr><td>20</td><td>32</td><td>3 times</td></tr>
<tr><td>30</td><td>48</td><td>4 times</td></tr>
<tr><td>40</td><td>64</td><td>5 times</td></tr>
<tr><td>50</td><td>80</td><td>6 times</td></tr>
<tr><td>60</td><td>96</td><td>7 times</td></tr>
<tr><td>70</td><td>112</td><td>8 times</td></tr>
</table>
</td></tr>
</table>

The character size set by this command is valid for alphanumeric characters, user-defined characters, and multi-byte code characters (such as Chinese, Japanese, and Korean). Double-width and double-height modes can also be set by *ESC !* on page 45.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

GS $

Description Set Absolute Vertical Print Position (Page Mode)

Syntax `GS$nLnH`

ASCII	GS	$	*nL*	*nH*
Hex	1D	24	*nL*	*nH*
Decimal	29	36	*nL*	*nH*

Range *nL* = 0 to 255, *nH* = 0 to 255
0 ? (*nL* + *nH* × 256) ? 65535

Default None

Notes `GS $` is ignored in Standard mode.In Page mode, `GS $` sets the absolute vertical print starting position to
[(*nL* + *nH* × 256) × (vertical or horizontal motion unit)]

Depending on the print direction set by *ESC T* on page 57, the vertical motion unit is used for the calculation when the print start position is defined as the upper left or lower right of the print area (using *ESC T* on page 57). Otherwise, the horizontal motion unit is used.

The printer ignores any setting values that would cause printing outside of the print area set by *ESC W* on page 58.

GS (A

Description Execute Test Print

Syntax `GS(ApLpHnm`

ASCII	GS	(	A	*pL*	*pH*	*n*	*m*
Hex	1D	28	41	*pL*	*pH*	*n*	*m*
Decimal	29	40	65	*pL*	*pH*	*n*	*m*

Range *n* = 0 to 2, 48 to 50
m = 1 to 3, 49 to 51
(*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)

Default None

Notes This command prints a specified pattern for testing on a roll paper.

- Roll paper is specified by *n*.

n	Paper type
0, 48 1, 49 2, 50	Roll paper

- The type of test print is specified by *m*.

m	Test print
1, 49	Hexadecimal dump mode (The printer prints all of the data transmitted from the host to the printer.)
2, 50	Printer configuration printing
3, 51	Rolling pattern printing

After completion of this command, a software reset is executed automatically to restore the printer status set during power cycling. If this command is processed while a macro definition is in progress, the printer cancels the macro definition, and the macro becomes invalid.

The real-time command and ASB operations are not executed during the printing of printer configuration (*m* = 2, 50) and rolling pattern (*m* = 3, 51).

GS (F

Description Set Black Mark Control Functions

Notes This command performs various functions to control the black mark media when the black mark sensor is used. The command is stored and processed in the order it was received, so you may notice a delay in execution of this command.

m	Format	Function
2	GS (F *pL pH m a nL nH*	Sets the paper feed amount to adjust the paper cutting position after sensing the black mark.
112	GS (F *pL pH m aL aH bL bH*	Specifies the black mark paper format.

pL, *pH* specifies (*pL* + (*pH* × 256)) as the number of bytes after *pH* (*m* and other parameters).

<Function 2> (m = 2) — GS (F *pL pH m a nL nH*

Description Adjust Black Mark Paper Position

Syntax GS (F *pL pH m a nL nH*

ASCII	GS	(	F	*pL*	*pH*	*m*	*a*	*nL*	*nH*
Hex	1D	28	46	*04*	*00*	*02*	*a*	*nL*	*nH*
Decimal	29	40	70	*4*	*0*	*2*	*a*	*nL*	*nH*

Range (*pL* + *pH* × 256) = 4 (*pL* = 4, *pH* = 0)
m = 2
a = 0, 48
0 ? (*nL* + *nH* × 256) ? 65535 (*nL* = 0 to 255, *nH* = 0 to 255)

Default *nL* = 0, *nH* = 0

Notes This command adjusts the paper position after the printer senses a black mark.

- *pL*, *pH* specifies (*pL* + *pH* × 256) as the number of bytes after pH (*m*, *a*, *nL*, and *nH*)
- *nL*, *nH* specifies [(*nL* + *nH* × 256) × vertical motion units] as the adjustment value.

This command applies only toward forward paper feeding.

If the adjustment value specified is greater than the maximum adjustable length of 400 mm, the printer defaults to 400 mm.

<Function 112> (m = 112) — GS (F *pL pH m aL aH bL bH*

Description Set Black Mark Paper Format

Syntax GS (F *pL pH m aL aH bL bH*

ASCII	GS	(	F	*pL*	*pH*	*m*	*aL*	*aH*	*bL*	*bH*
Hex	1D	28	46	*05*	*00*	*70*	*aL*	*aH*	*bL*	*bH*
Decimal	29	40	70	*5*	*0*	*112*	*aL*	*aH*	*bL*	*bH*

Range (*pL* + *pH* × 256) = 5 (*pL* = 5, *pH* = 0)
m = 112
0 ? (*aL* + *aH* × 256) ? 65535 (*aL* = 0 to 255, *aH* = 0 to 255)
0 ? (*bL* + *bH* × 256) ? 65535 (*bL* 0 to 255, *bH* = 0 to 255)

Default *aL* = 141, *aH* = 0 (black mark height (from the top of a mark to the bottom): 20 mm)
bL = 20, *bH* = 11 (black mark interval (top of a black mark to the top of the next one): 400 mm)

Notes This command sets the black mark paper format.

- *pL*, *pH* specifies (*pL* + *pH* × 256) as the number of bytes after *pH* (*m*, *aL*, *aH*, *bL*, *bH*).
- *aL*, *aH* specifies [(*aL* + *aH* × 256) × vertical motion units] as the black mark height.
- *bL*, *bH* specifies as [(*bL* + *bH* × 256) × vertical motion units] as the black mark interval.

The available black mark height ranges from 4 to 20 mm. If the black mark height specified is out of range, this command is ignored.

The black mark interval ranges from 40 to 400 mm. If the black mark interval specified is out of range, this command is ignored.

GS (k

Description Specify and Print Symbols

Notes This command specifies data for two-dimensional codes.

- *cn* = symbol type
- *fn* = function code

cn	Two-Dimensional Code
48	PDF417
49	QR CODE
50	MAXI CODE
51	DATA MATRIX

cn	fn	Function	
48	65	*<Function 065> (fn = 65)* on page 74	PDF417: Specify the number of columns
	66	*<Function 066> (fn = 66)* on page 75	PDF417: Specify the number of rows
	67	*<Function 067> (fn = 67)* on page 76	PDF417: Specify the width of module
	68	*<Function 068> (fn = 68)* on page 76	PDF417: Specify the module height
	69	*<Function 069> (fn = 69)* on page 77	PDF417: Specify the error correction level
	70	*<Function 070> (fn = 70)* on page 78	PDF417: Specify the option
	80	*<Function 080> (fn = 80)* on page 79	PDF417: Store the received data in the symbol storage area
	81	*<Function 081> (fn = 81)* on page 80	PDF417: Print the symbol data in the symbol storage area
	82	*<Function 082> (fn = 82)* on page 82	PDF417: Send the size information of the symbol data in the symbol storage area

49	65	*<Function 165> (fn = 65)* on page 83	QR CODE: Select the module
	67	*<Function 167> (fn = 67)* on page 84	QR CODE: Select the size of module
	69	*<Function 169> (fn = 69)* on page 85	QR CODE: Select the error correction level
	80	*<Function 180> (fn = 80)* on page 86	QR CODE: Store the data in the symbol storage area
	81	*<Function 181> (fn = 81)* on page 87	QR CODE: Print the data in the symbol storage area
	82	*<Function 182> (fn = 82)* on page 89	QR CODE: Transmit the size information of the symbol data in the symbol storage area
50	65	*<Function 265> (fn = 65)* on page 90	MAXI CODE: Select the mode
	80	*<Function 280> (fn = 80)* on page 91	MAXI CODE: Store the data in the symbol storage area
	81	*<Function 281> (fn = 81)* on page 92	MAXI CODE: Print the symbol data saved in the symbol storage area
51	67	*<Function 367> (fn = 67)* on page 94	DATA MATRIX: Select the size of module
	80	*<Function 380> (fn = 80)* on page 95	DATA MATRIX: Store the symbol data in the symbol storage area
	81	*<Function 381> (fn = 81)* on page 96	DATA MATRIX: Print the symbol data in the storage area

PDF417 Symbol Data (when cn = 48)

The symbol data is defined, stored to the symbol storage area by *<Function 080> (fn = 80)* on page 79 and printed by the specification of *<Function 081> (fn = 81)* on page 80. The symbol data in the area remains reserved until one the following processes is executed:

- Performing *<Function 080> (fn = 80)* on page 79
- Performing *ESC @* on page 50
- Resetting the printer defaults or power cycling the printer

The setting values of Functions 065 to 070 are utilized for the processing of *<Function 080> (fn = 80)* on page 79 or *<Function 082> (fn = 82)* on page 82. The printable area must be large enough to accommodate different-sized symbols. If not, the symbol may not be printed.

- Print the same symbol data repeatedly by executing *<Function 081> (fn = 81)* on page 80 after performing Function 080.

- The same symbol data is printed differently by executing *<Function 081> (fn = 81)* on page 80 after setting the feature of the symbol by using Functions 065 through 070.
- By using *<Function 082> (fn = 82)* on page 82, the symbol size printed by *<Function 081> (fn = 81)* on page 80 is Available.

QR Code® Symbol Data (cn = 49)

The symbol data is defined, stored to the symbol storage area by *<Function 180> (fn = 80)* on page 86 and printed by the specification of *<Function 181> (fn = 81)* on page 87. The symbol data in the area remains reserved until one the following processes is executed:

- Performing Function 180
- Performing *ESC @* on page 50
- Resetting the printer defaults or power cycling the printer

The setting values of Functions 165 to 169 are utilized for the processing of *<Function 180> (fn = 80)* on page 86 or *<Function 182> (fn = 82)* on page 89. The printable area must be large enough to accommodate different-sized symbols. If not, the symbol may not be printed.

Print the symbol data repeatedly by executing *<Function 181> (fn = 81)* on page 87 after performing *<Function 180> (fn = 80)* on page 86.

The same symbol data is printed differently by executing *<Function 181> (fn = 81)* on page 87 after setting the feature of the symbol by using Functions 165 through 169.

By using *<Function 182> (fn = 82)* on page 89, the symbol size printed by *<Function 181> (fn = 81)* on page 87 is available.

MaxiCode Symbol Data (cn = 50)

The symbol data is defined, stored to the symbol storage area by *<Function 280> (fn = 80)* on page 91 and printed by the specification of *<Function 281> (fn = 81)* on page 92. The symbol data in the area remains reserved until one the following processes is executed:

- Performing *<Function 280> (fn = 80)* on page 91
- Performing *ESC @* on page 50
- Resetting the printer defaults or power cycling the printer

The setting value of *<Function 265> (fn = 65)* on page 90 is utilized for the processing of *<Function 281> (fn = 81)* on page 92. The printable area must be large enough to accommodate different-sized symbols. If not, the symbol may not be printed.

The same symbol data is repeatedly printed by executing *<Function 281> (fn = 81)* on page 92 after performing *<Function 280> (fn = 80)* on page 91.

The same symbol data is printed differently by executing *<Function 281> (fn = 81)* on page 92 after setting the mode by using *<Function 265> (fn = 65)* on page 90.

Data Matrix Symbol Data (cn = 51)

The symbol data is defined, stored to the symbol storage area by *<Function 380> (fn = 80)* on page 95 and printed by the specification of *<Function 381> (fn = 81)* on page 96. The symbol data in the area remains reserved until the following processes are executed:

- Performing *<Function 380> (fn = 80)* on page 95
- Performing *ESC @* on page 50
- Resetting the printer defaults or power cycling the printer

The setting value of *<Function 367> (fn = 67)* on page 94 is utilized for the processing of *<Function 381> (fn = 81)* on page 96. The printable area must be large enough to accommodate different-size symbols. If not, the symbol may not be printed.

The same symbol data is repeatedly printed by executing *<Function 381> (fn = 81)* on page 96 after performing *<Function 380> (fn = 80)* on page 95.

The same symbol data is printed differently by executing *<Function 381> (fn = 81)* on page 96 after setting the mode by using *<Function 367> (fn = 67)* on page 94.

<Function 065> (fn = 65) — GS (k *pL pH cn fn n*

Description Specify Number of Columns for PDF417

Syntax `GS ( k pL pH cn fn n`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
Hex	1D	28	6B	*03*	*00*	*30*	*41*	*n*
Decimal	29	40	107	*3*	*0*	*48*	*65*	*n*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)

cn = 48, *fn* = 65

n = 0 to 30

Default *n* = 0

Notes This command specifies the number of columns in the data area of PDF417.

- When *n* = 0, automatic processing is set.
- When *n* does not equal 0, the number of columns of the data area is set to *n*.

The settings of this function affect the processing of *<Function 081> (fn = 81)* on page 80 and *<Function 082> (fn = 82)* on page 82.

The following data is excluded from the number of columns:

- Start and stop patterns
- Indicator code word of left and right

With auto processing (*n* = 0) specified, the maximum number of columns in the data area is set to 30 columns. The actual number of columns is calculated using the following information:

- Print area when processing *<Function 081> (fn = 81)* on page 80 or *<Function 082> (fn = 82)* on page 82
- Module width (*<Function 067> (fn = 67)* on page 76)
- Option setting (*<Function 070> (fn = 70)* on page 78)

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 066> (fn = 66) — GS (k *pL pH cn fn n*

Description Specify Number of Rows for PDF417

Syntax `GS ( k pL pH cn fn n`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
Hex	1D	28	6B	*03*	*00*	*30*	*42*	*n*
Decimal	29	40	107	*3*	*0*	*48*	*66*	*n*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 48
fn = 66
n = 0, 3 to 90

Default *n* = 0

Notes This command specifies the number of rows in the data area of PDF417.

- When *n* = 0, automatic processing is set
- When *n* does not equal 0, the number of rows is set to `n` rows.

The settings of this function affect the processing of *<Function 081> (fn = 81)* on page 80 and *<Function 082> (fn = 82)* on page 82.

With auto processing (*n* = 0) specified, the maximum number of rows is set to 90. The actual number of rows is calculated by using the following information:

- Print area when processing *<Function 081> (fn = 81)* on page 80 or *<Function 082> (fn = 82)* on page 82
- Module height (*<Function 068> (fn = 68)* on page 76)

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 067> (fn = 67) — GS (k *pL pH cn fn n*

Description Specify Width of Module for PDF417

Syntax `GS ( k pL pH cn fn n`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
Hex	1D	28	6B	*03*	*00*	*30*	*43*	*n*
Decimal	29	40	107	*3*	*0*	*48*	*67*	*n*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 48
fn = 67
n = 2, 3

Default *n* = 3

Notes This command sets the width of the module of the PDF417 symbol to *n* dots.

The settings of this function affect the processing of *<Function 081> (fn = 81)* on page 80 and *<Function 082> (fn = 82)* on page 82.

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 068> (fn = 68) — GS (k *pL pH cn fn n*

Description Specify Module Height for PDF417

Syntax `GS ( k pL pH cn fn n`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
Hex	1D	28	6B	*03*	*00*	*30*	*44*	*n*
Decimal	29	40	107	*3*	*0*	*48*	*68*	*n*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 48
fn = 68
n = 2 to 8

Default *n* = 3

Notes This command sets the module height of PDF417 to [the module width × *n*]

The settings of this function affect the processing of *<Function 081> (fn = 81)* on page 80 and *<Function 082> (fn = 82)* on page 82.

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 069> (fn = 69) — GS (k *pL pH cn fn m n*

Description Specify Error Correction Level for PDF417

Syntax `GS ( k pL pH cn fn m n`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*	*n*
Hex	1D	28	6B	*04*	*00*	*30*	*45*	*m*	*n*
Decimal	29	40	107	*4*	*0*	*48*	*69*	*m*	*n*

Range (*pL* + *pH* × 256) = 4 (*pL* = 4, *pH* = 0)

cn = 48 *fn* = 69 m = 48

n = 0 to 8, 48 to 56

Default None

Notes This command specifies the error correction level for PDF417. The settings of this function affect the processing of *<Function 081> (fn = 81)* on page 80 and *<Function 082> (fn = 82)* on page 82.

Error correction level specified by “level” (*m* = 48) is as follows:

- The number of the error correction codeword is unchanged regardless of the number of codeword in the data area.

n	Function	Number of error correction codeword
48	Error correction level 0	2
49	Error correction level 1	4
50	Error correction level 2	8
51	Error correction level 3	16
52	Error correction level 4	32
53	Error correction level 5	64
54	Error correction level 6	128
55	Error correction level 7	256
56	Error correction level 8	512

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 070> (fn = 70) — GS (k *pL pH cn fn m*

Description Select the PDF417 Option

Syntax `GS ( k pL pH cn fn m`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*
Hex	1D	28	6B	*03*	*00*	*30*	*46*	*m*
Decimal	29	40	107	*3*	*0*	*48*	*70*	*m*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 48
fn = 70
m = 0, 1

Default *m* = 0

Notes This command selects the option for PDF417.

m	Function
0	Select the standard PDF417
1	Select the simplified PDF417

The settings of this function affect the processing of *<Function 081> (fn = 81)* on page 80 and *<Function 082> (fn = 82)* on page 82.

When simplified PDF417 symbol is canceled, the printer defaults to standard PDF417.

This command remains in effect until one of the following occurs: *ESC !* on page 45 or *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 080> (fn = 80) — GS (k *pL pH cn fn m d1...dk*

Description Store PDF417 Symbol Data

Syntax `GS ( k pL pH cn fn m d1...dk`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*	*d1...dk*
Hex	1D	28	6B	*pL*	*pH*	*30*	*50*	*30*	*d1...dk*
Decimal	29	40	107	*pL*	*pH*	*48*	*80*	*48*	*d1...dk*

Range 4 ? (*pL* + *pH* × 256) ? 65535 (*pL* = 0 to 255, *pH* = 0 to 255)
cn = 48
fn = 80
m = 48
d = 0 to 255
k = (*pL* + *pH* × 256) – 3

Default None

Notes This command stores the PDF417 symbol data (*d1...dk*) in the symbol storage area.

The data stored in the symbol storage area by this command remains reserved after processing *<Function 081> (fn = 81)* on page 80 or *<Function 082> (fn = 82)* on page 82.

The following data should not be included in the symbol data (*d1...dk*) because this information is automatically added by the printer:

- Start pattern and stop pattern.
- Indicator codeword of left and right.
- The descriptor of symbol length. (the first code word in the data area)
- The error correction codeword calculated by modulus 929.

This command remains in effect until the following processing is performed:

- Executing *<Function 080> (fn = 80)* on page 79
- Executing *ESC @* on page 50
- The printer defaults are reset, or the printer is power cycled

<Function 081> (fn = 81) — GS (k *pL pH cn fn m*

Description Encode and Print PDF417 Symbol Data

Syntax `GS ( k pL pH cn fn m`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*
Hex	1D	28	6B	*03*	*00*	*30*	*51*	*m*
Decimal	29	40	107	*3*	*0*	*48*	*81*	*m*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 48
fn = 81
m = 48

Default None

Notes This function encodes and prints the PDF417 symbol data in the symbol save area.

In Standard mode, this command is available only when the printer is at the beginning of a line or when the print buffer is empty. The paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol. In Page mode, the printer stores the symbol data in the print buffer without printing.

The printer cannot print a symbol that exceeds the printing area in size. Print modes (such as emphasized or double-strike) do not affect the printing of a symbol. Exceptions are the character size and upside-down printing.

Printing operation is not processed under the following conditions:

- There is no data (*<Function 080> (fn = 80)* on page 79 is not processed).
- The (number of columns × number of rows) is less than the number of codewords when automatic processing is specified for the number of columns and number of rows.
- More than 928 codewords exist in the data area.

The following data is added automatically by the encode processing:

- Start pattern and stop pattern.
- Indicator codeword of left or right.
- The descriptor of symbol length (the first codeword in the data area).
- The error correction codeword that was calculated by modulus 929.
- A pad codeword.

The data area includes the following codewords:

- Data specified by *<Function 080> (fn = 80)* on page 79.
- The descriptor of symbol length (the first codeword in the data area).
- The error correction codeword that was calculated by modulus 929.
- A pad codeword.

When automatic processing (*<Function 065> (fn = 65)* on page 74) is specified, the printer calculates the number of columns (maximum of 30) using the following information:

- The current printing area
- The module width (*<Function 067> (fn = 67)* on page 76)
- The option setting (*<Function 070> (fn = 70)* on page 78)
- The codeword in the data area

When automatic processing (*<Function 066> (fn = 66)* on page 75) is specified in Page mode, the printer calculates the number of rows (maximum of 90) using the following information:

- Current printing area
- Module height (*<Function 068> (fn = 68)* on page 76)
- Codeword in the data area

A quiet zone (the spaces surrounding the symbol such as upper, lower, left, and right spaces) is not included in the printing data. Make sure to include an adequate quiet zone for execution of this command.

<Function 082> (fn = 82) — GS (k *pL pH cn fn m*

Description Encode and Send Size Information for PDF417 Symbol Data

Syntax `GS ( k pL pH cn fn m`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*
Hex	1D	28	6B	*03*	*00*	*30*	*52*	*m*
Decimal	29	40	107	*3*	*0*	*48*	*82*	*m*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 48
fn = 82
m = 48

Default None

Notes This command encodes and sends the size information of the PDF417 symbol data in the symbol storage area. In Standard mode, this command is available only when the printer is at the beginning of a line or when the print buffer is empty.

The size information for the data is as follows:

Send data	Hex	Decimal	Data
Header	37H	55	1 byte
Identifier	2FH	47	1 byte
Horizontal size	30H – 39H	48 – 57	1 – 5 byte
Separator	1FH	31	1 byte
Vertical size	30H – 39H	48 – 57	1 – 5 byte
Separator	1FH	31	1 byte
Fixed value	31H	49	1 byte
Separator	1FH	31	1 byte
Other information	30H or 31H	48 or 49	1 byte
NUL	00H	0	1 byte

The following indicates whether or not printing of the symbol is possible:

Hex	Decimal	Condition
30H	48	Printing is possible
31H	49	Printing is impossible

A quiet zone (the spaces surrounding the symbol such as upper, lower, left, and right spaces) is not included in the printing data. Make sure to include an adequate quiet zone for execution of this command.

<Function 165> (fn = 65) — GS (k *pL pH cn fn n1 n2*

Description Set the QR Code Model

Syntax `GS ( k pL pH cn fn n1 n2`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n1*	*n2*
Hex	1D	28	6B	*04*	*00*	*31*	*41*	*n1*	*n2*
Decimal	29	40	107	*4*	*0*	*49*	*65*	*n1*	*n2*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 49
fn = 65
n1 = 49, 50
n2 = 0

Default *n1* = 50
n2 = 0

Notes This command sets the QR Code model as follows:

n1	Function
49	Model 1
50	Model 2

The settings of this function affect the processing of *<Function 181> (fn = 81)* on page 87 and *<Function 182> (fn = 82)* on page 89.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 167> (fn = 67) — GS (k *pL pH cn n*

Description Set the Size of the QR Code Module

Syntax `GS ( k pL pH cn n`

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	31	43	n
Decimal	29	40	107	3	0	49	67	n

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)

cn = 49

fn = 67

n = 0 to 9

Default *n* = 3

Notes This command sets the size of the QR Code module to *n* dots. Because a QR Code module is square, *n* = both the module width and the module height.

The settings of this function affect the processing of *<Function 181> (fn = 81)* on page 87 and *<Function 182> (fn = 82)* on page 89.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 169> (fn = 69) — GS (k *pL pH cn n*

Description Set the Error Correction Level for QR Code

Syntax `GS ( k pL pH cn n`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
Hex	1D	28	6B	*03*	*00*	*31*	*45*	*n*
Decimal	29	40	107	*3*	*0*	*49*	*69*	*n*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 49
fn = 69
n = 48 to 51

Default *n* = 48

Notes This command sets the error correction level for the QR Code. The printer uses Reed-Solomon correction to generate a series of error correction codewords.

n	Function	Recovery Amount (%)
48	Error Correction Level L	7
49	Error Correction Level M	15
50	Error Correction Level Q	25
51	Error Correction Level H	30

The settings of this function affect the processing of *<Function 181> (fn = 81)* on page 87 and *<Function 182> (fn = 82)* on page 89.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 180> (fn = 80) — GS (k *pL pH cn fn m d1...dk*

Description Save QR Code Symbol Data

Syntax `GS ( k pL pH cn fn m d1...dk`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*	*d1...dk*
Hex	1D	28	6B	*pL*	*pH*	*31*	*50*	*30*	*d1...dk*
Decimal	29	40	107	*pL*	*pH*	*49*	*80*	*48*	*d1...dk*

Range 4 ? (*pL* + *pH* × 256) ? 7092 (*pL* = 0 to 255, *pH* = 0 to 27)
cn = 49
fn = 8
m = 48
d = 0 to 255
k = (*pL* + *pH* × 256) – 3

Default None

Notes This command saves the symbol data of the QR Code to the symbol storage area.

This function defines and stores the symbol data to the symbol storage area. *<Function 181> (fn = 81)* on page 87 prints that symbol data. The data remains reserved after completion of printing.

The following shows the data available for encoding a QR code.

Character Type	Usable Characters
Numeric Data	“0” ~ “9”
Alphanumeric Data	“0” ~ “9”, “A” ~ “Z”, SP, $, %, *, +, -, ., /, :
Kanji Data	Shift JIS value
8bit Byte Data	00H ~ FFH

This command remains in effect until the following processing is performed:

- Executing *<Function 180> (fn = 80)* on page 86
- Executing *ESC @* on page 50
- The printer defaults are reset, or the printer is power cycled

<Function 181> (fn = 81) — GS (k *pL pH cn fn m*

Description Encode and Print QR Code Symbol Data

Syntax `GS ( k pL pH cn fn m`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*
Hex	1D	28	6B	*03*	*00*	*31*	*51*	*m*
Decimal	29	40	107	*3*	*0*	*49*	*81*	*m*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 49
fn = 81
m = 48

Default None

Notes This command encodes and prints the QR Code symbol data that was saved in the symbol storage area.

In Standard mode, this command is available only when the printer is at the beginning of a line or when the print buffer is empty. The paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol. In Page mode, the printer stores the symbol data in the print buffer without printing.

The printer cannot print a symbol that exceeds the printing area in size. Print modes (such as emphasized or double-strike) do not affect the printing of a symbol. Exceptions are the character size and upside-down printing.

Printing operation is not processed under the following conditions:

- There is no data. (*<Function 180> (fn = 80)* on page 86 is not executed)
- If (number of columns × number of rows) is less than the number of codewords, the numbers of columns and rows are automatically processed.

Based on the symbol data in the data storage area, the printer automatically selects the best compression mode from these four types:

- Numeric Data Code
- Alphanumeric Data mode
- Kanji Data mode
- 8 bit Data mode

The following data is added automatically by the encoding processing:

- Position sensor pattern
- Segregator for the position sensor pattern
- Timing pattern
- Format information

- Version information
- Error correction code text
- Pad code text
- Indicator for counting bits of bytes
- Mode indicator
- Concluder
- Queue pattern (when model 2 is selected)
- Expansion pattern (when model 1 is selected)

A quiet zone (the spaces surrounding the symbol such as upper, lower, left, and right spaces) is not included in the printing data. Make sure to include an adequate quiet zone for execution of this command.

<Function 182> (fn = 82) — GS (k *pL pH cn fn m*

Description Transmit Size Information for QR Code Symbol Data

Syntax `GS ( k pL pH cn fn m`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*
Hex	1D	28	6B	*03*	*00*	*31*	*52*	*m*
Decimal	29	40	107	*3*	*0*	*49*	*82*	*m*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 49
fn = 82
m = 48

Default None

Notes This command transmits the size information of the QR Code symbol data that was encoded by *<Function 180> (fn = 80)* on page 86. In Standard mode, this command is available only when the printer is at the beginning of a line or when the print buffer is empty.

The size information of each data is as follows:

Send data	Hex	Decimal	Data
Header	37H	55	1 byte
Flag	36H	54	1 byte
Horizontal size	30H – 39H	48 – 57	1 – 5 byte
Separator	1FH	31	1 byte
Vertical size	30H – 39H	48 – 57	1 – 5 byte
Separator	1FH	31	1 byte
Fixed Value	31H	49	1 byte
Separator	1FH	31	1 byte
Other Information	30H or 31H	48 or 49	1 byte
NUL	00H	0	1 byte

A quiet zone (the spaces surrounding the symbol such as upper, lower, left, and right spaces) is not included in the size information. Make sure to include an adequate quiet zone for execution of this command.

The following data indicates whether or not printing of the symbol is possible:

Hex	Decimal	Condition
30H	48	Printing is possible
31H	49	Printing is impossible

<Function 265> (fn = 65) — GS (k *pL pH cn fn n1 n2*

Description Set the Mode for MaxiCode

Syntax `GS ( k pL pH cn fn n1 n2`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
Hex	1D	28	6B	*03*	*00*	*32*	*41*	*n*
Decimal	29	40	107	*3*	*0*	*50*	*65*	*n*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 50
fn = 65
n = 50 to 52

Default *n* = 50

Notes This command selects the mode for MaxiCode:

n	Function
50	Mode 2 setting
51	Mode 3 setting
52	Mode 4 setting

The settings of this function affect the processing of *<Function 281> (fn = 81)* on page 92.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 280> (fn = 80) — GS (k *pL pH cn fn m d1...dk*

Description Store the MaxiCode Symbol Data

Syntax `GS ( k pL pH cn fn m d1...dk`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*	*d1...dk*
Hex	1D	28	6B	*pL*	*pH*	*32*	*50*	*30*	*d1...dk*
Decimal	29	40	107	*pL*	*pH*	*50*	*80*	*48*	*d1...dk*

Range 4 ? (*pL* + *pH* × 256) ? 141 (*pL* = 4 to 141, *pH* = 0)
cn = 50
fn = 80
m = 48
d = 0 to 255
k = (*pL* + *pH* × 256) – 3

Default None

Notes This command stores Maxi Code symbol data in the symbol storage area.

The data stored in the symbol storage area by this command is processed by *<Function 281> (fn = 81)* on page 92. The data remains reserved in the storage.

This command remains in effect until the following processing is performed:

- Executing *<Function 280> (fn = 80)* on page 91
- Executing *ESC @* on page 50
- The printer defaults are reset, or the printer is power cycled

<Function 281> (fn = 81) — GS (k *pL pH cn fn m*

Description Encode and Print MaxiCode Symbol Data

Syntax `GS ( k pL pH cn fn m`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*
Hex	1D	28	6B	*03*	*00*	*32*	*51*	*m*
Decimal	29	40	107	*3*	*0*	*50*	*81*	*m*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 50
fn = 81
m = 48

Default None

Notes This command encodes and prints the Maxi Code symbol data that was saved in the storage area. The printer uses Reed-Solomon correction to generate a series of error correction codewords.

In Standard mode, this command is available only when the printer is at the beginning of a line or when the print buffer is empty. The paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol. In Page mode, the printer stores the symbol data in the print buffer without printing.

The printer cannot print a symbol that exceeds the printing area in size.

Printing operation is not processed under the following conditions:

- There is no data. (*<Function 280> (fn = 80)* on page 91 is not executed)
- The number of numeric characters exceeds 138
- The number of alphanumeric characters exceeds 93

When mode 2 is selected, the primary message does not include the following:

Primary Message	Data Number	Character
Postal code	1~9	Numeric
ISO country code	1~3	Numeric
Service type code	1~3	Numeric

When mode 3 is selected, the primary message does not include the following:

Primary Message	Data Number	Character
Postal code	1~6	Setting Code A
ISO country code	1~3	Numeric
Service type code	1~3	Numeric

Modes 2 and 3 are executed according to the following.

- 9-byte data including `[)>`, `RS`, `01`, `GS`, and `yy` are regarded as the Header. (`RS` and `GS` indicate MAXI CODE control code while *y* indicates the 2-byte numeric data.)
  - The data that immediately follows the Header is the Primary Message.
  - When printing, the Header is placed at the beginning of the Secondary Message.
- When Header data is absent, the data are regarded as Primary Message.
- In the Primary Message, GS is used as the separator that divides message into Postal code, ISO country code, and Class of service. This GS is ignored.
- All data of the Secondary Message is regarded as symbol data.

In modes 4, 5, and 6, the printer regards all of the data in the symbol storage area as Primary Message and Secondary Message.

The following data is automatically added during the encoding process:

- Position sensor pattern
- Position pattern
- Error correction code text
- Mode separator
- Pad code text

A quiet zone (the spaces surrounding the symbol such as upper, lower, left, and right spaces) is not included in the printing data. Make sure to include an adequate quiet zone for execution of this command.

<Function 367> (fn = 67) — GS (k *pL pH cn n*

Description Set the Data Matrix Code Size

Syntax `GS ( k pL pH cn n`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
Hex	1D	28	6B	*03*	*00*	*33*	*43*	*n*
Decimal	29	40	107	*3*	*0*	*51*	*67*	*n*

Range (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 51
fn = 67
n = 2 to 3

Default *n* = 3

Notes This command sets the Data Matrix Code size. Because a Data Matrix Code module is square, *n* = both the module width and the module height.

The settings of this function affect the processing of *<Function 381> (fn = 81)* on page 96.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

<Function 380> (fn = 80) — GS (k *pL pH cn fn m d1...dk*

Description Store the Data Matrix Symbol Data

Syntax `GS ( k pL pH cn fn m d1...dk`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*	*d1...dk*
Hex	1D	28	6B	*pL*	*pH*	*33*	*50*	*30*	*d1...dk*
Decimal	29	40	107	*pL*	*pH*	*51*	*80*	*48*	*d1...dk*

Range 0 ? (*pL* + *pH* × 256) ? 3116 (*pL* = 0 to 255, *pH* = 0 to 13)
cn = 51
fn = 80
m = 48
d = 0 to 255
k = (*pL* + *pH* × 256) – 3

Default None

Notes This command stores the Data Matrix symbol data in the symbol storage area. The data stored to the symbol storage area by this command is executed by *<Function 381> (fn = 81)* on page 96. The data remains reserved in the symbol storage area.

This command remains in effect until the following processing is performed:

- Executing *<Function 380> (fn = 80)* on page 95
- Executing *ESC @* on page 50
- The printer defaults are reset, or the printer is power cycled

<Function 381> (fn = 81) — GS (k *pL pH cn fn m*

Description Encode and Print Data Matrix Symbol Data

Syntax `GS ( k pL pH cn fn m`

ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*
Hex	1D	28	6B	*03*	*00*	*33*	*51*	*m*
Decimal	29	40	107	*3*	*0*	*51*	*81*	*m*

Range *pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)
cn = 51
fn = 81
m = 48

Default None

Notes This command encodes and prints the Data Matrix symbol data saved in the storage area. The printer uses Reed-Solomon correction to generate a series of error correction codewords.

In Standard mode, this command is available only when the printer is at the beginning of a line or when the print buffer is empty.

A symbol exceeding the printing area in size can not be printed.

Printing operation is not processed under the following conditions:

- There is no data. (*<Function 380> (fn = 80)* on page 95 cannot be executed)
- The number of alphanumeric characters exceeds 2334.
- The number of 8 bit byte characters exceeds 1558.
- The number of numeric characters exceeds 3116.

Data Matrix uses ECC 200 symbols.

The following data is automatically added during the encoding process:

- Position pattern
- Error correction code text
- Mode separator
- Pad code text

In Standard mode, the paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol. In Page mode, the printer stores the symbol data in the print buffer without executing actual printing.

A quiet zone (the spaces surrounding the symbol such as upper, lower, left, and right spaces) is not included in the printing data. Make sure to include an adequate quiet zone for execution of this command.

GS (E

Description Set Nonvolatile User Memory Area

Notes `GS (E` stores the customized values to the nonvolatile user memory area and uses them for printer operation. The table below explains the functions available in this command.

fn	Format	No.	Purpose
1	GS (E *pL pH fn d1 d2*	1	Start the user setting mode
2	GS (E *pL pH fn d1 d2 d3*	2	End the user setting mode (performs a soft reset)
3	GS (E *pL pH fn [a1 b18...b11]... [ak bk8...bk1]*	3	Set value(s) for the memory switch
4	GS (E *pL pH fn a*	4	Transmit the settings of the memory switch to the host
11	GS (E *pL pH fn a d1...dk*	11	Set the communication conditions for the serial interface
12	GS (E *pL pH fn a*	12	Transmit the communication conditions for the serial interface

pL and *pH* are used to set the number of bytes that follow *pH* to (*pL* + *pH* × 256).

You must enter the user setting mode to change the items of the nonvolatile user memory. After the user setting mode is terminated (<*Function 2*> *(fn = 2)* on page 99), the printer resets its software and restores the initial settings in effect at power on. Receive and print buffers also are cleared.

<Function 1> (fn = 1) — GS (E *pL pH fn d1 d2*

Description Start User Setting Mode

Syntax `GS ( E pL pH fn d1 d2`

ASCII	GS	(	E	*pL*	*pH*	*fn*	*d1*	*d2*
Hex	1D	28	45	*pL*	*pH*	*fn*	*d1*	*d2*
Decimal	29	40	69	*pL*	*pH*	*fn*	*d1*	*d2*

Range (*pL* + *pH* × 256) = 3, (*pL* = 3, *pH* = 0)
fn = 1
d1 = 73
d2 = 78

Default None

Notes This function enables User Setting mode. Enable this mode before processing Functions 2 through 12. If User Setting mode is not enabled, those functions are ignored.

Mode change feedback enables the printer to notify that the mode has changed as follows:

	Hexadecimal	**Decimal**	**Number of Data**
Header	37H	55	1 byte
Flag	20H	32	1 byte
NUL	00H	0	1 byte

After the printer enters the user setting mode by this command, the printer transmits “mode change feedback” to the host. After confirming that this was sent to the host, send the command to reconfigure the nonvolatile user memory.

This command is effective only in Standard mode.

<Function 2> (fn = 2) — GS (E *pL pH fn d1 d2 d3*

Description End User Setting Mode

Syntax `GS ( E pL pH fn d1 d2 d3`

ASCII	GS	(	E	*pL*	*pH*	*fn*	*d1*	*d2*	*d3*
Hex	1D	28	45	*pL*	*pH*	*fn*	*d1*	*d2*	*d3*
Decimal	29	40	69	*pL*	*pH*	*fn*	*d1*	*d2*	*d3*

Range (*pL* + *pH* × 256) = 4 (*pL* = 4, *pH* = 0)
fn = 2
d1 = 79
d2 = 85
d3 = 84

Default None

Notes This command terminates the user setting mode and performs a software reset. After the reset, the printer resets its software and restores the initial settings in effect at power on.

All changes in settings that are made in user setting mode take effect only after this command is executed.

<Function 3> (fn = 3) — GS (E *pL pH fn [a1 b18...b11]...[ak bk8...bk1]*

Description Change Memory Switch Values

Syntax `GS ( E pL pH fn [a1 b18...b11]...[ak bk8...bk1]`

ASCII	GS	(	E	*pL*	*pH*	*fn*	*[b18...b11]... [bk8...bk1]*
Hex	1D	28	45	*pL*	*pH*	*fn*	*[b18...b11]... [bk8...bk1]*
Decimal	29	40	69	*pL*	*pH*	*fn*	*[b18...b11]... [bk8...bk1]*

Range 10 ? (*pL* + *pH* × 256) ? 65535
fn = 3
a = 1, 2, 5, 6, 7, 8
b = 48, 49, 50
k = 1 to 10

Default Varies based on the printer model

Notes This command simultaneously changes Memory Switches (Msw) 1 through 8 to the value specified by *b* in the following way:

- When *b* = 48, 49, the corresponding bits are set to Off and On, respectively.
- When *b* = 50, no change occurs in the memory switch.

Msw	Value			Function
Settings for memory switch 1				
	3	**2**	**1**	
1-1~3	48	48	48	Print density 130%
	48	48	49	Print density 120%
	48	49	48	Print density 110%
	48	49	49	Print density 150%
	49	48	48	Print density 100%
	49	48	49	Print density 140%
	49	49	48	Print density 90%
	49	49	49	Print density 80%
1-4	48			2-byte character mode not selected
	49			2-byte character mode selected
1-5	48			Print speed 90 mm/sec
	49			Print speed 50 mm/sec
1-6	48			Reserved

Msw	Value	Function
Settings for memory switch 2		
2-1	48	Font selection: Font A
	49	Font selection: Font B
2-2	48	Not supported
	49	Not supported

- The print density adjusts the darkness of characters to be printed.
- 2-byte character mode is selected to support for Chinese, Japanese, and Korean model.
- The printer supports printing speeds of 80 mm/sec and 50 mm/sec. Slower print speeds may give better print quality.

Code page selection using **memory switch 2-3 through 2-8** is as follows.

Msw2-8	Msw2-7	Msw2-6	Msw2-5	Msw2-4	Msw2-3	Character Table
48	48	48	48	48	48	PC437
48	48	48	49	48	48	PC850

The settings for **memory switch 5** are as follows.

Specify the length of idle time before the printer enters the power-down mode. The idle time can be from 0 to 90 seconds. When the memory switch value is 0, the power-down mode is not active

MSW5-8	MSW5-7	MSW5-6	MSW5-5	MSW5-4	MSW5-3	MSW5-2	MSW5-1	Value (Sec)
48	48	48	48	48	48	48	48	0
48	48	48	48	48	48	48	49	1
48	48	48	48	48	48	49	48	2
48	48	48	48	48	48	49	49	3
48	48	48	48	48	49	48	48	4
.	.	.	.	.	.	.	.	
.	.	.	.	.	.	.	.	
.	.	.	.	.	.	.	.	
48	49	48	49	49	48	49	48	90

The settings for **memory switch 6** are as follows.

Set the standby time before the printer enters the power saving mode. The standby time can be from 10 to 255 seconds. When memory switch value is 0, the power saving mode does not work.

MSW6-8	MSW6-7	MSW6-6	MSW6-5	MSW6-4	MSW6-3	MSW6-2	MSW6-1	Value
48	48	48	48	49	48	49	48	10
48	48	48	48	49	48	49	49	11
48	48	48	48	49	49	48	48	12
48	48	48	48	49	49	48	49	13
48	48	48	48	49	49	49	48	14
.	.	.	.	.	.	.	.	
.	.	.	.	.	.	.	.	
.	.	.	.	.	.	.	.	
49	49	49	49	49	49	49	49	255

Memory switch 7 is not supported.

The settings for **memory switch 8** are as follows:

- Either the character font A or B or C is selected.
- The beep is activated for the audible paper empty warning signal.
- The beep is activated for the audible low battery warning signal.
- The label printing is available by the setting.

<table>
<tr><th>Msw</th><th>Setting Value</th><th>Function</th></tr>
<tr><td>8-1</td><td rowspan="2" colspan="2"><table>
<tr><th>Function</th><th>MSW 8-2</th><th>MSW 8-1</th></tr>
<tr><td>Select font 12x24</td><td>48</td><td>48</td></tr>
<tr><td>Select font 9x24</td><td>48</td><td>49</td></tr>
<tr><td>Select font 9x17</td><td>49</td><td>48</td></tr>
</table></td></tr>
<tr><td>8-2</td></tr>
<tr><td rowspan="2">8-3</td><td>48</td><td>No beeps for roll paper end</td></tr>
<tr><td>49</td><td>Beeps for roll paper end</td></tr>
<tr><td rowspan="2">8-4</td><td>48</td><td>Beeps for low battery status</td></tr>
<tr><td>49</td><td>No beeps low battery status</td></tr>
<tr><td>8-5</td><td>49</td><td>Reserved</td></tr>
<tr><td>8-6</td><td colspan="2" rowspan="2">Not supported</td></tr>
<tr><td>8-7</td></tr>
<tr><td>8-8</td><td>48</td><td>Reserved</td></tr>
</table>

<Function 4> (fn = 4) — GS (E *pL pH fn a*

Description Transmit Memory Switch Value

Syntax `GS ( E pL pH fn a`

ASCII	GS	(	E	*pL*	*pH*	*fn*	*a*
Hex	1D	28	45	*pL*	*pH*	*fn*	*a*
Decimal	29	40	69	*pL*	*pH*	*fn*	*a*

Range (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)
fn = 4
a = 1, 2, 5, 6, 7, 8

Default None

Notes This command transmits the setting value of the memory switch corresponding to *a*.

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Identifier	21H	33	1 byte
Setting value	30H or 31H	48 or 49	8 bytes
NUL	00H	0	1 byte

The setting value is sent from bit 8 to bit 1, consisting of 8 bytes in total.

- Off: Hexadecimal = 30H / Decimal = 48
- On: Hexadecimal = 31H / Decimal = 49

<Function 11> (fn = 11) — GS (E *pL pH fn a d1…dk*

Description Set Serial Interface Configuration

Syntax `GS ( E pL pH fn a d1…dk`

ASCII	GS	(	E	*pL*	*pH*	*fn*	*a*	*d1*	*dk*
Hex	1D	28	45	*pL*	*pH*	*0B*	*a*	*d1*	*dk*
Decimal	29	40	69	*pL*	*pH*	*11*	*a*	*d1*	*dk*

Range 3 ? (*pL* + *pH* × 256) ? 8, (*pL* = 3 to 8, *pH* = 0)
fn = 11 a = 1 to 4
d = 48 to 57 [*a* = 1]
d = 48 to 50 [*a* = 2]
d = 48, 49 [*a* = 3]
d = 55,56 [*a* = 4]
k = 1 to 6

Default
d1...dk = “115200” [*a* = 1]
d = 48 [*a* = 2]
d = 48 [*a* = 3]
d = 56 [*a* = 4]

Notes Sets the configuration item for the serial interface specified by *a* to the values specified by *d1...dk*.

a	Configuration item
1	Transmission speed
2	Parity
3	Flow control
4	Data length

Transmission speed (*a* = 1) is specified by number.

Example: When defining 19200 bps: 5 bytes *d1…dk* “19200”(Hexadecimal = 31H, 39H, 32H, 30H, 30H / Decimal = 49, 57, 50, 48, 48)

Baud rate is specified as follows: (*k* = 1 to 6)

d11~dk1	Function
“115200”	Baud rate 115200
“57600”	Baud rate 57600
“38400”	Baud rate 38400
“19200”	Baud rate 19200
“9600”	Baud rate 9600
“4800”	Baud rate 4800
“2400”	Baud rate 2400

Parity (*a* = 2) is specified by d as follows:

d	Function
48	Select no parity
49	Select odd parity
50	Select even parity

Flow control (*a* = 3) is specified by d as follows:

d	Function
48	Select flow control DTR/DSR
49	Select flow control XON/XOFF

Data Length (*a* = 4) is specified by d14 as follows:

d	Function
55	Select 7 bits length
56	Select 8 bits length

<Function 12> (fn = 12) — GS (E *pL pH fn a*

Description Transmit Serial Interface Conditions

Syntax `GS ( E pL pH fn a`

ASCII	GS	(	E	*pL*	*pH*	*fn*	*a*
Hex	1D	28	45	*pL*	*pH*	*fn*	*a*
Decimal	29	40	69	*pL*	*pH*	*fn*	*a*

Range (`pL` + `pH` × 256) = 2 (`pL` = 2, `pH` = 0)
`fn` = 12
`a` = 1 to 4

a	Communication Condition
1	Baud rate
2	Parity
3	Flow control
4	Data length

Default None

Notes This command transmits the communication conditions of the serial interface.

The data format to be transmitted is as follows:

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Identifier	33H	39	1 byte
Communication condition (a)	31H - 34H	49 - 52	1 byte
Separator	1FH	31	1 byte
Setting value	30H - 39H	48 - 57	1 - 6 bytes
NUL	00H	0	1 byte

Communication condition is defined by *a* and setting value defined as shown in the following. When the baud rate (*a* = 1) is specified:

Baud rate (bps)	d1	d2	d3	d4	d5	d6
2400	50	52	48	48	--	--
4800	52	56	48	48	--	--
9600	57	54	48	48	--	--
19200	49	57	50	48	48	--
38400	51	56	52	48	48	--
57600	53	55	54	48	48	--
115200	49	49	53	50	48	48

When the parity setting (*a* = 2) is specified:

d1	Parity
48	No parity
49	Odd parity
50	Even parity

When the flow control setting (*a* = 3) is specified:

d1	Flow control
48	DTR / DSR (Fixed)
49	XON / XOFF

When the data length setting (*a* = 4) is specified:

d1	Data length
55	7 bits
56	8 bits

GS (L, GS 8 L

Description Process Graphics Data

Syntax `GS(L`

ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*[parameter]*
Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*[parameter]*
Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*[parameter]*

`GS8L`

ASCII	GS	8	L	*p1*	*p2*	*p3*	*p4*	*m*	*fn*	*[parameter]*
Hex	1D	38	4C	*p1*	*p2*	*p3*	*p4*	*m*	*fn*	*[parameter]*
Decimal	29	56	76	*p1*	*p2*	*p3*	*p4*	*m*	*fn*	*[parameter]*

Notes These commands process graphics data according to the function code (`fn`). They are adapted to print image data.

fn	Format	Function No.	Function
0, 48	GS (L *pL pH m fn*	Function 48	Transmits the nonvolatile graphics memory capacity.
2, 50	GS (L *pL pH m fn*	Function 50	Prints the graphics data in the print buffer.
3, 51	GS (L *pL pH m fn*	Function 51	Transmits the remaining capacity of the nonvolatile graphics memory.
64	GS (L *pL pH m fn d1 d2*	Function 64	Transmits the defined nonvolatile graphics key code list.
65	GS (L *pL pH m fn d1 d2 d3*	Function 65	Deletes all nonvolatile graphics data.
66	GS (L *pL pH m fn kc1 kc2*	Function 66	Deletes the specified nonvolatile graphics data.
67	GS (L *pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1 dk]b*	Function 67	Defines the raster graphics data in the nonvolatile memory.
69	GS (L *pL pH m fn kc1 kc2 x y*	Function 69	Prints the specified nonvolatile graphics data.
112	GS (L *pL pH m fn a bx by c xL xH yL yH d1...dk*	Function 112	Stores the raster graphics data in the print buffer memory.

pL and *pH* specify the number of bytes following *pH* using (*pL* + *pH* × 256).

<Function 48> (fn = 0, 48) — GS (L *pL pH m fn*

Description Transmit the Capacity of the Nonvolatile Bit Image Memory

Syntax `GS ( L pL pH m fn`

ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*
Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*
Decimal	29	40	76	*pL*	*pH*	*m*	*fn*

Range (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)
m = 48
fn = 0, 48

Default None

Notes Transmits the total capacity of the nonvolatile bit image memory (number of bytes in the memory area). The total capacity data is converted to character codes that correspond to decimal data, and then transmitted from the Most Significant Bit (MSB).

This command is available in Standard mode and Page mode.

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	30H	48	1 byte
Data	30H - 39H	48 - 57	1 - 8 bytes
NUL	00H	0	1 byte

<Function 50> (fn = 2, 50) — GS ^ L *pL pH fn*

Description Print the Graphics Data

Syntax `GS ^ L pL pH fn`

ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*
Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*
Decimal	29	40	76	*pL*	*pH*	*m*	*fn*

Range (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)
m = 48
fn = 2, 50

Default None

Notes This command prints the graphics data that is stored in the print buffer. The graphics data are defined by *<Function 112> (fn = 112)* on page 115.

The printer uses the required amount of line feed pitch for printing graphics data, regardless of the existing setting value for the line feed pitch.

This command is available in Standard mode and Page mode.

<Function 51> (fn = 3, 51) — GS (L *pL pH m fn*

Description Transmit Amount of Unused Nonvolatile User Memory

Syntax `GS ( L pL pH m fn`

ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*
Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*
Decimal	29	40	76	*pL*	*pH*	*m*	*fn*

Range (*pL* + *pH* × 256) = 2 (`pL` = 2, `pH` = 0)
m = 48
fn = 3, 51

Default None

Notes Transmits the amount of unused memory (in bytes) in the nonvolatile user memory. The number of bytes of remaining memory is converted to character codes that correspond to decimal data, which is then transmitted from the MSB. The data length is variable.

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	31H	49	1 byte
Data	30H – 39H	48 - 57	1 - 8 bytes
NUL	00H	0	1 byte

<Function 64> (fn = 64) — GS (L *pL pH m fn d1 d2*

Description Transmit the Nonvolatile Graphics Key Code List

Syntax `GS ( L pL pH m fn d1 d2`

ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*d1*	*d2*
Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*d1*	*d2*
Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*d1*	*d2*

Range (*pL* + *pH* × 256) = 4 (*pL* = 4, *pH* = 0)
m = 48
fn = 64
d1 = 75
d2 = 67

Default None

Notes Transmits the defined nonvolatile graphics key code list.

When the key code is present:

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	72H	114	1 byte
Status	40H or 41H	64 or 65	1 byte
Data	30H - 39H	48 - 57	2 - 80 bytes
NUL	00H	0	1 byte

When the key code is not present:

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	72H	114	1 byte
Status	40H	64	1 byte
NUL	00H	0	1 byte

<Function 65> (fn = 65) — GS (L *pL pH m fn d1 d2 d3*

Description Delete All Defined Nonvolatile Graphics Data

Syntax `GS ( L pL pH m fn d1 d2 d3`

ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*d1*	*d2*	*d3*
Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*d1*	*d2*	*d3*
Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*d1*	*d2*	*d3*

Range (*pL* + *pH* × 256) = 5 (*pL* = 5, *pH* = 0)
m = 48
fn = 65
d1 = 67
d2 = 76
d3 = 82

Default None

Notes This command removes all defined nonvolatile graphics data. The graphics data is defined by *<Function 67> (fn = 67)* on page 113 into the nonvolatile graphics memory with a sector dedicated for storing nonvolatile graphics data.

<Function 66> (fn = 66) — GS (L *pL pH m fn kc1 kc2*

Description Delete Nonvolatile Graphics Data *kc1* and *kc2*

Syntax `GS ( L pL pH m fn kc1 kc2`

ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*
Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*
Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*

Range (*pL* + *pH* × 256) = 4 (*pL* = 4, *pH* = 0)
m = 48
fn = 66
kc1 = 32 to 126
kc2 = 32 to 126

Default None

Notes This command deletes the nonvolatile graphics data corresponding to *kc1* and *kc2*. *kc1* and *kc2* exist in each of the graphics data groups to be stored into the nonvolatile graphics memory in the order of download.

The graphics data is defined by *<Function 67> (fn = 67)* on page 113.

<Function 67> (fn = 67) — GS (L *pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b*

Description Define Raster Graphics Data in the Nonvolatile Graphics Area

Syntax `GS ( L pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1... [c d1...dk]b`

ASCII	GS	(	L	*pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b d1...dk]b*
Hex	1D	28	4C	*pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b d1...dk]b*
Decimal	29	40	76	*pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b d1...dk]b*

Range

- *b* specifies the number of the color of the defined data.
- *xL*, *xH* specifies the defined data in the horizontal direction to (*xL* + *xH* × 256) dots.
- *yL*, *yH* specifies the defined data in the vertical direction to (*yL* + *yH* × 256) dots.
- *c* specifies the color of the defined data.

c	Defined data color
49	Color 1 (black)

When using GS (L:

3 ? (*pL* + *pH* × 256) ? 65535 (*pL* = 0 to 255, *pH* = 0 to 255)

When using GS 8 L

12 ? (*p1* + ? 256 + *p3* ? 65536 + *p4* ?16777216) ? 253119]
m = 48
fn = 67
a = 48
kc1 = 32 to 126
kc2 = 32 to 126
b = 1, 2
1 ? (*xL* + *xH* × 256) ? 384
1 ? (*yL* + *yH* × 256) ? 1662
c = 49
d = 0 to 255
k = (int ((*xL* + *xH* × 256) + 7) / 8) × (*yL* + *yH* × 256)

Default None

Notes This command defines the raster graphics data in the nonvolatile graphics area. The total capacity of the nonvolatile graphic memory is 256 K bytes

<Function 69> (fn = 69) — GS (L *pL pH m fn kc1 kc2 x y*

Description Print Nonvolatile Graphics Data *kc1* and *kc2*

Syntax `GS ( L pL pH m fn kc1 kc2 x y`

ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*	*x*	*y*
Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*	*x*	*y*
Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*	*x*	*y*

Range (*pL* + *pH* × 256) = 6 (*pL* = 6, *pH* = 0)
m = 48
fn = 69
kc1 = 32 to 126
kc2 = 32 to 126
x = 1, 2
y = 1, 2

Default None

Notes Prints the nonvolatile graphics data defined by the key codes *kc1* and *kc2*. The graphics data is enlarged by *x* and *y* in the horizontal and vertical directions. This command prints the nonvolatile graphics data defined by *<Function 67> (fn = 67)* on page 113.

The printer does not print nonvolatile graphics data beyond the print area for one line.

This command is available in Standard mode and Page mode.

<Function 112> (fn = 112) — GS (L *pL pH m fn a bx by c xL xH yL yH d1...dk*

Description Store the Raster Graphics Data in the Print Buffer

Syntax `GS ( L pL pH m fn a bx by c xL xH yL yH d1...dk`

ASCII	GS	(	L	*pL pH m fn a bx by c xL xH yL yH d1...dk*
Hex	1D	28	4C	*pL pH m fn a bx by c xL xH yL yH d1...dk*
Decimal	29	40	76	*pL pH m fn a bx by c xL xH yL yH d1...dk*

Range 11 ? (*pL* + *pH* × 256) ? 65535 (*pL* = 0 to 255, *pH* = 0 to 255)

Common settings:

m = 48
fn = 112
a = 48
bx = 1, 2
by = 1, 2
c = 49
1 ? (*xL* + *xH* × 256) ? 384
1 ? (*yL* + *yH* × 256) ? 1662 (when *by* = 1)
k = (int ((*xL* + *xH* × 256) + 7) / 8) × (*yL* + *yH* × 256)

Default None

Notes This command stores the raster graphics data in the print buffer, enlarged by *bx* and *by* in the horizontal and vertical directions.

- *xL*, *xH* specifies the raster graphics data in the horizontal direction as (*xL* + *xH* × 256) dots.
- *yL*, *yH* specifies the raster graphics data in the vertical direction to (*yL* + *yH* × 256) dots.
- *d* denotes the stored data (raster format).
- *k* denotes the number of the graphics data.
- *c* specifies the color of the defined data.

c	Defined data color
49	Color 1 (black)

Real-time commands are not processed during processing of this command.

GS :

Description Start/End Macro Definition

Syntax `GS:`

ASCII	GS	:
Hex	1D	3A
Decimal	29	58

Notes This command starts or ends macro definition. The macro is executed by *GS ^* on page 124.

The printer starts macro definition during normal operation and finishes it upon receiving this command. The printer can continue to print during macro definition.

The maximum amount of macro data that can be defined varies based on the printer model. Any data that exceeds the printer's limit is not stored.

ESC @ on page 50 does not clear an existing defined macro. The macro remains effective until the printer is reset or power cycled.

GS B

Description Turn Reverse Printing Mode On/off.

Syntax `GSBn`

ASCII	GS	B	*n*
Hex	1D	42	*n*
Decimal	29	66	*n*

Range *n* = 0 to 255

Default *n* = 0

Notes This command selects white/black reverse printing mode by setting the least significant bit (LSB) of *n*.

- When the LSB of *n* is 0, white/black reverse mode is turned off.
- When the LSB of *n* is 1, white/black reverse mode is turned on.

Multi-byte characters such as Kanji, Japanese and Korean are not reversed by this command, and underline mode is not effective. The right space defined by *ESC SP* on page 45 is included in the area reversed by this command.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

GS H

Description Selects Print Position of HRI Characters

Syntax `GSHn`

ASCII	GS	H	*n*
Hex	1D	48	*n*
Decimal	29	72	*n*

Range *n* = 0 to 3, 48 to 51

Default *n* = 0

Notes `GS H` specifies where Human Readable Interpretation (HRI) characters are positioned when printing a barcode. The print position is set according to the value of *n*:

n	Print position
0, 48	Not printed
1, 49	Above the barcode
2, 50	Below the barcode
3, 51	Both above and below the barcode

The font of the HRI characters is defined by *GS f* on page 127.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

GS I

Description Transmit Printer ID

Syntax `GSIn`

ASCII	GS	I	*n*
Hex	1D	49	*n*
Decimal	29	73	*n*

Range *n* = 1 to 69

Default None

Notes `GS I` transmits the printer ID or specified information.

Transmits 1 byte of printer ID or information, using *n* as follows:

n	Printer ID	Specification
1, 49	Printer model ID	Printer model
2, 50	Type ID	Printer type
3, 51	Printer feature ID	Printing method and Printer size
65	Firmware version	Firmware version
66	Manufacturer	ZEBRA TECHNOLOGIES
67	Printer model	Printer model
69	Code page	Currently enabled code page

Transmits specified printer information, using *n* as follows:

Printer information (when *n* = 65, 66, 67, or 69) consists of [Header ~ NULL] data:

Transmitted data	Hex	Decimal	Amount of data
Header	5FH	95	1 byte
Printer information	Varies by printer model	Varies by printer model	0 to 15 bytes
NUL	00H	0	1 byte

The firmware version can be confirmed by self-test printing.

Differences The printer ID is shown according to printer models as follows:

Printer ID	Definition
1 (printer model ID)	0x41
2 (type ID)	Type ID varies depending on functions the printer supports as follows: - 0x01 (Multi-byte character)
3 (printer feature ID)	0x69
66 (manufacturer)	Zebra Technologies
67 (printer model)	Printer model name
69 (language of font)	Code page currently being used. Refer to cod page setting command, ESC t.

GS I b

Description Transmit Battery Status

Syntax `GSIb`

ASCII	GS	I	*b*
Hex	1D	49	*62*
Decimal	29	73	*98*

Notes `GS I` transmits the battery power status of the printer.

The [Header ~ NUL] data is transmitted as follows:

Transmitted data	Hex	Decimal	Amount of data
Header	37H	55	1byte
Identifier	45H	69	1byte
Remaining battery power	30h to 34H	48-52	1byte
NUL	00H	0	1byte

The printer indicates the remaining battery power as follows:

Hex	Decimal	Remaining battery power level
30H	48	Full (F)
31H	49	High (H)
32H	50	Middle (M)
33H	51	Low (L)

GS L

Description Set Left Margin

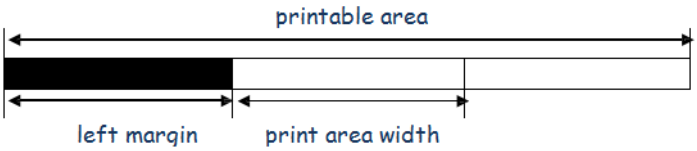
Syntax `GSL`*nL nH*

ASCII	GS	L	*nL*	*nH*
Hex	1D	4C	*nL*	*nH*
Decimal	29	76	*nL*	*nH*

Range *nL* = 0 to 255
nH = 0 to 255

Default (*nL* + *nH* × 256) = 0 (*nL* = 0, *nH* = 0)

Notes `GS L` adjusts the size of the left margin according to the following:
[(*nL* + *nH* × 256) × (horizontal motion units)]



Use *GS W* on page 122 to adjust the print area width. If the adjustment value specified exceeds the printable area for the left margin, the printer defaults the left margin to the maximum value allowed.

This command is ineffective in Page mode. If the left margin is enabled in Page mode, the setting takes effect when the printer returns to Standard mode.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

GS T

Description Set Print Position to Beginning of Print Line

Syntax `GSTn`

ASCII	GS	T	*n*
Hex	1D	54	*n*
Decimal	29	84	*n*

Range *n* = 0, 1, 48, 49

- When *n* = 1, 49, the printer prints the data in the print buffer and executes a line feed, based on the line feed amount specified.
- When *n* = 0, 48, the printer removes the print data in the print buffer.

Default None

Notes This command sets the print position to the beginning of the print line. *n* specifies when this command is executed relative to when the data in the print buffer is processed as follows:

n	Function
0, 48	Sets the print position after the data in the print buffer is deleted.
1, 49	Sets the print position after the data in the print buffer is printed.

This command is effective only in Standard mode and is ignored in Page mode.

After the printer processes this command, the print buffer is empty, and the printer moves the print position to the left of the print area. The printer ignores this command if the print position is already the beginning of the line.

GS W

Description Set Printing Area Width

Syntax `GSWnLnH`

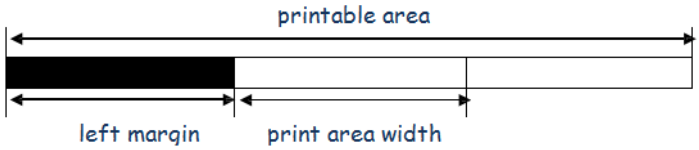
ASCII	GS	W	*nL*	*nH*
Hex	1D	57	*nL*	*nH*
Decimal	29	87	*nL*	*nH*

Range 0 ? *nL* ? 255, 0 ? *nH* ? 255

Default (*nL* + *nH* × 256) = 384 (*nL* = 80, *nH* = 1)

Notes `GS W` adjusts the width of the print area according to the following:

[(*nL* + *nH* × 256) × (horizontal motion units)]



Use *GS L* on page 120 to adjust the print area width. If the adjustment value specified exceeds the printable area for the print area, the printer defaults the print area to

(printable area – left margin)

This command is ineffective in Page mode. If the print area width is enabled in Page mode, the setting takes effect when the printer returns to Standard mode.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

GS \

Description Set Relative Vertical Print Position (Page Mode)

Syntax `GS \`

ASCII	GS	\	*nL*	*nH*
Hex	1D	5C	*nL*	*nH*
Decimal	29	92	*nL*	*nH*

Range *nL* = 0 to 255
nH = 0 to 255

Default None

Notes In Page mode, `GS \` moves the vertical print position to a position relative to the current one according to the following:

[(*nL* + *nH* × 256) × (vertical or horizontal motion units)]

The command is ignored in Standard mode. The printer ignores any setting that exceeds the print area set by *ESC W* on page 58.

The horizontal motion unit is used for the calculation when the print start position is defined to the upper right or lower right of print area (using *ESC T* on page 57). Otherwise, the vertical motion unit is used.

GS ^

Description Execute Macro

Syntax GS^*rtm*

ASCII	GS	^	*r*	*t*	*m*
Hex	1D	5E	*r*	*t*	*m*
Decimal	29	94	*r*	*t*	*m*

Range *r* = 0 to 255
t = 0 to 255
m = 0, 1

Default None

Notes A macro can be used to print the same data repeatedly. This command executes a macro using parameters as following:

- *r* = the number of times to execute the macro.
- *t* = the waiting time before the macro is executed.
- *m* = macro executing mode.

m	Function
0	Executes the macro *r* times continuously at the interval specified by *t*.
1	The printer waits for the paper FEED button to be pressed for the time specified by *t*. The macro is executed once when the button is pressed. This operation is repeated *r* times.

The macro is defined by *GS :* on page 116. If the macro is not defined or if *r* = 0, the command is ignored.

GS a

Description Enable/Disable Automatic Status Back

Syntax `GSan`

ASCII	GS	a	*n*
Hex	1D	61	*n*
Decimal	29	97	*n*

Range *n* = 0 to 255

Default *n* = 0

Notes This enables or disables Automatic Status Back (ASB). ASB is enabled when *n* is a value other than 0. After you enable ASB, the printer transmits its status at the specified interval until ASB is disabled. ASB is disabled when *n* = 0, at which point the printer stops transmitting its status.

ASB is the function that transmits the printer status (such as printer cover open/closed and online/offline) continuously at the specified time interval, even if the printer status did not change. Using this function, the host can check if the printer is running properly.

For the parallel and USB interfaces, printer status is transmitted whenever the host computer changes to the reverse mode, regardless of whether the printer changed status. You should set the time interval at which the host changes to reverse mode to more than 500 ms so that you receive the correct status. For the serial interface, status is transmitted continuously at the interval of 1 sec even if the status is not changed.

This command remains in effect until one of the following occurs: *ESC @ on page 50* is run, the printer defaults are reset, or the printer is power cycled.

The 4 bytes of printer information transmitted are in the following format:

Byte 1—Printer Information

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	Off	00	0	Not used. Fixed to Off
2	Off	00	0	Not used. Fixed to Off
3	Off	00	0	On-line
	On	08	8	Off-line
4	On	10	16	Not used. Fixed to On
5	Off	00	0	Cover is closed
	On	20	32	Cover is open

6	Off	00	0	Paper is not being fed by the paper feed button
	On	40	64	Paper is being fed by the paper feed button
7	Off	00	0	Not used. Fixed to Off

Byte 2—Printer Information

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	Off	00	0	Not used. Fixed to Off
2	Off	00	0	Not used. Fixed to Off
3	Off	00	0	Not used. Fixed to Off
4	Off	00	0	Not used. Fixed to Off
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error (Turn off the power as soon as possible if this occurs.)
6	Off	00	0	No automatically recoverable error
	On	40	64	Automatically recoverable error occurred
7	Off	00	0	Not used. Fixed to Off

Byte 3—Paper Sensor Information

Bit	Off/On	Hex	Decimal	Function
0,1	Off	00	0	Not used. Fixed to Off
2,3	Off	00	0	Paper end sensor: paper present
	On	0C	12	Paper end sensor: no paper present
4	Off	00	0	Not used. Fixed to Off
5	Off	00	0	Not used. Fixed to Off
6	Off	00	0	Not used. Fixed to Off
7	Off	00	0	Not used. Fixed to Off

Byte 4—Paper Sensor Information

Bit	Off/On	Hex	Decimal	Function
0	On	01	1	Not used. Fixed to On
1	On	02	2	Not used. Fixed to On
2	On	04	4	Not used. Fixed to On
3	On	08	8	Not used. Fixed to On
4	Off	00	0	Not used. Fixed to Off
5	Off	00	0	Not used. Fixed to Off
6	Off	00	0	Not used. Fixed to Off
7	Off	00	0	Not used. Fixed to Off

GS f

Description Select font for HRI characters

Syntax `GSfn`

ASCII	GS	f	*n*
Hex	1D	66	*n*
Decimal	29	102	*n*

Range *n* = 0, 1, 48, 49

Default *n* = 0

Notes This command selects a font for the HRI (Human Readable Interpretation) characters used when printing a barcode, using *n* as follows:

n	Font
0, 48	Font A
1, 49	Font B

Use *GS H* on page 117 to specify the print position of HRI characters.

Differences Configuration of font: Font A (12 × 24), Font B (9 × 24)

GS h

Description Specify Barcode Height

Syntax `GShn`

ASCII	GS	h	*n*
Hex	1D	68	*n*
Decimal	29	104	*n*

Range *n* = 1 to 255

Default *n* = 162

Notes `GS h` specifies the height of the barcode to *n* dots.

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

GS k

Description Print Barcode

Syntax

1 GSk*m d1...dk*NUL

2 GSk*mn d1...dn*

1	ASCII	GS	k	*m*	*d1...dk*	NUL
	Hex	1D	6B	*m*	*d1...dk*	NUL
	Decimal	29	107	*m*	*d1...dk*	NUL
2	ASCII	GS	k	*m*	*n*	*d1...dn*
	Hex	1D	6B	*m*	*n*	*d1...dn*
	Decimal	29	107	*m*	*n*	*d1...dn*

Range

The range of the variables depend on the barcode system.

1
- *m* = 0 to 6
- *k* = the number of bytes of barcode data.
- *d* = the character code data of the barcode data to be printed.

2
- *m* = 65 to 73
- *n* = the number of bytes of barcode data.
- *d* = the character code data of the barcode data to be printed.

1

m	Barcode System	Range of k	Range of d
0	UPC-A	*k* = 11, 12	*d* = 48 to 57
1	UPC-E	*k* = 11, 12	*d* = 48 to 57
2	JAN13(EAN)	*k* = 12, 13	*d* = 48 to 57
3	JAN8(EAN)	*k* = 7, 8	*d* = 48 to 57
4	CODE39	1 ? *k*	*d* = 48 to 57, 65 to 90 *d* = 32, 36, 37, 43, 45, 46, 47
5	ITF	1 ? *k* (even number)	*d* = 48 to 57
6	CODABAR	1 ? *k*	*d* = 48 to 57, 65 to 68 *d* = 36, 43, 45, 46, 47, 58

2			
m	**Barcode System**	**Range of k**	**Range of d**
65	UPC-A	11 to 12	*d* = 48 to 57
66	UPC-E	11 to 12	*d* = 48 to 57
67	JAN13(EAN)	12 to 13	*d* = 48 to 57
68	JAN8(EAN)	7 to 8	*d* = 48 to 57
69	CODE39	1 to 255	*d* = 48 to 57, 65 to 90 *d* = 32, 36, 37, 43, 45, 46, 47
70	ITF	1 to 255 (even number)	*d* = 48 to 57
71	CODABAR	1 to 255	*d* = 48 to 57, 65 to 68 *d* = 36, 43, 45, 46, 47, 58
72	CODE93	1 to 255	*d* = 0 to 127
73	CODE128	2 to 255	*d* = 0 to 127

Default None

Notes This command selects a barcode system and prints the barcode.

The printer ignores any setting that exceeds the print area set by *ESC W* on page 58. Print modes (such as emphasized or double-strike) do not affect the printing of a symbol. Exceptions are the character size and upside-down printing.

A quiet zone (the spaces surrounding the symbol such as upper, lower, left, and right spaces) should be taken into account when using this command.

GS r

Description Transmit Status

Syntax `GSrn`

ASCII	GS	r	*n*
Hex	1D	72	*n*
Decimal	29	114	*n*

Range *n* = 1, 49

n	Function
1, 49	Transmit the paper sensor status

Default None

Notes The command transmits the one-byte status specified by *n* as follows:

The status to be transmitted is as follows:

- Paper sensor status (*n* = 1, 49):

Bit	Off/On	Hex	Decimal	Function
0, 1	Off	00	0	Paper near-end sensor: Paper adequate
	On	03	3	Paper near-end sensor: Paper near end
2, 3	Off	00	0	Paper end sensor: Paper present
	On	0C	12	Paper end sensor: Paper not present
4	Off	00	0	Fixed
5	Off	00	0	Reserved
6	Off	00	0	Reserved
7	Off	00	0	Fixed

Bits 2 and 3: This command can not be executed when the printer is offline due to the lack of paper. Therefore, the status of bit 2 (1) and bit 3 (1) is not transmitted.

GS v 0

Description Print Raster Bit Image

Syntax `GSv0mxLxHyLyHd1...dk`

ASCII	GS	v	0	*m*	*xLxHyLyHd1...dk*
Hex	1D	76	30	*m*	*xLxHyLyHd1...dk*
Decimal	29	118	48	*m*	*xLxHyLyHd1...dk*

Range *m* = 0 to 3, 48 to 51
1 ? (*xL* + *xH* × 256) ? 384 (*xL* = 0 to 80, *xH* = 0, 1)
1 ? (*yL* + *yH* × 256) ? 1662 (*yL* = 0 to 126, *yH* = 0 to 6)
d = 0 to 255 = the definition data of the bit image data.
k = 1 to 119664

- *xL*, *xH* = (*xL* + *xH* × 256) byte(s) in the horizontal direction for the bit image
- *yL*, *yH* = (*yL* + *yH* × 256) dot(s) in the vertical direction for the bit image

Default None

Notes This command prints a raster bit image according to the mode defined by *m*.

m	Mode	Vertical dot density (DPI)	Horizontal dot density (DPI)
0, 48	Normal	203	203
1, 49	Double-width	203	203/2
2, 50	Double-height	203/2	203
3, 51	Quadruple	203/2	203/2

In Standard mode, this command is effective when the print buffer is empty and the printer is at the beginning of the line. If the print buffer is not empty, after processing *m*, the printer treats the following data as normal data.

In Page mode, the bit image is stored in the print buffer without being printed.

None of the available print modes (such as emphasized, underlined, or double-strike) affects the printing of the bit image.

The default dot density set by *GS L on page 120* is applied to printing of the bit image.

m	Mode	Vertical dot density (DPI)	Horizontal dot density (DPI)
0, 48	Normal	203	203
1, 49	Double-width	203	203/2
2, 50	Double-height	203/2	203
3, 51	Quadruple	203/2	203/2

GS w

Description Set Barcode Width

Syntax `GSwn`

ASCII	GS	w	*n*
Hex	1D	77	*n*
Decimal	29	119	*n*

Range *n* = 2 to 6 = the barcode module width

Default *n* = 3

Notes `GS w` sets the horizontal width of a barcode, using *n* as follows:

n	Multi-level barcode module width (mm)	Binary-level barcode	
		Thin element width (mm)	Thick element width (mm)
2	0.250	0.250	0.625
3	0.375	0.375	1.000
4	0.500	0.500	1.250
5	0.625	0.625	1.625
6	0.750	0.750	2.000

This command is effective for the following barcodes:

- Multi-level barcodes: UPC-A, UPC-E, JAN13, HAN8, CODE93, CODE128
- Binary-level barcodes: CODE39, ITF, CODABAR

This command remains in effect until one of the following occurs: *ESC @* on page 50 is run, the printer defaults are reset, or the printer is power cycled.

BS L A

Description Execute Automatic Calibration in Label Mode

Syntax `BSLA`

ASCII	BS	L	A
Hex	08	4C	41
Decimal	8	76	65

Notes `BS L A`, which is effective only in Label mode, executes auto calibration.

When this command is executed, this printer feeds three labels or three black marks to read the light intensity reflected from the liner or black mark. It stores the optimal value for reading the labels or black marks into nonvolatile memory. The printer moves the print position to the leading edge of the next label or black mark using this value.

BS L L

Description Select Label Mode

Syntax `BSLL`

ASCII	BS	L	L
Hex	08	4C	4C
Decimal	8	76	76

Notes `BS L L` specifies Label mode, which must be used for the printer to print on labels or black mark paper.

This command can activate Label mode even if Receipt mode is predefined by the memory switch (Msw 8-5). However, because the memory switch (Msw 8-5) is set to enable the default mode, Receipt mode goes into effect after the printer defaults are reset or the printer is power cycled. The memory switch (Msw 8-5) should be enabled to maintain Label mode after the printer defaults are reset or the printer is power cycled.

After the printer has entered Label mode, do the following to ensure proper operation:

- Run automatic calibration (*BS L A* on page 133) to allow the printer to determine the label or black mark specifications.
- Readjust the print position by pressing the Feed button or opening and then closing the printer cover.

BS L R

Description Select Receipt Mode

Syntax

ASCII	BS	L	R
Hex	08	4C	52
Decimal	8	76	82

Notes This command selects Receipt mode, which must be set for printing on continuous roll paper. This command is enabled only in Label mode.

This command can activate Receipt mode even if Label mode is predefined by the memory switch (Msw 8-5). However, because the memory switch (Msw 8-5) is set to enable the default mode, Label mode goes into effect after the printer defaults are reset or the printer is power cycled. The memory switch (Msw 8-5) should be set to disable Receipt mode after the printer defaults are reset or the printer is power cycled.

BS M

Description Specify Font Type

Syntax `BSM`*`nm`*

ASCII	BS	M	*n*	*m*
Hex	08	4D	*n*	*m*
Decimal	08	77	*n*	*m*

Range *m* = 65 to 67
n = 0

Default *n* = 0

Notes `BS M` specifies the font type by *m* as follows:

m	Function (Select font type)
65	Font A (12 × 24)
66	Font B (9 × 17)
67	Font C (9 × 24)

This command remains in effect until one of the following occurs: *ESC !* on page 45, *ESC @* on page 50, or *ESC M* on page 54 is run; the printer defaults are reset; or the printer is power cycled.

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

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

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

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

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

apl.version

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

Type `getvar`

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

apl.framework_version

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

Type `getvar`

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

Supported Fonts

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

Contents

Supported Fonts

Table 1 shows the standard fonts and associated character sets that are provided with Virtual Device-E.

Table 1 • Supported Fonts

Font Name	Character Set		
Code Page 437	Code Page 437-FONTA !"#$%&' ()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ ÇüéâäàåçêëèïîìÄÅ áíóúñÑªº¿⌐¬½¼¡«» ▒▓|┤╡╢╖╕╣║╗╝╜╛┐ └┴┬├─┼╞╟╚╔╩╦╠═╬╧ ╨╤╥╙╘╒╓╫╪┘┌▄▌▐▀ αßΓπΣσµτΦΘΩδ∞φε∩ ≡±≥≤⌠⌡÷≈°∙·√ⁿ²■	Code Page 437-FONTB !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ ÇüéâäàåçêëèïîìÄÅ áíóúñÑªº¿⌐¬½¼¡«» ▒▓|┤╡╢╖╕╣║╗╝╜╛┐ └┴┬├─┼╞╟╚╔╩╦╠═╬╧ ╨╤╥╙╘╒╓╫╪┘┌▄▌▐▀ αßΓπΣσµτΦΘΩδ∞φε∩ ≡±≥≤⌠⌡÷≈°∙·√ⁿ²■	Code Page 437-FONTC !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ ÇüéâäàåçêëèïîìÄÅ áíóúñÑªº¿⌐¬¼¼¡«» ▒▓|┤╡╢╖╕╣║╗╝╜╛┐ └┴┬├─┼╞╟╚╔╩╦╠═╬╧ ╨╤╥╙╘╒╓╫╪┘┌▄▌▐▀ αßΓπΣσµτΦΘΩδ∞φε∩ ≡±≥≤⌠⌡÷≈°∙·√ⁿ²■
Code Page 850	Code Page 850-FONTA !"#$%&' ()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ ÇüéâäàåçêëèïîìÄÅ áíóúñÑªº¿®¬½¼¡«» ▒▓|┤ÁÂÀ©╣║╗╝¢¥┐ └┴┬├─ãÃ╚╔╩╦╠═╬¤ ðÐÊËÈ1ÍÎÏ┘┌▄¦Ì▀ ÓßÔÒõÕµþÞÚÛÙýÝ¯´ -±‗¾¶§÷¸°¨·¹³²■	Code Page 850-FONTB !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ ÇüéâäàåçêëèïîìÄÅ áíóúñÑªº¿®¬½¼¡«» ▒▓|┤ÁÂÀ©╣║╗╝¢¥┐ └┴┬├─ãÃ╚╔╩╦╠═╬¤ ðÐÊËÈ1ÍÎÏ┘┌▄¦Ì▀ ÓßÔÒõÕµþÞÚÛÙýÝ¯´ -±‗¾¶§÷¸°¨·¹³²■	Code Page 850-FONTC !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ ÇüéâäàåçêëèïîìÄÅ áíóúñÑªº¿®¬¹¼¡«» ▒▓|┤ÁÂÀ©╣║╗╝¢¥┐ └┴┬├─ãÃ╚╔╩╦╠═╬¤ ðÐÊËÈ1ÍÎÏ┘┌▄¦Ì▀ ÓßÔÒõÕµþÞÚÛÙýÝ¯´ -±‗¾¶§÷¸°¨·¹³²■

Table 1 • Supported Fonts (Continued)

Font Name	Character Set		
Code Page 1251	Page 1251 (Font A) !"#$%&' ()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ ЂЃ‚ѓ„…†‡€‰Љ‹ЊЌЋЏ ђ‘’“”•–—™љ›њќћџ °±Ііґµ¶·ёN№є»jSsї АБВГДЕЖЗИЙКЛМНОП РСТУФХЦЧШЩЪЫЬЭЮЯ абвгдежзийклмноп рстуфхцчшщъыьэюя	Page 1251 (Font B) !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ ЂЃ‚ѓ„…†‡€‰Љ‹ЊЌЋЏ ђ‘’“”•–—™љ›њќћџ °±Ііґµ¶·ёN№є»jSsї АБВГДЕЖЗИЙКЛМНОП РСТУФХЦЧШЩЪЫЬЭЮЯ абвгдежзийклмноп рстуфхцчшщъыьэюя	Page 1251 (Font C) !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ ЂЃ‚ѓ„…†‡€‰Љ‹ЊЌЋЏ ђ‘’“”•–—™љ›њќћџ °±Ііґµ¶·ёN№є»jSsї АБВГДЕЖЗИЙКЛМНОП РСТУФХЦЧШЩЪЫЬЭЮЯ абвгдежзийклмноп рстуфхцчшщъыьэюя
Code Page 1252	Page 1252 (Font A) !"#$%&' ()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ € ‚ƒ„…†‡ˆ‰Š‹Œ Ž ¡¢£¤¥¦§¨©ª«¬-®¯ °±²³´µ¶·¸¹º»¼½¾¿ ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏ ÐÑÒÓÔÕÖ×ØÙÚÛÜÝÞß àáâãäåæçèéêëìíîï ðñòóôõö÷øùúûüýþÿ	Page 1252 (Font B) !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ € ‚ƒ„…†‡ˆ‰Š‹Œ Ž ¡¢£¤¥¦§¨©ª«¬-®¯ °±²³´µ¶·¸¹º»¼½¾¿ ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏ ÐÑÒÓÔÕÖ×ØÙÚÛÜÝÞß àáâãäåæçèéêëìíîï ðñòóôõö÷øùúûüýþÿ	Page 1252 (Font C) !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ € ‚ƒ„…†‡ˆ‰Š‹Œ Ž ¡¢£¤¥¦§¨©ª«¬-®¯ °±²³´µ¶·¸¹º»¼½¾¿ ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏ ÐÑÒÓÔÕÖ×ØÙÚÛÜÝÞß àáâãäåæçèéêëìíîï ðñòóôõö÷øùúûüýþÿ

ZDownloader Utility

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

Contents

Downloading the ZDownloader Utility

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

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

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

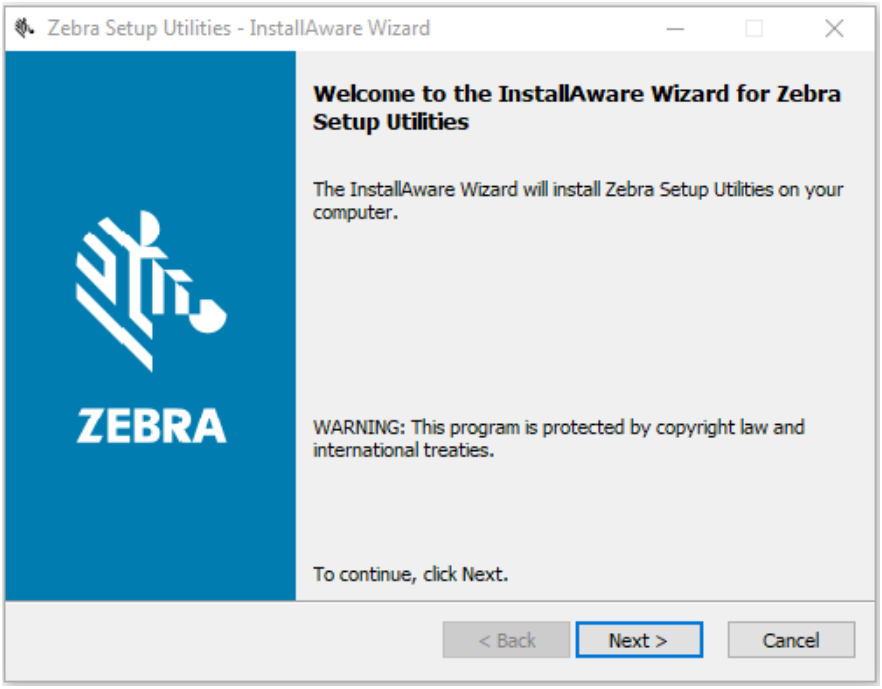
6. Click on the **Accept and Begin Download Now** button.
   The installation file download will begin.

Installing the ZDownloader Utility

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

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

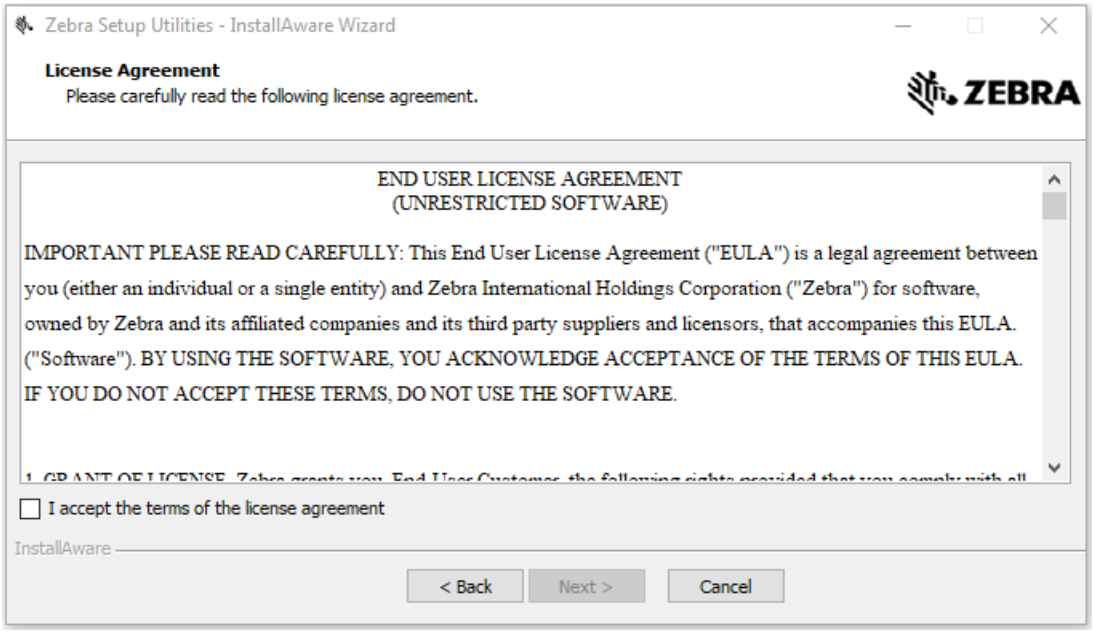
   The utility installs on your computer. When installation is complete, the Firmware Downloader and ZBI Key Manager installation wizard appears.



3. Click **Next**.

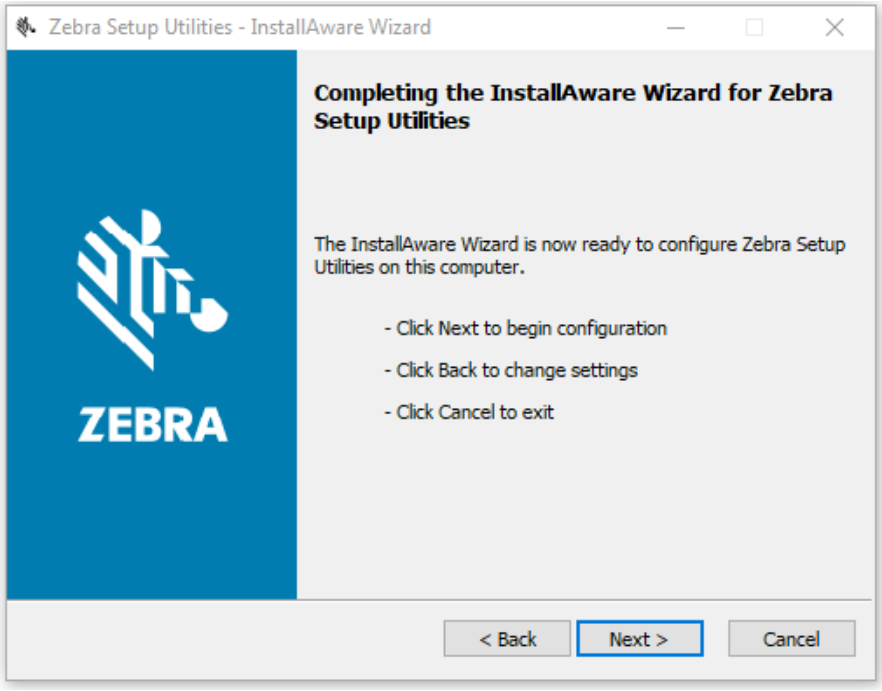
   The End User License Agreement appears.

4. Read the terms of the agreement.



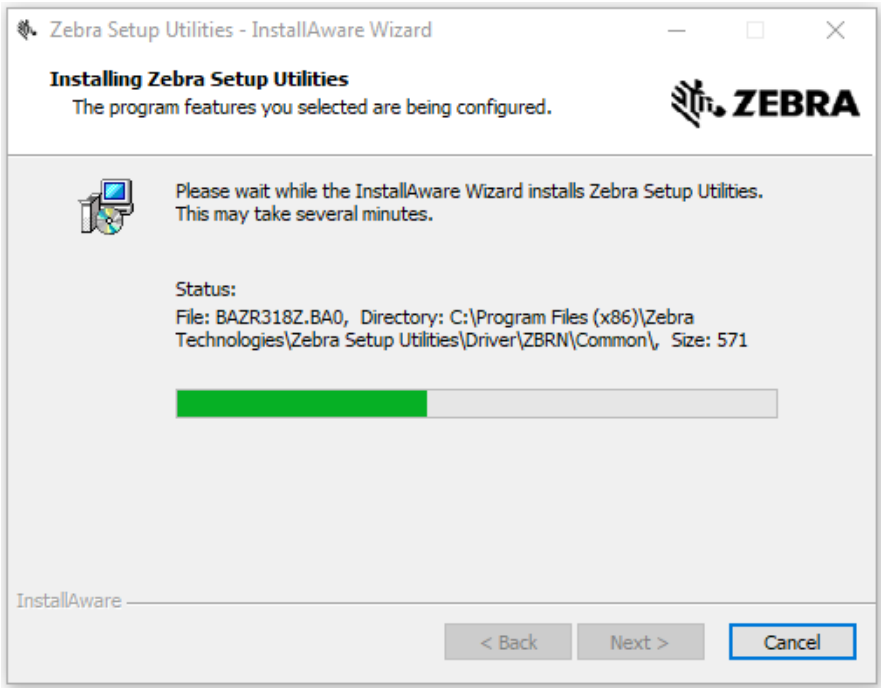
5. Click the **checkbox** to accept the terms.
6. Click **Next**.

   The installation wizard displays information about the installation.

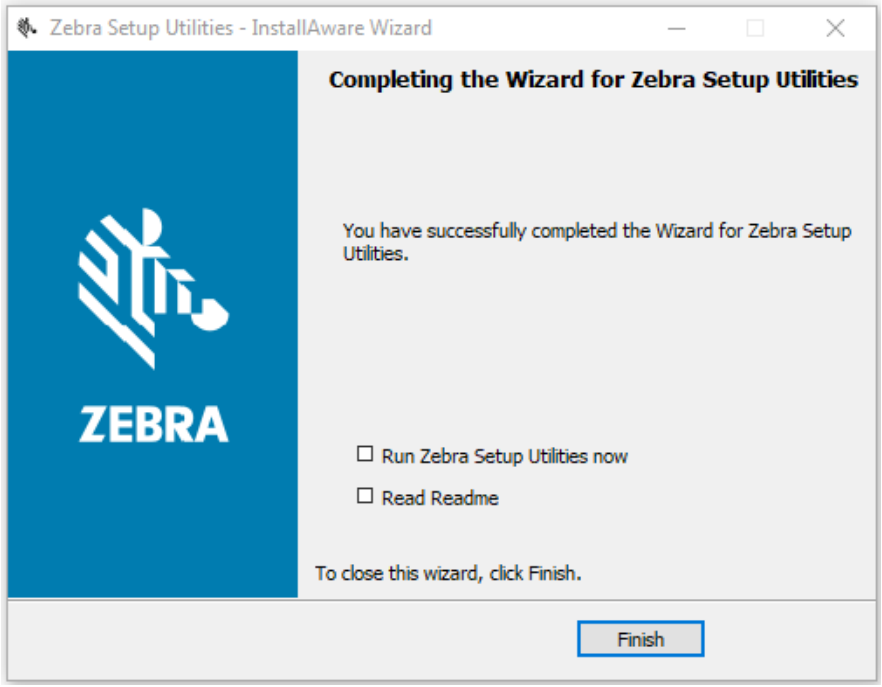


7. Click **Next**.

   The installation wizard installs the application.



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



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Corporate Headquarters

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

http://www.zebra.com

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