Link-OS™
Virtual Device-I
User Guide
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15. **Governing Law.** To the maximum extent permitted by law, the laws of the State of Illinois, U.S.A., without reference to its conflict of laws provisions, will apply to this Agreement. You irrevocably agree to submit to the exclusive jurisdiction and venue of the state or federal courts in the State of Illinois in the event of any litigation involving this Agreement or the Software. You agree that you shall not assert any claim that you are not subject to the jurisdiction of such courts, that the venue is improper, that the forum is inconvenient or any similar objection, claim or argument. Zebra may, in its sole discretion, choose to resolve any controversy or dispute between you and Zebra concerning this Agreement, or the existence, validity, breach or termination thereof, whether during or after the term by binding arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Association (“AAA”), as modified or supplemented under this Section 15, by providing notice to you. In the event that Zebra provides such notice, you hereby waive any right to institute a court or other dispute resolution proceeding with respect to such controversy or dispute and acknowledge arbitration in accordance with this Section 15 as the sole and exclusive means of resolving such controversy or dispute. The arbitration proceeding will take place in Chicago, Illinois and be conducted in the English language. The arbitration panel will consist of 3 arbitrators, one arbitrator appointed by each party and a third neutral arbitrator appointed by the two arbitrators designated by the parties. Any communication between a party and any arbitrator will be directed to the AAA for transmittal to the arbitrator. The parties expressly agree that the arbitrators will be empowered to, at either party's request, grant injunctive relief. The arbitral award will be the exclusive remedy of the parties for all claims, counterclaims, issues or accountings presented or pleaded to the arbitrators. Judgment upon the arbitral award may be entered in any court that has jurisdiction thereof. Any additional costs, fees or expenses incurred in enforcing the arbitral award will be charged against the party that resists its enforcement. Nothing in this Section will prevent Zebra from seeking interim injunctive relief against you or filing an action against you to collect unpaid and past due amounts in any court of competent jurisdiction.

16. **Injunctive Relief.** You acknowledge that, in the event you breach any provision of this Agreement, Zebra will not have an adequate remedy in money or damages. Zebra shall therefore be entitled to obtain an injunction against such breach from any court of competent jurisdiction immediately upon request without posting bond. Zebra's right to obtain injunctive relief shall not limit its right to seek further remedies.

17. **Entire Agreement.** This Agreement constitutes the entire understanding and agreement of the parties and supersedes any and all prior or contemporaneous representations, understandings and agreements between the parties with respect to the subject matter of this Agreement. If any provision of this Agreement is held invalid, the remainder of this Agreement shall continue in full force and effect.

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19. **Modification.** No modification of this Agreement shall be binding unless it is in writing and is signed by an authorized representative of the party against whom enforcement of the modification is sought.

20. **Waiver.** The failure by a party to exercise any right hereunder shall not operate as a waiver of such party's right to exercise such right or any other right in the future.
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<EOT>n ............................................................... 71
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About This Document

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

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Who Should Use This Document

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

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<td>SI68-002625A* or later</td>
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<td>iMZ™ Series</td>
<td>Contact your Zebra representative.</td>
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* This is based on firmware VXX.19.6Z

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

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

How This Document Is Organized

The User Guide is set up as follows:

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<tr>
<td>Install, Register, and Enable Virtual Device-I on page 17</td>
<td>This section provides you with instructions on how to install and enable the Virtual Device-I application on one or more Zebra printers.</td>
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<td>This section provides a detailed listing of commands for use on your Zebra printer with the Virtual Device-I app.</td>
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<tr>
<td>Download the ZDownloader Application on page 119</td>
<td>Zebra recommends that you use the ZDownloader application to download a Virtual Device app to your printers. This section provides you with the instructions for downloading and installing this application.</td>
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Introduction

This section describes the features and functions of a Zebra printer that is running the Virtual Device-I application. The Virtual Device-I application enables Zebra mobile and tabletop printers to work with many host systems that are using INTERMEC® 3400D printers. In most cases, no changes will be required to the host application. This feature can help customers to make a smooth transition to Zebra printers and save them the time and expense of having to rewrite their host software.

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Virtual Device-I Features

The Virtual Device-I application:

- Uses existing features of Zebra printers, when available.
- Offers fonts similar to the original device. These fonts will use 120 KB or more of memory space.
- Supports the Bluetooth®, RS-232, Ethernet, WLAN, and USB interfaces.
- Offers many outline fonts, barcodes, and specific commands and features of target printer models (see Supported Fonts and Barcodes on page 121).
- Provides support of INTERMEC® 3400D commands (see Commands on page 41).

Configuring Network Connectivity

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

- Bluetooth—For detailed information to connect a Bluetooth device, refer to the Bluetooth User Guide.
- Wired print server—For detailed information, refer to the Zebra Net Wired and Wireless Print Servers User Guide.
- Wireless print server (a/b/g/n)—For detailed information, refer to the Zebra Net Wired and Wireless Print Servers User Guide.

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

Notes

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

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

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Acquiring the Virtual Device Application

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


2. Locate your printer type in the list of printers, and then click “Download Now.”

3. Fill out the information on the Virtual Device Download Request form.

4. Click “Submit.”

5. Read the End User License Agreement.

6. Click “Accept and Begin Download Now.”
   Your browser prompts you to open or save the archive containing the Virtual Device app.

7. Save and store the Virtual Device app archive file to your computer.
   The archive file contains the following:
   - A printer firmware .ZPL file to be downloaded to a Zebra printer.
   - A .txt file that contains the SGD command for immediately activating the Virtual Device app.

8. Extract the files from the archive to your computer.
Getting Started

Downloading the Virtual Device-I Application Using ZDownloader

The ZDownloader application can update Virtual Device-I files in Zebra printers connected by RS-232, Parallel, USB, and IP Ethernet networks.

**Figure 1 • Initial ZDownloader Screen**

Adding Printers to the ZDownloader List

There are two ways to add printers to the list:

- Auto-Detect (use for USB or IP Ethernet interfaces)
- Manual add (use for RS-232, Parallel, or IP Ethernet interfaces)

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

Use Auto-Detect for USB or IP Ethernet interfaces.

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

USB printers can only be added by using Auto-Detect. The ZDownloader program can support as many USB printers as your computer can support (most computers typically can support up to 255).
To Auto-Detect printers connected via the USB or IP Ethernet interfaces, perform the following steps:

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

Manually Add Printers

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

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

2. Add a printer name and your printer model in the appropriate fields.
Adding an RS-232 Printer

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

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

4. Click Port Settings.
   The following window appears.

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

6. Click OK to save the port settings.
7. Click OK to add the printer.

**Adding a Parallel Printer**

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

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

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

10. Click OK to add the printer.

**Adding a Network Printer**

11. Select the Network Communication Type.

12. Click Port Settings.
    The following window appears.

13. Enter the printer’s IP address.
14. Click OK to save the network settings.

15. Click OK to add the printer.

Modifying Printers in the List

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

1. Select the printer to modify.

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

OR

Right-click on the printer and select “Modify Printer…”. The printer settings for the selected printer are displayed.

3. Modify the settings as desired.

4. Click OK to save the settings.
Deleting Printers from the List

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

1. Select one or more printers to delete.

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

   Right-click on one of the selected printers and select “Delete Printer(s)”. The printer is removed from the list.
Downloading the Virtual Device App to Selected Printers

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

**Figure 2 • ZDownloader Screen with Multiple Printers Added**

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

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

2. Click the “Select Firmware” toolbar button or
   OR
   Right-click on one of the selected printers and select “Select Firmware File.”

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

The file that you selected appears under Download File for the selected printers.
Printers that are present in the list, but do not have a file selected will be ignored when Downloading starts.

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

6. Click the “Download All” toolbar button.
   OR
   Right-click in the ZDownloader window and select “Download All.”

After downloading has begun, the progress of each printer will be shown in the “Download Status” column.
Canceling a Download in Progress

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

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

1. Click the “Cancel Download” toolbar button.
   OR
   Right-click in the ZDownloader window and select “Cancel Download.”

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

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

Allowing Simultaneous Downloads

ZDownloader, by default, downloads files to one printer at a time. If you have multiple printers to update and want to speed up the process, you can increase the number of simultaneous downloads.

To allow simultaneous downloads, perform the following step:

1. Click “Tools > Options…”
   The following prompt appears.

   ![Options Prompt]

2. Raise the number shown to allow multiple simultaneous downloads.

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

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

ZDownloader Log File

To send the log file, complete these steps:

1. Based on your operating system, navigate to the appropriate folder:
   - Microsoft® Windows® XP
     C:/Program Files/Common Files/FirmwareDownloader
   - Microsoft® Windows® 7
     C:\ProgramData\Zebra Technologies\Firmware Downloader and ZBI Key Manager

2. Copy the log file (DownloadLog.txt), and email to Zdownloader@zebra.com.
   If you are downloading from several computers, you need to send the log file from each computer. If you download files to printers on one day and do not send the file the same day, please note this in your email so that the log file management group picks up the previous load detail. Otherwise, they only pick up the load data for the day that the log file is sent.
Enabling the Virtual Device

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

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

Using an SGD Command

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

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

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

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

You must restart the printer after changing the value of `apl.enable`. For more information about this SGD command, see `apl.enable` on page 117.

Using the User Menus

This section includes instructions for the following printers:

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

If necessary, refer to the User Guide for your printer for additional information about your printer’s control panel.
QLn420 Printers

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

   The printer displays the Home Menu.

2. Use the ARROWS to navigate to the LANGUAGE menu.
3. Press the OK button.

The printer displays the LANGUAGE selection screen.

4. Use the LEFT or RIGHT ARROW to navigate to the VIRTUAL DEVICE selection screen.
5. Use the UP or DOWN ARROW to scroll to the APL-I option.

6. Press the RIGHT SOFT KEY to select USE.

The printer restarts and uses the Virtual Device that you selected.
QLn320 and QLn220 Printers

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

The printer displays the Home Menu.

2. Use the ARROWS to navigate to the SETTINGS menu.
3. Press the OK button.

The printer displays the VIRTUAL DEVICE selection screen.

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

5. With the up arrow highlighted, press the OK button until you scroll to the apl-i option.
6. Press the LEFT ARROW to highlight apl-i.

7. Press OK to select USE.

The printer restarts and uses the Virtual Device that you selected.
ZT230 Printers

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

The printer displays the Home Menu.

![Home Menu Display](image_url)
2. Use the ARROWS to navigate to the LANGUAGE menu.

3. Press the OK button.

The printer displays the LANGUAGE selection screen.
4. Use the LEFT or RIGHT ARROW to navigate to the VIRTUAL DEVICE selection screen.

5. Use the UP or DOWN ARROW to scroll to the APL-I option.
6. Press the RIGHT SOFT KEY or OK to select USE.

The printer restarts and uses the Virtual Device that you selected.
This section provides a detailed listing of commands for use on your Zebra printer with the Virtual Device-I app.

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Immediate Commands

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

<EM>

Description  Abort Print Job

Purpose  To abort the current print job.

Syntax  <EM>

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

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

<BEL>

Description  Error Code, Request

Purpose  To check the printer for errors and warnings.

Syntax  <BEL>

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

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

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

<ESC>L

Description  Label and Gap Length, Transmit

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

Syntax  <ESC>L

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

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

**Description**  Remaining Quantity and Batch Count, Transmit

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

**Syntax**  <ESC>Q

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

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

<DLE>

**Description**  Reset

**Purpose**  To start a printer power-up reset immediately.

**Syntax**  <DLE>

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

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

<VT>

**Description**  Status Dump

**Purpose**  To upload the current status to the printer.

**Syntax**  <VT>

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

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

**Description**  Status Inquiry

**Purpose**  To send the current printer status to the host.

**Syntax**  <ENQ>

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

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

<ESC>Cn

Description  Advanced Mode, Select

Purpose  To switch the printer to Advanced Mode.

Syntax  <ESC>Cn

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

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

<GS>

Description  Alphanumeric Field Separator

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

Syntax  <GS>

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

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

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

<US>n

Description  Batch Count, Set

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

Syntax  <US>n

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

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

Important  • If the amount is out of range, an error code 21 is generated.
<CAN>

**Description**  Clear All Data

**Purpose**  To clear data from previous format.

**Syntax**  `<CAN>`

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

**Notes**  After you select:
- a format—the pointer specifies the first field
- a page—the pointer specifies the first data field in the format.

<DEL>

**Description**  Clear Data From Current Field

**Purpose**  To clear data from present field.

**Syntax**  `<DEL>`

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

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

<NUL>

**Description**  Command Terminator 1

**Purpose**  To stop the present command.

**Syntax**  `<NUL>`

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

<LF>

**Description**  Command Terminator 2

**Purpose**  To stop the present command.

**Syntax**  `<LF>`

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

Description  Configuration Parameters, Transmit

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

Syntax  <ESC>p

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

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

<SO>

Description  Cut

Purpose  To move the label to the cutter and cut.

Syntax  <SO>

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

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

<SUB> or <DLE>

Description  Data Shift – International Characters

Purpose  To enter certain command characters in a data field.

Syntax  <SUB> or <DLE>

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

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

**Description**  Direct Graphics Mode, Select

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

**Syntax**  `<ESC>gm`

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

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

*Default Value:* \( m = 0 \)

*Accepted Values:*

- \( 0 = 8 \) bits per byte
- \( 1 = 8 \) bits per byte, nibblized

**<ESC>cn**

**Description**  Emulation Mode, Enter

**Purpose**  To switch the printer to Emulation mode.

**Syntax**  `<ESC>cn`

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

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

*Default Value:* \( n = 0 \)

*Values for \( n \):*

- \( 0 = 10 \) mil dot size
- \( 1 = 15 \) mil dot size for barcodes only.
  Everything else is 10 mil.
<ESC>Fn

Description  Field, Select

Purpose  To choose a data field for data entry.

Syntax  <ESC>Fn

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

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

Things to be aware of:

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

<ESC>Dn

Description  Field Decrement, Set

Purpose  To set the field decrement value.

Syntax  <ESC>Dn

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

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

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

<ESC>In

Description  Field Increment, Set

Purpose  To set the field increment value.

Syntax  <ESC>In

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

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

**Description**  First Data Entry Field, Select

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

**Syntax**  `<ACK>`

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

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

<ESC>vn

**Description**  Font, Transmit

**Purpose**  To upload printer fonts.

**Syntax**  `<ESC>vn`

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

<FF>

**Description**  Form Feed

**Purpose**  To feed a label.

**Syntax**  `<FF>`

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

**Notes**  Things to be aware of:

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

Description  Format, Select

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

Syntax  <ESC>En,m

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

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

Notes  Things to be aware of:

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

Important  If an invalid format number is entered, error code 36 is generated.
<ESC>xn

Description  Format, Transmit

Purpose  To send a printer format to the host.

Syntax  <ESC>xn

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

Notes  Things to be aware of:

- If <ESC>x is sent to the printer without specifying the value for n, the printer uploads
the complete format directory. The format directory is in the following format:

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

  - [Idnumber] is the value identified by n. [name] is the name set out in the command that created the
    format. [type] is 0. [storage size] is the amount of memory necessary to store
    the format.

- If you enter an incorrect number, an error code 25 is generated.

- The printer must stay in Advanced mode.

<ESC>N

Description  Increment and Decrement, Disable

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

Syntax  <ESC>N

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

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

<ESC>mn

Description  Memory Usage, Transmit

Purpose  To display the amount of printer memory being used.

Syntax  <ESC>mn

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

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

**Description**  Next Data Entry Field, Select

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

**Syntax**  `<CR>`

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

**Important**  Things to be aware of:

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

<FS>

**Description**  Numeric Field Separator

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

**Syntax**  `<FS>`

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

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

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

**Description**  Options Selected, Transmit

**Purpose**  To transmit the selected options list.

**Syntax**  `<ESC>O`

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

**Notes**  Values returned by printer:
- 0 = No options selected
- 1 = Cutter
- 2 = Self Strip

**<ESC>Gn**

**Description**  Page, Select

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

**Syntax**  `<ESC>Gn`

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

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

**Important**  Things to be aware of:
- All user-entered data is erased.
- If an invalid page number is entered, an error code 36 is generated.
<ESC>yn

Description  Page, Transmit

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

Syntax  <ESC>yn

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

Notes  Things to be aware of:

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

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

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

<ETB>

Description  Print

Purpose  To print the present page or format.

Syntax  <ETB>

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

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

<ESC>H

Description  Printhead Parameters, Transmit

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

Syntax  <ESC>H

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

Example  This is an example of a transmitted printhead parameter value: 895.5.0.
<ESC>P

**Description**  Program Mode, Enter

**Purpose**  To switch to Program mode.

**Syntax**  `<ESC>P`

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

**Notes**  Using this command erases all previously entered data.

<ESC>Mn

**Description**  Program Number, Transmit

**Purpose**  To send program and version number.

**Syntax**  `<ESC>Mn`

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

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

<RS>n

**Description**  Quantity Count, Set

**Purpose**  To set the number of printed label batches.

**Syntax**  `<RS>n`

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

**Notes**  Data increments and decrements occur between batches of labels.

**Important**  If the quantity is out of range, error code 21 is generated.
<ESC><SP>

Description  Start and Stop Codes (Code 39), Print

Purpose  To print a Code 39 barcode with no data.

Syntax  <ESC><SP>

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

Notes  The printer erases all data in the current field.

<ESC>T

Description  Test and Service Mode, Enter

Purpose  To switch to Test and Service mode.

Syntax  <ESC>T

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

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

<ESC>u

Description  User-Defined Characters, Transmit

Purpose  To send a graphic to the host.

Syntax  <ESC>u

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

<ESC>Z

Description  User-Defined Tables, Transmit

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

Syntax  <ESC>Z

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

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

**Syntax**  `<BS>`

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

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

**<SI>N**

**Description**  Amount of Storage, Define

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

**Syntax**  `<SI>N`

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

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

**<ESC>j**

**Description**  Auto-Transmit 1, Enable

**Purpose**  To enable auto-transmit 1.

**Syntax**  `<ESC>j`

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

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

**<ESC>d**

**Description**  Auto-Transmit 2, Enable

**Purpose**  To enable auto-transmit 2.

**Syntax**  `<ESC>d`

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

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

- `<DC1>` = when using Virtual Device-I handshaking protocol
- `<DC2>` = when using XON/XOFF handshaking protocol

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

**Description**  Auto-Transmit 3, Enable

**Purpose**  To enable auto-transmit 3.

**Syntax**  `<ESC>e`

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

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

**<ESC>k**

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

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

**Syntax**  `<ESC>k`

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

**Notes**  This command turns off the auto transmit status responses.

**<SI>c**

**Description**  Cutter, Enable or Disable

**Purpose**  To enable or disable the cutter option.

**Syntax**  `<SI>c`

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

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

*Default Value:*  $n = 0$

*Values for $n$:*

- $0 = $Turns cutter off$
- $1 = $Turns cutter on
<SI>dn

**Description**  Dark Adjust, Set

**Purpose**  To set printer darkness.

**Syntax**  `<SI>dn`

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

**Notes**  Things to be aware of:

*Default:*  $n = 0$

*Values for $n$:*

+10 is the darkest setting and –10 is the lightest setting, in increments of 1.

---

<SI>Cn

**Description**  Emulation or Advanced Mode on Power-Up

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

**Syntax**  `<SI>Cn`

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

*Default Value:*  $n = 1$

*Values for $n$:*

0 = Emulation mode (10 mil)

1 = Advanced mode (5 mil)

2 = Emulation mode (15 mil)

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

---

<SI>Dn

**Description**  End-of-Print Skip Distance, Set

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

**Syntax**  `<SI>Dn`

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

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

**Description**  IBM Language Translation, Enable or Disable

**Purpose**  To enable and disable the IBM language translation.

**Syntax**  `<SI>in`

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

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

*Default Value: n = 0*

*Values for n:*

- 0 = disable IBM
- 1 = enable IBM

---

**<SYN>n**

**Description**  Intercharacter Delay, Set

**Purpose**  To determine the intercharacter delay for transmissions.

**Syntax**  `<SYN>n`

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

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

*Default: n = 0*

*Values for n: 0 – 9999*
<SI>fn

Description  Label Rest Point, Adjust

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

Syntax  <SI>fn

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

Notes  You can enable this control through the control panel.

Default:  \( n = 0 \)

Values for \( n \): \(-30\) (backwards) to \(+30\) (forward) in 5 mil increments

<SI>Rn

Description  Label Retract, Enable or Disable

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

Syntax  <SI>Rn

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

Notes  Things to be aware of:

Default:  \( n = 1 \)

Values for \( n \):

\[ 0 = \text{disables label retract} \]
\[ 1 = \text{enables label retract} \]

<SI>rn

Description  Label Retract Distance, Set

Purpose  To set the label retract distance.

Syntax  <SI>rn

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

Description  Label Stock Type, Select

Purpose  To set the media type.

Syntax  <SI>Tn

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

Notes  The n argument specifies the media type.

Default: n = 1
Values for n:

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

<SI>Wn

Description  Label Width, Set

Purpose  To determine the label width.

Syntax  <SI>Wn

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

<SI>L

Description  Maximum Label Length, Set

Purpose  To identify the maximum label length.

Syntax  <SI>L

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

Notes  This command is primarily used for detecting media errors.
Commands
Configuration Commands—<SI>gn,m

<SI>gn,m

Description  Media Sensitivity, Select

Purpose  To choose the printer's media sensitivity.

Syntax  <SI>gn,m

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

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

<ESC><SYN>n

Description  Message Delay, Set

Purpose  To determine the delay between transmissions.

Syntax  <ESC><SYN>n

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

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

Default: \( n = 0 \)
Values for \( n \): \( 0 – 9999 \)

<SI>I

Description  Number of Image Bands, Set

Purpose  To determine the number of image bands.

Syntax  <SI>I

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

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

**Description**  Postamble, Set

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

**Syntax**  `<EOT>n`

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

**Notes**  Assigns the Postamble character.

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

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

---

<SOH>n

**Description**  Preamble, Set

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

**Syntax**  `<SOH>n`

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

**Notes**  Assigns the Preamble character.

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

With n equal to default value, a preamble character is not sent by the printer.
<SI>Sn

Description  Print Speed, Set

Purpose  To determine the print speed.

Syntax  <SI>Sn

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

Notes  Defines the print speed.

Default: \(n = 30\)

Values for \(n\): 20, 30, 40, 50, or 60

20 = 2 inches per second (ips), 30 = 3 ips, et cetera.

<SI>ln

Description  Printer Language, Select

Purpose  To determine the printer language.

Syntax  <SI>ln

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

Default: \(n = 0\)

Values for \(n\): 0 to 10

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

<SI>hn,m

Description  Printhead Loading Mode, Select

Purpose  To determine the printhead loading mode.

Syntax  <SI>hn,m

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

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

Description  Self-Strip, Enable or Disable

Purpose  To enable or disable the self-strip feature.

Syntax  <SI>tn

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

Notes  Activates or deactivates the peel sensor.

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

<SI>Fn

Description  Top of Form, Set

Purpose  To set the form top position.

Syntax  <SI>Fn

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

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

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

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

cn,m1,m2,m3

Description  Barcode, Select Type

Purpose  To choose the barcode field type.

Syntax  cn,m1,m2,m3

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

Notes  This command defines the Symbology of the barcode.

Values for n:

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

If you use the Null character in the Barcode data stream, you will lose that character as well as any following data. If using any of the following control characters (<RS>, <GT>, <EOT>, et cetera), you have to precede it with a <SUB> character.
c0m

Description  Code 39

Purpose  To specify a Code 39 barcode field.

Syntax  c0m

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

Notes  This command has one argument, \( m \) for mode, which defaults to 0.

These are the types of Code 39 that are supported:

- Full ASCII
- 43 Character
- 8646 compatible

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

These are the supported Code 39 barcode modes:

\[ m = \text{Code 39 Mode} \]

\[ \begin{align*}
0 &= \text{No check digit, 8646 compatible barcode type.} \\
1 &= \text{Printer provides check digit, 8646 compatible type.} \\
2 &= \text{User provides check digit, which is verified by printer 8646 compatible type.} \\
3 &= \text{No check digit, full ASCII type.} \\
4 &= \text{Printer provides check digit, full ASCII type.} \\
5 &= \text{User provides check digit, which is verified by printer, full ASCII type.} \\
6 &= \text{No check digit, 43 character type.} \\
7 &= \text{Printer provides check digit, 43 character type.} \\
8 &= \text{User provides check digit, which is verified by printer, 43 character type.}
\end{align*} \]

---

c1

Description  Code 93

Purpose  To specify a Code 93 barcode field.

Syntax  c1

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

Notes  Things to be aware of:

- There are no arguments for the Code 93 barcode.
- If a string has an odd number of characters, the printer automatically adds a zero.
c2,m

Description  Interleaved 2 of 5

Purpose  To specify an Interleaved 2 of 5 barcode field.

Syntax  c2,m

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

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

c3,m

Description  Code 2 of 5

Purpose  To specify a Code 2 of 5 barcode field.

Syntax  c3,m

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

Notes  Things to be aware of:
- The c3 command has one argument, $m$ for mode, which defaults to $0$.
- The Code 2 of 5 barcode supports these modes:
  - $m = $ Interleaved 2 of 5 Mode
    - $0 = $ Start/stop code size is 3 bars.
    - $1 = $ Start/stop code size is 2 bars.
**c4,m**

**Description**  Codabar

**Purpose**  To specify a Codabar barcode field.

**Syntax**  \texttt{c4,m}

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

**Notes**  Things to be aware of:
- The \texttt{c4} command has one argument, \textit{m} for mode, which defaults to 0.

**Default:** \textit{m} - 0

**Values for \textit{m}:** \textit{m} = 0
- The Codabar barcode supports these modes:
  \texttt{m} = Codabar Mode
  - 0 = User provides start/stop codes, which are verified by printer.
  - 1, \texttt{x}, \texttt{y} = Printer provides start code \texttt{x} and stop code \texttt{y}, where \texttt{x} and \texttt{y} are values with ranges of A to D and a to d.

- You can send the start/stop characters as part of the human readable field of the barcode or as a separate text field (print data). Characters sent down as printer data override start/stop characters defined by the barcode field.

---

**c5,m**

**Description**  Code 11

**Purpose**  To specify a Code 11 barcode field.

**Syntax**  \texttt{c5,m}

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

**Notes**  Things to be aware of:
- The \texttt{c5} command has one argument, \textit{m} for mode, which defaults to 0.

**Default:** \textit{m} = 0

**Values for \textit{m}:**
- The Code 11 barcode supports these modes:
  \texttt{m} = Code 11 Mode
  - 0 = Printer provides two check digits.
  - 1 = Printer provides one check digit.
  - 2 = User provides two check digits, which are verified by the printer.
  - 3 = User provides one check digit, which is verified by the printer.
**c6,m1,m2**

**Description**  Code 128

**Purpose**  To specify a Code 128 barcode field.

**Syntax**  `c6,m1,m2`

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

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

The Code 128 barcode supports these modes:

- `m` = Code 128 Mode
  - 0 = Printer provides two check digits.
  - 1 = Printer provides one check digit.
  - 2 = User provides two check digits, which are verified by the printer.
  - 3 = User provides one check digit, which is verified by the printer.
**c7,m1,m2**

**Description**  UPC/EAN

**Purpose**  To specify a UPC/EAN barcode field.

**Syntax**  \texttt{c7,m1,m2}

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

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

**Virtual Device-I Printer Label**

![Virtual Device-I Printer Label]

**Intermec 3400D Printer Label**

![Intermec 3400D Printer Label]

**Barcodes not implemented:** version D1-D5. When data entered is too long, an EAN-13 barcode is printed.
**c8,m1,m2**

**Description**  HIBC Code 39

**Purpose**  To specify an HIBC Code 39 barcode field.

**Syntax**  c8,m1,m2

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

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

Default: m1 = 0

**Values for m1 Supplier Std.:**
- 0 = Primary format
- 1 = Backup Primary format
- 2,m2 = Second Data format. The linking character comes from the field identifier (m2 value)

**Values for m1 Provider Std.:**
- 3 = Single format
- 4 = 1st data format
- 5,m2 = Second Data Format

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

The HIBC Code 39 barcode supports these modes:

<table>
<thead>
<tr>
<th>m1</th>
<th>HIBC Code 39 Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Primary format.</td>
</tr>
<tr>
<td>1</td>
<td>Alternate Primary format.</td>
</tr>
<tr>
<td>2,m2</td>
<td>Secondary format with m2 as the linkage character and field identifier.</td>
</tr>
<tr>
<td>3</td>
<td>Single format.</td>
</tr>
<tr>
<td>4</td>
<td>First data format.</td>
</tr>
<tr>
<td>5,m2</td>
<td>Second data format with m2 as the linkage character and field identifier.</td>
</tr>
<tr>
<td>6</td>
<td>Multiple data format.</td>
</tr>
</tbody>
</table>
c9

**Description**  Code 16K

**Purpose**  To specify a Code 16K barcode field.

**Syntax**  c9

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

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

---

c10

**Description**  Code 49

**Purpose**  To specify a Code 49 barcode field.

**Syntax**  c10

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

**Notes**  Things to be aware of:

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

**Important**  Only Alphanumeric (0) and numeric (2) modes are supported by the printer.
c11

**Description**  POSTNET

**Purpose**  To specify a POSTNET barcode field.

**Syntax**  c11

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

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

**Virtual Device-I Printer Label**

![Virtual Device-I Printer Label](image)

**Intermec 3400D Printer Label**

![Intermec 3400D Printer Label](image)

**Notes**  The c11 command has no arguments.

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

**Origin difference**  y-direction.
**c12,m1,m2,m3**

**Description**  
PDF417

**Purpose**  
To specify a PDF417 barcode field.

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

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

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

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

**Virtual Device-I Printer Label**

![Virtual Device-I Printer Label](image1)

**Intermec 3400D Printer Label**

![Intermec 3400D Printer Label](image2)
Using ,m1 to Select the Number of Columns

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

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

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

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

Using ,m2 to Select an Error Correction Level

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

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

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

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

<table>
<thead>
<tr>
<th>m2</th>
<th>Number of Code words</th>
<th>Error Detection Characters Generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>&lt;not recommended&gt;</td>
<td>2 (no error recovery)</td>
</tr>
<tr>
<td>1</td>
<td>&lt;not recommended&gt;</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>1-40</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>41-160</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>161-320</td>
<td>32</td>
</tr>
<tr>
<td>5</td>
<td>321-863</td>
<td>64</td>
</tr>
<tr>
<td>6</td>
<td>&lt;reserved for special applications&gt;</td>
<td>128</td>
</tr>
<tr>
<td>7</td>
<td>&lt;reserved for special applications&gt;</td>
<td>256</td>
</tr>
<tr>
<td>8</td>
<td>&lt;reserved for special applications&gt;</td>
<td>512</td>
</tr>
<tr>
<td>9</td>
<td>&lt;printer automatically determines error correction level&gt; varies</td>
<td></td>
</tr>
</tbody>
</table>
Using ,m3 to Set the Truncate Flag

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

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

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

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

*Default: m3 = 0*

*Values for m3,*

- 0 = disables truncating
- 1 = enables truncating

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

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

<table>
<thead>
<tr>
<th>Character Set</th>
<th>Data Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full ASCII</td>
<td>1108</td>
</tr>
<tr>
<td>Alphanumeric</td>
<td>1850</td>
</tr>
<tr>
<td>Numeric</td>
<td>2725</td>
</tr>
</tbody>
</table>

**Important**  Use these guidelines. Due to the fact that 2-dimensional symbols encode data by compressing it, the capacity varies due to the data being encoded.
**c14,m1**

**Description** MaxiCode

**Purpose** To specify a Code MaxiCode barcode field.

**Syntax** `c14,m1`

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

![Virtual Device-I Printer Label](image)

![Intermec 3400D Printer Label](image)

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

See the labels examples to see the differences between printers.

- Interpretive field fonts could be different.
- Barcodes might print. They do not print on 3400D printers.
The MaxiCode barcode supports these modes:

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

**c15,m1**

**Description**  JIS-ITF

**Purpose**  To specify a JIS-ITF barcode field.

**Syntax**  c15,m

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

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

*Default Value: m = 0*

*Values for n,m*

\[\begin{array}{l}
\theta = 5 \text{ dot narrow magnification} \\
1 = 8 \text{ dot narrow magnification} \\
2 = 10 \text{ dot narrow magnification} \\
\end{array}\]

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

*Default Value: 0,14*

*Values for n:*

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

**Important**  The JIS-ITF barcode always includes an interpretive field located underneath the barcode field. This symbology cannot achieve a true 2.5 to 1 ratio due to the printhead dot size limitations. The actual ratio is 2.4 to 1.
c16,m1,m2

**Description**  HIBC Code 128

**Purpose**  To specify an HIBC Code 128 barcode field.

**Syntax**  c16,m1,m2

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

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

The HIBC Code 128 barcode supports these modes:

<table>
<thead>
<tr>
<th>m1</th>
<th>HIBC Code 128 Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Primary format.</td>
</tr>
<tr>
<td>1</td>
<td>Alternate Primary format.</td>
</tr>
<tr>
<td>2,m2</td>
<td>Secondary format with m2 as the linkage character and field identifier.</td>
</tr>
<tr>
<td>3</td>
<td>Single format.</td>
</tr>
<tr>
<td>4</td>
<td>First data format.</td>
</tr>
<tr>
<td>5,m2</td>
<td>Second data format with m2 as the linkage character and field identifier.</td>
</tr>
<tr>
<td>6</td>
<td>Multiple data format.</td>
</tr>
</tbody>
</table>
**c17,m1,m2,m3,m4,m5,m6**

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

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

**Syntax**  \textit{c17,m1,m2,m3,m4,m5,m6}

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

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

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

<table>
<thead>
<tr>
<th>Argument</th>
<th>Purpose</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{m1}</td>
<td>Enhanced error correction</td>
<td>200</td>
</tr>
<tr>
<td>\textit{m2}</td>
<td>Square mode</td>
<td>0</td>
</tr>
<tr>
<td>\textit{m3}</td>
<td>Position of current symbol in group</td>
<td>0</td>
</tr>
<tr>
<td>\textit{m4}</td>
<td>Total number of symbols in group</td>
<td>\textit{m3} parameter</td>
</tr>
<tr>
<td>\textit{m5}</td>
<td>File ID number</td>
<td>1</td>
</tr>
<tr>
<td>\textit{m6}</td>
<td>File ID number</td>
<td>1</td>
</tr>
</tbody>
</table>
**c18,m1,m2,m3**

**Description**  QR Code

**Purpose**  To specify a QR Code barcode field.

**Syntax**  \( c_{18},m_{1},m_{2},m_{3} \)

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

**Notes**  The \( c_{18} \) command has three arguments.

You can only produce QR symbols up to 3550 characters.

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

<table>
<thead>
<tr>
<th>Argument</th>
<th>Purpose</th>
<th>Default/Possible Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>( m_{1} )</td>
<td>Enhanced error correction 200</td>
<td>2/1,2 for Model 1,2 resp.</td>
</tr>
<tr>
<td>( m_{2} )</td>
<td>Square mode</td>
<td>M/L,M,Q,H for 7,15,25,30% error correction, resp.</td>
</tr>
<tr>
<td>( m_{3} )</td>
<td>Mask number</td>
<td>8/0-7 for mask type, 8 for auto-selection of mask</td>
</tr>
</tbody>
</table>
**c19,m1,m2**

**Description**  MicroPDF417

**Purpose**  To specify a MicroPDF417 barcode field.

**Syntax**  `c19,m1,m2`

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

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

**Virtual Device-I Printer Label**

**Intermec 3400D Printer Label**

The `c19` command has 2 arguments.

When rotated 180 degrees, barcode position could differ.

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

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>m1</code></td>
<td>Number of columns of data in barcode; possible values of 0–4, where 0 lets the printer set the best-fitting value.</td>
<td>0</td>
</tr>
<tr>
<td><code>m2</code></td>
<td>Number of rows of data in barcode; possible values depend on the value of <code>m1</code>, and 0 lets the printer set the best-fitting value.</td>
<td>0</td>
</tr>
</tbody>
</table>
**Bn,name**

**Description**  Barcode Field, Create or Edit

**Purpose**  To edit or create a barcode field.

**Syntax**  `Bn,name`

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

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

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

---

**yn**

**Description**  Bitmap Cell Height for Graphic or UDF, Define

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

**Syntax**  `yn`

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

**Notes**  Sets the graphic or user-defined font height.

**Default:**

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

**Values for n:** 1 to 799

**Note** • Things to be aware of:

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

---

**xn**

**Description**  Bitmap Cell Width for Graphic or UDF, Define

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

**Syntax**  `xn`

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

**Description**  Bitmap User-Defined Font, Clear or Define

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

**Syntax**  \( Tn \)

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

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

bn

**Description**  Border Around Human-Readable Text, Define

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

**Syntax**  \( bn \)

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

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

**Description**  Box Field, Create or Edit

**Purpose**  To edit or create a box field.

**Syntax**  

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

**Notes**  This command is used to design a box field.

*Default: n = 0*

*Values for n: 0 – 199; name is optional*

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

Box field command parameters are as follows:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Origin</td>
<td>0</td>
</tr>
<tr>
<td>Default</td>
<td>0,0</td>
</tr>
<tr>
<td>Field Direction</td>
<td>f Default = 0 degrees</td>
</tr>
<tr>
<td>Box Length</td>
<td>l Default = 100</td>
</tr>
<tr>
<td>Box Height</td>
<td>h Default = 100</td>
</tr>
<tr>
<td>Box Width</td>
<td>w Default = 1</td>
</tr>
</tbody>
</table>

**Xn**

**Description**  Character Bitmap Origin Offset, Define

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

**Syntax**  

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

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

*Default: n = 0*

*Values for n: 0 – 800*

**Important**  You can use this command only with bitmapped fonts.
**rn**

**Description** Character Rotation or Barcode Ratio, Define

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

**Syntax** `rn`

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

*Character Rotation Default*

\[ n = 0 \]

1 = horizontal

2 = 90° counterclockwise

*Bar Code Ratio Default: \( n = 1 \)*

Barcode fields, ratio of wide to narrow bar

*Accepted values for \( n \):*

\[ \theta = 2.5 \text{ to } 1 \]

\[ 1 = 3.0 \text{ to } 1 \]

\[ 2 = 2.0 \text{ to } 1 \]

\[ 3 = 3.0 \text{ to } 1 \]

\( n = 3 \) is used for Code 39 and creates a ratio of 7 dots to 3 dots.

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

**Description** Code 39 Prefix Character, Define

**Purpose** To determine the prefix for a Code 39 field.

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

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

*Default is for No prefix*

*Accepted values for \( n \):* A - Z (case sensitive) and \( \theta - 9 \)

After selecting the prefix, enter Code 39.

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

Description  Command Tables, Load

Purpose  To download a command table.

Syntax  C

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

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

N

Description  Current Edit Session, Save

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

Syntax  N

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

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

en,m1,m2

Description  Data Source for Format in a Page, Define

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

Syntax  en,m1,m2

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

Default Value:

\[ n = 0 \]
\[ m = a \]
\[ m2 = 0 \]

Accepted values for \( n \):

\( 0 \) = formats receive their data while in Print mode
\( 1 \) = format is slave to another format on this page.
**Dn**

**Description**  Field, Delete

**Purpose**  To delete field *n* from the format.

**Syntax**  `Dn`

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

*Default Value: n = 0*

*Accepted values for n: 0 – 199*

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

**dₙ,m₁,m₂**

**Description**  Field Data, Define Source

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

**Syntax**  `dₙ,m₁,m₂`

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

*Default values bar code fields: 0,20,0*

*Default values human-readable fields: 0,30,0*

*Accepted values for n:*

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

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

Description  Field Direction, Define

Purpose  To determine the field rotation.

Syntax  fn

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

Default Value:  \( n = 0 \)

Accepted values for \( n \):
- \( n = 0 \) = Horizontal (all are rotated counterclockwise from horizontal)
- \( n = 1 \) = 90°
- \( n = 2 \) = 180°
- \( n = 3 \) = 270°

on,m

Description  Field Origin, Define

Purpose  To determine the origin of a field.

Syntax  on,m

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

Default Value:
- \( n = 0 \)
- \( m = 0 \)

Accepted values for \( n \) and \( m \):
- \( n = \) 0 – 19999
- \( m = \) 0 – 19999
### Zn

**Description**  Font Character Width, Define

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

**Syntax**  \texttt{Zn}

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

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

*Default:* Bitmap width of characters, minus font character offset (Xn) plus intercharacter space (zn)

*Accepted values for n:* \( n = 1 – 799 \)

### cn,m

**Description**  Font Type, Select

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

**Syntax**  \texttt{cn,m}

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

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

### A or F

**Description**  Format, Create or Edit

**Purpose**  To create or edit a format.

**Syntax**  \texttt{A} or \texttt{F}

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

**Notes**  If the format number is out of range, an error code 36 is generated.
\textbf{qn}

**Description**  Format Direction in a Page, Define

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

**Syntax**  \texttt{qn}

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

*Default Value:*  \( n = 0 \)

*Accepted values for* \( n \):

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

\( 1 \) = 90°

\( 2 \) = 180°

\( 3 \) = 270°

**En**

**Description**  Format, Erase

**Purpose**  To erase a format.

**Syntax**  \texttt{En}

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

*Default Value:*  NONE

*Accepted values for* \( n \): 1 – 19

**Important**  Cannot erase format 0.
On, m

Description Format Offset Within a Page, Define

Purpose To determine the format offset within a page.

Syntax On, m

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

Default Value:
\[
\begin{align*}
  n &= \emptyset \\
  m &= \emptyset
\end{align*}
\]

Accepted values for n and m:
\[
\begin{align*}
  n &= \emptyset \text{ – } 19999 \\
  m &= \emptyset \text{ – } 19999
\end{align*}
\]

mp

Description Format Position From Page, Delete

Purpose To delete a format from within a page.

Syntax mp

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

Default Value: \( p = a \)

Accepted values for p: a – z

Mp, n

Description Format Position in a Page, Assign

Purpose To assign a format to a page position.

Syntax Mp, n

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

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

Notes \( n \) is the numeric format ID, and \( p \) is the page position.
**cn**

**Description**  Graphic, Select

**Purpose**  To choose a graphic for graphic fields.

**Syntax**  \texttt{cn}

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

\textit{Default Value:} \texttt{n}

\textit{Accepted values for} \texttt{n}: 0 – 99

**Important**  • Valid for graphic fields only.

**u**

**Description**  Graphic or UDC, Define

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

**Syntax**  \texttt{u}

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

**hn**

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

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

**Syntax**  \texttt{hn}

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

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

**Description**  Human-Readable Field, Create or Edit

**Purpose**  To edit or create a human-readable field.

**Syntax**  Hn

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

*Default Value:* \( n \)
*Values for \( n \): \( 0 – 199 \)

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

---

**zn**

**Description**  Intercharacter Space for UDF, Define

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

**Syntax**  zn

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

*Default Value:* \( n = 2 \)
*Accepted values for \( n \): \( 0 – 199 \)

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

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

**Description**  Interpretive Field, Edit

**Purpose**  To edit an interpretive field.

**Syntax**  `In`

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

*Default Value: n = 0*

*Accepted values for n: 1 – 199*

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

**in**

**Description**  Interpretive Field, Enable or Disable

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

**Syntax**  `in`

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

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

*Default: n = 0*

*Accepted values for n:*

- 0 = disabled
- 1 = enable with start and stop characters
- 2 = enable without start and stop characters
**In**

**Description**  Length of Line or Box Field, Define

**Purpose**  To determine the length of a line or box.

**Syntax**  `ln`

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

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

*Default Value:* \( n = 100 \)

*Accepted values for* \( n \): \( 1 \text{ – 9999} \)

**Ln**

**Description**  Line Field, Create or Edit

**Purpose**  To edit or create a line field.

**Syntax**  `Ln`

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

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

*Default Value:* \( n = 0 \)

*Accepted values for* \( n \): \( 0 \text{ – 199} \)

**J**

**Description**  Outline Font, Clear or Create

**Purpose**  To clear or create an outline font or graphic.

**Syntax**  `J`

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

**Description**  Outline Font, Download

**Purpose**  To download outline font descriptions.

**Syntax**  j

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

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

Sn

**Description**  Page, Create or Edit

**Purpose**  To edit or create a page.

**Syntax**  Sn

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

**Notes**  Default page (page 0) cannot be altered.

*Default Value:* NONE

*Accepted values for n: 1 – 9*

sn

**Description**  Page, Delete

**Purpose**  To delete a page.

**Syntax**  sn

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

**Notes**  Default page (page 0) cannot be altered.

*Default Value:* NONE

*Accepted values for n: 1 – 9*
**gn**

**Description**  Pitch Size, Set

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

**Syntax**  `gn`

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

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

*Default Value: n = 12*

*Accepted values for n: 1 – 50*

**kn**

**Description**  Point Size, Set

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

**Syntax**  `kn`

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

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

*Default Value: n = 12*

*Accepted values for n: 4 – 288*

**v**

**Description**  Print Line Dot Count Limit, Set

**Purpose**  To limit the print line dot count limit.

**Syntax**  `v`

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

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

**Description**  Program Mode, Exit

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

**Syntax**  R

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

Gn

**Description**  User-Defined Character, Clear or Create

**Purpose**  To clear or create graphic bitmaps.

**Syntax**  Gn

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

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

*Default Value:* NONE

*Accepted values for* \( n \): 0 – 99

Un

**Description**  User-Defined Character Field, Create or Edit

**Purpose**  To create or edit a graphical field.

**Syntax**  Un

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

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

*Default Value:* \( n = 0 \)

*Accepted values for* \( n \): 0 – 199
tn

**Description**  User-Defined Font Character, Create

**Purpose**  To identify the next font to be defined.

**Syntax**  `tn`

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

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

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

wn

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

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

**Syntax**  `wn`

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

*Default value for line, box, bar code fields, and graphics: `n` = 1*  
*Accepted values for `n`:  
  - Line and box fields: 1 – 9999  
  - Barcode fields: 1 – 99  
  - Graphics: 1 – 999*

*Default value for human-readable fields and POSTNET: `n` = 2*  
*Accepted values for human-readable fields and POSTNET: 1 – 250*
Test and Service Commands

A

Description  Ambient Temperature, Transmit

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

Syntax  A

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

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

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

;

Description  Command Terminator

Purpose  To end all commands in Test and Service mode.

Syntax  ;

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

K

Description  Dark Adjust

Purpose  To change the darkness of the print on labels.

Syntax  K

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

D

Description  Factory Defaults, Reset

Purpose  To set the printer configuration to the factory defaults.

Syntax  D

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

**Purpose**  To print all stored formats.

**Syntax**  f

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

---

**Description**  Hardware Configuration Label, Print

**Purpose**  To print a hardware configuration label.

**Syntax**  h

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

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

**Virtual Device-I Printer Label**

---

**Intermec 3400D Printer Label**

---
T

Description  Label Taken Sensor Value, Transmit

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

Syntax  T

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

p

Description  Pages, Print

Purpose  To print the pages stored on the printer.

Syntax  p

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

C

Description  Pitch Label, Print

Purpose  To print the pitch label.

Syntax  C

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

Description  Print Quality Label, Print

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

Syntax  Q

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

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

**Virtual Device-I Printer Label**

![Virtual Device-I Printer Label]

**Intermec 3400D**

![Intermec 3400D]
**p**

**Description**  Printhead Temperature Sensor Value, Transmit

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

**Syntax**  p

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

**M**

**Description**  Reflective Sensor Value, Transmit

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

**Syntax**  M

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

**s**

**Description**  Software Configuration Label, Print

**Purpose**  To print a software configuration label.

**Syntax**  s

**Partially Supported**  Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:
The label examples show how the unsupported values on the label could differ, but overall the format is the same.

**Virtual Device-I Printer Label**

![Virtual Device-I Printer Label]

**Intermec 3400D Printer Label**

![Intermec 3400D Printer Label]
R

Description  Test and Service Mode, Exit
Purpose  To make the printer exit Test and Service mode.
Syntax  R
Supported  Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

G

Description  Transmissive Sensor Value, Transmit
Purpose  To send the label gap transmissive sensor and output back to the host.
Syntax  G
Supported  Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

g

Description  User-Defined Characters (UDC) and Graphics, Print
Purpose  To print the user-defined characters and graphics stored on the printer.
Syntax  g
Supported  Based on testing, this command works the same on the Zebra printer with Virtual Device-I firmware as on the 3400D printer.

t

Description  User-Defined Fonts, Print
Purpose  To print the user-defined fonts stored on the printer.
Syntax  t
Partially Supported  Based on testing, this command is partially supported on the Zebra printer with Virtual Device-I firmware with the following differences and outputs:

Notes  There are slight differences in spacing, and it is optimized for 4 in. x 6 in. label.
Set/Get/Do (SGD) Commands

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

**apl.enable**

**Description**  This command enables or disables a Virtual Device app.

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

**Type**  setvar

<table>
<thead>
<tr>
<th>Commands</th>
<th>Details</th>
</tr>
</thead>
</table>
| setvar   | This command instructs the printer to enable a virtual device.  
  **Format:** ! U1 setvar "apl.enable" "value"  
  **Values:**  
  "apl-i" = enable Virtual Device-I  
  "none" = disable any Virtual Device app (ZPL and CPCL function normally) |

**Example 1**  This example shows how to enable the Virtual Device-I app:  
! U1 setvar "apl.enable" "apl-i"

**Example 2**  This example shows how to disable the Virtual Device-I app:  
! U1 setvar "apl.enable" "none"

**apl.framework_version**

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

**Type**  getvar

<table>
<thead>
<tr>
<th>Commands</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>getvar</td>
<td><strong>Format:</strong> ! U1 getvar &quot;apl.framework_version&quot;</td>
</tr>
</tbody>
</table>
Download the ZDownloader Application

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

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


   The following prompt appears:

   ![File Download - Security Warning](image)

   2. Click Run to run the file without downloading it, or click Save to save it your hard drive and then run it from there.
3. If you are prompted to allow the application to make changes to your computer, click Yes. The program installs on your computer. When installation is complete, the Firmware Downloader and ZBI Key Manager installation wizard appears:

4. Click Next.
The End User Licence Agreement appears.

5. Read the terms of the agreement.

6. Click the box to accept the terms.

7. Click Next.
The installation wizard displays information about the installation.
8. Read the installation information.

![Installation Information]

9. Click Next.

The installation wizard displays information about the installation.

![Installation Wizard Information]

- Click Next to begin configuration
- Click Back to change settings
- Click Cancel to exit
10. Click Next.

   The installation wizard installs the application.

   ![Installation progress](image)

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

   ![Restart prompt](image)

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