

ZPL & CPCL PRINTER DRIVER FOR OPOS



ZEBRA

Application Programmer's Guide

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OPOS Information

Who Should Use This Document

The manual is targeted to an application developer who requires access to POS-specific peripheral devices.

OPOS Web Sites

Refer to the following web sites for Open Point of Service (OPOS) information:

Reference implementation — Common Control Objects: <http://monroeecs.com/opos.htm>

OLE for Retail POS Controls

The goal of this document is to provide an overview and programming guide for the Zebra ZPL & CPCL Printer Driver for OPOS driver implementation.

How an Application Uses an OPOS Control

The first action the application must take on the Control is to call its **Open** method. The parameter for this method selects a device name to associate with the Control. The **Open** method performs the following steps:

- Establishes a link to the device name that, in our case, is the Windows[®] printer driver name.
- Initializes the properties **OpenResult**, **Claimed**, **DeviceEnabled**, **DataEventEnabled**, **FreezeEvents**, **AutoDisable**, **DataCount**, and **BinaryConversion**, as well as descriptions and version number of the OPOS Control layers. Additional class-specific properties may also be initialized.

Several applications may have an OPOS Control open at the same time. Therefore, after the device is opened, the application will need to call the **ClaimDevice** method to gain exclusive access to the device. The device must be claimed before the Control allows access to its methods and properties. Claiming the device ensures that other applications do not interfere with the use of the device. The application may call the **ReleaseDevice** method when the device can be shared by other applications—for instance, at the end of a transaction.

Before using the device, the application must set the **DeviceEnabled** property to TRUE. This value brings the device to an operational state, while FALSE disables the device.

After the application has finished using the device, the **DeviceEnabled** property should be set to FALSE, then the **ReleaseDevice** method, and finally the **Close** method should be called to release the device and associated resources. Before exiting, an application should close all open OPOS Controls.

Summary

In summary, the application follows this general sequence:

- **Open** method: Call to link the Control Object to the Service Object.
- **ClaimDevice** method: Call to gain exclusive access to the device. Required for exclusive-use devices; optional for some sharable devices.
- **DeviceEnabled** property: Set to TRUE to make the device operational.
- Use the device.
- **DeviceEnabled** property: Set to FALSE to disable the device.
- **ReleaseDevice** method: Call to release exclusive access to the device.
- **Close** method: Call to release the Service Object from the Control Object.

Supported Bar Codes and Fonts

Supported Bar Codes

Barcode Symbology	Supported in ZPL	Supported in CPCL
Codabar	Yes	Yes
Code 128	Yes	Yes
* Code 128 Parsed	Yes	Yes
Code 39	Yes	Yes
Code 93	Yes	Yes
† DataMatrix ⁴	Yes	No
* EAN 128	Yes	Yes
* EAN 13s ³	Yes	Yes
* EAN 8S ³	Yes	Yes
EANJan 13	Yes	Yes
EANJan 8	Yes	Yes
Itf	Yes	Yes
* Maxicode	Yes	Yes
* PDF417	Yes	Yes
† QRCode ⁵	Yes	No
* GS1DataBar	Yes	Yes
* GS1DataBarExpanded	Yes	Yes
TF	Yes	No
UPC-A	Yes	Yes
* UPC-AS ¹	Yes	Yes

NOTES:

*Identifies those Barcodes that have no center and right alignments, and the driver will return E_ILLEGAL when used with PTR_BC_CENTER or PTR_BC_RIGHT.

1) Supports the UPCA with a 5-digit extension for the CPCL firmware.

2) Supports the UPCE with a 5-digit extension for the CPCL firmware.

3) Supports the EAN-x with a 5-digit extension for the CPCL firmware.

† Properties for 2D barcodes:

4) DataMatrix barcode parameters should be in the following range:

Width: 1; Height : <= 30 (depending on width of printer); Alignment: left, center, or right; Text Position: above, below, or none

5) QRCode parameters should be in the following range:

Width: 1 < 10; Height: 2 <= 10; Alignment: left, center, or right; Text Position: Below

Supported Bar Codes and Fonts

Barcode Symbology	Supported in ZPL	Supported in CPCL
UPC-D	No	No
UPC-D2	No	No
UPC-D3	No	No
UPC-D4	No	No
UPC-D5	No	No
* OCR-A	Yes	Yes
OCR-B	No	No
UPC-E	Yes	Yes
* UPC-ES ²	Yes	Yes

NOTES:
 *Identifies those Barcodes that have no center and right alignments, and the driver will return E_ILLEGAL when used with PTR_BC_CENTER or PTR_BC_RIGHT.
 1) Supports the UPCA with a 5-digit extension for the CPCL firmware.
 2) Supports the UPCE with a 5-digit extension for the CPCL firmware.
 3) Supports the EAN-x with a 5-digit extension for the CPCL firmware.
 † Properties for 2D barcodes:
 4) DataMatrix barcode parameters should be in the following range:
 Width: 1; Height : <= 30 (depending on width of printer); Alignment: left, center, or right; Text Position: above, below, or none
 5) QRCode parameters should be in the following range:
 Width: 1 < 10; Height: 2 <= 10; Alignment: left, center, or right; Text Position: Below

Supported ZPL Fonts

Font Typeface (Value for # in ESC #T)	Font Name	Font Size (h x w)	Line Height	Inter-Character Gap (dots)	Total Width (dots)
0	D	18 x 10	24	2	12
1	F	26 x 13	30	3	16
2	A	9 x 5	12	1	6

Font D

Font D will be the default font. If nothing is specified in the print command, this font will be used. The spacing between lines shall be 24 dots. Counting the inter-character gap of 2 dots the characters are 12 dots wide. In calculating the number of characters that can be placed on an 832 dot line, the result is 69 characters.

Example Command

```
PrintNormal "123456789ABCDEFGHIJKLMNQRSTUvwXYZ6789012345678901234567890123456789"
PrintNormal "0987654321abcdefghijklmnopqrstuvwxy65432109876543210987654321098765432"
PrintNormal "123456789012345678901234567890123456789012345678901234567890123456789"
PrintNormal "098765432109876543210987654321098765432109876543210987654321098765432"
```

Printed Image

1234567890ABCDEFGHIJKLMN0PQRSTUVWXYZ789012345678901234567890123456789
0987654321abcdefghijklmnopqrs0tuvwxyz432109876543210987654321098765432
123456789012345678901234567890123456789012345678901234567890123456789
098765432109876543210987654321098765432109876543210987654321098765432

Font F

The spacing between lines shall be 28 dots. Counting the inter-character gap of 3 dots, the characters are 16 dots wide. In calculating the number of characters that can be placed on an 832 dot line, the result is 52 characters.

Example Command

PrintNormal "ESC|1fT1234567890123456789012345678901234567890123456789012"
PrintNormal "ESC|1fT0987654321098765432109876543210987654321098765432109"
PrintNormal "ESC|1fT1234567890123456789012345678901234567890123456789012"
PrintNormal "ESC|1fT0987654321098765432109876543210987654321098765432109"

Printed Image

12345678901234567890123456789012345678901234567890123456789012
09876543210987654321098765432109876543210987654321098765432109
12345678901234567890123456789012345678901234567890123456789012
09876543210987654321098765432109876543210987654321098765432109

Font A

The spacing between lines shall be 12 dots. Counting the inter-character gap of 1 dots, the characters are 6 dots wide. In calculating the number of characters that can be placed on an 832 dot line, the result is 138 characters.

Example Command

PrintNormal "ESC|2fT12345678901234567890123456789012345678901234567890123456789"
PrintNormal "ESC|2fT 0987654321098765432109876543210987654321098765432109876543210987654321098765432"
PrintNormal "ESC|2fT123456789012345678901234567890123456789012345678901234567890123456789"
PrintNormal "ESC|2fT 0987654321098765432109876543210987654321098765432109876543210987654321098765432"

Printed Image

123456789012345678901234567890123456789012345678901234567890123456789
098765432109876543210987654321098765432109876543210987654321098765432
123456789012345678901234567890123456789012345678901234567890123456789
098765432109876543210987654321098765432109876543210987654321098765432

Supported CPCL Fonts

Font Typeface (Value for # in ESC #FT)	Font Name	Font Size (h x w)	Line Height	Total Width (dots)
0	7	0 (24 x 12)	24	12
1	0	3 (18 x 16)	18	16
2	Mono1*	0 (24 x 12)	24	12

Note: You must install the Mono1 font. If you do not install this font, you will not receive a printout.

Font for Typeface 0

The Font for typeface 0 will be CPCL font 7. If nothing is specified in the print command this font will be used. The spacing between lines shall be 24 dots. Counting the inter-character gap of 2 dots, the characters are 10 dots wide. In calculating the number of characters that can be placed on an 832 dot line, the result is 69 characters.

Example Command

```
PrintNormal "0987654321abcdefghijklmnopqrstuvwxyz6543210987654321098765432109876"
PrintNormal "1234567890123456789012345678901234567890123456789012345678901234567"
PrintNormal "0987654321098765432109876543210987654321098765432109876543210987654"
```

Printed Image

```
1234567890123456789012345678901234567890123456789012345678901234567890123456789
0987654321098765432109876543210987654321098765432109876543210987654321098765
1234567890123456789012345678901234567890123456789012345678901234567890123456789
0987654321098765432109876543210987654321098765432109876543210987654321098765
```

Font for Typeface 1

The spacing between lines shall be 28 dots. Counting the inter-character gap of 2 dots, the characters are 14 dots wide. In calculating the number of characters that can be placed on an 832 dot line, the result is 52 characters.

Example Command

```
PrintNormal "\ESC|1fT12345678901234567890123456789012345678901234567890123456789012"
PrintNormal "\ESC|1fT09876543210987654321098765432109876543210987654321098765432109"
PrintNormal "\ESC|1fT12345678901234567890123456789012345678901234567890123456789012"
PrintNormal "\ESC|1fT09876543210987654321098765432109876543210987654321098765432109"
```

Printed Image

```
123456789012345678901234567890123456789012345678901234567890123456789
0987654321098765432109876543210987654321098765432109876543210987654321098765432
1234567890123456789012345678901234567890123456789012345678901234567890123456789
0987654321098765432109876543210987654321098765432109876543210987654321098765432
```

Font for Typeface 2

The Font for Typeface 2 will be Mono1. The spacing between lines shall be 24 dots. The character width shall be 12 dots. This amounts to approximately 43 characters on a 3 inch printhead depending on the actual print width in dots.

Example Command

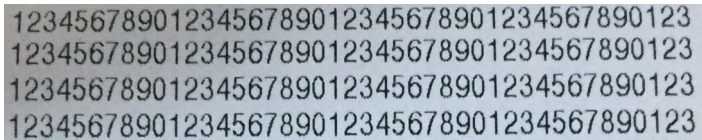
```
PrintNormal "ESC|2fT1234567890123456789012345678901234567890123456789012"
```

```
PrintNormal "ESC|2fT0987654321098765432109876543210987654321098765432109"
```

```
PrintNormal "ESC|2fT1234567890123456789012345678901234567890123456789012"
```

```
PrintNormal "ESC|2fT0987654321098765432109876543210987654321098765432109"
```

Printed Image



```
1234567890123456789012345678901234567890123
1234567890123456789012345678901234567890123
1234567890123456789012345678901234567890123
1234567890123456789012345678901234567890123
```

Supported Specifications and Printers

Specifications Supported

- UPOS specification supported: v1.14
- ActiveX supported
 - The Common Control Objects (CCO) must be installed from <http://monroecs.com/opus.htm> for ActiveX to work.
- .NET framework supported: v4.8
- Use of Microsoft POS for .NET v1.14

Supported Operating Systems

- Windows 10 (32 bit and 64 bit)
- Windows 11

Supported Printers

Table 1 Supported Printer Models (Alphabetical Order)

#'s -S4M	TLP-ZQ	ZQ-ZT
105SL (203 dpi, 300 dpi)	TLP 2824 Plus (ZPL)	ZQ520 (ZPL/CPCL)
110PAX4 (203 dpi, 300 dpi)	TLP 2824-Z (203 dpi)	ZQ521 (ZPL,CPCL)
110XiiiPlus (203 dpi, 300 dpi, 600 dpi)	TLP 2844-Z (203 dpi)	ZQ521R (ZPL)
140XiiiPlus	TLP 3844-Z (300 dpi)	ZQ610 (ZPL/CPCL)
170PAX4 (203 dpi, 300 dpi)	ZD220 (ZPL)	ZQ610 Plus (ZPL/CPCL)
170XiiiPlus (203 dpi, 300 dpi)	ZD230 (ZPL)	ZQ620 (ZPL/CPCL)
220XiiiPlus (203 dpi, 300 dpi)	ZD410 (203 dpi, 300 dpi, ZPL)	ZQ620 Plus (ZPL/CPCL)
EZ320	ZD411 (203 dpi, 300 dpi, ZPL)	ZQ630 (CPCL, ZPL)
GC420d (ZPL)	ZD420 (203 dpi, 300 dpi, ZPL)	ZQ630 Plus (ZPL/CPCL)
GC420t (ZPL)	ZD421 (203 dpi, 300 dpi, ZPL)	ZQ630R (ZPL)
GK420d	ZD500 (203 dpi, 300 dpi, ZPL)	ZQ630R Plus (ZPL)
GK420t	ZD500R (203 dpi, 300 dpi, ZPL)	ZR118 (CPCL)
GK888d	ZD611 (203 dpi, 300 dpi, ZPL)	ZR138 (CPCL)
GK888t	ZD611R (203 dpi, 300 dpi, ZPL)	ZR318 (ZPL/CPCL)
GT800 (203 dpi, 300 dpi, ZPL)	ZD620 (203 dpi, 300 dpi, ZPL)	ZR328 (ZPL/CPCL)
GX420d	ZD621 (203 dpi, 300 dpi, ZPL)	ZR328 Plus (ZPL/CPCL)
GX420s	ZD621R (203 dpi, 300 dpi, ZPL)	ZR338 (ZPL/CPCL)
GX420t	ZD888 (ZPL)	ZR628 (ZPL/CPCL)
GX430t	ZE500-4 (203 dpi, 300 dpi, ZPL)	ZR638 (ZPL/CPCL)
iMZ220 (ZPL/CPCL)	ZE500-6 (203 dpi, 300 dpi, ZPL)	ZR658 (ZPL/CPCL)
iMZ320 (ZPL/CPCL)	ZE500R-4 (203 dpi, 300 dpi, ZPL)	ZR668 (ZPL/CPCL)
KR403	ZM400 (203 dpi, 300 dpi, 600 dpi)	ZR668 Plus (ZPL/CPCL)
LP 2824 Plus (ZPL)	ZM600 (203 dpi, 300 dpi)	ZT210 (203 dpi, 300 dpi, ZPL)
LP 2824-Z	ZQ112 (CPCL)	ZT220 (203 dpi, 300 dpi, ZPL)
LP 2844-Z	ZQ120 (CPCL)	ZT230 (203 dpi, 300 dpi, ZPL)
MZ 220	ZQ120 Plus (CPCL)	ZT410 (203 dpi, 300 dpi, 600 dpi, ZPL)
MZ 320	ZQ220 Plus (CPCL)	ZT410R (203 dpi, 300 dpi, 600 dpi, ZPL)
QL 220 Plus	ZQ210 (CPCL)	ZT411 (203 dpi, 300 dpi, 600 dpi, ZPL)
QL 320 Plus	ZQ220 (CPCL)	ZT411R (203 dpi, 300 dpi, 600 dpi, ZPL)
QL 420 Plus	ZQ310 (ZPL/CPCL)	ZT420 (203 dpi, 300 dpi, ZPL)
QLn220 (ZPL/CPCL)	ZQ310 Plus (ZPL/CPCL)	ZT420R (203 dpi, 300 dpi, ZPL)
QLn320 (ZPL/CPCL)	ZQ320 (ZPL/CPCL)	ZT421 (203 dpi, 300 dpi, ZPL)
QLn420 (ZPL/CPCL)	ZQ320 Plus (ZPL/CPCL)	ZT421R (203 dpi, 300 dpi, ZPL)
RW 220	ZQ510 (ZPL/CPCL)	ZT510 (203 dpi, 300 dpi, ZPL)
RW 420	ZQ511 (ZPL,CPCL)	ZT610 (203 dpi, 300 dpi, 600 dpi, ZPL)
S4M (203 dpi, 300 dpi)	ZQ511R (ZPL)	ZT610R (203 dpi, 300 dpi, 600 dpi, ZPL)
		ZT620 (203 dpi, 300 dpi, ZPL)
		ZT620R (203 dpi, ZPL)

Common Properties, Methods, and Events

This section provides the common and specific commands for properties, methods, and events.

Summary of Common Properties

Name	Type/Access	Supported for Zebra ZPL Printer	Supported for Zebra CPCL Printer
AutoDisable	Boolean /R/W	No	No
CapCompareFirmwareVersion	Boolean /R	No	No
BinaryConversion	Long R/W	No	No
CapPower Reporting	Long /R	Yes	Yes
CapStatisticsReporting	Boolean /R	Yes	No
CapUpdateFirmware	Boolean /R	No	No
CapUpdateStatistics	Boolean /R	No	No
CheckHealthTest	String /R	Yes	Yes
Claimed	Boolean /R	Yes	Yes
DataCount	Long /R	No	No
DataEventEnabled	Boolean /R/W	No	No
DeviceEnabled	Boolean /R/W	Yes	Yes
FreezeEvents	Boolean /R/W	Yes	Yes
OpenResult	Long /R	Yes	Yes
OutputID	Long /R	Yes	Yes
PowerNotify	Long /R/W	Yes	Yes
PowerState	Long /R	Yes	Yes
ResultCode	Long /R	Yes	Yes
ResultCodeExtended	Long /R	Yes	Yes
State	Long /R	Yes	Yes
ControlObjectDescription	String /R	Yes	Yes
ControlObjectVersion	Long /R	Yes	Yes
Service ObjectDescription	String /R	Yes	Yes

Name	Type/Access	Supported for Zebra ZPL Printer	Supported for Zebra CPCL Printer
ServiceObjectVersion	Long /R	Yes	Yes
DeviceDescription	String /R	Yes	Yes
DeviceName	String /R	Yes	Yes

Summary of Common Methods

Name	Supported for Zebra ZPL Printer	Supported for Zebra CPCL Printer
Open	Yes*	Yes*
Close	Yes	Yes
Claim	Yes*	Yes*
ReleaseDevice	Yes	Yes
CheckHealth	Yes	Yes
ClearInput	No	No
ClearInputProperties	No	No
ClearOutput	Yes	Yes
DirectIO	Yes	Yes
CompareFirmwareVersion	No	No
ResetStatistics	No	No
RetrieveStatistics	No	No
UpdateFirmware	No	No
UpdateStatistics	No	No

*Note: The status check has been moved from the Open to the Claim function, which also implies that the driver will always open even if the printer has an error or is not there.

Summary of Common Events

Name	Supported for Zebra ZPL Printer	Supported for Zebra CPCL Printer
DataEvent	No	No
DirectIOEvent	Yes	Yes
ErrorEvent	Yes	Yes
OutputCompleteEvent	Yes	Yes
StatusUpdateEvent	Yes	Yes

Summary of Specific Properties

Name	Type/Access	Supported for Zebra ZPL Printer	Supported for Zebra CPCL Printer
CapConcurrentJrnRec	Boolean /R	No	No
CapConcurrentJrnSlp	Boolean /R	No	No
CapConcurrentRecSlp	Boolean /R	No	No
CapCoverSensor	Boolean /R	Yes	Yes
CapTransaction	Boolean /R	Yes	Yes
CapConcurrentPageMode	Boolean /R	No	No
CapMapCharacterSet	Boolean /R	No	No
CapJrnPresent	Boolean /R	Yes	Yes
CapJrn2Color	Boolean /R	Yes	Yes
CapJrnBold	Boolean /R	Yes	Yes
CapJrnCartridgeSensor	Long /R	Yes	Yes
CapJrnColor	Long /R	Yes	Yes
CapJrnDhigh	Boolean /R	Yes	Yes
CapJrnDwide	Boolean /R	Yes	Yes
CapJrnDwideDhigh	Boolean /R	Yes	Yes
CapJrnEmptySensor	Boolean /R	Yes	Yes
CapJrnItalic	Boolean /R	No	No
CapJrnNearEndSensor	Boolean /R	No	No
CapJrnUnderline	Boolean /R	No	No
CapRecPresent	Boolean /R	Yes	Yes
CapRec2Color	Boolean /R	Yes	Yes
CapRecBarCode	Boolean /R	Yes	Yes
CapRecBitmap	Boolean /R	Yes	Yes
CapRecBold	Boolean /R	Yes	Yes
CapRecCartridgeSensor	Long /R	Yes	Yes
CapRecColor	Long /R	Yes	Yes
CapRecDhigh	Boolean /R	Yes	Yes
CapRecDwide	Boolean /R	Yes	Yes
CapRecDhighDwide	Boolean /R	Yes	Yes
CapRecEmptySensor	Boolean /R	Yes	Yes
CapRecItalic	Boolean /R	No	No
CapRecLeft90	Boolean /R	Yes	Yes
CapRecMarkFeed	Long /R	Yes	Yes
CapRecNearEndSensor	Boolean /R	No	No
CapRecPapercut	Boolean /R	Yes	Yes
CapRecRight90	Boolean /R	Yes	Yes
CapRecRotate180	Boolean /R	Yes	Yes

Common Properties, Methods, and Events

Name	Type/Access	Supported for Zebra ZPL Printer	Supported for Zebra CPCL Printer
CapRecStamp	Boolean /R	No	No
CapRecUnderline	Boolean /R	No	No
CapRecPageMode	Boolean /R	Yes	Yes
CapRecRuledLine	Int32	No	No
CapSlpPageMode	Boolean /R	No	No
CapSlpRuledLine	Int32	No	No
CapSlpPresent	Boolean /R	No	No
CapSlpFullslip	Boolean /R	No	No
CapSlp2Color	Boolean /R	No	No
CapSlpBarCode	Boolean /R	No	No
CapSlpBitmap	Boolean /R	No	No
CapSlpBold	Boolean /R	No	No
CapSlpBothSidesPrint	Boolean /R	No	No
CapSlpCartridgeSensor	Long /R	No	No
CapSlpColor	Long /R	No	No
CapSlpDhigh	Boolean /R	No	No
CapSlpDwide	Boolean /R	No	No
CapSlpDhighDwide	Boolean /R	No	No
CapSlpEmptySensor	Boolean /R	No	No
CapSlpItalic	Boolean /R	No	No
CapSlpLeft90	Boolean /R	No	No
CapSlpNearEndSensor	Boolean /R	No	No
CapSlpRight90	Boolean /R	No	No
CapSlpRotate180	Boolean /R	No	No
CapSlpUnderline	Boolean /R	No	No
AsyncMode	Boolean /R/W	Yes	Yes
CartridgeNotify	Long /R/W	Yes	Yes
CharacterSet	Long /R/W	Yes	Yes
CharacterSetList	String /R	Yes	Yes
CoverOpen	Boolean /R	No	No
ErrorLevel	Long /R	Yes	Yes
ErrorStation	Long /R	Yes	Yes
ErrorString	String /R	Yes	Yes
FontTypefaceList	String /R	Yes	Yes
FlagWhenIdle	Boolean /R/W	No	No
MapCharacterSet	Boolean /R/W	No	No
MapMode* See the NOTE Regarding MapMode: on page 19.	Long /R/W	Yes	Yes

Common Properties, Methods, and Events

Name	Type/Access	Supported for Zebra ZPL Printer	Supported for Zebra CPCL Printer
PageModeArea	String /R/W	Yes	Yes
PageModeDescriptor	Int32 R/W	Yes	Yes
PageModeHorizontalPosition	Int32 R/W	Yes	Yes
PageModePrintArea	String /R/W	Yes	Yes
PageModePrintDirection	Int32 R/W	Yes	Yes
PageModeStation	Int32 R/W	Yes	Yes
PageModeVerticalPosition	Int32 R/W	Yes	Yes
RotateSpecial	Long /R/W	Yes	Yes
JrnLineChars	Long /R/W	Yes	Yes
JrnLineCharsList	String /R	Yes	Yes
JrnLineHeight	Long /R/W	Yes	Yes
JrnLineSpacing	Long /R/W	Yes	Yes
JrnLineWidth	Long /R	Yes	Yes
JrnLetterQuality	Boolean /R/W	Yes	Yes
JrnEmpty	Boolean /R	Yes	Yes
JrnNearEnd	Boolean /R	Yes	Yes
JrnCartridgeState	Long /R	Yes	Yes
JrnCurrentCartridge	Long /R/W	Yes	Yes
RecLineChars	Long /R/W	Yes	Yes
RecLineCharsList	String /R	Yes	Yes
RecLineHeight	Long /R/W	Yes	Yes
RecLineSpacing	Long /R/W	Yes	Yes
RecLineWidth	Long /R	Yes	Yes
RecLetterQuality	Boolean /R/W	Yes	Yes
RecEmpty	Boolean /R	No	No
RecNearEnd	Boolean /R	No	No
RecSidewaysMaxLines	Long /R	Yes	Yes
RecSidewaysMaxChars	Long /R	Yes	Yes
RecLinesToPaperCut	Long /R	Yes	Yes
RecBarCodeRotationList	String /R	Yes	Yes
RecBitmapRotationList	String /R	No	No
RecCartridgeState	Long /R	Yes	Yes
RecCurrentCartridge	Long /R/W	Yes	Yes
SlpLineChars	Long /R/W	No	No
SlpLineCharsList	String /R	No	No
SlpLineHeight	Long /R/W	No	No
SlpLineSpacing	Long /R/W	No	No
SlpLineWidth	Long /R	No	No
SlpLetterQuality	Boolean /R/W	No	No

Name	Type/Access	Supported for Zebra ZPL Printer	Supported for Zebra CPCL Printer
SlpEmpty	Boolean /R	No	No
SlpNearEnd	Boolean /R	No	No
SlpSidewaysMaxLines	Long /R	No	No
SlpSidewaysMaxChars	Long /R	No	No
SlpMaxLines	Long /R	No	No
SlpLinesNearEndToEnd	Long /R	No	No
SlpBarCodeRotationList	String /R	No	No
SlpBitmapRotationList	String /R	No	No
SlpPrintSide	Long /R	No	No
SlpCartridgeState	Long /R	No	No
SlpCurrentCartridge	Long /R/W	No	No



NOTE Regarding MapMode:

In the Zebra SO, MapMode applies only to RecLineCharsList settings.

The following properties may get changed:

- RecLineChars, RecLineHeight, RecLineSpacing
- RecLineWidth, RecSidewaysMaxChars, RecSidewaysMaxLines
- RecLinesToPaperCut

The following properties are not changed:

- PageModeArea property
- PageModePrintArea property
- PageModeHorizontalPosition
- PageModeVerticalPosition

Barcode printing: printBarcode

- Due to the nature of the printer barcodes and how they are generated and printed Zebra allows only specific DOT values for barcode width and height as outlined in the barcode notes.

Bitmap printing: printBitmap

- The width of the bitmap is ignored and therefore not converted.

Summary of Specific Methods

Name	Supported for:	
	Zebra ZPL Printer	Zebra CPCL Printer
PrintNormal	Yes	Yes
PrintTwoNormal	No	No
PrintImmediate	Yes	Yes
PrintMemoryBitmap	No	No
BeginInsertion	No	No
EndInsertion	No	No
BeginRemoval	No	No
ClearPrintArea	Yes	Yes
EndRemoval	No	No
CutPaper	Yes	Yes
DrawRuledLine	No	No

Name	Supported for:	
	Zebra ZPL Printer	Zebra CPCL Printer
RotatePrint	Yes	Yes
PrintBarcode *‡	Yes	Yes
PrintBitmap [#]	Yes	Yes
TransactionPrint	Yes	Yes
ValidateData	Yes	Yes
SetBitmap	Yes	Yes
SetLogo	Yes	Yes
ChangePrintSide	No	No
MarkFeed	Yes	Yes
PageModePrint	Yes	Yes

* **NOTE:** The provided OPOS constant for Data Matrix and QR code will not work with the PrintBarcode function. You must replace the provided OPOS constant BarCodeSymbology.QRCode with the custom OPOS constant BarCodeSymbology.Other and BarCodeSymbology.DataMatrix with (BarCodeSymbology.Other + 1). Additionally, to use the QR barcode, the driver uses the ^HB command, which is not supported on the KR403 printer. You need custom firmware for this feature.

‡ **NOTE:** The effect of the PrintBarcode width parameter depends on the Barcode symbology being used.

NOTE: The width parameter of the printBitmap method will be ignored as only the width of the actual bitmap will be taken into consideration. Therefore the Map Mode parameter will not have any effect on this function.

For the following barcodes, the width parameter, supplied in the PrintBarcode method, controls the barcode module width in dots, and must be a value between 1 and 10.

- Code 39, Code 128, Code 128 parsed
- Ean8s, Ean13s
- EanJan8, EanJan13
- ITF (Code 2 of 5)

For the following barcodes, the width parameter, supplied in the PrintBarcode method, has no effect and the barcodes print with fixed ZPL values according to the description below:

- Code 93 has a fixed width as defined by the ZPL command ^BY4.
- QR Code has a fixed width as defined by the ZPL command ^BY2.
- Data Matrix has a fixed width as defined by the ZPL command ^BY2.
- TF has a fixed width as defined by the ZPL command ^BY4.
- UPCD1 to UPCD5 have a fixed width as defined by the ZPL command ^BY2.
- UPCE has a fixed width as defined by the ZPL command ^BY4.

For the following barcodes, the barcode module width is calculated using the width parameter supplied in the PrintBarcode method.

- Codabar
- Ean128
- MaxiCode
- PDF417
- GS1 Data Bar and GS1 Data Bar Expanded
- UPCA, UPCAs
- UPCEs

Summary of Events

Name	May Use After	Supported for Zebra ZPL Printer	Supported for Zebra CPCL Printer
DataEvent	Not Supported	No	No
DirectIOEvent	Open, Claim & Enable	Yes	Yes
ErrorEvent	Open, Claim & Enable	Yes	Yes
OutputCompleteEvent	Open, Claim & Enable	Yes	Yes
StatusUpdateEvent	Open, Claim & Enable	Yes	Yes

Data Characters and Escape Sequences

The default character set of all POS printers is assumed to support at least the ASCII characters 0x20 through 0x7F, which include spaces, digits, uppercase, lowercase, and some special characters. If the printer does not support lowercase characters, then the Service may translate them to uppercase.

Every escape sequence begins with the escape character, whose value is 27 decimal, followed by a vertical bar ('|'). This is followed by zero or more digits and/or lowercase alphabetic characters. The escape sequence is terminated by an uppercase alphabetic character.

If a sequence does not begin with ESC "|", or it begins with ESC "|" but is not a valid UnifiedPOS escape sequence, the Service will make a reasonable effort to pass it through to the printer. However, not all such sequences can be distinguished from printable data, so unexpected results may occur.

The application can use the ESC|#E escape sequence to ensure more reliable handling of the amount of data to be passed through to the printer. Use of this escape sequence will make an application non-portable. The application may, however, maintain portability by performing Embedded Data Escape sequence calls within conditional code. This code may be based upon the value of the DeviceServiceDescription, the PhysicalDeviceDescription, or the PhysicalDeviceName property.



NOTE: This command sequence definition and the corresponding definition in the Point Card Reader Writer Chapter, are the only known deviations from preserving the interchangeability of devices defined in this specification. If an application finds it necessary to utilize this command sequence, please inform the UnifiedPOS Committee with the details of its usage, so that a possible standard/generic Application Interface may be incorporated into a future release of the UnifiedPOS Standard. In order to preserve peripheral independence and interoperability at the Application level, it is the Committee's position that this command sequence should be used only as a "last resort".

To determine if escape sequences or data can be performed on a printer station, the application can call the **validateData** method. (For some escape sequences, corresponding capability properties can also be used.)

The following escape sequences are recognized. If an escape sequence specifies an operation that is not supported by the printer station, then it is ignored.

Commands, outlined in [Table 2](#), perform the indicated action.

Table 2 Commands

Name	Data	Remarks	ZPL Printer	CPCL Printer
Paper cut	ESC #P	Cuts receipt paper. The character '#' is replaced by an ASCII decimal string telling the percentage cut desired. If '#' is omitted, then a full cut is performed. For example: The C string "\x1B 75P" requests a 75% partial cut.	Yes ^a	Yes ^a
Feed and Paper cut	ESC #fP	Cuts receipt paper, after feeding the paper by the RecLinesToPaperCut lines. The character '#' is defined by the "Paper cut" escape sequence.	Yes ^a	Yes ^a
Feed, Paper cut, and Stamp	ESC #sP	Cuts and stamps receipt paper, after feeding the paper by the RecLinesToPaperCut lines. The character '#' is defined by the "Paper cut" escape sequence.	No	No
Fire stamp	ESC sL	Fires the stamp solenoid, which usually contains a graphical store emblem.	No	No
Print bitmap	ESC #B	Prints the pre-stored bitmap. The character '#' is replaced by the bitmap number. See setBitmap method.	Yes	Yes
Print top logo	ESC tL	Prints the pre-stored top logo.	Yes	Yes
Print bottom logo	ESC bL	Prints the pre-stored bottom logo.	Yes	Yes
Feed lines	ESC #fF	Feed the paper forward by lines. The character '#' is replaced by an ASCII decimal string telling the number of lines to be fed. If '#' is omitted, then one line is fed.	Yes	Yes
Feed units	ESC #uF	Feed the paper forward by mapping mode units. The character '#' is replaced by an ASCII decimal string telling the number of units to be fed. If '#' is omitted, then one unit	Yes	Yes
Feed reverse	ESC #rF	Feed the paper backward. The character '#' is replaced by an ASCII decimal string telling the number of lines to be fed. If '#' is omitted, then one line is fed.	No	No
Pass through embedded data	ESC #E	Send the following # characters of data through to the hardware without modifying it. The character '#' is replaced by an ASCII decimal string telling the number of bytes following the escape sequence that should be passed through as-is to the hardware.	Yes	Yes
Print in-line barcode	ESC #R	Prints the defined barcode in-line. The character '#' is the number of characters following the R to use in the definition of the characteristics of the barcode to be printed. See details below. Note: The QR and Data Matrix codes can be configured with the Microsoft defined constants.	Yes	Yes

Notes:

a. All printers will perform only a full cut. The Kiosk printer KR403 is the only exception. You need to configure the partial cut in the Device Manager and use the Escape command to activate the partial cut in your data stream.

In-line Barcode Printing

The application can use the ESC|#R escape sequence to print barcodes in-line with other print commands. The character '#' is the number of characters following the R to use in the definition of the characteristics of the barcode to be printed.

In the data following the R, other lower case letters and numbers are used to identify different values. The same value definitions as defined for the **printBarcode** method headers and definitions are used for the various barcode values. Converting to string the values from the definitions are consistent.

The attribute symbols are defined as follows:

s symbology **h** height **w** width **a** alignment

t human readable text position

d start of data

e end of sequence

The attributes **must appear in the order specified** in the above list.

Using a basic UPCA, center aligned, with bottom text, 200 dots height and ~400 dots wide, the command is as follows:

```
ESC|33Rs101h200w400a-2t-13d123456789012e
```

Commands associated with Print Mode characteristics (see [Table 3](#)) are remembered until explicitly changed.

Table 3 Print Mode Commands

Name	Data	Remarks	ZPL Printer	CPCL Printer
Font typeface selection	ESC #T	<p>Selects a new typeface for the following data. Values for the character '#' are:</p> <p>0 = Default typeface.</p> <p>1 = Select first typeface from the FontTypefaceList property.</p> <p>2 = Select second typeface from the FontTypefaceList property.</p> <p>And so on.</p>	Yes	Yes

Commands associated with Print Line characters (see [Table 4](#)) are reset at the end of each print method, by an explicit reset (where applicable), or by a "Normal" sequence.

Table 4 Print Line Commands

Name	Data	Remarks	ZPL Printer	CPCL Printer
Bold	ESC (!)bC	Prints in bold or double-strike. If '!' is specified then bold is disabled.	Yes	Yes
Underline	ESC #uC	Prints with underline. The character '#' is replaced by an ASCII decimal string telling the thickness of the underline in printer dot units. If '#' is omitted, then a printer-specific default thickness is used.	No	No
Italic	ESC (!)iC	Prints in italics. If '!' is specified then italic is disabled.	No	No
Alternate color (Custom)	ESC #rC	Prints using an alternate custom color. The character '#' is replaced by an ASCII decimal string indicating the desired color. The value of the decimal string is equal to the value of the cartridge constant used in the printer device properties. If '#' is omitted, then the secondary color (Custom Color 1) is selected. Custom Color 1 is usually red.		
Reverse video	ESC (!)rvC	Prints in a reverse video format. If '!' is specified then reverse video is disabled.	No	No
Shading	ESC #sC	Prints in a shaded manner. The character '#' is replaced by an ASCII decimal string telling the percentage shading desired. If '#' is omitted, then a printer-specific default level of shading is used.	No	No
Single high and wide	ESC 1C	Prints normal size.	Yes	Yes
Double wide	ESC 2C	Prints double-wide characters.	Yes	Yes
Double high	ESC 3C	Prints double-high characters.	Yes	Yes
Double high and wide	ESC 4C	Prints double-high/double-wide characters.	Yes	Yes
Scale horizontally	ESC #hC	Prints with the width scaled '#' times the normal size, where '#' is replaced by an ASCII decimal string.	Yes	Yes
RGB Color	ESC #fC	Prints in # color. The character '#' is replaced by an ASCII decimal string indicating the additive amount of RGB to produce the desired color. There are 3 digits each of Red, Green, and Blue elements. Valid values range from "000" to "255". (E.g., "255255000" represents yellow). Color Matching to the subtractive percentage of CMY (Cyan, Magenta and Yellow color components) to produce the desired color matching specified by RGB is up to the Service. If '#' is omitted, then the primary color is used. Bitmap printing is not affected.	No	No
SubScript	ESC (!)tbC	Prints SubScript characters. If '!' is specified then SubScript is disabled.	No	No
SuperScript	ESC (!)tpC	Prints SuperScript characters. If '!' is specified then SuperScript is disabled.	No	No

† Note: The justification (or alignment) associated with these ESC commands are only supported when using internal or downloaded TTF monospaced fonts for both, ZPL and CPCL printers. Justification is not supported when using proportional fonts.

Common Properties, Methods, and Events

Name	Data	Remarks	ZPL Printer	CPCL Printer
†Center	ESC cA	Aligns following text in the center.	Yes	Yes
†Right justify	ESC rA	Aligns following text at the right.	Yes	Yes
†Left justify	ESC lA	Aligns following text at the left.	Yes	Yes
Normal	ESC N	Restores printer characteristics to normal condition.	Yes	Yes

† Note: The justification (or alignment) associated with these ESC commands are only supported when using internal or downloaded TTF monospaced fonts for both, ZPL and CPCL printers. Justification is not supported when using proportional fonts.

Driver Installation

This section provides the steps to install the OPOS printer driver.

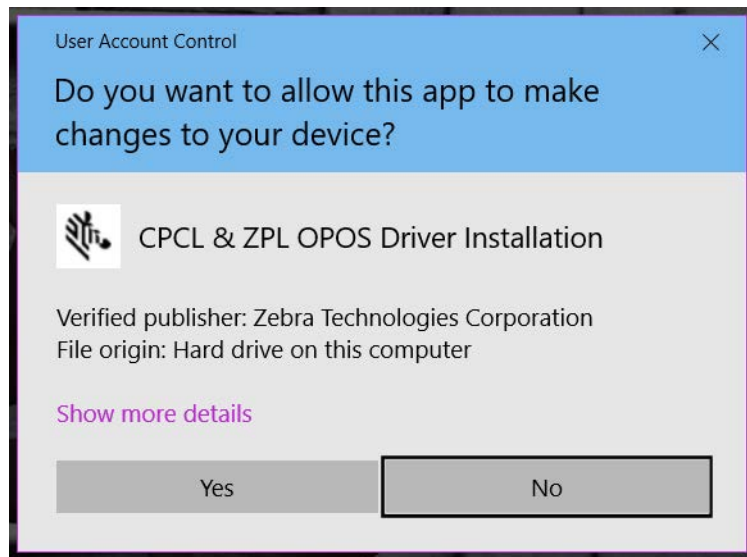
OPOS Driver Installation

To start the installation, perform the following steps.

1. Open the installation file zebra-printer-opos-driver-installer-X_XX_X_XX.exe.
(where X reflects the version of this driver and changes with each new version.)

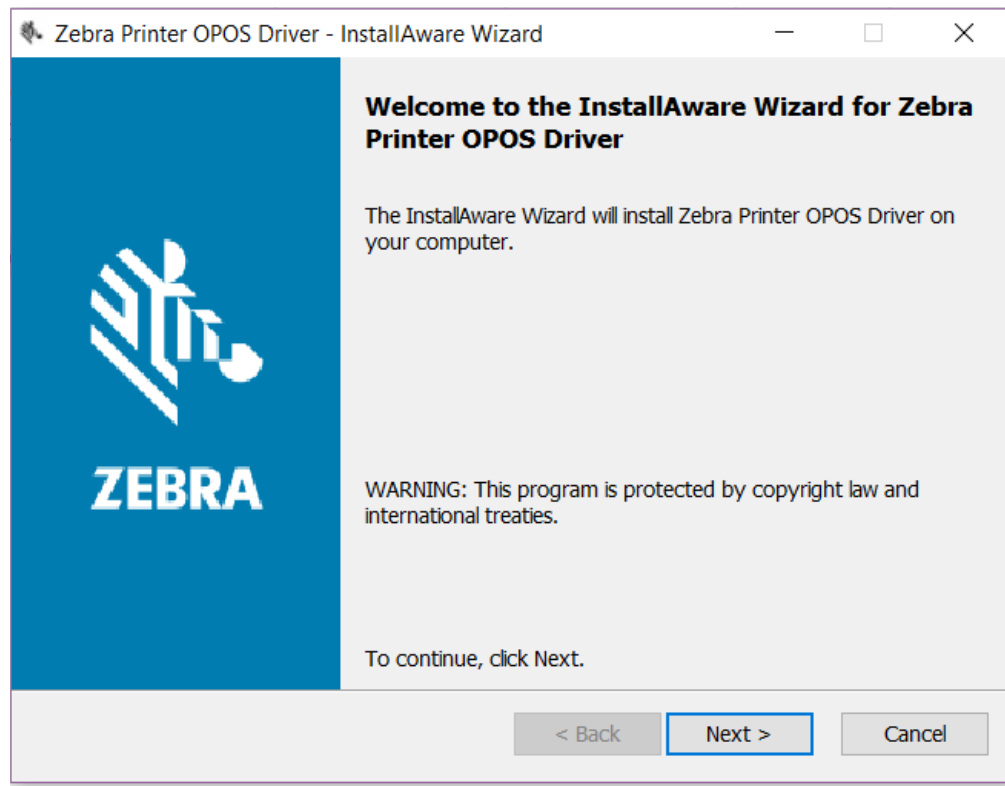
The User Account Control dialog box opens.

2. Click **Yes** to install the driver.

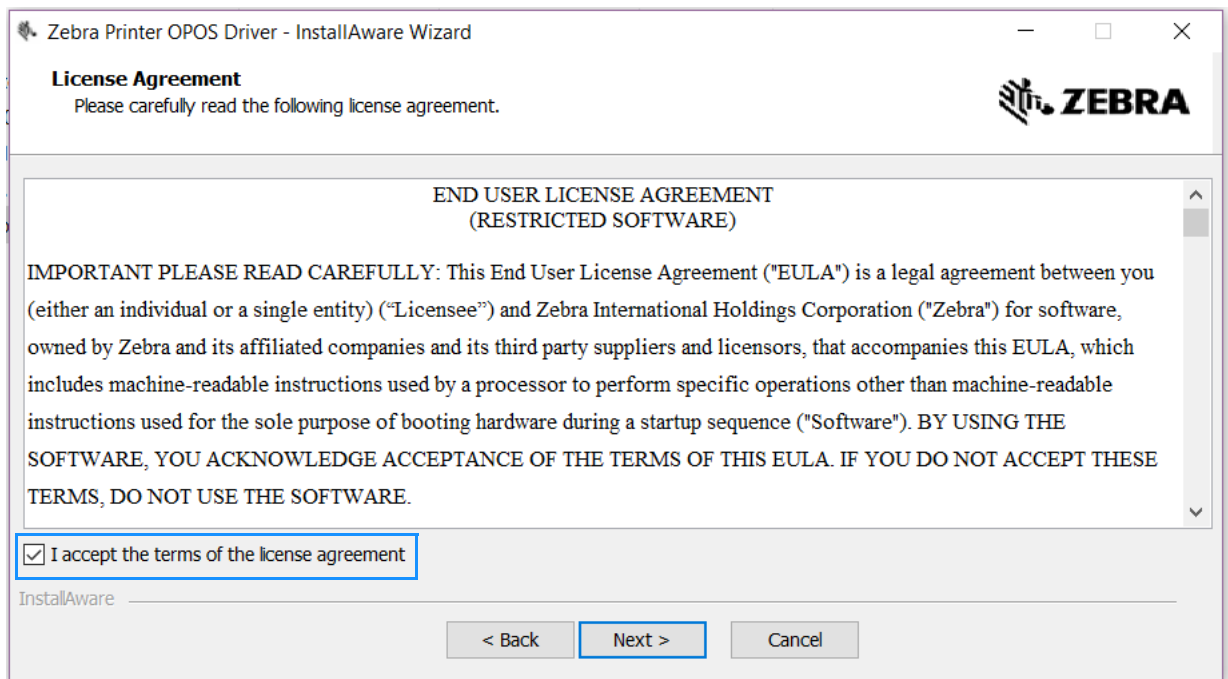


The Welcome to the InstallAware Wizard opens.

3. Click **Next** to continue.



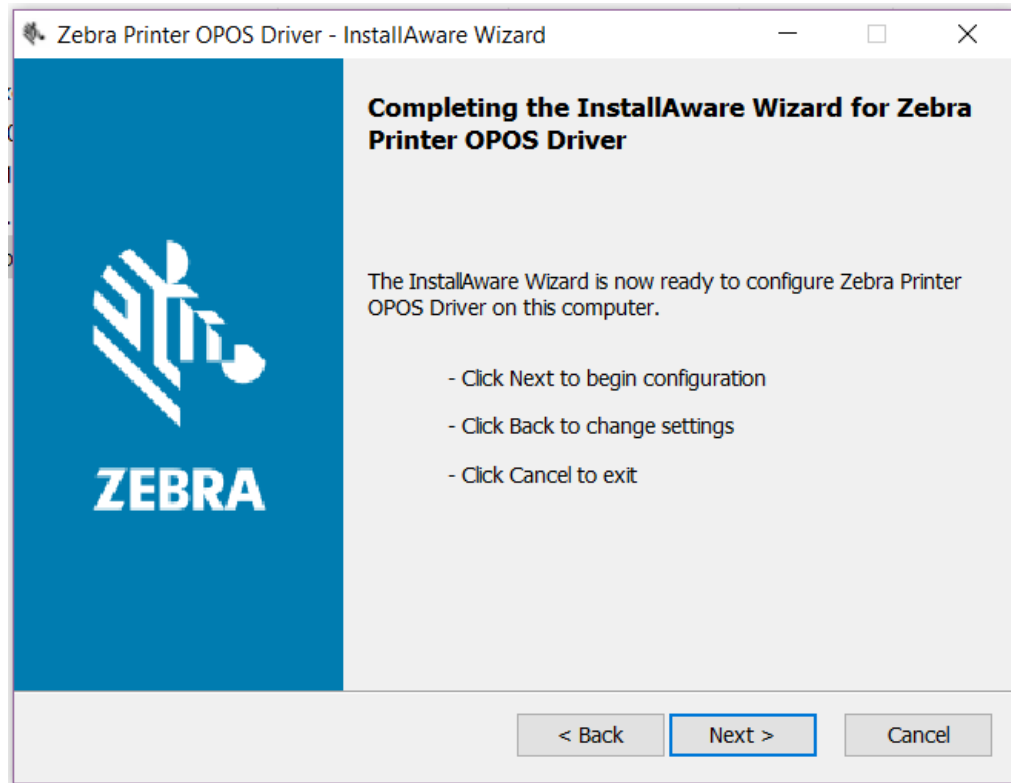
The License Agreement dialog box opens.



4. Select the **I accept the terms of the license agreement** checkbox.

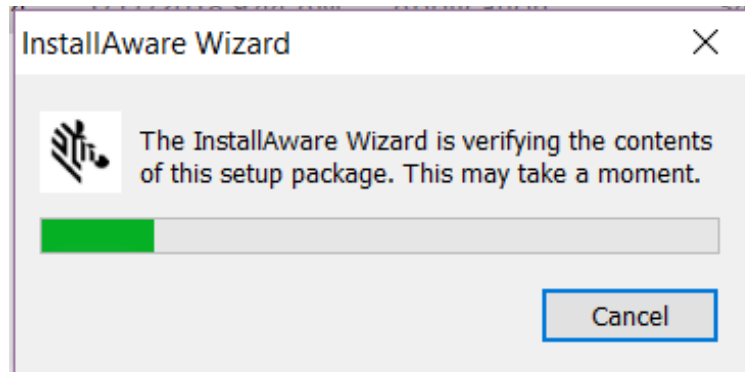
5. Click **Next** to accept the license agreement.

The Completing the InstallAware Wizard dialog box opens.

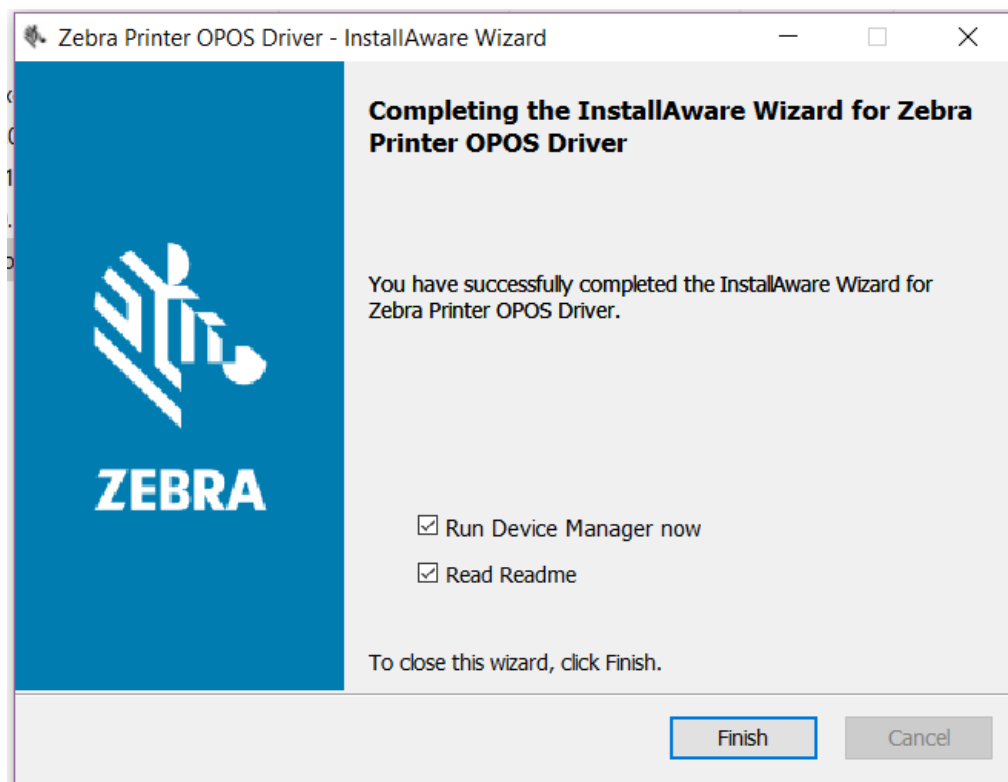


6. Click **Next** to confirm and begin the installation.

The InstallAware Wizard dialog box opens.



The Installation Complete dialog box opens.



7. Select the **Read Readme** checkbox, if desired, and the file will open in an Internet Explorer browser.
8. Click **Finish**.
9. To configure your printer for use with the OPOS driver, use the Device Manager. See [Device Manager on page 32](#) for more information on configuration.

OPOS Driver Silent Installation

To silently install the OPOS driver, you must start the executable with the /s command line parameter.

```
zebra-printer-opos-driver-installer-X_XX_X_XX.exe /s
```

This will preinstall the driver, the test application, and Device Manager, but will not install any printers. To install a printer, you must use the Device Manager or have the Zebra Custom Application Group (CAG) create a special driver.

Add Printer Via Command Line

To add a printer via command line you can also use the POSDM tool found in the C:\Program Files (x86)\Microsoft Point Of Service directory.

To properly add a Zebra printer you must add all properties that the Device Manager configures when a printer is getting added.

The following is a sample batch file to install a printer via POSDM: (Note: all the properties must be adjusted to the printer properties that should be installed.)

```
@echo on
rem batch adding a new Zebra OPOS printer via Ethernet or WiFi
rem %~1=port
rem %2=printer name
rem %3=printer family
rem all properties like labellength, pagewidth, darkness, printspeed, etc. should be
rem established before and added to the batch
If "%~1"==" " goto usage
If "%~2"==" " goto usage
If "%~3"==" " goto usage
posdm adddevice %~1 /type:PosPrinter /soname:ZPLSO
posdm addname %~2 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty PortType IP/WiFi /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty PortName %~1 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty ModelName "%~3" /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty DNSName "" /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty interface ETHERNET /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty portNumber 9100 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty ItemList "" /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty units Mm /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty labellength 0 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty pagewidth 832 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty darkness 30 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty pollingInterval 60 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty printspeed 5 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty orientation Off /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty mirrorimage Off /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty isCutterEquipped No /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty EnableAuditLog On /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty operationmode Rewind /type:PosPrinter /soname:ZPLSO /path:%~1
```

```
posdm addproperty lHomeLeft 0 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty lHomeTop 0 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty mediatype Direct /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty trackingmode Continuous /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty DPI 203 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty RecLinesToPaperCut 4 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty defaultfontsize 28 /type:PosPrinter /soname:ZPLSO /path:%~1
posdm addproperty defaultfont 0 /type:PosPrinter /soname:ZPLSO /path:%~1
goto end
:usage
echo batch adding a new Zebra OPOS printer via Ethernet or WiFi
echo First parameter=port
echo Second parameter=printer name
echo Third parameter=printer family
echo all properties like labellength, pagewidth, darkness, printspeed, etc.
echo should be established before and added to the batch

:end
```


Device Manager

This section provides information about the Device Manager and its uses.

Using the Device Manager

Use the Zebra OPOS Device Manager to add a printer. First, make a cable or wireless connection to a supported printer with one of the following:

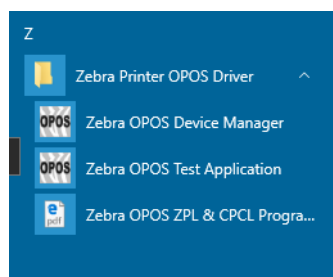
- Bluetooth
- IP/WiFi
- Parallel
- Serial
- USB

To connect to a supported printer, perform the following steps:

1. To run the Device Manager from the **Start** button on the PC, go to Start > Zebra Printer OPOS Driver > Zebra OPOS Device Manager.

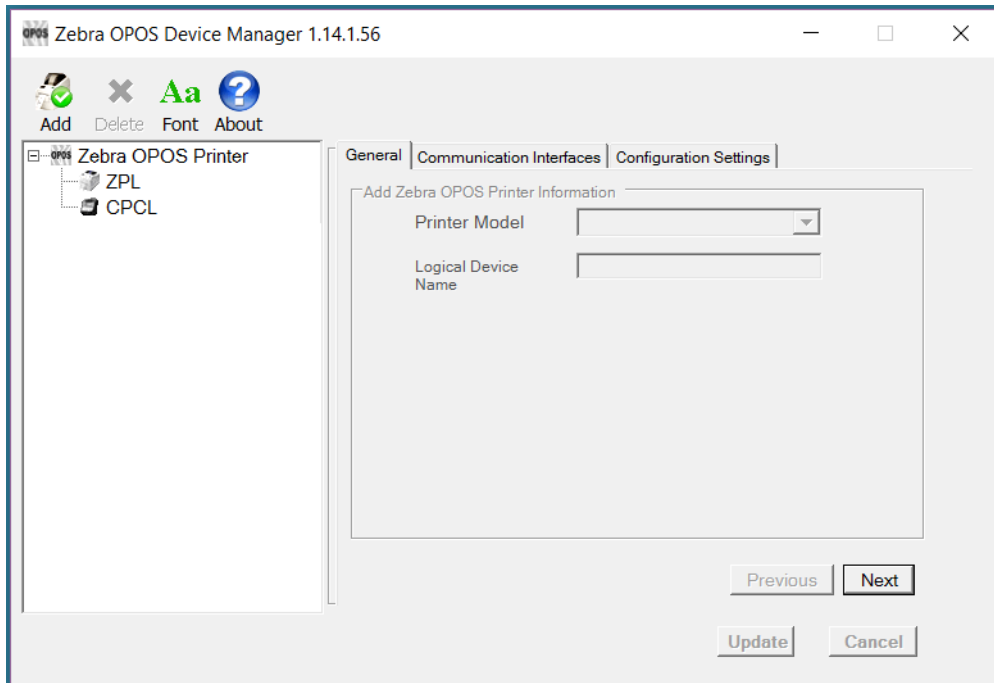


NOTE: In Windows 10 and Windows 11, you may need to run this application with Administrator rights.



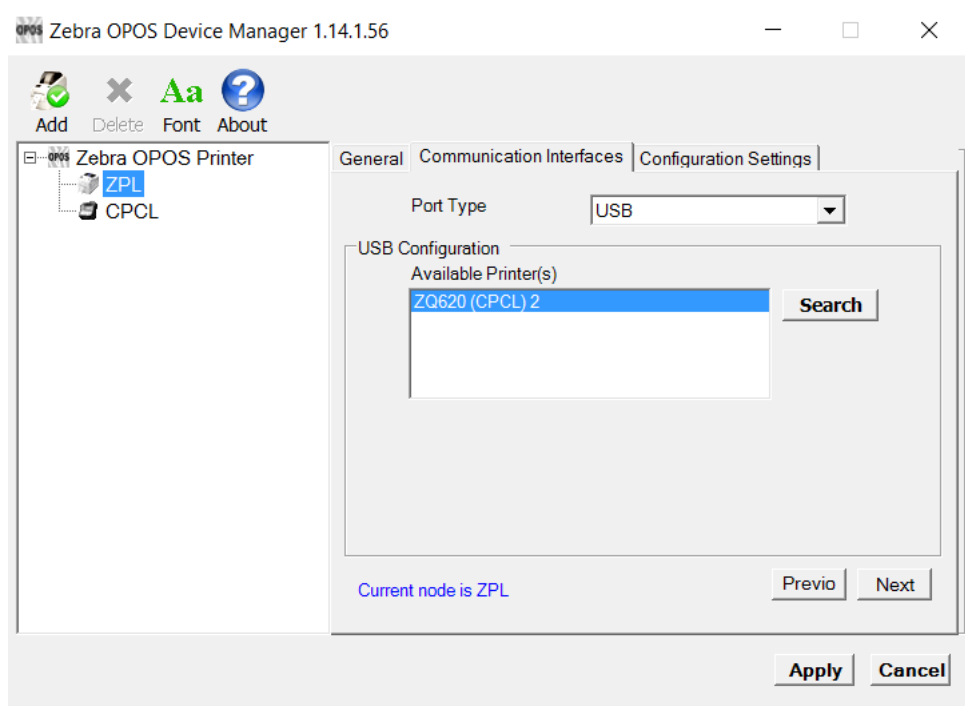
2. When the program displays, click the **Add** icon. The General tab is used to add a printer by selecting the printer model using the drop-down menu.

A logical device name for the printer must be defined, as this name will be used by the OPOS application.



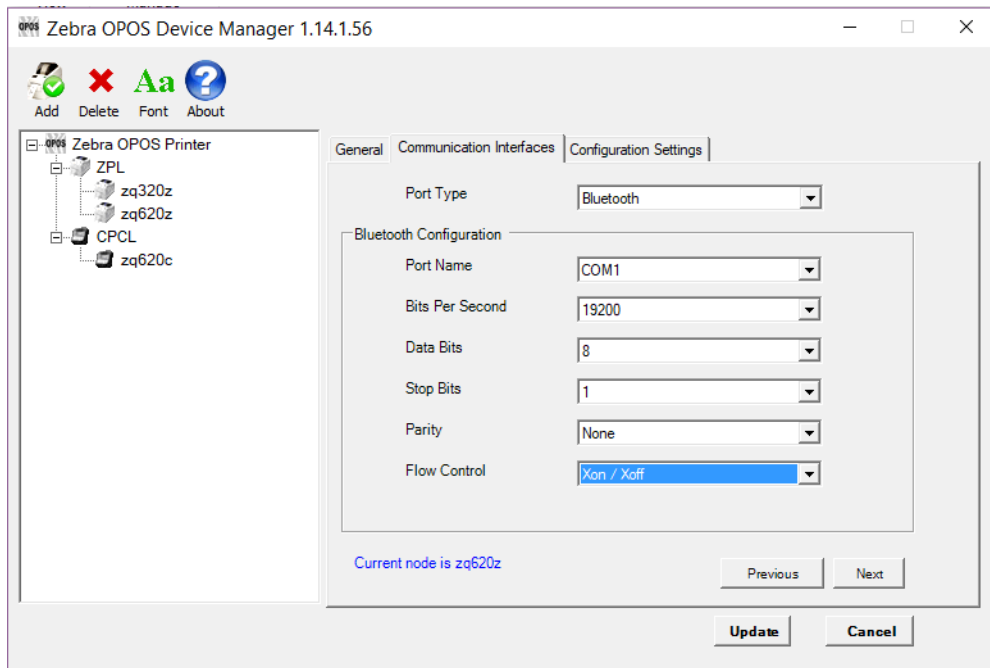
3. Once these steps are complete click **Next**.
The Communication Interfaces dialog displays.
4. On this screen, select the port type from the drop-down menu.
5. Choose the interface to which the printer is connected.

- Click **Search** and the printer model should populate the area under Available Printer(s).



Connecting Using Bluetooth

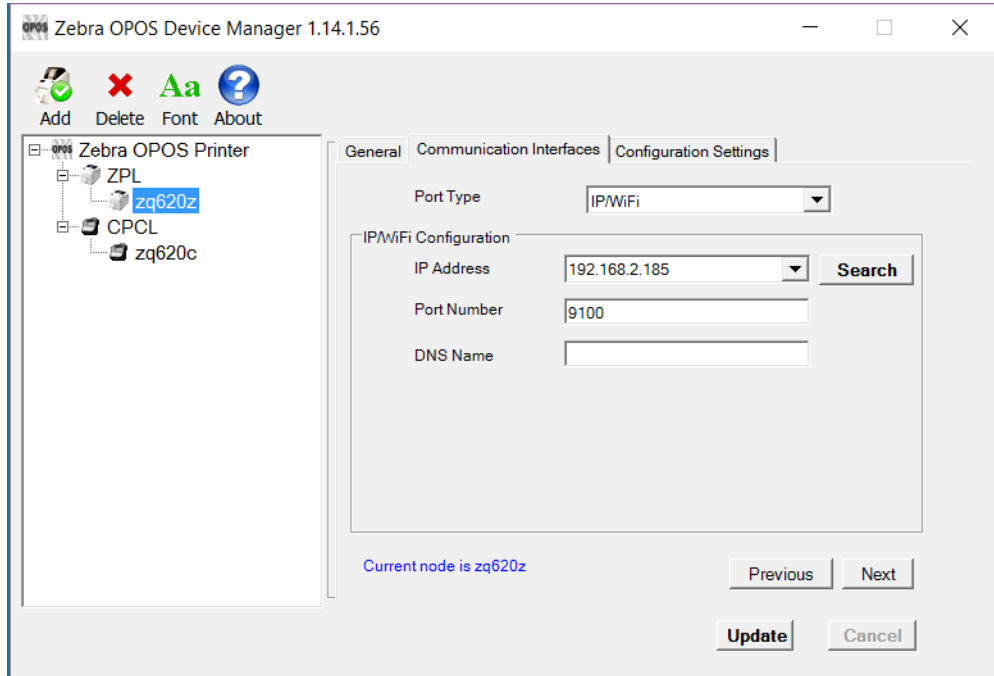
With Bluetooth as a Port Type, make a serial cable connection, and define the Bluetooth Configuration parameters to match the Bluetooth device.



Once this is complete, click **Next**.

Connecting Using an IP Address

With IP/WiFi as a Port Type, manually enter the IP Address of the device or click **Search**. A search for devices that have the same subnet as the PC running the Device Manager will start and then populate the drop-down menu.



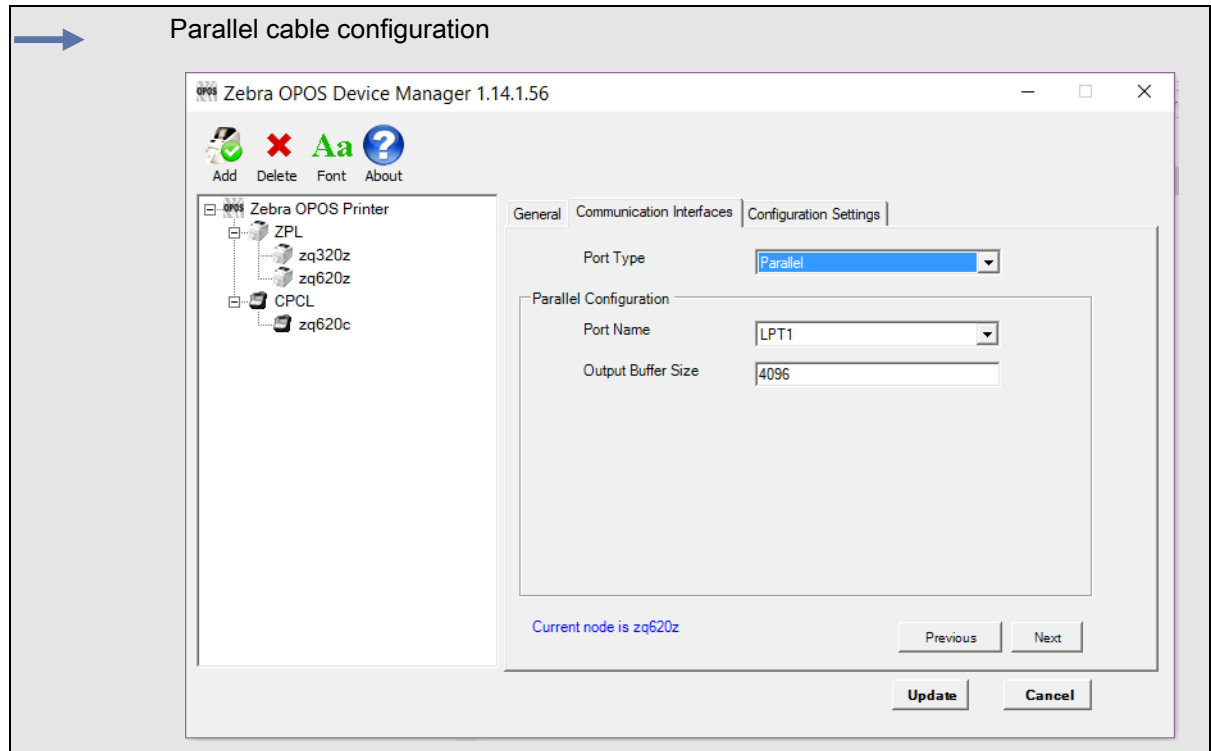
Once this is complete, click **Next**.

Connecting Using a Parallel Cable

A parallel cable can be used to connect to the printer. Configure Port Type to Parallel.



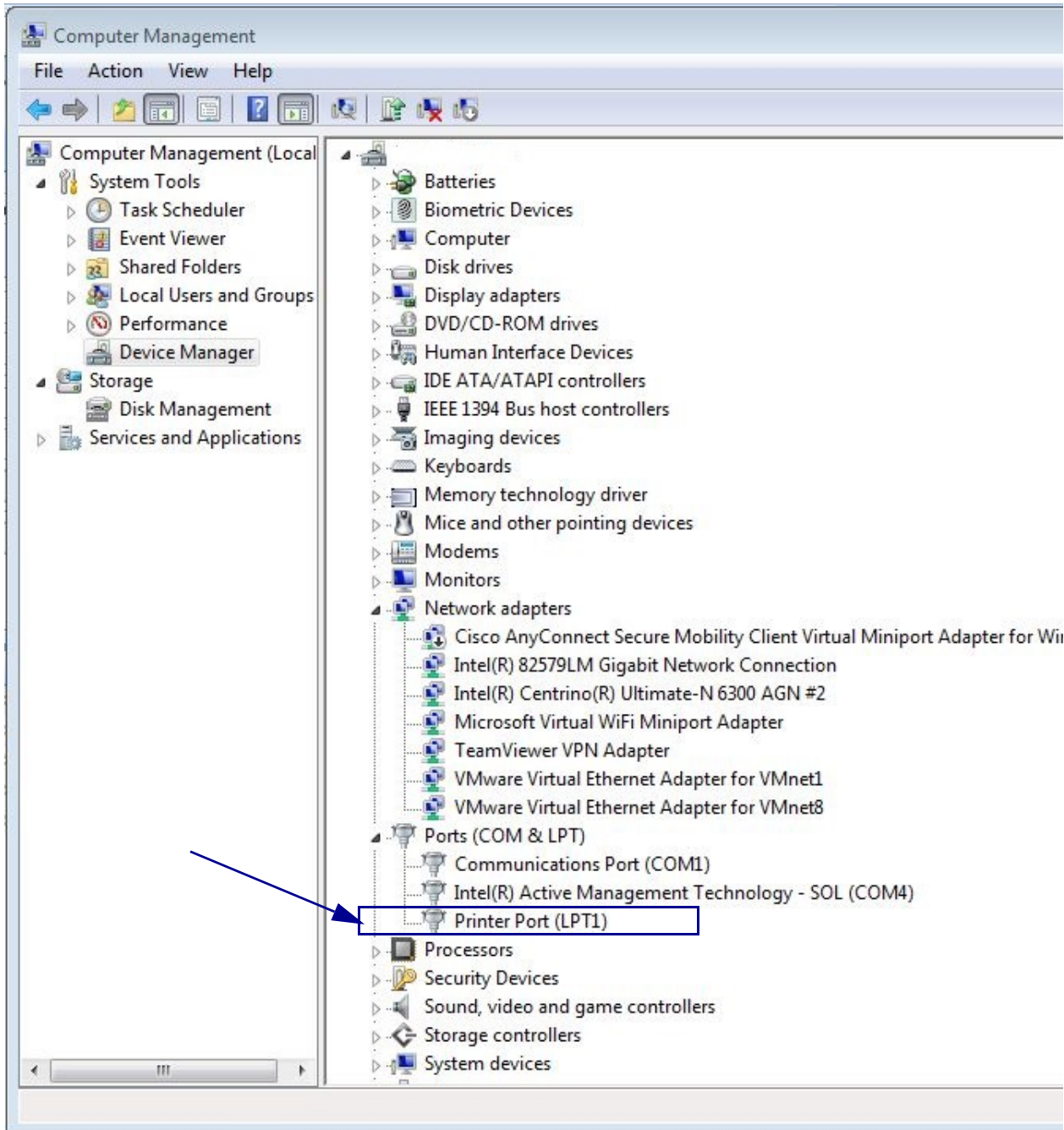
NOTE: When connecting on a Windows 10 x64 or higher operating system, you may discover problems with Plug and Play caused by the system settings. See [Connecting Using a Parallel Cable for 64-Bit Machines on page 37](#).



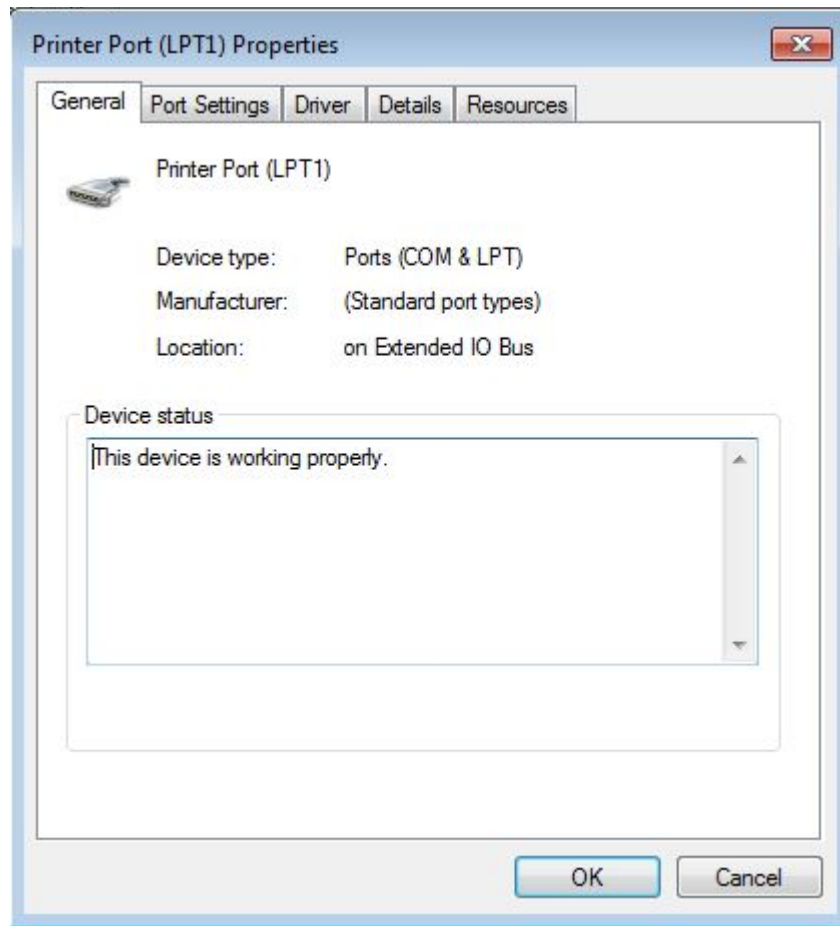
Once this is complete, click **Next**.

Connecting Using a Parallel Cable for 64-Bit Machines

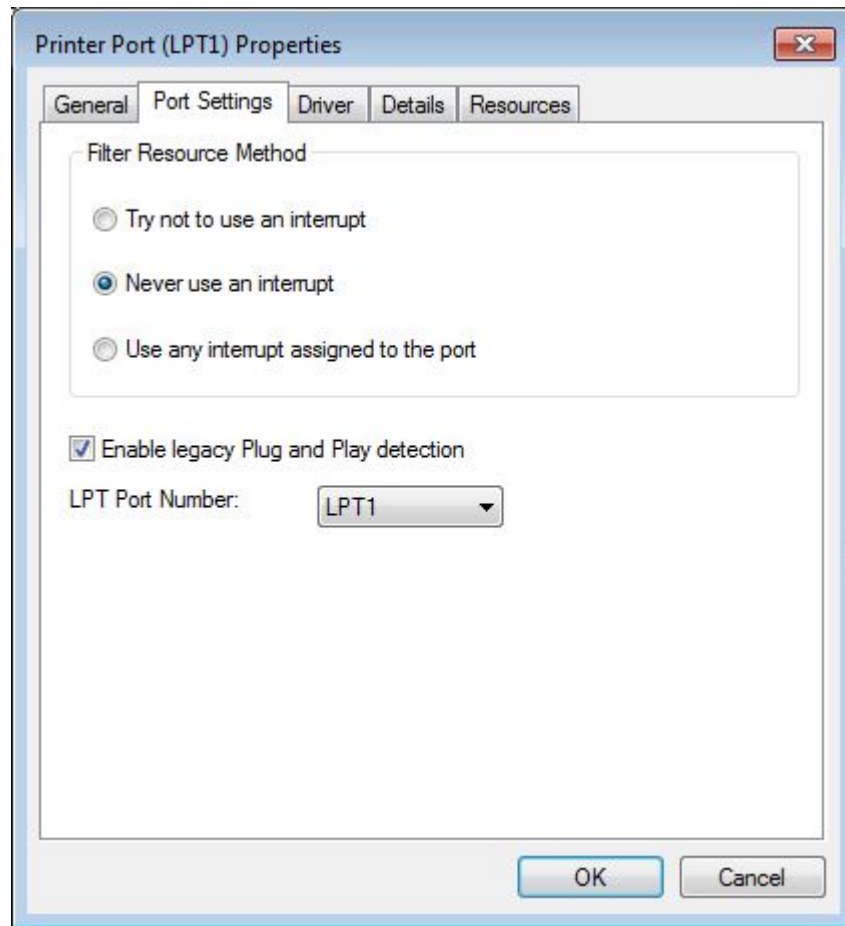
1. Open the Device Manager for your computer.



2. Open Printer Port Properties.



3. Select the Port Settings tab.

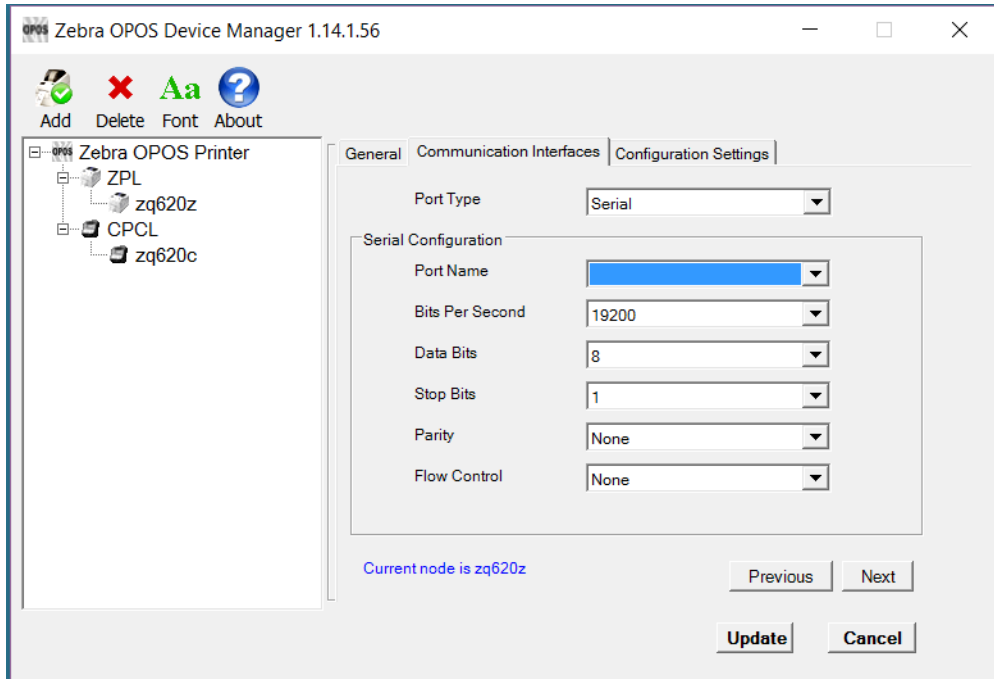


4. Select the **Enable legacy Plug and Play detection** checkbox.
5. Click **OK** to save the setting and reboot the computer.

This setting change enables the parallel port Plug and Play function and the Device Manager to find your parallel printer.

Connecting Using a Serial Cable

A serial cable can be used to connect to the printer. Configure Port Type to Serial, then configure Port Name, Bits Per Second, Data Bits, Stop Bits, Parity and Flow Control to match the settings on the printer.

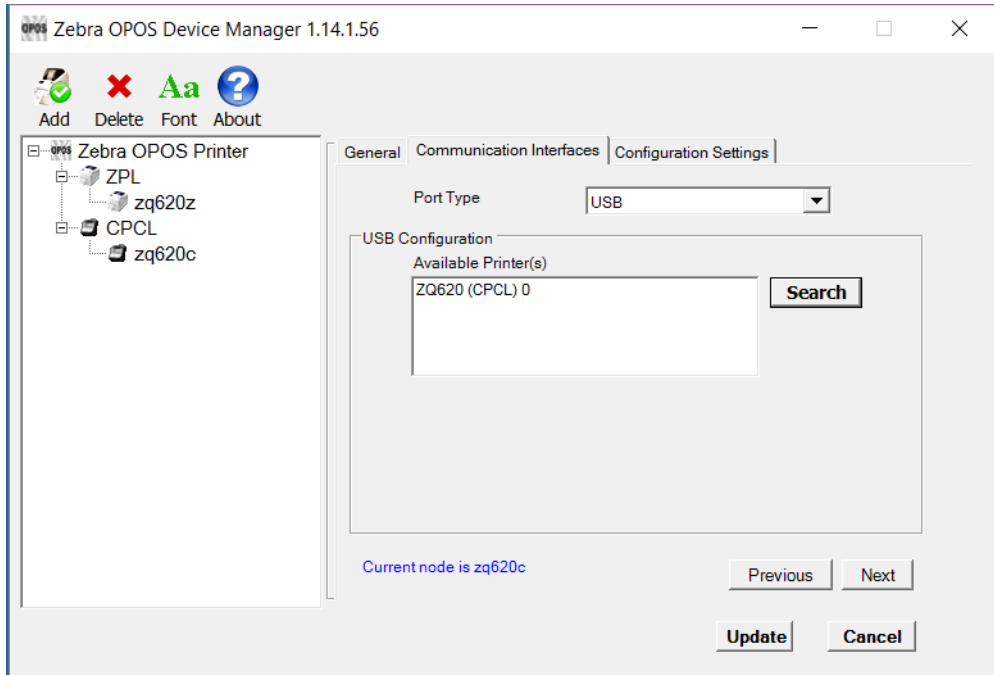


Once this is complete, click **Next**.

Connecting Using a USB Cable

1. When using a USB cable, make the cable connection first.
2. Then, click **Search**.

This will populate the Available Printer(s) area with found printers.



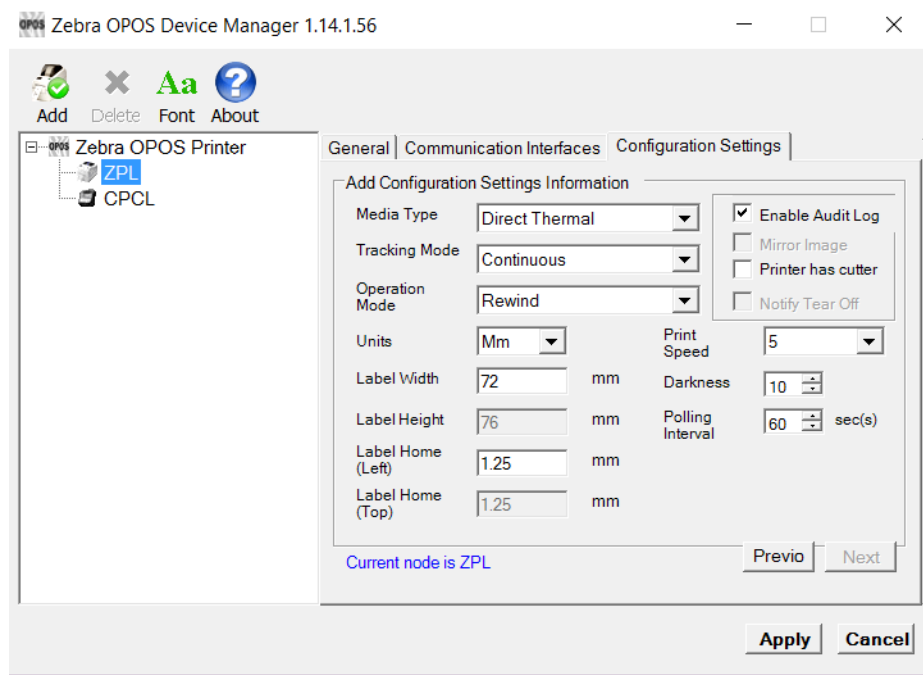
3. Click on the printer.
4. Click **Next**.

The Configurations Settings tab displays.

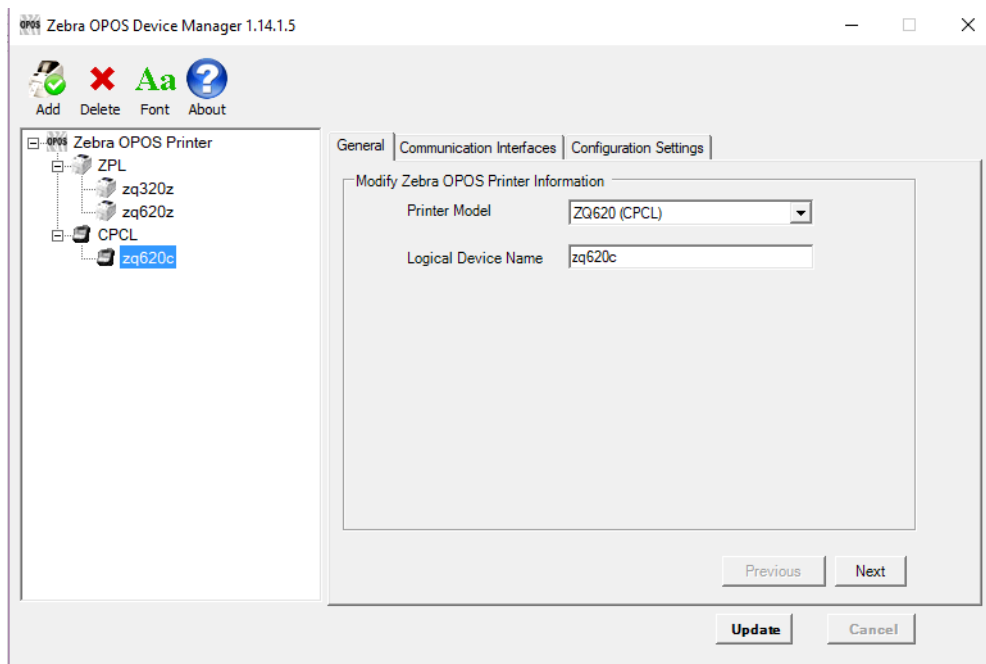
Configuration Settings

Adding a Printer

1. On the Configurations Settings tab, select the settings that will be used for the printer.



2. Once complete, click **Update**.
 3. A message appears asking if you are sure you want to add the printer, click **Yes**.
- The printer is added under the CPCL directory.



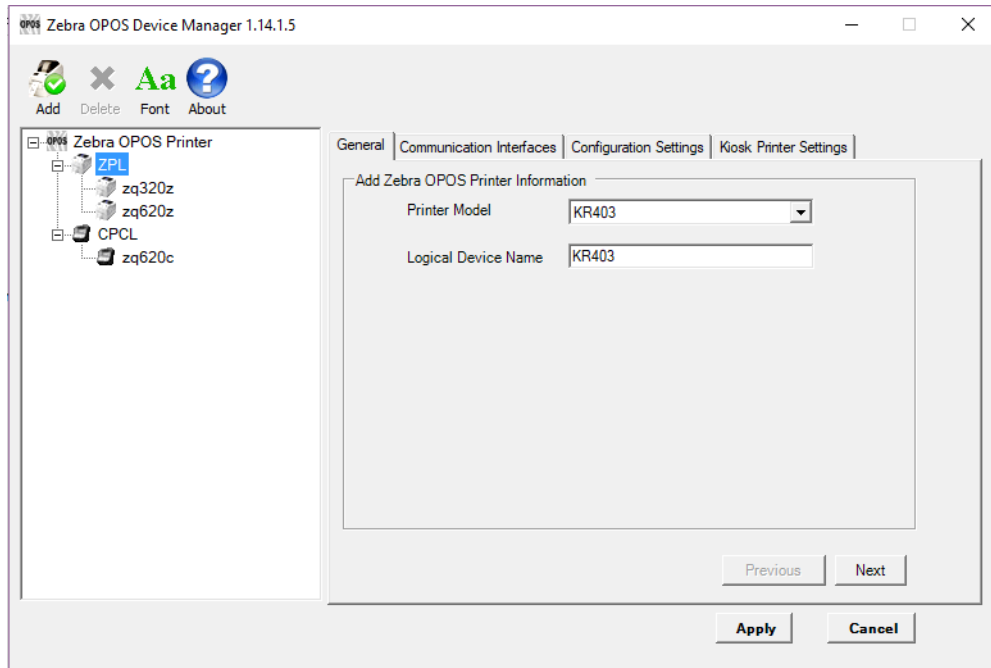
Adding a KR403 Kiosk Printer

1. Open the Device Manager application, select ZPL under Zebra OPOS Printer. Click **Add**.



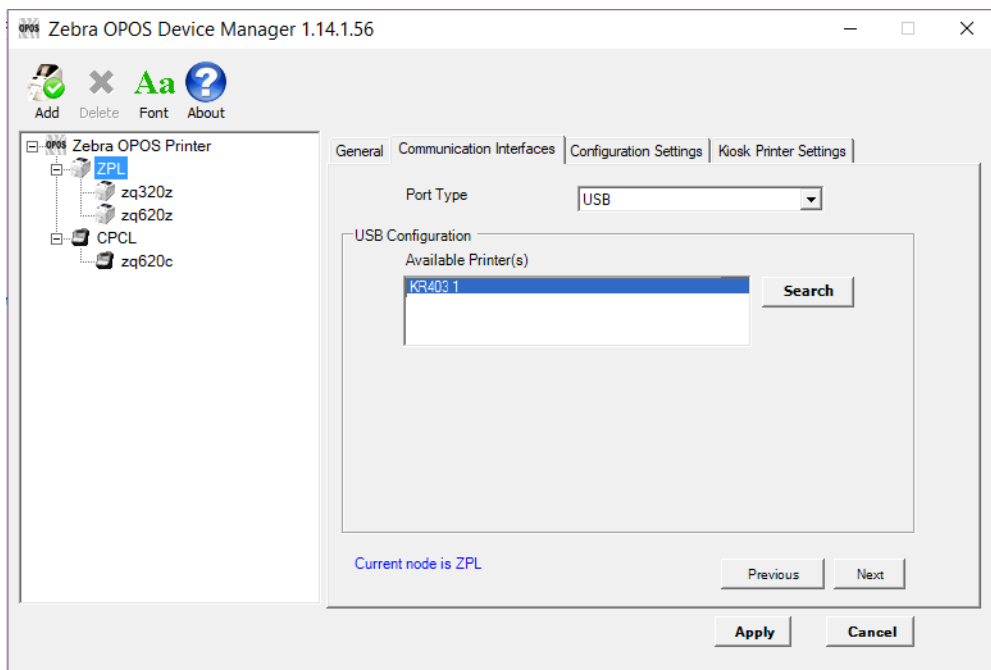
NOTE: In Windows 10 and Windows 11, you may need to run this application with Administrator rights.

2. Select KR403 from the Printer Model drop-down menu and type in the logical device name.



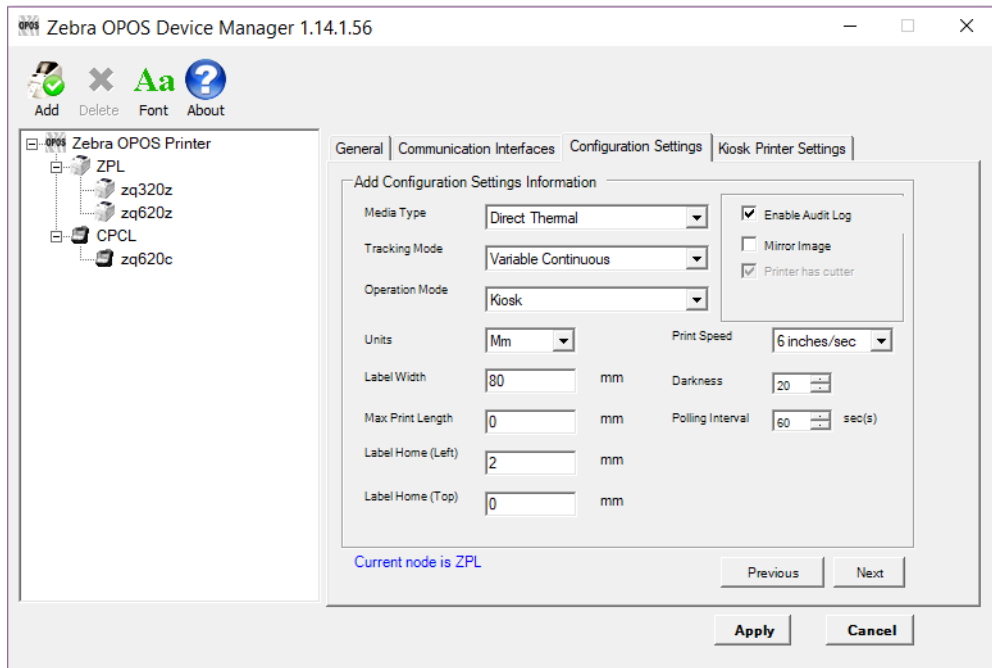
3. Click **Next**.

4. In the Communication Interfaces tab, select the Port Type and then click **Next**.



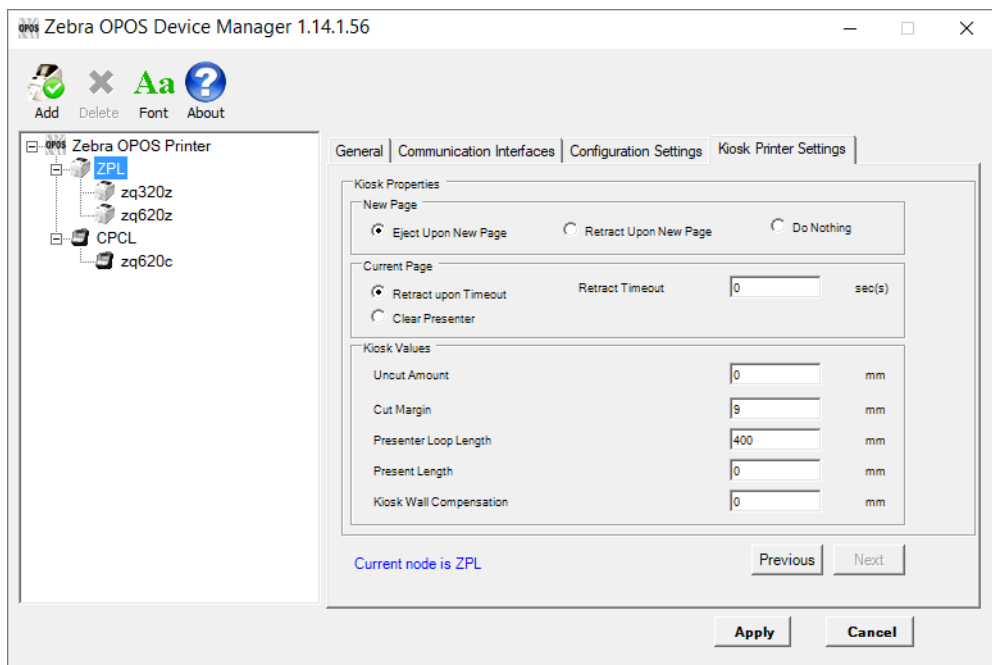
Device Manager

5. In the Configuration Settings tab, select the settings such as Media Type, Tracking Mode, etc. Check the Enable Audit Log box to enable event logging.



6. Click **Next** and configure the Kiosk Printer Settings.

For a detailed explanation of the Kiosk Printer Settings, see [Kiosk Printer Settings on page 55](#).



7. Click **Apply**.
8. Click **Yes** to add the printer.

The KR403 should now be listed in the Device Manager.

Output Logging

The Driver can log its printer command output for troubleshooting purposes. By default, this option is not turned on to keep the logs from consuming disk space. In the event that the Output Logs are needed, the feature can be activated from within the Device Manager.

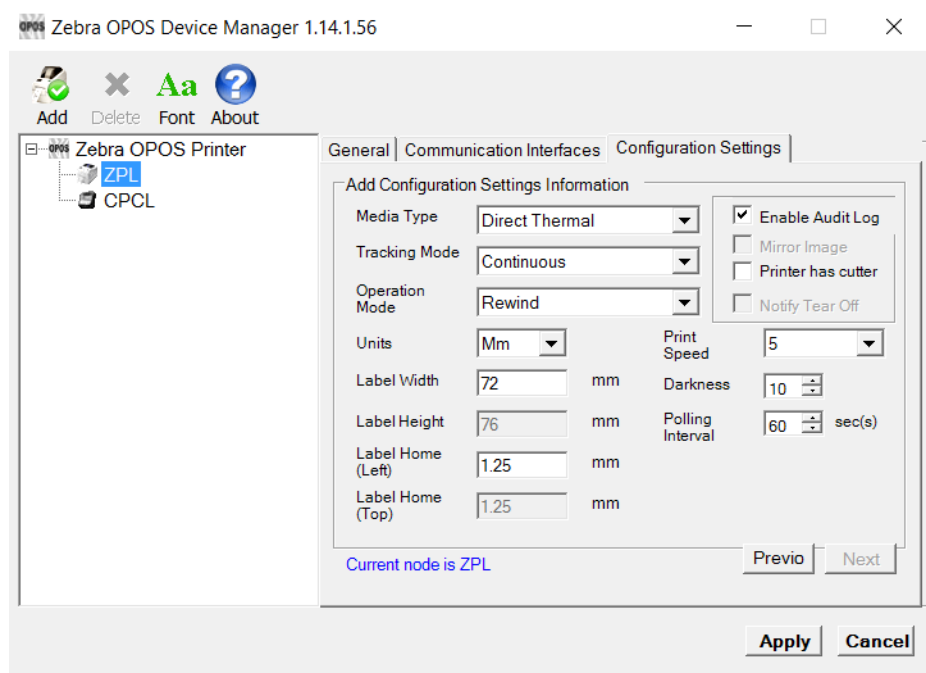
To turn on Output Logging, perform the following:

1. Run the Device Manager and select the printer to be monitored.



NOTE: In Windows 10 and Windows 11, you may need to run this application with Administrator rights.

2. Click on the Configuration Settings tab and check Enable Audit Log.



The logs can be found at C:\ProgramData\Zebra Technologies\OPOS\LOGS.

There are two logs:

- ZebraPOS_Audit.txt - contains a running log of the OPOS commands used and the resulting driver output.
- ZebraPOS_Status_Audit.txt - contains a running log of when status queries were sent.

To turn off the logging, perform the following:

1. Uncheck the Enable Audit Log box in the Device Manager.



NOTE: If logging is turned off or on while a printer is in the "Claimed" state, the setting change will not take effect until the printer has been "Released".

Additional Font Handling

In order to provide customers with the ability to add fonts to the printer and then use those in the OPOS driver, the Device Manager UI has the following functionality.



NOTES:

- Zebra offers a pre-converted font for use with ZPL-based printers. This is a monospaced font called “Mono1”.
- Zebra also offers a pre-converted font for use with CPCL-based printers. This is a monospaced font called “Mono1”. As a convenience, “Mono1” is predefined as an Additional Font for the CPCL printer models.

Fonts are included in the installation at C:\Program Files (x86)\Zebra Technologies\ZebraOPOS\FONTS.

Adding a New Font in Device Manager

The following example demonstrates how to add the “Mono1” font to a ZPL printer.

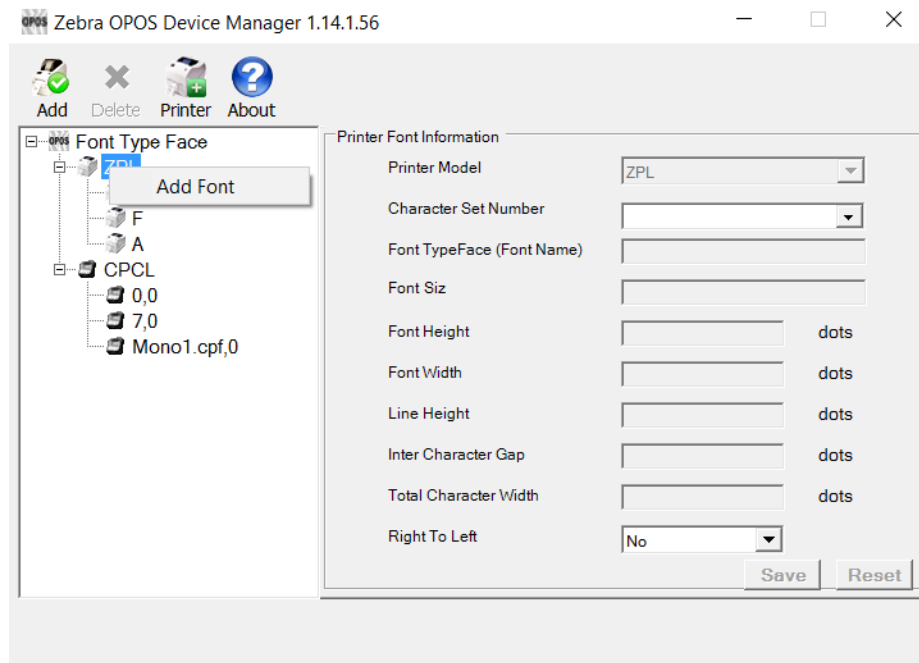
1. Open the Device Manager Application and click the Font button.



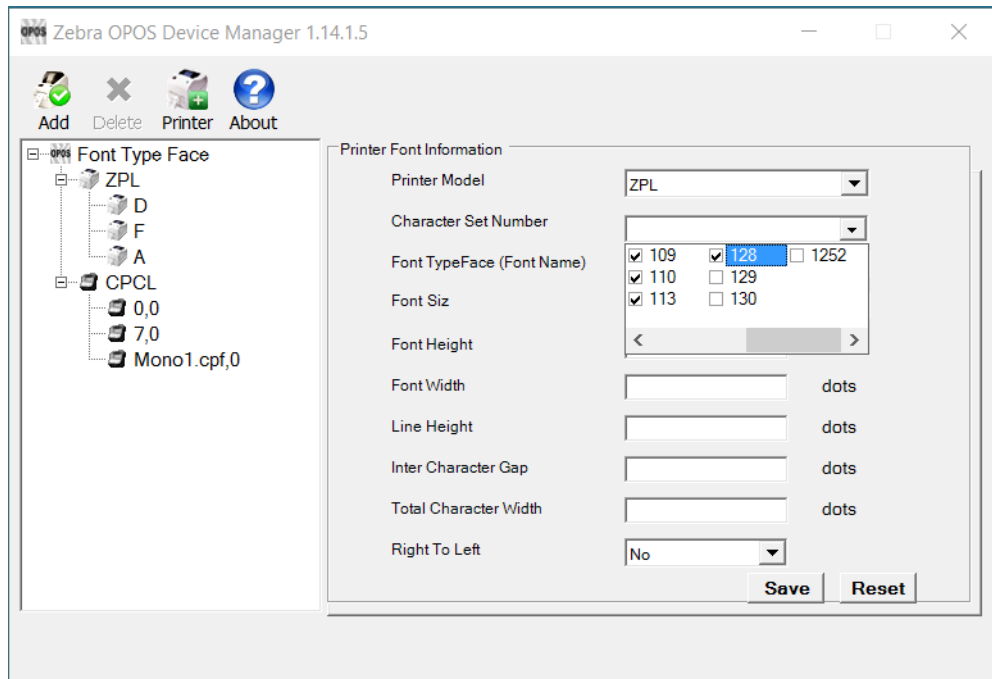
NOTE: In Windows 10 and Windows 11, you may need to run this application with Administrator rights.

1. Right-click ZPL and click **Add Font**.

Fonts D, F and A will be listed under ZPL.



2. Select the **Character Set Number** drop-down menu, verify selectable character sets (100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 113, 128, 129, 130) and select the character sets by clicking the corresponding boxes.



3. Enter **Font Name**, **Font Height**, and **Width** (in dots). If adding the “Mono1” font, use the name “Mono1”, height 25, and width 13.
4. Enter **Line Height**, **Inter Character Gap** (in dots), **Total Character Width**, and select Yes or No to identify if your Font supports “Right to Left”.



NOTE: For the Mono1 font the following parameter values should be added:

For CPCL:

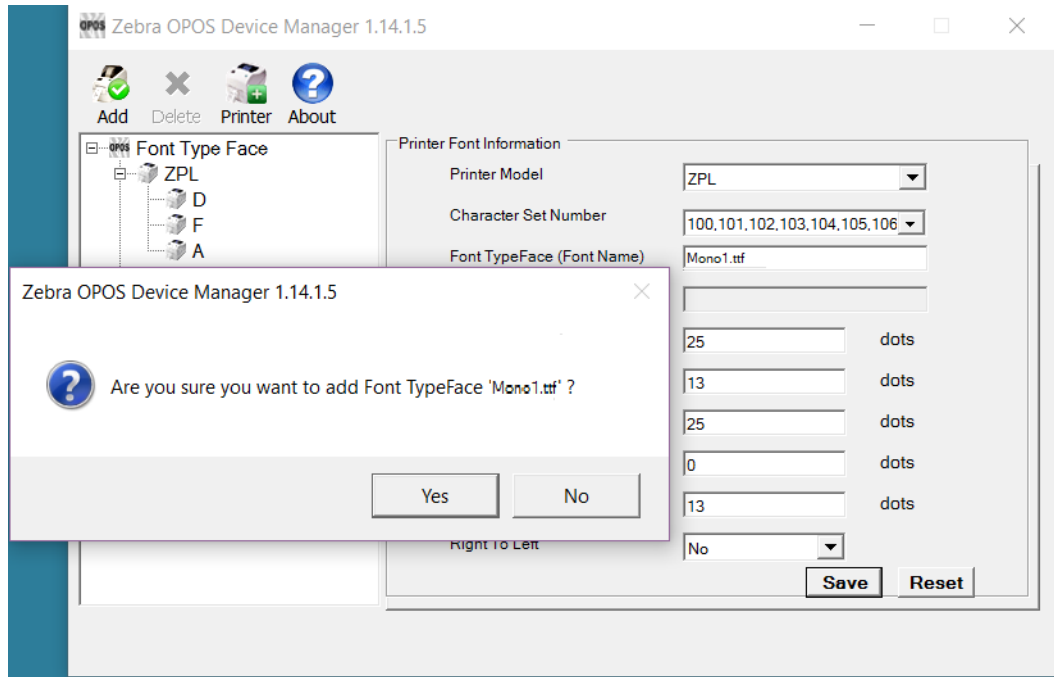
- Font Name = Mono1.cpf
- Font Size = 0
- Font Height = 25
- Font Width = 13
- Line Height = 25
- Inter Character Gap = 0
- Total Character Width = 13

For ZPL:

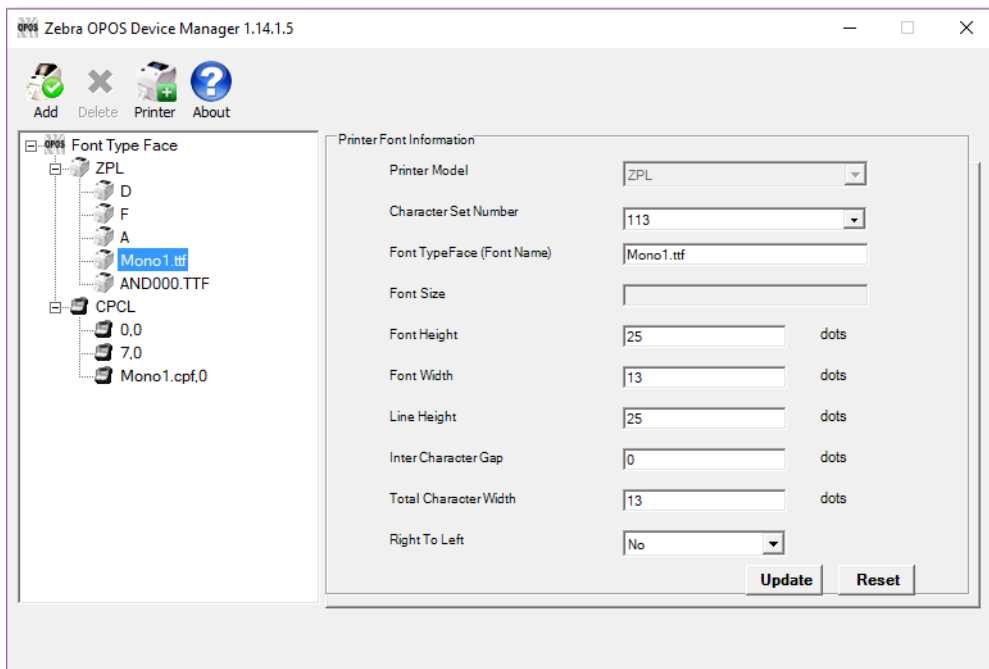
- Select Character Set Number 1252
- Font Name = Mono1.ttf
- Font Height = 25
- Font Width = 13
- Line Height = 25
- Inter Character Gap = 0
- Total Character Width = 13

5. Click **Save** to save the Font.

(The user will be presented with a dialog box to confirm the adding of the font.)



6. The new font should now be listed.



NOTE: When using One Shot ESC commands, the index entry for the font will be assigned by the Device Manager to the next available font slot.

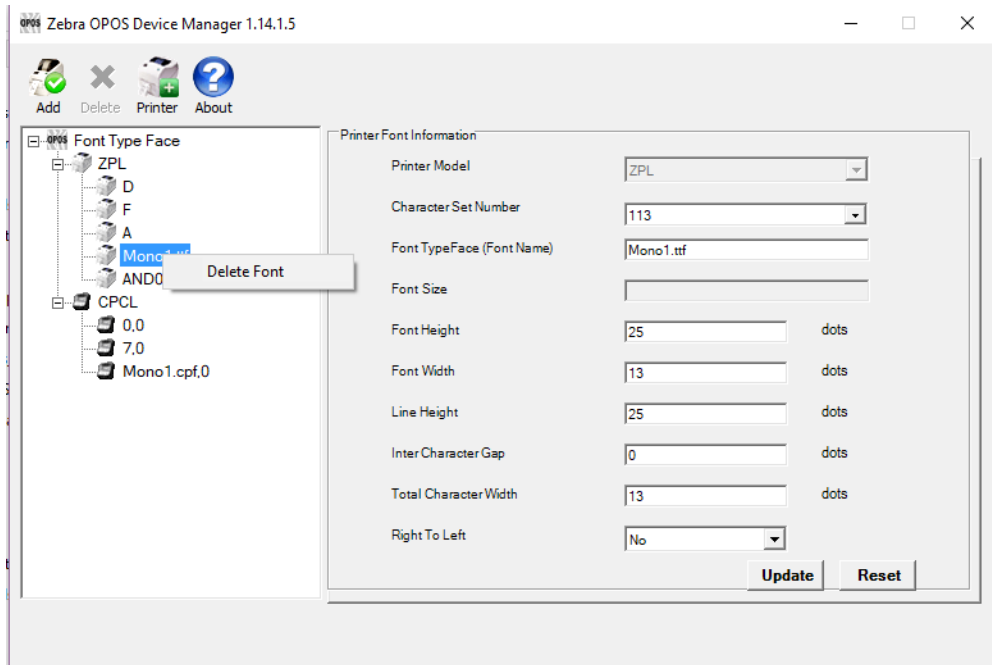
0, 1, 2 are built-in ZPL fonts and any new font will be assigned a following number.

Assigning Multiple Fonts

1. To assign multiple fonts, repeat the steps in [Adding a New Font in Device Manager on page 46](#) for every font you want to add.

Deleting a Font

1. To delete a font from the list, simply right-click the Font you wish to delete and select **Delete Font**. (The user will be presented with a dialog box to confirm the deletion of the font.)



Selecting and Using a Font with Chinese Characters

The Andale Mono WT S font has a character set for Simplified Chinese and is available from Zebra for purchase. Using this font with the OPOS driver allows you to print Chinese characters.



NOTE: Other Andale Mono fonts are available for purchase from Zebra for printing Traditional Chinese, Japanese, and Korean languages.

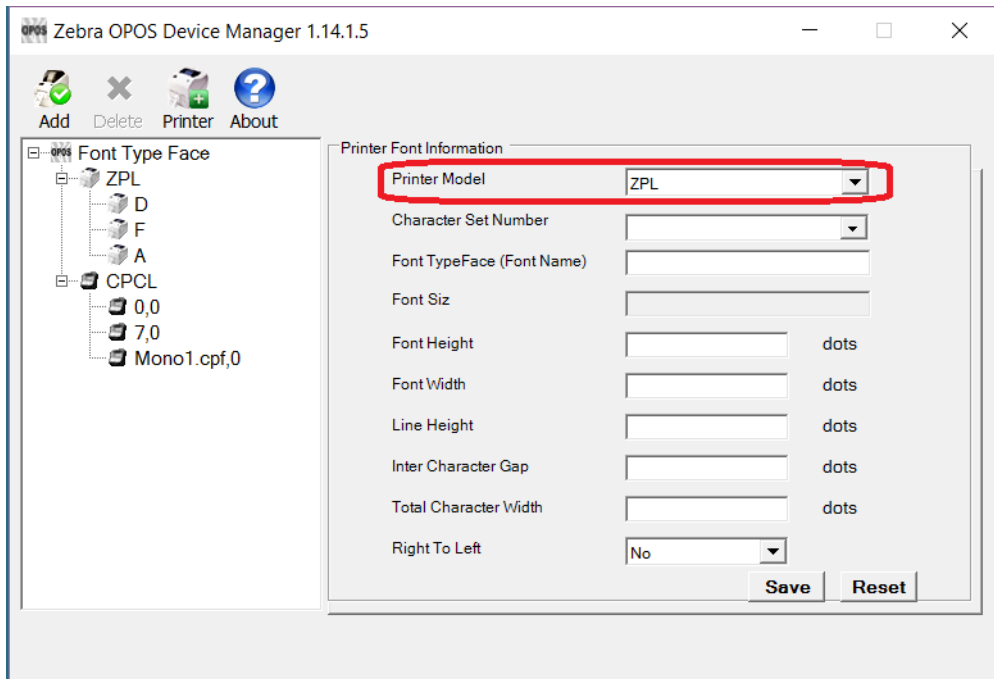
Setting the Printer Font Information

1. Open Device Manager and select **Font** button.
2. See [Figure 1](#). In the **Printer Model** dialog box, select **ZPL**.



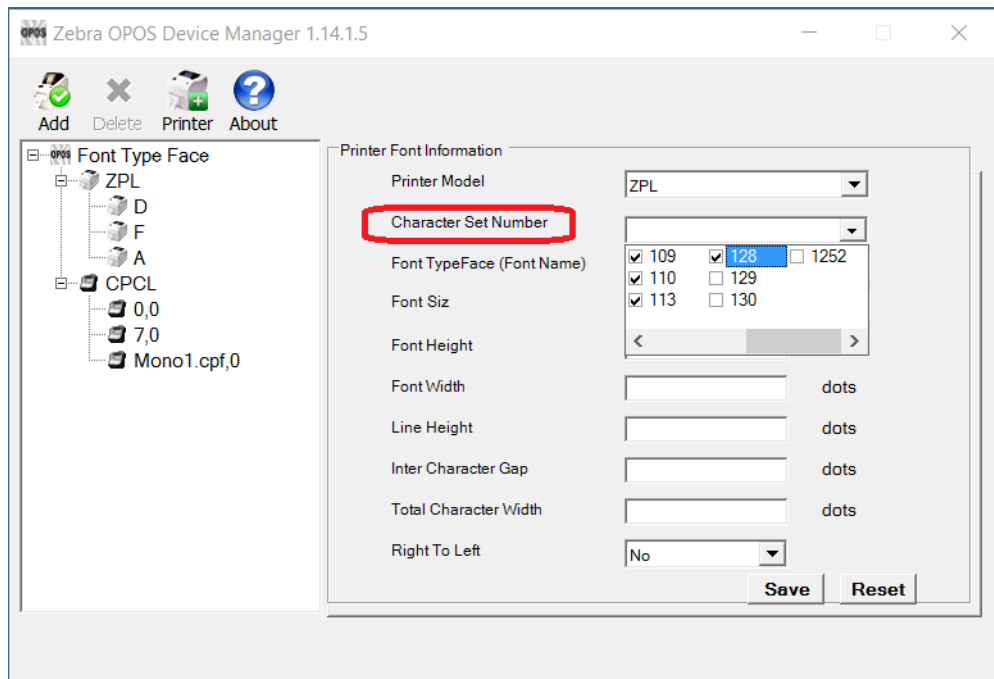
NOTE: This font can only be used with a ZPL printer.

Figure 1 Setting the Printer Model



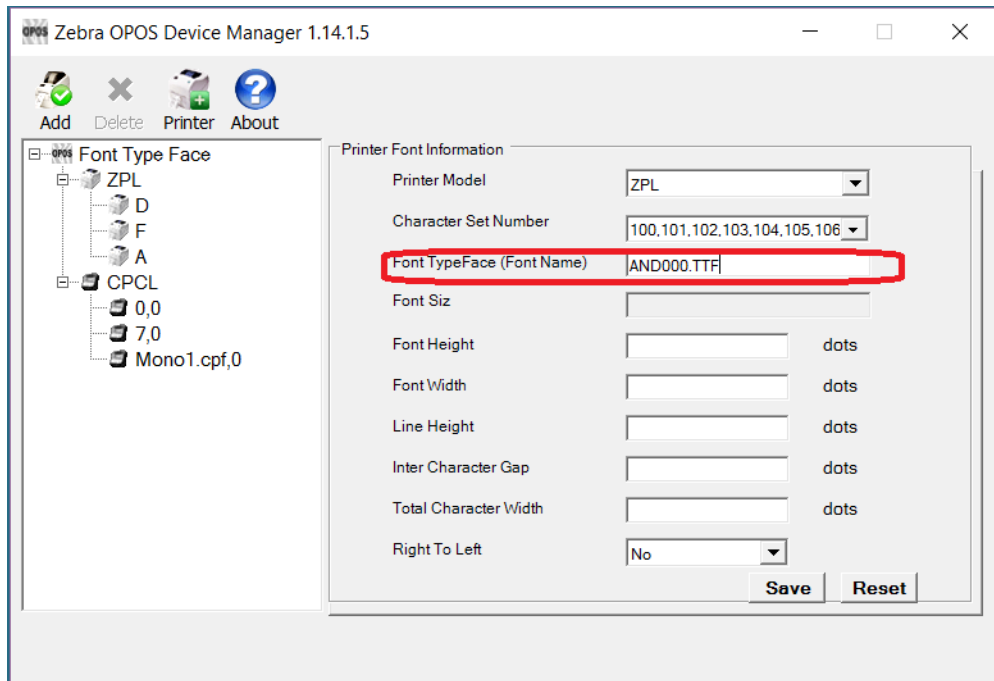
1. See [Figure 2](#). Enter the **Character Set Number** for the selected font.
For the Andale font, select all numbers up to **Code 128**.

Figure 2 Setting the Character Set Numbers



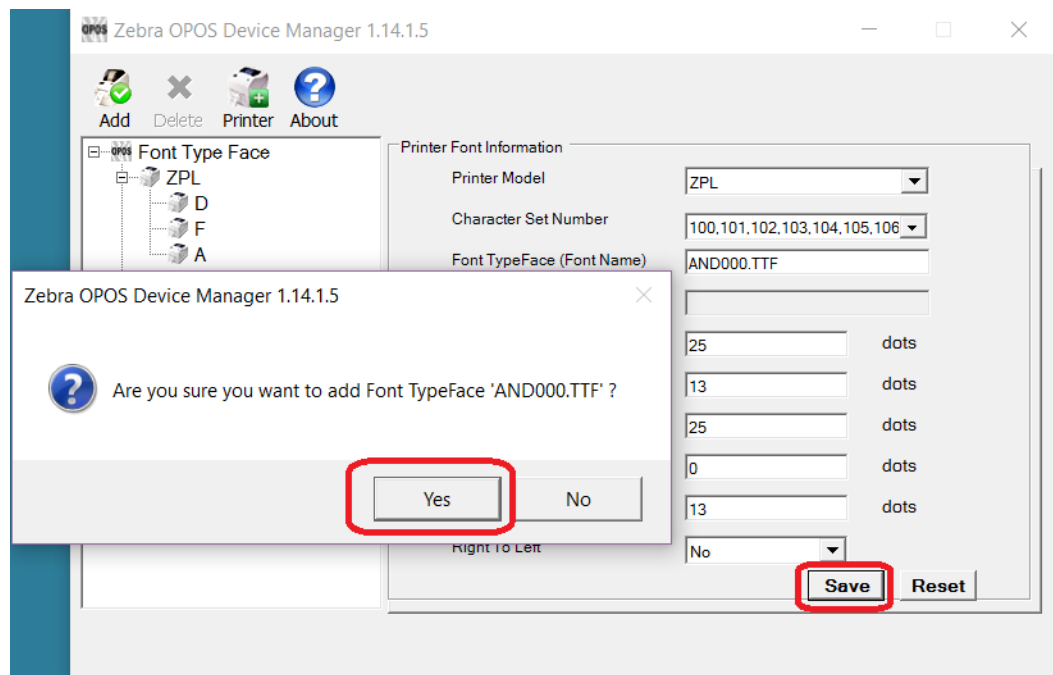
2. See [Figure 3](#). Add the name and all other parameters for the font.
Enter the font name **exactly** as it appears on the printer as this representation will be used to select the font.

Figure 3 Setting the Font Name



3. See [Figure 4](#). Click **Save** and click **Yes** to add the font typeface.

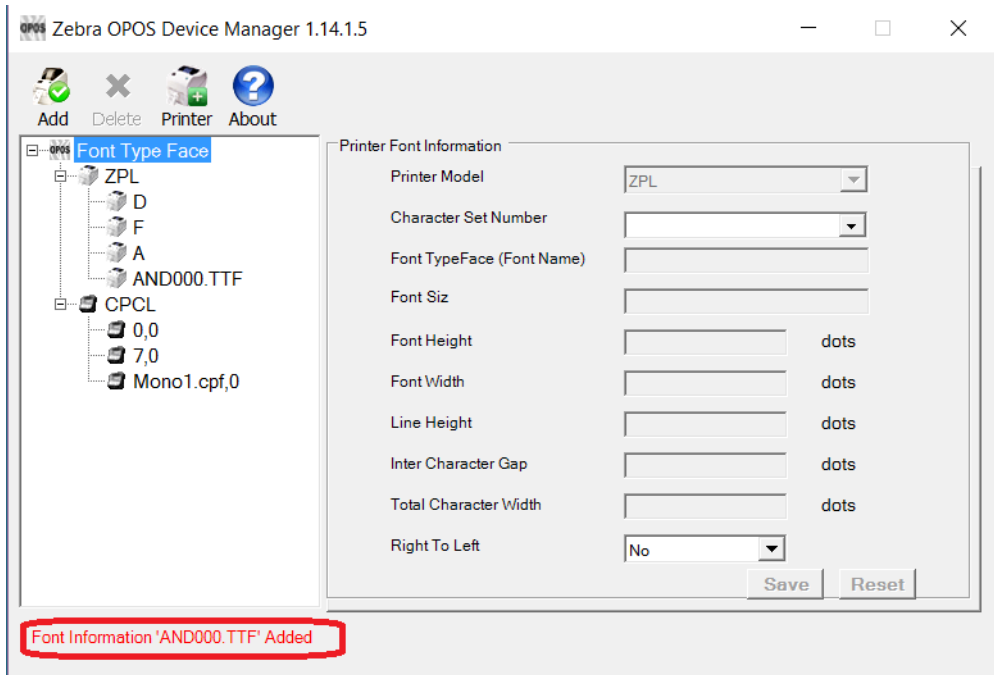
Figure 4 Saving the Font Information



- See [Figure 5](#). You have now added the Andale font to your OPOS driver which is available within the OPOS application using the **ESC|#fT** command.

In this example, the printer now has three default fonts and one OEM font, and the OEM font target number would be 3(**ESC|3fT**).

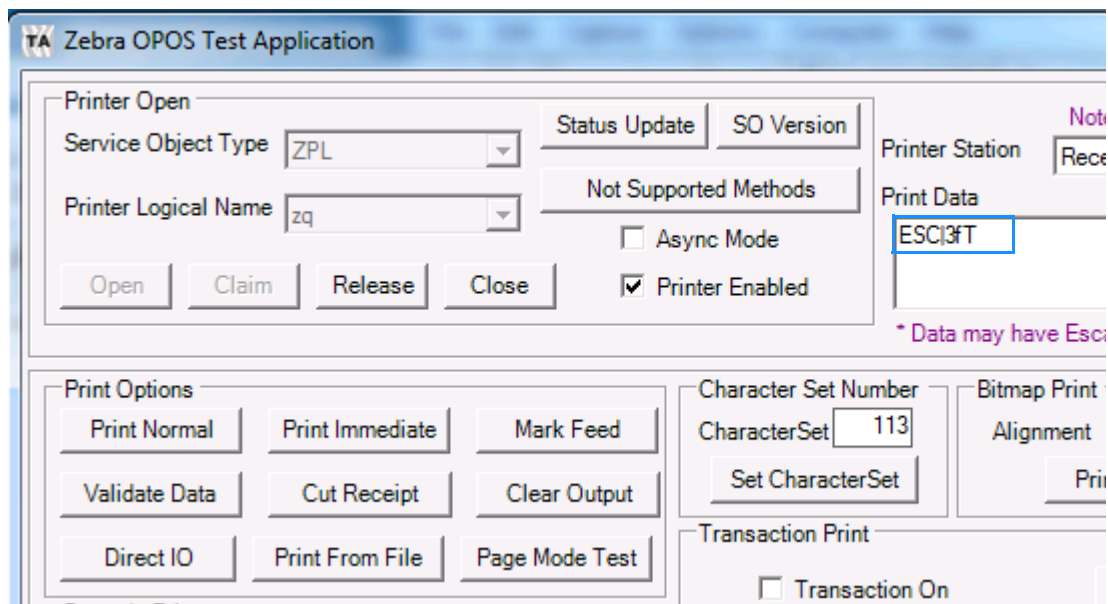
Figure 5 Confirming the New Font Type



Testing the New Font

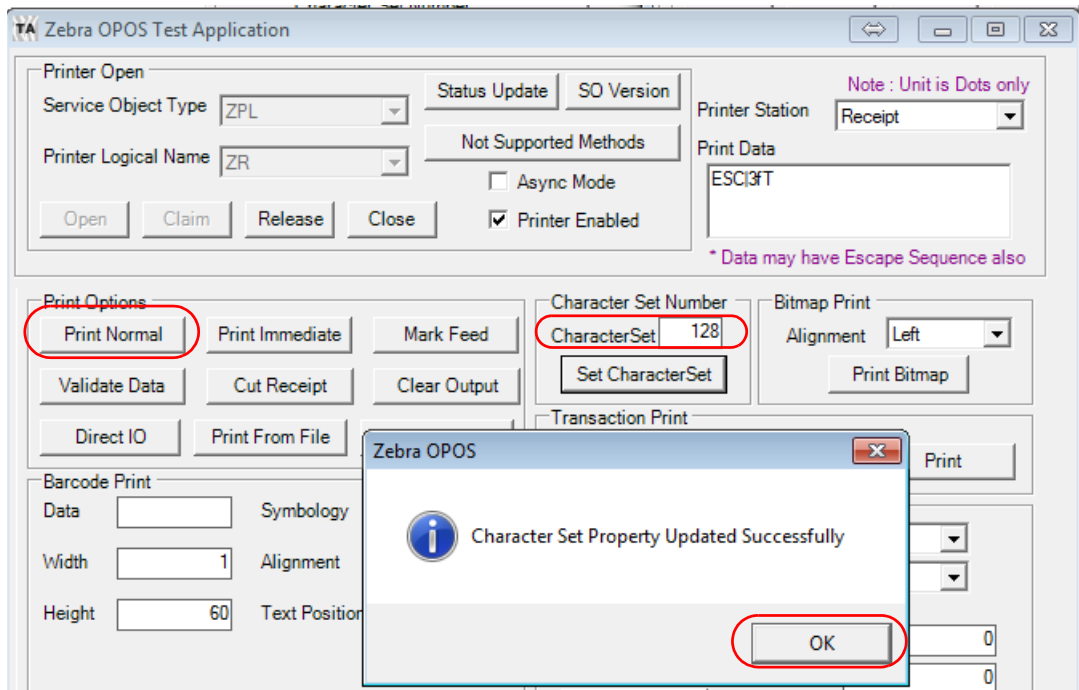
- See [Figure 6](#). Open the test application to try out the new font.
- Open, Claim and Enable the printer and enter **ESC|3fT** in the **Print Data** box.

Figure 6 Setting the Print Data



- See [Figure 7](#). Press **Print Normal** once, and then change the CharacterSet number to **128**. Click **OK** in the confirmation dialog.

Figure 7 Updating the Character Set Property



Now you can add Chinese text behind the ESC command in the Print Data box and print to the printer.

Programming Tips For Using Additional ZPL Fonts

In order to print in other languages, it is necessary to load a new font Swiss721 into the printer and control it within the OPOS driver. See [Adding a New Font in Device Manager on page 46](#) for more specific information.

An OPOS application developer has to select the proper font encoding by selecting the new codepage as described in the font definition.

In order to enable locale setting, we can check the currently selected language support in the OS and select the OPOS CharacterSet value according to the following selection:

Zebra ^CI Values	OPOS CharacterSet Value
0 = Single Byte Encoding - U.S.A. 1 Character Set	100
1 = Single Byte Encoding - U.S.A. 2 Character Set	101
2 = Single Byte Encoding - U.K. Character Set	102
3 = Single Byte Encoding - Holland Character Set	103
4 = Single Byte Encoding - Denmark/Norway Character Set	104
5 = Single Byte Encoding - Sweden/Finland Character Set	105
6 = Single Byte Encoding - Germany Character Set	106
7 = Single Byte Encoding - France 1 Character Set	107
8 = Single Byte Encoding - France 2 Character Set	108

Zebra ^CI Values	OPOS CharacterSet Value
9 = Single Byte Encoding - Italy Character Set	109
10 = Single Byte Encoding - Spain	110
13 = Zebra Code Page 850	113 (default)
27 = Code page 1252	1252
28 = Unicode (UTF-8 encoding) - Unicode Character Set	128
29 = Unicode (UTF-16 Big-Endian encoding) - Unicode Character Set	129
30 = Unicode (UTF-16 Little-Endian encoding) - Unicode Character Set	130



NOTE: If printing with a new font and character set shall occur, perform the steps in the next procedure shown on [page 54](#).

If using Swiss721 font (with font index 3), perform the steps below.

1. Send the ESC|3fT. With the first use, the CharacterSetNumber value (128,129,130) (assigned to the Swiss721 font) will be appended to the default CharacterSetList property (100,101,102,103,104,105,106,107,108,109,110,113).

This will throw an exception as “Selected Font doesn't support character set”. You will need to add the appropriate character set number within 128,129,130.

2. Assign the CharacterSetNumber within the CharacterSetNumber value (128,129,130) selected for Swiss721.

Now, the Service Object will change the CharacterSetNumber to the specified number and use it for future printing.



NOTE: Using a proportional font may cause unexpected results. Due to the nature of proportional fonts, the driver cannot calculate the exact text position for all text, and text wrapping may not work as expected. The benefit this font has is that you can use international character sets with multiple languages. In general, the use of monospaced fonts such as the Mono1 font is preferred.

Use of OPOS Character Properties

The **CharacterSetList** property will display all of the ASCII numeric set numbers associated with the currently loaded fonts. The default is:

“100,101,102,103,104,105,106,107,108,109,110,113”.

If a new font is added, the new character set values will be added to the **CharacterSetList** so an application can choose the new values for the respective fonts.

The **CharacterSet** property will initialize with 113 on “open”.

The **CapMapCharacterSet** property will be initialized with **FALSE** on “open”.



NOTE: The above setting has the effect that the **MapCharacterSet** property will also always show FALSE regardless of what the user sets it to. If **MapCharacterSet** is set to TRUE, an error **E_ILLEGAL** will be thrown.

The **CapCharacterSet** property will initialize with **DISP_CCS_ASCII** on “open”. This property will change with a different selection of the CharacterSet property.

CapCharacterSet	CharacterSet
DISP_CCS_ASCII	100-110, 113
DISP_CCS_UNICODE	128,129,130



NOTE: Error handling - If a specific character set value is selected with the CharacterSet property and a font is selected that cannot support the character set, an error E_ILLEGAL will be thrown.

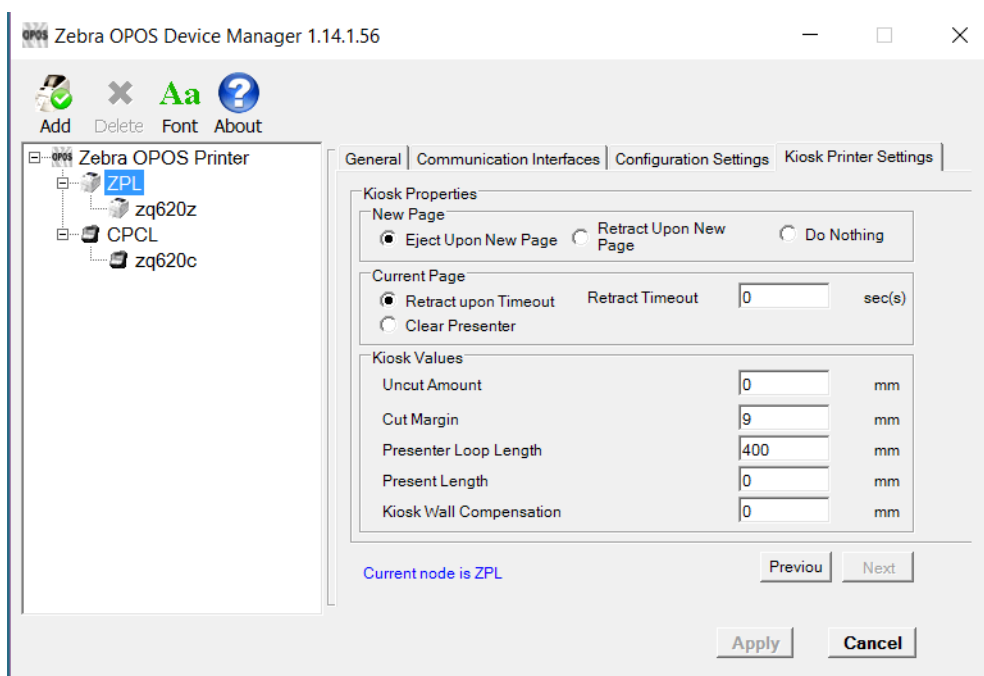


NOTE: OPOS Properties - The driver does not support font mapping. The application is responsible for this task. **CapMapCharacterSet** is always FALSE, which will also cause MapCharacterSet to always be FALSE. If **MapCharacterSet** is set to TRUE, an error E_ILLEGAL will be thrown.

KR403 Specific User Interface

Kiosk Printer Settings

The Kiosk Printer Settings tab will appear only after adding KR403 as a Printer Model under the General tab. The following information will assist configuring Kiosk properties.



Kiosk Properties

New Page:

There are three settings which you may select when a new page is printed:

- Eject Upon New Page
- Retract Upon New Page
- Do Nothing

These settings instruct the printer to change the presenter function mode.

Eject Upon New Page – Ejects the current page while the new page is printed.

Retract Upon New Page – Retracts current page while the new page is printed.

Do Nothing – The current page still remains in the printer neither ejects nor retracts.

Current Page:

Retract upon Timeout – If a label is not taken, you can define a timeout value when expired will retract the current page. Retract timeout can be defined from 0 – 300 seconds.

Clear Presenter – Will eject the current page before printing a new page.

Kiosk Values:

Uncut Amount – When a partial cut is made by the printer, the media left uncut can be defined from 10 to 60mm.

Cut Margin – This setting determines the margin between the cutter and the printhead. It is defined from 2 to 9mm. The default is 9mm.

Presenter Loop Length – Determines the length of the presenter loop. It is defined from 3 to 1023mm. The default gives a loop of approximately 400mm.

With this feature, we build a loop with the imaged receipt and keep the printout in the printer to prevent the kiosk user from taking the receipt while it is still being imaged. When the full receipt is imaged, we cut the receipt and present a portion of the receipt to the user for them to take. This reduces jamming and print image distortion of the receipt.

Present Length – Determines the amount of media to eject the page through the presenter module.

When the customer takes the receipt, the printer detects a movement and issues the rest of the receipt at 300 mm/s to help ensure receipt is removed undamaged. Value range from 0 to 255mm.

Kiosk Wall Compensation – By default, the printer will eject the paper 50 mm during a present cycle. The kiosk wall compensation setting allows the user to increase the distance that media is ejected during a present cycle. The additional distance can range from 0 to 255 mm.

Details for Variable Continuous Mode vs. Continuous Mode

The KR403 printer supports two continuous modes. The “variable continuous mode” is different from the “continuous mode”. Variable continuous mode allows the printer to print pages without length limitation.



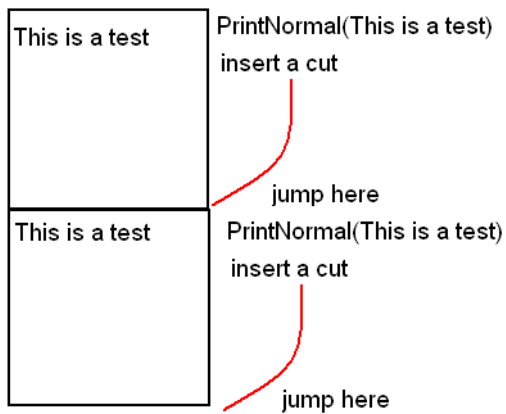
NOTE: The minimum presenter length of 70 mm always applies.

- Variable continuous mode will print on continuous paper without page boundaries until a cut command is issued.
- Continuous mode requires a defined page length and will print a page that adheres to that set page length.

Continuous Mode

- You have a set label width
- You have a set label height (minimum length is 70 mm)
- You have a Label Home (left and top)

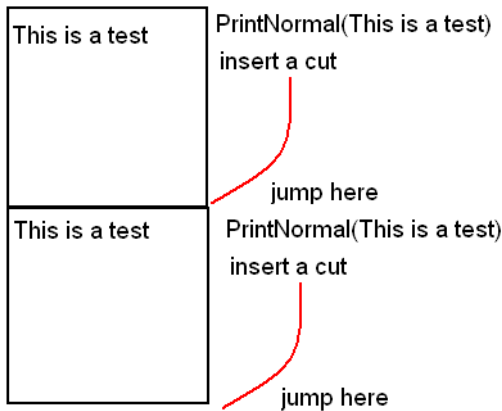
You print content that is not filling the page and you receive a cut command. The printer shall feed to the end of the page and cut there.



Variable Continuous Mode 1

- You have a set label width
- You have a minimum label height of 70 mm
- You have a Label Home (left and top)

You print content that is not filling the page and you receive a cut command. The printer shall feed to the end of the page and cut there.

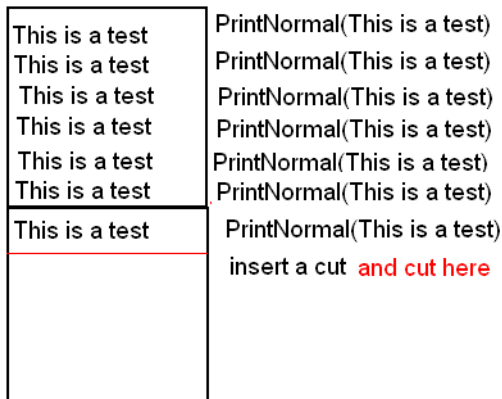


In this example, the minimum label length is not exceeded and is not different from Continuous mode.

Variable Continuous Mode 2

- You have a set label width
- You have a minimum label height of 70 mm
- You have a Label Home (left and top)

You print content that is exceeding the minimum page and you receive a cut command. The printer shall not feed to the end of the page and cut right after the last print.



In this example, only the minimum page length is honored and after the minimum length is exceeded the printer can cut at any location after the last print statement.

Implementation

To begin printing in variable continuous mode, we need to issue PrintNormal statements until the minimum page length is exceeded and the cut command is received.

This means we have to establish a hybrid. Using page mode and continuous mode, you will set up a requirement to cut at any location (other the end of the page), once the minimum page length is exceeded.



NOTES:

- This requirement is introduced due to a change in the original firmware behavior to the new minimum page length requirement.
- Variable mode is the default mode for the KR403.

When using variable mode, you need to also set a minimum page length in order to accomplish the desired effect. In this mode, the printer is feeding paper without length limitation (besides the minimum presenter length).

Test Application

This section provides steps and illustrations to prepare your keyboard to use additional languages and to launch and perform various operations using the OPOS Test Application.

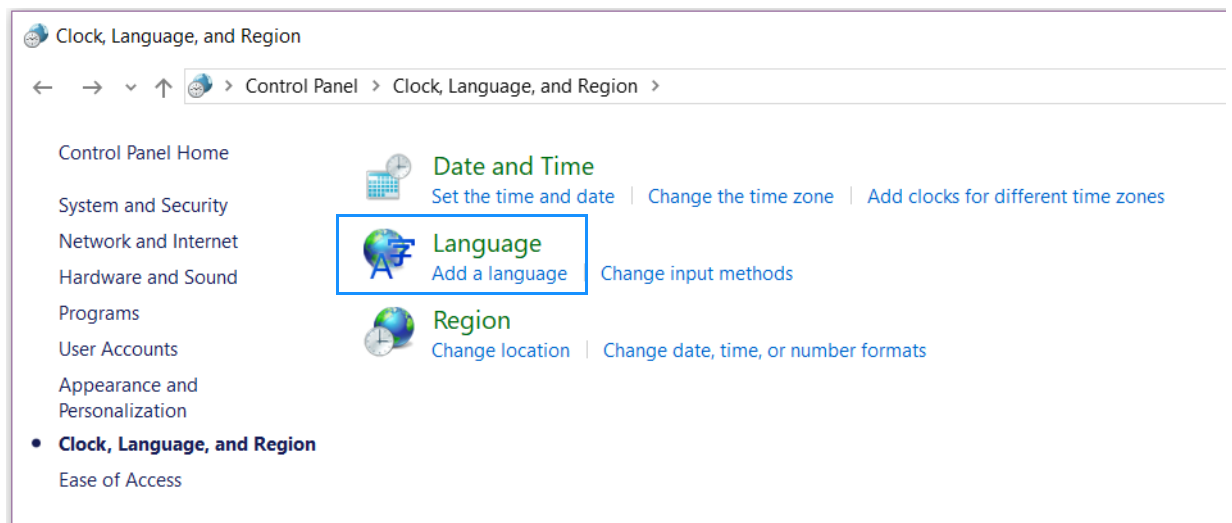
Preparing Windows and Printer for Unicode Printing

To print in other languages, it is necessary to load a new font into the printer and control the font within the OPOS driver. See [Adding a New Font in Device Manager on page 46](#) to add a new font. Before attempting to print, be sure that the new font is already loaded in the printer in the E: directory.

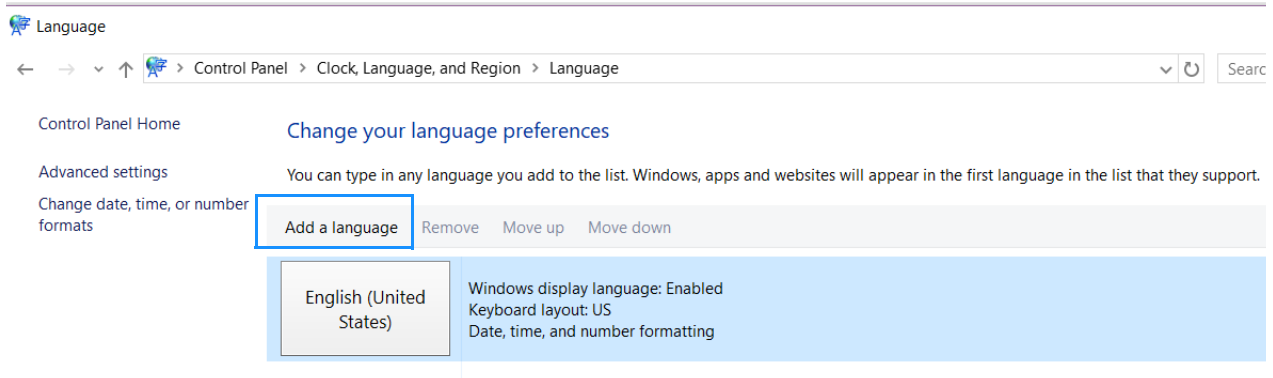


NOTE: To add language support to the PC, it may require Administrative rights. If you do not have Administrative rights, seek assistance from your IT organization.

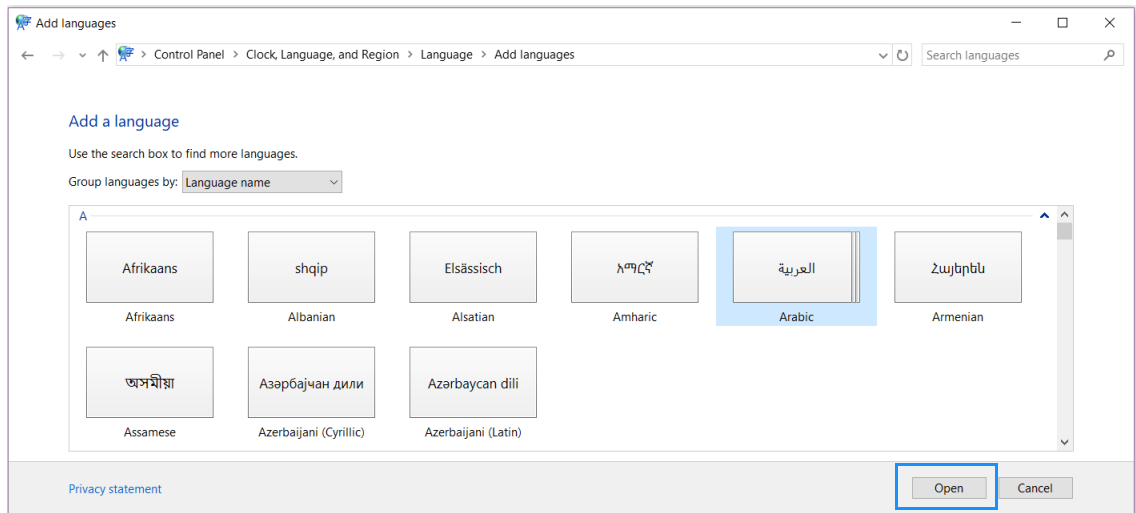
1. Navigate to the Control Panel and click **Clock, Language, and Region**.
2. Select **Add a language**.



3. Under Change your language preferences, click Add a Language.



4. Select the desired language from the menu and click **Open**.



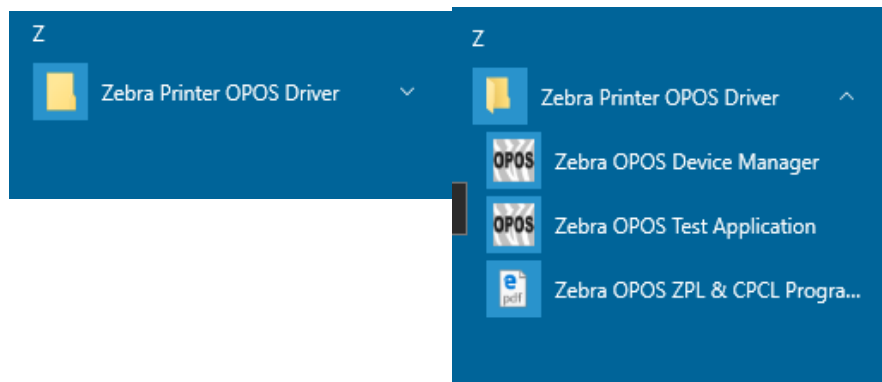
Zebra OPOS Test Application

Once the printer has been added using the Device Manager, you can test the driver with the Zebra OPOS Test Application utility.

1. From the Start menu, navigate to All Programs > Zebra Printer OPOS Driver > Zebra OPOS Test Application.



NOTE: In Windows 10 and Windows 11, you may need to run this application with Administrator rights.



Test Application

1. From the Printer Open section, choose a Printer Language from the Service Object Type drop-down menu.
2. Choose CPCL or ZPL.
3. Select a printer in the **Printer Logical Name** drop-down menu.

The defined printers in the Device Manager should be available.

The screenshot displays the 'Zebra OPOS Test Application' window. The interface is organized into several sections:

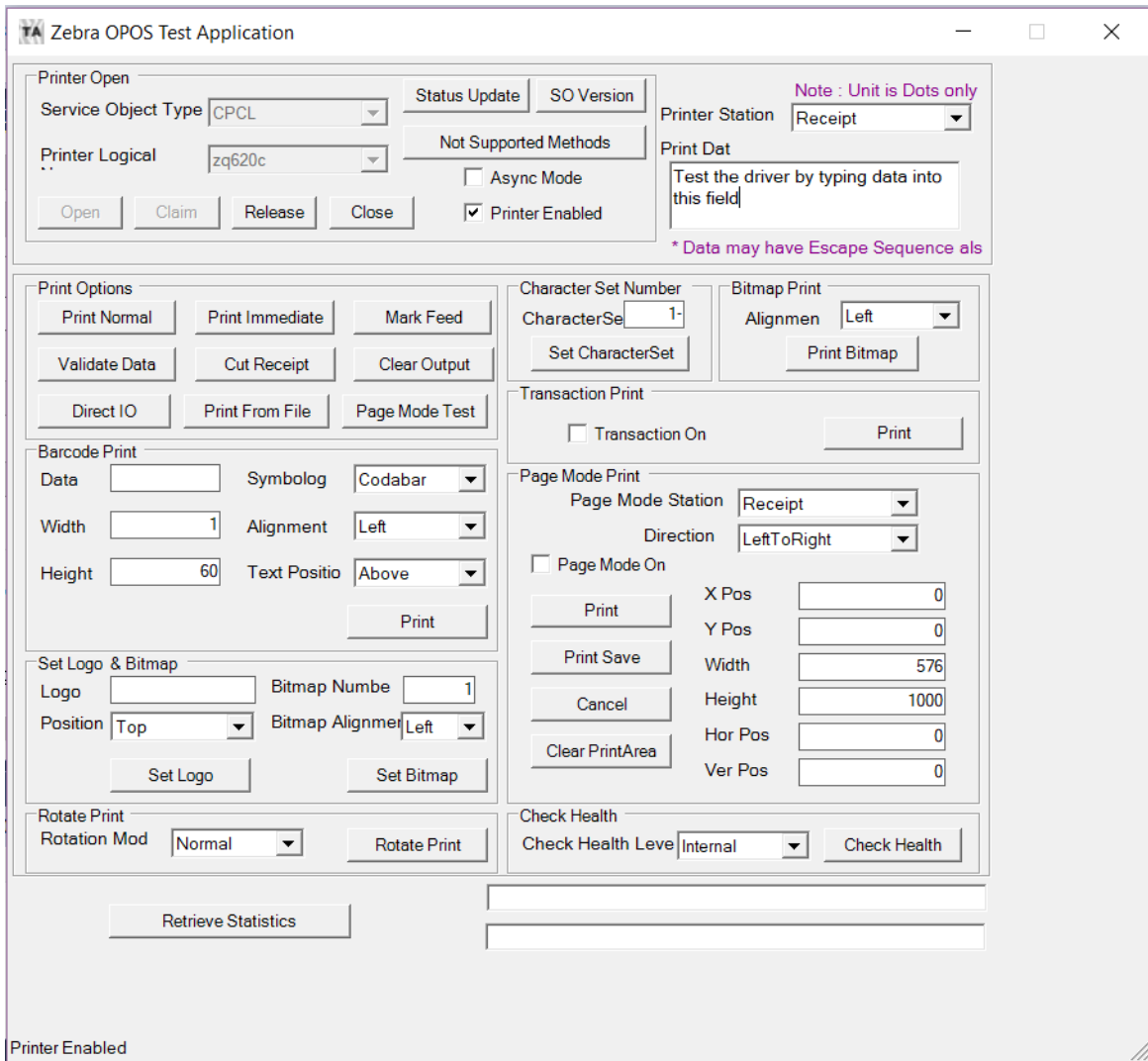
- Printer Open:** Includes 'Service Object Type' (set to CPCL), 'Printer Logical' (set to zq620c), 'Printer Station' (set to Receipt), and 'Print Dat' (set to 345678901234567890123). It also features buttons for 'Status Update', 'SO Version', 'Not Supported Methods', 'Open', 'Claim', 'Release', and 'Close'. A note states 'Note : Unit is Dots only' and a checkbox for 'Printer Enabled' is present.
- Print Options:** Contains buttons for 'Print Normal', 'Print Immediate', 'Mark Feed', 'Validate Data', 'Cut Receipt', 'Clear Output', 'Direct IO', 'Print From File', and 'Page Mode Test'.
- Barcode Print:** Includes fields for 'Data', 'Width' (set to 1), 'Height' (set to 60), and dropdowns for 'Symbolog' (set to Codabar), 'Alignment' (set to Left), and 'Text Positio' (set to Above). A 'Print' button is located below.
- Set Logo & Bitmap:** Includes fields for 'Logo', 'Position' (set to Top), 'Bitmap Numbe' (set to 1), and 'Bitmap Alignmen' (set to Left). Buttons for 'Set Logo' and 'Set Bitmap' are provided.
- Rotate Print:** Includes a 'Rotation Mod' dropdown (set to Normal) and a 'Rotate Print' button.
- Character Set Number:** Includes a 'CharacterSe' dropdown (set to 1) and a 'Set CharacterSet' button.
- Bitmap Print:** Includes a 'Alignmen' dropdown (set to Left) and a 'Print Bitmap' button.
- Transaction Print:** Includes a checkbox for 'Transaction On' and a 'Print' button.
- Page Mode Print:** Includes a 'Page Mode Station' dropdown (set to Receipt), a 'Direction' dropdown (set to LeftToRight), a checkbox for 'Page Mode On', and a 'Print' button. Below these are input fields for 'X Pos', 'Y Pos', 'Width' (set to 576), 'Height' (set to 1000), 'Hor Pos', and 'Ver Pos'. Buttons for 'Print Save', 'Cancel', and 'Clear PrintArea' are also present.
- Check Health:** Includes a 'Check Health Level' dropdown (set to Internal) and a 'Check Health' button.
- Retrieve Statistics:** A button located at the bottom left.

At the bottom left of the window, the text 'Printer Closed' is displayed.

Test Application

- To gain exclusive access to the device, click **Open**, click **Claim**, and then check the **Printer Enabled** in the **Printer Open** section.

You can now begin using the Test Application.



On the next pages, two methods to run a test print are described.

Test One

1. Type some data into the Print Data field.
2. Click **Print Normal** in the **Print Options** area, and then click **Mark Feed**.

The printer will print the contents from the Print Data field.

The screenshot shows the 'Zebra OPOS Test Application' window. It is divided into several functional areas:

- Printer Open:** Includes dropdowns for 'Service Object Type' (CPCL) and 'Printer Logical' (zq620c). It has buttons for 'Status Update', 'SO Version', 'Not Supported Methods', 'Open', 'Claim', 'Release', and 'Close'. A 'Printer Station' dropdown is set to 'Receipt'. A 'Print Data' field contains the text 'Test the driver by typing data into this field'. A note states 'Note : Unit is Dots only' and a warning says '* Data may have Escape Sequence als'. There are checkboxes for 'Async Mode' and 'Printer Enabled'.
- Print Options:** A grid of buttons including 'Print Normal', 'Print Immediate', 'Mark Feed', 'Validate Data', 'Cut Receipt', 'Clear Output', 'Direct IO', 'Print From File', and 'Page Mode Test'.
- Barcode Print:** Fields for 'Data', 'Width' (1), 'Height' (60), 'Symbolog' (Codabar), 'Alignment' (Left), and 'Text Positio' (Above). A 'Print' button is at the bottom.
- Set Logo & Bitmap:** Fields for 'Logo', 'Position' (Top), 'Bitmap Numbe' (1), and 'Bitmap Alignmen' (Left). Buttons for 'Set Logo' and 'Set Bitmap' are present.
- Transaction Print:** A checkbox for 'Transaction On' and a 'Print' button.
- Page Mode Print:** Fields for 'Page Mode Station' (Receipt) and 'Direction' (LeftToRight). A checkbox for 'Page Mode On' and a 'Print' button are included. Below are fields for 'X Pos', 'Y Pos', 'Width' (576), 'Height' (1000), 'Hor Pos', and 'Ver Pos', along with 'Print Save', 'Cancel', and 'Clear PrintArea' buttons.
- Rotate Print:** A 'Rotation Mod' dropdown (Normal) and a 'Rotate Print' button.
- Check Health:** A 'Check Health Leve' dropdown (Internal) and a 'Check Health' button.

At the bottom left, a status bar indicates 'Printer Enabled'. A 'Retrieve Statistics' button is located at the bottom center.

Test Two

1. Type some data into the **Data** field in the **Barcode Print** area.
2. Then, select **QRCode** from the drop-down menu next to **Symbology**.
3. Click **Print** in the Barcode area and **Mark Feed** in the **Print Options** area.

The printer will print the QR code and the data entered in the Data area.

The screenshot shows the Zebra OPOS Test Application window with the following sections and controls:

- Printer Open:** Service Object Type (CPCL), Printer Logical (zq620c), Status Update, SO Version, Printer Station (Receipt), Print Dat (Test the driver by typing data into this field), Async Mode (unchecked), Printer Enabled (checked).
- Print Options:** Print Normal, Print Immediate, Mark Feed, Validate Data, Cut Receipt, Clear Output, Direct IO, Print From File, Page Mode Test.
- Barcode Print:** Data (1234567890), Symbology (QRCode), Width (10), Alignment (Left), Height (10), Text Positio (None), Print button.
- Set Logo & Bitmap:** Logo, Bitmap Numbe (1), Position (Top), Bitmap Alignmer (Left), Set Logo, Set Bitmap.
- Rotate Print:** Rotation Mod (Normal), Rotate Print.
- Character Set Number:** CharacterSe (1-), Set CharacterSet.
- Bitmap Print:** Alignmen (Left), Print Bitmap.
- Transaction Print:** Transaction On (unchecked), Print.
- Page Mode Print:** Page Mode Station (Receipt), Direction (LeftToRight), Page Mode On (unchecked), Print, Print Save, Cancel, Clear PrintArea, X Pos (0), Y Pos (0), Width (576), Height (1000), Hor Pos (0), Ver Pos (0).
- Check Health:** Check Health Level (Internal), Check Health.
- Retrieve Statistics:** Button.

Printer Enabled

Printing Unicode with the Test Application

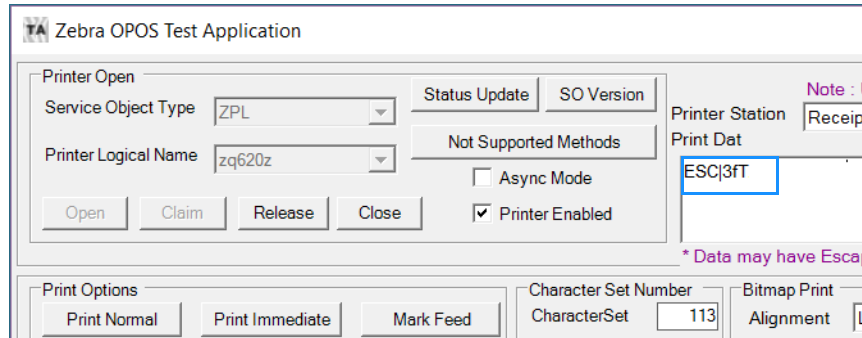
Before printing with the test application, please make sure that the font has been loaded in the printer and added in the Device Manager. (See [Adding a New Font in Device Manager on page 46.](#))

1. Open the Zebra OPOS Test Application, select the Service Object Type (ZPL or CPCL) and then the Printer Logical Name.



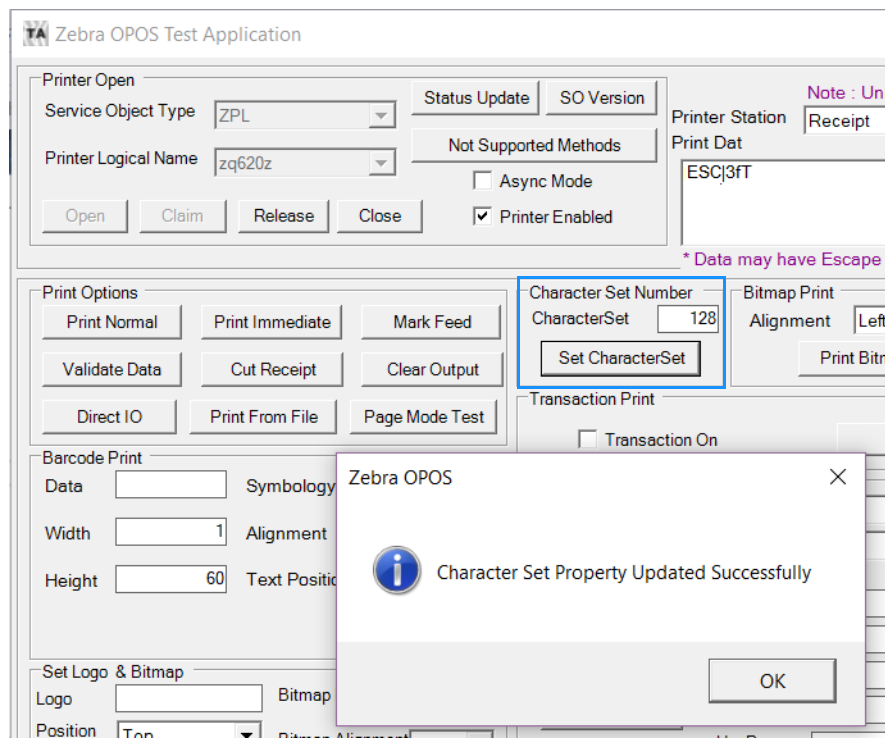
NOTE: In Windows 10 and Windows 11, you may need to run this application with Administrator rights.

1. Click **Open**, **Claim**, and check the **Printer Enabled** checkbox.



2. Select the new font by sending the correct OPOS one-shot command (example: ESC|3fT).
3. Type the one-shot command in the **Print Data** field and click **Print Normal**.
4. Change the Character Set value (Default is 113) by entering the correct Character Set value in the Character Set Number box, and then click the **Set CharacterSet** button below.

The user will get a message showing that the Character Set was updated.



ZPL Fonts and Bar Codes

This section provides information about different fonts (type faces) and bar codes that can be used with the printer.

Standard Printer Fonts

Most Zebra printers come standard with 15 bitmapped fonts and one scalable font, see [Figure 8](#). Additional downloadable bitmapped and scalable fonts are also available. Character size and density (how dark it appears) depend on the density of the printhead and the media used.

Figure 8 Examples of the Standard Printer Fonts

FONT A -- ABCDxyz 12345
FONT B -- ABCDXYZ 12345 UPPER CASE ONLY
FONT D -- ABCDwxyz 12345
FONT E -- (OCR-B) ABCDwxyz 12345
FONT F -- ABCDwxyz 12345
FONT G -- **AByz 12**
FONT H -- (OCR-A) UPPER CASE ONLY
zero — **FONT O** -- (Scaleable) ABCDwxyz 12345
FONT GS -- ® © ™ ® Accessed with the ^gs
FONT P -- ABCDwxyz 12345
FONT Q -- ABCDwxyz 12345
FONT R -- ABCDwxyz 12345
FONT S -- ABCDwxyz 12345
FONT T -- ABCDwxyz 12345
FONT U -- **ABCDwxyz 12345**
FONT V -- **ABCDwxyz 12345**

To use one of these fonts, you must either use the change alphanumeric default font command (^CF) or specify an alphanumeric field command (^A).

The standard Zebra character set is Code 850 for character values greater than 20 HEX. There are six HEX character values below 20 HEX that are also recognized. Figure 9 shows how these character values are printed.



NOTE: Unidentified characters should default to a space.

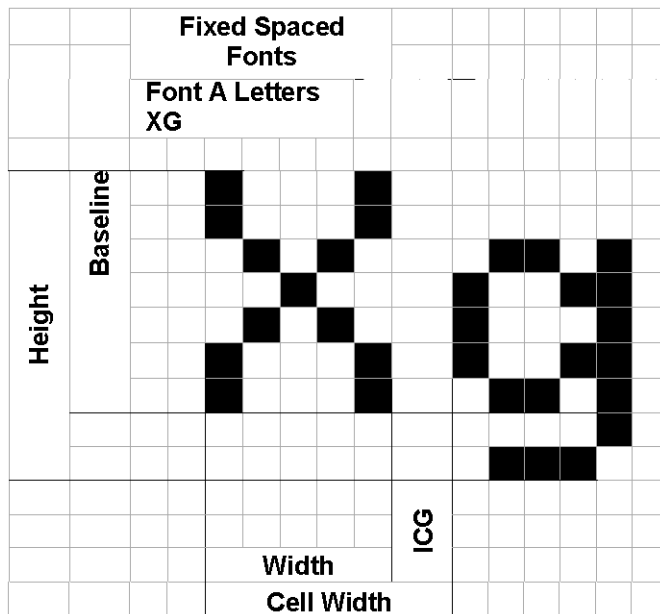
Figure 9 Recognized HEX Values below 20 HEX

A HEX	1a	will print a	0 (numeric)
A HEX	1b	will print a	⅓
A HEX	1c	will print a	⅔
A HEX	1d	will print a	U
A HEX	1e	will print a	ij
A HEX	1f	will print a	\

Proportional and Fixed Spacing

Proportional spacing is different than fixed spacing. In Table 5, the intercharacter gap (ICG), the space between characters, is constant for fonts A through H, which means that the spacing between all characters is the same. For example, the spacing between the letters MW is the same as between the letters IE.

Figure 10 Example of Fixed Space Fonts Proportion



The baseline is the imaginary line on which the bottom (base) of all characters (except any descenders) rest. The area between the baseline and the bottom of the matrix is used for any character “descenders.” Baseline numbers define where the baseline is located in relationship to the top of the matrix. For example, the baseline for font “E” is 23 dots down from the top of the matrix.

Table 5 Intercharacter Gap and Baseline Parameters

Font	H x W (in dots)	Type	Intercharacter Gap (in dots)	Baseline (in dots)
A	9 x 5	U-L-D	1	7
B	11 x 7	U	2	11
C,D	18 x 10	U-L-D	2	14
E	28 x 15	OCR-B	5	23
F	26 x 13	U-L-D	3	21
G	60 x 40	U-L-D	8	48
H	21 x 13	OCR-A	6	21
GS	24 x 24	SYMBOL	PROPORTIONAL	3 x HEIGHT/4
0	DEFAULT: 15 x 12		PROPORTIONAL	3 x HEIGHT/4

Scalable Versus Bitmapped Fonts

For scalable fonts, setting the height and width equally produces characters that appear the most balanced. Balanced characters are pleasing to the eye because actual height and width are approximately equal to each other. This is achieved through the use of a smooth-scaling algorithm in the printer.

For bitmapped fonts, this balancing is built into the font. In actuality, the height of a bitmap font is slightly larger than the width. Bitmap fonts are always at the maximum size of the character’s cell.

Scalable Fonts

All dot parameters used in the commands to create scalable fonts are translated into a point size because scalable fonts are measured in point sizes, not dots. To determine how many dots to enter to obtain a particular point size, use the following formula. The actual point size will be an approximate value.

$$\text{Dots} = \frac{(\text{Point size}) \times (\text{Dots per inch of printer})}{72}$$

- For printers using a 6 dot/mm printhead the “dots per inch of printer” value is 152.4
- For printers using a 8 dot/mm printhead the “dots per inch of printer” value is 203.2
- For printers using a 12 dot/mm printhead the “dots per inch of printer” value is 304.8
- For printers using a 24 dot/mm printhead the “dots per inch of printer” value is 609.6

The actual height and width of the character in dots will vary, depending on the font style and the particular character. Therefore, some characters will be smaller and some will be larger than the actual dot size requested. The baselines for all scalable fonts are calculated against the dot size of the cell. The baseline is 3/4 down from the top of the cell. For example, if the size of the cell is 80 dots, the baseline will be 60 dots (3/4) down from the top of the cell.

For more information concerning fonts and related commands, see `~DB` and `~DS` in the **Programming Guide (for ZPL II, ZBI 2, Set-Get-Do, Mirror, WML)**. You can download the latest copy of the manual from <http://www.zebra.com/manuals>.

Bitmapped Fonts

Internal bitmapped fonts can be magnified from 1 to 10 times their normal (default) size. The magnification factor is in whole numbers. Therefore, if the normal size of a bitmapped font is 9 dots high and 5 dots wide, a magnification factor of 3 would produce a character of 27 dots high and 15 dots wide. Height and width can be magnified independently.

Magnification Factor

The font commands contain parameters for entering the height and width of printed characters. The values are always entered in dots. When entering these values for bitmapped fonts, use the following formula:

$$\text{Base Height} \times \text{Magnification Factor} = \text{Height Parameter Value}$$

The same principle applies when calculating width.

Example:

Base height = 9 dots

Base width = 5 dots

To magnify a bitmapped character with the above specifics 3 times its size:

Height parameter = 27 [9 x 3]

Width parameter = 15 [5 x 3]

Changing Bitmapped Font Size

Alphanumeric field command (`^A`) parameters `h` and `w` control the magnification and, therefore, the ultimate size of the font. The parameter is specified in dots, but ZPL II actually uses an integer multiplier times the original height/width of the font. For example, if you specify

`^AD,54`

you get characters three times their normal size (54 dots high), but if you specify

`^AD,52`

you receive the same result, not characters 52 dots high.

Defining only the height or width of a bitmapped font forces the magnification to be proportional to the parameter defined. If neither is defined, the `^CF` height and width are used. For example, if the height is twice the standard height, the width will be twice the standard width.

Example

If a ^CF command, with height and width parameters defined, is used to set the first font, any ^A commands (to select a different font) that follow must have the height and width parameter filled in.

If this is not done, the newly selected font will be magnified using values for the ^CF height and width parameters. This is an example of what happens:

ZPL II CODE	GENERATED LABEL
<pre> ^XA^LL1800 ^FO50,50^CFD,26,10^FDZEBRA...^FS ^FO50,100^FD"Bar Code, Bar None"^FS ^FO50,200^AA^FDZEBRA...^FS ^FO50,250^FD"Bar Code, Bar None"^FS ^XZ </pre>	

Font Matrices

Type Key **U** = Uppercase, **L** = Lowercase, **D** = Descenders

Table 6 6 dot/mm Printhead

Font	Matrix	Type	Character Size			
	HxW (in dots)		HxW (in in.)	Char./in.	HxW (in mm)	Char. /mm
A	9 x 5	U-L-D	0.059 x 0.039	25.4	1.50 x 0.99	1.01
B	11 x 7	U	0.072 x 0.059	16.9	1.82 x 1.50	0.066
C, D	18 x 10	U-L-D	0.118 x 0.079	12.7	2.99 x 2.00	0.05
E	21 x 10	OCR-B	0.138 x 0.085	11.7	3.50 x 2.16	0.46
F	26 x 13	U-L-D	0.170 x 0.105	9.53	4.32 x 2.67	0.37
G	60 x 40	U-L-D	0.394 x 0.315	3.18	10.0 x 8.00	0.125
H	17 x 11	OCR-A	0.111 x 0.098	10.2	2.81 x 2.48	0.40
GS	24 x 24	SYMBOL	0.157 x 0.157	6.35	3.98 x 3.98	0.251
0	Default: 15 x 12					

Table 7 8 dot/mm (203 dpi) Printhead

Font	Matrix	Type	Character Size			
	HxW (in dots)		HxW (in in.)	Char./in.	HxW (in mm)	Char. /mm
A	9 X 5	U-L-D	0.044 x 0.030	33.3	1.12 x 0.76	1.31
B	11 X 7	U	0.054 x 0.044	22.7	1.37 x 1.12	0.89
C, D	18 X 10	U-L-D	0.089 x 0.059	16.9	2.26 x 1.12	0.66
E	28 x 15	OCR-B	0.138 x 0.098	10.2	3.50 x 2.49	0.40
F	26 x 13	U-L-D	0.128 x 0.079	12.7	3.25 x 2.00	0.50

Table 7 8 dot/mm (203 dpi) Printhead

Font	Matrix	Type	Character Size			
	HxW (in dots)		HxW (in in.)	Char./in.	HxW (in mm)	Char. /mm
G	60 x 40	U-L-D	0.295 x 0.197	4.2	7.49 x 5.00	0.167
H	21 x 13	OCR-A	0.103 x 0.093	10.8	2.61 x 2.36	0.423
GS	24 x 24	SYMBOL	0.118 x 0.118	8.5	2.99 x 2.99	0.334
P	20 x 18	U-L-D	0.098 x 0.089	N/A	2.50 x 2.25	N/A
Q	28 x 24	U-L-D	0.138 x 0.118	N/A	3.50 x 3.00	N/A
R	35 x 31	U-L-D	0.172 x 0.153	N/A	4.38 x 3.88	N/A
S	40 x 35	U-L-D	0.197 x 0.172	N/A	5.00 x 4.38	N/A
T	48 x 42	U-L-D	0.236 x 0.207	N/A	6.00 x 5.25	N/A
U	59 x 53	U-L-D	0.290 x 0.261	N/A	7.38 x 6.63	N/A
V	80 x 71	U-L-D	0.394 x 0.349	N/A	10.00 x 8.88	N/A
0	Default: 15 x 12	U-L-D	Scalable		Scalable	

Table 8 12 dot/mm (300 dpi) Printhead

Font	Matrix	Type	Character Size			
	HxW (in dots)		HxW (in in.)	Char./in.	HxW (in mm)	Char. /mm
A	9 X 5	U-L-D	0.030 x 0.020	50.8	0.75 x 0.50	2.02
B	11 X 7	U	0.036 x 0.030	33.8	0.91 x 0.75	1.32
C, D	18 X 10	U-L-D	0.059 x 0.040	25.4	1.50 x 1.00	1.00
E	42 x 20	OCR-B	0.138 x 0.085	23.4	1.75 x 1.08	0.92
F	26 x 13	U-L-D	0.085 x 0.053	19.06	2.16 x 1.34	0.74
G	60 x 40	U-L-D	0.197 x 0.158	6.36	5.00 x 4.00	0.25
H	34 x 22	OCR-A	0.111 x 0.098	10.20	2.81 x 2.48	0.40
GS	24 x 24	SYMBOL	0.079 x 0.079	12.70	1.99 x 1.99	0.52
P	20 x 18	U-L-D	0.067 x 0.060	N/A	1.69 x 1.52	N/A
Q	28 x 24	U-L-D	0.093 x 0.080	N/A	2.37 x 2.03	N/A
R	35 x 31	U-L-D	0.117 x 0.103	N/A	2.96 x 2.62	N/A
S	40 x 35	U-L-D	0.133 x 0.177	N/A	3.39 x 2.96	N/A
T	48 x 42	U-L-D	0.160 x 0.140	N/A	4.06 x 3.56	N/A
U	59 x 53	U-L-D	0.197 x 0.177	N/A	5.00 x 4.49	N/A
V	80 x 71	U-L-D	0.267 x 0.237	N/A	6.77 x 6.01	N/A
0	Default: 15 x 12	U-L-D	Scalable		Scalable	

Table 9 24 dot/mm (600 dpi) Printhead

Font	Matrix	Type	Character Size			
	HxW (in dots)		HxW (in in.)	Char./in.	HxW (in mm)	Char. /mm
A	9 X 5	U-L-D	0.015 x 0.010	100.00	0.38 x 0.25	4.00
B	11 X 7	U	0.018 x 0.015	66.66	0.46 x 0.38	2.60
C, D	18 X 10	U-L-D	0.030 x 0.020	50.00	0.77 x 0.51	2.0
E	42 x 20	OCR-B	0.137 x 0.087	11.54	3.47 x 2.20	0.45
F	26 x 13	U-L-D	0.043 x 0.027	37.5	1.10 x 0.68	1.50
G	60 x 40	U-L-D	0.100 x 0.080	12.50	2.54 x 2.04	0.50
H	34 x 22	OCR-A	0.100 x 0.093	10.71	2.54 x 2.37	0.42
GS	24 x 24	SYMBOL	0.040 x 0.040	25.00	1.02 x 1.02	1.00
P	20 x 18	U-L-D	0.067 x 0.060	N/A	1.69 x 1.52	N/A
Q	28 x 24	U-L-D	0.093 x 0.080	N/A	2.37 x 2.03	N/A
R	35 x 31	U-L-D	0.117 x 0.103	N/A	2.96 x 2.62	N/A
S	40 x 35	U-L-D	0.133 x 0.117	N/A	3.39 x 2.96	N/A
T	48 x 42	U-L-D	0.160 x 0.140	N/A	4.06 x 3.56	N/A
U	59 x 53	U-L-D	0.197 x 0.177	N/A	5.00 x 4.49	N/A
V	80 x 71	U-L-D	0.267 x 0.237	N/A	6.77 x 6.01	N/A
0	Default: 15 x 12	U-L-D	Scalable		Scalable	

Bar Codes

Every bar code contains data made up of a sequence of light spaces and dark bars that represent letters, numbers, or other graphic characters. The usable characters differ among the various kinds of bar codes. Each bar code section in the ZPL commands provides a table of applicable characters. Start and stop characters and check digits are used by many, but not all, bar codes. These will be indicated in the specific bar code explanations.

Zebra printers can print the following kinds of bar codes:

Bar code modulus “X” dimensions

- Picket fence (non-rotated) orientation:
 - 203 dpi = 0.0049 in. mil to 0.049 in.
 - 300 dpi = 0.0033 in. mil to 0.033 in.
- Ladder (rotated) orientation:
 - 203 dpi = 0.0049 in. mil to 0.049 in.
 - 300 dpi = 0.0039 in. mil to 0.039 in.

Two-dimensional bar codes

- Aztec
- Code 49
- Maxi Code
- TLC39
- PDF-417
- QR Code
- Codablock
- DataMatrix
- Micro-PDF417

Bar code ratios

- 2:1
- 7:3
- 5:2
- 3:1

Linear bar codes

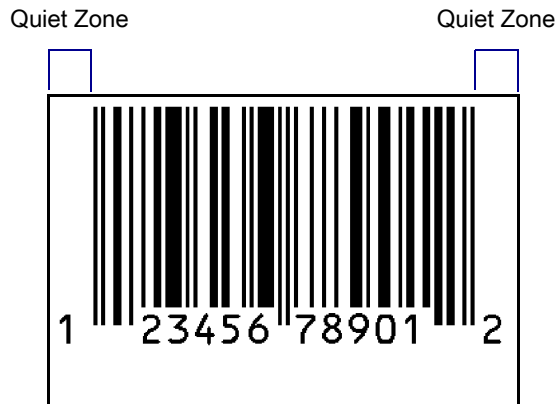
- Codabar
- Code 11
- Code 39
- Code 93
- Code 128 with subsets A/B C and UCC Case Codes
- ISBT-128
- UPC-A
- UPC-E
- EAN-8
- EAN-13
- UPC and EAN 2 or 5 digit extensions
- Planet Code
- Plessey
- Postnet
- Standard 2 of 5
- Industrial 2 of 5
- Interleaved 2 of 5
- LOGMARS
- MSI
- GS1 DataBar Omnidirectional

Basic Format for Bar Codes

The basic format for bar codes is quiet zone, start character, data, check digit, stop character, and quiet zone. Not all bar codes require each of these elements.

Every bar code requires a quiet zone. A quiet zone (sometimes called a “clear area”) is an area adjacent to the machine-readable symbols that ensure proper reading (decoding) of the symbols. No printing is permissible within this area. Preprinted characters, borders, and background color are acceptable if they are invisible to the reading device; these are used in some applications but restrict the type of reading device that can be used. The size of the quiet zone depends on the size of bar widths (usually 10 times the width of the narrow bar).

Figure 11 Quiet Zone in a Bar Code



Bar Code Field Instructions

To create a bar code, a bar code field command must be contained in the label format. [Table 10](#) shows the bar code field commands. The number in brackets denotes the print ratio. Each command produces a unique bar code.



IMPORTANT: (*) for Fixed Printing Ratio means that the ratio between the width of the bars in the code is a fixed standard and cannot be changed.

Table 10 Bar Code Field Commands

ZPL Command	Command Description	Ratio
^B0	Aztec Bar Code Parameters	[Fixed]
^B1	Code 11 (USD-8)	[2.0 - 3.0]
^B2	Interleaved 2 of 5	[2.0 - 3.0]
^B3	Code 39 (USD-3 and 3 of 9)	[2.0 - 3.0]
^B4	Code 49 (*)	[Fixed]
^B5	Planet Code Bar Code	[Fixed]
^B7	PDF417 (*)	[Fixed]
^B8	EAN-8 (*)	[Fixed]
^B9	UPC-E	[Fixed]
^BA	Code 93 (USS-93)(*)	[Fixed]
^BB	CODABLOCK A, E, F (*)	[Fixed]

Table 10 Bar Code Field Commands (Continued)

ZPL Command	Command Description	Ratio
^BC	Code 128 (USD-6) (*)	[Fixed]
^BD	UPS MaxiCode (*)	[Fixed]
^BE	EAN-13	[Fixed]
^BF	Micro-PDF417	[Fixed]
^BI	Industrial 2 of 5	[2.0 - 3.0]
^BJ	Standard 2 of 5	[2.0 - 3.0]
^BK	ANSI Codabar (USD-4 and 2 of 7)	[2.0 - 3.0]
^BL	LOGMARS	[2.0 - 3.0]
^BM	MSI	[2.0 - 3.0]
^BO	Aztec Bar Code Parameters	[Fixed]
^BP	Plessey	[2.0 - 3.0]
^BQ	QR Code (*)	[Fixed]
^BR	GS1 DataBar (formerly RSS)	[Fixed]
^BS	UPC/EAN Extensions (*)	[Fixed]
^BU	UPC-A (*)	[Fixed]
^BX	Data Matrix (*)	[Fixed]
^BZ	PostNet (*), USPS Intelligent Mail, and Planet bar codes	[Fixed]

Additionally, each bar code field command can be issued with a definition parameter string. The parameter string defines field rotation, height, and interpretation line status for all bar codes. For some bar codes, the parameter string also sets a check digit, start character, and/or stop character. Use the definition parameter string to command the printer to print bar codes of appropriate heights and densities that conform to the specifications of the application.

The use of the parameter string is optional because all parameters have default values. If the default values for all of the bar code parameters suit the application, then only the bar code command needs to be entered.

Parameters in bar code field commands are “position specific.” If a value (other than the default value) is manually entered for one parameter the ZPL II delimiter character (a comma) must be used to mark the position of the preceding parameters in the string.

To change just the third parameter, enter two commas and then the value for the third parameter. The default values will be automatically used for the first and second parameters.

Bar Code Command Groups

Bar code commands are organized into four groups. Each group represents a type of bar code. [Table 11](#) through [Table 14](#) identify the groups and the bar codes they contain:

Table 11 Numeric Only Bar Codes

ZPL Command	Command Description
^B0	Aztec Bar Code Parameters
^B1	Code 11
^B5	Planet Code Bar Code
^BI	Industrial 2 of 5
^BJ	Standard 2 of 5
^BK	ANSI Codabar (or NW-7)
^BM	MSI
^B0	Aztec Bar Code Parameters
^BP	Plessey
^BZ	PostNet (*), USPS Intelligent Mail, and Planet bar codes

Table 12 Retail Labeling Bar Codes

ZPL Command	Command Description
^B0	Aztec Bar Code Parameters
^B8	EAN-8
^B9	UPC-E
^BE	EAN-13
^B0	Aztec Bar Code Parameters
^BS	UPC/EAN extensions
^BU	UPC-A

Table 13 Alphanumeric Bar Codes

ZPL Command	Command Description
^B0	Aztec Bar Code Parameters
^B3	Code 39
^BA	Code 93
^BC	Code 128
^BL	LOGMARS
^B0	Aztec Bar Code Parameters

Table 14 Two-Dimensional Bar Codes

ZPL Command	Command Description
^B0	Aztec Bar Code Parameters
^B4	Code 49
^B7	PDF417
^BB	CODABLOCK
^BD	UPS MaxiCode
^BF	MicroPDF417
^BQ	QR Code
^B0	Aztec Bar Code Parameters
^BR	GS1 DataBar (formerly RSS)
^BT	TLC39
^BX	Data Matrix

