

# Link-OS



**ZEBRA**

## Release Notes

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## Publication Date

10 February, 2020

# Version Numbers and Printer Models

This document applies to all Link-OS printer models. Exceptions are noted as needed.

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For the printer models supported by the different firmware versions, see [Table 1 on page 4](#).

For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

**Table 1** Printer Firmware Versions

Printer Models	OS Branch
QLn220 QLn320 QLn420 QLn220 HC QLn320 HC	V68
ZT210 ZT220 ZT230	V72
iMZ220 iMZ320	V73
ZD500 ZD500R	V74
ZT410 ZT420	V75
ZQ510 ZQ520	V76
ZR338	V78
ZR628 ZR638	V79
ZT510 ZT610 ZT620	V80
ZQ310 ZQ320	V81
ZR318 ZR328	V82
ZD510	V83
ZD410D ZD420C ZD420D ZD420T ZD620D ZD620T	V84
ZQ610 ZQ620 ZQ630	V85

**Table 1** Printer Firmware Versions (Continued)

Printer Models	OS Branch
ZR658 ZR668	V86
ZD220 ZD230 ZD888	V89
ZT411 ZT421	V92

# Link-OS v6.2 Release Notes

This document applies to all listed Link-OS printer models. Exceptions are noted as needed.

For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

## Link-OS 6.2

**Release Date: 10 February 2020**

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD500 ZD500R	V74	20.21Z
ZT410 ZT420	V75	20.21Z
ZQ510 ZQ520	V76	20.21Z
ZT510 ZT610 ZT620	V80	20.21Z
ZQ310 ZQ320	V81	20.21Z
ZR318 ZR328	V82	20.21Z
ZD510	V83	20.21Z

Printer Models	OS Branch	Build
ZD410D ZD420C ZD420D ZD420T ZD620D ZD620T	V84	20.21Z
ZQ610 ZQ620 ZQ630	V85	20.21Z
ZR658 ZR668	V86	20.21Z
ZD220 ZD230 ZD888	V89	21.04Z
ZT411 ZT421	V92	21.04Z

## Changes

Sleep Mode has been disabled in the following models: ZD410D, ZD420C, ZD420D, ZD420T, ZD620D, and ZD620T in order to prevent the printer from continuing to process a print job after it has begun entering sleep mode. Sleep mode will be re-enabled in a future Printer OS release.

## Frequently Asked Questions:

1. “Why should I upgrade to v6.2?”

Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.2 contains improvements, such as new Supplies Use Visibility features, but also fixes that could otherwise positively impact your business. We encourage updating to the latest version to take advantage of the new features and fixes.

2. “How do I get Link-OS v6.2?”

Link-OS v6.2 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT410” or “ZQ620”).

<http://www.zebra.com/support>

You can then use one of our utilities, such as the Z-Downloader, to update your printer. For details on using Z-Downloader, go to:

<http://www.zebra.com/us/en/support-downloads/knowledge-articles/using-the-z-downloader-utility-available-from-the-zebra-website.html>

3. “What does Link-OS v6.2 cost?”

Link-OS v6.2 is a free upgrade.

4. “As of Link-OS v5.1, Industrial and Desktop printers can’t be downgraded to versions earlier than v5.1. Why is that?”

To maintain continuity in Zebra’s manufacturing process and to address global constraints on flash memory availability, a new set of memory components may be used as new printers are manufactured. These new memory components are future compatible with Link-OS v5.1 and later printer Operating System releases but will not be back-compatible with earlier Link-OS versions.

To ensure compatibility between the flash memory and printers operating systems, Industrial and Desktop printers that are already running v5.1 or later will not support downgrading to printer’s OS versions earlier than v5.1.

When and if an attempt is made to downgrade from v5.1 to an earlier build, the older build will not be loaded. The printer will not accept the older operating system and will return to using the v5.1 or later version currently loaded on the printer. The printer will provide feedback that the download is not supported, using one of the following methods:

- On printers with a screen, the message “Download Not Supported” will be displayed. In addition, the LED's on the printer will behave in the following way – the status LED will turn solid red. The other 4 LEDs will be cycled on 1 at a time, changing the "on" LED every second. The exception to this is the ZD500 series printer. On that unit the Status LED will turn red.
- On printers with no screen, the status LED will turn solid red. The other 4 LEDs will be cycled on 1 at a time, changing the "on" LED every second.

## Issues Corrected

1. JSON handling has been improved so that repeated requests to the printer via BTLE do not hold up communications.
2. Sending larger files (larger than 20 MB) over the Bluetooth Classic connection has been optimized to ensure all data is sent.
3. Bluetooth Low Energy communication with iOS devices improved to more reliably handle reconnect events
4. Bluetooth version number is now being reported correctly

## Upcoming Changes

Zebra is announcing:

- SHA-1 support will be removed in the future “Version 7” of the Link-OS Printer OS. This step is being taken to enhance product security. SHA-1 is still supported in Link-OS v6.0. It will be removed in Link-OS v7.0 and beyond.
- The rfid.adaptive\_antenna command will be removed in the future “Version 7” of the Link-OS Printer OS.



# Link-OS v6.1 Release Notes

This document applies to all listed Link-OS printer models. Exceptions are noted as needed.

For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

## Link-OS 6.1

**Release Date: 8 November 2019**

Printer Models	OS Branch	Build
ZT210 ZT220 ZT230	V72	20.20Z
ZD500 ZD500R	V74	20.20Z
ZT410 ZT420	V75	20.20Z
ZQ510 ZQ520	V76	20.20Z
ZT510 ZT610 ZT620	V80	20.20Z
ZQ310 ZQ320	V81	20.20Z
ZR318 ZR328	V82	20.20Z
ZD510	V83	20.20Z

Printer Models	OS Branch	Build
ZD410D ZD420C ZD420D ZD420T ZD620D ZD620T	V84	20.20Z
ZQ610 ZQ620 ZQ630	V85	20.20Z
ZR658 ZR668	V86	20.20Z
ZD220 ZD230 ZD888	V89	21.03Z
ZT411 ZT421	V92	21.03Z

## Changes:

### Summary:

- Improved ease of use for the Tap/Pair and Scan/Pair apps when using Bluetooth Security Mode 1.
- Selected Simple Network Management Protocol (SNMP) responses have been updated.
- New Supplies Use Visibility features have been added.

### Details:

#### Improved ease of use for the Tap/Pair and Scan/Pair apps when using Bluetooth Security Mode 1

When “bluetooth.minimum\_security\_mode” is set to “1”, the printer will unconditionally enable Bluetooth pairing. This allows easier use of the Tap/Pair and Scan/Pair apps when the printer is configured for Bluetooth Security Mode 1.

#### Selected Simple Network Management Protocol (SNMP) responses have been updated.

- .1.3.6.1.2.1.1.1.0 – **sysDescr** – the response has changed to this structure:  
“company name product name active print server”  
Example: “Zebra Technologies ZD510-300dpi / internal wired”  
Previous response: name of the active print server
- .1.3.6.1.2.1.1.5.0 – **sysName** – the response has changed to this structure:  
“Product name”  
Example: “ZD510”  
Previous response: Product Serial Number
- .1.3.6.1.2.1.25.3.2.1.3 – **hrDeviceDescr** – the response has changed to this structure:  
“Product name model name”  
Example: “Zebra Technologies ZD510”  
Previous response: “Zebra Printer”

#### New Supplies Use Visibility features have been added.

- A new “**zbrOdometerNetRibbonUse**” OID has been added: .1.3.6.1.4.1.10642.3.1.18.  
This tracks the total net length of ribbon that has moved through the printer, with backup movement compensated for.
- A new “**odometer.net\_ribbon\_length**” SGD command has been added.  
This tracks the total net length of ribbon that has moved through the printer, with backup movement compensated for.
- A new “**zbrOdometerNetMediaUse**” OID has been added: .1.3.6.1.4.1.10642.3.1.19.  
This tracks the total net length of media that has moved through the printer, with backup movement compensated for.
- A new “**odometer.net\_media\_length**” SGD command has been added.  
This tracks the total net length of media that has moved through the printer, with backup movement compensated for.

- A new “**zbrSuppliesMediaCartTable**” SNMP table has been added: .1.3.6.1.4.1.10642.48.1.3  
This tracks data on the last 100 media cartridges that have been used in the printer. Data in the table includes:
  - An index value
  - The number of times the cartridge has been installed
  - If a media cartridge is installed or not
  - The part number for the cartridge
  - The serial number for the cartridge
  - The total length of the media in the cartridge
  - The width of the media in the cartridge
  - The print speed used with the cartridge
  - The darkness level used with the cartridge
  - The total number of labels in a new cartridge
  - The total number of labels remaining in the cartridge
- A new “**zbrSuppliesRibbonCartTable**” SNMP table has been added: .1.3.6.1.4.1.10642.48.2.3  
This tracks data on the last 100 ribbon cartridges that have been used in the printer. Data in the table includes:
  - An index value
  - The number of times the cartridge has been installed
  - The part number for the cartridge
  - The serial number for the cartridge
  - The type of ribbon in the cartridge
  - The total length of the ribbon in the cartridge
  - The width of the ribbon in the cartridge
  - The total length of ribbon in a new cartridge
  - The total number of labels remaining in the cartridge
- A new “**zbrSuppliesMediaRollTable**” SNMP table has been added at .1.3.6.1.4.1.10642.48.1.4  
This tracks data on the last 100 media calibration length events that occurred on the printer. Data in the table includes:
  - An index value
  - If a media roll is installed or not (future use)
  - The part number for the media (future use)
  - The serial number for the media (future use)
  - The calibrated length of the currently loaded media
  - The width of the media (future use)
  - The print speed used with the media (future use)
  - The darkness level used with the media (future use)
  - The total number of labels on a new roll (future use)

- The number of labels remaining on the roll (future use)
- A new “zbrTrackedAlertsTable” SNMP table has been added at .1.3.6.1.4.1.10642.10.31  
This tracks data on a specific set of the last 50 alert events. Data in the table includes:
  - An index value
  - The Alert Severity
  - The Alert “Training Level”, which identifies the training level needed to address the alert
  - The Alert Group, which identifies the printer subsystem the Alert happens within.
  - The value of the sysUpTime (.1.3.6.1.2.1.1.3.0) when the Alert occurred
  - The Alert Code, which can include:
    - ribbon-out
    - head-too-hot
    - head-under-temp
    - head-open
    - power-supply-over-temp
    - motor-over-temp
    - ribbon-in
    - rewind-fault
    - cutter-jammed
    - printer-paused
    - head-element-bad
    - basic-runtime
    - basic-forced
    - power-on
    - battery-low
    - rfid-error
    - cold-start
    - ribbon-auth-error
  - **NOTE:** The zbrTrackedAlertsTable, zbrSuppliesMediaRollTable, zbrSuppliesMediaCartTable, zbrSuppliesRibbonCartTable contents will be deleted when the printer Decommissioning feature is used.
  - **NOTE:** The Zebra SNMP Management Information Base (MIB) file contains more details. It can be downloaded from zebra.com at <https://www.zebra.com/us/en/support-downloads.html>



### Other Changes:

- The Link-OS version has been updated to v6.1
- The V68, V73, V78 and V79 builds are deprecated, they are no longer being updated.

## Frequently Asked Questions:

1. “Why should I upgrade to v6.1?”

Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.1 contains both improvements, such as new Supplies Use Visibility features, but also fixes that could otherwise positively impact your business. We encourage updating to the latest version to take advantage of the new features and fixes.

2. “How do I get Link-OS v6.1?”

Link-OS v6.1 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT230” or “QLn320”).

<http://www.zebra.com/support>

You can then use one of our utilities, such as the Z-Downloader, to update your printer. For details on using Z-Downloader, go to:

<http://www.zebra.com/us/en/support-downloads/knowledge-articles/using-the-z-downloader-utility-available-from-the-zebra-website.html>

3. “What does Link-OS v6.1 cost?”

Link-OS v6.1 is a free upgrade.

4. “As of Link-OS v5.1, Industrial and Desktop printers can’t be downgraded to versions earlier than v.5.1. Why is that?”

To maintain continuity in Zebra’s manufacturing process and to address global constraints on flash memory availability, a new set of memory components may be used as new printers are manufactured. These new memory components are future compatible with Link-OS v5.1 and later printer Operating System releases but will not be back-compatible with earlier Link-OS versions.

To ensure compatibility between the flash memory and printers operating systems, Industrial and Desktop printers that are already running v5.1 or later will not support downgrading to printer’s OS versions earlier than v5.1.

When and if an attempt is made to downgrade from v5.1 to an earlier build, the older build will not be loaded. The printer will not accept the older operating system and will return to using the v5.1 or later version currently loaded on the printer. The printer will provide feedback that the download is not supported, using one of the following methods:

- On printers with a screen, the message “Download Not Supported” will be displayed. In addition, the LED’s on the printer will behave in the following way – the status LED will turn solid red. The other 4 LEDs will be cycled on 1 at a time, changing the “on” LED every second. The exception to this is the ZD500 series printer. On that unit the Status LED will turn red.
- On printers with no screen, the status LED will turn solid red. The other 4 LEDs will be cycled on 1 at a time, changing the “on” LED every second.

## Issues Corrected:

- An issue with re-establishing a Bluetooth connection to an iOS device after the printer has been power cycled has been corrected.
- A printer in sleep mode and connected to a Windows or OSX system via USB will now correctly “wake up” when the Windows or OSX system wakes up.
- An Aztec code with no data will now not print and not otherwise impact printer responses.
- The German translation for “Label Length Cal” has been translated to “Etikettenlängenkal”.

## Security Related Items:

- CVE-2019-9506 – also known as the Bluetooth Encryption Key Size Validation issue has been addressed. See the following link for more details:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-security-alerts.html>

## Upcoming Changes:

Zebra is announcing:

- SHA-1 support will be removed in the future “Version 7” of the Link-OS Printer OS. This step is being taken to enhance product security. SHA-1 is still supported in Link-OS v6.0. It will be removed in Link-OS v7.0 and beyond.
- The `rfid.adaptive_antenna` command will be removed in the future “Version 7” of the Link-OS Printer OS.

# Link-OS v6.0 Release Notes

This document applies to all listed Link-OS printer models. Exceptions are noted as needed.

For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

## Link-OS 6.0

**Release Date: 28 June 2019**

Printer Models	OS Branch	Build
ZT210 ZT220 ZT230	V72	.18
ZD500 ZD500R	V74	.18
ZT410 ZT420	V75	.18
ZQ510 ZQ520	V76	.18
ZT510 ZT610 ZT620	V80	.18
ZQ310 ZQ320	V81	.18
ZR318 ZR328	V82	.18
ZD510	V83	.18

Printer Models	OS Branch	Build
ZD410D ZD420C ZD420D ZD420T	V84	.18
ZD620D ZD620T		.18
ZQ610 ZQ620 ZQ630	V85	.19
ZR658 ZR668	V86	.18
ZD220 ZD230 ZD888	V89	.01
ZT411 ZT421	V92	.18
		.18

## Changes:

The OS now supports several new **PrintSecure v2 features**. See the Printer Administration Guide for additional details on using these new features:

- **Bluetooth Discovery and Pairing Mode:** The `bluetooth.discoverable` function is now off by default.
  - Bluetooth Discovery and Pairing Mode can be activated by holding the FEED button on the printer for 5 seconds.
  - Specifically, on the ZD220, ZD230, and ZD888 models, the 4 flash LED sequence places the printer into Bluetooth Pairing Mode.
  - Specifically, on the ZD510 model, the 5 flash LED sequence places the printer into Bluetooth Pairing Mode.

Upon entering Bluetooth Pairing Mode, the printer will provide feedback that the printer is in Pairing Mode using one of these methods:

- On printers with a “Bluetooth” screen icon or Bluetooth LED, the printer shall flash the “Bluetooth” screen icon or Bluetooth LED on and off every second while in pairing mode
- On printers without a “Bluetooth” screen icon or Bluetooth LED, the printer shall flash the “Data” icon or Data LED on and off every second while in pairing mode



**NOTE:** In any Bluetooth Security Mode, pairing will require placing the printer into the Discovery and Pairing Modes by pressing and holding the FEED key, as described above. This applies in all use cases and scenarios. (Added 8 November 2019.)



**NOTE:** Users can disable the ability to enable Bluetooth discovery and Pairing Mode by setting `bluetooth.enable` to “off”. This will turn off the ability to Discover and Pair with the printer.

```
! U1 setvar "bluetooth.enable" "off"
```

- **WLAN ESSID:** The default ESSID "125" setting has been removed. The new default is an empty string. The Zebra Printer Setup Utility, available for Windows, Android or iOS can be used to set the command. See the Printer Administration Guide for details.



**NOTE:** The "wlan.essid" command can also be used to configure the command :

```
! U1 setvar "wlan.essid" "Your ESSID"
```

- **Automated WLAN certificate Management:** This feature, when used with the Printer Profile Manager Enterprise server software, will automate WLAN certificate updating, keeping track of certificate expiration dates, generating new certificate signing requests, getting them signed by the users Certificate Authority and placing them on the printer prior to the existing certificate expiring. See the Printer Administration Guide for details.
- **Protected Mode:** This feature allows the user to place the printer into a mode where a specific set of settings cannot be changed unless a user defined password is sent to the printer. We recommend consulting the Printer Administration Guide for details on using this feature.
- **OS Download Blocking:** This feature allows the user to place the printer in a mode where the printer's OS cannot be changed. We recommend consulting the Printer Administration Guide for details on using this feature.



- **Decommissioning Mode:** This feature allows the user to return the printer to a factory-built state, removing user files from the printer's memory and defaulting all settings. Optionally, the user can choose to have the printer write over its Flash memory up to three times. We recommend consulting the Printer Administration Guide for details on using this feature.



**NOTE:** This command is not the same as defaulting the printer. Using it will remove files from the printer's memory, including fonts, graphics and certificates.

### Other Changes:

- The Link-OS version has been updated to v6.0
- The OpenSSL library has been updated to version 1.0.2
- Support for the ZQ630 has been added
- Support for the ZD220, ZD230, and ZD888 has been added
- Support for the ZT411 and ZT420 has been added
- The ~HS, ^HZ and device.host\_status commands will no longer report the printers pin code as set by the ^KP command. Instead the command will always return 0000
- Bluetooth Low Energy support on the Bluetooth only ZQ510/ZQ520 and ZT600 printers has been removed.
- All support for the WEP 40 bit and WEP 128 bit WLAN securities has been removed.
- The telnet menu and support for port 23 have been removed.
- The Remote-Auto-Connect feature has been removed.
- The OS now supports the Color Touch Display option on the ZT600 printer
- Several other new SGD commands have been created, see the Programming Guide for details.
- The default for the command "rfid.antenna\_sweep" has been changed to "off"
- Thermal Transfer Mode only mode on the ZD420C has been added.
- Installing a 600 dpi printhead into a ZT500 or ZT600 that was manufactured as 200 dpi or 300 dpi unit is no longer supported.
- The V68, V73, V78 and V79 builds are deprecated, they are no longer being updated.
- Some Printer OS releases are being announced prior to the release of the printer, since those new printers will release initially running Link-OS v6.

## Frequently Asked Questions:

1. “Why should I upgrade to v6.0?”

Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.0 contains both improvements, such as new PrintSecure features, but also fixes that could otherwise positively impact your business. We encourage updating to the latest version to take advantage of the new features and fixes.

2. “How do I get Link-OS v6.0?”

Link-OS v6.0 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT230” or “QLn320”).

<http://www.zebra.com/support>

You can then use one of our utilities, such as the Z-Downloader, to update your printer. For details on using Z-Downloader, go to:

<http://www.zebra.com/us/en/support-downloads/knowledge-articles/using-the-z-downloader-utility-available-from-the-zebra-website.html>

3. “What does Link-OS v6.0 cost?”

Link-OS v6.0 is a free upgrade.

4. “As of Link-OS v5.1, Industrial and Desktop printers can’t be downgraded to versions earlier than v5.1. Why is that?”

To maintain continuity in Zebra’s manufacturing process and to address global constraints on flash memory availability, a new set of memory components may be used as new printers are manufactured. These new memory components are future compatible with Link-OS v5.1 and later printer Operating System releases but will not be back-compatible with earlier Link-OS versions.

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When and if an attempt is made to downgrade from v5.1 to an earlier build, the older build will not be loaded. The printer will not accept the older operating system and will return to using the v5.1 or later version currently loaded on the printer. The printer will provide feedback that the download is not supported, using one of the following methods:

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- On printers with no screen, the status LED will turn solid red. The other four LEDs will be cycled on one at a time, changing the “on” LED every second.

## Issues Corrected:

1. The ZQ500 battery eliminator feature has been enhanced to better handle printing thick lines on the label.
2. Issue fixed wherein LPD port 515 would stop responding.
3. The EMAIL (EML) port in ZBI programs will now function correctly.
4. RFID encoding issue with getting voids when reading certain data from the RFID tag. This included using a number 2 and 9 at end of an encoded string
5. RFID labels will now be voided when a incorrectly formatted ^RU command is used.
6. The EPL AutoFR feature has been enhanced to better handle variable data that could appear as if it was an EPL command
7. Support for nested "ifs" in WML has been corrected
8. Lower case characters are now allowed in the Change Caret command (^CC)
9. The EPL Q command setting and Black Mark offset setting will now be properly retained during power up if the printer was in Mark mode when it powered down.
10. Media sensor calibration values on Mobile printers will be properly saved across a default and power cycle
11. The Japanese translation for the word About on the ZT410 has been corrected.
12. The SNMP Pause Alert will no longer be sent twice when the Pause button is pressed
13. Storing the printer's configuration report to the E drive has been corrected so that the file that is created contains the correct content.
14. File names on the USB drive are now restricted to use only ASCII characters, not including these characters \* , / ? \ space (del)
15. SFTP support for Mirror now does not attempt to use "keyboard-interactive" authentication mode when connecting to the FTP server
16. The networking system now supports an infinite DHCP address lease
17. Issue where the printer would not reconnect via Bluetooth with a host system after a disconnect event has been corrected
18. Sleep mode on the ZQ600 has been improved to avoid the printer not properly entering sleep mode when the buttons on the front panel are repeatedly pressed
19. An issue wherein the Bluetooth connection can drop while printing has been corrected, an issue seen when handling larger formats, such as those using graphics
20. Bluetooth connectivity improved to better handle connection and disconnection events
21. Bluetooth pairing when using Android Nougat has been improved
22. Bluetooth pairing on the ZQ600 is now operating correctly.
23. Print quality on the ZQ600 where darkness did not match print quality on prior models has been improved. Addressed in both legacy and non-legacy print modes.
24. The Applicator Mode End Print signal will now be active when:
  - a. The media moves backwards to reach a program position (^RS, Bxx)
  - b. Performing an RFID operation (^RS)
  - c. Both forward movement and programming (^RSFxx) are happening
25. The deactivation of the Void Signal and End Print Signal in Applicator Mode have been synchronized.

26. The Data Ready and Service Request signaling on the ZT600 in Applicator Mode has been altered to duplicate how they operated on the Xi4 products
27. An issue with re-establishing a connection when closing and opening a socket connection from within a ZBI program has been corrected.
28. ZBI handling of TCP connection close events has been improved
29. ZBI performance and throughput has been enhanced
30. The ZT4x0 cover light now retains its setting after the printer is turned off.
31. 802.11r abbreviated handshakes when roaming are now supported.
32. The Japanese translation of the text "About" has been corrected on front panels.
33. The German translation of the front panel message "Battery Low" has been corrected.
34. Incorrect data in the Zebra MIB has been corrected.
35. The HTTP server now correctly closes connections in all cases.
36. Association request packets for used in 802.11r are now correctly formatted.
37. The ZD510 now retains data from an ejected media cartridge until a new cartridge is inserted, allowing data about the previous cartridge to be read.

### Upcoming Changes:

Zebra is announcing:

- SHA-1 support will be removed in the future "Version 7" of the Link-OS Printer OS. This step is being taken to enhance product security. SHA-1 is still supported in Link-OS v6.0. It will be removed in Link-OS v7.0 and beyond.
- The rfid.adaptive\_antenna command will be removed in the future "Version 7" of the Link-OS Printer OS.

# Link-OS v5.x Release Notes

This document applies to all Link-OS printer models. Exceptions are noted as needed.

For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Version Number: V85.20.16 (Based on Link-OS v5.2)

- Version number V85.20.16 for the ZQ630 & ZQ630R models

**Release Date: 8 April 2019**

### Changes

Initial release for the ZQ630 & ZQ630R models.

## Build Number: 20.16Z

- Build number V81.20.16Z for the ZQ310 & ZQ320 models
- Build number V82.20.16Z for the ZR318/ZR328 models

**Release Date: 15 January 2019**

### Changes

The Link-OS version has been updated to v5.3.

### Issues Corrected

The ZQ300 battery management system has been updated. The reason for this change is that it may not be possible to charge a battery that has been drained significantly below the operation level. This can happen when the battery has not been charged for a significant time duration. This release adds the capability of charging batteries that have been discharged significantly below the operational level.

## Build Number: 20.15Z

**Release Date: 12 October 2018**

### Changes

- The Link-OS version has been updated to v5.2.
- The Link-OS build number appears on the printer's front panel.
- The build number (vxx.20.15z) can be viewed by pressing the ABOUT button on the main screen.
- Support for the 802.11G radio has been removed.
- The ThingMagic RFID system has removed support for the Korea 917300 tag channel.
- The ThingMagic RFID system does not support Morocco in region 8.
- Support for WLAN Ad Hoc mode has been removed, due to a change in the underlying radio's software.

### Frequently Asked Questions

1. "Why should I upgrade to v5.2?"

Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 5.2 contains improvements (such as enhanced WLAN roaming) and fixes that could otherwise impact your business. We encourage updating to the latest version to take advantage of the new features and fixes.

2. "How do I get Link-OS v5.2?"

Link-OS v5 can be downloaded from the Zebra web site by using the link below and entering your printer's model name (such as "ZT230" or "QLn320").

<http://www.zebra.com/support>

You can then use one of our utilities, such as the Z-Downloader, to update your printer. For details on using Z-Downloader, go to:

<http://www.zebra.com/us/en/support-downloads/knowledge-articles/using-the-z-downloader-utility-available-from-the-zebra-website.html>

3. "What does Link-OS v5.2 cost?"

Link-OS V5.2 is a free upgrade.

4. "As of Link-OS v5.1, Industrial and Desktop printers can't be downgraded to versions earlier than v.5.1. Why is that?"

To maintain continuity in Zebra's manufacturing process and to address global constraints on flash memory availability, a new set of memory components may be used as new printers are manufactured. These new memory components are future compatible with Link-OS v5.1 and later printer Operating System releases but will not be backward-compatible with earlier Link-OS versions.

To ensure compatibility between the flash memory and printers operating systems, Industrial and Desktop printers that are already running v5.1 or later will not support downgrading to printer OS versions earlier than v5.1.

When and if an attempt is made to downgrade from v5.1 to an earlier build, the older build will not be loaded. The printer will not accept the older operating system and will return to using the v5.1 or later version currently loaded on the printer. The printer will provide feedback that the download is not supported, using one of the following methods:

- On printers with a display screen, the message “Download Not Supported” will be displayed.
- The lights on the printer will behave in the following way – the Status light will turn solid red. The other lights will be cycled on one at a time, changing the “on” light every second. (Exception: on the ZD500 series printer, only the Status light will turn solid red.)

### Issues Corrected

- WLAN roaming has been enhanced in the following ways:
  - The printer will perform scanning one channel at a time
  - Cleaning the Access Point black list will occur more quickly, to allow for high-AP density environments.
  - The potential for a disassociation/deauthentication loop has been eliminated
  - Roam timing has been tuned to better schedule roam triggers and events.
  - A condition where channel scanning could stop has been addressed.
- 802.11ac radio is now more stable during long idle times (2+ hours)



**NOTE:** 802.11r is supported only on the 802.11ac WLAN radio.

- Checks put in place to retain the County Code setting over a power cycle in Bluetooth only units.
- The startup process has been updated to allow for networks that do not deliver an DHCP address for an extended time.
- A self-adjusting capability has been added to the Peel sensor so that the sensors settings are preserved through a manual calibration.
- Power save has been defaulted to “off” on the ZQ600 series.
- The QLn will now report “sb” for the battery eliminator when the “battery type” command is used.
- If `usb.host.lock_out` is set to a “on”, the front panel menu item, CONFIG INFO to USB shall not be displayed.
- The sequence of the DHCP addressing protocol has been corrected that all steps happen in the appropriate order.

### Upcoming Changes

- Zebra is announcing that the WLAN securities 40-bit WEP and 128-bit WEP will be removed in the future “Version 6” release of Link-OS. This step is being taken to enhance product security. 40-bit WEP and 128-bit WEP are still supported in Link-OS v5.2. They will be removed in v6.0 and beyond.
- Zebra is announcing that SHA-1 support will be removed in the future “Version 7” of Link-OS. This step is being taken to enhance product security. SHA-1 is still supported in Link-OS v5.2. It will be removed in Link-OS v7.0 and beyond.

# V68 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V68.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- QLn220
- QLn320
- QLn420
- QLn220 Healthcare
- QLn320 Healthcare

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)
  - User supplied certificates for TLS
  - User control TTLS with support for “pap”, “chap”, “mschap” and “mschap2”
  - HTTPS for the printer web pages
  - User supplied certificates for HTTPs
  - User Defined Gateway Ping intervals
  - User supplied web sockets certificates
  - New Service control commands
  - OpenSSL v1.0.21
  - The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The UCODE8 and UCODE8M RFID chips are now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset
- A “BATTERY MISSING” alert has been added, for those printers that support it.

- The default for the `power.sleep.timeout` and `power.inactivity_timeout` have been changed on selected products:

	QLn series	ZQ500 series	iMZ series	ZQ3 series
<code>power.sleep.timeout</code>	N/A	20 minutes	N/A	20 minutes
<code>power.inactivity_timeout</code>	No change	10 hours	no change	10 hours

- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - `head.serial_number` has been added.
  - `wlan.bssid` has been added.
  - `device.location` has been added.
  - `interface.network.active.speed` has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - The LE GAP Device name – this GATT attribute will require pairing before it can be read.
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - Printers with radios that support 4.1 or later now support Numeric Comparison pairing for Bluetooth Low Energy pairing events. NOTE – only used if both devices support Bluetooth 4.1 and the Secure LE connection protocol.
  - SetGetDo changes. Several commands have changed:
    - `bluetooth.bonding` – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.
    - `bluetooth.minimum_security_mode` – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
      - 1:** No encryption or authentication is required to access the Zebra Parser Service.
      - 2:** Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
      - 3 or 4:** Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.

## V68 Printer OS Release Notes

- `bluetooth.allow_non_display_numeric_comparison` – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device. If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.
noprint	Display Only	If Passkey Pairing is used, the printer will not print out the passkey. If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.
off	No I/O	Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!

- **Deprecated Commands:**

Command Name	Use This Command Instead
<code>bluetooth.le.print_passkey</code>	<code>bluetooth.allow_non_display_numeric_comparison</code>
<code>bluetooth.le.minimum_security</code>	<code>bluetooth.minimum_security_mode</code>

- **LE Security Changes:**

LE Minimum Security Value	Previous Minimum Security Value	New Minimum Security Value
<code>unauth_key_encrypt</code>	1	2
<code>auth_key_encrypt</code>	1 or 2	4
<code>none</code>	1, 2, 3, or 4	No change

### Issues Corrected

- ZBI now correctly handles output on the serial port.
- The printer now correctly handles repeated `~WR` commands.
- Printer web page rendering has been made more reliable.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where `conn1` and `conn2` are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).
- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.
- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.

- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- Mirror Feedback files are now working correctly.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### **"media.tof\_tune"**

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.
- Example:
  - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
- Suggested starting value when migrating from RW to ZQ500: "-13".
- Not affected by a printer default.

### **"print.vertical\_dpi\_adjust"**

- Range: 95.0 to 105.0.
- Default: 100.0 (no change in y-coordinate or height of print fields)
- Example:
  - ! U1 setvar "print.vertical\_dpi\_adjust" "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
- Suggested starting value when migrating from RW to ZQ500: "98.4".
- Not affected by a printer default.

## Link-OS 4

### V68.20.01ZB

**Release Date: 01 November 2017**

This firmware includes all features of the previous release, except where noted otherwise. It is for use with the following printer models:

- QLn220
- QLn320
- QLn420
- QLn220 Healthcare
- QLn320 Healthcare

### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V68.20.01Z

**Release Date: 14 October 2016**

This firmware includes all features of the previous [V68.19.15Z](#) release, except where noted otherwise. It is for use with the following printer models:

- QLn220
- QLn320
- QLn420
- QLn220 Healthcare
- QLn320 Healthcare

### Changes

- Link-OS version updated to v4.0.
- Support has been added for a Visibility Agent. This new feature can connect a networked Link-OS printer to Zebra’s Asset Visibility Service (AVS). The Asset Visibility Service is a Zebra-managed service offering that provides Zebra partners and customers ‘at-a-glance’ visibility to analytical insights about their device health, utilization, and performance. When Link-OS v4 printers are connected to a wired or wireless network, they will attempt to connect to the Asset Visibility Service by default. When successfully connected, the printer sends approximately 5 Kbytes of data per day (depending on how many alert events happen per day).
  - Data printed on any labels, tags or receipts are not transmitted to the Asset Visibility Service. The printers only communicate predefined settings on a scheduled basis. The printer sends Discovery Data and Settings and Alerts Data. The settings that are transmitted are listed below in the form of Set-Get-Do commands and are detailed in the Zebra Programming Guide.
  - The printer uses an encrypted, certificate-authenticated web socket connection to connect to the ZPC. **NOTE:** This is the same connection type that is typically used when you connect to an e-commerce or banking site.

- The Visibility Agent can be turned off using a Set-Get-Do Command. Using your preferred software or Zebra Setup Utilities, send the commands below to configure and validate the Asset Visibility Agent settings. You can download Zebra Setup utilities at <https://www.zebra.com/setup>.

## weblink.zebra\_connector.enable

Turns the Asset Visibility Agent on or off. Additional information can be found in the App Note. See <https://www.zebra.com/us/en/products/software/barcode-printers/link-os/application-notes.html>.

**Values:** "on" or "off"

**Default Value:** "on"

### To send the commands:

- Send the following command to Opt Out (disable the connection to ZPC and the Asset Visibility Service):

```
! U1 setvar "weblink.zebra_connector.enable" "off"
```

- Send the following command to validate that you have opted out:

```
! U1 getvar "weblink.zebra_connector.enable"
```

The printer should respond with "off".



**NOTE:** Be sure to include a carriage return/line feed after sending a command to the printer.

If the Visibility Agent is on, there are two data types that the printer can send to the AVS platform – **Discovery Data** and **Setting/Alert Data**.

### Discovery Data

This information is sent when the printer connects to the ZPC. The following printer settings are transmitted:

Printer Settings		
device.unique_id	media.type	device.oem.model_name
ip.dns.domain	media.thermal_mode	appl.name
ip.active_network	media.printmode	device.location
mac_raw	odometer.total_label_count	zpl.system_status
ip.protocol	odometer.media_marker_count1	ip.addr
ip.netmask	odometer.media_marker_count2	ip.ftp.enable
ip.gateway	label_queue.batch_label_cnt	ip.lpd.enable
ip.port	label_queue.format_counter	ip.tcp.enable
device.pnp_option	zbi.enabled	ip.udp.enable
device.languages	zbi.state	ip.http.enable
device.cpcl_formatting_commands_disable	zbi.revision	ip.smtp.enable
head.resolution.in_dpmm	head.width.in_dots	ip.pop3.enable
zpl.label_length	ip.port_json_config	ip.snmp.enable
ezpl.print_width	appl.link_os_version	ip.telnet.enable
media.darkness.mode	device.friendly_name	weblink.enable

## Settings and Alerts Data

This information is sent by the printer at the schedule listed in the table below. The following printer settings or alerts are transmitted:

Printer Settings		
weblink.zebra_connector.version	device.bluetooth_installed	PAPER OUT
device.product_name	odometer.media_marker_count	RIBBON OUT
print.tone_format	media.type, ezpl.media_type	HEAD ELEMENT BAD
power.percent_full	interface.network.active.speed	SUPPLY TOO HOT
power.serial_number_string		HEAD OPEN
power.manufacture_date		HEAD COLD
power.cycle_count		HEAD TOO HOT
power.device_name	power.percent_full	CUTTER JAMMED
power.full_charge_capacity	wlan.signal_strength	COLD START
power.date_first_used	odometer.total_print_length	
interface.network.active.ip_addr	interface.network.active.speed	
wlan.signal_strength		
odometer.total_print_length		power.cycle_count
odometer.rfid.valid_resetable		power.device_name
odometer.rfid.void_resetable	print.tone	power.full_charge_capacity
memory.flash_size	print.tone_zpl	odometer.total_label_count
memory.flash_free	media.speed	odometer.rfid.valid_resetable
device.ltu_installed	zpl.label_length	odometer.rfid.void_resetable
device.cutter_installed		memory.flash_free
device.rewinder_installed		odometer.media_marker_count
		media.type
		ezpl.media_type

- Front Panel Batch Counters have been made available. They can be turned on by using the SGD command **display.batch\_counter**.
- Web sockets connections now support SHA2 certificates. The printers will continue to support SHA1 certificates until Link-OS v5 is released (in 2017). At that time, the printers will no longer support SHA1 certificates, in accordance with privacy best practices.
- Alerts are no longer displayed over the Home menu to enhance readability.
- New Set-Get-Do Commands were implemented. Refer to the Zebra Programming Guide for details on each command.
  - head.resolution.in\_dpi
  - file.capture\_response.begin
  - file.capture\_response.end
  - file.capture\_response.destination
  - device.command\_override.add
  - device.command\_override.clear

- `device.command_override.list`
- `device.command_override.active`
- `weblink.zebra_connector.version`
- `weblink.zebra_connector.enable`
- `weblink.zebra_connector.proxy`
- `weblink.zebra_connector.authentication`
- `weblink.zebra_connector.authentication.add`
- `weblink.zebra_connector.authentication.remove`
- `weblink.zebra_connector.authentication.entries`
- `wlan.wpa.timecheck`
- `wlan.rts_cts_enabled`
- `display.batch_counter`
- `device.set_clock_to_build_date`

### Issues Corrected

- The SGD command `power.low_battery_timeout_alt` is now read/write.
- Bluetooth connectivity has been improved so that it will not disconnect during a network reset (~WR).
- When using the Dual Radio, the Bluetooth radio will remain active even if the WLAN radio is not.
- The SNMP `zbraOptUnsAlertCondition` and `zbrOptUnsAlertsEntry` response strings have been extended to include 1023 characters.
- The Japanese and Korean front panel menus have been adjusted to eliminate character overlaps.
- SNMP Print Job Completed reporting has been enhanced when using the Pause Alert.
- The ZBI `WRITE` command has been corrected to count all data written to the system.
- The EPL `URH` and `URL` commands will now return a value in meters.
- The Mirror system timing has been altered to include a retry, so as to improve file writing performance.
- EPL has been enhanced to handle images larger than the label size.
- The command `zp1.zp1_override` has been eliminated; use the `device.command_override` commands instead.
- The printer will now come back on-line after being rebooted while in the cradle when the battery is fully charged.
- The printer will now feed to the `SET-TOF` defined position when that setting has been set, and the FEED button is pressed.
- The Mirror system will now accept the return code `125` in addition to the return code `150`, in order to support IIS7 and FileZilla servers.
- The Mirror system now supports time and date stamping used by IIS7 and FileZilla servers.
- Firmware updating when using both Profile Manager and either IIS7 or FileZilla has been optimized to avoid conflicts.
- Wi-Fi roaming and Protected Management Frames (PMF) support have been improved.
- Charging while the printer is turned on has been optimized to eliminate unneeded charge cycles.



- Memory management during printing has been optimized for cases where a `.TTF` font, graphics, and inverted orientation printing are being used.
- The JSON implementation of the `usb.mirror.feedback.odometer` and `ip.mirror.feedback.odometer` commands now have values of `READ_WRITE_ACCESS`.
- The JSON implementation of the `zbi.state` command has been changed from a string type to an enum type.
- The EPL command `OR0,0` is now supported..
- The Czech menu will now use the word `INCHES`.
- Socket connections on ZBI have been optimized to avoid a connection not ending when it should.
- The `CHARGING TEMP FAULT` message system has been optimized to be more accurate.
- The JSON implementation of `interface.network.active.speed` is now treated as an integer.
- `APPLICATOR` mode will be offered and selectable, and the printer will use `APPLICATOR` paper movement behavior while in the mode; however since the printer does not have an applicator option, the printer will not wait for applicator signals.
- The label feed length after a calibration will now be updated to use the newly calibrated length.
- The range for `ip.discovery.port` is now 1 - 65535.
- The range for `zp1.label1_length` has been corrected in the `allconfig`.

## Link-OS 3

### V68.19.15Z

**Release Date: 14 January 2016**

This firmware includes all features of the previous [V68.19.13Z](#) release, except where noted otherwise. It is for use with the following printer models:

- QLn220
- QLn320
- QLn420
- QLn220 Healthcare
- QLn320 Healthcare

### Changes

- The wireless settings commands only support non-control ASCII characters.
- FTP PORT commands are supported when the port number requested is above 1023 and the IP address being requested is the same as that of the device initiating the connection.

### Issues Corrected

- Network Time Protocol settings syntax checking has been enhanced.

### V68.19.13Z

**Release Date: 31 August 2015**

This firmware includes all features of the previous [V68.19.10Z](#) release, except where noted otherwise. It is for use with the following printer models:

- QLn220
- QLn320
- QLn420
- QLn220 Healthcare
- QLn320 Healthcare



**NOTE:** When updating from firmware V68.16.3Z or any earlier version, users must first update the printer to V68.18.6Z, before updating to any later versions. We also recommend that users power cycle the printer after the update to V68.18.6Z, before moving to any later versions.

In addition, when updating from firmware V68.18.1Z or any earlier version, we recommend users default the printer after updating to a later firmware version. To default the printer, send these ZPL commands to the unit:

```
^XA^JUF^XZ
```

```
^XA^JUS^XZ
```

Wait 5 seconds after sending these command and then power cycle the printer.

## Changes

- Link-OS printers now support downloading PEM and DER formatted WLAN certificates in the P12 format for the TLS, TTLS and PEAP security types. Additionally, P12 formatted certificates are now supported for downloading private keys and client certificates. For more information, see the App Note "Direct WLAN Cert Downloading."
- Front Panel passwords are now supported on the QLn220 and QLn320 Healthcare units – and on the QLn420. The password level can be set from the Tools menu.
- The new Zebra logo is now used on the front panel, web pages and two-key report.
- The printers will now store information related to the state of the devices sensors and internal printer operations which may be accessed and used by Zebra for the purpose of improving the products performance and readability. For more information, please contact [softpm@zebra.com](mailto:softpm@zebra.com).

## Issues Corrected

- The "`netmanage.avalanche.agent_addr`" command will now accept a DNS value.
- The OID: `.1.3.6.1.4.1.10642.200.14.5.0 (zql-power-low-battery_shutdown)` response has been corrected.
- The printers will now accept a `.GRF` image larger than 100KB.
- The Power Smart Print Technology version number will now report in the correct format.
- The ZPL implementation of the Datamatrix barcode has been enhanced to support more combinations of standard ASCII and extended ASCII character strings.
- The Head Open detection system has been enhanced to avoid false head open reports.
- The Battery Authentication system has been enhanced to improve "time to ready" performance.
- TTF font handling in CPCL has been enhanced to improve performance.
- CPCL TTF character mapping now uses 1252/Latin 1 to locate characters for print events.
- Label Bar and/or Gap detection during backfeed events has been enhanced to ensure complete label printing.
- Charging has been enhanced to optimize battery health.
- JSON parsing has been enhanced to better handle slow transmissions to the printer.
- Rendering time for ZPL generated circles, boxes with rounded corners and diagonal lines has been enhanced.
- Font handling has been improved to ensure that when a new font replaces an existing font, the character mapping is correctly updated.
- The `^HZO` response now places a drive letter in the `<OBJECT-DATA>` reply.
- The `^GFA` command will no longer produce a stretched image when the last line of the encoded graphic is a `" , "` or a `" ! "`.
- The time the Bluetooth system will wait for a connection has been extended to accommodate the needs of more devices.
- ZBI program throughput has been enhanced.
- The Cloud Connect web sockets system has been optimized to improve throughput.
- The Cloud Connect web sockets has been optimized to better handle large file (1MB+) downloads from the printer to a host system.
- The USB implementation has been enhanced to optimize bi-directional communication.

- The Bluetooth system has been enhanced to support scenarios where the Master device is sending data immediately after creating a connection.
- In order to improve throughput, the WLAN system will now use "CTS to Self" for the default HT mode. The system can be set to use "RTS-CTS" by using the "`wlan.rts_cts_enabled`" command (default is "off").
- Checksum validation during CPCL downloads has been altered to accept images from the Multiplatform SDK.
- The printer will now stay on when the `power.inactivity_timeout` is set to a non-zero value and the unit is plugged in or in a powered cradle.

## V68.19.10Z

### Release Date: 07 January 2015

This firmware includes all features of the previous [V68.19.7Z](#) release, except where noted otherwise. It is for use with the following printer models:

- QLn220
- QLn320
- QLn420
- QLn HC



**NOTE:** When updating from firmware V68.16.3Z or any earlier version, users must first update the printer to V68.18.6Z, before updating to any later versions. We also recommend that users power cycle the printer after the update to V68.18.6Z, before moving to any later versions.

In addition, when updating from firmware V68.18.1Z or any earlier version, we recommend users default the printer after updating to a later firmware version. To default the printer, send these ZPL commands to the unit:

```
^XA^JUF^XZ
^XA^JUS^XZ
```

Wait 5 seconds after sending these command and then power cycle the printer.

### Changes

- Wi-Fi certification for this model is now based on the Standard Zebra Wireless driver
- Ad-Hoc wireless is now supported.
- Opportunistic Key Caching (OKC), "Fast Roaming" is now supported on WLAN connections.
- The Network Time Protocol (NTP), which allows setting the printers clock based on a time server, is now supported.
- Country support for RFID has been expanded.
- A secondary Bluetooth® channel for management tasks has been added.
- The total label count odometer value has been added to the configuration label .
- "Qatar" is now a supported value for the "wlan.country\_code" SetGetDo command on the QLn220 and QLn320 printers.
- The Avalanche client now supports reporting a successful printer OS update.
- The printer will now validate that user-assigned network port number assignments do not conflict with each other.
- The OpenSSL version the printers use is now v1.0.0m.
- The "device.jobs\_print" SetGetDo command is now supported.
- The "power.low\_battery\_warning\_raw" command now uses use a consistent implementation across the Link-OS Mobile product line. If updating an existing printer, users will have to send the **! U1 setvar "device.restore\_defaults" "power"** command to use this new implementation.
- The **device.languages** command default for the QLn220 HC and QLn320 HC printers is now "ep1\_zpl" .
- The Battery Eliminator is now supported.

- Users can now control if the network activity LED on the QLn cradle blinks by using the SetGetDo command "**internal\_wired.activity\_led**". There are two settings, "**blink**" or "**solid**"; "**blink**" is the default.
- The Link-OS version is now v2.5.

### Issues Corrected

- Throughput for small label (1.5" long and shorter) has been enhanced.
- Support for CCX is now available via the Zebra Development Services team, so that implementations can be tailored to individual network needs.
- ^HZA responses when running ZBI programs have been corrected to include all expected data.
- WML has been corrected to consistently show messages positioned in the bottom center of the screen.
- ZBI processing of formats larger than 32K has been corrected.
- The EPL speed command ("**S**") will now set the print speed, slew and backfeed rates.
- The value set by the "**Q**" command will now be used in both ZB and ZT modes.
- The printer will now respond to an "**Escape H**" command, when it's received at the end of a ZPL format.
- The WLAN MAC address will now be consistently reported after a power up event when a new main logic board has been installed .
- The ~JP command now correctly pauses the printer.
- EPL '**p**' commands will no longer effect subsequently printed ZPL formats.
- The Czech and Russian translations on the front panel of the QLn420 have been updated.
- Graphics sent to the printer using the EPL command "**GM**" are now supported.
- The **bluetooth.bonding** setting will now be returned via either a JSON Bluetooth branch or allconfig request.
- MAC address reporting has been enhanced to ensure address is correctly reported at startup.
- Management of Bluetooth connections has been enhanced to ensure data integrity when new connections are being made while data from a prior connection is still being processed.
- The E:SYSLOG.TXT file will only be saved to the E: drive when the "**device.syslog.save\_local\_file**" setting is set to "**yes**".
- An UCC/EAN128 barcode, using mode D, which contains an odd number of digits following a subset A/B section will now print correctly.
- Spaces are now allowed in "**netmanage.avalance.set\_property**" SetGetDo commands.
- Recalling formats that contain serialized fields with XML is now functional.
- Media sensing calibration has been enhanced to increase accuracy.
- Media cover open (print head open) detection has been improved.

## V68.19.7Z

### Release Date: 21 March 2014

This firmware is for use with the following printer models:

- QLn220
- QLn320
- QLn420
- QLn HC

This firmware includes all features of the previous [V68.19.6Z](#) release.



**NOTE:** When updating from firmware V68.16.3Z or any earlier version, users must first update the printer to V68.18.6Z, before updating to any later versions. We also recommend that users power cycle the printer after the update to V68.18.6Z, before moving to any later versions.

In addition, when updating from firmware V68.18.1Z or any earlier version, we recommend users default the printer after updating to a later firmware version. To default the printer, send these ZPL commands to the unit:

```
^XA^JUF^XZ
^XA^JUS^XZ
```

Wait 5 seconds after sending these command and then power cycle the printer.

## Changes

- Added support for the QLn HC (Healthcare) series.
- Added support for the EPL command language:
  - The device.languages SetGetDo command now supports the values "ep1\_zp1" and "ep1".
  - The printer defaults to "hybrid\_xml\_zp1" for the device.languages setting on QLn 220, QLn 320, QLn420 units, and to "ep1\_zp1" on QLn HC units.
  - The setting may be changed via the **COMMAND LANGUAGE** menu in the **LANGUAGES** menu on the QLn420 and QLn HC series units. The default password is "1234".
  - An alternate Plug and Play string for EPL has been added.
- Added support for Bluetooth® connectivity to iOS devices.
  - This applies to printers with SKU designators Qxx-xxNxxMxx-xx and Qxx-xxCxxMxx-xx that are loaded with V68.19.7Z or later.
- Control panel menu changes:
  - **MFI CAPABILITY** added to the Bluetooth menu.
  - **WLAN STATUS** added to the QLn420 and QL HC Network menu.
  - **AP MAC ADDRESS** added to the QLn420 and QL HC Network menu.
  - **COMMAND LANGUAGE** added to the QLn420 and QL HC Language menu.
  - **BACKLIGHT TIMEOUT** in the QLn420 and QL HC Tools menu is now password protected. The default password is "1234".
  - **MEDIA TYPE** in the QLn420 and QLn HC Settings menu is now modifiable and password protected. The default password is "1234".
  - SetGetDo commands added to control passwords on QLn420 and QLn HC series printers

- Bluetooth Pairing QR code:

Press the arrow up key from the printer's home screen to display a QR code

containing the printers Bluetooth MAC address.

If Bluetooth is enabled, a QR Code containing the printers Bluetooth MAC address will display. If the printer has an IP address and Bluetooth is enabled, pressing the up arrow will display a QR code containing the IP address - and pressing the right or left arrow key will then display a QR Code containing the printers Bluetooth MAC address.

- IP Address Pairing QR code:

If the printer has an IP address, press the arrow up key from the printer's home screen to display a QR Code containing the IP address.

If the printer does not have an IP address, the QR Code containing the IP address will not display. If the printer has an IP address and Bluetooth is enabled, pressing the up arrow will display a QR code containing the IP address, and pressing the right or left arrow key will then display a QR Code containing the printers Bluetooth MAC address.

- The two key config report now includes a line that begins with PCC and ends with the stock keeping unit (SKU) number of the printer as assigned at the point of manufacture.
- Syslog support added.
- The following SetGetDo commands were added or updated:

<code>display.suppress_all_alerts</code>	Temporarily suppresses alerts. Choices: <b>off</b> , <b>on</b> Default: <b>off</b>
<code>display.status_bar_suppress</code>	Temporarily suppresses the status bar. Choices: <b>off</b> , <b>on</b> Default: <b>off</b>
<code>device.syslog.clear_log</code>	Clears the local syslog file.
<code>device.syslog.configuration</code>	Specifies the location for the syslog reports to be recorded.
<code>device.syslog.enable</code>	Enables the syslog file to record system messages. Choices: <b>off</b> , <b>on</b> Default: <b>off</b>
<code>device.syslog.entries</code>	Displays the contents of the local syslog file.
<code>device.syslog.log_max_file_size</code>	Specifies the maximum size of the syslog file. Choices: <b>10000-400000</b> Default: <b>10000</b>
<code>device.syslog.save_local_file</code>	Saves the contents of the local syslog to E:SYSLOG.TXT., Choices: <b>no</b> , <b>yes</b> Default: <b>no</b>
<code>display.password.current</code>	Specifies the current password on QLn420 and QLn HC printers Choices: <b>0</b> to <b>9999</b>
<code>display.password.length</code>	Specifies the length of the display password on QLn420 and QLn HC printers Choices: <b>1</b> to <b>20</b>



<code>display.root_wml</code>	Controls which index.wml file to use: For QLn220 and QLn320 units, the default value is "INDEX320.WML" For QLn420 and QLn HC units, the default value is "INDEX420.WML"
<code>ip.tcp.nagle_algorithm</code>	Controls the Nagle algorithm. Default: "enable" See RFC 896 for further details: <a href="http://tools.ietf.org/html/rfc896">http://tools.ietf.org/html/rfc896</a>
<code>power.inactivity_timeout</code>	Now supports "up" and "down" values, for use in menus.
<code>wlan.poor_signal_threshold</code>	Controls when the printer indicates it is receiving a poor signal. Range: 0 to 100 Default: 0

### Issues Corrected

- Bluetooth passwords can now be up to 16 characters long.
- Line mode in CPCL corrected so that it does not require a carriage return/line feed after barcode fields.
- The SetGetDo command `device.macro_get` was corrected to support pre-pending and post-pending .
- Bluetooth radio now supports interaction with devices that use credit-based flow control.
- The SetGetDo command "`input.capture`" "`run`" now captures all incoming data.
- Bluetooth radio performance enhanced to support out of order packet streams.
- Corrected an issue where the control panel content could be temporarily display illegibly during an alert condition.
- Corrected an issue where the printer can turn off before processing transmitted data when a serial port DTR low event occurs.

## Link-OS 2

### V68.19.6Z

**Release Date: 20 September 2013**

This firmware is for use with the following printer models:

- QLn220
- QLn320
- QLn420

This firmware includes all features of the previous [V68.19.4Z](#) release.



**NOTE:** When updating from firmware V68.16.3Z or any earlier version, users must first update the printer to V68.18.6Z, before updating to any later versions. We also recommend that users power cycle the printer after the update to V68.18.6Z, before moving to any later versions.

In addition, when updating from firmware V68.18.1Z or any earlier version, we recommend users default the printer after updating to a later firmware version. To default the printer, send these ZPL commands to the unit:

```
^XA^JUF^XZ
^XA^JUS^XZ
```

Wait 5 seconds after sending these command and then power cycle the printer.

### Changes

- The Link-OS version number is now 2.0.
- Added full support for Profile Manager features. Upgrade to this firmware version to use printers with the Profile Manager app. This firmware is embedded in the Profile Managers Resources system to facilitate updating.
- Added support for DHCP option 43. The feature allows the printer to obtain the settings used to control Cloud Connect weblink connections or Mirror events as part of receiving a DHCP assigned IP address. This requires that DHCP Option 60 is not empty and that `ip.dhcp.auto_provision_enable` is set to "on".

The package of Cloud Connect/weblink information sent from the DHCP server in the Option 43 response can include the:

- Server address
- Authentication server name
- User name and password for proxy logins

The package of Mirror information sent from the DHCP server in the Option 43 packet can include the:

- Server address
- Mirror path
- Mirror feedback path
- Mirror appl path
- Mirror mode

Consult the Programming Guide for more information.

- Added a **"default"** field to the **"allconfig"** JSON response for each setting.
- The Cloud Connect weblink connection will now send a websocket ping to the connected server every 60 seconds. If no response is received after three attempts, the connection will be closed.
- The Cloud Connect weblink connection now logs the servers certificate serial number and fingerprint.
- Additional bits added to the **~HQES** response and Advanced Discovery packet.
- A new setting **weblink.ip.connX.num\_connections** has been added. This setting shows the number of established connections. The control channel counts as 1 as well as all other sub channels (echo, raw\_port, json\_config). This is getvar only settings with a max value that is the same as the **max\_number\_connections**. Consult the Programming Guide for more information.
- A new group of settings for position have been added. These allow users to manually set latitude, longitude and altitude values on the printer. Consult the Programming Guide for more information. The new settings are:
  - device.position.latitude** in degrees min/max: -90.0/90.0
  - device.position.longitude** in degrees man/max: -180.0/180.0
  - device.position.altitude** in meters min/max: -10000.0/406700000.0
  - device.position.accuracy** in meters min/max: 0.0/406700000

### Issues Corrected

- JSON will now return a null instead of a "?" for settings that do not exist on the device.
- The **ip.dns.domain** or **ip.dns.servers** values can now be set while IP addressing is set to permanent.
- PCX graphics handling has been improved to handle additional scenarios.
- Scalable font field handling improved.
- Handling of Bluetooth remote device disconnect events improved.
- **odometer.user\_label\_count** can be set to **"0"**.
- Ping response times have been enhanced.

## Link-OS 1

### V68.19.4Z

#### Release Date: 10 June 2013

This firmware is for use with the following printer models:

- QLn220
- QLn320
- QLn420

This firmware includes all features of the previous [V68.19.2Z](#).



**NOTE:** When updating from firmware V68.16.3Z or any earlier version, users must first update the printer to V68.18.6Z, before updating to any later versions. We also recommend that users power cycle the printer after the update to V68.18.6Z, before moving to any later versions.

In addition, when updating from firmware V68.18.1Z or any earlier version, we recommend users default the printer after updating to a later firmware version. To default the printer, send these ZPL commands to the unit:

```
^XA^JUF^XZ
^XA^JUS^XZ
```

Wait 5 seconds after sending these command and then power cycle the printer.

#### Changes

- The QLn420 battery eliminator is now supported.
- Additional 802.11n country codes supported: Bahrain, Belarus, Croatia, Lebanon, Oman, Serbia, Sri Lanka, Uruguay, Venezuela, Vietnam
- This release includes support for simultaneous 802.11 a/b/g/n and Bluetooth Dual Radio.



**NOTE:** The Dual radio option is only available on the n radio configuration. By default, the Bluetooth radio is disabled on printers that support dual radio. The Bluetooth radio can be enabled by using the `bluetooth.enable` command. When both the WLAN and Bluetooth radios are enabled, the `wlan.power_save` feature will be turned off.

#### Issues Corrected

- Peel sensor performance has been corrected to support additional use cases
- Enhanced memory management to resolve text field not printing issue.
- To support applications created for the QLPlus, if the printer is in CPCL synchronous mode with “on out of paper” set to PURGE and Retry set to “1”, the printer will discard the current label when the printer runs out of paper or the head is opened.

## V68.19.2Z

### Release Date: 15 February 2013

This firmware is for use with the following printer models:

- QLn220
- QLn320
- QLn420

This firmware includes all features of the previous [V68.19.1Z](#) and [V68.18.8Z](#).



**NOTE:** When updating from firmware V68.16.3Z or any earlier version, users must first update the printer to V68.18.6Z, before updating to any later versions. We also recommend that users power cycle the printer after the update to V68.18.6Z, before moving to any later versions.

In addition, when updating from firmware V68.18.1Z or any earlier version, we recommend users default the printer after updating to a later firmware version. To default the printer, send these ZPL commands to the unit:

```
^XA^JUF^XZ
^XA^JUS^XZ
```

Wait 5 seconds after sending these command and then power cycle the printer.

### Issues Corrected

- Printer will no longer skip labels when ^LT and ^PQ are used in a format.

## V68.19.1Z

### Release Date: 11 January 2013

This firmware is for use with the following printer models:

- QLn220
- QLn320
- QLn420

This firmware includes all features of the previous [V68.18.7Z](#).



**NOTE:** When updating from firmware V68.16.3Z or any earlier version, users must first update the printer to V68.18.6Z, before updating to any later versions. We also recommend that users power cycle the printer after the update to V68.18.6Z, before moving to any later versions.

In addition, when updating from firmware V68.18.1Z or any earlier version, we recommend users default the printer after updating to a later firmware version. To default the printer, send these ZPL commands to the unit:

```
^XA^JUF^XZ
^XA^JUS^XZ
```

Wait 5 seconds after sending these command and then power cycle the printer.

### Issues Corrected

NA

## Link-OS Features

Initial release of Link-OS support.

- Data Capture to SGD
- Unsolicited alerts for SGD changes
- HTTP POST transport for unsolicited alerts
- SGD change log
- ZBI events for SGD changes
- User Variables Port 9200 - SGD Channel
- Cloud Connectivity

## Non-Link-OS Firmware Builds

### V68.18.8Z

**Release Date: 1 February 2013**

#### Issues Corrected

- The printer will now correctly retain and use TONE settings.



**NOTE:** When updating from firmware V68.16.3Z or any earlier version, users must first update the printer to V68.18.6Z, before updating to any later versions. We also recommend that users power cycle the printer after the update to V68.18.6Z, before moving to any later versions.

In addition, when updating from firmware V68.18.1Z or any earlier version, we recommend users default the printer after updating to a later firmware version. To default the printer, send these ZPL commands to the unit:

```
^XA^JUF^XZ
```

```
^XA^JUS^XZ
```

Wait 5 seconds after sending these command and then power cycle the printer.

#### Changes

- NA

### V68.18.7Z

**Release Date: 3 December 2012**



**NOTE:** When updating from firmware V68.16.3Z or any earlier version, users must first update the printer to V68.18.6Z, before updating to any later versions. We also recommend that users power cycle the printer after the update to V68.18.6Z, before moving to any later versions.

In addition, when updating from firmware V68.18.1Z or any earlier version, we recommend users default the printer after updating to a later firmware version. To default the printer, send these ZPL commands to the unit:

```
^XA^JUF^XZ
```

```
^XA^JUS^XZ
```

Wait 5 seconds after sending these command and then power cycle the printer.

#### Enhancements

- BT: Add support for BT 3.0 radio (QNx-xxCxxxxx-xx)
- BT: Add SIG certification for BT 3.0 radio (QNx-xxCxxxxx-xx)
- BT: Updated Bluetooth driver
- BT: Add support for Bluetooth Key Bonding, see below for details
- LCD: Add support for 2-byte WML and international fonts on the display
- LCD: Add ability to flip the display, see below for details
- 802.11: Updated driver and improved roaming algorithm for 802.11 n radio (QNx-xxNxxxxx-xx)

- 802.11: Add WIFI certification for 802.11 n radio (QNx-xxNxxxxx-xx)
- 802.11: Add CCXv4 ASD certification for 802.11 n radio (QNx-xxNxxxxx-xx)
- 802.11: Add support for additional 802.11 n countries, see below for details

## Issues Corrected

- CPCL: Form Feed character (0x0C) not processed correctly
- SGD: wlan.allowed\_band parameter incorrectly reset by device.restore\_defaults command
- 802.11: Incompatibility with Motorola WS5100 using WEP multicast key
- 802.11: Resource Location Server (RLS) address (option 11) is not requested in DHCP discovery packet

## Changes

- 802.11: Removed support for Ad Hoc mode
- 802.11: Removed support for WEP with 802.11 i authentication (WEP with PSK is still supported).

## Bluetooth® Key Bonding

With the advent of the Bluetooth Simple Secure Pairing (SSP) algorithm, connecting two devices that both support BT version 2.1 (or higher) may take longer. The connection time between the QLn and terminal can take up to 8 seconds, compared with roughly 2 seconds if the terminal is BT 2.0 or earlier. The additional delay is due to the complex, but more secure, key exchange protocol required as part of SSP. Prior to SSP, Bluetooth devices used pre-configured PINs. Except for the first time any two devices are paired; the key bonding feature avoids the additional delay by saving and reusing the encryption key. Up to 15 encryption keys are stored in printer memory, corresponding to 15 unique printer-terminal pairs. If the printer is paired with a 16th terminal, the oldest key used is replaced with the new one. The entire key cache can be cleared for security purposes.

Examples showing how to turn the key bonding feature on (default) or off, get the current status, and clear the cache are shown below:

```
! U1 setvar "bluetooth bonding" "on"
! U1 setvar "bluetooth bonding" "off"
! U1 getvar "bluetooth bonding"
! U1 do "bluetooth.clear _ bonding _ cache" ""
```

If the key cache is cleared all previously established encryption keys are lost, and it will be necessary to go through the key exchange protocol the first time each new terminal is paired with the printer.

## Display Flip

It is now possible to invert the orientation of the display (180°) to make it easier to read in some installations, e.g. when mounted to a wall or a fork lift. It can also be configured to automatically invert when docked in a cradle. It is necessary to restart the printer after changing the orientation setting.



Examples showing how to set the display to normal (default), inverted, and automatic mode are shown below. Remember to send the `device.reset` command after changing the value. The final example shows how to read back the current status:

```
! U1 setvar "display.orientation" "normal"
! U1 setvar "display.orientation" "inverted"
! U1 setvar "display.orientation" "auto"
! U1 do "device.reset" ""
! U1 getvar "display.orientation"
```

## Configuring the 802.11 n Country Code

When configuring the 802.11 n radio it is important to configure the `wlan.country_code` parameter in order to define the channels allowed in that country, group of countries, or region. The list of country options is determined by the `wlan.region_code` parameter, which is set at the factory based on the Group designator in the printer SKU, as indicated by the “?” as follows: QNx-xxxx?xxx-xx. The choices are shown in the table below:

Group	wlan.region_code	wlan.country_code choices
0	usa/canada	usa/canada
J	japan	japan
E,L,A,B	rest of world	not selected, argentina, mexico, brazil, costa rica, nicaragua, peru, europe, russia, ukraine, turkey, south africa, israel, saudi arabia, uae, egypt, jordan, singapore, australia/nz, korea, china, taiwan, india, malaysia, philippines, thailand, hong kong, panama, bolivia, colombia, el salvador, guatemala, honduras, chile

For Groups 0 and J the `wlan.country_code` is set at the factory as shown above, and no changes are permitted. For Groups E, L, A, and B the `wlan.region_code` is set to “rest of world”, and the default value for `wlan.country_code` is “not selected”. In these cases it is necessary to configure the `wlan.country_code` parameter for proper operation. Examples showing how to get the region and country codes, and how to set the country code are shown below:

```
! U1 getvar "wlan.region _ code"
! U1 getvar "wlan.country _ code"
! U1 setvar "wlan.country _ code" "europe"
! U1 setvar "wlan.country _ code" "australia/nz"
! U1 setvar "wlan.country _ code" "brazil"
```

The current country code choices can be generated by sending the following command to the printer:

```
! U1 getvar "wlan"
```

## Notes

- EU/EFTA countries should set the country code to “europe”
- The choices provided do not imply the printer is certified in those countries, rather that the printer knows what channels that country, group, or region allows
- SGD conventions dictate that all choices are lower case text only
- For USA, Canada, and Japan the `wlan.country_code` parameter is set at the factory, no changes are allowed

- If wlan.region\_code is set to “rest of world”, it is not possible to configure the wlan.country\_code to usa/canada or japan.
- Setting the wlan.country\_code parameter to an incorrect value based on the installed location may result in incorrect operation
- If the wlan.country\_code is not configured the 802.11 n radio will default to only use channels 1 – 11 in the 2.4 GHz band

### V68.18.6Z

**Release Date: 9 November 2012**



**NOTE:** When updating from firmware V68.16.3Z or any earlier version, users must first update the printer to V68.18.6Z, before updating to any later versions. We also recommend that users power cycle the printer after the update to V68.18.6Z, before moving to any later versions.

In addition, when updating from firmware V68.18.1Z or any earlier version, we recommend users default the printer after updating to a later firmware version. To default the printer, send these ZPL commands to the unit:

```
^XA^JUF^XZ  
^XA^JUS^XZ
```

Wait 5 seconds after sending these command and then power cycle the printer.

#### Enhancements

- Improved 802.11 n noise floor performance. Affects QNx-xxNxxxxx-xx configurations only.

#### Issues Corrected

- Files sent from ZBI-Developer will not remain in flash after a power cycle.

### V68.18.5Z

**Release Date: 17 October 2012**

#### Enhancements

- Add new auto-recovery feature (see details below).

#### Issues Corrected

- N/A

#### Auto-Recovery

A new Auto-Recovery feature has been added that will reinstall the firmware if an issue is detected during start up. If a problem is detected the printer will display “Decompressing Files”, then “Writing Files to Flash” and then “Finishing Install” on the LCD, after which the printer will restart. The firmware version on the printer will remain the same after Auto-Recovery.



**NOTE:** Data sent to the printer during Auto-Recovery may not be received or processed.

## V68.18.3Z

**Release Date: 10 September 2012**

### Enhancements

- Add support for 802.11 n radio for EU/EFTA countries, SKU QNx-xxNxExxx-xx
- Ability to print Aztec barcode with Bluetooth mac address from LCD
- Add support for Wavelink Avalanche (over Ethernet or WLAN)
- CPCL: Add support for ESC-JRU command
- Mirror: Add ability to show progress during mirror updates
- Mirror: Add support for a common application directory (see below)
- Mirror: Improved download performance
- Mirror: Increase maximum number of download files from 100 to 300
- Increase the max top of form setting from 89 to 120 for the QLn320 (see below)
- SGD: Change default value of the usb.halt parameter from yes to no
- SGD: Added new parameter media.feed\_skip (see below)
- Updated Bluetooth Stack to version 4.2.0

### Issues Corrected

- CPCL: PRESENT-AT not performed on ! U1 FORM
- CPCL: 4 dot row registration error when using black bar media (see below)
- CPCL: PRESENT-AT not undone for first label after a power on
- DUMP mode not working correctly
- LCD: battery icon may falsely display fully charged status during startup
- PRINT: skipping labels with ½ inch (12 mm) label stock
- PRINT: first label printed is not registered correctly
- SERIAL: printer may turn off (using DTR) before executing all transmitted data over the serial port
- ZBI does not consume button events
- ZPL: printing cut off for internal directory and ZPL status reports on the QLn220

### Common Mirror Application Directory

A new SGD parameter `ip.mirror.appl_path` has been added which allows a common firmware directory for those cases when multiple applications / settings are used. This new command will define the “common firmware directory” for printers to search as a secondary firmware location. This eliminates redundancy and reduces the total amount of storage space required on the server when multiple mirror directories are used.

### Behavior

- If the new "`ip.mirror.appl_path`" is blank (i.e., not configured), then the printer's mirror behavior is the same as it is today. This is the default.

- If the value is anything other than blank the printer searches the directory defined in this path if there is no firmware file in the standard mirror path (defined by ip.mirror.path).
- If the firmware in the "**ip.mirror.path**" matches what is currently on printer, then the printer does not check for firmware in the "**ip.mirror.appl\_path**".

## Examples

```
! U1 getvar "ip.mirror.appl_path"
! U1 setvar "ip.mirror.appl_path" "pathname"
```

## Increase the Maximum TOF Setting for the QLn320

The maximum Top Of Form (TOF) setting for the QLn320 (only) has been increased from 89 to 120 dot rows. The maximum TOF setting for the QLn220 remains at 89. This new capability requires both hardware and firmware changes, and allows printing on media with the black bar up to 120 dot rows below the beginning edge of the label. The hardware changes are cut in on a rolling basis starting (approximately) with printers built in November 2012. The firmware changes in this release are designed to be backwards compatible, meaning it automatically detects which hardware is present and prints identically on either version. Note that loading older firmware (prior to V68.18.3Z) on printers built after the date listed above is not supported and will likely result in incorrect registration.

## New SGD Parameter `media.feed_skip` and CPCL Registration Error

This SGD parameter controls the number of dot rows to skip after the trailing edge of the black bar or gap, for CPCL labels only. This parameter is the saved (after a power cycle) version of the second parameter in the CPCL SETFF command (see the SETFF command description in the CPCL programming manual for more details). The default value is 5.

Note that in this release a 4 dot row registration error was corrected for CPCL labels when using black bar media. Starting in this release, CPCL labels will begin printing

4 dot rows (~ 0.5mm) closer to top edge of the label. This is likely not visible to most users. However, if this should not be the case the `media.feed_skip` parameter can be used to compensate. To do so set the value to "9", and this will add back the extra 4 dot rows removed by the firmware. Since this parameter does not exist in earlier versions of firmware, adding this setting to a configuration file would have no impact for those versions. Such a change would allow for common registration behavior across firmware versions.

```
! U1 getvar "media.feed_skip"
! U1 setvar "media.feed_skip" "9"
```

## Potential Issue When Updating Firmware to V68.18.3Z

Updating printers that were initially built with firmware prior to this release may cause the printer to feed a label on power up. Printers originally built with the V68.18.3Z release will not have this behavior. To correct this issue such that no feed is performed at power up send the following commands (including CR/LF after each line) to the printer:

```
^XA^JUF^XZ
^XA^JUS^XZ
```

Note that this will reset the printer's configuration. Any previously installed customer unique configuration commands will need to be re-applied.

## V68.18.1Z

**Release Date: 7 June 2012**

### Enhancements

- Add support for 802.11 n radio, SKU QNx-xxNxxxxx-xx (US and CA only)
- Improved USB performance
- Improved 802.11 and Ethernet file download performance
- Printer no longer reboots when docked or undocked from Ethernet cradle
- SGD: added file.dir\_format command, see details below

### Issues Corrected

- CPCL: change ON-OUT-OF-PAPER default from PURGE 2 to PURGE 1
- CPCL: Performance degradation with large number of references to CPF fonts
- CPCL: DIR commands incorrectly lists files from the Z: drive
- Firmware update occasionally fails
- Mirror: FTP process very slow running on WS2008 IIS7 FTP v7.5
- Print: Printer feeds ~10 inches after a 2-key (should be 3 inches max)
- SGD: file.type adds double quotes at beginning and end of file data
- ZPL: ^JUA command sets inactivity timeout to incorrect default value
- ZPL: Add ZPL configuration section to 2-key report
- ZPL: printer does not use stored tear-off setting after power up
- ZPL: ^MF command fails to perform media calibration
- ZPL: printer delays 2-3 seconds when format contains a ^JUS
- 802.11: Fails to connect to an AP configured for WEP with shared authentication
- 802.11: Remote auto-connect occurring before power on mirror

### File.dir\_format SGD Command

A new SGD parameter called file.dir\_format has been created. When set to "zpl" the file.dir command operates as described in the ZPL programming manual. When set to "cpcl" the file.dir command operates identically to the DIR command described in the CPCL programming manual. The default value is "zpl".

### Examples

```
! U1 setvar "file.dir_format" "cpcl"
! U1 getvar "file.dir_format"
! U1 getvar "file.dir"
```

## V68.18.0Z

**Release Date: 13 January 2012**

### Enhancements

- Add support for ZPL (see comments below)
- Add support for ZPL command override feature (see comments below)
- Add support for XML input
- Add support for ZBI 2.0 (requires license to enable)
- Reduced printer shutdown time
- Mirror: Add support for fs\_image feature
- Mirror: add support for ip.mirror.enable\_firmware\_update SGD
- SGD: Add support for remote auto-connect via TCP
- SGD: Add support for Secure FTP (SFTP)
- SGD: add capability to save a two-key report to a text file (see comments below)
- SGD: add support for ip.dhcp.cache\_ip parameter
- SGD: add ability to restore all defaults (device.restore\_defaults with “all” option)
- SGD: optional disablement of battery alerts
- SGD: add support for DHCP Option 12
- LCD: Envelop icon now stays on when the parser is locked to a port expecting more data
- Add ability to parse ZPL commands in config.sys and autoexec.bat files

### Issues Corrected

- Telnet.wml file does not work
- Index.shtml and logo.png files show up in E: drive listing
- Bluetooth: Potential loss of data when a connection is closed by the host
- LCD can become garbled on power up
- LCD: display “Restarting” instead of “Shutting Down” after a firmware update
- Mirror: unable to FTP index.shtml file
- Mirror: files with more than 16.3 characters in the filename do not mirror
- Mirror: alert messages are not correct per the user manual
- Mirror: update incorrectly triggered by updating file on E: drive
- Mirror: fails when using a DNS server name
- Mirror: fs\_image hangs in UNIX/LINUX environment
- Print: RSS expanded barcodes are difficult to scan
- SGD: The media.tof parameter is not persistent
- SGD: The media.tof parameter does not support negative values
- 802.11: Static IP addresses do not display on LCD (or SGD) until printer is associated

- 802.11: FTP login with -A option (anonymous) does not work from a Microsoft Windows platform (see comments below)

## ZPL Notes for QLn

- No changes are needed to the **device.languages** SGD parameter to enable ZPL, both CPCL and ZPL are always active. Label formats using CPCL and ZPL commands can be alternated, but only on complete label boundaries.
- ZPL labels print bottom first by default, as they do on legacy mobile printers and tabletop printers.
- Mobile batch files: ZPL commands are now supported in the config.sys and au-toexec.bat files. For example the ^POI command can be added to the config.sys file to cause labels to print top first.
- When printing ZPL labels the default drive is the R: drive. In other words if you load a file via a ZPL command and the drive letter is not specified, the file will be stored on R:. All CPCL files are stored on the E: drive.
- The concept of Pause is an inherent part of ZPL. There are several commands that will put the printer in a Paused state. Tabletop printers address this by including a Pause button on the front panel. The QLn does not have this option. When the QLn enters a Paused state, the Pause message will appear on the screen. Pressing the Feed Button will take the printer out of Pause and will NOT feed any media. If the printer is not in a Paused state, and the feed button is pressed, the normal label feed operation will be performed.
- For printing on continuous media with ZPL, we recommend using the black mark sensor. In CPCL, that is the default behavior so no additional steps are required. That is not the case for ZPL. To use the black mark sensor with ZPL for continuous media, set the sensor to the black mark with the following commands, and then send your normal label with continuous content (note that printer uses the sensor to determine if it is out of media):

```

^xa^mnm^xz
^xa
^mnn
...Normal label content
^xz
    
```

- ZPL Fonts: All standard ZPL fonts are available. Custom fonts must be True type (.ttf) only, Intellifont (.fnt) fonts are not supported. Swiss721 will be included on new printers from the factory, and is available from Zebra Technical Support for printers sold prior to this release. Note that the ~DY command must be used to download the font to the printer, see below regarding the ~DU command.
- The following ZPL features and commands are not present in this release, but may be added in a future release:
  - ^IF - change current working folder
  - ^MA - Set Maintenance Alerts
  - ^MP - Mode Protection
  - ^MW - Modify Heading Warning
  - ^NT - SMTP zpl command
- Real Time Clock functionality: labels with RTC content will not be re-rendered if the label doesn't print within the specified time. For example, this situation can arise if you send a label to the printer and the printer is out of media.

- ^ZZ - Printer Sleep
- ~DU – Download Unbounded True Type Font
- ~HE - Returns to Host Eprom Status
- ~HU - Return ZebraNet Alert Configuration
- ~NR - Set All Network Printers Transparent
- ~NT - Set Currently Connected Printer Transparent
- The following ZPL commands are not present in this release due to deprecation of support for Intellifont fonts:
  - ~DS – Download Intellifont
  - ~DT – Download Bounded True Type Font
- The following ZPL commands are not present in this release due to hardware incompatibilities:
  - ^JV and ~JV - Clamping for the PAX
  - ~PR - Applicator Reprint
- Avoiding ZPL calibration at startup: The QLn does not automatically perform ZPL calibration at startup to avoid wasting media. In addition, the SGD command `zpl.label_length` can be used to avoid executing the ~JC command for similar reasons (though ~JC is supported and can be used if desired). This parameter allows the user to specify the length of the media being used in dot rows, presumably in a startup batch file. This is the same command used on the QL Plus. The format of the command is as follows (for a 400 dot row label in this example):
 

```
! U1 setvar "zpl.label_length" "400"
! U1 getvar "zpl.label_length"
```
- The `zpl.label_length` SGD parameter is updated to the length of the media being used if the ~JC command is executed.
- TCP port: The QLn listens on both ports 6101 (traditional CPCL port) and 9100 (traditional ZPL port), for both the Ethernet and 802.11 interfaces.

## ZPL Override Command

A new suite of SGD parameters called `device.override` has been created. These are permanent settings which indicate whether or not the specified ZPL commands are ignored. The intent is to include the `device.override` commands in a start up file, to take effect on subsequent ZPL commands sent to the printer via one of the communications interfaces. Only a small subset of ZPL commands can be overridden, these are listed below. This feature is not supported for CPCL commands. The following describes the specific SGD commands:

**`device.command_override.add`:** looks for a supported override command, and if supported adds it to the override list. This is a setvar command only.

**`device.command_override.clear`:** clears the override list. This is a setvar command only.

**`device.command_override.list`:** returns the list of ZPL commands to override. This is a getvar command only.

Supported ZPL commands that can be overridden: ^MN and ^MM



## Examples

```
! U1 setvar "device.command _ override.add" "^MN"
! U1 setvar "device.command _ override.add" "^MM"
! U1 setvar "device.command _ override.clear" ""
! U1 getvar "device.command _ override.list"
```

## Saving the 2-Key Report to a File

This feature is intended to facilitate interactions between the user and Zebra technical support. Often a copy of the 2-key (configuration) report is required to debug a problem. Prior to this feature the 2-key needed to be printed and scanned. With this feature the report can now be saved to a text file on the printer's flash memory, copied to a local PC using the Zebra Setup Utility (ZSU), and then emailed. To generate the report send the following command to the printer using the "Open Communication With Printer" menu in the ZSU:

```
! U1 do "device.save _ 2key" "now"
```

To retrieve the file send the following command:

```
! U1 do "file.type" "2key.txt"
```

This will display the results in the receive window. On the File menu of the ZSU, select Export Received Data, and save to a file on your PC.

## Using Anonymous FTP Login from a Microsoft Windows Platform

A new SGD parameter (`ip.ftp.request_password`) has been added to control whether the password was requested by the ftp client. In order to make the QLn behave the same way as the legacy QL Plus family did when sending an ftp -A command from a Microsoft Windows platform, first send the following command to the printer:

```
! U1 setvar "ip.ftp.request_password" "yes"
```

Note that the default behavior for QLn is similar to Zebra desktop and tabletop printers (i.e., the default value for the above SGD is "no").

## V68.16.3Z

**Release Date: 6 September 2011**

### Enhancements

- 802.11: Added wlan.roam.interval parameter, reduces roaming
- 802.11: Improved roaming algorithm

### Issues Corrected

- HW: Incorrect media width sensor operation
- HW: Enable charging circuit on power up
- COMM: Serial and USB port lockup after 1020 labels on QLn220 only
- CPCL: QLn responding incorrectly in CPCL synchronous mode
- CPCL: After media load PRESENT-AT is not performed

- CPCL: Print redirection not working when run from a startup file
- Ethernet: DHCP fails on soft reset when docked
- 802.11: Application corruption when mirroring
- 802.11: WEP-128 requires all four keys to be set, should only need one
- 802.11: IP roam packets not sent if WEP-128 is used
- 802.11: Roaming thresholds using incorrect values, see note below
- 802.11: Updated roaming related default values, see note below
- 802.11: "Loss of Signal" alert messages are too aggressive
- 802.11: In range roaming based on signal strength does not work
- WML: Unable to display full Latin character set using custom WML files

After loading this release it is necessary to send the following commands to the printer in order to update the default roaming values:

```
! U1 do "device.restore _ defaults" "wlan"  
! U1 do "device.reset" ""
```

Note that a carriage return and line feed are required after each line.

### V68.16.2ZA

## (Service Pack)

**Release Date: 5 August 2011**

### Enhancements

- N/A

### Issues Corrected

- HW: incorrect media width sensor operation
- COMM: Serial and USB port lockup after 1020 labels on QLn220 only
- CPCL: QLn responding incorrectly in CPCL synchronous mode

## V68.16.2Z

**Release Date: 5 August 2011**

### Enhancements

- N/A

### Issues Corrected

- PRINT: Feed key does not perform PRESENT-AT
- CPCL: TYPE command does not respond when file does not exist
- 802.11: Roaming does not work when using WEP encryption
- 802.11: IP roam packets sent out before DHCP request
- 802.11: Channels mask does not work for channels 12 – 14

## V68.16.1ZA

## (Service Pack)

**Release Date: 15 July 2011**

### Enhancements

- N/A

### Issues Corrected

- PRINT: Feed key does not perform PRESENT-AT
- CPCL: TYPE command does not respond when file does not exist
- 802.11: Roaming does not work when using WEP encryption
- 802.11: IP roam packets sent out before DHCP request

## V68.16.1Z

**Release Date: 15 July 2011**

### Enhancements

Original release on QLn220

### Issues Corrected

- PRINT: Improved print quality on tag stock.

## V68.16.0Z

**Release Date: 06 May 2011**

This is the initial release of this firmware. It is for use with the following printer models:

- QLn320

# V72 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V72.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZT210
- ZT220
- ZT230

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):

- IP Address Whitelisting for incoming print connections
- 802.1x, with support for user name, password and private key password
- User supplied certificates for 802.1x
- Transport Layer Socket (TLS)
- User supplied certificates for TLS
- User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”
- HTTPS for the printer web pages
- User supplied certificates for HTTPS
- User Defined Gateway Ping intervals
- User supplied web sockets certificates
- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset.
- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location
  - has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - The LE GAP Device name – this GATT attribute will require pairing before it can be read.
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - Printers with radios that support 4.1 or later now support Numeric Comparison pairing for Bluetooth Low Energy pairing events. NOTE – only used if both devices support Bluetooth 4.1 and the Secure LE connection protocol.

### Issue Corrected

- ZBI now correctly handles output on the serial port.
- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).

- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- Mirror Feedback files are now working correctly.
- The display of “Labels remaining in batch” information on the front panel has been optimized.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### **"media.tof\_tune"**

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.
- Example:
  - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
- Suggested starting value when migrating from RW to ZQ500: “-13”.
- Not affected by a printer default.

### **"print.vertical\_dpi\_adjust "**

- Range: 95.0 to 105.0.
- Default: 100.0 (no change in y-coordinate or height of print fields)
- Example:
  - ! U1 setvar "device.cpcl\_adjust\_length\_dpi" "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
- Suggested starting value when migrating from RW to ZQ500: “98.4”.
- Not affected by a printer default.

## Link-OS 4

### V72.20.01ZB

**Release Date: 01 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZT210
- ZT220
- ZT230

#### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V72.20.01Z

**Release Date: 14 October 2016**

This firmware includes all features of the previous [V72.19.15Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZT210
- ZT220
- ZT230

#### Changes

- Link-OS version updated to v4.0.
- Support has been added for a Visibility Agent. This new feature can connect a networked Link-OS printer to Zebra’s Asset Visibility Service (AVS). The Asset Visibility Service is a Zebra-managed service offering that provides Zebra partners and customers ‘at-a-glance’ visibility to analytical insights about their device health, utilization, and performance. When Link-OS v4 printers are connected to a wired or wireless network, they will attempt to connect to the Asset Visibility Service by default. When successfully connected, the printer sends approximately 5 Kbytes of data per day (depending on how many alert events happen per day).
  - Data printed on any labels, tags or receipts are not transmitted to the Asset Visibility Service. The printers only communicate predefined settings on a scheduled basis. The printer sends Discovery Data and Settings and Alerts Data. The settings that are transmitted are listed below in the form of Set-Get-Do commands and are detailed in the Zebra Programming Guide.
  - The printer uses an encrypted, certificate-authenticated web socket connection to connect to the ZPC. **NOTE:** This is the same connection type that is typically used when you connect to an e-commerce or banking site.



- The Visibility Agent can be turned off using a Set-Get-Do Command. Using your preferred software or Zebra Setup Utilities, send the commands below to configure and validate the Asset Visibility Agent settings. You can download Zebra Setup utilities at <https://www.zebra.com/setup>.

## weblink.zebra\_connector.enable

Turns the Asset Visibility Agent on or off. Additional information can be found in the App Note. See <https://www.zebra.com/us/en/products/software/barcode-printers/link-os/application-notes.html>.

**Values:** "on" or "off"

**Default Value:** "on"

### To send the commands:

- Send the following command to Opt Out (disable the connection to ZPC and the Asset Visibility Service):

```
! U1 setvar "weblink.zebra_connector.enable" "off"
```

- Send the following command to validate that you have opted out:

```
! U1 getvar "weblink.zebra_connector.enable"
```

The printer should respond with "off".



**NOTE:** Be sure to include a carriage return/line feed after sending a command to the printer.

If the Visibility Agent is on, there are two data types that the printer can send to the AVS platform – **Discovery Data** and **Setting/Alert Data**.

### Discovery Data

This information is sent when the printer connects to the ZPC. The following printer settings are transmitted:

Printer Settings		
device.unique_id	media.type	device.oem.model_name
ip.dns.domain	media.thermal_mode	appl.name
ip.active_network	media.printmode	device.location
mac_raw	odometer.total_label_count	zpl.system_status
ip.protocol	odometer.media_marker_count1	ip.addr
ip.netmask	odometer.media_marker_count2	ip.ftp.enable
ip.gateway	label_queue.batch_label_cnt	ip.lpd.enable
ip.port	label_queue.format_counter	ip.tcp.enable
device.pnp_option	zbi.enabled	ip.udp.enable
device.languages	zbi.state	ip.http.enable
device.cpcl_formatting_commands_disable	zbi.revision	ip.smtp.enable
head.resolution.in_dpmm	head.width.in_dots	ip.pop3.enable
zpl.label_length	ip.port_json_config	ip.snmp.enable
ezpl.print_width	appl.link_os_version	ip.telnet.enable
media.darkness.mode	device.friendly_name	weblink.enable

## Settings and Alerts Data

This information is sent by the printer at the schedule listed in the table below. The following printer settings or alerts are transmitted:

Printer Settings		
At connection:	At connection:	When the Alert occurs:
weblink.zebra_connector.version	device.bluetooth_installed	PAPER OUT
device.product_name	odometer.media_marker_count	RIBBON OUT
print.tone_format	media.type, ezpl.media_type	HEAD ELEMENT BAD
power.percent_full	interface.network.active.speed	SUPPLY TOO HOT
power.serial_number_string		HEAD OPEN
power.manufacture_date		HEAD COLD
power.cycle_count		HEAD TOO HOT
power.device_name	power.percent_full	CUTTER JAMMED
power.full_charge_capacity	wlan.signal_strength	COLD START
power.date_first_used	odometer.total_print_length	
interface.network.active.ip_addr	interface.network.active.speed	
wlan.signal_strength		
odometer.total_print_length		power.cycle_count
odometer.rfid.valid_resetable		power.device_name
odometer.rfid.void_resetable	print.tone	power.full_charge_capacity
memory.flash_size	print.tone_zpl	odometer.total_label_count
memory.flash_free	media.speed	odometer.rfid.valid_resetable
device.ltu_installed	zpl.label_length	odometer.rfid.void_resetable
device.cutter_installed		memory.flash_free
device.rewinder_installed		odometer.media_marker_count
		media.type
		ezpl.media_type

- Front Panel Batch Counters have been made available. They can be turned on by using the SGD command `display.batch_counter`.
- Web sockets connections now support SHA2 certificates. The printers will continue to support SHA1 certificates until Link-OS v5 is released (in 2017). At that time, the printers will no longer support SHA1 certificates, in accordance with privacy best practices.
- Alerts are no longer displayed over the Home menu to enhance readability.
- New Set-Get-Do Commands were implemented. Refer to the Zebra Programming Guide for details on each command.
  - head.resolution.in\_dpi
  - file.capture\_response.begin
  - file.capture\_response.end
  - file.capture\_response.destination
  - device.command\_override.add
  - device.command\_override.clear

- `device.command_override.list`
- `device.command_override.active`
- `weblink.zebra_connector.version`
- `weblink.zebra_connector.enable`
- `weblink.zebra_connector.proxy`
- `weblink.zebra_connector.authentication`
- `weblink.zebra_connector.authentication.add`
- `weblink.zebra_connector.authentication.remove`
- `weblink.zebra_connector.authentication.entries`
- `wlan.wpa.timecheck`
- `wlan.rts_cts_enabled`
- `display.batch_counter`
- `device.set_clock_to_build_date`

### Issues Corrected

- The SNMP `zbraOptUnsAlertCondition` and `zbrOptUnsAlertsEntry` response strings have been extended to include 1023 characters.
- The Japanese and Korean front panel menus have been adjusted to eliminate character overlaps.
- SNMP Print Job Completed reporting has been enhanced when using the Pause Alert.
- The ZBI `WRITE` command has been corrected to count all data written to the system.
- The EPL `URH` and `URL` commands will now return a value in meters.
- The Mirror system timing has been altered to include a retry, so as to improve file writing performance.
- EPL has been enhanced to handle images larger than the label size.
- The command `zp1.zp1_override` has been eliminated; use the `device.command_override` commands instead.
- The printer will now feed to the `SET-TOF` defined position when that setting has been set, and the FEED button is pressed.
- The Mirror system will now accept the return code `125` in addition to the return code `150`, in order to support IIS7 and FileZilla servers.
- The Mirror system now supports time and date stamping used by IIS7 and FileZilla servers.
- Firmware updating when using both Profile Manager and either IIS7 or FileZilla has been optimized to avoid conflicts.
- Wi-Fi roaming and Protected Management Frames (PMF) support have been improved.
- Memory management during printing has been optimized for cases where a `.TTF` font, graphics, and inverted orientation printing are being used.
- The JSON implementation of the `usb.mirror.feedback.odometer` and `ip.mirror.feedback.odometer` commands now have values of `READ_WRITE_ACCESS`.
- The JSON implementation of the `zbi.state` command has been changed from a string type to an enum type.
- The EPL command `oR0,0` is now supported..

- The Czech menu will now use the word **INCHES**.
- Socket connections on ZBI have been optimized to avoid a connection not ending when it should.
- The JSON implementation of **interface.network.active.speed** is now treated as an integer.
- **APPLICATOR** mode will be offered and selectable, and the printer will use **APPLICATOR** paper movement behavior while in the mode; however since the printer does not have an applicator option, the printer will not wait for applicator signals.
- The label feed length after a calibration will now be updated to use the newly calibrated length.
- The range for **ip.discovery.port** is now 1 - 65535.
- The range for **zp1.label\_length** has been corrected in the allconfig.

## Link-OS 3

### V72.19.15Z

**Release Date: 14 January 2016**

This firmware includes all features of the previous [V72.19.13Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZT210
- ZT220
- ZT230

#### Changes

- The wireless settings commands only support non-control ASCII characters.
- FTP PORT commands are supported when the port number requested is above 1023 and the IP address being requested is the same as that of the device initiating the connection.

#### Issues Corrected

- Network Time Protocol settings syntax checking has been enhanced.

### V72.19.13Z

**Release Date: 31 August 2015**

This firmware includes all features of the previous [V72.19.10Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZT210
- ZT220
- ZT230

#### Changes

- The printers now support the “small label tracking” feature, by default. The command `"media.small_label_tracking"` can be set to `"off"` to disable this feature.
- Link-OS printers now support downloading PEM and DER formatted WLAN certificates in the P12 format for the TLS, TTLS and PEAP security types. Additionally, P12 formatted certificates are now supported for downloading private keys and client certificates. For more information, see the App Note “Direct WLAN Cert Downloading.”
- Front Panel passwords are now supported on the ZT230. The password level can be set from the Tools menu.
- The new Zebra logo is now used on the front panel, web pages and two-key report.
- The printers will now store information related to the state of the devices sensors and internal printer operations which may be accessed and used by Zebra for the purpose of improving the products performance and readability. For more information, please contact [softpm@zebra.com](mailto:softpm@zebra.com).

## Issues Corrected

- The printer will no longer apply adjustments to the ~TA (Tear Off) setting after completing the “No Motion” Head Open or Power Up action.
- The contrast setting on the display will be retained through a power cycle.
- The "netmanage.avalanche.agent\_addr" command will now accept a DNS value.
- The printers will now accept a .GRF image larger than 100KB.
- The ZPL implementation of the Datamatrix barcode has been enhanced to support more combinations of standard ASCII and extended ASCII character strings.
- JSON parsing has been enhanced to better handle slow transmissions to the printer.
- Rendering time for ZPL generated circles, boxes with rounded corners and diagonal lines has been enhanced.
- Font handling has been improved to ensure that when a new font replaces an existing font, the character mapping is correctly updated.
- The ^HZ0 response now places a drive letter in the <OBJECT-DATA> reply.
- The ^GFA command will no longer produce a stretched image when the last line of the encoded graphic is a “,” or a “!”.
- ZBI program throughput has been enhanced.
- The Cloud Connect web sockets system has been optimized to improve throughput.
- The Cloud Connect web sockets has been optimized to better handle large file (1MB+) downloads from the printer to a host system.
- The USB implementation has been enhanced to optimize bi-directional communication.
- In order to improve throughput, the WLAN system will now use "CTS to Self" for the default HT mode. The system can be set to use "RTS-CTS" by using the "wlan.rts\_cts\_enabled" command (default is "off").

## V72.19.10Z

### Release Date: 07 January 2015

This firmware includes all features of the previous [V72.19.6Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZT210
- ZT220
- ZT230

## Changes

- Wi-Fi certification for this model is now based on the Standard Zebra Wireless driver
- Ad-Hoc wireless is now supported.
- Opportunistic Key Caching (OKC), "Fast Roaming" is now supported on WLAN connections.
- The Network Time Protocol (NTP), which allows setting the printers clock based on a time server, is now supported.
- Country support for RFID has been expanded.

- The total label count odometer value has been added to the configuration label.
- The Avalanche client now supports reporting a successful printer OS update.
- The printer will now validate that user-assigned network port number assignments do not conflict with each other.
- The OpenSSL version the printers use is now v1.0.0m.
- The "**device.jobs\_print**" SetGetDo command is now supported.
- The Link-OS version is now v2.5.

### Issues Corrected

- Throughput for small labels (1.5" long and shorter) has been enhanced.
- Support for CCX is now available via the Zebra Development Services team, so that implementations can be tailored to individual network needs.
- ^HZA responses when running ZBI programs have been corrected to include all expected data.
- WML has been corrected to consistently show messages positioned in the bottom center of the screen.
- ZBI processing of formats larger than 32K has been corrected.
- The EPL speed command ("**S**") will now set the print speed, slew and backfeed rates.
- The value set by the "**Q**" command will now be used in both ZB and ZT modes.
- The WLAN MAC address will now be consistently reported after a power up event when a new main logic board has been installed.
- The ~JP command now correctly pauses the printer.
- EPL '**p**' commands will no longer effect subsequently printed ZPL formats.
- The Czech and Russian translations on the front panel of the ZT230 have been updated.
- Graphics sent to the printer using the EPL command "**GM**" are now supported.
- MAC address reporting has been enhanced to ensure address is correctly reported at startup.
- The E:SYSLOG.TXT file will only be saved to the E: drive when the "**device.syslog.save\_local\_file**" setting is set to "**yes**".
- An UCC/EAN128 barcode, using mode D, which contains an odd number of digits following a subset A/B section will now print correctly.
- Spaces are now allowed in "**netmanage.avalanche.set\_property**" SetGetDo commands.
- Recalling formats that contain serialized fields with XML is now functional.
- The ZT230 front panel menu now supports a Label Top setting.
- The printer web page label preview function has been enhanced to support longer labels.
- Keyboard Display Unit support has been enhanced to correctly support processing Real Time Clock fields.
- Sensor selections (Reflective/Transmissive) will now be maintained through a power cycle.
- EPL cut mode processing has been enhanced to better handle repeated cut events in a batch.

## Link-OS 2

### V72.19.6Z

**Release Date: 20 September 2013**


This firmware includes all features of the previous [V72.19.5Z](#), and is for use with the following printer models:

- ZT210
- ZT220
- ZT230



**NOTE:** For optimal printing quality and proper printer performance across our product line, Zebra strongly recommends the use of genuine Zebra supplies as part of the total solution. Specifically, the ZT210, ZT220, and ZT230 printers are designed to work only with genuine Zebra printheads, thus maximizing safety and print quality. Please note the following Printer status messages that can be displayed on the unit.

**Table 2**

<p><b>Status of Printer as Shown by Indicator Lights:</b></p>  <p>STATUS PAUSE DATA SUPPLIES NETWORK</p> <p><b>ZT230 Error Message:</b></p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>PH NOT AUTHENTICATED REPLACE PRINthead</b></p> </div>	<p><b>STATUS light steady red</b>  <b>PAUSE light steady red</b>  <b>DATA light steady red</b></p> <p>The printhead was replaced with one that is not a genuine Zebra printhead. Install a genuine Zebra printhead to continue.</p>
--	---

### Changes

- The Link-OS version number is now 2.0
- Added full support for Profile Manager features. Upgrade to this firmware version to use printers with the Profile Manager app. This firmware is embedded in the Profile Managers Resources system to facilitate updating.
- In order to ensure current time reporting, the Real-time clock has been enhanced to support re-rendering formats during printing.
- Added support for DHCP option 43. The feature allows the printer to obtain the settings used to control Cloud Connect weblink connections or Mirror events as part of receiving a DHCP assigned IP address. This requires that DHCP Option 60 is not empty and that `ip.dhcp.auto_provision_enable` is set to "on".

The package of Cloud Connect/weblink information sent from the DHCP server in the Option 43 response can include the:

- Server address
- Authentication server name



- User name and password for proxy logins

The package of Mirror information sent from the DHCP server in the Option 43 packet can include the:

- Server address
- Mirror path
- Mirror feedback path
- Mirror appl path
- Mirror mode

Consult the Programming Guide for more information.

- Added a **"default"** field to the **"allconfig"** JSON response for each setting
- The Cloud Connect weblink connection will now send a websocket ping to the connected server every 60 seconds. If no response is received after three attempts, the connection will be closed.
- The Cloud Connect weblink connection now logs the servers certificate serial number and fingerprint
- Additional bits added to the **~HQUES** response and Advanced Discovery packet
- A new setting **weblink.ip.connX.num\_connections** has been added. This setting shows the number of established connections. The control channel counts as 1 as well as all other sub channels (echo, raw\_port, json\_config). This is getvar only settings with a max value that is the same as the **max\_number\_connections**. Consult the Programming Guide for more information.
- A new group of settings for position have been added. These allow users to manually set latitude, longitude and altitude values on the printer. Consult the Programming Guide for more information. The new settings are:
  - device.position.latitude** in degrees min/max: -90.0/90.0
  - device.position.longitude** in degrees man/max: -180.0/180.0
  - device.position.altitude** in meters min/max: -10000.0/406700000.0
  - device.position.accuracy** in meters min/max: 0.0/406700000
- User available **E:** memory is now 32MB.

### Issues Corrected

- JSON will now return a null instead of a "?" for settings that do not exist on the device.
- .TTF and .TTE files will now be listed when using the **"List Fonts"** from the front panel.
- ZBI Event ID 4 (Cancel Key press) is now supported.
- Settings will now appear correctly in the ZebraNet Bridge application.
- Handing DSR handshaking has been altered to duplicate the behavior used on the S4M.
- Downloading larger font files has been improved.
- The **ip.dns.domain** or **ip.dns.servers** values can now be set while IP addressing is set to permanent.
- Scalable font field handling improved.
- Ping response times have been enhanced.

## Link-OS 1

### V72.19.5Z

**Release Date: 03 July 2013**

This firmware includes all features of the previous [V72.19.1Z](#), and is for use with the following printer models:

- ZT210, ZT220, ZT230

#### Changes

- Dual support for ZPL and EPL II



**NOTE:** The following commands are not supported:  
AUTOFR, FB, JB, JC, JF, OF, OS, US, US1, UT.

When using the tap to reprint function on the ZT230, the printer must be at the idle screen and the down arrow key is used to trigger the reprint event.

- The SGD command "`device.ep1_legacy_mode`" now supports a new "`2746e`" parameter. This mode is the default setting on ZT200 series printers.



**NOTE:** You must send the following two commands to get all of the 2746e compatibility features:

```
! U1 setvar "device.ep1_legacy_mode" "2746e"
! U1 setvar "device.ep1_legacy_mode" "print_orientation"
```

- The SGD command "`device.languages`" now supports "`zpl`", "`hybrid_xml_zpl`", "`ep1`" and "`ep1_zpl`". The default on ZT200 series printers is now "`ep1_zpl`".
- The `^MWN` command will now deactivate the HEAD COLD Warning.

#### Issues Corrected

- The default Telnet password has been set to "`1234`"
- `^MWN` command is now working correctly.

### V72.19.1Z

**Release Date: 11 January 2013**

This firmware is for use with the following printer models:

- ZT210
- ZT220
- ZT230

This firmware includes all features of the previous [Non-Link-OS](#).

#### Issues Corrected

NA

## Link-OS Features

Initial release of Link-OS support.

- Data Capture to SGD
- Unsolicited alerts for SGD changes
- HTTP POST transport for unsolicited alerts
- SGD change log
- ZBI events for SGD changes
- User Variables Port 9200 -- SGD Channel
- Cloud Connectivity

## Non-Link-OS

### V72.18.4Z

**Release Date: 26 November 2012**

This firmware is for use with the following printer models:

- ZT210
- ZT220
- ZT230

This firmware includes all features of the previous [V72.18.3Z](#).

#### Changes

- Improved 802.11n noise floor performance.

#### Issues Corrected

- Files sent from ZBI-Developer will now remain in flash after a power cycle.

### V72.18.3Z

This firmware is for use with the following printer models:

- ZT210
- ZT220
- ZT230

**Release Date: 15 October 2012**

This firmware includes all features of the previous [V72.18.2ZA](#)

#### Changes

- The front panel menu system for the ZT230 now supports Japanese, Korean, Simplified Chinese and Traditional Chinese, Russian, Polish, Czech and Romanian

- Front Panel Alerts on the ZT230 are now easier to read due to a new, larger character size font.
- A new Auto-Recovery feature has been added that will reinstall the printers operating system if an issue is detected during printer start up. The operating system version on the printer will remain the same after Auto-Recovery. When Auto-Recovery runs on a ZT230 printer, the unit will display “Decompressing Files”, then “Writing Files to Flash” and then “Finishing Install” after which the printer will then restart. When Auto-Recovery runs on a ZT210 or ZT220 printer, all LEDs will remain yellow until the Auto-Recovery process is complete and then the printer will then restart.



**NOTE:** Data sent to the unit during a printer Operating System update or an Auto-Recovery may not be received or processed.

### Issues Corrected:

- The result of using the font identifier command (^CW) is now shown on the printers directory Web page.
- The Real-Time clock has been enhanced to roll-over to a new date when the month has 31 days and “months” is being used as the offset time.
- The format counter response in the ~HS command response has been corrected when Reprint Mode is enabled.
- The LPR port is now supported in ZBI apps.
- Processing of the ~JP command, when used with the Set-Get-Do command
- "formats.cancel\_all" has been enhanced
- Web pages have been enhanced to display faster.
- Front Panel French phrases on the ZT230 have been edited to fit across the width of the screen

## V72.18.2ZA

**Release Date: 29 June 2012**

This firmware is for use with the following printer models:

- ZT210
- ZT220
- ZT230

This firmware includes all features of the previous [V72.18.2Z](#).

### Changes

- None.

### Issues Corrected

- When setting the printer password using the ^KP command, the web page password is also now set to the same value.
- When Reprint Mode is enabled, using the ~PR command now reprints the last label printed.
- Sending the ^JZ command now re-prints the missing label after an error condition.
- The Label Take Up (LTU) unit will now rewind the backing before the printed label is removed.
- Persistent files can now only be deleted via the ^ID and file.delete commands when the file location and file name are fully defined in the command.

## V72.18.2Z

**Release Date: 27 April 2012**

This firmware is for use with the following printer models:


- ZT210
- ZT220
- ZT230

### Changes

- 802.11a/b/g/n is now supported.

The front panel content is now entirely written in WML. Changes made to settings via the front panel are now immediately in effect. For users who wish to edit the front panel content, the WML for the front panel is available for download at [www.zebra.com](http://www.zebra.com).

- The printer now supports a SNMP MIB. This is available for download at [www.zebra.com](http://www.zebra.com). The “683” Print Server MIB is no longer supported in this product.
- The printer now supports TCP Raw connections via ports 9100 and 6101 by default.
- The printer now supports up to 23 alerts.
- The Unicode engine can be turned off by sending `^XA^ZC2^XZ` to the printer. It can be turned on by sending `^XA^ZC0^XZ`. Include a `^JUS` before the `^XZ` to make changes permanent across power cycles.
- The Swiss721 font is now included by default. If desired it can be deleted to recover space by sending `^XA^IDE:TT0003M_.TTF^XZ` to the printer.
  - Intellifont fonts are no longer supported. The `~DS` and the `~DT` commands are no longer supported.
  - Scripts that previously called for font files named using the `.fnt` extension will now be supported by the printer automatically searching on E memory for a `.TTF` file named with the same name. For example, the printer will treat `TT0003M_.TTF` as if it were `TT0003M_.FNT`.
- The “Cold Start” Alert is now manageable. It is on by default, but can be deleted if desired. The alert can be deleted via the web interface, or by sending `^SX0,F,N,N` to the printer.
- If a `getvar` is executed against a branch name rather than a full SGD name, the printer will return the name of all SGDs in that branch along with their possible values.

 **! U1** `getvar “power”` will return:

```
power.
power.dtr_power_off : on , Choices: on,off
power.shutdown
```

- A number of new Set-Get-Do commands are supported. These are listed here and detailed in the Programming Guide:
 

<ul style="list-style-type: none"> <li>• <code>comm.halt</code></li> <li>• <code>comm.handshake</code></li> <li>• <code>device.cutter_installed</code></li> <li>• <code>device.ff_disable</code></li> </ul>	<ul style="list-style-type: none"> <li>• <code>netmanage.avalanche.agent_addr</code></li> <li>• <code>netmanage.avalanche.available_agent</code></li> <li>• <code>netmanage.avalanche.available_port</code></li> <li>• <code>netmanage.avalanche.encryption_type</code></li> </ul>
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## V72 Printer OS Release Notes

- device.host\_identification
- device.host\_status
- device.ltu\_installed
- device.pause
- device.print\_reprogram\_2key
- device.super\_host\_status
- device.unpause
- display.backlight
- display.backlight\_on\_time
- display.language
- display.load\_card
- ezpl.head\_close\_action
- ezpl.label\_length\_max
- ezpl.label\_sensor
- ezpl.manual\_calibration
- ezpl.media\_type
- ezpl.power\_up\_action
- ezpl.print\_method
- ezpl.print\_mode
- ezpl.print\_width
- ezpl.reprint\_mode
- ezpl.take\_label
- ezpl.tear\_off
- file.dir\_format
- formats.cancel\_all
- input.capture
- interface.network.active.arp\_interval
- interface.network.active.cable\_type
- interface.network.active.cache\_ip
- interface.network.active.dhcp\_received\_host\_name
- interface.network.active.protocol\_error
- interface.network.active.rx\_errors
- interface.network.active.rx\_packets
- interface.network.active.server\_address
- interface.network.active.server\_protocol
- interface.network.active.speed
- interface.network.active.tx\_errors
- netmanage.avalanche.interval
- netmanage.avalanche.interval\_update
- netmanage.avalanche.model\_name
- netmanage.avalanche.set\_property
- netmanage.avalanche.startup\_update
- netmanage.avalanche.tcp\_connection\_timeout
- netmanage.avalanche.terminal\_id
- netmanage.avalanche.text\_msg.
- netmanage.avalanche.text\_msg.beep
- netmanage.avalanche.text\_msg.display
- netmanage.avalanche.text\_msg.print
- netmanage.avalanche.udp\_timeout
- parallel\_port.mode
- parallel\_port.present
- power.dtr\_power\_off
- power.label\_queue.
- power.label\_queue.shutdown
- power.shutdown
- sensor.paper\_supply
- sensor.peeler
- usb.connected
- usb.device.device\_id\_string
- usb.device.device\_unique\_id
- usb.device.device\_version
- usb.device.manufacturer\_string
- usb.device.product\_id
- usb.device.product\_string
- usb.device.serial\_string
- usb.device.vendor\_id
- usb.halt
- wlan.11n.20mhz\_only
- wlan.11n.aggregation
- wlan.11n.greenfield
- wlan.11n.rifs
- wlan.11n.short\_gi\_20mhz
- wlan.11n.short\_gi\_40mhz
- wlan.active\_channels

- interface.network.active.tx\_packets
  - interface.network.active.wins\_addr
  - internal\_wired.ip.dhcp.arp\_verify
  - internal\_wired.ip.port\_alternate
  - ip.dhcp.arp\_verify
  - ip.dhcp.user\_class\_id
  - ip.dhcp.vendor\_class\_id
  - ip.ftp.request\_password
  - ip.http.admin\_name
  - ip.http.admin\_password
  - ip.http.custom\_link\_name
  - ip.http.custom\_link\_url
  - ip.http.faq\_url
  - ip.http.port
  - ip.mirror.mode
  - ip.port\_alternate
  - ip.snmp.trap\_community\_name
  - log.reboot.
  - log.reboot.code
  - log.reboot.codes
  - log.reboot.reason
  - log.reboot.report
  - wlan.allowed\_band
  - wlan.channel\_mask
  - wlan.ip.dhcp.arp\_verify
  - wlan.ip.port\_alternate
  - wlan.permitted\_channels
  - wlan.roam.monitor
  - wlan.user\_channel\_list
  - wlan.waveagent.
  - wlan.waveagent.enable
  - wlan.waveagent.udp\_port
  - zpl.calibrate
  - zpl.caret
  - zpl.control\_character
  - zpl.delimiter
  - zpl.label\_length
  - zpl.left\_position
  - zpl.save
  - zpl.system\_error
  - zpl.system\_status
  - zpl.zpl\_mode
  - zpl.zpl\_override
- The printer will negotiate with any parallel port connected print server to determine which communication methods can be supported (unidirectional “Compatibility Mode” or bi-directional “Nibble Mode”). This applies to any parallel port connected print server.
  - The ZebraLink 1284.4 layer is no longer supported. The IP address of a ZebraLink print server connected to the parallel port will not be displayed on the printers front panel. Settings from a ZebraLink Print Server connected to the printers parallel port will not be communicated between the print server and printer.
  - External wired SGD commands are not supported.
  - The following items will be supported in a future release:
    - Logical ports on the print server
    - Japanese, Simplified Chinese, Traditional Chinese, Russian, Polish, Romanian, Czech, and Korean translations on the front panel
    - Real Time Clock
    - ^MP full implementation (button protection is supported)
    - Front panel passwords

# V73 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V73.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- iMZ220
- iMZ320

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)
  - User supplied certificates for TLS



- User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”
- HTTPS for the printer web pages
- User supplied certificates for HTTPs
- User Defined Gateway Ping intervals
- User supplied web sockets certificates
- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The UCODE8 and UCODE8M RFID chips are now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset.
- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - The LE GAP Device name – this GATT attribute will require pairing before it can be read.
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - Printers with radios that support 4.1 or later now support Numeric Comparison pairing for Bluetooth Low Energy pairing events. NOTE – only used if both devices support Bluetooth 4.1 and the Secure LE connection protocol.
  - SetGetDo changes. Several commands have changed:
    - **bluetooth.bonding** – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.
    - **bluetooth.minimum\_security\_mode** – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
      - **1**: No encryption or authentication is required to access the Zebra Parser Service.
      - **2**: Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
      - **3 or 4**: Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.

- **bluetooth.allow\_non\_display\_numeric\_comparison** – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device. If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.
noprint	Display Only	If Passkey Pairing is used, the printer will not print out the passkey. If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.
off	No I/O	Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!

## Issue Corrected

- ZBI now correctly handles output on the serial port.
- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).
- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.
- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- Mirror Feedback files are now working correctly.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### "media.tof\_tune"

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.

- Example:
  - ! U1 setvar "media.tof\_tune" "5"
- Followed by a carriage return/line feed.
- The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
- Suggested starting value when migrating from RW to ZQ500: "-13".
- Not affected by a printer default.

### "print.vertical\_dpi\_adjust"

- Range: 95.0 to 105.0.
- Default: 100.0 (no change in y-coordinate or height of print fields)
- Example:
  - ! U1 setvar "print.vertical\_dpi\_adjust" "97.8"
- Followed by a carriage return/line feed.
- When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
- Suggested starting value when migrating from RW to ZQ500: "98.4".
- Not affected by a printer default.

## Link-OS 4

### V73.20.01ZB

#### Release Date: 01 November 2017

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- iMZ220
- iMZ320

#### Issues Corrected

The WLAN system has been updated to fix the "Key Reinstallation Attacks" issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V73.20.01Z

#### Release Date: 14 October 2016

This firmware includes all features of the previous [V73.19.15Z](#) release, except where noted otherwise. It is for use with the following printer models:

- iMZ220
- iMZ320

## Changes

- Link-OS version updated to v4.0.
- Support has been added for a Visibility Agent. This new feature can connect a networked Link-OS printer to Zebra's Asset Visibility Service (AVS). The Asset Visibility Service is a Zebra-managed service offering that provides Zebra partners and customers 'at-a-glance' visibility to analytical insights about their device health, utilization, and performance. When Link-OS v4 printers are connected to a wired or wireless network, they will attempt to connect to the Asset Visibility Service by default. When successfully connected, the printer sends approximately 5 Kbytes of data per day (depending on how many alert events happen per day).
  - Data printed on any labels, tags or receipts are not transmitted to the Asset Visibility Service. The printers only communicate predefined settings on a scheduled basis. The printer sends Discovery Data and Settings and Alerts Data. The settings that are transmitted are listed below in the form of Set-Get-Do commands and are detailed in the Zebra Programming Guide.
  - The printer uses an encrypted, certificate-authenticated web socket connection to connect to the ZPC. **NOTE:** This is the same connection type that is typically used when you connect to an e-commerce or banking site.
  - The Visibility Agent can be turned off using a Set-Get-Do Command. Using your preferred software or Zebra Setup Utilities, send the commands below to configure and validate the Asset Visibility Agent settings. You can download Zebra Setup utilities at <https://www.zebra.com/setup>.

### **weblink.zebra\_connector.enable**

Turns the Asset Visibility Agent on or off. Additional information can be found in the App Note. See <https://www.zebra.com/us/en/products/software/barcode-printers/link-os/application-notes.html>.

**Values:** "on" or "off"

**Default Value:** "on"

### **To send the commands:**

1. Send the following command to Opt Out (disable the connection to ZPC and the Asset Visibility Service):

```
! U1 setvar "weblink.zebra_connector.enable" "off"
```

2. Send the following command to validate that you have opted out:

```
! U1 getvar "weblink.zebra_connector.enable"
```

The printer should respond with "off".



**NOTE:** Be sure to include a carriage return/line feed after sending a command to the printer.

If the Visibility Agent is on, there are two data types that the printer can send to the AVS platform – **Discovery Data** and **Setting/Alert Data**.

### **Discovery Data**

This information is sent when the printer connects to the ZPC. The following printer settings are transmitted:

Printer Settings		
device.unique_id	media.type	device.oem.model_name
ip.dns.domain	media.thermal_mode	appl.name
ip.active_network	media.printmode	device.location
mac_raw	odometer.total_label_count	zpl.system_status
ip.protocol	odometer.media_marker_count1	ip.addr
ip.netmask	odometer.media_marker_count2	ip.ftp.enable
ip.gateway	label_queue.batch_label_cnt	ip.lpd.enable
ip.port	label_queue.format_counter	ip.tcp.enable
device.pnp_option	zbi.enabled	ip.udp.enable
device.languages	zbi.state	ip.http.enable
device.cpcl_formatting_commands_disable	zbi.revision	ip.smtp.enable
head.resolution.in_dpmm	head.width.in_dots	ip.pop3.enable
zpl.label_length	ip.port_json_config	ip.snmp.enable
ezpl.print_width	appl.link_os_version	ip.telnet.enable
media.darkness.mode	device.friendly_name	weblink.enable

## Settings and Alerts Data

This information is sent by the printer at the schedule listed in the table below. The following printer settings or alerts are transmitted:

Printer Settings		
At connection:	At connection:	When the Alert occurs:
weblink.zebra_connector.version	device.bluetooth_installed	PAPER OUT
device.product_name	odometer.media_marker_count	RIBBON OUT
print.tone_format	media.type, ezpl.media_type	HEAD ELEMENT BAD
power.percent_full	interface.network.active.speed	SUPPLY TOO HOT
power.serial_number_string		HEAD OPEN
power.manufacture_date		HEAD COLD
power.cycle_count		HEAD TOO HOT
power.device_name	power.percent_full	CUTTER JAMMED
power.full_charge_capacity	wlan.signal_strength	COLD START
power.date_first_used	odometer.total_print_length	
interface.network.active.ip_addr	interface.network.active.speed	
wlan.signal_strength		
odometer.total_print_length		power.cycle_count
odometer.rfid.valid_resetable		power.device_name
odometer.rfid.void_resetable	print.tone	power.full_charge_capacity
memory.flash_size	print.tone_zpl	odometer.total_label_count
memory.flash_free	media.speed	odometer.rfid.valid_resetable
device.ltu_installed	zpl.label_length	odometer.rfid.void_resetable
device.cutter_installed		memory.flash_free
device.rewinder_installed		odometer.media_marker_count
		media.type
		ezpl.media_type

- Web sockets connections now support SHA2 certificates. The printers will continue to support SHA1 certificates until Link-OS v5 is released (in 2017). At that time, the printers will no longer support SHA1 certificates, in accordance with privacy best practices.
- New Set-Get-Do Commands were implemented. Refer to the Zebra Programming Guide for details on each command.
  - head.resolution.in\_dpi
  - file.capture\_response.begin
  - file.capture\_response.end
  - file.capture\_response.destination
  - device.command\_override.add
  - device.command\_override.clear
  - device.command\_override.list
  - device.command\_override.active

- `weblink.zebra_connector.version`
- `weblink.zebra_connector.enable`
- `weblink.zebra_connector.proxy`
- `weblink.zebra_connector.authentication`
- `weblink.zebra_connector.authentication.add`
- `weblink.zebra_connector.authentication.remove`
- `weblink.zebra_connector.authentication.entries`
- `wlan.wpa.timecheck`
- `wlan.rts_cts_enabled`
- `display.batch_counter`
- `device.set_clock_to_build_date`

### Issues Corrected

- When using the Dual Radio, the Bluetooth radio will remain active even if the WLAN radio is not.
- The SNMP `zbraOptUnsAlertCondition` and `zbrOptUnsAlertsEntry` response strings have been extended to include 1023 characters.
- SNMP Print Job Completed reporting has been enhanced when using the Pause Alert.
- The ZBI `WRITE` command has been corrected to count all data written to the system.
- The Mirror system timing has been altered to include a retry, so as to improve file writing performance.
- The command `zp1.zp1_override` has been eliminated; use the `device.command_override` commands instead.
- The printer will now feed to the `SET-TOF` defined position when that setting has been set, and the FEED button is pressed.
- The Mirror system will now accept the return code `125` in addition to the return code `150`, in order to support IIS7 and FileZilla servers.
- Firmware updating when using both Profile Manager and either IIS7 or FileZilla has been optimized to avoid conflicts.
- Wi-Fi roaming and Protected Management Frames (PMF) support have been improved.
- Memory management during printing has been optimized for cases where a `.TTF` font, graphics, and inverted orientation printing are being used.
- The JSON implementation of the `usb.mirror.feedback.odometer` and `ip.mirror.feedback.odometer` commands now have values of `READ_WRITE_ACCESS`.
- The JSON implementation of the `zbi.state` command has been changed from a string type to an enum type.
- Socket connections on ZBI have been optimized to avoid a connection not ending when it should.
- The JSON implementation of `interface.network.active.speed` is now treated as an integer.
- APPLICATOR mode will be offered and selectable, and the printer will use APPLICATOR paper movement behavior while in the mode; however since the printer does not have an applicator option, the printer will not wait for applicator signals.
- The range for `ip.discovery.port` is now 1 - 65535.
- The range for `zp1.label_length` has been corrected in the `allconfig`.

## Link-OS 3

### V73.19.15Z

**Release Date: 14 January 2016**

This firmware includes all features of the previous [V73.19.13Z](#) release, except where noted otherwise. It is for use with the following printer models:

- iMZ220
- iMZ320

**Changes**

- The wireless settings commands only support non-control ASCII characters.
- FTP PORT commands are supported when the port number requested is above 1023 and the IP address being requested is the same as that of the device initiating the connection.

**Issues Corrected**

- Network Time Protocol settings syntax checking has been enhanced.

### V73.19.13Z

**Release Date: 31 August 2015**

This firmware includes all features of the previous [V73.19.10Z](#) release, except where noted otherwise. It is for use with the following printer models:

- iMZ220
- iMZ320

**Changes**

- Link-OS printers now support downloading PEM and DER formatted WLAN certificates in the P12 format for the TLS, TTLS and PEAP security types. Additionally, P12 formatted certificates are now supported for downloading private keys and client certificates. For more information, see the App Note "Direct WLAN Cert Downloading."
- The new Zebra logo is now used on the web pages and two-key report.
- The printers will now store information related to the state of the devices sensors and internal printer operations which may be accessed and used by Zebra for the purpose of improving the products performance and readability. For more information, please contact [softpm@zebra.com](mailto:softpm@zebra.com).

**Issues Corrected**

- The "netmanage.avalanche.agent\_addr" command will now accept a DNS value.
- The printers will now accept a .GRF image larger than 100KB.
- The ZPL implementation of the Datamatrix barcode has been enhanced to support more combinations of standard ASCII and extended ASCII character strings.
- TTF font handling in CPCL has been enhanced to improve performance.



- Rendering time for ZPL generated circles, boxes with rounded corners and diagonal lines has been enhanced.
- CPCL TTF character mapping now uses 1252/Latin 1 to locate characters for print events.
- JSON parsing has been enhanced to better handle slow transmissions to the printer.
- Font handling has been improved to ensure that when a new font replaces an existing font, the character mapping is correctly updated.
- The ^HZ0 response now places a drive letter in the <OBJECT-DATA> reply.
- The ^GFA command will no longer produce a stretched image when the last line of the encoded graphic is a “,” or a “!”.
- The time the Bluetooth system will wait for a connection has been extended to accommodate the needs of more devices.
- ZBI program throughput has been enhanced.
- The Cloud Connect web sockets system has been optimized to improve throughput.
- The Cloud Connect web sockets has been optimized to better handle large file (1MB+) downloads from the printer to a host system.
- The USB implementation has been enhanced to optimize bi-directional communication. .
- The Bluetooth system has been enhanced to support scenarios where the Master device is sending data immediately after creating a connection.
- In order to improve throughput, the WLAN system will now use "CTS to Self" for the default HT mode. The system can be set to use "RTS-CTS" by using the "wlan.rts\_cts\_enabled" command (default is "off").
- The sensor system will now turn off when not printing, to optimize battery use.
- Checksum validation during CPCL downloads has been altered to accept images from the Multiplatform SDK.

### V73.19.10Z

#### **Release Date: 07 January 2015**

This firmware includes all features of the previous [V73.19.7Z](#) release, except where noted otherwise. It is for use with the following printer models:

- iMZ220
- iMZ320

#### **Changes**

- Wi-Fi certification for this model is now based on the Standard Zebra Wireless driver
- Ad-Hoc wireless is now supported.
- Opportunistic Key Caching (OKC), "Fast Roaming" is now supported on WLAN connections.
- The Network Time Protocol (NTP), which allows setting the printers clock based on a time server, is now supported.
- A secondary Bluetooth® channel for management tasks has been added.
- The total label count odometer value has been added to the configuration label .
- "Qatar" is now a supported value for the "wlan.country\_code" SetGetDo command.

- The Avalanche client now supports reporting a successful printer OS update.
- The printer will now validate that user-assigned network port number assignments do not conflict with each other.
- The OpenSSL version the printers use is now v1.0.0m.
- The "**device.jobs\_print**" SetGetDo command is now supported.
- The "**power.low\_battery\_warning\_raw**" command now uses a consistent implementation across the Link-OS Mobile product line. If updating an existing printer, users will have to send the **! U1 setvar "device.restore\_defaults" "power"** command to use this new implementation.
- The Link-OS version is now v2.5.

### Issues Corrected

- Throughput for small label (1.5" long and shorter) has been enhanced.
- Support for CCX is now available via the Zebra Development Services team, so that implementations can be tailored to individual network needs.
- ^HZA responses when running ZBI programs have been corrected to include all expected data.
- ZBI processing of formats larger than 32K has been corrected.
- The printer will now respond to an "**Escape H**" command, when it's received at the end of a ZPL format.
- The WLAN MAC address will now be consistently reported after a power up event when a new main logic board has been installed .
- The ~JP command now correctly pauses the printer.
- The **bluetooth.bonding** setting will now be returned via either a JSON Bluetooth branch or allconfig request.
- MAC address reporting has been enhanced to ensure address is correctly reported at startup.
- Management of Bluetooth connections has been enhanced to ensure data integrity when new connections are being made while data from a prior connection is still being processed.
- The E:SYSLOG.TXT file will only be saved to the E: drive when the "**device.syslog.save\_local\_file**" setting is set to "**yes**".
- An UCC/EAN128 barcode, using mode D, which contains an odd number of digits following a subset A/B section will now print correctly.
- Spaces are now allowed in "**netmanage.avalanche.set\_property**" SetGetDo commands.
- Recalling formats that contain serialized fields with XML is now functional.
- Media sensing calibration has been enhanced to increase accuracy.
- Media cover open (print head open) detection has been improved.

## V73.19.7Z

**Release Date: 22 August 2014**

This firmware is for use with the following printer models:

- iMZ220
- iMZ320

This firmware includes all the features of the previous V73.19.6Z release.

### Changes

None

### Issues Corrected

- Bluetooth® connection handling has been improved.
- Handling of repeated bi-directional data requests over Bluetooth has been improved.
- Handling of large (over 600 byte) data streams over Bluetooth have been improved.
- The `device.macro_get` command has been enhanced to handle pre- and post- pending.
- Improved the radio start up process to ensure correct MAC address reporting.

## Link-OS 2

### V73.19.6Z

#### Release Date: 20 September 2013

This firmware is for use with the following printer models:

- iMZ220
- iMZ320

This firmware includes all the features of the previous V73.19.2Z release.

### Changes

- The Link-OS version number is now 2.0.
- Added full support for Profile Manager features. Upgrade to this firmware version to use printers with the Profile Manager app. This firmware is embedded in the Profile Managers Resources system to facilitate updating.
- Added support for simultaneous 802.11 a/b/g/n and Bluetooth® Dual Radio.



**NOTE:** The Dual radio option is only available on the n radio configuration. By default, the Bluetooth radio is disabled on printers that support dual radio. The Bluetooth radio can be enabled by using the `bluetooth.enable` command. When both the WLAN and Bluetooth radios are enabled, the `wlan.power_save` feature will be turned off.

- Added support for DHCP option 43. The feature allows the printer to obtain the settings used to control Cloud Connect weblink connections or Mirror events as part of receiving a DHCP assigned IP address. This requires that DHCP Option 60 is not empty and that `ip.dhcp.auto_provision_enable` is set to "on".
- The package of Cloud Connect/weblink information sent from the DHCP server in the Option 43 response can include the:
  - Server address
  - Authentication server name
  - User name and password for proxy logins
- The package of Mirror information sent from the DHCP server in the Option 43 packet can include the:
  - Server address
  - Mirror path
  - Mirror feedback path
  - Mirror appl path
  - Mirror mode

Consult the Programming Guide for more information.

- Added a "default" field to the "allconfig" JSON response for each setting.
- The Cloud Connect weblink connection will now send a websocket ping to the connected server every 60 seconds. If no response is received after three attempts, the connection will be closed.
- The Cloud Connect weblink connection now logs the servers certificate serial number and fingerprint.
- Additional bits added to the ~HQES response and Advanced Discovery packet.

- A new setting **weblink.ip.connX.num\_connections** has been added. This setting shows the number of established connections. The control channel counts as 1 as well as all other sub channels (echo, raw\_port, json\_config). This is getvar only settings with a max value that is the same as the **max\_number\_connections**. Consult the Programming Guide for more information.
- A new group of settings for position have been added. These allow users to manually set latitude, longitude and altitude values on the printer. Consult the Programming Guide for more information. The new settings are:
  - **device.position.latitude** in degrees min/max: -90.0/90.0
  - **device.position.longitude** in degrees man/max: -180.0/180.0
  - **device.position.altitude** in meters min/max: -10000.0/406700000.0
  - **device.position.accuracy** in meters min/max: 0.0/406700000
- This release includes support for simultaneous 802.11 a/b/g/n and Bluetooth® operation on units that have both radios.
- User available **E:** memory is now 16MB.

### Issues Corrected

- JSON will now return a null instead of a "?" for settings that do not exist on the device.
- The **ip.dns.domain** or **ip.dns.servers** values can now be set while IP addressing is set to permanent.
- PCX graphics handling has been improved to handle additional scenarios.
- Scalable font field handling improved.
- Handling of Bluetooth remote device disconnect events improved.
- **odometer.user\_label\_count** can be set to "0".
- Ping response times have been enhanced.

# V74 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V74.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZD500
- ZD500R

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)

- User supplied certificates for TLS
- User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”
- HTTPS for the printer web pages
- User supplied certificates for HTTPs
- User Defined Gateway Ping intervals
- User supplied web sockets certificates
- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPs can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The UCODE8 and UCODE8M RFID chips are now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset.
- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - The LE GAP Device name – this GATT attribute will require pairing before it can be read.
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - Printers with radios that support 4.1 or later now support Numeric Comparison pairing for Bluetooth Low Energy pairing events. NOTE – only used if both devices support Bluetooth 4.1 and the Secure LE connection protocol.
  - SetGetDo changes. Several commands have changed:
    - **bluetooth.bonding** – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.
    - **bluetooth.minimum\_security\_mode** – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
      - **1:** No encryption or authentication is required to access the Zebra Parser Service.
      - **2:** Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
      - **3 or 4:** Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.

- **bluetooth.allow\_non\_display\_numeric\_comparison** – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device. If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.
noprint	Display Only	If Passkey Pairing is used, the printer will not print out the passkey. If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.
off	No I/O	Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!

## Issue Corrected

- ZBI now correctly handles output on the serial port.
- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Larger RFID label (5.5” wide by 16” long) will now print without blank labels.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).
- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.
- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- When printing small labels, the labels that print after a RFID VOID label no longer have a faint “VOID” printed on them.
- Mirror Feedback files are now working correctly.
- The display of “Labels remaining in batch” information on the front panel has been optimized.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.



### "media.tof\_tune"

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.
- Example:
  - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
- Suggested starting value when migrating from RW to ZQ500: "-13".
- Not affected by a printer default.

### "print.vertical\_dpi\_adjust"

- Range: 95.0 to 105.0.
- Default: 100.0 (no change in y-coordinate or height of print fields)
- Example:
  - ! U1 setvar "print.vertical\_dpi\_adjust" "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
- Suggested starting value when migrating from RW to ZQ500: "98.4".
- Not affected by a printer default.

## Link-OS 4

### V74.20.01ZB

**Release Date: 01 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZD500
- ZD500R

#### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V74.20.01Z

**Release Date: 14 October 2016**

This firmware includes all features of the previous [V74.19.15Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZD500
- ZD500R

#### Changes

- Link-OS version updated to v4.0.
- Support has been added for a Visibility Agent. This new feature can connect a networked Link-OS printer to Zebra’s Asset Visibility Service (AVS). The Asset Visibility Service is a Zebra-managed service offering that provides Zebra partners and customers ‘at-a-glance’ visibility to analytical insights about their device health, utilization, and performance. When Link-OS v4 printers are connected to a wired or wireless network, they will attempt to connect to the Asset Visibility Service by default. When successfully connected, the printer sends approximately 5 Kbytes of data per day (depending on how many alert events happen per day).
  - Data printed on any labels, tags or receipts are not transmitted to the Asset Visibility Service. The printers only communicate predefined settings on a scheduled basis. The printer sends Discovery Data and Settings and Alerts Data. The settings that are transmitted are listed below in the form of Set-Get-Do commands and are detailed in the Zebra Programming Guide.
  - The printer uses an encrypted, certificate-authenticated web socket connection to connect to the ZPC. **NOTE:** This is the same connection type that is typically used when you connect to an e-commerce or banking site.
  - The Visibility Agent can be turned off via the printer’s web pages or front panel. See the Application Note “Opting Out of the Asset Visibility Agent” included with this firmware download and posted on [www.zebra.com](http://www.zebra.com).

- The Visibility Agent can be turned off using a Set-Get-Do Command. Using your preferred software or Zebra Setup Utilities, send the commands below to configure and validate the Asset Visibility Agent settings. You can download Zebra Setup utilities at <https://www.zebra.com/setup>.

## weblink.zebra\_connector.enable

Turns the Asset Visibility Agent on or off. Additional information can be found in the App Note. See <https://www.zebra.com/us/en/products/software/barcode-printers/link-os/application-notes.html>.

**Values:** "on" or "off"

**Default Value:** "on"

### To send the commands:

- Send the following command to Opt Out (disable the connection to ZPC and the Asset Visibility Service):

```
! U1 setvar "weblink.zebra_connector.enable" "off"
```

- Send the following command to validate that you have opted out:

```
! U1 getvar "weblink.zebra_connector.enable"
```

The printer should respond with "off".



**NOTE:** Be sure to include a carriage return/line feed after sending a command to the printer.

If the Visibility Agent is on, there are two data types that the printer can send to the AVS platform – **Discovery Data** and **Setting/Alert Data**.

### Discovery Data

This information is sent when the printer connects to the ZPC. The following printer settings are transmitted:

Printer Settings		
device.unique_id	media.type	device.oem.model_name
ip.dns.domain	media.thermal_mode	appl.name
ip.active_network	media.printmode	device.location
mac_raw	odometer.total_label_count	zpl.system_status
ip.protocol	odometer.media_marker_count1	ip.addr
ip.netmask	odometer.media_marker_count2	ip.ftp.enable
ip.gateway	label_queue.batch_label_cnt	ip.lpd.enable
ip.port	label_queue.format_counter	ip.tcp.enable
device.pnp_option	zbi.enabled	ip.udp.enable
device.languages	zbi.state	ip.http.enable
device.cpcl_formatting_commands_disable	zbi.revision	ip.smtp.enable
head.resolution.in_dpmm	head.width.in_dots	ip.pop3.enable
zpl.label_length	ip.port_json_config	ip.snmp.enable
ezpl.print_width	appl.link_os_version	ip.telnet.enable
media.darkness.mode	device.friendly_name	weblink.enable

## Settings and Alerts Data

This information is sent by the printer at the schedule listed in the table below. The following printer settings or alerts are transmitted:

Printer Settings		
At connection:	At connection:	When the Alert occurs:
weblink.zebra_connector.version	device.bluetooth_installed	PAPER OUT
device.product_name	odometer.media_marker_count	RIBBON OUT
print.tone_format	media.type, ezpl.media_type	HEAD ELEMENT BAD
power.percent_full	interface.network.active.speed	SUPPLY TOO HOT
power.serial_number_string		HEAD OPEN
power.manufacture_date		HEAD COLD
power.cycle_count		HEAD TOO HOT
power.device_name	power.percent_full	CUTTER JAMMED
power.full_charge_capacity	wlan.signal_strength	COLD START
power.date_first_used	odometer.total_print_length	
interface.network.active.ip_addr	interface.network.active.speed	
wlan.signal_strength		
odometer.total_print_length		power.cycle_count
odometer.rfid.valid_resetable		power.device_name
odometer.rfid.void_resetable	print.tone	power.full_charge_capacity
memory.flash_size	print.tone_zpl	odometer.total_label_count
memory.flash_free	media.speed	odometer.rfid.valid_resetable
device.ltu_installed	zpl.label_length	odometer.rfid.void_resetable
device.cutter_installed		memory.flash_free
device.rewinder_installed		odometer.media_marker_count
		media.type
		ezpl.media_type

- Front Panel Batch Counters have been made available. They can be turned on by using the SGD command `display.batch_counter`.
- Web sockets connections now support SHA2 certificates. The printers will continue to support SHA1 certificates until Link-OS v5 is released (in 2017). At that time, the printers will no longer support SHA1 certificates, in accordance with privacy best practices.
- Alerts are no longer displayed over the Home menu to enhance readability.
- MEDIA AUTO-DETECT is now supported on the ZD500.
- New Set-Get-Do Commands were implemented. Refer to the Zebra Programming Guide for details on each command.
  - head.resolution.in\_dpi
  - file.capture\_response.begin
  - file.capture\_response.end
  - file.capture\_response.destination
  - device.command\_override.add

- `device.command_override.clear`
- `device.command_override.list`
- `device.command_override.active`
- `weblink.zebra_connector.version`
- `weblink.zebra_connector.enable`
- `weblink.zebra_connector.proxy`
- `weblink.zebra_connector.authentication`
- `weblink.zebra_connector.authentication.add`
- `weblink.zebra_connector.authentication.remove`
- `weblink.zebra_connector.authentication.entries`
- `wlan.wpa.timecheck`
- `wlan.rts_cts_enabled`
- `display.batch_counter`
- `device.set_clock_to_build_date`
- After an RFID Void label is printed, the printer will print using the configured print speed and darkness.
- Monza 6 tags are now supported.

### Issues Corrected

- The printer will report error code 81 during a paper jam in response to the EPL command `^ee`.
- When using the Dual Radio, the Bluetooth radio will remain active even if the WLAN radio is not.
- The SNMP `zbraOptUnsAlertCondition` and `zbrOptUnsAlertsEntry` response strings have been extended to include 1023 characters.
- The Japanese and Korean front panel menus have been adjusted to eliminate character overlaps.
- SNMP Print Job Completed reporting has been enhanced when using the Pause Alert.
- The ZBI `WRITE` command has been corrected to count all data written to the system.
- The Mirror system timing has been altered to include a retry, so as to improve file writing performance.
- The command `zp1.zp1_override` has been eliminated; use the `device.command_override` commands instead.
- The Mirror system will now accept the return code `125` in addition to the return code `150`, in order to support IIS7 and FileZilla servers.
- Firmware updating when using both Profile Manager and either IIS7 or FileZilla has been optimized to avoid conflicts.
- Wi-Fi roaming and Protected Management Frames (PMF) support have been improved.
- Memory management during printing has been optimized for cases where a `.TTF` font, graphics, and inverted orientation printing are being used.
- The JSON implementation of the `usb.mirror.feedback.odometer` and `ip.mirror.feedback.odometer` commands now have values of `READ_WRITE_ACCESS`.
- The JSON implementation of the `zbi.state` command has been changed from a string type to an enum type.
- The German translations in the RFID menu have been corrected.

- The Czech menu will now use the word **INCHES**.
- Socket connections on ZBI have been optimized to avoid a connection not ending when it should.
- The first label printed after a RFID VOID will no longer use lower-than-configured darkness.
- MEDIA OUT detection in black mark mode has been optimized.
- The JSON implementation of **interface.network.active.speed** is now treated as an integer.
- The Tear-Off adjust command setting will be used after a power cycle if Media Power Up is set to No Motion.
- APPLICATOR mode will be offered and selectable, and the printer will use APPLICATOR paper movement behavior while in the mode; however since the printer does not have an applicator option, the printer will not wait for applicator signals.
- The range for **ip.discovery.port** is now 1 - 65535.
- The range for **zp1.label1\_length** has been corrected in the allconfig.

## Link-OS 3

### V74.19.15Z

**Release Date: 14 January 2016**

This firmware includes all features of the previous [V74.19.13Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZD500
- ZD500R

**Changes**

- The wireless settings commands only support non-control ASCII characters.
- FTP PORT commands are supported when the port number requested is above 1023 and the IP address being requested is the same as that of the device initiating the connection.

**Issues Corrected**

- Network Time Protocol settings syntax checking has been enhanced.

### V74.19.13Z

**Release Date: 31 August 2015**

This firmware includes all features of the previous [V74.19.10Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZD500
- ZD500R

**Changes**

- Link-OS printers' now support downloading PEM and DER formatted WLAN certificates in the P12 format for the TLS, TTLS and PEAP security types. Additionally, P12 formatted certificates are now supported for downloading private keys and client certificates. For more information, see the App Note "Direct WLAN Cert Downloading".
- Front Panel passwords are now supported. The password level can be set from the Tools menu.
- The new Zebra logo is now used on the front panel and web pages.
- The printers will now store information related to the state of the devices sensors and internal printer operations which may be accessed and used by Zebra for the purpose of improving the products performance and readability. For more information, please contact [softpm@zebra.com](mailto:softpm@zebra.com).

**Issues Corrected**

- RFID tag calibration has been enhanced to increase first tag tracking accuracy.
- No Motion calibration has been enhanced when short labels are used.
- The "`netmanage.avalanche.agent_addr`" command will now accept a DNS value.
- The printers will now accept a .GRF image larger than 100KB.

- The ZPL implementation of the Datamatrix barcode has been enhanced to support more combinations of standard ASCII and extended ASCII character strings.
- Rendering time for ZPL generated circles, boxes with rounded corners and diagonal lines has been enhanced.
- JSON parsing has been enhanced to better handle slow transmissions to the printer.
- Font handling has been improved to ensure that when a new font replaces an existing font, the character mapping is correctly updated.
- The ^HZ0 response now places a drive letter in the <OBJECT-DATA> reply.
- The ^GFA command will no longer produce a stretched image when the last line of the encoded graphic is a “,” or a “!”.
- The time the Bluetooth system will wait for a connection has been extended to accommodate the needs of more devices.
- ZBI program throughput has been enhanced.
- The Cloud Connect web sockets system has been optimized to improve throughput.
- The Cloud Connect web sockets has been optimized to better handle large file (1MB+) downloads from the printer to a host system.
- The USB implementation has been enhanced to optimize bi-directional communication.
- The Bluetooth system has been enhanced to support scenarios where the Master device is sending data immediately after creating a connection.
- In order to improve throughput, the WLAN system will now use "CTS to Se1f" for the default HT mode. The system can be set to use "RTS-CTS" by using the "wlan.rts\_cts\_enabled" command (default is "off").

### V74.19.10Z

#### **Release Date: 07 January 2015**

This firmware includes all features of the previous [V74.19.9Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZD500
- ZD500R

#### **Changes**

- Wi-Fi certification for this model is now based on the Standard Zebra Wireless driver
- Ad-Hoc wireless is now supported.
- Opportunistic Key Caching (OKC), "Fast Roaming" is now supported on WLAN connections.
- The Network Time Protocol (NTP), which allows setting the printers clock based on a time server, is now supported.
- A secondary Bluetooth® channel for management tasks has been added.
- The total label count odometer value has been added to the configuration label .
- The Avalanche client now supports reporting a successful printer OS update.
- The printer will now validate that user-assigned network port number assignments do not conflict with each other.



- The OpenSSL version the printers use is now v1.0.0m.
- The "**device.jobs\_print**" SetGetDo command is now supported.
- Country support for RFID has been expanded.
- Monza 4, 5 and 6 tags are now supported.
- The Link-OS version is now v2.5.

### Issues Corrected

- Throughput for small label (1.5" long and shorter) has been enhanced.
- Support for CCX is now available via the Zebra Development Services team, so that implementations can be tailored to individual network needs.
- ^HZA responses when running ZBI programs have been corrected to include all expected data.
- WML has been corrected to consistently show messages positioned in the bottom center of the screen.
- ZBI processing of formats larger than 32K has been corrected.
- The EPL speed command ("**S**") will now set the print speed, slew and backfeed rates.
- The value set by the "**Q**" command will now be used in both ZB and ZT modes.
- The WLAN MAC address will now be consistently reported after a power up event when a new main logic board has been installed .
- The ~JP command now correctly pauses the printer.
- EPL '**p**' commands will no longer effect subsequently printed ZPL formats.
- The Czech and Russian translations on the front panel have been updated.
- Graphics sent to the printer using the EPL command "**GM**" are now supported.
- The **bluetooth.bonding** setting will now be returned via either a JSON Bluetooth branch or allconfig request.
- MAC address reporting has been enhanced to ensure address is correctly reported at startup.
- Management of Bluetooth connections has been enhanced to ensure data integrity when new connections are being made while data from a prior connection is still being processed.
- The E:SYSLOG.TXT file will only be saved to the E: drive when the "**device.syslog.save\_local\_file**" setting is set to "**yes**".
- An UCC/EAN128 barcode, using mode D, which contains an odd number of digits following a subset A/B section will now print correctly.
- Spaces are now allowed in "**netmanage.avalance.set\_property**" SetGetDo commands.
- Recalling formats that contain serialized fields with XML is now functional.
- The printer web page label preview function has been enhanced to support longer labels.
- Keyboard Display Unit support has been enhanced to correctly support processing Real Time Clock fields.
- The RFID antenna setting will now be saved after an RFID calibration.

## V74.19.9Z

**Release Date: 22 August 2014**

This firmware release includes the features of the previous [V74.19.7Z](#) release. It is for use with the following ZPL printer models:

- ZD500
- ZD500R

### Changes

- Support for additional countries added to the `rfid.country_code` command.

### Issues Corrected

- MAC address configuration optimized to reduce potential for duplicate address reporting.
- RFID tag encoding enhanced to improved accuracy.

### V74.19.7Z

**Release Date: 28 April 2014**

This firmware release includes the features of the previous [V74.19.6Z](#) release. It is for use with the following ZPL printer models:

- ZD500
- ZD500R

#### Changes

- Added support for the ZD500 printer.
- Backlight timeout menu control added to the ZD500 and ZD500R.
- Backlight timeout default changed to 600 seconds (10 minutes).
- RFID Menu on the non-RFID ZD500 unit displays:  
**RFID AVAILABLE ON ZD500R.**
- Support for additional countries added to the `wlan.country_code` and `rfid.country_code` commands.

#### Issues Corrected

None.

## Link-OS 2

### V74.19.6Z

**Release Date: 20 September 2013**

This is the initial firmware release for the ZD500R.

# V75 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V75.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZT410 (203, 300, and 600 dpi)
- ZT420 (203 and 300 dpi)

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)
  - User supplied certificates for TLS
  - User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”

- HTTPS for the printer web pages
- User supplied certificates for HTTPs
- User Defined Gateway Ping intervals
- User supplied web sockets certificates
- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The UCODE8 and UCODE8M RFID chips are now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset.
- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - The LE GAP Device name – this GATT attribute will require pairing before it can be read.
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - Printers with radios that support 4.1 or later now support Numeric Comparison pairing for Bluetooth Low Energy pairing events. NOTE – only used if both devices support Bluetooth 4.1 and the Secure LE connection protocol.
  - SetGetDo changes. Several commands have changed:
    - **bluetooth.bonding** – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.
    - **bluetooth.minimum\_security\_mode** – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
      - **1**: No encryption or authentication is required to access the Zebra Parser Service.
      - **2**: Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
      - **3 or 4**: Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.

- **bluetooth.allow\_non\_display\_numeric\_comparison** – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device.  If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.
noprint	Display Only	If Passkey Pairing is used, the printer will not print out the passkey.  If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.
off	No I/O	Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!

## Issue Corrected

- ZBI now correctly handles output on the serial port.
- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Larger RFID label (5.5” wide by 16” long) will now print without blank labels.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).
- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.
- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- When printing small labels, the labels that print after a RFID VOID label no longer have a faint “VOID” printed on them.
- Mirror Feedback files are now working correctly.
- The display of “Labels remaining in batch” information on the front panel has been optimized.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### "media.tof\_tune"

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.
- Example:
  - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
- Suggested starting value when migrating from RW to ZQ500: "-13".
- Not affected by a printer default.

### " print.vertical\_dpi\_adjust "

- Range: 95.0 to 105.0.
- Default: 100.0 (no change in y-coordinate or height of print fields)
- Example:
  - ! U1 setvar "device.cpcl\_adjust\_length\_dpi" "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
- Suggested starting value when migrating from RW to ZQ500: "98.4".
- Not affected by a printer default.

## Link-OS 4

### V75.20.01ZB

**Release Date: 01 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZT410 (203, 300, and 600 dpi)
- ZT420 (203 and 300 dpi)

#### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V75.20.01Z

**Release Date: 14 October 2016**

This firmware includes all features of the previous [V75.19.15Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZT410 (203, 300, and 600 dpi)
- ZT420 (203 and 300 dpi)

#### Changes

- Link-OS version updated to v4.0.
- Support has been added for a Visibility Agent. This new feature can connect a networked Link-OS printer to Zebra’s Asset Visibility Service (AVS). The Asset Visibility Service is a Zebra-managed service offering that provides Zebra partners and customers ‘at-a-glance’ visibility to analytical insights about their device health, utilization, and performance. When Link-OS v4 printers are connected to a wired or wireless network, they will attempt to connect to the Asset Visibility Service by default. When successfully connected, the printer sends approximately 5 Kbytes of data per day (depending on how many alert events happen per day).
  - Data printed on any labels, tags or receipts are not transmitted to the Asset Visibility Service. The printers only communicate predefined settings on a scheduled basis. The printer sends Discovery Data and Settings and Alerts Data. The settings that are transmitted are listed below in the form of Set-Get-Do commands and are detailed in the Zebra Programming Guide.
  - The printer uses an encrypted, certificate-authenticated web socket connection to connect to the ZPC. **NOTE:** This is the same connection type that is typically used when you connect to an e-commerce or banking site.
  - The Visibility Agent can be turned off via the printer’s web pages or front panel. See the Application Note “Opting Out of the Asset Visibility Agent” included with this firmware download and posted on [www.zebra.com](http://www.zebra.com).



- The Visibility Agent can be turned off using a Set-Get-Do Command. Using your preferred software or Zebra Setup Utilities, send the commands below to configure and validate the Asset Visibility Agent settings. You can download Zebra Setup utilities at <https://www.zebra.com/setup>.

## weblink.zebra\_connector.enable

Turns the Asset Visibility Agent on or off. Additional information can be found in the App Note. See <https://www.zebra.com/us/en/products/software/barcode-printers/link-os/application-notes.html>.

**Values:** "on" or "off"

**Default Value:** "on"

### To send the commands:

- Send the following command to Opt Out (disable the connection to ZPC and the Asset Visibility Service):

```
! U1 setvar "weblink.zebra_connector.enable" "off"
```

- Send the following command to validate that you have opted out:

```
! U1 getvar "weblink.zebra_connector.enable"
```

The printer should respond with "off".



**NOTE:** Be sure to include a carriage return/line feed after sending a command to the printer.

If the Visibility Agent is on, there are two data types that the printer can send to the AVS platform – **Discovery Data** and **Setting/Alert Data**.

### Discovery Data

This information is sent when the printer connects to the ZPC. The following printer settings are transmitted:

Printer Settings		
device.unique_id	media.type	device.oem.model_name
ip.dns.domain	media.thermal_mode	appl.name
ip.active_network	media.printmode	device.location
mac_raw	odometer.total_label_count	zpl.system_status
ip.protocol	odometer.media_marker_count1	ip.addr
ip.netmask	odometer.media_marker_count2	ip.ftp.enable
ip.gateway	label_queue.batch_label_cnt	ip.lpd.enable
ip.port	label_queue.format_counter	ip.tcp.enable
device.pnp_option	zbi.enabled	ip.udp.enable
device.languages	zbi.state	ip.http.enable
device.cpcl_formatting_commands_disable	zbi.revision	ip.smtp.enable
head.resolution.in_dpmm	head.width.in_dots	ip.pop3.enable
zpl.label_length	ip.port_json_config	ip.snmp.enable
ezpl.print_width	appl.link_os_version	ip.telnet.enable
media.darkness.mode	device.friendly_name	weblink.enable

## Settings and Alerts Data

This information is sent by the printer at the schedule listed in the table below. The following printer settings or alerts are transmitted:

Printer Settings		
At connection:	At connection:	When the Alert occurs:
weblink.zebra_connector.version	device.bluetooth_installed	PAPER OUT
device.product_name	odometer.media_marker_count	RIBBON OUT
print.tone_format	media.type, ezpl.media_type	HEAD ELEMENT BAD
power.percent_full	interface.network.active.speed	SUPPLY TOO HOT
power.serial_number_string		HEAD OPEN
power.manufacture_date		HEAD COLD
power.cycle_count		HEAD TOO HOT
power.device_name	power.percent_full	CUTTER JAMMED
power.full_charge_capacity	wlan.signal_strength	COLD START
power.date_first_used	odometer.total_print_length	
interface.network.active.ip_addr	interface.network.active.speed	
wlan.signal_strength		
odometer.total_print_length		power.cycle_count
odometer.rfid.valid_resettable		power.device_name
odometer.rfid.void_resettable	print.tone	power.full_charge_capacity
memory.flash_size	print.tone_zpl	odometer.total_label_count
memory.flash_free	media.speed	odometer.rfid.valid_resettable
device.ltu_installed	zpl.label_length	odometer.rfid.void_resettable
device.cutter_installed		memory.flash_free
device.rewinder_installed		odometer.media_marker_count
		media.type
		ezpl.media_type

- Front Panel Batch Counters have been made available. They can be turned on by using the SGD command **display.batch\_counter**.
- Web sockets connections now support SHA2 certificates. The printers will continue to support SHA1 certificates until Link-OS v5 is released (in 2017). At that time, the printers will no longer support SHA1 certificates, in accordance with privacy best practices.
- Alerts are no longer displayed over the Home menu to enhance readability.
- New Set-Get-Do Commands were implemented. Refer to the Zebra Programming Guide for details on each command.
  - head.resolution.in\_dpi
  - file.capture\_response.begin
  - file.capture\_response.end
  - file.capture\_response.destination
  - device.command\_override.add
  - device.command\_override.clear

- `device.command_override.list`
- `device.command_override.active`
- `weblink.zebra_connector.version`
- `weblink.zebra_connector.enable`
- `weblink.zebra_connector.proxy`
- `weblink.zebra_connector.authentication`
- `weblink.zebra_connector.authentication.add`
- `weblink.zebra_connector.authentication.remove`
- `weblink.zebra_connector.authentication.entries`
- `wlan.wpa.timecheck`
- `wlan.rts_cts_enabled`
- `display.batch_counter`
- `device.set_clock_to_build_date`
- After an RFID Void label is printed, the printer will print using the configured print speed and darkness.
- Monza 6 tags are now supported.

### Issues Corrected

- The printer will report error code 81 during a paper jam in response to the EPL command `^ee`.
- When using the Dual Radio, the Bluetooth radio will remain active even if the WLAN radio is not.
- The SNMP `zbraOptUnsAlertCondition` and `zbrOptUnsAlertsEntry` response strings have been extended to include 1023 characters.
- The Japanese and Korean front panel menus have been adjusted to eliminate character overlaps.
- Small label tracking has been optimized so that the label correctly feeds to the next edge when pressing the FEED button after printing a label in rewind mode.
- SNMP Print Job Completed reporting has been enhanced when using the Pause Alert.
- The ZBI `WRITE` command has been corrected to count all data written to the system.
- The EPL `URH` and `URL` commands will now return a value in meters.
- The PRINT INFO output on the 600 dpi unit now prints at the correct size.
- The Mirror system timing has been altered to include a retry, so as to improve file writing performance.
- EPL has been enhanced to handle images larger than the label size.
- The command `zp1.zp1_override` has been eliminated; use the `device.command_override` commands instead.
- The Mirror system will now accept the return code `125` in addition to the return code `150`, in order to support IIS7 and FileZilla servers.
- Firmware updating when using both Profile Manager and either IIS7 or FileZilla has been optimized to avoid conflicts.
- Wi-Fi roaming and Protected Management Frames (PMF) support have been improved.
- Memory management during printing has been optimized for cases where a `.TTF` font, graphics, and inverted orientation printing are being used.

- The JSON implementation of the **usb.mirror.feedback.odometer** and **ip.mirror.feedback.odometer** commands now have values of **READ\_WRITE\_ACCESS**.
- The JSON implementation of the **zbi.state** command has been changed from a string type to an enum type.
- The EPL command **OR0,0** is now supported..
- The Czech menu will now use the word **INCHES**.
- The German translations in the RFID menu have been corrected.
- Socket connections on ZBI have been optimized to avoid a connection not ending when it should.
- **MEDIA OUT** detection in black mark mode has been optimized.
- The JSON implementation of **interface.network.active.speed** is now treated as an integer.
- The Tear-Off adjust command setting will be used after a power cycle if Media Power Up is set to No Motion.
- Black mark media sensing has been optimized to enhance calibration.
- **APPLICATOR** mode will be offered and selectable, and the printer will use **APPLICATOR** paper movement behavior while in the mode; however since the printer does not have an applicator option, the printer will not wait for applicator signals.
- The range for **ip.discovery.port** is now 1 - 65535.
- The range for **zp1.label\_length** has been corrected in the allconfig.
- The Rewind spindle will continue to operate if the printer is in **PEEL** mode and a label is left in the Presenter.
- Forced download will now operate when the Parallel port card is installed.

## Link-OS 3

### V75.19.15Z

**Release Date: 14 January 2016**

This firmware includes all features of the previous [V75.19.13Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZT410 (203, 300, and 600 dpi)
- ZT420 (203 and 300 dpi)

#### Changes

- The wireless settings commands only support non-control ASCII characters.
- FTP PORT commands are supported when the port number requested is above 1023 and the IP address being requested is the same as that of the device initiating the connection.

#### Issues Corrected

- Network Time Protocol settings syntax checking has been enhanced.

### V75.19.13Z

**Release Date: 31 August 2015**

This firmware includes all features of the previous [V75.19.10Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZT410 (203, 300, and 600 dpi)
- ZT420 (203 and 300 dpi)

#### Changes

- Link-OS printers' now support downloading PEM and DER formatted WLAN certificates in the P12 format for the TLS, TTLS and PEAP security types. Additionally, P12 formatted certificates are now supported for downloading private keys and client certificates. For more information, see the App Note "Direct WLAN Cert Downloading".
- Front Panel passwords are now supported. The password level can be set from the Tools menu.
- The new Zebra logo is now used on the front panel, web pages and two-key report.
- The printers will now store information related to the state of the devices sensors and internal printer operations which may be accessed and used by Zebra for the purpose of improving the products performance and readability. For more information, please contact [softpm@zebra.com](mailto:softpm@zebra.com).

#### Issues Corrected

- The printers now support the "small label tracking" feature, by default. The command "media.small\_label\_tracking" can be set to "off" to disable this feature.
- Rendering time for ZPL generated circles, boxes with rounded corners and diagonal lines has been enhanced.

- The "`netmanage.avalanche.agent_addr`" command will now accept a DNS. value.
- The printers will now accept a .GRF image larger than 100KB.
- The ZPL implementation of the Datamatrix barcode has been enhanced to support more combinations of standard ASCII and extended ASCII character strings.
- JSON parsing has been enhanced to better handle slow transmissions to the printer.
- Font handling has been improved to ensure that when a new font replaces an existing font, the character mapping is correctly updated.
- The `^HZ0` response now places a drive letter in the <OBJECT-DATA> reply.
- The `^GFA` command will no longer produce a stretched image when the last line of the encoded graphic is a `" , "` or a `" ! "`.
- The time the Bluetooth system will wait for a connection has been extended to accommodate the needs of more devices.
- ZBI program throughput has been enhanced.
- The Cloud Connect web sockets system has been optimized to improve throughput.
- The Cloud Connect web sockets has been optimized to better handle large file (1MB+) downloads from the printer to a host system.
- The USB implementation has been enhanced to optimize bi-directional communication.
- The Bluetooth system has been enhanced to support scenarios where the Master device is sending data immediately after creating a connection.
- In order to improve throughput, the WLAN system will now use "`CTS to SeIf`" for the default HT mode. The system can be set to use "`RTS-CTS`" by using the "`wlan.rts_cts_enabled`" command (default is "`off`").
- Handling of the inter-label gap has been modified so that label image length more accurately matches that of the ZT2xx and ZM4xx models.

### V75.19.10Z

#### **Release Date: 07 January 2015**

This firmware includes all features of the previous [V75.19.7Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZT410 (203, 300, and 600 dpi)
- ZT420 (203 and 300 dpi)

#### **Changes**

- Wi-Fi certification for this model is now based on the Standard Zebra Wireless driver
- Ad-Hoc wireless is now supported.
- Opportunistic Key Caching (OKC), "Fast Roaming" is now supported on WLAN connections.
- The Network Time Protocol (NTP), which allows setting the printers clock based on a time server, is now supported.
- A secondary Bluetooth® channel for management tasks has been added.
- The total label count odometer value has been added to the configuration label .
- The Avalanche client now supports reporting a successful printer OS update.

- The printer will now validate that user-assigned network port number assignments do not conflict with each other.
- The OpenSSL version the printers use is now v1.0.0m.
- The "**device.jobs\_print**" SetGetDo command is now supported.
- Country support for RFID has been expanded.
- Monza 4, 5 and 6 tags are now supported.
- The Link-OS version is now v2.5.

### Issues Corrected

- Throughput for small label (1.5" long and shorter) has been enhanced.
- Support for CCX is now available via the Zebra Development Services team, so that implementations can be tailored to individual network needs.
- ^HZA responses when running ZBI programs have been corrected to include all expected data.
- WML has been corrected to consistently show messages positioned in the bottom center of the screen.
- ZBI processing of formats larger than 32K has been corrected.
- The WLAN MAC address will now be consistently reported after a power up event when a new main logic board has been installed .
- The ~JP command now correctly pauses the printer.
- The Czech and Russian translations on the front panel have been updated.
- The **bluetooth.bonding** setting will now be returned via either a JSON Bluetooth branch or allconfig request.
- MAC address reporting has been enhanced to ensure address is correctly reported at startup.
- Management of Bluetooth connections has been enhanced to ensure data integrity when new connections are being made while data from a prior connection is still being processed.
- The E:SYSLOG.TXT file will only be saved to the E: drive when the "**device.syslog.save\_local\_file**" setting is set to "**yes**".
- An UCC/EAN128 barcode, using mode D, which contains an odd number of digits following a subset A/B section will now print correctly.
- Spaces are now allowed in "**netmanage.avalance.set\_property**" SetGetDo commands.
- Recalling formats that contain serialized fields with XML is now functional.
- The printer web page label preview function has been enhanced to support longer labels.
- Keyboard Display Unit support has been enhanced to correctly support processing Real Time Clock fields.
- The RFID antenna setting will now be saved after an RFID calibration.
- USB Mirror events will not run at the same time as IP based Mirror events.
- EPL cut mode processing has been enhanced to better handle repeated cut events in a batch.

## V75.19.7Z

**Release Date: 14 February 2014**

This firmware release is for use on the following printers:

- ZT410 (203, 300, and 600 dpi)
- ZT420 (203 and 300 dpi)

### Changes

This is the initial release for this platform, with these features:

- Dual support for ZPL II<sup>®</sup> and EPL2.
- Support for the Profile Manager app, using Cloud Connect.
- Support for the Print Touch app.
- On-screen QR Codes that can be displayed on the printer's LCD during Warning and Error events.
- USB Mirror (automated printer management via USB). DOS Fat 32 formatted memory stick with the Mirror directory structure required. See the USB Mirror documentation for details.
- Ability to use a USB Human Interface device type (a keyboard or scanner) to fill templates stored on the printer, via the on-printer Print Station app.
- Ability to transfer selected file types from a USB memory stick to the printer. DOS Fat 32 formatted memory stick required.
- Ability to transfer selected file types from the printer to a USB memory stick. DOS Fat 32 formatted memory stick required.
- New SetGetDo commands have been created; consult the [Programming Guide](#) for details.
- Real time clock.
- RFID-Ready.
- System event logging.



# V76 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V76.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZQ510
- ZQ520

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)
  - User supplied certificates for TLS
  - User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”

- HTTPS for the printer web pages
- User supplied certificates for HTTPs
- User Defined Gateway Ping intervals
- User supplied web sockets certificates
- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset.
- A “BATTERY MISSING” alert has been added, for those printers that support it.
- The default for the power.sleep.timeout and power.inactivity\_timeout have been changed on selected products:

	QLn series	ZQ500 series	iMZ series	ZQ3 series
power.sleep.timeout	N/A	20 minutes	N/A	20 minutes
power.inactivity_timeout	No change	10 hours	no change	10 hours

- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location
  - has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - The LE GAP Device name – this GATT attribute will require pairing before it can be read.
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - Printers with radios that support 4.1 or later now support Numeric Comparison pairing for Bluetooth Low Energy pairing events. NOTE – only used if both devices support Bluetooth 4.1 and the Secure LE connection protocol.
  - SetGetDo changes. Several commands have changed:
    - **bluetooth.bonding** – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.

- **bluetooth.minimum\_security\_mode** – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
  - **1:** No encryption or authentication is required to access the Zebra Parser Service.
  - **2:** Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
  - **3 or 4:** Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.
- **bluetooth.allow\_non\_display\_numeric\_comparison** – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device.  If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.
noprint	Display Only	If Passkey Pairing is used, the printer will not print out the passkey.  If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.
off	No I/O	Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!

- **Deprecated Commands:**

Command Name	Use This Command Instead
bluetooth.le.print_passkey	bluetooth.allow_non_display_numeric_comparison
bluetooth.le.minimum_security	bluetooth.minimum_security_mode

- **LE Security Changes:**

LE Minimum Security Value	Previous Minimum Security Value	New Minimum Security Value
unauth_key_encrypt	1	2
auth_key_encrypt	1 or 2	4
none	1, 2, 3, or 4	No change

## Issues Corrected

- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).
- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.
- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- Mirror Feedback files are now working correctly.
- The display of "Labels remaining in batch" information on the front panel has been optimized.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### "media.tof\_tune"

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.
- Example:
  - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
- Suggested starting value when migrating from RW to ZQ500: "-13".
- Not affected by a printer default.

### "print.vertical\_dpi\_adjust "

- Range: 95.0 to 105.0.
- Default: 100.0 (no change in y-coordinate or height of print fields)
- Example:
  - ! U1 setvar "print.vertical\_dpi\_adjust " "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
- Suggested starting value when migrating from RW to ZQ500: "98.4".
- Not affected by a printer default.

## Link-OS 4

### V76.20.01ZB

**Release Date: 01 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZQ510
- ZQ520

#### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V76.20.01Z

**Release Date: 14 October 2016**

This firmware includes all features of the previous [V76.19.15ZA](#) release, except where noted otherwise. It is for use with the following printer models:

- ZQ510
- ZQ520

#### Changes

- Link-OS version updated to v4.0.
- Support has been added for a Visibility Agent. This new feature can connect a networked Link-OS printer to Zebra’s Asset Visibility Service (AVS). The Asset Visibility Service is a Zebra-managed service offering that provides Zebra partners and customers ‘at-a-glance’ visibility to analytical insights about their device health, utilization, and performance. When Link-OS v4 printers are connected to a wired or wireless network, they will attempt to connect to the Asset Visibility Service by default. When successfully connected, the printer sends approximately 5 Kbytes of data per day (depending on how many alert events happen per day).
  - Data printed on any labels, tags or receipts are not transmitted to the Asset Visibility Service. The printers only communicate predefined settings on a scheduled basis. The printer sends Discovery Data and Settings and Alerts Data. The settings that are transmitted are listed below in the form of Set-Get-Do commands and are detailed in the Zebra Programming Guide.
  - The printer uses an encrypted, certificate-authenticated web socket connection to connect to the ZPC. **NOTE:** This is the same connection type that is typically used when you connect to an e-commerce or banking site.
  - The Visibility Agent can be turned off using a Set-Get-Do Command. Using your preferred software or Zebra Setup Utilities, send the commands below to configure and validate the Asset Visibility Agent settings. You can download Zebra Setup utilities at <https://www.zebra.com/setup>.

**weblink.zebra\_connector.enable**

Turns the Asset Visibility Agent on or off. Additional information can be found in the App Note. See <https://www.zebra.com/us/en/products/software/barcode-printers/link-os/application-notes.html>.

**Values:** "on" or "off"

**Default Value:** "on"

**To send the commands:**

1. Send the following command to Opt Out (disable the connection to ZPC and the Asset Visibility Service):

```
! U1 setvar "weblink.zebra_connector.enable" "off"
```

2. Send the following command to validate that you have opted out:

```
! U1 getvar "weblink.zebra_connector.enable"
```

The printer should respond with "off".



**NOTE:** Be sure to include a carriage return/line feed after sending a command to the printer.

If the Visibility Agent is on, there are two data types that the printer can send to the AVS platform – **Discovery Data** and **Setting/Alert Data**.

**Discovery Data**

This information is sent when the printer connects to the ZPC. The following printer settings are transmitted:

Printer Settings		
device.unique_id	media.type	device.oem.model_name
ip.dns.domain	media.thermal_mode	appl.name
ip.active_network	media.printmode	device.location
mac_raw	odometer.total_label_count	zpl.system_status
ip.protocol	odometer.media_marker_count1	ip.addr
ip.netmask	odometer.media_marker_count2	ip.ftp.enable
ip.gateway	label_queue.batch_label_cnt	ip.lpd.enable
ip.port	label_queue.format_counter	ip.tcp.enable
device.pnp_option	zbi.enabled	ip.udp.enable
device.languages	zbi.state	ip.http.enable
device.cpcl_formatting_commands_disable	zbi.revision	ip.smtp.enable
head.resolution.in_dpmm	head.width.in_dots	ip.pop3.enable
zpl.label_length	ip.port_json_config	ip.snmp.enable
ezpl.print_width	appl.link_os_version	ip.telnet.enable
media.darkness.mode	device.friendly_name	weblink.enable

## Settings and Alerts Data

This information is sent by the printer at the schedule listed in the table below. The following printer settings or alerts are transmitted:

Printer Settings		
At connection:	At connection:	When the Alert occurs:
weblink.zebra_connector.version	device.bluetooth_installed	PAPER OUT
device.product_name	odometer.media_marker_count	RIBBON OUT
print.tone_format	media.type, ezpl.media_type	HEAD ELEMENT BAD
power.percent_full	interface.network.active.speed	SUPPLY TOO HOT
power.serial_number_string		HEAD OPEN
power.manufacture_date		HEAD COLD
power.cycle_count		HEAD TOO HOT
power.device_name	power.percent_full	CUTTER JAMMED
power.full_charge_capacity	wlan.signal_strength	COLD START
power.date_first_used	odometer.total_print_length	
interface.network.active.ip_addr	interface.network.active.speed	
wlan.signal_strength		
odometer.total_print_length		power.cycle_count
odometer.rfid.valid_resetable		power.device_name
odometer.rfid.void_resetable	print.tone	power.full_charge_capacity
memory.flash_size	print.tone_zpl	odometer.total_label_count
memory.flash_free	media.speed	odometer.rfid.valid_resetable
device.ltu_installed	zpl.label_length	odometer.rfid.void_resetable
device.cutter_installed		memory.flash_free
device.rewinder_installed		odometer.media_marker_count
		media.type
		ezpl.media_type

- Front Panel Batch Counters have been made available. They can be turned on by using the SGD command `display.batch_counter`.
- Web sockets connections now support SHA2 certificates. The printers will continue to support SHA1 certificates until Link-OS v5 is released (in 2017). At that time, the printers will no longer support SHA1 certificates, in accordance with privacy best practices.
- New Set-Get-Do Commands were implemented. Refer to the Zebra Programming Guide for details on each command.
  - head.resolution.in\_dpi
  - file.capture\_response.begin
  - file.capture\_response.end
  - file.capture\_response.destination
  - device.command\_override.add
  - device.command\_override.clear
  - device.command\_override.list

- `device.command_override.active`
- `weblink.zebra_connector.version`
- `weblink.zebra_connector.enable`
- `weblink.zebra_connector.proxy`
- `weblink.zebra_connector.authentication`
- `weblink.zebra_connector.authentication.add`
- `weblink.zebra_connector.authentication.remove`
- `weblink.zebra_connector.authentication.entries`
- `wlan.wpa.timecheck`
- `wlan.rts_cts_enabled`
- `display.batch_counter`
- `device.set_clock_to_build_date`

### Issues Corrected

- The default for the command `device.alerts.audible` is now **“high.”**
- When using the Dual Radio, the Bluetooth radio will remain active even if the WLAN radio is not.
- The SNMP `zbraOptUnsAlertCondition` and `zbrOptUnsAlertsEntry` response strings have been extended to include 1023 characters.
- The Japanese and Korean front panel menus have been adjusted to eliminate character overlaps.
- SNMP Print Job Completed reporting has been enhanced when using the Pause Alert.
- The ZBI `WRITE` command has been corrected to count all data written to the system.
- The Mirror system timing has been altered to include a retry, so as to improve file writing performance.
- The printer will now attempt to reconnect to the WLAN connection when removed from the powered cradle while in sleep mode.
- The command `zp1.zp1_override` has been eliminated; use the `device.command_override` commands instead.
- The printer will now feed to the `SET-TOF` defined position when that setting has been set, and the **FEED** button is pressed.
- The Mirror system will now accept the return code `125` in addition to the return code `150`, in order to support IIS7 and FileZilla servers.
- Firmware updating when using both Profile Manager and either IIS7 or FileZilla has been optimized to avoid conflicts.
- Wi-Fi roaming and Protected Management Frames (PMF) support have been improved.
- Memory management during printing has been optimized for cases where a `.TTF` font, graphics, and inverted orientation printing are being used.
- The JSON implementation of the `usb.mirror.feedback.odometer` and `ip.mirror.feedback.odometer` commands now have values of `READ_WRITE_ACCESS`.
- The JSON implementation of the `zbi.state` command has been changed from a string type to an enum type.
- The printer will now communicate via the USB port when powered by the Battery Eliminator.



- Socket connections on ZBI have been optimized to avoid a connection not ending when it should.
- The JSON implementation of **interface.network.active.speed** is now treated as an integer.
- APPLICATOR mode will be offered and selectable, and the printer will use APPLICATOR paper movement behavior while in the mode; however since the printer does not have an applicator option, the printer will not wait for applicator signals.
- The range for **ip.discovery.port** is now 1 - 65535.
- The range for **zp1.label1\_length** has been corrected in the allconfig.

## Link-OS 3

### V76.19.15ZA

**Release Date: 25 May 2016**

This firmware includes all features of the previous [V76.19.15Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZQ510
- ZQ520

**Changes**

- None

**Issues Corrected**

- The USB On-The-Go port will now be enabled when the printer is connected to the Battery Eliminator.
- The printer will now attempt to reconnect to the WLAN connection when removed from the powered cradle while in sleep mode.
- The printer will now feed to the **SET-TOF** defined position when that setting has been set, and the **FEED** button is pressed.

### V76.19.15Z

**Release Date: 14 January 2016**

This firmware includes all features of the previous [V76.19.13Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZQ510
- ZQ520

**Changes**

- The wireless settings commands only support non-control ASCII characters.
- FTP PORT commands are supported when the port number requested is above 1023 and the IP address being requested is the same as that of the device initiating the connection.

**Issues Corrected**

- Network Time Protocol settings syntax checking has been enhanced.

## V76.19.13Z

### Release Date: 31 August 2015

This firmware includes all features of the previous [V76.19.13Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZQ510
- ZQ520

### Changes

- The Battery Eliminator Cradle is now supported.
- The USB/Serial cable is now supported.
- Link-OS printers now support downloading PEM and DER formatted WLAN certificates in the P12 format for the TLS, TTLS and PEAP security types. Additionally, P12 formatted certificates are now supported for downloading private keys and client certificates. For more information, see the App Note "Direct WLAN Cert Downloading".
- The new Zebra logo is now used on the front panel, web pages and two-key report.
- The printers will now store information related to the state of the devices sensors and internal printer operations which may be accessed and used by Zebra for the purpose of improving the products performance and readability. For more information, please contact [softpm@zebra.com](mailto:softpm@zebra.com).

### Issues Corrected

- Print Quality for content that is printed immediately after a full width solid line has been improved.
- The "`netmanage.avalanche.agent_addr`" command will now accept a DNS value.
- The OID: `.1.3.6.1.4.1.10642.200.14.5.0` (`zql-power-low-battery_shutdown`) response has been corrected.
- The printers will now accept a `.GRF` image larger than 100KB.
- The ZPL implementation of the Datamatrix barcode has been enhanced to support more combinations of standard ASCII and extended ASCII character strings.
- TTF font handling in CPCL has been enhanced to improve performance.
- TTF font handling in CPCL has been enhanced to improve performance.
- CPCL TTF character mapping now uses 1252/Latin 1 to locate characters for print events.
- Rendering time for ZPL generated circles, boxes with rounded corners and diagonal lines has been enhanced.
- Font handling has been improved to ensure that when a new font replaces an existing font, the character mapping is correctly updated.
- The `^HZ0` response now places a drive letter in the `<OBJECT-DATA>` reply.
- The `^GFA` command will no longer produce a stretched image when the last line of the encoded graphic is a `" , "` or a `" ! "`.
- The time the Bluetooth system will wait for a connection has been extended to accommodate the needs of more devices.
- The printer will now wait to complete an on-going Bluetooth connection attempt when the sleep timeout is reached.

- ZBI program throughput has been enhanced.
- The Cloud Connect web sockets system has been optimized to improve throughput.
- The Cloud Connect web sockets has been optimized to better handle large file (1MB+) downloads from the printer to a host system.
- The USB implementation has been enhanced to optimize bi-directional communication.
- The Bluetooth system has been enhanced to support scenarios where the Master device is sending data immediately after creating a connection.
- In order to improve throughput, the WLAN system will now use "CTS to Self" for the default HT mode. The system can be set to use "RTS-CTS" by using the "`wlan.rts_cts_enabled`" command (default is "off").
- Checksum validation during CPCL downloads has been altered to accept images from the Multiplatform SDK.
- The printer will now stay on when the `power.inactivity_timeout` is set to a non-zero value and the unit is plugged in or in a powered cradle.

### V76.19.10Z

**Release Date: 12 May 2015**

This is the initial release for this platform.

# V78 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V78.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZR338

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)
  - User supplied certificates for TLS
  - User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”
  - HTTPS for the printer web pages
  - User supplied certificates for HTTPS
  - User Defined Gateway Ping intervals

- User supplied web sockets certificates
- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset
- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location
  - has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - SetGetDo changes. Several commands have changed:
    - **bluetooth.bonding** – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.
    - **bluetooth.minimum\_security\_mode** – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
      - **1**: No encryption or authentication is required to access the Zebra Parser Service.
      - **2**: Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
      - **3 or 4**: Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.

- **bluetooth.allow\_non\_display\_numeric\_comparison** – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device. If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.
noprint	Display Only	If Passkey Pairing is used, the printer will not print out the passkey. If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.
off	No I/O	Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!

## Issues Corrected

- ZBI now correctly handles output on the serial port.
- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).
- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.
- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- Mirror Feedback files are now working correctly.
- The display of “Labels remaining in batch” information on the front panel has been optimized.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### "media.tof\_tune"

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.

- Example:
    - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
  - Suggested starting value when migrating from RW to ZQ500: "-13".
  - Not affected by a printer default.
- " print.vertical\_dpi\_adjust "**
- Range: 95.0 to 105.0.
  - Default: 100.0 (no change in y-coordinate or height of print fields)
  - Example:
    - ! U1 setvar "print.vertical\_dpi\_adjust" "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
  - Suggested starting value when migrating from RW to ZQ500: "98.4".
  - Not affected by a printer default.



## Link-OS 4

### V78.20.01ZB

**Release Date: 01 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZR338

#### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V78.20.01Z

**Release Date: 10 January 2017**

This firmware includes all features of the previous [Link-OS 3](#) release, except where noted otherwise. It is for use with the following printer models:

- ZR338

#### Changes

- Link-OS version updated to v4.0.
- Support has been added for a Visibility Agent. This new feature can connect a networked Link-OS printer to Zebra’s Asset Visibility Service (AVS). The Asset Visibility Service is a Zebra-managed service offering that provides Zebra partners and customers ‘at-a-glance’ visibility to analytical insights about their device health, utilization, and performance. When Link-OS v4 printers are connected to a wired or wireless network, they will attempt to connect to the Asset Visibility Service by default. When successfully connected, the printer sends approximately 5 Kbytes of data per day (depending on how many alert events happen per day).
  - Data printed on any labels, tags or receipts are not transmitted to the Asset Visibility Service. The printers only communicate predefined settings on a scheduled basis. The printer sends Discovery Data and Settings and Alerts Data. The settings that are transmitted are listed below in the form of Set-Get-Do commands and are detailed in the Zebra Programming Guide.
  - The printer uses an encrypted, certificate-authenticated web socket connection to connect to the ZPC. **NOTE:** This is the same connection type that is typically used when you connect to an e-commerce or banking site.
  - The Visibility Agent can be turned off using a Set-Get-Do Command. Using your preferred software or Zebra Setup Utilities, send the commands below to configure and validate the Asset Visibility Agent settings. You can download Zebra Setup utilities at <https://www.zebra.com/setup>.

## weblink.zebra\_connector.enable

Turns the Asset Visibility Agent on or off. Additional information can be found in the App Note. See <https://www.zebra.com/us/en/products/software/barcode-printers/link-os/application-notes.html>.

**Values:** "on" or "off"

**Default Value:** "on"

### To send the commands:

1. Send the following command to Opt Out (disable the connection to ZPC and the Asset Visibility Service):

```
! U1 setvar "weblink.zebra_connector.enable" "off"
```

2. Send the following command to validate that you have opted out:

```
! U1 getvar "weblink.zebra_connector.enable"
```

The printer should respond with "off".



**NOTE:** Be sure to include a carriage return/line feed after sending a command to the printer.

If the Visibility Agent is on, there are two data types that the printer can send to the AVS platform – **Discovery Data** and **Setting/Alert Data**.

### Discovery Data

This information is sent when the printer connects to the ZPC. The following printer settings are transmitted:

Printer Settings		
device.unique_id	media.type	device.oem.model_name
ip.dns.domain	media.thermal_mode	appl.name
ip.active_network	media.printmode	device.location
mac_raw	odometer.total_label_count	zpl.system_status
ip.protocol	odometer.media_marker_count1	ip.addr
ip.netmask	odometer.media_marker_count2	ip.ftp.enable
ip.gateway	label_queue.batch_label_cnt	ip.lpd.enable
ip.port	label_queue.format_counter	ip.tcp.enable
device.pnp_option	zbi.enabled	ip.udp.enable
device.languages	zbi.state	ip.http.enable
device.cpcl_formatting_commands_disable	zbi.revision	ip.smtp.enable
head.resolution.in_dpmm	head.width.in_dots	ip.pop3.enable
zpl.label_length	ip.port_json_config	ip.snmp.enable
ezpl.print_width	appl.link_os_version	ip.telnet.enable
media.darkness.mode	device.friendly_name	weblink.enable

## Settings and Alerts Data

This information is sent by the printer at the schedule listed in the table below. The following printer settings or alerts are transmitted:

Printer Settings		
At connection:	At connection:	When the Alert occurs:
weblink.zebra_connector.version	device.bluetooth_installed	PAPER OUT
device.product_name	odometer.media_marker_count	RIBBON OUT
print.tone_format	media.type, ezpl.media_type	HEAD ELEMENT BAD
power.percent_full	interface.network.active.speed	SUPPLY TOO HOT
power.serial_number_string		HEAD OPEN
power.manufacture_date		HEAD COLD
power.cycle_count		HEAD TOO HOT
power.device_name	power.percent_full	CUTTER JAMMED
power.full_charge_capacity	wlan.signal_strength	COLD START
power.date_first_used	odometer.total_print_length	
interface.network.active.ip_addr	interface.network.active.speed	
wlan.signal_strength		
odometer.total_print_length		power.cycle_count
odometer.rfid.valid_resetable		power.device_name
odometer.rfid.void_resetable	print.tone	power.full_charge_capacity
memory.flash_size	print.tone_zpl	odometer.total_label_count
memory.flash_free	media.speed	odometer.rfid.valid_resetable
device.ltu_installed	zpl.label_length	odometer.rfid.void_resetable
device.cutter_installed		memory.flash_free
device.rewinder_installed		odometer.media_marker_count
		media.type
		ezpl.media_type

- Web sockets connections now support SHA2 certificates. The printers will continue to support SHA1 certificates until Link-OS v5 is released (in 2017). At that time, the printers will no longer support SHA1 certificates, in accordance with privacy best practices.
- New Set-Get-Do Commands were implemented. Refer to the Zebra Programming Guide for details on each command.
  - head.resolution.in\_dpi
  - file.capture\_response.begin
  - file.capture\_response.end
  - file.capture\_response.destination
  - device.command\_override.add
  - device.command\_override.clear
  - device.command\_override.list
  - device.command\_override.active

- `weblink.zebra_connector.version`
- `weblink.zebra_connector.enable`
- `weblink.zebra_connector.proxy`
- `weblink.zebra_connector.authentication`
- `weblink.zebra_connector.authentication.add`
- `weblink.zebra_connector.authentication.remove`
- `weblink.zebra_connector.authentication.entries`
- `wlan.wpa.timecheck`
- `wlan.rts_cts_enabled`
- `display.batch_counter`
- `device.set_clock_to_build_date`

### Issues Corrected

- When using the Dual Radio, the Bluetooth radio will remain active even if the WLAN radio is not.
- The SNMP `zbraOptUnsAlertCondition` and `zbrOptUnsAlertsEntry` response strings have been extended to include 1023 characters.
- SNMP Print Job Completed reporting has been enhanced when using the Pause Alert.
- The ZBI `WRITE` command has been corrected to count all data written to the system.
- The Mirror system timing has been altered to include a retry, so as to improve file writing performance.
- The command `zp1.zp1_override` has been eliminated; use the `device.command_override` commands instead.
- The printer will now feed to the `SET-TOF` defined position when that setting has been set, and the FEED button is pressed.
- The Mirror system will now accept the return code `125` in addition to the return code `150`, in order to support IIS7 and FileZilla servers.
- Firmware updating when using both Profile Manager and either IIS7 or FileZilla has been optimized to avoid conflicts.
- Wi-Fi roaming and Protected Management Frames (PMF) support have been improved.
- Memory management during printing has been optimized for cases where a `.TTF` font, graphics, and inverted orientation printing are being used.
- The JSON implementation of the `usb.mirror.feedback.odometer` and `ip.mirror.feedback.odometer` commands now have values of `READ_WRITE_ACCESS`.
- The JSON implementation of the `zbi.state` command has been changed from a string type to an enum type.
- Socket connections on ZBI have been optimized to avoid a connection not ending when it should.
- The JSON implementation of `interface.network.active.speed` is now treated as an integer.
- APPLICATOR mode will be offered and selectable, and the printer will use APPLICATOR paper movement behavior while in the mode; however since the printer does not have an applicator option, the printer will not wait for applicator signals.
- The range for `ip.discovery.port` is now 1 - 65535.
- The range for `zp1.label_length` has been corrected in the `allconfig`.

## Link-OS 3

### V78.19.15Z

**Release Date: 14 January 2016**

This firmware includes all features of the previous [V78.19.12Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZR338

#### Changes

- The wireless settings commands only support non-control ASCII characters.
- FTP PORT commands are supported when the port number requested is above 1023 and the IP address being requested is the same as that of the device initiating the connection.

#### Issues Corrected

- Network Time Protocol settings syntax checking has been enhanced.

### V78.19.12Z

**Release Date: 30 June 2015**

This is the initial release of this firmware. It is for use with the following printer models:

- ZR338

#### Changes/Issues Corrected

None.

# V79 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## V79.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZR628
- ZR638

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)
  - User supplied certificates for TLS
  - User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”
  - HTTPS for the printer web pages

- User supplied certificates for HTTPs
- User Defined Gateway Ping intervals
- User supplied web sockets certificates
- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset.
- A “BATTERY MISSING” alert has been added, for those printers that support it.
- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location
  - has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - SetGetDo changes. Several commands have changed:
    - **bluetooth.bonding** – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.
    - **bluetooth.minimum\_security\_mode** – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
      - **1**: No encryption or authentication is required to access the Zebra Parser Service.
      - **2**: Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
      - **3 or 4**: Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.

- **bluetooth.allow\_non\_display\_numeric\_comparison** – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device.  If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.
noprint	Display Only	If Passkey Pairing is used, the printer will not print out the passkey.  If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.
off	No I/O	Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!

## Issue Corrected

- ZBI now correctly handles output on the serial port.
- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).
- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.
- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- Mirror Feedback files are now working correctly.
- The display of “Labels remaining in batch” information on the front panel has been optimized.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### "media.tof\_tune"

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.



- Example:
    - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
  - Suggested starting value when migrating from RW to ZQ500: "-13".
  - Not affected by a printer default.
- " print.vertical\_dpi\_adjust "**
- Range: 95.0 to 105.0.
  - Default: 100.0 (no change in y-coordinate or height of print fields)
  - Example:
    - ! U1 setvar "print.vertical\_dpi\_adjust" "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
  - Suggested starting value when migrating from RW to ZQ500: "98.4".
  - Not affected by a printer default.

## Link-OS 4

### V79.20.01ZB

**Release Date: 01 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZR628
- ZR638

#### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V79.20.01Z

**Release Date: 10 January 2017**

This firmware includes all features of the previous [V79.19.15Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZR628
- ZR638

#### Changes

- Link-OS version updated to v4.0.
- Support has been added for a Visibility Agent. This new feature can connect a networked Link-OS printer to Zebra’s Asset Visibility Service (AVS). The Asset Visibility Service is a Zebra-managed service offering that provides Zebra partners and customers ‘at-a-glance’ visibility to analytical insights about their device health, utilization, and performance. When Link-OS v4 printers are connected to a wired or wireless network, they will attempt to connect to the Asset Visibility Service by default. When successfully connected, the printer sends approximately 5 Kbytes of data per day (depending on how many alert events happen per day).
  - Data printed on any labels, tags or receipts are not transmitted to the Asset Visibility Service. The printers only communicate predefined settings on a scheduled basis. The printer sends Discovery Data and Settings and Alerts Data. The settings that are transmitted are listed below in the form of Set-Get-Do commands and are detailed in the Zebra Programming Guide.
  - The printer uses an encrypted, certificate-authenticated web socket connection to connect to the ZPC. **NOTE:** This is the same connection type that is typically used when you connect to an e-commerce or banking site.
  - The Visibility Agent can be turned off using a Set-Get-Do Command. Using your preferred software or Zebra Setup Utilities, send the commands below to configure and validate the Asset Visibility Agent settings. You can download Zebra Setup utilities at <https://www.zebra.com/setup>.

## weblink.zebra\_connector.enable

Turns the Asset Visibility Agent on or off. Additional information can be found in the App Note. See <https://www.zebra.com/us/en/products/software/barcode-printers/link-os/application-notes.html>.

**Values:** "on" or "off"

**Default Value:** "on"

### To send the commands:

1. Send the following command to Opt Out (disable the connection to ZPC and the Asset Visibility Service):

```
! U1 setvar "weblink.zebra_connector.enable" "off"
```

2. Send the following command to validate that you have opted out:

```
! U1 getvar "weblink.zebra_connector.enable"
```

The printer should respond with "off".



**NOTE:** Be sure to include a carriage return/line feed after sending a command to the printer.

If the Visibility Agent is on, there are two data types that the printer can send to the AVS platform – **Discovery Data** and **Setting/Alert Data**.

### Discovery Data

This information is sent when the printer connects to the ZPC. The following printer settings are transmitted:

Printer Settings		
device.unique_id	media.type	device.oem.model_name
ip.dns.domain	media.thermal_mode	appl.name
ip.active_network	media.printmode	device.location
mac_raw	odometer.total_label_count	zpl.system_status
ip.protocol	odometer.media_marker_count1	ip.addr
ip.netmask	odometer.media_marker_count2	ip.ftp.enable
ip.gateway	label_queue.batch_label_cnt	ip.lpd.enable
ip.port	label_queue.format_counter	ip.tcp.enable
device.pnp_option	zbi.enabled	ip.udp.enable
device.languages	zbi.state	ip.http.enable
device.cpcl_formatting_commands_disable	zbi.revision	ip.smtp.enable
head.resolution.in_dpmm	head.width.in_dots	ip.pop3.enable
zpl.label_length	ip.port_json_config	ip.snmp.enable
ezpl.print_width	appl.link_os_version	ip.telnet.enable
media.darkness.mode	device.friendly_name	weblink.enable

## Settings and Alerts Data

This information is sent by the printer at the schedule listed in the table below. The following printer settings or alerts are transmitted:

Printer Settings		
At connection:	At connection:	When the Alert occurs:
weblink.zebra_connector.version	device.bluetooth_installed	PAPER OUT
device.product_name	odometer.media_marker_count	RIBBON OUT
print.tone_format	media.type, ezpl.media_type	HEAD ELEMENT BAD
power.percent_full	interface.network.active.speed	SUPPLY TOO HOT
power.serial_number_string		HEAD OPEN
power.manufacture_date		HEAD COLD
power.cycle_count		HEAD TOO HOT
power.device_name	power.percent_full	CUTTER JAMMED
power.full_charge_capacity	wlan.signal_strength	COLD START
power.date_first_used	odometer.total_print_length	
interface.network.active.ip_addr	interface.network.active.speed	
wlan.signal_strength		
odometer.total_print_length		power.cycle_count
odometer.rfid.valid_resetable		power.device_name
odometer.rfid.void_resetable	print.tone	power.full_charge_capacity
memory.flash_size	print.tone_zpl	odometer.total_label_count
memory.flash_free	media.speed	odometer.rfid.valid_resetable
device.ltu_installed	zpl.label_length	odometer.rfid.void_resetable
device.cutter_installed		memory.flash_free
device.rewinder_installed		odometer.media_marker_count
		media.type
		ezpl.media_type

- Front Panel Batch Counters have been made available. They can be turned on by using the SGD command `display.batch_counter`.
- Web sockets connections now support SHA2 certificates. The printers will continue to support SHA1 certificates until Link-OS v5 is released (in 2017). At that time, the printers will no longer support SHA1 certificates, in accordance with privacy best practices.
- Alerts are no longer displayed over the Home menu to enhance readability.
- New Set-Get-Do Commands were implemented. Refer to the Zebra Programming Guide for details on each command.
  - head.resolution.in\_dpi
  - file.capture\_response.begin
  - file.capture\_response.end
  - file.capture\_response.destination
  - device.command\_override.add
  - device.command\_override.clear

- `device.command_override.list`
- `device.command_override.active`
- `weblink.zebra_connector.version`
- `weblink.zebra_connector.enable`
- `weblink.zebra_connector.proxy`
- `weblink.zebra_connector.authentication`
- `weblink.zebra_connector.authentication.add`
- `weblink.zebra_connector.authentication.remove`
- `weblink.zebra_connector.authentication.entries`
- `wlan.wpa.timecheck`
- `wlan.rts_cts_enabled`
- `display.batch_counter`
- `device.set_clock_to_build_date`

### Issues Corrected

- The SGD command `power.low_battery_timeout_alt` is now read/write.
- Bluetooth connectivity has been improved so that it will not disconnect during a network reset (~WR).
- When using the Dual Radio, the Bluetooth radio will remain active even if the WLAN radio is not.
- The SNMP `zbraOptUnsAlertCondition` and `zbrOptUnsAlertsEntry` response strings have been extended to include 1023 characters.
- The Japanese and Korean front panel menus have been adjusted to eliminate character overlaps.
- SNMP Print Job Completed reporting has been enhanced when using the Pause Alert.
- The ZBI `WRITE` command has been corrected to count all data written to the system.
- The EPL `URH` and `URL` commands will now return a value in meters.
- The Mirror system timing has been altered to include a retry, so as to improve file writing performance.
- EPL has been enhanced to handle images larger than the label size.
- The command `zp1.zp1_override` has been eliminated; use the `device.command_override` commands instead.
- The printer will now come back on-line after being rebooted while in the cradle when the battery is fully charged.
- The printer will now feed to the `SET-TOF` defined position when that setting has been set, and the FEED button is pressed.
- The Mirror system will now accept the return code `125` in addition to the return code `150`, in order to support IIS7 and FileZilla servers.
- The Mirror system now supports time and date stamping used by IIS7 and FileZilla servers.
- Firmware updating when using both Profile Manager and either IIS7 or FileZilla has been optimized to avoid conflicts.
- Wi-Fi roaming and Protected Management Frames (PMF) support have been improved.
- Charging while the printer is turned on has been optimized to eliminate unneeded charge cycles.

- Memory management during printing has been optimized for cases where a `.TTF` font, graphics, and inverted orientation printing are being used.
- The JSON implementation of the `usb.mirror.feedback.odometer` and `ip.mirror.feedback.odometer` commands now have values of `READ_WRITE_ACCESS`.
- The JSON implementation of the `zbi.state` command has been changed from a string type to an enum type.
- The EPL command `OR0,0` is now supported..
- The Czech menu will now use the word `INCHES`.
- Socket connections on ZBI have been optimized to avoid a connection not ending when it should.
- The `CHARGING TEMP FAULT` message system has been optimized to be more accurate.
- The JSON implementation of `interface.network.active.speed` is now treated as an integer.
- `APPLICATOR` mode will be offered and selectable, and the printer will use `APPLICATOR` paper movement behavior while in the mode; however since the printer does not have an applicator option, the printer will not wait for applicator signals.
- The label feed length after a calibration will now be updated to use the newly calibrated length.
- The range for `ip.discovery.port` is now 1 - 65535.
- The range for `zp1.label1_length` has been corrected in the `allconfig`.

## Link-OS 3

### V79.19.15Z

**Release Date: 14 January 2016**

This firmware includes all features of the previous [V79.19.12Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZR628
- ZR638

#### Changes

- The wireless settings commands only support non-control ASCII characters.
- FTP PORT commands are supported when the port number requested is above 1023 and the IP address being requested is the same as that of the device initiating the connection.

#### Issues Corrected

- Network Time Protocol settings syntax checking has been enhanced.

### V79.19.12Z

**Release Date: 30 June 2015**

This is the initial release of this firmware. It is for use with the following printer models:

- ZR628
- ZR638

#### Changes/Issues Corrected

None.

# V80 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V80.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZT510
- ZT610
- ZT620

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)
  - User supplied certificates for TLS
  - User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”
  - HTTPS for the printer web pages



- User supplied certificates for HTTPs
- User Defined Gateway Ping intervals
- User supplied web sockets certificates
- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The UCODE8 and UCODE8M RFID chips are now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset.
- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - The LE GAP Device name – this GATT attribute will require pairing before it can be read.
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - Printers with radios that support 4.1 or later now support Numeric Comparison pairing for Bluetooth Low Energy pairing events. NOTE – only used if both devices support Bluetooth 4.1 and the Secure LE connection protocol.
  - SetGetDo changes. Several commands have changed:
    - **bluetooth.bonding** – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.
    - **bluetooth.minimum\_security\_mode** – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
      - **1**: No encryption or authentication is required to access the Zebra Parser Service.
      - **2**: Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
      - **3 or 4**: Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.

- **bluetooth.allow\_non\_display\_numeric\_comparison** – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	<p>If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device.</p> <p>If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.</p>
noprint	Display Only	<p>If Passkey Pairing is used, the printer will not print out the passkey.</p> <p>If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.</p>
off	No I/O	<p>Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!</p>

- **Deprecated Commands:**

Command Name	Use This Command Instead
bluetooth.le.print_passkey	bluetooth.allow_non_display_numeric_comparison
bluetooth.le.minimum_security	bluetooth.minimum_security_mode

- **LE Security Changes:**

LE Minimum Security Value	Previous Minimum Security Value	New Minimum Security Value
unauth_key_encrypt	1	2
auth_key_encrypt	1 or 2	4
none	1, 2, 3, or 4	No change

## Issues Corrected

- ZBI now correctly handles output on the serial port.
- The maximum label length for 600 dpi printers is now 32.35 inches.
- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Larger RFID label (5.5” wide by 16” long) will now print without blank labels.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).

- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.
- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- When printing small labels, the labels that print after a RFID VOID label no longer have a faint "VOID" printed on them.
- Mirror Feedback files are now working correctly.
- The display of "Labels remaining in batch" information on the front panel has been optimized.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### "media.tof\_tune"

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.
- Example:
  - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
- Suggested starting value when migrating from RW to ZQ500: "-13".
- Not affected by a printer default.

### "print.vertical\_dpi\_adjust "

- Range: 95.0 to 105.0.
- Default: 100.0 (no change in y-coordinate or height of print fields)
- Example:
  - ! U1 setvar "print.vertical\_dpi\_adjust" "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
- Suggested starting value when migrating from RW to ZQ500: "98.4".
- Not affected by a printer default.

## Link-OS 4

### V80.20.09Z

**Release Date: 17 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZT510
- ZT610
- ZT620

#### Issues Corrected

Contrast control on the ZT510 has been improved to maintain consistency.

### V80.20.06ZB

**Release Date: 01 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZT510
- ZT610
- ZT620

#### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V80.20.04Z

**Release Date: 25 July 2017**

This firmware is for use with the following printer models:

- ZT510
- ZT610
- ZT620

#### Changes

The ZT510 is now supported.

### Issues Corrected

- Cut positioning has been optimized for the ZT510 printer.
- Ethernet driver now supports polarity auto-detection.
- Front panel contrast settings have been optimized to reduce ghosting.

### V80.20.03Z

**Release Date: 15 July 2017**

This firmware is for use with the following printer models:

- ZT610
- ZT620

### Changes/Issues Corrected

This is the initial release of this new printer OS build.

# V81 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V81.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZQ310
- ZQ320

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)
  - User supplied certificates for TLS
  - User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”
  - HTTPS for the printer web pages
  - User supplied certificates for HTTPs
  - User Defined Gateway Ping intervals
  - User supplied web sockets certificates

- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset.
- A “BATTERY MISSING” alert has been added, for those printers that support it.
- The default for the power.sleep.timeout and power.inactivity\_timeout have been changed on selected products:

	QLn series	ZQ500 series	iMZ series	ZQ3 series
power.sleep.timeout	N/A	20 minutes	N/A	20 minutes
power.inactivity_timeout	No change	10 hours	no change	10 hours

- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - The LE GAP Device name – this GATT attribute will require pairing before it can be read.
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - Printers with radios that support 4.1 or later now support Numeric Comparison pairing for Bluetooth Low Energy pairing events. NOTE – only used if both devices support Bluetooth 4.1 and the Secure LE connection protocol.
  - SetGetDo changes. Several commands have changed:
    - **bluetooth.bonding** – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.
    - **bluetooth.minimum\_security\_mode** – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
      - **1**: No encryption or authentication is required to access the Zebra Parser Service.
      - **2**: Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
      - **3 or 4**: Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.

- **bluetooth.allow\_non\_display\_numeric\_comparison** – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device.  If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.
noprint	Display Only	If Passkey Pairing is used, the printer will not print out the passkey.  If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.
off	No I/O	Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!

- **Deprecated Commands:**

Command Name	Use This Command Instead
bluetooth.le.print_passkey	bluetooth.allow_non_display_numeric_comparison
bluetooth.le.minimum_security	bluetooth.minimum_security_mode

- **LE Security Changes:**

LE Minimum Security Value	Previous Minimum Security Value	New Minimum Security Value
unauth_key_encrypt	1	2
auth_key_encrypt	1 or 2	4
none	1, 2, 3, or 4	No change

## Issue Corrected

- ZBI now correctly handles output on the serial port.
- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).
- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.



- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- Mirror Feedback files are now working correctly.
- The display of “Labels remaining in batch” information on the front panel has been optimized.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### **"media.tof\_tune"**

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.
- Example:
  - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
- Suggested starting value when migrating from RW to ZQ500: “-13”.
- Not affected by a printer default.

### **"print.vertical\_dpi\_adjust "**

- Range: 95.0 to 105.0.
- Default: 100.0 (no change in y-coordinate or height of print fields)
- Example:
  - ! U1 setvar "device.cpcl\_adjust\_length\_dpi" "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
- Suggested starting value when migrating from RW to ZQ500: “98.4”.
- Not affected by a printer default.

## Link-OS 4

### V81.20.06ZB

**Release Date: 01 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZQ310
- ZQ320

#### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V81.20.06Z

**Release Date: 30 August 2017**

This is the initial release of this printer OS. It is for use with the following printer models:

- ZQ310
- ZQ320

# V82 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V82.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZR318
- ZR328

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)
  - User supplied certificates for TLS
  - User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”
  - HTTPS for the printer web pages
  - User supplied certificates for HTTPs
  - User Defined Gateway Ping intervals
  - User supplied web sockets certificates

- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset.
- A “BATTERY MISSING” alert has been added, for those printers that support it.
- The default for the power.sleep.timeout and power.inactivity\_timeout have been changed on selected products:

	QLn series	ZQ500 series	iMZ series	ZQ3 series
power.sleep.timeout	N/A	20 minutes	N/A	20 minutes
power.inactivity_timeout	No change	10 hours	no change	10 hours

- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - The LE GAP Device name – this GATT attribute will require pairing before it can be read.
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - Printers with radios that support 4.1 or later now support Numeric Comparison pairing for Bluetooth Low Energy pairing events. NOTE – only used if both devices support Bluetooth 4.1 and the Secure LE connection protocol.
  - SetGetDo changes. Several commands have changed:
    - **bluetooth.bonding** – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.
    - **bluetooth.minimum\_security\_mode** – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
      - **1:** No encryption or authentication is required to access the Zebra Parser Service.
      - **2:** Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
      - **3 or 4:** Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.

- **bluetooth.allow\_non\_display\_numeric\_comparison** – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device. If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.
noprint	Display Only	If Passkey Pairing is used, the printer will not print out the passkey. If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.
off	No I/O	Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!

- **Deprecated Commands:**

Command Name	Use This Command Instead
bluetooth.le.print_passkey	bluetooth.allow_non_display_numeric_comparison
bluetooth.le.minimum_security	bluetooth.minimum_security_mode

- **LE Security Changes:**

LE Minimum Security Value	Previous Minimum Security Value	New Minimum Security Value
unauth_key_encrypt	1	2
auth_key_encrypt	1 or 2	4
none	1, 2, 3, or 4	No change

## Issue Corrected

- ZBI now correctly handles output on the serial port.
- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).
- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.
- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.

- Mirror Feedback files are now working correctly.
- The display of “Labels remaining in batch” information on the front panel has been optimized.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### **"media.tof\_tune"**

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.
- Example:
  - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
- Suggested starting value when migrating from RW to ZQ500: “-13”.
- Not affected by a printer default.

### **" print.vertical\_dpi\_adjust "**

- Range: 95.0 to 105.0.
- Default: 100.0 (no change in y-coordinate or height of print fields)
- Example:
  - ! U1 setvar "print.vertical\_dpi\_adjust" "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
- Suggested starting value when migrating from RW to ZQ500: “98.4”.
- Not affected by a printer default.

## Link-OS 4

### V82.20.06ZB

**Release Date: 01 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZR318
- ZR328

#### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

### V82.20.06Z

**Release Date: 30 August 2017**

This is the initial release of this printer OS. It is for use with the following printer models:

- ZR318
- ZR328

# V83 Printer OS Release Notes

## V83.20.14Z

**Release Date: 17 May 2018**

This is the initial release of this firmware. It is for use with the following printer models:

- ZD510 HC

### Changes

- This is the initial release of this firmware.



# V84 Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit [www.zebra.com/support](http://www.zebra.com/support).

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## Link-OS 5

### V84.20.10Z

**Release Date: 22 January 2018**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZD410, ZD420
- ZD620



**NOTE:** The ZD400 series printers now use the V84 build of the printer OS, instead of the V77 build.

### Changes

- This is Link-OS version 5.
- Support has been added for the following features (see the PrintSecure Administration Guide for details):
  - IP Address Whitelisting for incoming print connections
  - 802.1x, with support for user name, password and private key password
  - User supplied certificates for 802.1x
  - Transport Layer Socket (TLS)

- User supplied certificates for TLS
- User control TTLS with support for “pap”, “chap”, “mschap” and “mschapv2”
- HTTPS for the printer web pages
- User supplied certificates for HTTPs
- User Defined Gateway Ping intervals
- User supplied web sockets certificates
- New Service control commands
- OpenSSL v1.0.21
- The user supplied certificates for web sockets, TLSRAW and HTTPS can now be P12 formatted.
- 802.11r, also known as “Fast Roaming”, is now supported.
- The Visibility Agent shall now attempt to use the Google DNS and OpenDNS systems to resolve the address when a static IP address is used.
- The SYSLOG now supports an entry for power down/reset
- The Visibility Agent has been updated (see the AppNote on “Disabling the Visibility Agent” for complete details):
  - head.serial\_number has been added.
  - wlan.bssid has been added.
  - device.location has been added.
  - interface.network.active.speed has been removed.
- The Bluetooth system has been updated. This involves several changes:
  - The LE GAP Device name – this GATT attribute will require pairing before it can be read.
  - Bluetooth pairing bonds will be retained across upgrades, but not across printer OS downgrades.
  - Printers with radios that support 4.1 or later now support Numeric Comparison pairing for Bluetooth Low Energy pairing events. NOTE – only used if both devices support Bluetooth 4.1 and the Secure LE connection protocol.
  - SetGetDo changes. Several commands have changed:
    - **bluetooth.bonding** – This command now applies to both Classic and Low Energy devices. Previously, it was only possible to completely disable bonding for Classic devices.
    - **NOTE: bluetooth.minimum\_security\_mode** – This SGD now applies to both Classic and Low Energy devices. Its functionality for Classic devices remains unchanged; its value affects LE security modes as follows:
      - **1:** No encryption or authentication is required to access the Zebra Parser Service.
      - **2:** Encryption, but not authentication is required to access the Zebra Parser Service. MITM protection is not required.
      - **3 or 4:** Encryption and authentication are required to access the Zebra Parser Service. MITM protection is required, and “Passkey Entry” is the only pairing method that will allow access.



- **bluetooth.allow\_non\_display\_numeric\_comparison** – This command now applies to both Classic and Low Energy devices that do not have a display. Its functionality for Classic devices remains unchanged; its value affects LE pairing as follows:

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device. If LE Numeric Comparison is used, the printer will print out the passkey and will <i>auto-confirm</i> the pairing request.
noprint	Display Only	If Passkey Pairing is used, the printer will not print out the passkey. If LE Numeric Comparison is used, the printer will not print out the passkey, but will <i>auto-confirm</i> the pairing request.
off	No I/O	Passkey pairing is not allowed. Only “Just Works” pairing can be used, and MITM protection is not possible. It is not possible to reject the pairing request!

- **Deprecated Commands:**

Command Name	Use This Command Instead
bluetooth.le.print_passkey	bluetooth.allow_non_display_numeric_comparison
bluetooth.le.minimum_security	bluetooth.minimum_security_mode

- **LE Security Changes:**

LE Minimum Security Value	Previous Minimum Security Value	New Minimum Security Value
unauth_key_encrypt	1	2
auth_key_encrypt	1 or 2	4
none	1, 2, 3, or 4	No change

## Issues Corrected

- ZBI now correctly handles output on the serial port.
- The printer now correctly handles repeated ~WR commands.
- Printer web page rendering has been made more reliable.
- Web sockets have been improved to better handle idle time, resets, connection retries/declines and incidents where conn1 and conn2 are set to the same address.
- The WLAN system now correctly handles scenarios where an access point offers it un-allowed mixes of security protocols (such as TKIP and HT and VHT support).
- The Unicode system now correctly handles shaping/rendering of Khmar character, when code combination are used.
- The WLAN radio has been updated to better handle DFS channels.
- LPR throughput has been improved.

- The Bluetooth system can now better handle complex scenarios involving multiple connects and disconnects.
- The GS1 Databar implementation has been enhanced to handle more data structure scenarios.
- Mirror Feedback files are now working correctly.
- The display of “Labels remaining in batch” information on the front panel has been optimized.
- The Protected Management Frames implementation has been updated to support newer radios.
- New SGD commands added to allow users to compensate for label layout variations.

### **"media.tof\_tune"**

- Range: -50 to 50. The media.tof limit (-400 to +400) will be applied to the sum of media.tof\_tune and media.tof\_adjust.
- Example:
  - ! U1 setvar "media.tof\_tune" "5"
  - Followed by a carriage return/line feed.
  - The total top-of-form that is used by the printer will be the sum of media.tof (assuming 0 for this example) and media.tof\_tune. Given the example command above, that would be 5.
- Suggested starting value when migrating from RW to ZQ500: “-13”.
- Not affected by a printer default.

### **"print.vertical\_dpi\_adjust "**

- Range: 95.0 to 105.0.
- Default: 100.0 (no change in y-coordinate or height of print fields)
- Example:
  - ! U1 setvar "print.vertical\_dpi\_adjust" "97.8"
  - Followed by a carriage return/line feed.
  - When a label height is specified as 2000, it will be changed to 1956 (97.8% of 2000) before printing the label. If a field y-coordinate is specified as 1000, it will be change to 978 (97.8% of 1000) before processing the field.
- Suggested starting value when migrating from RW to ZQ500: “98.4”.
- Not affected by a printer default.

## Link-OS 4

### V84.20.07Z

**Release Date: 13 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZD410, ZD420
- ZD620



**NOTE:** The ZD400 series printers now use the V84 build of the printer OS, instead of the V77 build.

### Changes

This release adds support for the Direct Thermal-only ZD420 and ZD620 printers.

### Issues Corrected

None.

### V84.20.05ZB

**Release Date: 01 November 2017**

This Printer OS release includes all features of the previous build, unless noted otherwise. It is for use with the following printer models:

- ZD410, ZD420
- ZD620



**NOTE:** The ZD400 series printers now use the V84 build of the printer OS, instead of the V77 build.

### Issues Corrected

The WLAN system has been updated to fix the “Key Reinstallation Attacks” issues reported against the WPA/WPA2 WiFi protocols.

These issues are detailed at <https://www.krackattacks.com/>

Zebra maintains a website with details on this issue at:

<https://www.zebra.com/us/en/support-downloads/lifeguard-security/lifeguard-krack.html>

## V84.20.05Z

**Release Date: 27 August 2017**

This Printer OS release includes all features of the previous [V77.20.01Z](#) build, unless noted otherwise. It is for use with the following printer models:

- ZD410, ZD420
- ZD620



**NOTE:** The ZD400 series printers now use the V84 build of the printer OS, instead of the V77 build.

### Changes

- The printer operating system for the ZD400 series printers is now based on the V84 build of the OS, rather than the V77 build.
- A new SGD command, `power.hold_cur`, with the choices `on` and `off`, has been created. This command can be used to address vertical registration shift when using narrow media.
- Users can now adjust the vertical (or y coordinate) dots per inch (DPI) the printer uses by means of the `print.vertical_dpi_adjust` command, which uses default of 100%, and a range of 95.0 to 105.0%.

By way of an example, if the command:

```
! U1 setvar "print.vertical_dpi_adjust" "97.8"
```

was used and the current label height was set to 2000 dots, it will be changed to 97.8% of 2000, or 1956 dots. In addition, a field y-coordinate specified as 1000 dots will be change to 97.8% of 1000, or 978 dots. Consequently, a box with a height of 500 dots will be reduced to 97.8% of 500, or 489 dots. Care should be taken when using this command to ensure that bar code scan-ability is maintained as content will be scaled to comply with the current "print.vertical\_dpi\_adjust" setting.

### Issues Corrected:

- WLAN roaming has been improved.
- The printer will now check media out status when coming out of sleep mode.
- Print head shutdown is now included in the Discovery packet and `~HQES` response
- The `bluetooth.enable_reconnect` default setting has been adjusted to correctly reflect which options are available.

## V77.20.01Z

### Release Date: 14 October 2016

This firmware includes all features of the previous [V77.19.17Z](#) release, except where noted otherwise. It is for use with the following printer models:

- ZD410
- ZD420

### Changes

- Link-OS version updated to v4.0.
- Support has been added for a Visibility Agent. This new feature can connect a networked Link-OS printer to Zebra's Asset Visibility Service (AVS). The Asset Visibility Service is a Zebra-managed service offering that provides Zebra partners and customers 'at-a-glance' visibility to analytical insights about their device health, utilization, and performance. When Link-OS v4 printers are connected to a wired or wireless network, they will attempt to connect to the Asset Visibility Service by default. When successfully connected, the printer sends approximately 5 Kbytes of data per day (depending on how many alert events happen per day).
  - Data printed on any labels, tags or receipts are not transmitted to the Asset Visibility Service. The printers only communicate predefined settings on a scheduled basis. The printer sends Discovery Data and Settings and Alerts Data. The settings that are transmitted are listed below in the form of Set-Get-Do commands and are detailed in the Zebra Programming Guide.
  - The printer uses an encrypted, certificate-authenticated web socket connection to connect to the ZPC. **NOTE:** This is the same connection type that is typically used when you connect to an e-commerce or banking site.
  - The Visibility Agent can be turned off via the printer's web pages or front panel. See the Application Note "Opting Out of the Asset Visibility Agent" included with this firmware download and posted on [www.zebra.com](http://www.zebra.com).
  - The Visibility Agent can be turned off using a Set-Get-Do Command. Using your preferred software or Zebra Setup Utilities, send the commands below to configure and validate the Asset Visibility Agent settings. You can download Zebra Setup utilities at <https://www.zebra.com/setup>.

#### **weblink.zebra\_connector.enable**

Turns the Asset Visibility Agent on or off. Additional information can be found in the App Note. See <https://www.zebra.com/us/en/products/software/barcode-printers/link-os/application-notes.html>.

**Values:** "on" or "off"

**Default Value:** "on"

#### **To send the commands:**

1. Send the following command to Opt Out (disable the connection to ZPC and the Asset Visibility Service):

```
! U1 setvar "weblink.zebra_connector.enable" "off"
```

2. Send the following command to validate that you have opted out:

```
! U1 getvar "weblink.zebra_connector.enable"
```

The printer should respond with "off".



**NOTE:** Be sure to include a carriage return/line feed after sending a command to the printer.

If the Visibility Agent is on, there are two data types that the printer can send to the AVS platform – **Discovery Data** and **Setting/Alert Data**.

### Discovery Data

This information is sent when the printer connects to the ZPC. The following printer settings are transmitted:

Printer Settings		
device.unique_id	media.type	device.oem.model_name
ip.dns.domain	media.thermal_mode	appl.name
ip.active_network	media.printmode	device.location
mac_raw	odometer.total_label_count	zpl.system_status
ip.protocol	odometer.media_marker_count1	ip.addr
ip.netmask	odometer.media_marker_count2	ip.ftp.enable
ip.gateway	label_queue.batch_label_cnt	ip.lpd.enable
ip.port	label_queue.format_counter	ip.tcp.enable
device.pnp_option	zbi.enabled	ip.udp.enable
device.languages	zbi.state	ip.http.enable
device.cpcl_formatting_commands_disable	zbi.revision	ip.smtp.enable
head.resolution.in_dpmm	head.width.in_dots	ip.pop3.enable
zpl.label_length	ip.port_json_config	ip.snmp.enable
ezpl.print_width	appl.link_os_version	ip.telnet.enable
media.darkness.mode	device.friendly_name	weblink.enable

### Settings and Alerts Data

This information is sent by the printer at the schedule listed in the table below. The following printer settings or alerts are transmitted:

Printer Settings		
weblink.zebra_connector.version	device.bluetooth_installed	PAPER OUT
device.product_name	odometer.media_marker_count	RIBBON OUT
print.tone_format	media.type, ezpl.media_type	HEAD ELEMENT BAD
power.percent_full	interface.network.active.speed	SUPPLY TOO HOT
power.serial_number_string		HEAD OPEN
power.manufacture_date		HEAD COLD
power.cycle_count		HEAD TOO HOT
power.device_name	power.percent_full	CUTTER JAMMED



Printer Settings		
power.full_charge_capacity	wlan.signal_strength	COLD START
power.date_first_used	odometer.total_print_length	
interface.network.active.ip_addr	interface.network.active.speed	
wlan.signal_strength		
odometer.total_print_length		power.cycle_count
odometer.rfid.valid_resettable		power.device_name
odometer.rfid.void_resettable	print.tone	power.full_charge_capacity
memory.flash_size	print.tone_zpl	odometer.total_label_count
memory.flash_free	media.speed	odometer.rfid.valid_resettable
device.ltu_installed	zpl.label_length	odometer.rfid.void_resettable
device.cutter_installed		memory.flash_free
device.rewinder_installed		odometer.media_marker_count
		media.type
		ezpl.media_type

- Web sockets connections now support SHA2 certificates. The printers will continue to support SHA1 certificates until Link-OS v5 is released (in 2017). At that time, the printers will no longer support SHA1 certificates, in accordance with privacy best practices.
- New Set-Get-Do Commands were implemented. Refer to the Zebra Programming Guide for details on each command.
  - head.resolution.in\_dpi
  - file.capture\_response.begin
  - file.capture\_response.end
  - file.capture\_response.destination
  - device.command\_override.add
  - device.command\_override.clear
  - device.command\_override.list
  - device.command\_override.active
  - weblink.zebra\_connector.version
  - weblink.zebra\_connector.enable
  - weblink.zebra\_connector.proxy
  - weblink.zebra\_connector.authentication
  - weblink.zebra\_connector.authentication.add
  - weblink.zebra\_connector.authentication.remove
  - weblink.zebra\_connector.authentication.entries
  - wlan.wpa.timecheck
  - wlan.rts\_cts\_enabled
  - display.batch\_counter
  - device.set\_clock\_to\_build\_date

## Issues Corrected

- The printer will report error code 81 during a paper jam in response to the EPL command `^ee`.
- When using the Dual Radio, the Bluetooth radio will remain active even if the WLAN radio is not.
- The SNMP `zbraOptUnsAlertCondition` and `zbrOptUnsAlertsEntry` response strings have been extended to include 1023 characters.
- SNMP Print Job Completed reporting has been enhanced when using the Pause Alert.
- The ZBI `WRITE` command has been corrected to count all data written to the system.
- The EPL `URH` and `URL` commands will now return a value in meters.
- The Mirror system timing has been altered to include a retry, so as to improve file writing performance.
- EPL has been enhanced to handle images larger than the label size.
- The command `zp1.zp1_override` has been eliminated; use the `device.command_override` commands instead.
- The Mirror system will now accept the return code `125` in addition to the return code `150`, in order to support IIS7 and FileZilla servers.
- Firmware updating when using both Profile Manager and either IIS7 or FileZilla has been optimized to avoid conflicts.
- Wi-Fi roaming and Protected Management Frames (PMF) support have been improved.
- Memory management during printing has been optimized for cases where a `.TTF` font, graphics, and inverted orientation printing are being used.
- The JSON implementation of the `usb.mirror.feedback.odometer` and `ip.mirror.feedback.odometer` commands now have values of `READ_WRITE_ACCESS`.
- The JSON implementation of the `zbi.state` command has been changed from a string type to an enum type.
- The EPL command `oR0,0` is now supported..
- Socket connections on ZBI have been optimized to avoid a connection not ending when it should.
- The JSON implementation of `interface.network.active.speed` is now treated as an integer.
- The Tear-Off adjust command setting will be used after a power cycle if Media Power Up is set to No Motion.
- The `ribbon.cartridge` SGD commands have been corrected to offer the correct range information.
- APPLICATOR mode will be offered and selectable, and the printer will use APPLICATOR paper movement behavior while in the mode; however since the printer does not have an applicator option, the printer will not wait for applicator signals.
- The range for `ip.discovery.port` is now 1 - 65535.
- The range for `zp1.label_length` has been corrected in the `allconfig`.

## Link-OS 3

### V77.19.17Z

**Release Date: 18 April 2016**

This firmware includes all features of the previous [V77.19.16Z](#) release. It is for use with the following printer models:

- ZD410
- ZD420

#### Changes

- The ZD420 is now supported.

#### Issues Corrected

- Improved handling with synthetic media.

### V77.19.16Z

**Release Date: 12 February 2016**

This firmware includes all features of the previous [V77.19.14Z](#) release. It is for use with the following printer models:

- ZD410
- ZD420

#### Changes

- The ZD420 is now supported.

#### Issues Corrected

- The performance of the EPL command GW has been optimized.

### V77.19.14Z

**Release Date: 18 December 2015**

This is the initial release of this firmware. It is for use with the following printer models:

- ZD410

#### Changes

- This is the initial release of this firmware.

# V85 Printer OS Release Notes

## V85.20.11Z

**Release Date: 20 June 2018**

This is the initial release of this firmware. It is for use with the following printer models:

- ZQ610
- ZQ620

### Changes

- This is the initial release of this firmware.

# V86 Printer OS Release Notes

## V86.20.11Z

**Release Date: 20 June 2018**

This is the initial release of this firmware. It is for use with the following printer models:

- ZR658
- ZR668

### Changes

- This is the initial release of this firmware.

