Link-OS



ZEBRA

Release Notes

P1105470-25EN Rev. A

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Publication Date

September 17, 2026

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

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For support, please visit 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 (prior to Link-OS 6.8 release 2)
ZQ310 ZQ320	V81
ZR318 ZR328	V82
ZD510	V83
ZD410D ZD420C ZD420D ZD420T ZD620D ZD620T	V84
ZQ610 ZQ620 ZQ630	V85
ZR658 ZR668	V86

Table 1 Printer Firmware Versions (Continued)

Printer Models	OS Branch
ZD220 ZD230 ZD888	V89
ZQ511 ZQ521	V91
ZT411 ZT421	V92
ZD421C ZD421D ZD421T ZD621D ZD621T	V93
ZE511 ZE521	V94
ZT510 ZT610 ZT620	V96 (Link-OS 6.8 release 2 and later)
ZT111 ZT211 ZT231	V97
ZQ610 Plus ZQ620 Plus ZT630 Plus	V100
ZQ310 Plus ZQ320 Plus	V101

Link-OS v7.7 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v7.7

Release Date: September 25, 2026

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.53Z
ZQ511 ZQ521	V91.	21.53Z
ZT411 ZT421	V92.	21.53Z
ZD411 ZD421 ZD611 ZD621	V93.	21.53Z
ZE511 ZE521	V94.	21.53Z
ZT510 ZT610 ZT620	V96.	21.53Z
ZT111 ZT211 ZT231	V97.	21.53Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.53Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.53Z

Changes

1. The Link-OS version number is now v7.7.
2. This release focused on addressing customer issues/bugs. Please refer to the “Issues Resolved” section below for details.

Issue Resolved

1. To improve network stability and ensure compliance with industry standards (RFC 952 / 1123), the validation behavior for DHCP Option 12 (Host Name) has been updated to align with the stricter validation used for DHCP Option 39 (Domain Name). This update ensures that Zebra printers never report an invalid hostname to the network, preventing difficult-to-diagnose DNS and connectivity issues.
   Behavior Changes:
   - Stricter Input Validation: Hostname formats containing invalid characters—such as spaces, special symbols (e.g., @, #), or non-ASCII/accented characters (e.g., é)—are no longer permitted. If a user attempts to save a hostname with these characters, the configuration will be rejected at save time.
   - Auto-Cleaning for Macro Templates: If a valid hostname template utilizes a macro (e.g., zebra-<device.unique_id>), and the expanded macro value contains invalid characters, the firmware will now automatically sanitize the reported hostname rather than rejecting the template. Invalid characters in the expanded value will be replaced with hyphens (e.g., a macro resulting in zebra-SN 001@A will be automatically reported to the network as zebra-SN-001-A).

   Key Takeaway: If you utilize automated provisioning scripts or MDM solutions to configure printer hostnames, please ensure your naming conventions only utilize valid alphanumeric characters and hyphens to prevent configuration rejections.
2. Resolved an issue causing printed labels to overlap when the printer operates in Linerless cutter mode.
3. Fixed an intermittent issue that blank labels are printed on the ZT231 printer with a cutter module.
4. Resolved a QR code printing issue in APL-D Emulation on theZT411 printer.
5. Fixed a media handling issue on the ZT610 printer using a custom media guide to ensure precise single-label feeding.
6. Resolved a feed lockup issue on the ZQ630 Plus printer that occurred when sending multiple PDF files while the printer was roaming.
7. Added the missing country code for Vietnam to the WLAN configuration options on the ZT610 printer.
8. Resolved a WLAN association failure with certain older Cisco 802.11ac Access Points when printers use WPA2 PSK security.
9. Fixed an issue where a USB-connected ZQ610 Plus printer may stop printing in a Virtual Machine (VM) environment.
10. Resolved an issue on the ZD621 with a cutter where an extra label would be fed after pressing the feed button.
11. Improved network visibility by ensuring that network discovery packets consistently include the correct DNS domain.
12. Corrected an issue where a ~JA command could cause the loss of subsequent label data.
13. Fixed a problem with the ^JJ command to ensure the successful toggle of the "Ribbon Low" warning.
14. Resolved an issue on the ZD421 printer to ensure serial number consistency on the printer’s web UI.

15. Fixed a WLAN radio failure that occurred when printers are roaming between 802.11ac (5 GHz) and 802.11ax (2.4 GHz) access points.

Frequently Asked Questions

1. “Why should I upgrade to v7.7?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 7.7 contains 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 v7.7?”

   Link-OS v7.2 can be downloaded from the Downloads tab on your printer’s support page. To access the support page, go to zebra.com/us/en/support-downloads/printers.html, and enter your printer’s model name (such as “ZT411” or “ZQ610 Plus”).

   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v7.7 cost?”

   Link-OS v7.7 is a free upgrade.

Known Issues

1. DHCP Option Behavior Issue When Downgrading Firmware to Link-OS v7.5 or Earlier.

   The Issue:
   If a printer was previously loaded with (or upgraded to) Link-OS v7.6 or v7.6.1 with a default configuration for DHCP Option settings, then downgraded to v7.5 or earlier, the DHCP Option format value of "<ip.hostname>" will persist after the downgrade. This may impact the printer’s name registration in DNS server and cause hostname or network communication failures.

   a. Affected SGDs:

      i. internal_wired.ip.dhcp.option12_format

      ii. wlan.ip.dhcp.option12_format

   b. Resolution:
      If your downgraded printers are experiencing communication issues or incorrect DNS registration, manually clear or reset these settings using the following steps:

      i. Set the affected SGDs to an empty string ("") or your desired custom value.
         ! U1 setvar "internal_wired.ip.dhcp.option12_format" ""
         ! U1 setvar "wlan.ip.dhcp.option12_format" ""

      ii. Perform a network or device reset to apply the changes.

Upcoming Changes

Zebra is announcing:

- For a Get request, IPv4 setting will no longer be guaranteed to return leading 0’s included in an IPv4 address set by user. This update will be included in a future Link-OS release.

Link-OS v7.6.2 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v7.6.2 Release Notes

Release Date: June 19, 2026

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.49Z
ZQ511 ZQ521	V91.	21.49Z
ZT411 ZT421	V92.	21.49Z
ZD411 ZD421 ZD611 ZD621	V93.	21.49Z
ZE511 ZE521	V94.	21.49Z
ZT510 ZT610 ZT620	V96.	21.49Z
ZT111 ZT211 ZT231	V97.	21.49Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.49Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.49Z

Changes

1. The Link-OS version number is now v7.6.2.
2. **IMPORTANT:** Update Device Naming Structure for Zebra Printers and Automated Migration

   a. Background

   In Link-OS v7.6, we introduced a deliberate design change to standardize how our printers register on enterprise networks to support Microsoft's Windows Protected Print (WPP) architecture and industry RFC standards. More specifically, we transitioned DHCP Option 12 (IPv4 hostname) and 39 (IPv6 hostname) network registration to a newly introduced parameter" ip.hostname" (please see below for more details regarding this new parameter). This change replaced the old behavior of using the "device.friendly_name" parameter for DNS registration in enterprise network environment, which will require manual scripting and/or profile updates to prevent possible print job routing failure after upgrading to Link-OS v7.6

   b. A new SGD has been created to support the updated naming structure starting from Link-OS 7.6.

   A brief description of the SGDs will be given below. For full details, please see the latest ZPL II Programming Guide available on Zebra.com.

   "ip.hostname" (setvar and getvar)

   This command allows the setting or retrieval of the hostname of the printer. The hostname is a human readable unique name, - a string with 2 to 63 characters, used to identify and look up a printer on a network.

   The valid characters for the hostname are alphanumeric (A-Z, a-z, 0-9) and the hyphen character ('-') only. Trying to set it with special characters will cause the set request to be rejected.

   The default value is in the format "<device.product_name>-<device.unique_id>", e.g., "ZT411-99J000800418".

   Example:

   ```
   ! U1 setvar "ip.hostname" "Zebra-ZT411-99J000800418"
   ```

   c. Link-OS v7.6.2 introduces an Automated Hostname Migration to seamlessly synchronize your existing printer names and prevent print job failures due to the use of printer's friendly name for host name.

   How the Automated Migration Works

   The migration logic executes one time only, upon the first boot after upgrading to Link-OS v7.6.2. The behavior depends on your previous firmware version and network configuration:

   - Upgrading from Link-OS v7.5 or Older

     If you are upgrading from an old version of firmware and have a custom, valid DNS name configured in "device.friendly_name", the firmware will automatically copy that exact name into the new "ip.hostname" parameter. Your printer will maintain its existing network identity and DNS routing without manual reconfiguration.

- Upgrading from Link-OS v7.6 or v7.6.1

  If you are currently running v7.6 or v7.6.1, and you have configured a custom "device.friendly_name" but left the "ip.hostname" at its factory default, the firmware will execute the migration and your "ip.hostname" will be automatically overwritten to match your custom "device.friendly_name". Please ensure your network configurations are prepared for this synchronization before upgrading to v7.6.2.

If you downgrade your printer from v7.6.2 to an older version (e.g., v7.5), the printer will automatically clean up its DHCP option settings. This ensures the new v7.6.2 default value for the DHCP option format field is not left behind, preventing hostname and network communication issues on the older firmware.

d. Best Practices for Network Naming (Post Link-OS v7.6.2 Upgrade)

To ensure stable network connectivity after upgrading to v7.6.2, please adhere to the following best practices:

- Network Identification: Always use the "ip.hostname" parameter to configure the name that the printer registers with the DHCP/DNS servers.
- Device Naming: Device naming ("device.friendly_name") and network identification ("ip.hostname") function best when they have the same value. However, if you desire non DNS compliant characters in "device.friendly_name", use it solely for the name displayed on the printer UI screen or via Bluetooth discovery, etc., and keep a mapping of how to convert one to the other.
- Configuration Scripts: Update your provisioning scripts and fleet management profiles (like PPME) to set "ip.hostname" when defining network routing identities.
- Valid Naming: Ensure any value applied to "ip.hostname" is a valid, RFC-compliant DNS name (e.g., all alphanumeric, no spaces, no special characters other than hyphens).
- Corner Case Handling: Reset the printer to its factory default when upgrading from an older version (e.g., v7.5) to v7.6 and then downgrading to the older version.

Frequently Asked Questions:

1. “Why should I upgrade to v7.6.2?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 7.6.2 contains 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 v7.6.2?”

   Link-OS v7.6.2 can be downloaded from the Downloads tab on your printer’s support page. To access the support page, go to zebra.com/us/en/support-downloads/printers.html, and enter your printer’s model name (such as “ZT411” or “ZQ610 Plus”).

   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v7.6.2 cost?”

   Link-OS v7.6.2 is a free upgrade.

Issues Corrected:

None

Known Issues:

Certain Zebra printers may experience USB enumeration failure when connected to Windows 10 computers with older Intel processors, i.e. pre-Core i5 7500-series. The printers are correctly identified on PCs running Windows 11, or Windows 10 with newer processors.

Upcoming Changes

Zebra is announcing that for a Get request, IPv4 setting will no longer be guaranteed to return leading 0's included in an IPv4 address set by user. This update will be included in a future Link-OS release.

Link-OS v7.6.1 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v7.6.1 Release Notes

Release Date: May 15, 2026

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.48Z
ZQ511 ZQ521	V91.	21.48Z
ZT411 ZT421	V92.	21.48Z
ZD411 ZD421 ZD611 ZD621	V93.	21.48Z
ZE511 ZE521	V94.	21.48Z
ZT510 ZT610 ZT620	V96.	21.48Z
ZT111 ZT211 ZT231	V97.	21.48Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.48Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.48Z

Changes

1. 1.The Link-OS version number is now v7.6.1.
2. Link-OS 7.6.1 introduced the following enhancements for EU RED (EU Radio Equipment Directive) compliant printers in EMEA region.

   a. A warning Message on Printer UI for EU RED Initial Setup

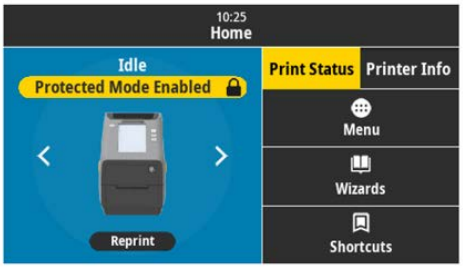
   Upon powering on an EU RED compliant printer equipped with printer UI and Link-OS 7.6.1 for the first time, users will now see a message on the printer's home screen. This message will guide the user to the Zebra Security Control Wizard to complete the required initial setup via a convenient on-screen QR code and/or URL. Users can select from the 14 languages supported in EMEA region in the "Language" bar to view the message.





Also, when the protected mode is enabled on your Zebra printers, a "Protected Mode Enabled" message will now display on the printer UI.





This enhancement is designed to raise awareness of the initial setup required for the EU RED compliant printer to ensure the printer is ready for use without delay.

b. New JSON Command for Partner support with EU RED compliant printers

Link-OS 7.6.1 introduced a new JSON command designed specifically for our partners who pre-configure and test EU RED compliant printers before shipping them to end customers. Using this command after testing/pre-configuration, partners can now reset all EU RED security settings - including protected mode password, to their default state without erasing any of other custom configurations before shipping the printers to their end customers.

The example of the new JSON command is shown below:

```
{}{
"protect":{
"authentication":
{"username":"admin","password":"<examplepassword>","type":"basic"},
"operation":"reset-advanced-security-mode",
"reset-advanced-security-mode":{}
  }
}
```

This feature will save significant time and effort by ensuring the printer is secure and ready for the end customers, all while preserving the valuable setup and testing work that partners have already completed.

Frequently Asked Questions:

1. "Why should I upgrade to v7.6.1?"

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 7.6.1 contains 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 v7.6.1?"

   Link-OS v7.6.1 can be downloaded from the Downloads tab on your printer's support page. To access the support page, go to zebra.com/us/en/support-downloads/printers.html, and enter your printer's model name (such as "ZT411" or "ZQ610 Plus").

   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. "What does Link-OS v7.6.1 cost?"

   Link-OS v7.6.1 is a free upgrade.

Issues Corrected:

None

Upcoming Changes

Zebra is announcing that for a Get request, IPv4 setting will no longer be guaranteed to return leading 0's included in an IPv4 address set by user. This update will be included in a future Link-OS release.

Link-OS v7.6 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v7.6

Release Date: April 10, 2026

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.47Z
ZQ511 ZQ521	V91.	21.47Z
ZT411 ZT421	V92.	21.47Z
ZD411 ZD421 ZD611 ZD621	V93.	21.47Z
ZE511 ZE521	V94.	21.47Z
ZT510 ZT610 ZT620	V96.	21.47Z
ZT111 ZT211 ZT231	V97.	21.47Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.47Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.47Z

Changes

1. The Link-OS version number is now v7.6.
2. Link-OS 7.6 adds WebUSB support to enable direct communication between Zebra printers and supported web applications over USB. WebUSB is a modern browser API that allows web-based applications to securely interact with USB-connected devices without requiring native drivers or local software.

   The WebUSB implementation with Link-OS 7.6 supports the Google Chrome browser under Windows, MacOS and Linux.
3. A new SGD has been created to support WebUSB.

   A brief description of the SGDs will be given below. For full details, please see the latest ZPL II Programming Guide available on Zebra.com.

   1) "usb.device.mode"

      This command allows the control of the printer's USB interface to ensure compatibility with different types of applications via USB connection.

   Possible values are –

   - "composite"

     In this mode, the printer operates as a standard composite USB device. It supports multiple interfaces simultaneously, allowing for functionalities like standard printing (PRN) and WebUSB.
   - “legacy”
     In this mode, the printer's USB interface acts as the traditional USB interface that only supports basic printing (PRN), which will allow older applications that cannot handle composite devices to communicate with the printer for printing tasks. WebUSB support will not be available in this mode.

     The default value for this command is "legacy".

     Example:

     ! U1 setvar " usb.device.mode " "composite"
4. Trusted features with Protected Mode enabled.

   Protected Mode is a critical printer feature for securing your Zebra printer settings from unauthorized changes (such as Wi-Fi, Ethernet, and Firmware Updates, etc.) since Link-OS 6.0. When this mode is on, a password is required to make changes to protected settings.

   In Link-OS 7.6, we've introduced several enhancements to make configuring printers in Protected Mode easier and more efficient, especially when deploying EU RED compliant printers at scale.

a. Trusted USB mirror feature with protected mode enabled

USB mirror is an existing feature that allows you to simplify printer configuration without needing a network connection or a separate setup application. By plugging a USB flash drive into the printer's USB host port, you can automatically clone configurations, upgrade firmware, and execute commands on multiple printers

Link-OS 7.6 allows customers to provision Zebra printers using USB mirror feature when protected mode is enabled. For a new EU RED compliant printer loaded with Link-OS 7.6 out of the box, this process will set the Protected Mode password and configure the printer simultaneously. This is the recommended method for rapidly setting up numerous printers.

Detailed guidance documentation will be available on zebra.com at the launch of Link-OS 7.6 release.

In addition, detailed instructions for setting up EU RED-compliant printers out of the box using USB mirror will be provided via the link below (coming soon)–

EU RED Cybers Security Enhancements for Zebra Printers – Overview and Setup Page (URL https://asr.zpc.zebra.com/index.html)

b. Trusted connections with protected mode enabled

Authorized enterprise management tools using MQTT, Cloud Connect, or IP Mirror can now securely change printer settings without requiring manual Protected Mode password entry on each device. This allows for seamless and scalable remote administration while keeping the printers secure.

In addition, when protected mode is enabled and the printer UI password has been set by the user, changes to the protected settings on the print UI are allowed.

c. Printer Web UI warning banner for protected mode

With Link-OS 7.6, when protected mode is enabled, the printer web UI will now display a clear warning banner to indicate certain settings are protected.



5. FTP and HTTP settings are currently enabled by default on Zebra printers, which may be perceived as security vulnerability. Starting form Link-OS 7.6, FTP and HTTP are disabled by default to further enhance printer security.

The new default values will take effect in the following specific situations:

- New Printers: All printers shipping from the factory with Link-OS 7.6 installed.
- Upgraded Printers: An existing printer will be affected by this change only if it is upgraded to Link-OS 7.6 and either:
  - Its original factory settings have never been changed or
  - It is reset to factory defaults after the upgrade.

Please note if you have previously modified these settings on your printers, your configuration will be retained after you upgrade to Link-OS 7.6.

The following SGDs are updated with default value set to "off"

- “ip.ftp.enable”
- "ip.http.enable"

6. The following SGDs can now allow up to 63 characters to be set to the value–
   a. "bluetooth.friendly_name"
   b. "bluetooth.local_name"
   c. "device.friendly_name"

Frequently Asked Questions

1. “Why should I upgrade to v7.6?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 7.6 contains 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 v7.6?”

   Link-OS v7.6 can be downloaded from the Downloads tab on your printer’s support page. To access the support page, go to https://www.zebra.com/us/en/support-downloads/printers.html, and enter your printer’s model name (such as “ZT411” or “ZQ610 Plus”).

   You can then use one of our utilities, such as the Z-Downloader, to update your printer. For details on using Z-Downloader, visit https://www.zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html.

3. “Is there a cost to upgrade to Link-OS 7.6?”

   Link-OS v7.6 is a free upgrade.

Issues Corrected

1. The ZQ630 Plus printer now boasts enhanced network stability, ensuring seamless and uninterrupted operation within Cisco environment.
2. The ZT411 printers can now ensure the wireless MAC address remains intact after firmware upgrades for consistent and reliable network connectivity.
3. A connection issue is now resolved to enable the use of either the printer's DNS name or IP address for all IPP and IPPS printing tasks.
4. The ZE521 printer's label handling is improved to ensure precise and reliable feeding in all print modes for more consistent operation.
5. PDF Direct printing is enhanced with more robust file detection on Zebra printers, ensuring all PDF documents now print successfully.
6. The APL-M emulation is optimized to handle media correctly, eliminating false "Media Out" errors to ensure uninterrupted, continuous printing.
7. The font rendering engine on your Zebra printers is enhanced to allow downloaded fonts like Arial now display correctly within field blocks for consistent label printing.
8. Zebra printers can now correctly process large PDF print jobs to ensure PDF documents print in the correct sequence without any skipped or blank labels.
9. The APL-M emulation is improved to correctly process label formats with extra barcode fields to print barcodes successfully every time without any splitting or formatting issues.
10. The ZQ610 Plus printer can now maintain a stable sleep mode on WLAN networks for power efficiency and reliability by preventing random interruptions.

11. The ZT610 600 dpi Micro Label Printer can now show the "peel off label” notification correctly and present each label for removal after calibration.
12. The ZT610 600 dpi Micro Label Printer now reboots automatically to apply Precision Printing configurations directly from the user interface, even when protect mode is enabled.

Upcoming Changes

Zebra is announcing:

- For a Get request, IPv4 setting will no longer be guaranteed to return leading 0’s included in an IPv4 address set by user. This update will be included in a future Link-OS release.

Link-OS v7.5 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v7.5

Release Date: January 9, 2026

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.46Z
ZQ511 ZQ521	V91.	21.46Z
ZT411 ZT421	V92.	21.46Z
ZD411 ZD421 ZD611 ZD621	V93.	21.46Z
ZE511 ZE521	V94.	21.46Z
ZT510 ZT610 ZT620	V96.	21.46Z
ZT111 ZT211 ZT231	V97.	21.46Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.46Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.46Z

Changes

1. The Link-OS version number is now v7.5.
2. Link-OS 7.5 is updated to support the newly announced ZT610 600 dpi Micro Label Printer, which heavily leverages existing ZT610 600dpi printer without major re-architecture effort, but is designed to consistently and accurately print labels as small as 3 mm at 600dpi to reduce media waste and downtime.
3. New and existing SGDs are available to support the ZT610 600 dpi Micro Label Printer.

   A brief description of the SGDs follows. For full details, see the latest *ZPL II Programming Guide* available on zebra.com.

   a. `"print.front_sensor"`

      This new command is to select the use of the front sensor for small label registration enhancement on the ZT610 600 dpi Micro Label Printer.

      Possible values for the SGD are "`enabled`" and "`disabled`", and the default is "`enabled`".

      Example:

      ```
      ! U1 setvar "print.front_sensor"  "enabled"
      ```

   b. "device.feature.front_sensor"

      This new command is to get the status information of the front sensor. There is no default value for this command.

      Possible responses are:

      - "`not available`" if the printer does not support front sensor hardware.
      - "`not present`" if the printer supports the front sensor but this particular printer does not have the front sensor installed.
      - "`present`" if the printer queried has a front sensor installed.

      Example:

      `! U1 getvar "device.feature.front_sensor"` returns one of the above values.

   c. `"device.sensor_profile_select"`

      This new command is to select the sensor used for the sensor profile when a front sensor is installed on the printer.

      Possible values for the SGD are "`rear`" and "`front`", and the default is "`rear`".

      Example:

      ```
      ! U1 setvar " device.sensor_profile_select " "front"
      ```

d. `"sensor.front_gap.brightness"`
`"sensor.front_gap.gain"`
`"sensor.front_gap.offset"`
`"sensor.front_gap.thold"`
`"sensor.front_gap.ppr_out_thold"`
`"sensor.front_gap.cur"`

These new commands are to get the parameters of the front gap/notch sensor, including brightness, gain, offset, threshold, paper-out threshold, and current.

Example:

`! U1 getvar "sensor.front_gap.brightness"` returns the brightness value of the front gap/notch sensor.

e. The following existing SGDs are available on the ZT610 600 dpi Micro Label Printer to get the parameters of the front bar sensor.

`"sensor.front_bar.brightness"`

`"sensor.front_bar.cur"`

`"sensor.front_bar.gain"`

`"sensor.front_bar.offset"`

`"sensor.front_bar.ppr_out_thold"`

`"sensor.front_bar.thold"`

4. Link-OS 7.5 continues to include the EU Radio Equipment Directive (RED) compliance support, which has been available on printers manufactured for EMEA customers since September 15, 2025, with EU RED security enabled for units following this date. Please note that this is only applicable to newly manufactured printers placed on the market in EMEA region but not for other regions in the world.

The key changes include:

- Services such as FTP, SNMP, HTTP, and TCP RAW are disabled out of the box but can be enabled via authentication.
- Protected Mode is enabled by default and requires an initial password setup out of the box.
- Firmware and protected file downloads are disabled by default but can be enabled via authentication.
- Protection remains intact after factory reset or decommissioning.
- The front panel UI is locked until PIN is set for applicable printers.
- No default password for the printer web page access.

The models that are compliant with EU RED requirements include:

- Industrial: ZT111, ZT211, ZT231, ZT411, ZT421, ZT510, ZT610, ZT620, ZE511, ZE521
- Desktop: ZD220, ZD230, ZD411, ZD421, ZD611, ZD621
- Mobile: ZQ310 Plus, ZQ320 Plus, ZQ511, ZQ521, ZQ610 Plus, ZQ620 Plus, ZQ630 Plus

Please note the RFID models also are included for the applicable printer families above.

Detailed instructions for setting up your EU RED-compliant printers out of the box are provided via this link:

EU RED Cybers Security Enhancements for Zebra Printers - Overview and Setup Page (URL: zebra.com/asr)

Please note the changes and information regarding EU RED are only applicable to the EU RED-compliant printers placed on the market in the EMEA region. Customers outside the EMEA region (such as in the Americas or Asia) SHOULD NOT follow these instructions, but should refer to the *PrintSecure Administration Guide* for best practices related to securing your printers.

5. General security enhancements have been added to Link-OS 7.5 including:
   - Wireless Security enhancement - WPA/TKIP is deprecated; WPA2 (AES) or higher is required.
   - Securing many more settings via protected mode.
   - Turning off SNMP v1/v2 out of box
6. The C23 command has been added to APL-I emulation to support Aztec barcode printing.

Frequently Asked Questions

1. “Why should I upgrade to v7.5?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 7.5 contains 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 v7.5?”

   Link-OS v7.5 can be downloaded from the Downloads tab on your printer’s support page. To access the support page, go to zebra.com/us/en/support-downloads/printers.html, and enter your printer’s model name (such as “ZT411” or “ZQ610 Plus”).

   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: zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v7.5 cost?”

   Link-OS v7.5 is a free upgrade.

Issues Corrected

1. The tabletop printers can now obtain a valid IP address after the Bluetooth connection is automatically restored with iOS mobile devices.
2. Zebra printers can now reconnect to a cloud client via weblink after a disconnection.
3. The ZPL `^BS` command now works correctly in combination with the `^LH` command to print barcodes correctly.
4. The ZT610 printer can now detect the label synchronization issue, report the error accordingly, and trigger the "Service Requested" signal.
5. The label peel position is now correct in Peel Mode on ZT610 printers after an error condition is cleared.
6. The APL-M label format can now print correctly when sent via serial connections on Zebra printers.

7. The ZPL `^FE` command now works correctly with the `^RFW` command for RFID tag encoding.
8. Zebra desktop printers can now print labels with no truncated text when rotated to 90 degrees or 270 degrees.
9. Zebra printers can now print label formats correctly in APL-D emulation with no missing text.

Upcoming Changes

Zebra is announcing:

- For FTP and HTTP settings via the SGD commands "`ip.ftp.enable`" and "`ip.http.enable`", the default setting will be changed to "`off`" as both services are considered insecure. This update will be included in a future Link-OS release.
- Please note the new default settings for the above services will take effect in all newly manufactured printers loaded with the Link-OS release with the change. For existing printers upgraded with the Link-OS release that includes the default setting change, the current settings will remain if the user has ever changed the settings from default values. The new default settings would take effect if the user never changed the settings or if the printer is reset with factory default.
- For a Get request, the IPv4 setting will no longer be guaranteed to return leading 0's included in an IPv4 address set by the user. This update will be included in a future Link-OS release.

Link-OS v7.4 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v7.4

Release Date: July 10, 2025

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.39Z
ZQ511 ZQ521	V91.	21.39Z
ZT411 ZT421	V92.	21.39Z
ZD411 ZD421 ZD611 ZD621	V93.	21.39Z
ZE511 ZE521	V94.	21.39Z
ZT510 ZT610 ZT620	V96.	21.39Z
ZT111 ZT211 ZT231	V97.	21.39Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.39Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.39Z

Changes

1. The Link-OS version number is now v7.4.
2. In Link-OS 7.4, Zebra printers listed in the above table support IPP (the Internet Printing Protocol), which is a protocol of operations, objects, and attributes for network printing over the Internet. IPP uses HTTP for transport and can use HTTPS for encrypted connections as IPPS.

   The IPP/IPPS support in Link-OS 7.4 allows Zebra Link-OS printers to be set up as IPP/IPPS printers with Windows 10/11 and Linux (CUPS). A configuration document and corresponding setup videos will be available on Zebra.com.
3. Two new SGDs have been added to support IPP/IPPS.

   A brief description of the SGDs follows. For full details, see the latest ZPL II Programming Guide available on zebra.com.

   a. `"ip.ipp.enable"`

      This new command is to enable or disable IPP support on Zebra printers.

      Possible values for the SGD are "`on`" and "`off`", and the default is "`on`".

      Example:

      ```
      ! U1 setvar "ip.ipp.enable"  "on"
      ```

   b. `"ip.ipp.mode"`

      This new command is to specify whether the use of TLS on the connection for IPPS is required or not.

      Possible values for the SGD are "`ipps`" and "`ipp/ipps`", and the default is "`ipp/ipps`".

      Example:

      ```
      ! U1 setvar "ip.ipp.mode"  "ipps"
      ```

4. The following RFID enhancements are included in Link-OS 7.4.

   a. RFID Calibration Profiles support (Save, Load, Delete profiles)

      Users can create an RFID calibration profile with the following RFID calibration parameters and save the file to the `E:` drive on printers.

      - `rfid.reader_1.antenna_port`
      - `rfid.reader_1.power.read`
      - `rfid.reader_1.power.write`
      - `rfid.position.program`

      Users can save, load, or delete the RFID profiles with SGD commands or from a color-touch UI, when available.

      The RFID profile file extension must be "`.RPF`", and the profile name can be up to 8 characters long.

      Up to 8 profiles can be created and saved to the `E:` drive.

      With this feature, users can change media and choose the RFID profile accordingly to avoid additional calibrations.

b. Parameterized RFID quick calibration

Users can now specify the range of the following parameters to perform quick RFID calibration:

- Antenna
- Read/Write power
- Program position

Note that the value of the ranges specified must be valid and available for the corresponding RFID modules.

The `^HR` command, which includes the program position range in current implementation, was updated to have new parameters, including the antenna and power ranges, so user can set all three parameters to perform quick calibration. For full details, see the latest ZPL II Programming Guide available on zebra.com.

5. One new SGD has been added to support RFID Calibration Profiles.

A brief description of the SGD follows. For full details, see the latest ZPL II Programming Guide available on zebra.com.

a. `"rfid.profile_save"`

This new command is for users to create and save the RFID calibration profile onto the `E:` drive when needed.

Example:

```
! U1 setvar "rfid.profile_save" "RFIDCAL1.RPF"
```

6. The below existing SGDs can be used to load and delete RFID calibration profiles.

- Load RFID calibration profile - "`file.run`"
- Delete RFID calibration profile - "`file.delete`"

Frequently Asked Questions

1. “Why should I upgrade to v7.4?”

Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 7.4 contains 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 v7.4?”

Link-OS v7.4 can be downloaded from the Downloads tab on your printer’s support page. To access the support page, go to zebra.com/us/en/support-downloads/printers.html, and enter your printer’s model name (such as “ZT411” or “ZQ610 Plus”).

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:
zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v7.4 cost?”

Link-OS v7.4 is a free upgrade.

Issues Corrected

1. Zebra printers can now report a "media out" alert properly when a missing label is encountered during printing.
2. ZT411 linerless printers can now return the correct label length in calibration after a factory reset (for example, when sending a `^JUF` command).
3. Zebra desktop printers can now detect Direct Thermal (DT) mode correctly with DT media.
4. Zebra printers can now reconnect to a cloud client via weblink after a power loss.
5. The ZT6xx printers now have the correct values in the "`device.zuid`" SGD so to be recognized by applications such as PPME.
6. Zebra printers can now align the print position for text with special characters correctly.
7. Zebra printers can now print with the Datamax emulation without feeding extra empty labels.
8. The ZT610 printers can now feed small labels correctly when the FEED button is pressed.
9. The Link-OS firmware can now support ZPL print preview from applications such as Visual Basic .NET applications.
10. The printer web page can now display the print speed between 15 and 18 inch per second (ips), when applicable.
11. The ZQ3xx Plus printers can now keep a stable Wi-Fi connection after multiple factory or network resets.
12. The ZQ630Plus and ZQ511 RFID printers can now detect the presence of an RFID module correctly after being idle for 15 minutes or longer.

Upcoming Changes

Zebra is announcing:

- For the SNMP v1/v2 protocol setting via the SGD command "`ip.snmp.enable`", the default setting value will be changed to "`off`" as SNMPv1/v2 is considered a vulnerability. This update will be included in a Link-OS release targeted at the end of 2025.
- For FTP and HTTP settings via the SGD commands "`ip.ftp.enable`" and "`ip.http.enable`", the default setting will be changed to "`off`" as both services are considered insecure. This update will be included in a future Link-OS release.
- Please note the new default settings for the above services will take effect in all newly manufactured printers loaded with the Link-OS release with the change. For existing printers upgraded with the Link-OS release that includes the default setting change, the current settings will remain if the user has ever changed the settings from default values. The new default settings would take effect if the user never changed the settings or if the printer is reset with factory default.
- For a Get request, the IPv4 setting will no longer be guaranteed to return leading 0's included in an IPv4 address set by the user. This update will be included in a future Link-OS release.

Link-OS v7.3 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v7.3

Release Date: March 28, 2025

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.38Z
ZQ511 ZQ521	V91.	21.38Z
ZT411 ZT421	V92.	21.38Z
ZD411 ZD421 ZD611 ZD621	V93.	21.38Z
ZE511 ZE521	V94.	21.38Z
ZT510 ZT610 ZT620	V96.	21.38Z
ZT111 ZT211 ZT231	V97.	21.38Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.38Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.38Z

Changes

1. The Link-OS version number is now v7.3.
2. The label registration enhancements for ZT610 printers are included this Link-OS release to mitigate the small label shifting issue in calibration and printing.
3. A new SGD has been included to support the ZT610 label registration enhancement.

   A brief description of the SGD follows. For full details, see the latest ZPL II Programming Guide available on zebra.com.

   a. `"media.small_label.enhanced_length_calibration"`

      This new command, when enabled, enhances the calibration process for small labels by sampling more label length.

      Possible values for the SGD are `"disabled"`, and `"enabled"` and the default is `"disabled"`.

      Example:

      ```
      ! U1 setvar "media.small_label.enhanced_length_calibration "  "enabled"
      ```

      NOTE: You will need to change some default settings for better registration performance with the label registration enhancements for the ZT610 including:

      - Enable small label enhanced length calibration with the SGD above. When it is disabled, the printer will use fewer labels for calibration. For better registration performance, user needs to change the setting to "enabled", which will use more labels for calibration to achieve better registration result.

        ```
        ! U1 setvar "media.small_label.enhanced_length_calibration" "enabled"
        ```

      - Turn off energy star. By default, energy star is turned on to reduce power usage. However disabling energy star can help to achieve better registration result.

        ```
        ! U1 setvar "power.energy_star.enable" "off"
        ```

      - Turn on hold current when printer is idle. The default setting for hold current is "off" to reduce power usage. User will need to set it to "on" for better registration result. Please note this SGD needs printer to restart to take effect.

        ```
        ! U1 setvar "power.hold_cur" "on"
        ```

4. The following RFID enhancements are included in Link-OS 7.3
   - RFID data logging is now enabled by default. The log will be overwritten after 10KB.
   - When RFID calibration fails, the default values will be set as follows:
     - Read power and write power: `0`
     - Antenna Element: `A1`
     - Program position: `F0`
5. In WPA PEAP settings, "User Name" is now under the Connection menu and the Wizard menu on the color touch front panel user interface.

Frequently Asked Questions

1. “Why should I upgrade to v7.3?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 7.3 contains 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 v7.3?”

   Link-OS v7.3 can be downloaded from the Downloads tab on your printer’s support page. To access the support page, go to zebra.com/us/en/support-downloads/printers.html, and enter your printer’s model name (such as “ZT411” or “ZQ610 Plus”).

   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v7.3 cost?”

   Link-OS v7.3 is a free upgrade.

Issues Corrected

1. The ZT610 printers can now feed media correctly when head close action is set to `"feed"`.
2. The printer webpage for ZE511 can now show 18 ips (inch per second) print speed in direct thermal mode.
3. The ZT610 printer can now correctly position the small gap media after RFID calibration.
4. The ZD421 printer can now retain authenticated ribbon cartridge info and can reauthenticate a ribbon cartridge after the printer restarts or is power cycled.
5. The batch counter on the front panel can now display the count info correctly when you send batch print jobs and then press the PAUSE and CANCEL keys.
6. ZQ6 plus printers on a Wi-Fi network can now enter sleep mode after power sleep timeout.
7. The ZD621 printer will not feed an extra label on first print after power on with `"ezpl.power_up_action"` set to `"calibrate"`.
8. The ZQ6 plus printer can now roam between access points as expected with WPA3 SAE security mode.
9. The ZQ6 plus printer can now connect back to the network after disconnecting the printer from the access point when the printer is in sleep state.
10. The RTC (real time clock) time can now show the correct value after a power cycle with `"rtc.timezone"` set to `"UTC-8"`.

Security Related Items

The printer's password protected web pages can now block unauthenticated HTTP POST requests.

Upcoming Changes

Zebra is announcing:

- For the SNMP v1/v2 protocol setting via the SGD command `"ip.snmp.enable"`, the default setting value will be changed to `"off"` as SNMPv1/v2 is considered a vulnerability. This update will be included in a Link-OS release targeted at the end of Q3 2025.
- For a Get request, the IPv4 setting will no longer be guaranteed to return leading 0's included in an IPv4 address set by the user. This update will be included in a future Link-OS release.

Link-OS v7.2 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v7.2

Release Date: January 10, 2025

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.37Z
ZQ511 ZQ521	V91.	21.37Z
ZT411 ZT421	V92.	21.37Z
ZD411 ZD421 ZD611 ZD621	V93.	21.37Z
ZE511 ZE521	V94.	21.37Z
ZT510 ZT610 ZT620	V96.	21.37Z
ZT111 ZT211 ZT231	V97.	21.37Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.37Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.37Z

Changes

1. The Link-OS version number is now v7.2.
2. The following new / updated features for Color Touch Front Panel user interface are included:
   - Add Serial Interface Port Settings.
   - Enable Batch Counter to display 1/1 (previously only visible for quantities 2 or more).
   - Add slew speed and backfeed speed settings.
   - Add Applicator Voltage settings.
   - Add "format convert" settings.
   - Add Reprint button enable/disable setting.
   - Add Display Time out settings.
   - Change Backfeed settings to have standard text (i.e., Normal, After, Off, and Before instead of N, A, O, and B).
3. The following PDF Printing Enhancements are included:
   - Allow “present after” (i.e., actions after printing such as cut, peel, etc.) at the end of a multi-page PDF document instead of every page/label.
   - Reduce processing time for PDF printing.
4. The 1-Watt RFID radio power option support on ZT411R printers for Japan Customers is included.
5. The following features are removed from Link-OS due to obsolete industry standards/versions or outdated technology:
   - SHA-1 support is removed in Link-OS 7.2 to enhance product security.
   - TLS1.0/1.1 support is removed in Link-OS 7.2.
   - The wave agent (i.e., the internal agent for support of Veriwave's WaveDeploy system for site survey) is removed in Link-OS 7.2.
6. The Link-OS is now updated for the ZT4/6 printer models to provide support to the 802.11ax Wi-Fi 6 radio.

Frequently Asked Questions

1. “Why should I upgrade to v7.2?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 7.2 contains 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 v7.2?”

   Link-OS v7.2 can be downloaded from the Downloads tab on your printer’s support page. To access the support page, go to zebra.com/us/en/support-downloads/printers.html, and enter your printer’s model name (such as “ZT411” or “ZQ610 Plus”).

   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v7.2 cost?”

   Link-OS v7.2 is a free upgrade.

Issues Corrected

1. The ZQ610 Plus printers can now roam as expected between access points on 2.4 GHz radio channels with WPA3 SAE security enable.
2. The ZT610 printers can now correctly indicate the printed labels are present or being taken in “Peel Off” mode.
3. The ZT411 linerless printers can now work correctly when the head close / power up action is set to “Calibrate” and the current print mode is set to “linerless cut” or “linerless delayed cut”.
4. The ZT411 linerless printers can now detect a label waiting to be peeled during Head Open / Close and display the "Peel Off label ready" alert message on the front panel UI.
5. When a ZPL script with the `^RFW` command to encode RFID data is sent to non-RFID printer, the command is now ignored.
6. The Line feed (\&) can now be printed correctly in field block with the `^FB` command.
7. The stored value for SGD `media.slew_speed` is now persistent for ZE511 printers in “direct thermal” mode after powered up.
8. After the security scan with Rapid7® software, the Zebra printer webpage can now be accessible.
9. The ZQ6x0 Plus printers can now re-connect to MQTT after waking from sleep.
10. The ZT411 printers assembled with cutters can now perform cut action correctly after completing sensor profile printout.
11. The WLAN roaming algorithm is improved such that the printers will remain associating with current access point when it has the best signal strength.

Security Related Items

None.

Upcoming Changes

Zebra is announcing:

- For a Get request, the IPv4 setting will no longer be guaranteed to return leading 0’s included in an IPv4 address set by the user. This update will be included in a future Link-OS release.

Link-OS v7.1 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v7.1

Release Date: October 04, 2024

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.34Z
ZQ511 ZQ521	V91.	21.34Z
ZT411 ZT421	V92.	21.34Z
ZD411 ZD421 ZD611 ZD621	V93.	21.34Z
ZE511 ZE521	V94.	21.34Z
ZT510 ZT610 ZT620	V96.	21.34Z
ZT111 ZT211 ZT231	V97.	21.34Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.34Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.34Z

Changes

1. The Link-OS version number is now v7.1.
2. Customers can now set the orientation for labels from the color touch user interface on the front panel of applicable Zebra printers. The options are:
   - **0 degrees:** labels are printed in normal orientation as defined in the format.
   - **90 degrees:** labels are printed in a rotated orientation with 90 degree clockwise.
   - **180 degrees:** labels are printed in inverted orientation.
   - **270 degrees:** the labels are printed in bottom-up orientation.
3. A new SGD has been included to support the label rotation feature.

   A brief description of the SGDs follows. For full details, see the latest ZPL II Programming Guide available on zebra.com.

   a. `"zpl.label_orientation"`

      This new command is to set or get the value of the orientation of the label printed in degrees.

      Possible values for the SGD are `"0"`, `"90"`, `"180"`, and `"270"`, and the default is `"0"`.

      Example:

      ```
      ! U1 setvar "zpl.label_orientation" "90"
      ```
4. The following RFID enhancements are included in Link-OS 7.1:
   - Enhancements to RFID locking command simplify the permanent locking of the RFID tags for programming.
   - The RFID calibration process is improved with new algorithms to reduce calibration time and optimize RFID encoding position.
5. The following features were removed from Link-OS:
   - Support for dynamic WEP Wi-Fi securities was removed due to obsolete industry standards. This includes all references to the dynamic WEP security settings that the user has access to for printer configurations including EAP-TLS, EAP-TTLS, EAP-FAST, PEAP, LEAP and WPA LEAP.
   - The `"rfid.adaptive_antenna"` command was removed due to outdated adaptive antenna parameters and limited use.
6. Link-OS is now updated for the ZD4x1/6x1 printer models to provide support to the 802.11ax Wi-Fi 6 radio.
7. Link-OS is also updated to support the Automation Friendly Aftermarket Kits, field-installable kits designed to make the ZT411 with peel and liner take-up more automation-friendly.

8. A new SGD has been added to support the automation friendly kits for ZT411.

   A brief description of the SGDs follows. For full details, see the latest ZPL II Programming Guide available on zebra.com.

   a. `"media.extended_presentation"`

      This new command, when enabled, extends the peel presentation position to match the extended peel plate on a ZT411 printer equipped with the automation friendly kit.

      When this command is enabled, the following distances are increased:

      - peel-bar-to-printline
      - tear-off-to-printline
      - applicator-to-printline

      When this command is disabled, the distances return to their initial values.

      Possible values for the SGD are `"disabled"`, and `"enabled"`. While the initial value is `"disabled"`, this setting will not reset to a default.

      Example:

      ```
      ! U1 setvar "media.extended_presentation"  "enabled"
      ```

Frequently Asked Questions

1. “Why should I upgrade to v7.1?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 7.1 contains 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 v7.1?”

   Link-OS v7.1 can be downloaded from the Downloads tab on your printer’s support page. To access the support page, go to zebra.com/us/en/support-downloads/printers.html, and enter your printer’s model name (such as “ZT411” or “ZQ620”).

   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v7.1 cost?”

   Link-OS v7.1 is a free upgrade.

Issues Corrected

1. The open cover light on ZT6 printers is now working correctly when the printer cover is opened.
2. The ZQ610 Plus printers with WiFi-6 radio options can now roam as expected in 2.4 GHz bands with WPA3 SAE security.
3. The ZE511 printers can now print text correctly on labels with customized fonts provided by customers.
4. A “Logout” button has been added to the footer of the web page for printer configuration to strengthen security.
5. The attempt to mirror using an FTP server can now correctly handle errors in responses to LIST command.
6. The SGDs `odometer.headnew` and `odometer.headclean` can now reset the values correctly on Zebra printers after the values reached to a specific number before the print head is replaced or cleaned.
7. Desktop printers can now handle “Printhead Over Temperature” error correctly, i.e., the Printhead Over Temperature alert will not clear and the printer cannot be rebooted until the temperature is lower than 70 ℃ .
8. The ZT5/ZT6 printers can now enable ZBI after the MLB (Main Logic Board) is replaced.
9. The German translation for color touch UI on Zebra printers is corrected per customers’ feedback.
10. The ZT5 printers do not show the false “Cover Open” alert after updating firmware to latest Link-OS.
11. The desktop printers can now get IP addresses as expected when the operating channel width is changed on the 802.11h enabled AP.
12. The ZD621 printers can now print labels with the vertical position of image the same as that printed by previous GK420 printers with EPL.

Security Related Items

A security fix is implemented to ensure WPA-SAE passphrase is hidden when running the connection wizard from the color touch UI.

Upcoming Changes

Zebra is announcing:

- SHA-1 support will be removed in Link-OS 7.2 to enhance product security. Customers are encouraged to move to SHA-256 ASAP.
- TLS1.0/1.1 support will be removed in Link-OS 7.2. Customers are encouraged to enable TLS1.2 support ASAP.
- The waveagent feature will be removed in Link-OS 7.2.
- For a Get request, the IPv4 setting will no longer be guaranteed to return leading zeroes included in an IPv4 address set by the user. This update will be included in a future Link-OS release.

Link-OS v7.0 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v7.0

Release Date: July 30, 2024

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.33Z
ZQ511 ZQ521	V91.	21.33Z
ZT411 ZT421	V92.	21.33Z
ZD411 ZD421 ZD611 ZD621	V93.	21.33Z
ZE511 ZE521	V94.	21.33Z
ZT510 ZT610 ZT620	V96.	21.33Z
ZT111 ZT211 ZT231	V97.	21.33Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.33Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.33Z

Changes

1. The Link-OS version number is now v7.0.
2. IPv6 (Internet Protocol version 6) is now incorporated into Link-OS. Zebra Link-OS printers can now be configured to support IPv6 functionality with both wired and wireless connections to the network.
3. New and updated SGDs have been included to support IPv6.

   A brief description of the SGDs follows. For full details, see the latest ZPL II Programming Guide, available soon on zebra.com.

   a. `"ip.address_mode"`

      This new command is to set or get the value of the IP protocol for the printer.

      Possible values for the command are `"ipv4"`, `"ipv6"`, and `"all"`, and the default is `"ipv4"`.

      Example:

      ```
      ! U1 setvar "ip.address_mode " "ipv6"
      ```

   b. `"wlan.ipv6.address_type"`

      This new command is to set or get the value of the method used to get an IPv6 address with WLAN.

      Possible values for the command are `"static"` and `"auto"`, and the default is `"auto"`.

      When set to `"auto"`, the Router Advertisement packets determine the usage of SLAAC (Stateless Address Auto Configuration) and/or DHCPv6.

      Example:

      ```
      ! U1 setvar "wlan.ipv6.address_type" "static"
      ```

   c. `"internal_wired.ipv6.address_type"`

      This new command is to set or get the value of the method used to get an IPv6 address with wired connection.

      Possible values for the command are `"static"` and `"auto"`, and the default is `"auto"`.

      When set to `"auto"`, the Router Advertisement packets determine the usage of SLAAC (Stateless Address Auto Configuration) and/or DHCPv6.

      Example:

      ```
      ! U1 setvar "internal_wired.ipv6.address_type" "auto"
      ```

   d. `"wlan.ipv6.static.addresses"`

      This new command is to set or get the value of IPv6 addresses when `address_type` is `"static"` in a WLAN network. Up to three IPv6 addresses are allowed to be set.

      The SGD returns `"::"` when no static address has been set.

      Example:

      ```
      ! U1 setvar "wlan.ipv6.static.addresses"
      "fc04:1795::fe94:1704/32,fd04:1795::207:4dff:fe94:1704/64,fd04:1796::e0b/64"
      ```

e. `"internal_wired.ipv6.static.addresses"`

This new command is to set or get the value of IPv6 addresses when address_type is `"static"` with a wired connection. Up to three IPv6 addresses are allowed to be set.

The SGD returns `"::"` when no static address has been set.

Example:

```
! U1 setvar "internal_wired.ipv6.static.addresses"
"fc04:1795::fe94:1704/32,fd04:1795::207:4dff:fe94:1704/64,fd04:1796::e0b/64"
```

f. `"wlan.ipv6.static.gateways"`

This new command is to set or get the value of IPv6 addresses when `address_type` is `"static"` in a WLAN network. Only one IPv6 address is allowed to be set.

The SGD returns `"::"` when no static address has been set.

Example:

```
! U1 setvar "wlan.ipv6.static.gateways" "fe80::202:b3ff:febf:9d18"
```

g. `"internal_wired.ipv6.static.gateways"`

This new command is to set or get the value of IPv6 addresses when `address_type` is `"static"` with a wired connection. Only one IPv6 address is allowed to be set.

The SGD returns `"::"` when no static address has been set.

Example:

```
! U1 setvar "internal_wired.ipv6.static.gateways" "fe80::202:b3ff:febf:9d18"
```

h. `"wlan.ip.dns.servers"`

This updated command is to set or get the value of IP addresses for DNS servers in a WLAN network. Both IPv4 and IPv6 are supported. Up to three IP addresses are allowed to be set.

This SGD has special behavior. The retrieved value is always the value currently in use. The Setvar value, if valid, is saved, but it may not reflect in the value returned from a Getvar command.

Setvar: IP addresses to be used as DNS servers when `address_type` is `"static"` (IPv6) or `ip.protocol` is `"permanent"` (IPv4).

Getvar: A space-separated list of IP address(es) of DNS server(s), up to three, that are currently in use by the device. The values to be used are a combination of addresses received from DHCPv4, DHCPv6, and user set values using the following rules:

i. At least one spot will be allocated to any enabled IP version.

ii. IPv4 addresses will take at least two slots if at least two IPv4 addresses are provided.

iii. User set value will be included if static/permanent addresses are used.

Example:

```
! U1 setvar "wlan.ip.dns.servers" "2001::123:4567:89ab:0:cdef"
```

i. `"internal_wired.ip.dns.servers"`

This updated command is to set or get the value of IP addresses for DNS servers in a wired network. Both IPv4 and IPv6 are supported. Up to three IP addresses are allowed to be set.

This SGD has special behavior. The retrieved value is always the value currently in use. The Setvar value, if valid, is saved, but it may not reflect in the value returned from a Getvar command.

Setvar: IP addresses to be used as DNS servers when `address_type` is `"static"` (IPv6) or `ip.protocol` is `"permanent"` (IPv4).

Getvar: A space-separated list of IP address(es) of DNS server(s), up to three, that are currently in use by the device. The values to be used are a combination of addresses received from DHCPv4, DHCPv6, and user set values using the following rules:

i. At least one spot will be allocated to any enabled IP version.

ii. IPv4 addresses will take at least two slots if at least two IPv4 addresses are provided.

iii. User set value will be included if static/permanent addresses are used.

Example:

```
! U1 setvar "internal_wired.ip.dns.servers" "2001::123:4567:89ab:0:cdef"
```

j. `"wlan.ip.dns.domain"`

This updated command is to set or get the value for DNS domains in a WLAN network. Up to five domains are allowed to be set.

This SGD has special behavior. The retrieved value is always the value currently in use. The Setvar value, if valid, is saved, but it may not reflect in the value returned from a Getvar command.

Setvar: IP addresses to be used by the device as DNS domains when `address_type` is `"static"` (IPv6) or `ip.protocol` is `"permanent"` (IPv4).

Getvar: A space-separated list of IP address(es) of DNS server(s), up to three, that are currently in use by the device. The values to be used are a combination of addresses received from DHCPv4, DHCPv6, and user set values using the following rules:

i. At least one spot will be allocated to any enabled IP version.

ii. IPv4 addresses will take at least two slots if at least two IPv4 addresses are provided.

iii. User set value will be included if static/permanent addresses are used.

Example:

```
! U1 setvar "wlan.ip.dns.domain" "zebra.com"
```

k. `"internal_wired.ip.dns.domain"`

This updated command is to set or get the value for DNS domains in a wired network. Up to five domains are allowed to be set.

This SGD has special behavior. The retrieved value is always the value currently in use. The Setvar value, if valid, is saved, but it may not reflect in the value returned from a Getvar command.

Setvar: IP addresses to be used by the device as DNS domains when `address_type` is `"static"` (IPv6) or `ip.protocol` is `"permanent"` (IPv4).

Getvar: A space-separated list of IP address(es) of DNS server(s), up to three, that are currently in use by the device. The values to be used are a combination of addresses received from DHCPv4, DHCPv6, and user set values using the following rules:

i. At least one spot will be allocated to any enabled IP version.

ii. IPv4 addresses will take at least two slots if at least two IPv4 addresses are provided.

iii. User set value will be included if static/permanent addresses are used.

Example:

```
! U1 setvar "internal_wired.ip.dns.domain" "zebra.com"
```

l. `"wlan.ip.dns.servers_user_value"`

This new command is to display the value that the user has set to `wlan.ip.dns.servers` with static (IPv6)/permanent (IPv4) acquisition mode with a WLAN connection.

Example:

```
! U1 getvar "wlan.ip.dns.servers_user_value"
```

m. `"internal_wired.ip.dns.servers_user_value "`

This new command is to display the value that the user has set to `internal_wired.ip.dns.servers` with static (IPv6)/permanent (IPv4) acquisition mode with a wired connection.

Example:

```
! U1 getvar "internal_wired.ip.dns.servers_user_value"
```

n. `"wlan.ip.dns.domain_user_value"`

This new command is to display the value that the user has set to `wlan.ip.dns.domain` with static (IPv6)/permanent (IPv4) acquisition mode with a WLAN connection.

Example:

```
! U1 getvar "wlan.ip.dns.domain_user_value"
```

o. `"internal_wired.ip.dns.domain_user_value"`

This new command is to display the value that the user has set to `internal_wired.ip.dns.domain` with static (IPv6)/permanent (IPv4) acquisition mode with a wired connection.

Example:

```
! U1 getvar "internal_wired.ip.dns.domain_user_value"
```

p. `"wlan.ipv6.dhcp.option39_enable"`

This new command is to set or get the value of option 39 (to configure the Fully Qualified Domain Name or FQDN) in DHCPv6 with a WLAN connection.

Possible values for the command are `"on"` and `"off"`, and the default is `"on"`.

Example:

```
! U1 setvar "wlan.ipv6.dhcp.option39_enable" "off"
```

q. `"internal_wired.ipv6.dhcp.option39_enable"`

This new command is to set or get the value of option 39 (to configure the Fully Qualified Domain Name or FQDN) in DHCPv6 with a wired connection.

Possible values for the command are `"on"` and `"off"`, and the default is `"on"`.

Example:

```
! U1 setvar "internal_wired.ipv6.dhcp.option39_enable" "off"
```

r. `"wlan.ipv6.dhcp.option39_format"`

This new command is to set or get the value of the format field for option 39 (to configure the Fully Qualified Domain Name or FQDN) in DHCPv6 with a WLAN connection. The value is a string up to 127 characters, and the default is `"<device.friendly_name>"`.

Note that the SetVar command supports using an SGD entry as source for the data to be set to the format field if the SGD entry is bracketed with the < and > characters.

Example:

```
! U1 setvar "wlan.ipv6.dhcp.option39_format" "abcdef"
```

or

```
! U1 setvar "wlan.ipv6.dhcp.option39_format" "<device.friendly_name>"
```

s. `"internal_wired.ipv6.dhcp.option39_format"`

This new command is to set or get the value of the format field for option 39 (to configure the Fully Qualified Domain Name or FQDN) in DHCPv6 with a wired connection. The value is a string up to 127 characters, and the default is `"<device.friendly_name>"`.

Note that the SetVar command supports using an SGD entry as source for the data to be set to the format field if the SGD entry is bracketed with the < and > characters.

Example:

```
! U1 setvar "internal_wired.ipv6.dhcp.option39_format" "abcdef"
```

or

```
! U1 setvar "internal_wired.ipv6.dhcp.option39_format" "<device.friendly_name>"
```

t. `"wlan.ipv6.addresses"`

This new command is to get the list of IPv6 address(es) in use by the printer with a WLAN connection. Up to 10 IPv6 addresses can be displayed in the list.

Example:

```
! U1 getvar "wlan.ipv6.addresses"
```

u. `"internal_wired.ipv6.addresses"`

This new command is to get the list of IPv6 address(es) in use by the printer with a wired connection. Up to 10 IPv6 addresses can be displayed in the list.

Example:

```
! U1 getvar "internal_wired.ipv6.addresses"
```

v. `"interface.network.active.ipv6.addresses"`

This new command is to get the list of active IPv6 address(es) used by the printer with WLAN or wired connection. Up to 10 IPv6 addresses can be displayed in the list.

Example:

```
! U1 getvar "interface.network.active.ipv6.addresses"
```

w. `"wlan.ipv6.gateways"`

This new command is to get the list of IPv6 gateway(s) in use by the printer with a WLAN connection. Up to 10 IPv6 addresses can be displayed in the list.

Example:

```
! U1 getvar "wlan.ipv6.gateways"
```

x. `"internal_wired.ipv6.gateways"`

This new command is to get the list of IPv6 gateway(s) in use by the printer with a wired connection. Up to 10 IPv6 addresses can be displayed in the list.

Example:

```
! U1 getvar "internal_wired.ipv6.gateways"
```

y. `"interface.network.active.ipv6.gateways"`

This new command is to get the list of active IPv6 gateway(s) used by the printer with a WLAN or wired connection. Up to 10 IPv6 addresses can be displayed in the list.

Example:

```
! U1 getvar "interface.network.active.ipv6.gateways"
```

z. `"interface.network.active.ipv6.address_type"`

This new command is to get the value of the method used to get an IPv6 address with WLAN or wired connection.

Possible values for the command are `"static"` and `"auto"`, and the default is `"auto"`.

Example:

```
! U1 getvar "interface.network.active.ipv6.address_type"
```

aa. `"interface.network.active.ipv6.dhcp_server_duid"`

This new command is to get the DHCP unique identifier or DUID provided by the DHCPv6 server that provided the printer network information. The value returned is a string of up to 384 characters.

Example:

```
! U1 getvar "interface.network.active.ipv6.dhcp_server_duid"
```

ab. `"wlan.ipv6.dhcp.option39_value"`

This new command is to get the value to be used for option 39 in DHCPv6 after processing the "wlan.ipv6.dhcp.option39_format" SGD with a WLAN connection. The value is a string up to 127 characters.

Example:

```
! U1 getvar "wlan.ipv6.dhcp.option39_value"
```

ac. `"internal_wired.ipv6.dhcp.option39_value"`

This new command is to get the value to be used for option 39 in DHCPv6 after processing the "internal_wired.ipv6.dhcp.option39_format" SGD with a wired connection. The value is a string up to 127 characters.

Example:

```
! U1 getvar "internal_wired.ipv6.dhcp.option39_value"
```

ad. `"wlan.ipv6.dhcp.option39_fqdn"`

This new command is to get the value of the fully qualified domain name or FQDN of the printer as provided by the DHCPv6 server for option 39 with a WLAN connection. The value is a string up to 127 characters.

Example:

```
! U1 getvar "wlan.ipv6.dhcp.option39_fqdn"
```

ae. `"internal_wired.ipv6.dhcp.option39_fqdn"`

This new command is to get the value of the fully qualified domain name or FQDN of the printer as provided by the DHCPv6 server for option 39 with a wired connection. The value is a string up to 127 characters.

Example:

```
! U1 getvar "internal_wired.ipv6.dhcp.option39_fqdn"
```

af. `"wlan.ipv6.dhcp.lease.length"`

This new command is to get the value of the lease duration for an IP address provided by the DHCPv6 in seconds with a WLAN connection. The value is a whole number up to 4,294,967,295 in seconds.

Example:

```
! U1 getvar "wlan.ipv6.dhcp.lease.length"
```

ag. `"internal_wired.ipv6.dhcp.lease.length"`

This new command is to get the value of the lease duration for an IP address provided by the DHCPv6 in seconds with a wired connection. The value is a whole number up to 4,294,967,295 in seconds.

Example:

```
! U1 getvar "internal_wired.ipv6.dhcp.lease.length"
```

ah. `"wlan.ipv6.dhcp.lease.time_left"`

This new command is to get the value of the remaining lease duration for an IP address provided by the DHCPv6 in seconds with a WLAN connection. The value is a whole number up to 4,294,967,295 in seconds.

Example:

```
! U1 getvar "wlan.ipv6.dhcp.lease.time_left"
```

ai. `"internal_wired.ipv6.dhcp.lease.time_left"`

This new command is to get the value of the remaining lease duration for an IP address provided by the DHCPv6 in seconds with a wired connection. The value is a whole number up to 4,294,967,295 in seconds.

Example:

```
! U1 getvar "internal_wired.ipv6.dhcp.lease.time_left"
```

aj. `"wlan.ipv6.dhcp.lease.last_attempt"`

This new command is to get the value of the Unix timestamp of the last attempt to obtain a DHCPv6 lease with a WLAN connection. The value is a whole number up to 4,294,967,295 in seconds.

Example:

```
! U1 getvar "wlan.ipv6.dhcp.lease.last_attempt"
```

ak. `"internal_wired.ipv6.dhcp.lease.last_attempt"`

This new command is to get the value of the Unix timestamp of the last attempt to obtain a DHCPv6 lease with a wired connection. The value is a whole number up to 4,294,967,295 in seconds.

Example:

```
! U1 getvar "internal_wired.ipv6.dhcp.lease.last_attempt"
```

al. `"ip.dhcp.dhcpv6_duid`

This new command is to get the DHCPv6 DUID that printer uses in DHCPv6 communication with WLAN or wired connection. The value is a string up to 355 characters.

Example:

```
! U1 getvar "ip.dhcp.dhcpv6_duid"
```

4. SNMPv3 (Simple Network Management Protocol Version 3) is now incorporated in Link-OS to ensure secure access to Zebra Link-OS printers with user authentication as well as encryption of data traffic over the network between the printers and other components.
5. To enable and configure SNMPv3, the printer must first have Protected Mode configured, which requires setting the Protected Mode admin password. Protected Mode and SNMPv3 configuration are done using JSON.

   To configure SNMPv3, the "setup-snmpv3-user" operation is used to create, update, or delete the admin user. Once the SNMPv3 admin user is created, SNMPv3 is automatically enabled.

   For more details on SNMPv3 configuration, refer to the latest PrintSecure Administration Guide, available soon on Zebra.com.

6. New SGDs have been added to Link-OS to support SNMPv3.

   A brief description of the SGDs follows. For full details, see the latest ZPL II Programming Guide, available soon on Zebra.com.

   a. `"ip.snmpv3.enable"`

      This new command is to get the value of whether SNMPv3 is enabled or not. Possible values for the SGD are "on" and "off" and there is no default.

      Example:

      ```
      ! U1 getvar "ip.snmpv3.enable"
      ```

   b. `"ip.snmpv3.admin.name"`

      This new command is to get the value of the assigned username for the SNMPv3 admin user (with read/write access). The value is a string with up to three2 characters.

      Example:

      ```
      ! U1 getvar "ip.snmpv3.admin.name"
      ```

   c. `"ip.snmpv3.monitor.name"`

      This new command is to get the value of the assigned username for the SNMPv3 monitor user (with read only access) . The value is a string with up to three2 characters.

      Example:

      ```
      ! U1 getvar "ip.snmpv3.monitor.name"
      ```

   d. `"ip.snmpv3.admin.auth_protocol"`

      This new command is to get the value of the authentication protocol to be used for the SNMPv3 admin user. Possible values for the SGD are "MD5" and "SHA" and there is no default value.

      Example:

      ```
      ! U1 getvar "ip.snmpv3.admin.auth_protocol"
      ```

   e. `"ip.snmpv3.admin.priv_protocol"`

      This new command is to get the value of the privacy protocol to be used for the SNMPv3 admin user. Possible values for the SGD are "AES" and "DES" and there is no default value.

      Example:

      ```
      ! U1 getvar "ip.snmpv3.admin.priv_protocol"
      ```

   f. `"ip.snmpv3.monitor.auth_protocol"`

      This new command is to get the value of the authentication protocol to be used for the SNMPv3 monitor user. Possible values for the SGD are "MD5" and "SHA" and there is no default value.

      Example:

      ```
      ! U1 getvar "ip.snmpv3.monitor.auth_protocol"
      ```

   g. `"ip.snmpv3.monitor.priv_protocol"`

      This new command is to get the value of the privacy protocol to be used for the SNMPv3 monitor user. Possible values for the SGD are "AES" and "DES" and there is no default value.

      Example:

      ```
      ! U1 getvar "ip.snmpv3.monitor.priv_protocol"
      ```

7. Link-OS is now updated to support the ZT411 linerless printers.
8. New SGDs have been added to Link-OS to support the ZT411 linerless printers.

   A brief description of the new SGDs will be given below. For full details, please see the latest ZPL II Programming Guide available on Zebra.com.

   a. `"media.linerless_offset"`

      This new command is to set or get the value of the linerless media offset (or the size of the so called no print zone or dead zone), which is at the beginning of the label, starting at the top of form and continuing in the number of pixels defined by the current value of the setting.

      For ZT411 linerless printers, the default value and range in pixels is DPI dependent as shown below.

Printer DPI	Min Value	Default Value	Max Value
203	0	61	76
300	0	90	113
600	0	180	225

      For other tabletop printers with a legacy cutter installed, the default value of this command is 0 and the range is 0 to 225.

      The current user configured value will remain as the last configured value.

      Example: (for a 203 DPI printer)

      ```
      ! U1 setvar "media.linerless_offset" "65"
      ```

   b. `"ezpl.take_label_calibration"`

      This new command is to initiate the calibration of the label taken sensor. There is no data range or default value for this command.

      Example:

      ```
      ! U1 setvar "ezpl.take_label_calibration"
      ```

Frequently Asked Questions

1. “Why should I upgrade to v7.0?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 7.0 contains 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 v7.0?”

   Link-OS v7.0 can be downloaded from the Downloads tab on your printer’s support page. To access the support page, go to zebra.com/support, and enter your printer’s model name (such as “ZT411” or “ZQ620”).

   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v7.0 cost?”

   Link-OS v7.0 is a free upgrade.

Issues Corrected

1. The SGD `diag.printhead.type` can now return correct value when no printhead is connected on desktop printers.
2. Users will now be prompted with correct information during the manual calibration process for direct thermal printers.
3. Printers can now reassociate with a CISCO AP (Access Point) as expected after link loss during roaming.
4. The ZD6 printers can now acquire an IP address as expected after reconnecting to a network.
5. The ZE511 printer can now respond immediately to a pause request (such as the user pressing the PAUSE button) while printing.
6. The manual calibration is now improved to work correctly with small labels for ZT610 600 dpi printers.
7. The ZD621 RFID printers can now print labels as expected with `^FE` and `^SF` command.
8. A new OID (Object Identifier) `1.3.6.1.4.1.10642.2.10.3.14.0` was added to provide SNMP access to `zpl.label_length`.
9. The SGD `ezpl.manual_calibration` now has all the valid choice values included in the value range.
10. Users can now scroll the **Printer Info** menu properly on the color touch UI of Zebra printers.
11. Printouts in German and Swedish languages now display the correct characters.

Security Related Items

Security fixes to address the authentication bypass in printer web pages.

Upcoming Changes

Zebra is announcing:

- The `rfid.adaptive_antenna` command will be removed in Link-OS 7.1.
- Support for Dynamic WEP Wi-Fi securities will be removed in Link-OS 7.1.
- SHA-1 support will be removed in Link-OS 7.2 to enhance product security. Customers are encouraged to move to SHA-256 ASAP.
- TLS1.0/1.1 support will be removed in Link-OS 7.2. Customers are encouraged to enable TLS1.2 support ASAP.
- The waveagent feature will be removed in Link-OS 7.2.
- For a Get request, the IPv4 setting will no longer be guaranteed to return leading zeroes included in an IPv4 address set by the user. This update will be included in a future Link-OS release.

Link-OS v6.9 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v6.9

Release Date: 11 April 2024

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.30Z
ZQ511 ZQ521	V91.	21.30Z
ZT411 ZT421	V92.	21.30Z
ZD411 ZD421 ZD611 ZD621	V93.	21.30Z
ZE511 ZE521	V94.	21.30Z
ZT510 ZT610 ZT620	V96.	21.30Z
ZT111 ZT211 ZT231	V97.	21.30Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.30Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.30Z

Changes

1. The Link-OS version number is now v6.9.
2. Color touch front panel enhancements:
   - User can view the current printer DPI (dots per inch) info in the "Printer Info" section in home screen of printers with color touch display.
   - User can set up time and date for the printer via the settings menu of printers with a color touch display.
3. Flash memory operation improvements - the combination of hardware and firmware enhancements can now handle flash memory operation better to increase printer uptime.
4. Automatic printhead identification for ZD4x1/ZD6x1 printers.
5. New SGDs have been added to Link-OS to support the cutter cleaning reminder alert.

   A brief description of the new SGDs will be given below. For full details, see the latest ZPL II Programming Guide, available soon on Zebra.com.

   a. `"cutter.clean_reminder_enable"`

      This command is to set or get the value of the cutter cleaning reminder alert configuration.

      The values for the SGD are "disabled" and "enabled" and the default is "disabled".

      Example: `! U1 setvar "cutter.clean_reminder_enable"  "enabled"`

   b. `"cutter.clean_reminder_threshold"`

      This command is to set or get the value of cutter cleaning reminder threshold, i.e. number of cuts, to trigger cutter cleaning reminder alert.

      The value ranges between "0" and "4294967295" and is integer value only. The default is "100000".

      Example: `! U1 setvar " cutter.clean_reminder_threshold "  "200000"`

Frequently Asked Questions

1. “Why should I upgrade to v6.9?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.9 contains 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 v6.9?”

   Link-OS v6.9 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”). 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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.9 cost?”

   Link-OS v6.9 is a free upgrade.

Issues Corrected

1. With Protected Mode enabled and static IP address configured (wired or wireless), user is not allowed to modify the IP netmask and DNS server list as documented in the PrintSecure Admin guide.
2. The prompt message for Mirror can now correctly display on ZT5 and ZT6 printers after power cycle.
3. The ZQ3 Plus and ZQ6 Plus printers can now shutdown correctly in sleep mode after the inactivity timeout value is reached.
4. Static IP address can now display correctly in configuration data after being set.
5. The Manual Calibration for ZT printers is now working properly when using media less than 1 inch in length.
6. GS1 Datamatrix Barcode can now be correctly generated with APL-I Emulation and FNC-1 dataset.
7. The ZD621R printers can now correctly lock RFID tags.
8. The ZE5 print engines can now print labels with the same vertical print offset in applicator mode as in other print modes after power cycle.
9. Printers can now print all labels correctly at normal speed with APL-D emulation.
10. Printers can now handle print jobs with small labels correctly after powered on.
11. The ZQ6 plus printers can now maintain WiFi connection after waking up from sleep mode.
12. Link-OS v6.9: The ZQ6 Plus RFID printers can now correctly display RFID module status info when the RFID module is disabled, and the printer is powered up.

Security Related Items

Security fixes to address the XSS (cross site scripting) vulnerability in printer web pages.

Upcoming Changes

Zebra is announcing:

- SHA-1 support will be removed in a future version of Link-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 a future version of Link-OS.
- Support for Dynamic WEP Wi-Fi securities will be removed in a future version of Link-OS.

Link-OS v6.8 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v6.8.1

Release Date: 20 December 2023

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.27Z
ZQ511 ZQ521	V91.	21.27Z
ZT411 ZT421	V92.	21.27Z
ZD411 ZD421 ZD611 ZD621	V93.	21.27Z
ZE511 ZE521	V94.	21.27Z
ZT510 ZT610 ZT620	V96.	21.27Z
ZT111 ZT211 ZT231	V97.	21.27Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.27Z
ZQ310 Plus ZQ320 Plus ZR300 Plus	V101.	21.27Z

Changes

The Link-OS version number is now v6.8.1.

Frequently Asked Questions

1. “Why should I upgrade to v6.8.1?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.8 contains 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 v6.8.1?”

   Link-OS v6.8.1 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620 Plus”). 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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.8.1 cost?”

   Link-OS v6.8.1 is a free upgrade.

Issues Corrected

1. Customers can now navigate to view the ZBI application from front panel of ZT411 printers without unintentionally stopping the program from running.
2. ZQ630 printers can now communicate with Zebra VisibilityIQ service when in sleep mode.
3. The ZT and ZD series printers can now handle mismatching firmware downloaded from USB drive correctly without being locked up.
4. The ZT and ZD series printers can now perform mirroring correctly using a USB drive.

Security Related Items

The OpenSSL library used by Link-OS printers has been updated to the latest version to mitigate vulnerability. This fix addresses CVE-2022-0778.

Upcoming Changes

Zebra is announcing:

- SHA-1 support will be removed in a future version of Link-OS. This step is being taken to enhance product security. SHA-1 is still supported in Link-OS v6.0.
- The `rfid.adaptive_antenna` command will be removed in a future version of Link-OS.
- Support for Dynamic WEP Wi-Fi securities will be removed in a future version of Link-OS.

Link-OS v6.8 Release 2

Release Date: 23 October 2023

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD220 ZD230 ZD888	V89.	21.26Z
ZQ511 ZQ521	V91.	21.26Z
ZT411 ZT421	V92.	21.26Z
ZD411 ZD421 ZD611 ZD621	V93.	21.26Z
ZE511 ZE521	V94.	21.26Z
ZT510 ZT610 ZT620	V96.	21.26Z
ZT111 ZT211 ZT211XX ZT231	V97.	21.26Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.26Z
ZQ300 Plus ZR300 Plus	V101.	21.26Z

Changes

1. Customer can now print larger size QR code with the ZPL command ^BQ by increasing the QR code maximum magnification factor from 10 to 100.
2. A new ZPL command `^FE` has been added to allow field data concatenation and substring extraction by referencing `^FN` fields.

   A brief description of the new command will be given below. For full details, please see the latest ZPL II Programming Guide, soon available on Zebra.com. A PDF file with detailed description of the command is also available on request before the updated ZPL II Programming Guide is posted.

   Format: `^FEa`

   This table identifies the parameters for this format:

Parameters	Details
a	**Values:** any character except current format and control prefix (^ and ~ by default) **Default:** #

3. The MQTT API version number is changed to 2 as the SGD "`rfid.logging.entries`" can now be retrieved via JSON over MQTT.
4. The firmware version for ZT510/ZT610/ZT620 is now V96. Customers can upgrade from any previous V80 build directly to V96 for new features and issue fixes in Link-OS 6.8 and later releases. Detailed guidance for upgrading is available on zebra.com.

Frequently Asked Questions

1. “Why should I upgrade to v6.8?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.8 contains 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 v6.8?”

   Link-OS v6.8 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZQ620 Plus”). 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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.8 cost?”

   Link-OS v6.8 is a free upgrade.

Issues Corrected

1. ZT411 printers can now print correctly with APL-S code sent to printers.
2. ZT411 printers can now correctly process label offset positions with APL-D.
3. ZT411 printers can now print rectangular labels (64x18 mm) with correct alignment.
4. New version of ZLib has been built for ZT/ZQ printers from upstream source from QNX to ensure these printers are out of risk.
5. ZT411 and ZD421 printers can now connect to Wi-Fi successfully with all supported security types.
6. Mobile printers can now demonstrate expected charging status when the PowerPrecisionPlus (PP+) battery is replaced by a legacy battery with charger removed.
7. ZD621 printers can now print labels as expected when the batch counter is enabled and backfeed is completely turned off.
8. ZT5/6 printers can now correctly perform media gap detection to avoid false "media out" alert.
9. ZQ6 plus printers can now detect PowerPrecisionPlus (PP+) batteries correctly after firmware upgrade.
10. The front panel UI of ZT6 printers can now display the prompts correctly for users to go through the whole manual calibration process.
11. ZQ521 printers can now display the correct information of RFID reader.
12. ZQ6 Plus printers can now roam and connect to WiFi network successfully in an environment with poor signal strength.
13. ZT5/6 printers with cutter module installed can now correctly go through the cutter cycle after power up.
14. ZE511/521 printers can now correctly identify printhead upon firmware flashing.

Security Related Items

The multiprotocol file transfer library used by Link-OS has been updated to the latest version to mitigate vulnerability. This fix addresses CVE-2022-42915.

Upcoming Changes

Zebra is announcing:

- SHA-1 support will be removed in a future version of Link-OS. This step is being taken to enhance product security. SHA-1 is still supported in Link-OS v6.0.
- The `rfid.adaptive_antenna` command will be removed in a future version of Link-OS.
- Support for Dynamic WEP Wi-Fi securities will be removed in a future version of Link-OS.

Link-OS v6.8

Release Date: 8 September 2023

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.25Z

Changes

1. The Link-OS version number is now v6.8.
2. The printer OS for the ZQ6x0 printer models has been updated to provide support to the 802.11ax Wi-Fi 6 radio.
3. New SGDs have been added to Link-OS to support the 802.11ax Wi-Fi 6 radio.

   A brief description of the new SGDs will be given below. For full details, see the latest ZPL II Programming Guide, available soon on Zebra.com.

   a. `"device.feature.802_11ax"`

      This command is to get status information on the 802.11ax Wi-Fi 6 radio. It is getvar only.

      Possible values for the SGD are:

      - "not available" if the printer model does not support an 802.11ax feature option.
      - "not present" if the printer model supports an 802.11ax option but this particular printer does not have the feature installed.
      - "present" if the printer queried has an 802.11ax radio installed.

      Example: `! U1 getvar "device.feature.802_11ax"`

   b. `"wlan.roam.neighbor_assist"`

      This command is to support 802.11k roaming functionality. When enabled and connected to network, the printer will query the neighbor list from Access Point (AP) and use the neighbor AP channel list to reduce the channels needed to scan during roaming attempts.

      The values for the SGD are "on" and "off" and the default is "off".

      Example: `! U1 setvar "wlan.roam.neighbor_assist " "on"`

   c. `"wlan.8021x.ttls_anonymous_identity"`

      This command is to get the anonymous identity string for EAP-TTLS (to be used as the unencrypted identity) for WLAN.

      The value is a character string up to 32 characters. There is no default.

      Example: `! U1 getvar "wlan.8021x.ttls_anonymous_identity"`

d. `"internal_wired.8021x.ttls_anonymous_identity"`

   This command is to get the anonymous identity string for EAP-TTLS (to be used as the unencrypted identity) for wired Ethernet connection.

   The value is a character string up to 32 characters. There is no default.

   Example: `! U1 getvar "internal_wired.8021x.ttls_anonymous_identity"`

e. `"wlan.transition_disable_clear"`

   This command is to clear the Transition Disable setting value saved in the printer.

   Example: `! U1 setvar "wlan.transition_disable_clear" ""`

4. Existing SGDs have been updated with new values added to support 802.11ax Wi-Fi 6 radio.

   a. `"wlan.wpa.wpa_version"`

      This command is to obtain the version of the WPA (WiFi Protected Access) security standard. The new value "WPA3" is added to the value choices.

   b. `"bluetooth.radio_version"`

      This command is to obtain the version of Bluetooth radio. The new value "5.3" is added to the value choices.

   c. `"wlan.security"`

      This command is to obtain the WLAN security mode. The new value "wpa sae" is added to the value choices.

5. New SGDs to define an internet firewall proxy that would apply to all Ethernet and WLAN connections have been added to Link-OS. A brief description of the new SGDs will be given below. For full details, see the latest ZPL II Programming Guide, available soon on Zebra.com.

   a. `"ip.firewall.proxy"`

      This command is to assign proxy setting for HTTP/HTTPS connections when the printer must go through a proxy server. If no connection-specific value is set (such as Weblink or Alerts), this setting will act as a general value to apply.

      The value is a character string of up to 2048 characters. There is no default.

      Example:
      `! U1 setvar "ip.firewall.proxy" "http://username:password@mydomain.com:4321/"`

   b. `"ip.firewall.authentication.add"`

      This command is to allow the user to add a single server/username/password triplet into the list of authentication entries. The authentication entry is applied to HTTP/HTTPs connections when the printer must go through an authentication server. This setting is separate from the proxy setting.

      The value is a character string of up to 2048 characters. There is no default.

      Example:
      `! U1 setvar "ip.firewall.authentication.add" "servername[ username][ password]"`

   c. "ip.firewall.authentication.entries"

      This command is to obtain the server names added to the authentication entries list delimited by carriage return line feed. Only the server names will be shown. This is getvar only.

      Example: `! U1 getvar "firewall.authentication.entries"`

d. `"ip.firewall.authentication.remove"`

This command is to allow the user to remove a single server/username/password triplet from the list of authentication entries. To remove an entry only the server's name is required, and the entire entry will be removed. No action is taken when an invalid entry is provided.

The value is a character string of up to 2048 characters. There is no default.

Example: `! U1 setvar "ip.firewall.authentication.remove" "servername"`

Frequently Asked Questions

1. “Why should I upgrade to v6.8?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.8 contains 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 v6.8?”

   Link-OS v6.8 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZQ620 Plus”). 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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.8 cost?”

   Link-OS v6.8 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 LEDs 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. The ZT411 printer can now process PDF files of up to 2000 pages.
2. The ZT411 printers will now correctly advance to the next top of form in all cases when using APL-I.
3. Graphical images can now be processed correctly with APL-D even if the data does not perfectly match the command specification.
4. The IP protocol setting is now correctly set to the default value (ALL) when performing the network reset self-test on ZD421/621 printers.
5. The ZD621R printers can now correctly perform permanent lock on U9 tags.
6. Printers can now be paired with correct Bluetooth MAC address in protected mode.
7. ZQ320 printers can now scan DFS channel 144 and connect to WLAN.
8. ZQ520 printers will now always properly detect the presence of Bluetooth on power up.
9. The `wlan.country_code` property now contains all the countries supported by the ZD421 printers.
10. ZT411 printers can now perform print jobs correctly when sending `^MUd` commands at the beginning and at the end of the script.
11. The value of SGD `"zpl.label_length_always"` is now available through SNMP.
12. The correct cycle count status is now displayed on the Power Precision Plus battery pack LED.
13. The paring accepted message will correctly not appear when reconnecting with previously paired device.

Security Related Items

None

Upcoming Changes

Zebra is announcing:

- SHA-1 support will be removed in a future version of Link-OS. This step is being taken to enhance product security. SHA-1 is still supported in Link-OS v6.0.
- The `rfid.adaptive_antenna` command will be removed in a future version of Link-OS.
- Support for Dynamic WEP Wi-Fi securities will be removed in a future version of Link-OS.

Link-OS v6.7 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v6.7 Release 5

Release Date: 14 February 2023

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZQ310 Plus ZQ320 Plus	V101.	21.23Z

Changes

This is the initial release for the ZQ310 Plus and ZQ320 Plus.

Frequently Asked Questions

1. “Why should I upgrade to v6.7?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.6 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 v6.7?”

   Link-OS v6.7 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.7 cost?”

   Link-OS v6.7 is a free upgrade.

4. “As of Link-OS v6.7, certain printers can't be downgraded to versions earlier than v.6.7 and/or versions earlier than the firmware builds for Release 4. Why is that?”

   To maintain continuity in Zebra's manufacturing process and to address global constraints on some integrated circuits, some new components (such as motor drivers) may be used as new printers are manufactured. These new components are future compatible with Link-OS v6.7 and later printer Operating System releases but will not be back-compatible with earlier Link-OS versions.

   To ensure compatibility between these new components and the printer's operating systems, the Desktop printer models ZD220, ZD230, ZD888, (OS Branch V89) and ZD421C, ZD421D, ZD421T, ZD621D and ZD621T (OS Branch V93) that are already running v6.7 or later will not support downgrading to printer's OS versions earlier than v6.7. ZT5x0 and ZT6x0 printers (OS Branch V80) that are running this release of v6.7 (V80.20.29Z) cannot downgrade to any earlier version of the OS for the same reason. ZQ511 and ZQ521 printers (OS Branch V91) that are running this release of v6.7 (V91.21.20Z) cannot downgrade to any earlier version of the OS as well. Also, ZT4x1 printers running this release of v6.7 (V92.21.17Z) cannot downgrade to any earlier version of the OS.

   When and if an attempt is made to downgrade from v6.7 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 v6.7 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 LEDs 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.

5. “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 LEDs 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.

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.
- Support for Dynamic WEP Wi-Fi securities will be removed in a future version of Link-OS.

Link-OS v6.7 Release 4

Release Date: 17 November 2022

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZT510 ZT610 ZT620	V80.	20.29Z
ZQ511 ZQ521	V91.	21.20Z
ZQ610 Plus ZQ620 Plus ZQ630 Plus	V100.	21.21Z

Changes

1. The printer OS for the ZT510/ZT6x0 printer models and the ZQ5x1 models has been updated to accommodate new versions of some key components. This has been required to address global supply constraints on some integrated circuits. Because of this, the ability to downgrade to earlier versions of the Printer OS has been restricted. Please see item 4 in the FAQ below.
2. The self-adjusting media sensor is no longer available on new models of the ZT6x0. On those models, the only possible value for `"sensor.self_adjusting_enable"` is `"no"`.
3. The 802.11ac radio power settings for channel 13 in China have been updated to conform to new China regulations.

Frequently Asked Questions

1. “Why should I upgrade to v6.7?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.6 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 v6.7?”

   Link-OS v6.7 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.7 cost?”

   Link-OS v6.7 is a free upgrade.

4. “As of Link-OS v6.7, certain printers can't be downgraded to versions earlier than v.6.7 and/or versions earlier than the firmware builds for Release 4. Why is that?”

   To maintain continuity in Zebra's manufacturing process and to address global constraints on some integrated circuits, some new components (such as motor drivers) may be used as new printers are manufactured. These new components are future compatible with Link-OS v6.7 and later printer Operating System releases but will not be back-compatible with earlier Link-OS versions.

   To ensure compatibility between these new components and the printer's operating systems, the Desktop printer models ZD220, ZD230, ZD888, (OS Branch V89) and ZD421C, ZD421D, ZD421T, ZD621D and ZD621T (OS Branch V93) that are already running v6.7 or later will not support downgrading to printer's OS versions earlier than v6.7. ZT5x0 and ZT6x0 printers (OS Branch V80) that are running this release of v6.7 (V80.20.29Z) cannot downgrade to any earlier version of the OS for the same reason. ZQ511 and ZQ521 printers (OS Branch V91) that are running this release of v6.7 (V91.21.20Z) cannot downgrade to any earlier version of the OS as well. Also, ZT4x1 printers running this release of v6.7 (V92.21.17Z) cannot downgrade to any earlier version of the OS.

   When and if an attempt is made to downgrade from v6.7 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 v6.7 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 LEDs 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.

5. “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 LEDs 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. On ZQ5x1 models, the Bluetooth information is now printed on the 2 Key report.
2. The ZT510 will no longer incorrectly cycle the installed cutter on power up.
3. The ZT510 and ZT6x0 printers will position the next label to the correct gap location after running a ~JG sensor profile with "device.sensor_profile" set to "store".
4. The ZT510 will now correctly reenter Energy Star mode after it previously exited due to a ~JA or Cancel Format command.
5. The printer will not incorrectly report "Media Out" when "zpl.label_length_always" is set to "yes" or when ^LL,y is being used.

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.
- Support for Dynamic WEP Wi-Fi securities will be removed in a future version of Link-OS.

Link-OS v6.7 Release 3

Release Date: 23 August 2022

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZT510 ZT610 ZT620	V80.	20.27Z
ZT411 ZT421	V92.	21.17Z
ZT111 ZT211 ZT231	V97.	21.18Z

Changes

1. The printer OS for the ZT510/ZT6x0 printer models and the ZT4x1 models has been updated to accommodate new versions of some key components. This has been required to address global supply constraints on some integrated circuits. Because of this, the ability to downgrade to earlier versions of the Printer OS has been restricted. Please see item 4 in the FAQ, below.
2. The self-adjusting media sensor is no longer available on new models of the ZT6x0. On those models, the only possible value for SGD `"sensor.self_adjusting_enable"` is `"no"`.

Frequently Asked Questions

1. “Why should I upgrade to v6.7?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.6 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 v6.7?”

   Link-OS v6.7 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.7 cost?”

   Link-OS v6.7 is a free upgrade.

4. “As of Link-OS v6.7, Industrial and Desktop printers can’t be downgraded to versions earlier than v.6.6. 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 v6.7 and later printer Operating System releases but will not be back-compatible with earlier Link-OS versions.

   To ensure compatibility between these new components and the printer's operating systems, the Desktop printer models ZD220, ZD230, ZD888, (OS Branch V89) and ZD421C, ZD421D, ZD421T, ZD621D and ZD621T (OS Branch V93) that are already running v6.7 or later will not support downgrading to printer's OS versions earlier than v6.7. ZT5x0 and ZT6x0 printers (OS Branch V80) that are running this release of v6.7 (V80.21.28Z) cannot downgrade to any earlier version of the OS for the same reason. Also, ZT4x1 printers running this release of v6.7 (V92.21.17Z) cannot downgrade to any earlier version of the OS.

   When and if an attempt is made to downgrade from v6.7 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 v6.7 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 LEDs 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.

5. “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 LEDs 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

None

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.
- Support for Dynamic WEP Wi-Fi securities will be removed in a future version of Link-OS.

Link-OS v6.7 Release 2

Release Date: 30 June 2022

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZT510 ZT610 ZT620	V80.	20.27Z

Changes

1. Printers using this version of OS cannot be downgraded to earlier releases. Please see section 4 of the Frequently Asked Questions.
2. The self-adjusting media sensor is no longer available on new models of the ZT610/ZT620. On those models, the only possible value for `"sensor.self_adjusting_enable"` is `"no"`.

Frequently Asked Questions

1. “Why should I upgrade to v6.7?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.6 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 v6.7?”

   Link-OS v6.7 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.7 cost?”

   Link-OS v6.7 is a free upgrade.

4. “As of Link-OS v6.7, Industrial and Desktop printers can’t be downgraded to versions earlier than v.6.6. 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 v6.7 and later printer Operating System releases but will not be back-compatible with earlier Link-OS versions.

   To ensure compatibility between these new components and the printer's operating systems, the Desktop printer models ZD220, ZD230, ZD888, (OS Branch V89) and ZD421C, ZD421D, ZD421T, ZD621D and ZD621T (OS Branch V93) that are already running v6.7 or later will not support downgrading to printer's OS versions earlier than v6.7. Also, ZT510 and ZT610/ZT620 printers (OS Branch V80) that are running this release of v6.7 (V80.21.27Z) cannot downgrade to any earlier version of the OS for the same reason.

   When and if an attempt is made to downgrade from v6.7 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 v6.7 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 LEDs 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.

5. “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 LEDs 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

None

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.
- Support for Dynamic WEP Wi-Fi securities will be removed in a future version of Link-OS.

Link-OS v6.7

Release Date: 24 June 2022

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZT210 ZT220 ZT230	V72.	20.25Z
ZT510 ZT610 ZT620	V80.	20.25Z
ZQ310 ZQ320	V81.	20.25Z
ZR318 ZR328	V82.	20.25Z
ZD510	V83.	20.25Z
ZQ610 ZQ620 ZQ630	V85.	20.25Z

Printer Models	OS Branch	Build
ZR658 ZR668	V86.	20.25Z
ZD220 ZD230 ZD888	V89.	21.16Z
ZQ511 ZQ521	V91.	21.16Z
ZT411 ZT421	V92.	21.16Z
ZD421C ZD421D ZD421T ZD621D ZD621T	V93.	21.16Z
ZE511 ZE521	V94.	21.16Z
ZT111 ZT211 ZT231	V97.	21.16Z

Changes

1. The Link-OS version number is now v6.7.
2. MQTT communication protocol is now incorporated into Link-OS. MQTT is not available in Link-OS Basic printers, which in this release includes ZD220, ZD230, ZD888, ZT111, and ZT221. MQTT is also not available in the ZT210, ZT220, or ZT230 models.
3. As the ZT231 now has a movable transmissive sensor, the default sensor for gap media has been changed to the transmissive sensor.
4. Security for the printer web page settings pages has been improved by replacing the previous 4-digit password (set by the `^KP` command) with a username and alphanumeric password. The username is set using the "`ip.http.admin_name`" SGD, and the password is set using the "`ip.http.admin_password`" SGD. See the Zebra Programming Guide, available on Zebra.com, for more information about using these SGD commands.
5. A new parameter has been added to `^LL` that allows the defined label length to be applied to gap or mark media. Previously, the label length that is defined by using `^LL` only applied when using continuous media; gap or mark media used the label length measured during calibration. The command is now:

   ```
   ^LLy,x
   ```

   where "y" is the length of the label and "x" defines the media to which that length applies - "x" can be "N" or "Y". The default is "N", which means the length applies only to continuous media. Setting this parameter to "Y" means that the defined label length will also apply to gap or mark media. The value of "x" applies for all formats until it is changed.

   An alternate way of setting the "x" parameter is to use the new SGD "`zpl.label_length_always`". This SGD has values "`no`" and "`yes`" with the default being "`no`", and the effect is the same as setting the corresponding value with the `^LL` command.

   An example usage would be:

   ```
   ! U1 setvar "zpl.label_length_always" "no"
   ```

6. SGDs have been added to Link-OS to allow MQTT to be controlled and configured. There are two separate MQTT communication channels with SGDs for each one. In the below descriptions, where the name of the SGD starts with "`mqtt.connX`", the "`X`" can be either "`1`" or "`2`" representing two SGDs, one for each channel. In cases where the SGD starts with "`mqtt`." but there is no "`connX`", then the SGD applies to both channels.

   A brief description of each of these new SGDs will be given below. For full details, please see the latest Zebra Programming Guide, available on Zebra.com.

   a. "`mqtt.enable`"

   Controls if the MQTT system is running or not. Possible values are "`on`" and "`off`" and the default is "`off`". Example:

   ```
   ! U1 setvar "mqtt.enable" "on"
   ```

   b. "`mqtt.restore_defaults`"

   This will reset all the MQTT SGDs to their factory defaults without changing any other settings. No value is needed. Example:

   ```
   ! U1 setvar "mqtt.restore_defaults" ""
   ```

c. "mqtt.connX.server_address"

Assigns the URL of the server for this connection. The value is a character string of up to 2048 characters. There is no default. Example:

```
! U1 setvar "mqtt.conn1.server_address" "mqtts://myserver.cloud.com:8883"
```

d. "mqtt.connX.tenant_id"

Assigns the MQTT client tenant ID. The value is a character string of up to 64 characters but cannot include "+#/$". The default value is "zebra". Example:

```
! U1 setvar "mqtt.conn1.tenant_id" "zebra"
```

e. "mqtt.connX.username"

This specifies the username for the MQTT broker in use. The broker may require a username, a username and password, or both. The value is a character string of up to 64 characters. The default value is "". Example:

```
! U1 setvar "mqtt.conn1.username" "myname"
```

f. "mqtt.connX.password"

This specifies the password for the MQTT broker in use. The broker may require a username, a username and password, or both. The value is a character string of up to 64 characters. The default value is "". Example:

```
! U1 setvar "mqtt.conn1.password" "mypassword"
```

g. "mqtt.connX.retry_interval_random_max"

This specifies the maximum random retry interval to attempt connection to an MQTT broker in case the connection is lost. The value is a number in seconds between 1 and 600. The default value is "120". Example:

```
! U1 setvar "mqtt.conn1.retry_interval_random_max" "10"
```

h. "mqtt.connX.ping_interval"

When no traffic is being sent, the MQTT channel sends ping packets to keep the connection open. This specifies the interval between packets. The value is a number in seconds between 1 and 300. The default value is "30". Example:

```
! U1 setvar "mqtt.conn1.ping_interval" "15"
```

i. "mqtt.connX.reset_now"

This command tells the printer to reset the MQTT connection. This is needed to apply any changes to settings that have been made. No value is needed. Example:

```
! U1 setvar "mqtt.conn1.reset_now" ""
```

j. "mqtt.connX.reset_required"

When an MQTT setting is changed, a reset is needed to apply that change. This SGD returns a value indicating if a setting has changed and therefore a reset is required. This is a getvar only, with possible return values of "yes" and "no". Example:

```
! U1 getvar "mqtt.conn1.reset_required"
```

k. "mqtt.connX.clean_session_flag"

This command tells the broker whether or not to start a new session as clean, removing any pending messages from a previous session, or not. Possible values are "on" and "off" and the default is "off". Example:

```
! U1 setvar "mqtt.conn1.clean_session_flag" "on"
```

l. "mqtt.logging.entries"

This command retrieves the log entries that are generated by the MQTT system. This is a getvar only, with possible return values of "yes" and "no". Example:

```
! U1 getvar "mqtt.conn1.logging.entries"
```

Here is an example of a log entry:

```
"[07-12-2021 21:31:29.733][Info][0000100F][mqtt1] Waiting 2 seconds"
```

m. "mqtt.logging.max_entries"

This sets the maximum number of log entries that will be recorded before the least-recently-logged entry is removed. The value is the number of entries between 0 and 10000. The default value is "500". Setting this to 0 disables adding entries to the MQTT log, though they will still be added to syslog. Example:

```
! U1 setvar "mqtt.conn1.logging.max_entries" "250"
```

n. "mqtt.logging.clear"

This immediately clears the MQTT application log. Syslog is not affected. No value is needed. Example:

```
! U1 setvar "mqtt.conn1.logging.clear" ""
```

o. "ip.firewall.authentication.entries"

This lists the server names added to the authentication entries list. Only the server names will be shown. The username and passwords will not be shown. This is a getvar only. Example:

```
! U1 getvar "ip.firewall.authentication.entries"
```

p. "ip.firewall.authentication.add"

This adds a single server/username/password triplet into the list of authentication entries. This authentication entry is applied before making an outgoing HTTP/HTTPs connection in case the printer must go through an authentication server beforehand. The username and password are optional, as required by the server, but if present must be preceded by a single space character, not a tab or other whitespace. The value is a character string of up to 2048 characters. There is no default. Example:

```
! U1 setvar "ip.firewall.authentication.add" "myfirewall.com myname mypass"
```

q. "ip.firewall.authentication.remove"

This removes a single server/username/password triplet from the list of authentication entries. To remove an entry only the server name is supplied. The value is a character string of up to 2048 characters. There is no default. Example:

```
! U1 setvar "ip.firewall.authentication.remove" "myfirewall.com"
```

r. "device.zuid"

This generates and returns a guaranteed unique identifier for the printer. This identifier will not change unless the printer is decommissioned. This is a getvar only. The value is returned as a character string. Example:

```
! U1 getvar "device.zuid"
```

s. "alerts.send_current_status_alerts"

This generates an alert corresponding to the current printer condition for each configured alert for the given destination. The possible destinations are the same as used by "alerts.destinations". Example:

```
! U1 setvar "alerts.send_current_status_alerts" "SERIAL"
```

7. A new Alerts destination has been added to the possible destinations as defined in "`alerts.destinations`". This new destination is "`MQTT`".

Frequently Asked Questions

1. “Why should I upgrade to v6.7?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.6 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 v6.7?”

   Link-OS v6.7 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.7 cost?”

   Link-OS v6.7 is a free upgrade.

4. “As of Link-OS v6.7, Industrial and Desktop printers can’t be downgraded to versions earlier than v.6.6. 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 v6.7 and later printer Operating System releases but will not be back-compatible with earlier Link-OS versions.

   To ensure compatibility between these new components and the printer's operating systems, the Desktop printer models ZD220, ZD230, ZD888, (OS Branch V89) and ZD421C, ZD421D, ZD421T, ZD621D and ZD621T (OS Branch V93) that are already running v6.7 or later will not support downgrading to printer OS versions earlier than v6.7.

   When and if an attempt is made to downgrade from v6.7 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 v6.7 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 LEDs 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.

5. “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 LEDs 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. Wi-Fi communication no longer needs to be disabled to allow stable Bluetooth connections from iOS devices.
2. USB communication no longer randomly fails on ZD4x1/6x1 printers that do not have a serial option card.
3. Bluetooth transmission delays will no longer occur when Wi-Fi is disabled, or a mobile printer is docked.
4. Parallel port flow control can no longer inadvertently cause to parallel port to be disabled.
5. Authentication on 802.11x with an Aruba switch now works correctly on ZD4x1/6x1 printers.
6. Very large multipage PDF files are now handled correctly without skipping labels.
7. The Reprint signal will no longer act as the Print signal on a ZE5x1 after powerup.
8. Japanese text no longer overlaps on the Manual Calibration start screen on Color Touch Front Panels.
9. The parallel port no longer initializes incorrectly in certain circumstances, causing the external printer server to malfunction.
10. `SendFileToPrint` can now be used when an Emulation is active.
11. The print system now correctly handles any print width change between labels.
12. The OS now properly handles downloading firmware from the wrong OS branch using Mirror.
13. `^HZA` now returns the correct value for `NON-RESET-COUNTER` for large values.
14. Sending data via LPD (port 515) now works correctly when using an Emulation.
15. The SGD "`ezpl.label_length_max`" now correctly defaults to 15 on ZD220/230/888 printers.
16. Printing on ZE5x1 300 dpi printers has been improved to remove the possibility of a small vertical print truncation.

Security Related Items

1. A problem with the OS memory allocation system that could potentially be used to create a Denial of Service attack has been removed. This fix addresses CVE-2021-22156.

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.
- A new means of defining an internet firewall proxy that would apply to all Ethernet and WLAN connections will be added in a future version of Link-OS. The settings used will be `ip.firewall.proxy`, `ip.firewall.authentication.add`, `ip.firewall.authentication.entries`, and `ip.firewall.authentication.remove`.
- Support for Dynamic WEP Wi-Fi securities will be removed in a future version of Link-OS.

Link-OS v6.6 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v6.6 Release 2

Release Date: 1 April 2022

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZD421C ZD421D ZD421T ZD621D ZD621T	V93.	21.12Z

Changes

Printers using this version of OS cannot be downgraded to earlier releases. Please see section 4 of the Frequently Asked Questions.

Frequently Asked Questions

1. “Why should I upgrade to v6.6?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.6 contains 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 v6.6?”

   Link-OS v6.6 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.6 cost?”

   Link-OS v6.6 is a free upgrade.

4. “As of Link-OS v6.6 Release 2 (V93.21.12Z), Desktop printers can’t be downgraded to versions earlier than v.6.6 Release 2. 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 v6.6 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 V93.21.12Z or later will not support downgrading to printer OS versions earlier than that build.

   When and if an attempt is made to downgrade from this build 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 OS that was on the printer at the time of download. 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 LEDs 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.
   - 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. The printer will no longer occasionally have a motor stall during a calibration after power up.
2. When the Head Close Action is set to Feed, the printer will correctly maintain calibration if the media is changed to another media with a different length.

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.
- A new means of defining an internet firewall proxy that would apply to all Ethernet and WLAN connections will be added in a future version of Link-OS. The settings used will be `ip.firewall.proxy`, `ip.firewall.authentication.add`, `ip.firewall.authentication.entries`, and `ip.firewall.authentication.remove`.

Link-OS v6.6

Release Date: 4 February 2022

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZT210 ZT220 ZT230	V72.	20.24Z
ZT510 ZT610 ZT620	V80.	20.24Z
ZQ310 ZQ320	V81.	20.24Z
ZR318 ZR328	V82.	20.24Z
ZD510	V83.	20.24Z
ZQ610 ZQ620 ZQ630	V85.	20.24Z

Printer Models	OS Branch	Build
ZR658 ZR668	V86.	20.24Z
ZD220 ZD230 ZD888	V89.	21.11Z
ZQ511 ZQ521	V91.	21.11Z
ZT411 ZT421	V92.	21.11Z
ZD421C ZD421D ZD421T ZD621D ZD621T	V93.	21.11Z
ZE511 ZE521	V94.	21.11Z

Changes

1. The Link-OS version number is now v6.6.
2. The Datamax emulation is now incorporated into the standard Printer OS and is always available to be selected, except for the ZT2x0, ZD2x0 and ZD888 printer models. The Datamax emulation is not included in the OS for those printers.
3. The Intermec emulation is now incorporated into the standard Printer OS and is always available to be selected, except for the ZT2x0, ZD2x0 and ZD888 printer models. The Intermec emulation is not included in the OS for those printers.
4. Terminology on the Front Panel and 2Key report dealing with Bluetooth connections has been updated to conform to industry standards.
5. The username parameter for WiFi securities now allows up to 64 characters.
6. GS1 type QR barcodes can now be created by specifying the FNC1 code at the beginning of the data. This is done by using >8 as the first data after the `^FD` command.
7. The JSON used to configure subjectAltName SAN fields has been extended to include supporting other additional types including UPN. Additional details will be published in the Printer Administration Guide.ug

8. A new `bluetooth.disconnect_idle_link` Set-Get-Do command has been added to all printer models that have a Bluetooth capability. This SGD controls the way in which the printer closes Bluetooth connections. Accepted values are "yes" and "no" with the default value of "yes" keeping previous functionality. Changing the setting to "no" will cause the printer to leave the connection open until it is explicitly closed by the other device. Setting this to "no" may increase throughput when using Bluetooth to connect to a Windows computer. An example usage would be:

   ```
   ! U1 setvar "bluetooth.disconnect_idle_link" "no"
   ```

9. A new `bluetooth.sniff_mode_enable` Set-Get-Do command has been added to all printer models that have a Bluetooth capability. This SGD allows a Bluetooth connectivity option known as "sniff mode" to be disabled. Accepted values are "enabled" and "disabled" with the default value of "enabled" keeping previous functionality. Changing the setting to "disabled" will turn off "sniff mode", which will allow better connectivity to newer iOSTM based products such as the iPhone® 12. An example usage would be:

   ```
   ! U1 setvar "bluetooth.sniff_mode_enable" "disabled"
   ```

10. Firmware Download recovery has been improved on ZT4x1, ZD4x1, ZD6x1, and ZE5x1 printers. In some circumstances, such as when a firmware file intended for a different model is sent to the printer, the OS will recover without rebooting. That circumstance will be indicated by the Status LED blinking red for 5 seconds.

Frequently Asked Questions

1. “Why should I upgrade to v6.6?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.6 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 v6.6?”

   Link-OS v6.6 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.6 cost?”

   Link-OS v6.6 is a free upgrade.

4. “As of Link-OS v6.6, Industrial and Desktop printers can’t be downgraded to versions earlier than v.6.6. 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 v6.6 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 v6.6 or later will not support downgrading to printer’s OS versions earlier than v6.6.

   When and if an attempt is made to downgrade from v6.6 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 v6.6 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 LEDs 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. ZD4x1/ZD6x1 printers will now print correctly when using a ZD-Series battery pack.
2. Max Label Length is now correctly saved across a power cycle.
3. On the ZE5x1, the Applicator End Print signal is now correctly set to inactive when the printer enters an error state.
4. On the ZE5x1, the Service light and associated Service Required signal now operates correctly after closing cover and taking the printer out of Pause.
5. On the ZE5x1, the Applicator End Print signal now works correctly when feeding labels in Mode 2.
6. ZD4x1/ZD6x1 printers will no longer display an "Unsupported USB Host Device" error when using a ZD-Series battery pack.
7. Values can now be correctly retrieving from MIB branch zbrTrackedAlertsTable after entries in that table are cleared.
8. The Front Panel batch counter now continues to function correctly after a label is canceled.
9. On ZT4x1 printers the Cover Open light now correctly behaves according to the setting of the SGD `device.light.cover_open_brightness`.
10. When using Print Station on printers with the Color Touch Front Panel, the previous value entered for a field will be cleared when new data is entered for the next label.
11. On ZT4x1, ZD4x1, ZD6x1, and ZE5x1 printers, the USB Host data port now works consistently with a wider range of USB HID devices
12. The `^MPW` command now correctly disables the Pause button in all circumstances.
13. ZQ521 will now print at the correct darkness in low battery conditions.
14. When the FEED key is pressed, the printer will now correctly feed only one label with any combination of settings.
15. Mirror Feedback now returns the correct information for `ip.ntp.log`.

16. The SGD `usb.mirror.error_retry` now correctly specifies the number of times the USB Mirror system will attempt to retry the mirror operation if an error occurs.
17. `^MC` command processing has been improved on the ZE5x1 so it now works correctly with any setting value for backfeed.
18. On the ZD421C printer, a “Ribbon In” error is only reported when a ribbon cartridge is present and the printer is in Direct Thermal mode.
19. On desktop printers, the Ethernet status LED that is part of the Ethernet cable socket now correctly shows as off when there is no Ethernet link.
20. Resettable Counters 1 and 2 and the EPL Head Usage counter are now correctly not modified when a `^JUF` command (or EPL `^default` command) is processed.
21. Labels are now printed correctly for all combinations of `^JM` and `~JS`.

Security Related Items

1. The Wi-Fi security vulnerabilities known as FragAttack that Link-OS was subject to have been fixed.

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.
- A new means of defining an internet firewall proxy that would apply to all Ethernet and WLAN connections will be added in a future version of Link-OS. The settings used will be `ip.firewall.proxy`, `ip.firewall.authentication.add`, `ip.firewall.authentication.entries`, and `ip.firewall.authentication.remove`.

Link-OS v6.5 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v6.5

Release Date: 19 November 2021

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZT411 ZT421	V92.	10.10Z

Frequently Asked Questions:

1. "Why should I upgrade to v6.5?"

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.5 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 v6.5?"

   Link-OS v6.5 can be downloaded from the Zebra web site by using the link below and entering your printer's model name (such as "ZT411" or "ZQ620").
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. "What does Link-OS v6.5 cost?"

   Link-OS v6.5 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 LEDs 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. The Printhead Element Out test now works correctly on the ZT4x1 printer family.

Link-OS v6.4 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v6.4

Release Date: 3 September 2021

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZT210 ZT220 ZT230	V72.	20.23Z
ZD500	V74.	20.23Z
ZT510 ZT610 ZT620	V80.	20.23Z
ZQ310 ZQ320	V81.	20.23Z
ZR318 ZR328	V82.	20.23Z
ZD510	V83.	20.23Z
ZD410D ZD420C ZD420D ZD420T ZD620D ZD620T	V84.	20.23Z

Printer Models	OS Branch	Build
ZQ610 ZQ620 ZQ630	V85.	20.23Z
ZR658 ZR668	V86.	20.23Z
ZD220 ZD230 ZD888	V89.	21.10Z
ZQ511 ZQ521	V91.	21.09Z
ZT411 ZT421	V92.	21.09Z
ZD421C ZD421D ZD421T ZD621D ZD621T	V93.	21.09Z
ZE511 ZE521	V94.	21.09Z

Changes

1. The Link-OS version number is now v6.4.
2. The Monarch®, Sato©, and ESC-POS© 200 dpi emulations will now be preloaded into the printer as new printers are manufactured, with the exception of the ZT2x0 and ZR3x8 due to memory constraints. The emulations will also continue to be available on zebra.com for download and use (only on printers that have been updated to Link-OS v6.4).
3. The term “Virtual Device” has been replaced with the term “Emulation.”
4. Command Language can now be changed from the Color Touch Front Panel. It is located under Program Language in the System menu.
5. Backfeed can now be changed from the Color Touch Front. It is located under Image Adjust in the Print menu.
6. The Sato emulation now supports graphic rotation using the <ESC>% command.
7. The SGDs `weblink.ip.conn1` and `weblink.ip.conn2` can no longer be set to the same location.
8. The RFID Void pattern has been improved for readability.
9. The Batch Counter display on the Color Touch Front Panel has been improved to add the total number of labels being printed.
10. A new `print.xi_compatibility_adjust` Set-Get-Do command has been added to the ZT5xx and ZT6xx printer models, which will enable the user to proportionately decrease the length of a printed label. The range of values is from 96.0 to 100.0 with a default value of 100.0. The setting will not be changed by defaulting the printer. An example usage would be:

    ```
    ! U1 setvar "print.xi_compatibility_adjust" "98.6"
    ```

Frequently Asked Questions:

1. “Why should I upgrade to v6.4?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.4 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 v6.4?”

   Link-OS v6.4 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.4 cost?”

   Link-OS v6.4 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 LEDs 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. Holding the Feed button for 7 seconds or more now correctly places the Bluetooth radio in discovery mode.
2. Turning off WLAN no longer disables the Bluetooth radio.
3. The "`power.energy_star.enable`", "`power.energy_star.timeout`" and "`power.energy_star.active`" SGDs now function correctly on ZD4x0/ZD6x0 printers.
4. When using EPL stored forms, all of the previous label image will now be cleared properly.
5. Setting the IP protocol to Permanent on the printer's web page no longer resets the gateway to all zeros.
6. In some circumstance when using RFID TID serialization, duplicate serial numbers could be created. This has been corrected.
7. The EPL Black Mark command (part of the Q command) now correctly changes the value of the SGD media.tof.
8. Mirror now correctly authenticates with AIX SFTP servers when using keyboard interactive mode.
9. The ribbon cartridge on a ZD420c now correctly authenticates when using WLAN EAP-TLS security.
10. An interaction between LPR printing and ZBI that was causing some labels to not be printed has been corrected.
11. The value returned by the EPL `^ee` command when printing in peel mode has been corrected to be backward compatible.
12. Setting the SGD "`device.sensor_profile`" to the value "`reply`" now works correctly.
13. Tear off on 600 dpi ZT600 printers has been corrected to be backward compatible.
14. The ZBI system has been optimized to ensure that data is received properly.
15. The printer web page format preview feature has been enhanced to handle large formats.

16. Any ZBI program can now be selected for execution from the Color Touch Front Panel when more than one is present.
17. When printing on a ZT6x0 printer in rewind mode, only one label will now be fed per press of the Feed button.
18. Media Out condition on ZD4x0/ZD6x0 printers has been corrected to be backward compatible.
19. The calibrated media type is now correctly saved when using the two key (PAUSE + CANCEL) calibration method.
20. The SGD "`ip.dhcp.vendor_class_id`" now correctly saves its value when set.
21. On ZQ5x1 printers, when connected via USB, the printer Emulation setting is now properly maintained across a power cycle.
22. The SNMP table zebra.zbrSupplies.zbrSuppliesRibbonCartTable now correctly saves its values.
23. WLAN now correctly handles the situation when the connection is closed due to wlan.timeout.value expiring and only a partial format has been received.
24. The printer now correctly manages very short connection/disconnect events when large numbers of TCP/IP port 9100 connection attempts are made.
25. The battery charging process on ZQ5x1 and ZQ6x0 printers has been optimized.
26. Large numbers of repeated requests on certain SNMP OIDS now function correctly.
27. A WPA PSK passkey entered as a string on the Color Touch Front Panel is now correctly converted to a PSK key per RFC2898.
28. WLAN process synchronization has been improved to prevent a situation where DHCP requests could be ignored.
29. Serial Communication settings that are set with ^SC are now properly saved when a ^JUS is used.
30. Serial Communication settings set with the printer web pages are now correctly saved.
31. On 600 dpi printers, print images with data on the very first dot row no longer create extra wear on the print head.
32. The ZQ6x0 series quad bay sustains battery temperature during charging.
33. USB Host is now compatible with additional USB scanners and keyboards.
34. ZD220/ZD230 now correctly senses and reports Ribbon Out.

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.
- A new means of defining an internet firewall proxy that would apply to all Ethernet and WLAN connections will be added in a future version of Link-OS. The settings used will be `ip.firewall.proxy`, `ip.firewall.authentication.add`, `ip.firewall.authentication.entries`, and `ip.firewall.authentication.remove`.

Link-OS v6.3 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v6.3 Release 2

Release Date: 1 September 2022

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZQ510 ZQ520	V76.	20.23Z

Changes

1. Security for the printer web page settings pages has been improved by replacing the previous 4-digit password (set by the `^KP` command) with a username and alphanumeric password. The username is set using the "`ip.http.admin_name`" SGD, and the password is set using the "`ip.http.admin_password`" SGD.

   See the Zebra Programming Guide, available on zebra.com, for more information about using these SGD commands.

Frequently Asked Questions:

1. “Why should I upgrade to v6.3?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.3 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 v6.3?”

   Link-OS v6.3 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.3 cost?”

   Link-OS v6.3 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 LEDs 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. A problem with the OS memory allocation system that could potentially be used to create a Denial of Service attack has been removed. This fix addresses CVE-2021-22156.
2. The Wi-Fi radio vulnerability known as FragAttack has been removed. This fix addresses CVE-2020-24588, CVE-2020-26146, CVE-2020-26147, CVE-2020-26140 and CVE-2020-26143.
3. Portions of the printer's web pages can no longer be accessed without entering the password.
4. Printhead Element Out Test now works correctly in all cases.

Link-OS v6.3

Release Date: 31 August 2020

Applies to the following Link-OS printer models:

Printer Models	OS Branch	Build
ZT210 ZT220 ZT230	V72.	20.22Z
ZD500	V74.	20.22Z
ZQ510 ZQ520	V76.	20.22Z
ZT510 ZT610 ZT620	V80.	20.22Z
ZQ310 ZQ320	V81.	20.22Z
ZR318 ZR328	V82.	20.22Z
ZD510	V83.	20.22Z

Printer Models	OS Branch	Build
ZD410D ZD420C ZD420D ZD420T ZD620D ZD620T	V84.	20.22Z
ZQ610 ZQ620 ZQ630	V85.	20.22Z
ZR658 ZR668	V86.	20.22Z
ZD220 ZD230 ZD888	V89.	21.05Z
ZQ511 ZQ521	V91.	21.05Z
ZT411 ZT421	V92.	21.05Z

Changes

1. The Link-OS version number is now v6.3.
2. The PDF Direct emulation, which was previously a paid option, will be no charge as of this release. The emulation will be preloaded into the printer as new printers are manufactured. The emulation will also be available on zebra.com for download and use (only on printers that have been updated to Link-OS v6.3).
3. Link-OS v6.3 uses an improved method to control low-battery behavior. This method delivers more consistent image quality when printing large amounts of black and when printing in low temperatures. This method also has the benefit of improving battery charging reliability and avoiding premature printer shutdown. We recommend users experiencing an inability to charge their battery or earlier than expected printer shutdown events, update their printers to Link-OS v6.3.
4. A new "`device.reset_button_enable`" Set-Get-Do command has been added to the ZD4, ZD6 and ZD888 printer models, which will enable the user to disable the physical reset button. The default for the command will be "on", users can choose to set it to "off". The setting will not be changed by defaulting the printer.
5. The SGD command "`internal_wired.8021x.security`" is now included in the list of commands covered by Protected Mode.

6. The RFID encoding system in the ZT610R is certified for use in Cambodia, Myanmar, Pakistan, & Ethiopia
7. The SNMP system will now log Alert Clear events. The MIB file has been updated and will be posted along with this new release.

Frequently Asked Questions:

1. “Why should I upgrade to v6.3?”

   Zebra continually revises and adapts our printer operating system to keep it current with the latest technology trends and best practices. Version 6.3 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 v6.3?”

   Link-OS v6.3 can be downloaded from the Zebra web site by using the link below and entering your printer’s model name (such as “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.html

3. “What does Link-OS v6.3 cost?”

   Link-OS v6.3 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 LEDs 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. Charging management for extended battery pack used on the ZQ511, ZQ521, and ZQ600 series printers has been updated to extend battery health over time.
2. Support for Fast BSS Transition (802.11r) has been improved.
3. The Wi-Fi system has been enhanced to ensure DHCP generated addresses are maintained over link loss events.
4. The ZQ600 series has been enhanced to better support Wi-Fi roaming events.
5. The TCP connection system has been enhanced to properly handle, in all cases, connection requests when the number of open connections is at the maximum limit.
6. An issue where the CPCL Font 7 printed an empty space after a 0xD6 character has been corrected.
7. It is now possible to encode a serial number in a DataMatrix barcode when the serial number ends in “00”'.
8. GS1 Application Identifier encoding in DataMatrix barcodes has been corrected.
9. The ZBI system has been enhanced to ensure that Bluetooth will reconnect after the Bluetooth connection is closed and a reconnection request occurs.
10. JSON responses for battery status information have been corrected so that software applications can correctly retrieve information.
11. The Sleep system on the ZD620 has been enhanced to protect against print job loss when the printer is entering sleep mode.
12. The Bluetooth Mode name has been changed to “Client”.

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 v6.2 Release Notes

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

For support, please visit zebra.com/support.

Link-OS v6.2

Release Date: 03 March 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,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 reenabled 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 6.1 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 v6.2?”

   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 “ZT411” or “ZQ620”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.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 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 LEDs 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 zebra.com/support.

Link-OS v6.1

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 toal 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 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”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.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 LEDs 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. Seethe following link for more details:

  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 zebra.com/support.

Link-OS v6.0

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	V84	.18
ZD420T ZD620D		.18
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”).
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.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 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 LEDs on the printer will behave in the following way – 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. 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 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 zebra.com/support.

Version Number: V85.20.16 (Based on Link-OS v5.2) 115
Build Number: 20.16Z 115
Build Number: 20.15Z 116

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").
   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:
   zebra.com/us/en/support-downloads/software/printer-software/zdownloader.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 zebra.com/support.

Link-OS 5 119
V68.20.10Z 119
Link-OS 4 123
V68.20.01ZB 123
V68.20.01Z 123
V68.19.15Z 128
V68.19.13Z 128
V68.19.10Z 131
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Link-OS 2 136
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Link-OS 1 138
V68.19.4Z 138
V68.19.2Z 139
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V68.16.1ZA 153
V68.16.1Z 154
V68.16.0Z 154

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 “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
  - OpenSLL 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
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 *auto-confirm* 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 *auto-confirm* 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 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 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 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
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

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 `zpl.zpl_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 `zpl.label_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: 31August 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.

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 throughoput 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 `"epl_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 `"epl_zpl"` and `"epl"`.
  - The printer defaults to `"hybrid_xml_zpl"` for the device.languages setting on QLn 220, QLn 320, QLn420 units, and to `"epl_zpl"` 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-xxNxx**M**xx-xx and Qxx-xxCxx**M**xx-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:

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

display.root_wml	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"
ip.tcp.nagle_algorithm	Controls the Nagle algorithm. Default: "enable" See RFC 896 for further details: http://tools.ietf.org/html/rfc896
power.inactivity_timeout	Now supports "up" and "down" values, for use in menus.
wlan.poor_signal_threshold	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 re- lease 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:
- 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.
  - ^IF - change current working folder
  - ^MA - Set Maintenance Alerts
  - ^MP - Mode Protection
  - ^MW - Modify Heading Warning
  - ^NT - SMTP zpl command
  - ^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 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
- OpenSLL 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 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 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_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

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 `zpl.zpl_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 `zpl.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.

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.avalance.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

Status of Printer as Shown by Indicator Lights:  **ZT230 Error Message:** PH NOT AUTHENTICATED REPLACE PRINTHEAD	**STATUS light steady red** **PAUSE light steady red** **DATA light steady red** The printhead was replaced with one that is not a genuine Zebra printhead. Install a genuine Zebra printhead to continue.

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 ~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
- 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.epl_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.epl_legacy_mode" "2746e"
! U1 setvar "device.epl_legacy_mode" "print_orientation"
```

- The SGD command `"device.languages"` now supports `"zpl", "hybrid_xml_zpl", "epl"` and `"epl_zpl"`. The default on ZT200 series printers is now `"epl_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 zebra.com.

- The printer now supports a SNMP MIB. This is available for download at 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:

- comm.halt
- comm.handshake
- device.cutter_installed
- device.ff_disable
- netmanage.avalanche.agent_addr
- netmanage.avalanche.available_agent
- netmanage.avalanche.available_port
- netmanage.avalanche.encryption_type

- 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 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
- OpenSLL 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 *auto-confirm* 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 *auto-confirm* 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 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 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_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

- 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 `zpl.zpl_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 `zpl.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.

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 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 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.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.

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 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
- OpenSLL 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 *auto-confirm* 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 *auto-confirm* 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 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 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 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_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.
- 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 `zpl.zpl_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 `zpl.label_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.

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 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"`).

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 zebra.com/support.

Link-OS 5 202
V75.20.10Z 202
Link-OS 4 206
V75.20.01ZB 206
V75.20.01Z 206
Link-OS 3 211
V75.19.15Z 211
V75.19.13Z 211
V75.19.10Z 212
V75.19.7Z 213

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
- OpenSLL 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 *auto-confirm* 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 *auto-confirm* 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 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 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 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_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 `zpl.zpl_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 `zpl.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.

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 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").
- 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® 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 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
- OpenSLL 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 *auto-confirm* 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 *auto-confirm* 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 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 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_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.
- 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 `zpl.zpl_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 `zpl.label_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.

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 zebra.com/support.

Link-OS 5 227
V78.20.10Z 227
Link-OS 4 231
V78.20.01ZB 231
V78.20.01Z 231
Link-OS 3 235
V78.19.15Z 235
V78.19.12Z 235

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
- OpenSLL 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 *auto-confirm* 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 *auto-confirm* 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 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 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_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

- 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 `zpl.zpl_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 `zpl.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 zebra.com/support.

Link-OS 5

Link-OS 5 236
V79.20.10Z 236
Link-OS 4 240
V79.20.01ZB 240
V79.20.01Z 240
Link-OS 3 245
V79.19.15Z 245
V79.19.12Z 245

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
- OpenSLL 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 *auto-confirm* 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 *auto-confirm* 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 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 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_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

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 `zpl.zpl_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 `zpl.label_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 zebra.com/support.

Link-OS 5 246
V80.20.10Z 246
Link-OS 4 250
V80.20.09Z 250
V80.20.06ZB 250
V80.20.04Z 250
V80.20.03Z 251

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
- OpenSLL 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 *auto-confirm* 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 *auto-confirm* 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 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 zebra.com/support.

Link-OS 5 252
V81.20.10Z 252
Link-OS 4 256
V81.20.06ZB 256
V81.20.06Z 256

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
- OpenSLL 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 *auto-confirm* 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 *auto-confirm* 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 zebra.com/support.

Link-OS 5 257
V82.20.10Z 257
Link-OS 4 261
V82.20.06ZB 261
V82.20.06Z 261

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
- OpenSLL 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 *auto-confirm* 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 *auto-confirm* 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 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
- OpenSLL 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 *auto-confirm* 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 *auto-confirm* 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 krackattacks.com/

Zebra maintains a website with details on this issue at:
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 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 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 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 `zpl.zpl_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 `zpl.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.

V93 Printer OS Release Notes

V93.21.06Z

Release Date: 23 December 2020

This Printer OS release is for use with the following printer models:

- ZD421, ZD421d, ZD421t
- ZD621d, ZD621t

Changes

- Initial release.

V94 Printer OS Release Notes

V94.21.08Z

Release Date: 3 March 2021

This Printer OS release is for use with the following printer models:

- ZE511
- ZE521

Changes

- No changes.

Issues Corrected

- Throughput improved when in Tear Off mode.

V94.21.07Z

Release Date: 18 February 2021

This Printer OS release is for use with the following printer models:

- ZE511
- ZE521

Changes

- Initial release.