



Link-OS V5, build V74.20.10Z

Printer OS Release Notes

This document summarizes the following printer OS releases. For support, please visit www.zebra.com/support.

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Link-OS 5

V74.20.10Z

Release Date: 22 January 2018

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

- ZD500
- ZD500R

Changes

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

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

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

SGD Value	I/O Capabilities	Affect on LE
print (default)	Display Only	If Passkey Pairing is used, the printer will print out a small label with the passkey to be entered on the remote device. If LE Numeric Comparison is used, the printer will print out the passkey and will 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

V74.20.01ZB

Release Date: 01 November 2017

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

- ZD500
- ZD500R

Issues Corrected

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

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

Zebra maintains a website with details on this issue at:

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

V74.20.01Z

Release Date: 14 October 2016

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

- ZD500
- ZD500R

Changes

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

weblink.zebra_connector.enable

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

Values: "on" or "off"
Default Value: "on"

To send the commands:

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

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

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

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

The printer should respond with "off".



Important • 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	Every Hour:	HEAD TOO HOT

Printer Settings		
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	Once A Day:
wlan.signal_strength		
odometer.total_print_length	Every 6 Hours:	power.cycle_count
odometer.rfid.valid_resetable		
odometer.rfid.void_resetable	print.tone	power.device_name
memory.flash_size	print.tone_zpl	power.full_charge_capacity
memory.flash_free	media.speed	odometer.total_label_count
device.ltu_installed	zpl.label_length	odometer.rfid.valid_resetable
device.cutter_installed		odometer.rfid.void_resetable
device.rewinder_installed		memory.flash_free
		odometer.media_marker_count
		media.type
		ezpl.media_type

Changes (continued)

- 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.