

Z9-PC or Z9-PC-SR001 Release Notes

These sections describe the additions, changes, and known limitations in each software version for the ZumLink Z9-PC or Z9-PC-SR001. The most recent version is listed first.



The latest firmware and software versions and the most recent list of known limitations and workarounds are available on www.freewave.com.

1.1. Version 1.1.2.2

Release Date: July 2019

Additions and Changes

- The Web Interface has been re-designed for improved usability on the Z9-PC or Z9-PC-SR001.
- Support has been added for:
 - Supply Voltage
 - **localDiagnostics.SupplyVoltage** is NOT supported on **Z9-P, Z9-PE, Z9-PC, or Z9-PC-SR001** models.
 - 0 (zero) indicates the individual radio does not support **localDiagnostics.SupplyVoltage**.
 - VLAN Management
 - Users can only access the device from the VLAN ID.
 - If the VLAN tag is set on a specific Ethernet port, that port cannot be used to access the Management VLAN ID.

Note: See the **network.vlanMgmt** parameter for additional information.

Corrections have been implemented for:

- The **devuser** login password and the sudo password were out of sync when loading a new IQ Application Environment when the default password was changed on the existing IQ Application Environment. These passwords are now in sync.
- Files uploaded using the Web Interface cannot be deleted by users.
- After updating the **systemInfo.rteTemplateVersion** parameter, a reboot is necessary to update the **sys_info.txt** file.

Known Limitations and Workarounds

- Setting **date.timeString** causes the **entire Z9-PC or Z9-PC-SR001 configuration** to revert to saved settings.
 - **Workaround:** Save settings before changing the **date.timeString** parameter.
- Cannot change the **date.timeString** once the time is set using NTP.

- The **UCD-SNMP-MIB-WP201.txt** file is missing definition for **dskIndex**.
- The Ethernet port can become unresponsive after changing networks and the **network.vlanTag** IDs.
 - **Workaround:** Reboot the Z9-PC or Z9-PC-SR001 for changes to take effect.
- Unable to get input voltage via Modbus.
- When using the Web Interface on a computer with **Windows® 8** or **Windows® 10**, clicking **Cancel** does **not** halt the upload process.
- Files uploaded using the Web Interface drag-n-drop procedure are now write-protected and cannot be deleted.
- When changing and saving the **radiosSettings Parameters**, the CLI interface may momentarily lock.
- If there is enough space to transfer the update firmware but not enough to facilitate the update, the update fails and the Upgrade Failed LEDs do not function.
 - **Workaround:** Users should verify the available free space before uploading an update firmware file.
At least 2x free space is needed on the Z9-PC or Z9-PC-SR001 for the firmware update file.
- Users should wait at least 30 seconds after a factory default command is issued before making configuration changes.
- The fields in the **NTP** parameters are **not** validated by the system.
 - **Workaround:** Verify the NTP parameter settings are correct.
- Unable to set the time when the **ntpReference** parameter **=NETWORK_TIME_SERVER**.
- The highest baud rate supported for RS422 and RS485 is 421 kbps.
- In Firmware v1.1.2.2, when the **Com1.flowControl** or **Com2.flowControl** parameter is set to **hardware**, the COM port's flow control does not function.
- The **localDiagnostics.signalLevel** parameter reports a maximum of -42 dBm when the **radioSettings.rfDataRate=RATE_1M**.
- Unable to pull support bundles for **Z9-PC** or **Z9-PC-SR001** networks.
 - **Workaround:** The clock must be set to later than January 1, 2000 to create the bundle.

1.2. Version 1.1.1.2

Release Date: December 2018

Additions and Changes

- Improved encryption configuration via the Web Interface.
- At startup, the Z9-PC or Z9-PC-SR001 will synchronize with an NTP server if a server is listed in the **ntp.ntp_address1-5**.

Support has been added for:

- ARP Filtering
 - ARP requests of a device have a path to the desired IP addresses and are filtered from non-desired IP addresses.
- VLAN
 - VLAN tagging 802.1q (ports and services)
- Modbus Registers
 - Connect to device via Modbus
 - Modbus TCP
 - Modbus RTU over TCP
 - Modbus RTU using COM1 or COM2 serial ports
 - Supports Reading from FreeWave IO Expansion Modules.
 - Supports requests from external MODBUS RTU serial device using COM1 and COM2.
 - Any Modbus TCP, Modbus RTU over TCP, and Modbus RTU request will convert to a serial Modbus RTU request that is sent out the configured serial port to a serial Modbus device.
 - Acts as a Modbus TCP to serial Modbus Gateway.
 - Allows radio diagnostics and settings to be read via Modbus.
- Updated MIB and SNMP agent:
 - Change from type of Float32TC to INTEGER for these OIDs:
 - `fwtZumLinkSignalLevel .1.3.6.1.4.1.29956.3.2.10.1.0`
 - `fwtZumLinkSignalMargin .1.3.6.1.4.1.29956.3.2.10.2.0`
 - `fwtZumLinkNoiseLevel .1.3.6.1.4.1.29956.3.2.10.40.0`

Corrections have been implemented for:

- MIB and SNMP agent:
 - `localDiagnostics.TxAvailability` is ONLY available via MIB, not via SNMP.
 - `localDiagnostics.RxSuccess` is NOT available via SNMP.
 - `localDiagnostics.TxAvailability` returns `localDiagnostics.RxSuccess` value via SNMP.
- The Web Interface and CLI windows now show the same value for the `localDiagnostics.TxSuccess` on the Gateway.
- `network.netmask` value does NOT match the actual value after two value changes.
- `network.ip_address` value does NOT match actual value after two value changes
- Options are visible but not active in the `Com1 and 2.handler` parameter.
- Setting `dataPath.aggregateEnabled=true` on all Endpoints in a network prevents the neighbor table from being populated.
 - The **Network Diagnostics** window does not appear correctly when `dataPath.aggregateEnabled=true`.
- Brackets `{}` or back slashes `\` in a `systemInfo.deviceName` breaks the Network Table.
- The `encryption.setKey` cannot be entered using the Web Interface.

- When **Com2.flowControl=Hardware** is enabled on the COM ports of the Z9-PC or Z9-PC-SR001, the CTS line will go low and does not allow traffic to pass through the COM port.

Beta Features

Web Interface

- Improved encryption configuration.
 - Added Encryption Configuration table.
 - The Encryption key is can now be entered in the Web Interface.

Note: See the **Change the Encryption Parameters** procedure in the User Manual for detailed information.

- Network Diagnostics menu
 - Added Network Diagram
 - Visual representation of: Radio Network RF, Communication Path, and Link Quality.
 - Available views are: Link Margin, RSSI, Tx Rate, Rx Rate, Margin with Neighbors, and RSSI with Neighbors.

Note: See the **Network Diagnostics** window for additional information.

- Available options are: Download support bundle, clear stats, clear all stats, refresh network diagnostics, save image.

Known Limitations and Workarounds

- Exiting from the CLI may take up to 30 seconds.
- Entering the shortcut text of **ModbusTcp** and **ModbusRtuOverTcp** results in a DUPLICATE_PARAMETER Error.
 - **Workaround:** The fully-qualified parameter of **modbus.modbusTcp** and **modbus.modbusRtuOverTcp** must be entered.
- The **encryption.getKey** and **encryption.setKey** parameters are now deprecated.
- When issuing the **factoryDefaults=set** command, after making changes for any of the **Network** parameters, the user is locked out of the CLI.
 - **Workaround:** Reboot the Z9-PC or Z9-PC-SR001 for changes to take effect.
- VSWR reading may be inconsistent between the **Network Diagram** on the **Network Diagnostics** window and the information reported in the **Local Diagnostics** window.
- The **File Upload** window shows a 100% upload when the upload file has not completed on **Windows® 8** and **Windows® 10** computers.
 - **Workaround:** Wait the appropriate amount of time or watch the LEDs to indicate completion of file transfer or use the **Firmware Upgrade - Drag and Drop** procedure.
- When setting the parameter **network.arpFilterEnabled=true**, ARP requests and responses are NOT blocked on VLAN interfaces.

- The `localDiagnostics.signalLevel` parameter reports a maximum of -42 dBm when the `radioSettings.rfDataRate=RATE_1M`.
- When the `TerminalServerRelay.termserv_relay_mapping` parameter is designated and the `Com1.flowControl` or `Com2.flowControl` parameter is set to `Hardware`, the COM port's flow control does not function.
- Unable to pull support bundles for `Z9-PC` or `Z9-PC-SR001` networks.
 - **Workaround:** The clock must be set to later than January 1, 2000 to create the bundle.

1.3. Version 1.1.0.1

Release Date: August 2018

Additions and Changes

- Support has been added for:
 - Local Diagnostics:
 - `localDiagnostics.noiseLevel`
 - `localDiagnostics.RxSuccess`
 - `localDiagnostics.TxAvailability`
 - `localDiagnostics.TxSuccess`
 - `localDiagnostics.VSWR`

Important! VSWR **may not** function on Z9-PC or Z9-PC-SR001 models manufactured prior to September, 2018.
If the Z9-PC or Z9-PC-SR001 always reports a VSWR value of 0 (zero), VSWR is **not** supported.
The VSWR is instantaneous, not averaged.
Each measurement can produce a different value; units that do support VSWR will occasionally report 0 (zero) due to an invalid measurement.

- `network.mtu` 1994 byte size with a VLAN tag.
 - Previously supported an MTU 1400 byte size with a VLAN tag.
- Multicast traffic
- Expanded MIB and SNMP agent for Z9-PC or Z9-PC-SR001:
 - SNMP v2c and v3 write access.
 - Parameters have been added to the MIB and SNMP agent.
- Increase Terminal Server connections from 20 to 128 concurrent TCP connections.
- Default settings were changed to improve field performance:
 - `dataPath.compressionEnabled` default is now **True**.
 - `radioSettings.beaconBurstCount` default is now **3**.
 - `radioSettings.radioHoppingMode` default is now **Hopping_On**.
 - `radioSettings.rfDataRate` default is now **RATE_500K**.
 - `radioSettings.txPower` default is now **30**.

Important! A Gateway MUST BE configured for the radios to communicate.

- Corrections have been implemented for:
 - Frequency Mask
 - COM ports temporarily stop functioning when passing traffic with certain **TerminalServerRelay.termserv_relay_mapping=** settings enabled.
 - When **radioSettings.rfDataRate = RATE_4M** and **radioSettings.beaconBurstCount = 1**:
 - Endpoint-Repeaters may lose synchronization with the Gateway and reset themselves.
 - Updated time out behavior for the COM1 and COM2 terminal servers:
 - The connection remains open if data is being sent or received.
 - The **Comx.TerminalServerTimeOut** connection remains open if data is sent or received.
 - When an invalid Gateway is entered, the **network.gateway** is set to a null value.
 - When a Z9-PC or Z9-PC-SR001 with a non-default **network.gateway** value (e.g., 194.2.2.2) is upgraded to v1.1.0.1, it is set to a null value after upgrade.
 - IQ Application Environment now available
 - This was previously only available as a standard option in the v1.0.6.0 release.

Important! If upgrading to v1.1.0.1 from any previous firmware version, a license key MUST BE requested to activate the IQ Application Environment. Contact FreeWave Technical Support for the license key.

- The default value for **ntp.ntpReference** was changed to NETWORK_TIME_SERVER.
 - This causes the Z9-PC or Z9-PC-SR001 to attempt to contact the default external **time.nist.gov** IP address listed in **ntp.ntp_address1**.

Beta Features

Important! Beta Features have not been fully tested by FreeWave. The intent is to expose the feature and receive early feedback from customers.

- Web Interface
 - Added a **Configuration** menu.
 - Added a **Network Diagnostics** menu

Important! A Gateway is required to use the **Network Diagnostics** menu.

- Network Discovery
 - Discover other Endpoints in the network.
 - Show hops and their paths from the Gateway.
 - Show the link quality (RSSI and Margin).

- Show neighbors.
- Available options are:
 - Download Support Bundle
 - Clear Status
 - Refresh Network Diagnostics
 - Save Network Diagnostics
- MacTableEntryAgeTimeout
 - The MacTableEntryAgeTimeout is the number of seconds before an inactive entry in the radio MAC Table ages out and expires.
 - This feature:
 - Allows the optimization of the time it takes a unit to learn a new path to allow for Repeater redundancy.
 - Is used to adjust fail-over times with parallel Repeaters.
 - User field sets MacTableEntryAgeTimeout period.
 - The default is 120 seconds, with a Minimum of 30 seconds and a Maximum of 86400 seconds.

Known Limitations and Workarounds

- A downgrade from v1.1.0.1 to v1.0.4.x **requires** an intermediate **downgrade** to v1.0.7.0.

Example: Downgrade v1.1.0.1 to v1.0.7.0, then downgraded to v1.0.4.0.

- v1.0.6.0 / v1.1.0.1 Upgrade or Downgrade
 - When either updating or downgrading, the IQ Application Environment template is changed but NOT the active IQ Application Environment runtime application environment version.
 - Active applications will continue to run.

FREEWAVE Recommends: Prior to an update or downgrade procedure, save and backup all applications.

- After updating the **systemInfo.rteTemplateVersion** parameter, a reboot is necessary to update the **sys_info.txt** file.
 - Performing a **runtimeEnvironment.rteReset** to copy in the new FW template erases any existing applications in the original runtime application environment.
 - If the new runtime environment is needed, save all applications prior to performing a **runtimeEnvironment.rteReset**.
- Changing the **network.ip_address** to some value other than 192.x.x.x will prevent all subsequent IP address changes.
 - **Workaround:** Enter a Gateway address and reboot the Z9-PC or Z9-PC-SR001.

- VSWR **may not** function on Z9-PC or Z9-PC-SR001 models manufactured prior to September, 2018.
If the Z9-PC or Z9-PC-SR001 always reports a VSWR value of 0 (zero), VSWR is **not** supported.
- VSWR is less accurate at higher power levels (>20 dBm).

Note: The reported VSWR is a value proportional to the VSWR. It is closer to VSWR at lower powers, but at higher power levels, it still increases with reflected power.

- Rebooting a pair of radios simultaneously when one of the Z9-PC or Z9-PC-SR001 has the parameter `TerminalServerRelay.termserv_relay_mapping=Enabled`, the terminal server relay takes up to 6 minutes to become active.
- To update the **Network Diagnostics** window, refresh the browser to clear the browser cache.
- When upgrading to v1.1.0.1, the `fw_upgrade_result.txt` file **does NOT appear** after the upgrade is completed.
 - If the `fw_upgrade_result.txt` file does appear in the USB drive after an upgrade, it is now write-protected and cannot be deleted.
- Setting `dataPath.aggregateEnabled=true` on all Endpoints in a network prevents the neighbor table from being populated.
 - The **Network Diagnostics** window does not appear correctly when `dataPath.aggregateEnabled=true`.
- `localDiagnostics.TxAvailability` is ONLY available via MIB, not via SNMP.
- `localDiagnostics.RxSuccess` is NOT available via SNMP.
- `localDiagnostics.TxAvailability` returns `localDiagnostics.RxSuccess` value via SNMP.
- Options are visible but not active in the `Com1 and 2.handler` parameter.
- The `localDiagnostics.signalLevel` parameter reports a maximum of -42 dBm when the `radioSettings.rfDataRate=RATE_1M`.
- When the `TerminalServerRelay.termserv_relay_mapping` parameter is designated and the `Com1.flowControl` or `Com2.flowControl` parameter is set to `Hardware`, the COM port's flow control does not function.
- When `Com2.flowControl=Hardware` is enabled on the COM ports of the Z9-PC or Z9-PC-SR001, the CTS line will go low and does not allow traffic to pass through the COM port.

FREEWAVE Recommends: Do NOT use `Com1 and Com2.flowControl=Hardware` for poll-response data.

- **Workaround:** Any device connected to COM1 or COM2 should have flow control disabled.
- Unable to pull support bundles for **Z9-PC** or **Z9-PC-SR001** networks.
 - **Workaround:** The clock must be set to later than January 1, 2000 to create the bundle.

- The **encryption.setKey** cannot be entered using the Z9-PC or Z9-PC-SR001 Web Interface.

Important! The **encryption.setKey** MUST BE entered in CLI.

1.4. Version 1.0.7.0

Release Date: January 2018

Important! The **Z9-PC** firmware v1.0.7.0 is fully over-the-air compatible with the **Z9-P / Z9-PE** firmware v1.0.7.0.

Upgrade Notes for Z9-PC or Z9-PC-SR001 - v1.0.7.0

Inside the downloaded **Z9-PC-and-Z9-PC-SR001-v1070-Firmware.zip** file, use these **.pkg** and the **.fcf** files when upgrading from **v1.0.4.3** firmware:

- The **1_Device_Firmware_v1_0_7_0.pkg** file.
- The **.fcf** file for the second part of the upgrade.

Additions and Changes

- Hop table frequency masking masks the channels that fall within the range plus or minus one-half ($\frac{1}{2}$) the channel bandwidth.
- Support has been added for:
 - Multiple Repeaters using a maximum of 3 Repeater slots.
 - The Endpoint-Repeater has a radio Repeater slot range from 1-3.
 - A maximum number of 3 Endpoint-Repeaters are supported in an overlapping communication space or RF coverage area.
 - The radio Repeater slot numbers can be reused where there is no RF connectivity or overlap between the reused radio Repeater slots.

FREEWAVE Recommends: Set the to **2** or more for optimal throughput when Repeaters are used and the RF environment is noisy.
This increases the number of beacons sent in a beacon interval.

- The **Terminal Server Relay Client** provides radio-to-radio serial communication.
- Hopping data rates from the Gateway to Endpoint and the Endpoint to Gateway are now more symmetric.
- Improved sensitivity, noise filtering, and interference avoidance for 250 and 500 kbps rates. Throughput rates between the Gateway and Endpoint have been rebalanced.

Important! Data rates 250K and 500K are NOT compatible with previous releases of the ZumLink radio firmware.

- When `network.netmaskFilterEnabled=true`, VLAN tagged packets are filtered out because the radio is not considered on the VLAN and therefore VLAN packets cannot be on the same subnet.
- Multiple FEC-related corrections have been implemented.
- A problem where the Ethernet interface does not work due to pings at boot time has been fixed.
- 250,000 bps is no longer the maximum baud rate for Com1 and Com2.
- After 30 seconds of inactivity on the COM port, the COM ports no longer go into low power mode.

Beta Features

Important! Beta Features have not been fully tested by FreeWave. The intent is to expose the feature and receive early feedback from customers.

- 1.5 Mbps RF Data Rate
 - Sensitivity -90dBm
- MacTableEntryAgeTimeout
 - The MacTableEntryAgeTimeout is the number of seconds before an inactive entry in the radio MAC Table ages out and expires.
 - This feature:
 - Allows the optimization of the time it takes a unit to learn a new path to allow for Repeater redundancy.
 - Is used to adjust fail-over times with parallel Repeaters.
 - User field sets MacTableEntryAgeTimeout period.
 - The default is 120 seconds, with a Minimum of 30 seconds and a Maximum of 86400 seconds.

Known Limitations and Workarounds



Caution: `config.restore` can give inconstant results if the `radioSettings.radioMode` was changed.

- Significant data is lost between radios when operating in close proximity (3-6 feet) when `radioSettings.rfDataRate=RATE_4M..`
 - **Workarounds:**
 - Reduce power on radios when operating in close proximity.
 - Enable the `radioSettings.InaBypass`.
- When using the USB, the CLI may lock up on units with `termserv_relay_mapping` parameter enabled.
 - **Workarounds:**
 - Re-seat the cable

- COM ports temporarily stop functioning when passing traffic with certain **Terminal Server Relay** settings enabled.
- When the **TerminalServerRelay.termserv_relay_mapping** parameter is in use, the **Com1 or Com2.connectionDrops** count should be ignored.
- When operating at **rfDataRate=RATE_4M** and **beaconBurstCount=1**:
 - Endpoint-Repeaters may lose synchronization with the Gateway and reset themselves.
 - TCP traffic can be intermittent when operating multiple Repeaters.
- When operating at **radioSettings.rfDataRate=RATE_4M** and with multiple Repeaters, if a **short radioSettings.beaconInterval** and a **high radioSettings.beaconBurstCount** are designated, throughput is very low.
 - **Workaround:** Use either a **longer radioSettings.beaconInterval** or a **lower radioSettings.beaconBurstCount**.
- As Repeaters are chained in the network, round trip delay increases.
 - When issuing pings of large packet sizes at the lower data rates, such as 115.2K, and a **beaconInterval=TWENTY_FIVE_MS**, the latency can increase causing the pings to fail.
 - **Workaround:** Allow an appropriate delay between pings.

FREEWAVE Recommends: Set the **beaconBurstCount=2** or more and **beaconInterval=ONE_HUNDRED_MS** or more for optimal throughput when extended Repeater networks are used.

- Frequency Mask is not working properly.
- The **localDiagnostics.signalLevel** parameter reports a maximum of -42 dBm when the **radioSettings.rfDataRate=RATE_1M**.
- When **Com2.flowControl=Hardware** is enabled on the COM ports of the Z9-PC or Z9-PC-SR001, the CTS line will go low and does not allow traffic to pass through the COM port.

FREEWAVE Recommends: Do NOT use **Com1 and Com2.flowControl=Hardware** for poll-response data.

- **Workaround: Workaround:** Any device connected to COM1 or COM2 should have flow control disabled.
- Unable to pull support bundles for **Z9-PC** or **Z9-PC-SR001** networks.
 - **Workaround:** The clock must be set to later than January 1, 2000 to create the bundle.
- ZumIQ application environment is not available.

1.5. Version 1.0.4.3 (Initial Release)

Release Date: September 2017

Important! The Z9-PC firmware v1.0.4.3 is fully over-the-air compatible with the Z9-P / Z9-PE firmware v1.0.4.2 and v1.0.4.1 but is NOT compatible with firmware v1.0.3.2 when the `radioSettings.radioHoppingMode` setting is set to **On** (enabled).

Known Limitations and Workarounds

- The COM ports are currently limited to a maximum of 250 kbps.
- After approximately 30 seconds of inactivity on the COM port, it will go into a low power mode.
 - Once the COM port detects activity, it can take up to 100 microseconds to wake up and could result in corrupted data.
 - This can be prevented by actively sending data through the COM port in either direction or actively transitioning the RTS or DTR signals at an interval less than 30 seconds.
- The left LED comes on when powered and blinks when data is being passed while the right LED always remains off.
- Only two LEDs are functional:
 - The CD reflects the state of the RF link.
 - The power is always RED when power is applied.
 - The third LED is non-functional.

Learn More

For additional product information about the ZumLink Z9-PC or Z9-PC-SR001, visit <http://support.freewave.com/>.

For additional assistance, contact a local reseller, or contact FreeWave Technologies, Inc. at 303.381.9200 or 1.866.923.6168, or by email at support@freewave.com.

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The Z9-PC or Z9-PC-SR001 complies with FCC Part 15 rules. Operation is subject to the following two conditions: 1) This device may not cause harmful interference and 2) this device must accept any interference received, including interference that may cause undesired operation.

The Z9-PC or Z9-PC-SR001 must be professionally installed and is only approved for use when installed in devices produced by FreeWave or third party OEMs with the express written approval of FreeWave Technologies, Inc. Changes or modifications should not be made to the device.

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