

FX Series and ATR7000 Firmware v3.24.43 Release Notes

This document summarizes the following firmware release:

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For support, please visit www.zebra.com/support

FX Series and ATR7000 Release V3.24.43

Release Date: 2-June-2023



In order to update to 3.24.43 from versions older than V3.21.21 the readers must be updated to 3.21.21 first. Once updated to 3.24.43 the reader cannot be downgraded to 3.21.21. However, “revert back” functionality from 3.24.43 to 3.21.21 is supported and can be used.



V3.10.30 and above mandates that the user changes the default admin password during first login to web console. The reader web console directs the user to switch to https and then change the password before any further configuration. Also please ensure that the browser cache is cleared to remove cached web pages. This is important to ensure that the web console enhancements are available for use.

For a friendly user experience, it is recommended to use the 123RFID Desktop utility available from the Zebra support site.

Release Notes lists new features, any specific usage instructions, and any known issues.

The current build, 3.24.43, is applicable to all ATR7000 SKUs, FX7500 and FX9600 readers.

Contents of the release package:

IMAGE TYPE	VERSION	FILE NAME	DATE
RM Server	3.24.43	platform_3.24.43.jffs2	6/2/2023
LLRP Server	3.24.43		
X-Loader	4.0.0	x-load_4.0.0.0.bin.ift	08/26/2018
U-Boot	3.17.6	u-boot_3.17.6.0.bin	8/31/2022
Operating System	3.20.2	ulmage_3.20.2.0	3/14/2023
Root FS	3.21.8	rootfs_3.21.8.0.jffs2	4/16/2023
OsUpdate Utility	1.0.0	osupdate.elf	8/31/2022
FxUpdate Utility	1.0.0	fxupdate.elf	8/31/2022
Response	N/A	response.txt response_ext.txt	8/31/2022
Linux Kernel	4.9.182		
Radio Firmware	2.1.51 (FX9600) 2.1.51 (FX7500 ASIC) 1.4.88 (FX7500) 2.2.28.0 (ATR7000)		
FPGA	1.8.0.0 (ATR Spartan 6) 2.0.0.0 (ATR Spartan 7)		
Radio API	2.2.36.0		
EtherNet/IP	1.0.12	zebraethernetip_1.0.12.deb	02/24/2023

Profinet	1.0.3	ZebraProfinetApp_1.0.3.zip	02/24/2023
Modbus	1.0.3	ZebraModbusApp_1.0.3.zip	02/24/2023

IOT Connector Components Version Info:

IMAGE TYPE	VERSION	FILE NAME	DATE
IOT Connector Debian Package	2.9.24	ZIOTC_2.9.24.zip	5/25/2023
Cloud Agent	0.6.0.24	Cloud_agent.elf	5/25/2023
Radio Control	0.2.56.0	radio_control.elf	3/14/2023

Note – All the SDKs (Host & Embedded) are available in Zebra support site.

Host API release Version Info:

IMAGE TYPE	VERSION	FILE NAME	DATE
RFID3 C API DLL	5.5.7.8	RFIDAPI32PC.DLL	May 2023
RFID3 .NET DLL	1.5.6.2	Symbol.RFID3.*.dll	May 2021
RFID3 Java JNI DLL	1.4.0.49	RFIDAPI3_JNI_HOST.dll	May 2021
RFID3 Java API	1.4.0.49	Symbol.RFID.API3.jar	May 2021
123RFID Desktop	1.3.0.0	123RFID_Desktop_v1.3.0.0	Sep 2020

Native DLL's available for 64-bit.

Host SDK:

DESCRIPTION	VERSION	FILE NAME	DATE
Zebra RFID FXSeries Host C SDK for Windows 7 and 10	V1.0.5	Zebra-RFID-FXSeries-Host-C-SDK_v1.0.5.msi	May 2021
Zebra RFID FXSeries Host .NET SDK for Windows 7 and 10	V1.0.5	Zebra-RFID-FXSeries-Host-DotNet-SDK_V1.0.5.msi	May 2021

Zebra RFID FXSeries Host Java SDK for Windows 7 and 10	V1.7	Zebra-RFID-FXSeries-Host-Java-SDK_V1.6.msi	May 2021
Zebra RFID C and Java SDK for 64 bit Host Linux (CentOS & Ubuntu)	V5.5.4.16 V1.4.0.49	Linux64_SDK_C_V5_5_4_19_JAVA_v1_4_0_49.tar.gz	10/02/2021

Embedded SDK:

DESCRIPTION	DOCUMENTATION	FILE NAME	DATE
Zebra Native Java SDK on Windows 7	Zebra-FXSeries-Embedded-Java-SDK-UserGuide_Windows.docx	Zebra-FXSeries-Embedded-SDK-Java-Windows_V1.0.1.zip	May 2020
Zebra Native Java SDK on Windows 10			
Zebra Java SDK for Linux	Zebra-FXSeries-Embedded-Java-SDK-UserGuide_Linux.docx	Zebra-FXSeries-Embedded-SDK-Java_Linux_V1.0.1.tar.gz ZebraFXSeriesEmbeddedSDKJavaLinux_1.0.1.deb	May 2020
Zebra C / CPP SDK for Linux	Zebra-FXSeries-Embedded-C-CPP-SDK-UserGuide_Linux.docx	Zebra-FXSeries-Embedded-SDK-C-CPP_Linux_V1.0.1.tar.gz ZebraFXSeriesEmbeddedSDKCCPPLinux_1.0.1.deb	May 2020

Installation Instructions

There are multiple supported ways to upgrade the FX Series & ATR7000 RFID readers.

Method 1 – USB Flash Drive:

This is the recommended method. Unzip images and copy to a USB drive. Connect USB drive to the FX Series reader. Upgrade will automatically start in 7-10 seconds. Please note this method cannot be used with ATR7000

Method 2 – 123RFID Desktop:

Zebra 123RFID Desktop utility can be used to update the firmware on FX Series readers using a simple and intuitive 3 step process.

The latest 123RFID Desktop can be downloaded from

<https://www.zebra.com/us/en/support-downloads/software/utilities/123rfid.html>

Refer to the video for help on updating the reader firmware using 123RFID Desktop

<https://www.youtube.com/watch?v=NNDBPghjOg8&list=PLrcZVTwQp0ldXdysFQHwqI9FyoBNuApfM&index=5&t=0s>

- ✓ 123RFID can also be used to upgrade multiple readers with a single operation.

Method 3 – Web Interface:

Copy images to the local drive of a local PC, log in to the reader, select 'File based upgrade' on reader upgrade webpage, Enter username and password of reader. Select image to upgrade from the local PC. Click 'Start upgrade'. If the reader firmware is older than version 2.7.19, please ensure to execute a two-step update. First update to version 2.7.19 and then to this new version.

- ✓ The recommended browsers are IE11, Edge, Mozilla Firefox and Chrome v68 or newer.

Method 4 – FTP Server:

Copy images to an FTP server. Navigate to the reader upgrade webpage and select 'FTP upgrade' page. Enter username and password of the FTP server. 'Start upgrade'.

- ✓ FTP/SCP/FTPS server can be used to upgrade the readers.

HARDWARE REQUIREMENTS

All SKU's of FX Series and ATR7000 readers are supported with this firmware.

ATR7000

FX9600

FX7500

IMPORTANT NOTES ABOUT FIRMWARE UPDATE TO V3.24.43

- **Admin Users will now be forced to change the password during first login.**
- **Due to the changes in key licensed components and introduction of a new firmware update process, downgrades to previous releases are not supported once the reader is updated to V3.21.x or above.**
- **Readers will not allow revert-back to older firmware (older than V3.21.x) once the reader is updated to the current firmware.**
- When using file-based update it is recommended to clear the cached pages and reload the pages of the web console to ensure that the reader upgrades properly.
- If the reader is upgraded/downgraded from/to any other older firmware versions, then some of the UI pages will not work properly due to cached pages from previous build. Hence it is required to clear the browser cache after any upgrade/downgrade.

ENHANCEMENTS / CHANGES in 3.24.43 over 3.21.23

Zebra IoT Connector Enhancements

- Support for TCP/IP data endpoint in Zebra IoT Connector Interface with batching and retention support.
- Support for Web Socket server as data endpoint in Zebra IoT Connector Interface. Supports both secure and plain web sockets. To use the secure web sockets the reader must be configured to HTTPS and for plain web sockets the reader must be configured to HTTP.
- Support for Access operations (Read/Write) using Zebra IoT Connector Interface.
- Enhanced performance for local REST request from embedded apps.
- Ability to set beams on ATR7000 not just Antennas in Zebra IoT Connector Interface operating mode.
- Addition of Antenna Names in Zebra IoT Connector operating mode.
- Support for reporting MAC/hostname in data events in Zebra IoT Connector.
- Support for making local REST Zebra IoT Connector calls from DA app without login.
- Local REST in Zebra IoT Connector is always available on HTTP from DA app regardless of reader HTTP settings.
- A Built in Python module for DA apps for better performance on python DA apps.
- Zebra IoT Connector HTTP POST now supports servers returning 2XX and not just 200.
- Support for Limiting radio power if reader is on POE when used with Zebra IoT Connector.
- Support for configurable key stroke delay in USB HID mode with Zebra IoT Connector.
- Asynchronous handling of the local REST interface in Zebra IoT Connector.
- Ability to configure retention on HID endpoint from web page for Zebra IoT Connector.
- Added ability in web UI to configure GPI debounce with Zebra IoT Connector.
- Support in legacy DA python library to enabling/disabling GPI events.

Platform Enhancements

- Update Israel Regulatory to use single channel 916300.
- Embedded user apps are limited to use 80% of available RAM on the reader.
- FX7500 ASIC now uses radio firmware 2.1.51 which is the same radio firmware for 9600.

Security Updates

- Upgraded nodeJS to 14.21
- Upgraded libarchive, dbus, libgrypt
- Upgraded Apache to 2.4.56
- Security fixes in Busybox (CVE-2022-28391, CVE-2022-28391)
- Upgraded SSH
- Upgraded curl 7.87
- Kernel fixes
 - GCC stack protector support
 - Hardened Usercopy
 - SLAB freelist randomization
 - Kernel heap randomization
 - Restrict /dev/kmem access

SPR Fixes

- SPR 47752 – Apache Vulnerability in FX9600 Firmware V3.21.23
- SPR 47425 – Java sample code does not show the temperature alarm event notification in the application.
- SPR 47404 - Static IP set in web console applied without Set Properties resulting in reader becoming inaccessible in specific scenario.
- SPR 48113 - Problem with updating RFID Reader profile by SDK .Net application
- SPR 48334 - User unable to set LinkProfile for specific link profiles via JSON configuration pushed using “PUT Mode” to the reader (MQTT or HTTP endpoint)
- SPR 48551 - IoT not connecting after reboot after a firmware update due to incorrect configuration in set config.
- SPR 47860 - FW3.21.23 login to reader RM with 127.0.0.1 IP via Embedded SDK for Java to call Reader Info and Antenna Status Classes shown Operation Failure Error

Issues Addressed

- Fix for Enabling Batching in Zebra IoT Connector HID mode results in infinite loop of data sent.
- Fix to use the appropriate cable loss compensation for Antenna Detection when the cable loss is set to more than 2.54.
- Fix for issue of MQTT reconnect exit on some failures (like JWT renewal failure) which resulted in Zebra IoT Connector not reconnecting to ZDS sometimes.
- Incorrect run status displayed for Python DA app in applications page.
- DA apps now have /apps set as their default HOME directory.
- Fix in the legacy DA python module for clean handling of SIGTERM.
- Fix in RC for crash observed during long run with python DA app.
- Fix for memory leak in SNMP agent.

Known Issues in 3.24.43

- The Operating Mode page for IoT Connector lists 480 antennas while the set_mode Zebra IoT Connector command only accepts 14 antennas. The current antenna behavior will be deprecated in future in favor of a cleaner antenna configuration for ATR7000.
- After mapping the Keyboard Emulation to a data endpoint in Zebra IoT Connector, If the Line ending needs to be changed, Users will need to, after changing the line ending, map the data endpoint to None and click on update, and then change the data endpoint back to keyboard emulation.
- Idle Mode time out is not used by Zebra IoT Connector Interface and should be set to 0 ensuring that the radio stays powered on before connecting to cloud. It is recommended to change this to 0 first to disable the Idle mode before enabling Zebra IoT Connector Interface.
- Rare occurrence of “Self-Signed Certificate error” is shown in the webpage when in http mode (it is a false alarm). There is no loss of functionality due to this issue and can be ignored.
- RM Server does not indicate that the reader is dis-enrolled or dis-connected from Cloud if it is done outside the reader.

ADDITIONAL NOTES

Summary of major issues and limitations are listed below.

LLRP

- Number of rounds stop trigger when more than one antenna is enabled does not stop reads after N rounds
- LLRP in secure mode will prevent the Read Tags, Advanced Antenna Config, Serial port communication from functioning properly. To use the above functionality, it is recommended to set LLRP to non-secure mode to use these features. There is no security risk as the non-secure connection is internal to the reader.
- It is not possible to disable GPI function as defined in the LLRP standard. It is simply recommended to just not use the GPI function if it is not needed for a use case.
- Performing changes in the reader and committing the same while LLRP is upgrading the Radio firmware can cause LLRP to shutdown and not start back. To confirm readers are operational after an update, please check the version page to confirm 'Radio firmware version' shows up with values matching image version number table above
- Moderated Timeout for Portal Directionality Events (Zone Entry, Exit or Transition Events) needs to be atleast 5 seconds or above for the moderation to take effect.

User Apps

- User applications installed on older release (2.x etc.) will not execute on 3.x build. Users will have to recompile their apps using the new tool chain.
- Applications that use RFID3 API to perform reader firmware update must use RFID3 API for C dll version 5.5.2.15. There is no need to recompile the app as the dll signature has not changed.

Web console

- When updating the reader it is necessary to clear the browser cache to use the pages that use Node JS. Some of the web pages that need this are ReadTags, Syslog.
- If the admin user password is changed it will be necessary to install the latest versions of EtherNet/IP, Profinet and Modbus packages on FX9600.
- Large file names are not supported when importing reader configuration in Reader Profiles web page
- When reader web console is set to secure HTTP mode, 'Read Tags' reader operation demonstration page in web console won't be loaded in some of the browsers (latest Firefox and Internet Explorer) unless trusted certificates are used on the reader or default self-signed certificate is trusted by the browser.

Miscellaneous

- **Cable loss compensation is being used to aid in the detection of Antenna presence on FX9600. As part of deployment, it is required to set the Cable length and loss appropriately as per the cable used for a given antenna connection.**
- Since the Reader will only accept zebra signed firmware, downgrades to previous releases are not supported.
- Serial Port configuration (including BaudRate, StopBits, DataBits, Flowcontrol and Parity) on FX9600 and Mode of usage (Debug, Push Data or free Port) changes need reader reboot

before these changes take effect. However, the Tag reporting and inventory settings in push data mode take effect immediately without reboot.

- After changing serial port configuration on FX9600, banner message “reboot required” is not consistent. It is recommended to follow above note whenever serial port configuration is changed.
- Regular inventory operations fail after RFSurvey is performed. Reader needs to be restarted to restore regular operation.
- RFSurvey is not supported in FXSeries Readers even though the LLRP capability reports true for canDoRFSurvey.

LLDP/POE/POE+

- Some of the switches do not respond back to the reader power negotiation request if there is no change in the requested power from the reader. Thus, the reader will consider negotiation is successful only at startup. If the LLDP negotiation setting is changed (Off to on) at run time reader will show power negotiation as failed. In these cases, it is recommended to restart the reader on changing the Power Negotiation Configuration.
- If POE power negotiation is turned off in web console, LLDP power negotiation will not be performed. It may be noted that older version of ATR software prior to 2.15.14 had power negotiation turned off. If ATRs are updated to 2.15.14 from any of the older versions, as reader configurations are migrated and reused, power negotiation will not be enabled by default. User need to either reset readers to factory default settings or explicitly turn on Power Negotiation from ‘Configure Reader’ link in Web Console.
- Power negotiation requires ATRs to be connected to PoE+ compliant switch and switch to be configured with power negotiation via LLDP enabled. If switch ports are configured to supply PoE+ power levels and power negotiation is disabled in the switch, ATRs need to be configured to turn off power negotiation. Else ATR will attempt power negotiation and as switch will not respond to negotiation attempt, ATR will assume failure to negotiate power and reader operator will not be allowed to run radio operations.
- Maximum power configured for each port on the switch should account for power losses on the connectors, CATx cable used and its length. Typically, 4.5 W/port of loss is normal. As such, configuration for maximum power per port typically needs to be around 30 W such that request from the ATR for 25.4W of power can succeed.
- Power negotiation is not possible with PoE Injectors. If ATR is powered over PoE injectors, user need to ensure PoE injector is rated to supply 25.4 W at a minimum.

ATR7000 Differences with FXSERIES Readers

ATR7000 RM / Web console differences compared to FX Series Readers

ATR7000 web console does not support the following web pages (when compared to FX7500)

- Wireless and Bluetooth config is not supported

Number of Antenna's (beams) exposed in ATR7000

ATR7000 exposes 480 antenna's as part of the capability. However, with the current ATR7000 firmware only the following beams are supported.

- Beams 101-197
- Beams 201-297
- Beams 301-397

Beams other than the above do not result in Tag reads. These are left unused for future use and will provide appropriate error in a subsequent release.