FXR90

RFID Reader

Integration Guide

ZEBRA

MN-004924-01EN Rev A

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About This Guide

The FXR90 industrial fixed RFID readers provide real-time, seamless EPC-compliant tags processing for asset management in rugged industrial and enterprise environments.

The FXR90 supports Wi-Fi, Bluetooth, 1000BASE-T Ethernet, POE+ and optional 5G WAN, and offers 4-port, 8-port, and integral RFID antenna variants.

This Integration Guide provides information about installing, configuring, and using the FXR90 RFID reader and is intended for use by professional installers and system integrators.

Icon Conventions

The documentation set is designed to give the reader more visual clues. The following visual indicators are used throughout the documentation set.

NOTE: The text here indicates information that is supplemental for the user to know and that is not required to complete a task.

IMPORTANT: The text here indicates information that is important for the user to know.

CAUTION: If the precaution is not heeded, the user could receive a minor or moderate injury.

WARNING: If danger is not avoided, the user CAN be seriously injured or killed.

Service Information

If you have a problem with your equipment, contact Zebra Global Customer Support for your region. Contact information is available at: zebra.com/support.

When contacting support, please have the following information available:

- Serial number of the unit
- Model number or product name
- Software type and version number

Zebra responds to calls by email, telephone, or fax within the time limits set forth in support agreements.

If your problem cannot be solved by Zebra Customer Support, you may need to return your equipment for servicing and will be given specific directions. Zebra is not responsible for any damages incurred during

shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your Zebra business product from a Zebra business partner, contact that business partner for support.

Getting Started

This section provides information on FXR90 fixed RFID reader features, parts, and LED indications.

Features

The FXR90 fixed industrial RFID readers are based on Zebra's fixed reader platform and are easy to use, deploy, and manage.

The reader offers real-time, seamless EPC-compliant tags processing for inventory management and asset tracking applications in large scale deployments. The reader offers a wide range of features that enable implementation of complete, high-performance, intelligent RFID solutions:

- Rugged construction for industrial markets such as manufacturing and transportation/logistics
- Suitable for indoor, outdoor, and vehicle-mounted use
- Wireless communication:
  - WWAN
  - Wi-Fi 6
  - Bluetooth
- NFC tag for tap-to-pair
- Industrial M12 connectors
- IP65 and IP67 sealed
- Operating temperature of -40°C to +65°C
- 4 and 8 antenna port options
- Optional integrated antenna with 4-port configuration

FXR90 Parts

Figure 1 FXR90 Connections (Front Panel and Left Side)

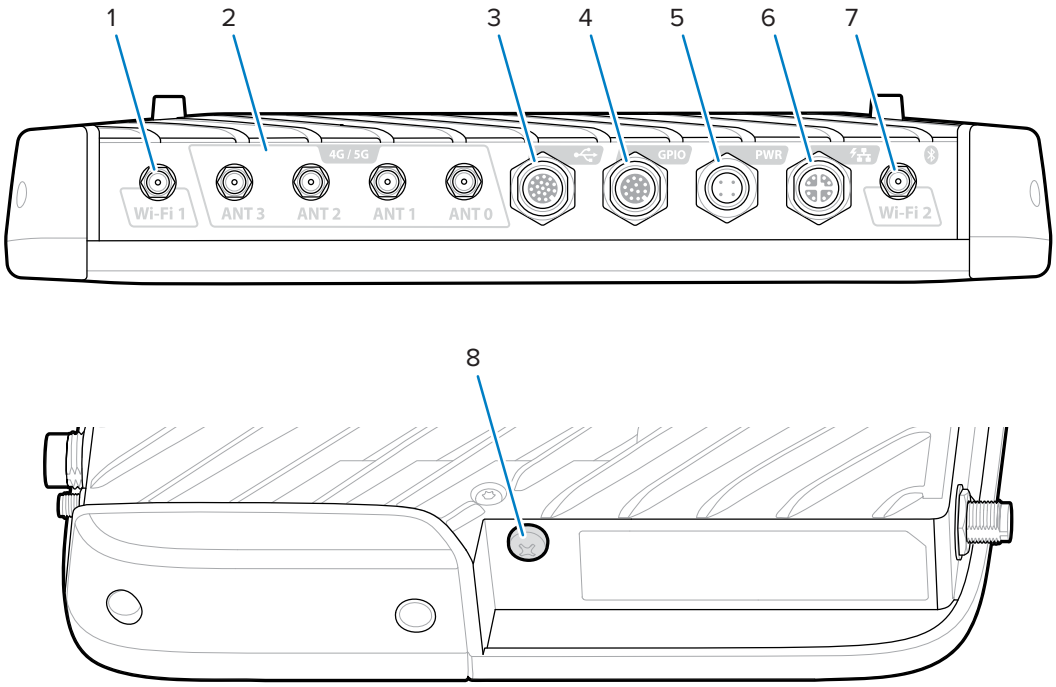


Table 1 FXR90 Connections

1	WLAN (Wi-Fi) antenna 1
2	WWAN antennas (4G / 5G / GPS) (4)
3	USB (Host & Client) (M12 Connector)
4	General Purpose Input Output (GPIO) (M12 Connector)
5	DC Power Input (M12 Connector)
6	10/100/1000 Base-T Ethernet with POE+ (IEEE 802.3at compatible) (M12 Connector)
7	WLAN (Wi-Fi) / Bluetooth antenna 2
8	Grounding Screw

NOTE: Not pictured; protective connector caps are included with the device.

Figure 2 FXR90 RFID Antennas

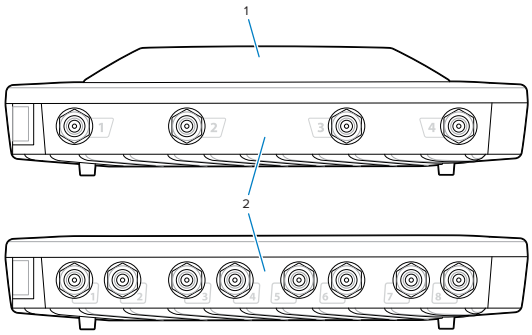


Table 2 FXR90 RFID Antennas

1	Integrated RFID antenna (optional)
2	RFID Antenna ports, RP-TNC (4 or 8)

FXR90 LEDs

The reader LEDs indicate reader status as described in the following table.

Figure 3 FXR90 LEDs

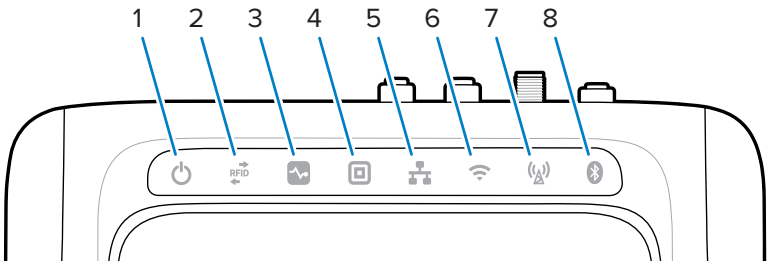


Table 3 FXR90 LED Indications

	Function	Color/Status
1	Power	Green = On Yellow = Application initialization/booting Red = Critical failure
2	Activity	Green flashing = Tag read Yellow flashing = Another tag operation Red flashing = Error in RF operation
3	Status	Green flashing = GPI event Yellow flashing = Firmware update Red = Firmware update failure

Table 3 FXR90 LED Indications (Continued)

	Function	Color/Status
4	Application	Green, Yellow, and Red. Defined by Application.
5	Ethernet	Green flashing = 1000 Mbps link detected Yellow flashing = 100 Mbps link detected
6	WiFi	Green = Connected Green flashing = Connecting Red = Error/Lost connection
7	WAN (4G/5G)	Green = Connected Green flashing = Connecting Red = Error
8	Bluetooth	Blue = Bluetooth Module On No LED= Bluetooth Module Off

Installation and Communication

This section includes FXR90 RFID reader installation and communication procedures.

CAUTION: The FXR90 RFID reader must be professionally installed.

IMPORTANT: Only use Zebra-approved cable assemblies with the reader.

Unpacking the Reader

Remove the reader from the shipping container and inspect it for damage. Keep the shipping container; use the container if the reader needs to be returned for servicing.

Flush Mounting the Reader

The FXR90 comes standard with two mounting brackets installed on the reader that allow for flush mounting of the reader to a surface. These brackets require four #8 mounting screws.

NOTE: For drywall applications, use correctly sized toggle bolts or drywall anchors.

Pre-drill a rectangle measuring 310 mm by 100 mm (12.20 in. x 3.94 in.) into the mounting surface prior to using mounting screws.

WARNING:

The mounting surface must support the full device weight and the weight of any attached cables.

Go to Technical Specifications for device weight information.

Figure 4 FXR90 Mechanical Dimensions

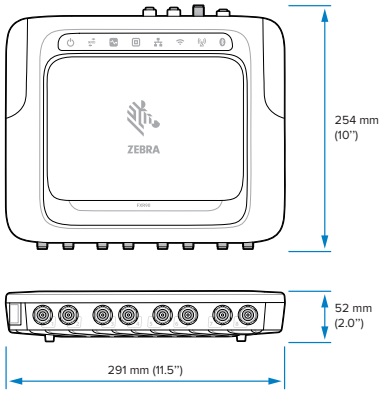


Figure 5 FXR90 Mechanical Dimensions with Brackets

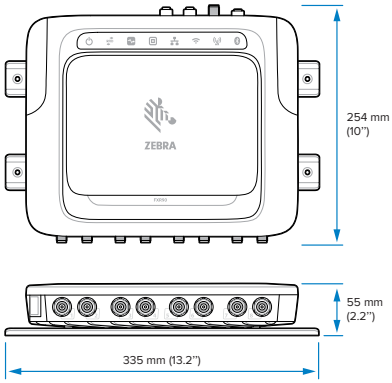


Figure 6 FXR90 Mechanical Dimensions with Antenna

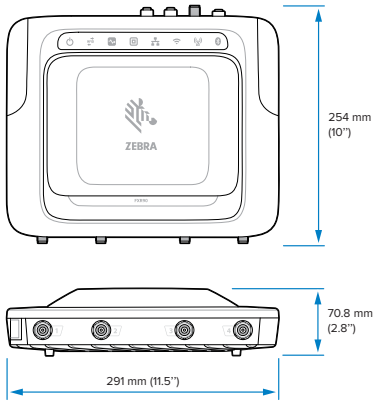
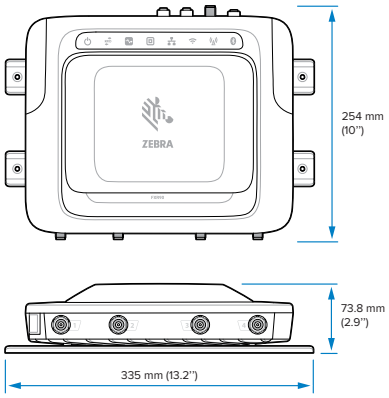
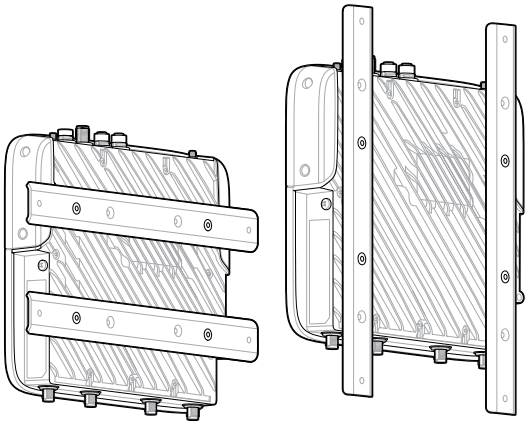


Figure 7 FXR90 Mechanical Dimensions with Antenna and Brackets



NOTE: The brackets can be rotated to support the reader's mounting in both vertical and horizontal orientations.

Figure 8 Bracket Orientations



Mounting Tips

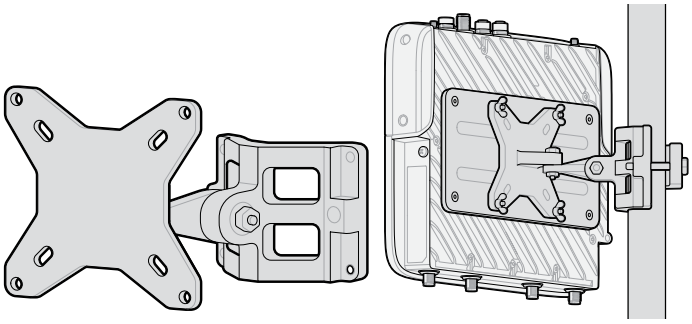
Mount the reader in any orientation. Consider the following before selecting a location for the reader.

- Mount the reader in an area free from electromagnetic interference. Sources of interference include generators, pumps, converters, non-interruptible power supplies, AC switching relays, light dimmers, and computer CRT terminals.
- Ensure that any cable losses between the reader and antenna are considered to ensure the desired level of system performance.
- Ensure that power can reach the reader.
- Ensure the reader is mounted in a location where it will not be easily disturbed, bumped, or damaged.
- Use a level for precise vertical or horizontal mounting.

VESA Mount

This section describes an external bracketing device that can be used to mount the FXR90 reader.

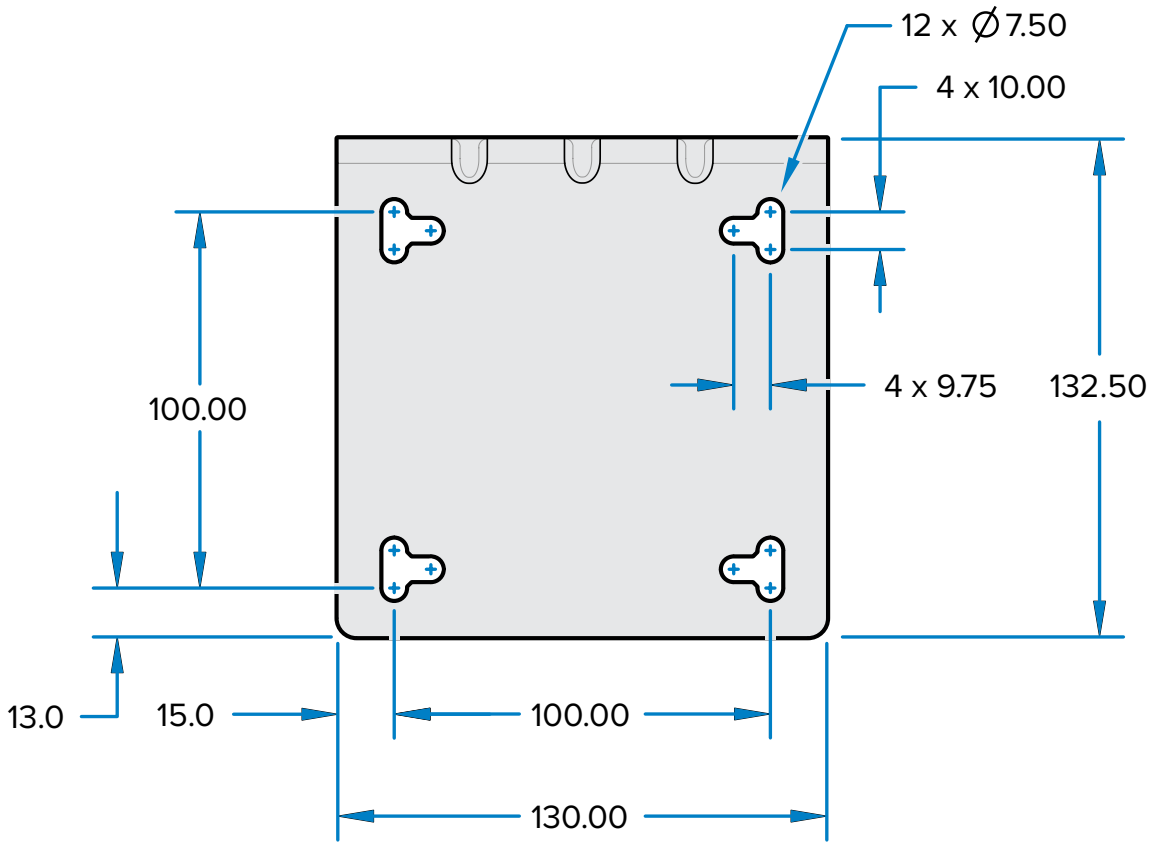
The VESA Mount (P/N: MNT-100100MM-01) is a heavy-duty articulating mounting bracket.



- The bracket can be used in both vertical and horizontal configurations.
- The bracket is suitable for indoor/outdoor use.
- The bracket is adjustable in both azimuth and elevation for the purpose of aiming the reader.
- The adaptor plate (P/N: ADP-200100MM-01) is assembled between the FXR90 and the VESA mounting bracket. To complete the assembly, adapt the 200 mm x 100 mm hole pattern on the FXR90 to the VESA mounting bracket's 100mm x 100mm hole pattern. Use the screws from the flush mount bracket to attach the adaptor plate.

WAN Antenna Bracket

This section provides the mounting pattern information for the WAN Antenna Bracket (P/N: BRKT-000373-01)



NOTE: The vertical and horizontal slots provided allow the use of 12.7 mm (0.5 in.) hose clamps to secure the bracket instead of screws.

Connecting Reader Antennas

To safely install the reader antennas

IMPORTANT: The appropriate Zebra antennas provide optimal performance for various use cases. To meet optimum RF specifications, an antenna with maximum VSWR = 1.3 must be used.

CAUTION: To ground the device, use the pre-installed #10-32 x 0.250" grounding screw on the side of the device.

IMPORTANT: The protective caps should remain on all connectors when not in use, especially for outdoor applications.

WARNING: Follow all antenna installation and power connection instructions before operating the reader to avoid personal injury or equipment damage that may result from improper use. To

safeguard personnel, be sure to position all antenna(s) according to the specified requirements for your regulatory region.

CAUTION: Power off the reader before connecting antennas. Never disconnect the antennas while the reader is powered on or reading tags. This can damage the reader.

Do not turn on the antenna ports from a host when the antennas are not connected.

Maximum antenna gain (including any cable loss) cannot exceed 6.7 dBiL. Ensure that the device is correctly set to the country where the reader is being used to assure regulatory compliance.

When mounting the antennas outside the building, equipment shall permanently connect to building earth (ground) by a skilled person. Perform this in accordance with applicable national electrical installation codes.

To connect the antennas to the reader, attach the RP-TNC connector coming from each antenna to an antenna port and secure the cable using wire ties. Do not bend the cable beyond the rated bend radius.

Communication and Power Connection

Use a standard Power-Over Ethernet (PoE) or PoE+ connection for the reader to a host or network.

IMPORTANT: The protective caps should remain on all connectors when not in use, especially for outdoor applications.

Ethernet Connection

The reader communicates with the host using an Ethernet connection (10/100/1000 Base-T Ethernet cable).

This connection allows access to the Administrator Console, which changes reader settings and controls the reader. With a wired Ethernet connection (10/100/1000 Base-T cable), power using either the approved reader Zebra power supply or by PoE/PoE+ through the Ethernet cable.

Ethernet: Power via External Power Supply

The FXR90 RFID reader communicates to the host through a 10/100/1000 Base-T Ethernet cable and receives power through a Zebra power supply.

1. Select the 1 m, 3 m, 5 m, or 15 m Ethernet cable.
2. Connect the Ethernet cable to the FRX90 Ethernet M12 connector.
3. Connect the other end of the Ethernet cable to the host system LAN port.
4. Assemble the power supply cable connector to the reader.
5. Route the power cable.
6. Connect the FXR90 Zebra AC power supply to a wall outlet.
7. Verify that the unit booted properly and is operational.
8. On a networked computer, open an internet browser and connect to the reader. Go to Connecting to the Reader.
9. Log into the Administrator Console. Go to Administrator Console Login

Ethernet: Power via PoE or PoE+

The PoE installation option allows the reader to communicate and receive power on the same 10/100/1000 Base-T Ethernet cable.

1. Select the 1 m, 3 m, 5 m, or 15m Ethernet cable.
2. Connect the Ethernet cable to the FXR90 Ethernet M12 connector.
3. Connect the other end of the cable to an Ethernet network with PoE or PoE+ capability.
4. Verify that the reader booted properly and is operational.
5. On a networked computer, open an internet browser and connect to the reader. Go to Connecting to the Reader.
6. Log into the Administrator Console. Go to Administrator Console Login

USB Connection

The USB port supports (by default) a Network mode of operation. This enables a secondary network interface as a virtual network adapter over USB.

The Ethernet network interface co-exists with the USB virtual network adapter. However, only one application connection (RFID or web console connection) is allowed a time. The default IPv4 to access the reader is 169.254.10.1.

IMPORTANT: Keep protective caps on all connectors when not in use, especially for outdoor applications.

GPIO Interface Connection

The GPIO connection allows up to 4 inputs, 4 outputs and supplies +24 VDC for external sensors and signaling devices. The GPIO interface is electrically isolated from the reader's chassis ground, but its ground is common to the power return of the 24 VDC external supply when this is present.

GPIO signals allow some flexibility. Inputs are pulled up within the reader to +5 VDC and can be shorted to ground to pull them low. They are broadly compatible with industrial sensors with NPN outputs and may be connected directly to relays or switch contacts. Alternatively, they can be driven by 5V logic. In the low-state logic, the current source from the reader is approximately 3 mA, so standard gates in most logic families can drive them directly. Current flow in the logic high state is close to zero. The general-purpose outputs are open-drain (NPN type) drivers, pulled up to 5V. Each output can withstand voltages up to +30 VDC but should not be driven negatively. Drive 24V relays, indicator lamps, etc., by wiring them between the +24 VDC supply pin and the general-purpose output pins. Although each output can sink up to 1A, the maximum current drawn from the internal 24V supply is 1A, so use an external power supply if the current requirements exceed this. Note that the state of the general-purpose outputs is inverted; for example, driving a control pin high at the processor pulls the corresponding output low.

Table 4 GPIO Color Codes

Color	Description
Red	+12V/24V AUX DC Power Out
Black	GROUND
Brown	GP OUT 1

Table 4 GPIO Color Codes (Continued)

Color	Description
Orange	GP OUT 2
Yellow	GP OUT 3
Green	GP OUT 4
Blue	GROUND
Purple	GP IN 1
Grey	GP IN 2
White	GP IN 3
Pink	GP IN 4
Light Green	GROUND

Power Supply Options

This section reviews power supply options, procedures, and notices.

IMPORTANT: The only ways to provide power to the reader are with the Zebra-approved AC-DC power supply, the DC-DC power supply, through a PoE connection via an injector, or to 12-24 VDC directly using the Zebra-approved flying-leads cable or the Zebra-approved auto auxiliary power outlet adaptor (cigarette lighter) cable.

WARNING: Do not directly connect the reader to the line voltage.

Connecting the AC-DC Outdoor Input

Follow the instructions in this section to connect the AC-DC power supply input (P/N: PWR-BGA24V90W0WW).

1. Connect the appropriate AC power supply cord using the threaded circular connector. Fully insert the circular connector and hand-tighten it to secure it.
2. Determine the type of AC power supply cord.
   - When using the open lead AC power supply cord (CBL-PWRA150-M1200), connect the corresponding wire phase to the AC power system following the color codes below.

     Table 5 Wire Phase Color Codes

Phase	Color
Line	Black
Neutral	White
Protective Earth	Green / Yellow

   - When using an AC power supply cord terminating in a fixed IEC connector (CBL-PWRA035-M12IEC), connect to an appropriate IEC-style cord set.

For all applications, the connection should be performed by a licensed electrician, following local electrical codes, using certified connectors, wiring boxes, and weatherproof provisions as needed.

Connecting the AC-DC Outdoor Output

Follow the instructions in this section to connect the AC-DC power supply output (P/N: PWR-BGA24V90W0WW)

1. Connect the DC output cord (CBL-PWRD035-M12M12 or CBL-PWRD100-M12M12) to the power supply using the threaded circular connector. Ensure the appropriate length cord is used.

   Fully insert the circular connector and hand-tighten it to secure it.

2. Connect the opposite end of the DC output cord to the RFID reader.

Connecting the DC-DC Input

Follow the instructions in this section to connect the DC-DC power supply input (P/N: PWR-BGA24V90W1WW).

1. Using the threaded circular connector, connect the DC power supply cord (CBL-PWRD150-M12M00).

   Make sure the circular connector is fully inserted and screwed down; hand tighten only.

2. Observe the DC input wire color code

Table 6 DC Wire Color Code

SIGNAL	CONN 1	COLOR
DC_IN_POS (9-60 VDC)	1	RED
	2	RED
DC_IN_NEG	3	BLACK
	4	BLACK
ENABLE (DEFAULT ON)	5	BLUE

IMPORTANT: Grounding the ENABLE signal will disable the unit. Letting it float will enable it. ENABLE should not be connected to a voltage greater than 18 V DC.

Connection should be performed by a qualified professional, following local electrical codes, using certified connectors, wiring boxes, and weatherproof provisions as needed.

Connecting the DC-DC Output

Follow the instructions in this section to connect the AC-DC power supply output (P/N: PWR-BGA24V90W1WW).

1. Connect the DC output cord (CBL-PWRD035-M12M12 or CBL-PWRD100-M12M12) to the power supply using the threaded circular connector. Ensure the appropriate length cord is used.

   Fully insert the circular connector and hand-tighten it to secure it.

2. Connect the opposite end of the DC output cord to the RFID reader.

Connecting the AC-DC Indoor Power Supply

Follow the instructions in this section to connect the AC-DC power supply (P/N: PWR-BGA24V78W3WW).

Locate the indoor use power supply in a cool, dry location.

- For Input: Connect an appropriate IEC power supply cord following local receptacle configurations.
- For Output: Connect the DC output cord to the RFID reader following the connection instructions provided.

Power Supply Mounting Pattern

The images below detail the mounting pattern for the outdoor AC-DC power supply (P/N: PWR-BGA24V90W0WW) andDC-DC power supply(P/N: PWR-BGA24V90W1WW) .

Figure 9 Outdoor AC-DC Power Supply Mounting Pattern

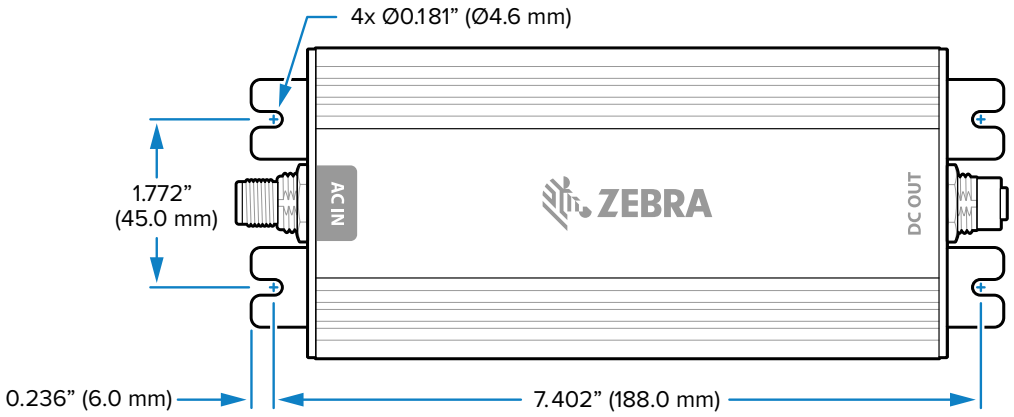
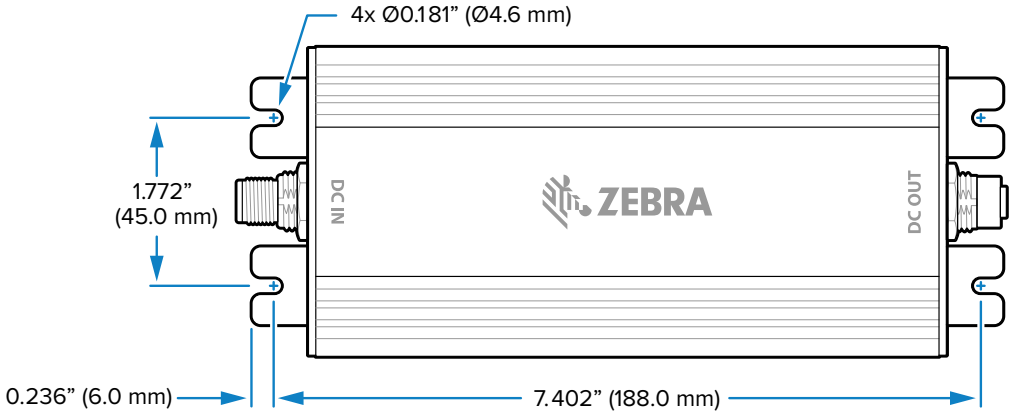


Figure 10 DC-DC Power Supply Mounting Pattern



NOTE: This does not apply to the indoor AC-DC (P/N: PWR-BGA24V78W3WW) power supply.

Cable Length Versus Voltage Drop

Table 7 Minimum Recommended Voltage at Battery Terminals

Cable Length of CBL-PWRD150-M12M00 (18 AWG x 2 DC+, DC-)	VDC
0 m (0 ft)	9.0
1.5240 m (5 ft)	9.2
3.048 m (10 ft)	9.4
4.572 m (15 ft)	9.6
6.096 m (20 ft)	9.8
7.620 m (25 ft)	10.0
9.144 m (30 ft)	10.2
10.668 m (35 ft)	10.4
12.192 m (40 ft)	10.6
13.716 m (45 ft)	10.8
15.240 m (50 ft)	11.0

123RFID Desktop Application

123RFID Desktop is a setup and optimization tool for RFID sleds. This section describes the application and its features.

Application Features

123RFID Desktop is a software tool that simplifies reader setup. The application finds and connects to a reader with three simple clicks and optimizes Zebra passive RFID fixed and handheld readers. Supported models include FX7500, FX9600, FXR90, ATR7000, RFD40 and RFD90.

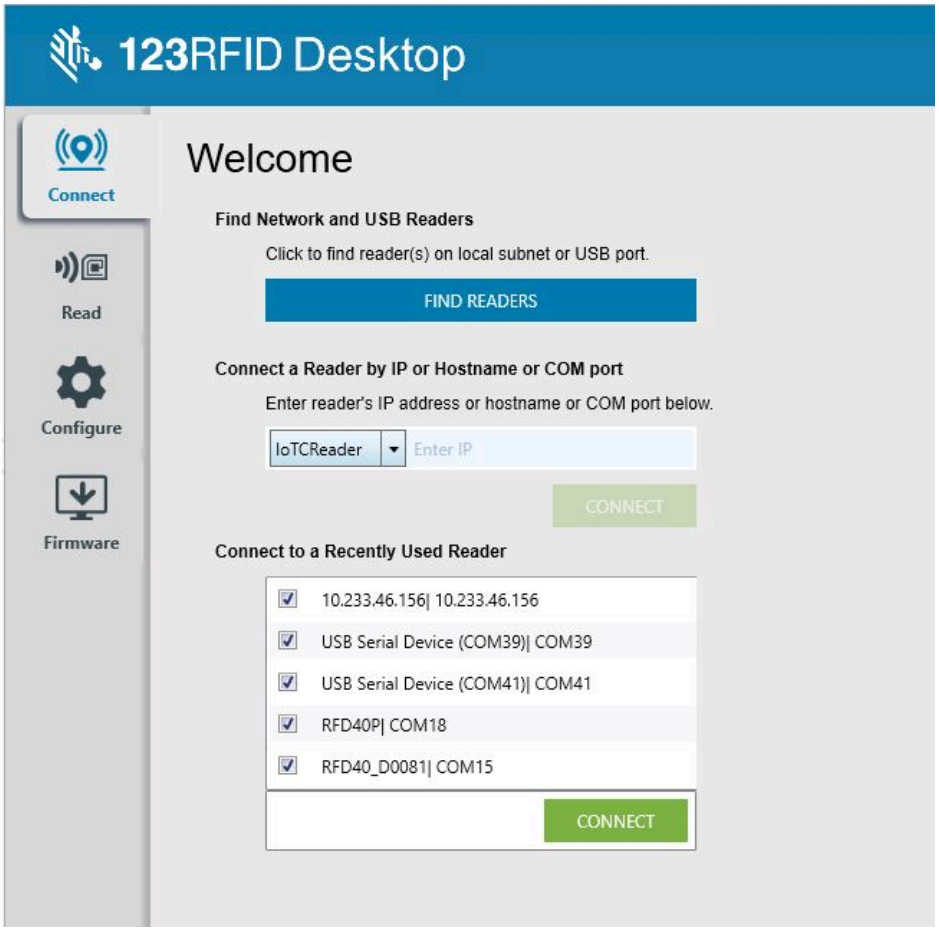
- Connect - allows users to search for readers on the local subnet, USB port, or Bluetooth.
- Read - allows users to start an inventory, view summary metrics on tag reads, and sort, filter, and export tag data. Select an antenna and set the power level to begin building an inventory.
- Configure - allows users to configure reader and scanner settings. Settings can be saved to a file or as a printed report.
- Firmware - allows users to update the firmware on up to five devices.

NOTE: The Scan tab is available only for connected sleds that have an imager.

Connect

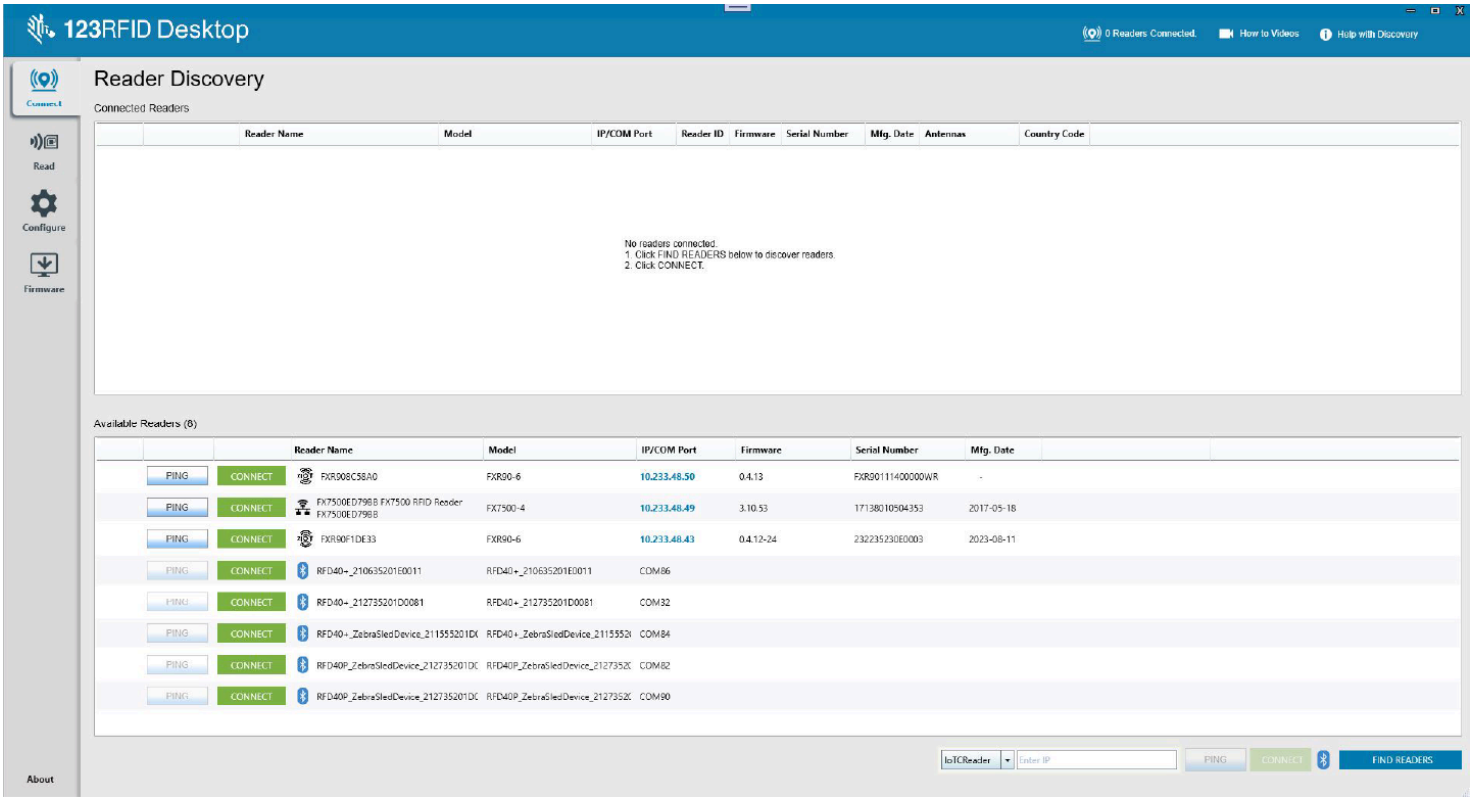
Users can locate readers on the local subnet or via USB port by clicking **Find Readers** or by entering the IP, hostname, COM port, or by Bluetooth and clicking **Connect**.

Figure 11 Fixed Readers



To discover readers on the network, view the **Available Readers** section of the application and click **Connect** on one of the associated rows to connect to the specified reader.

Figure 12 Available Readers

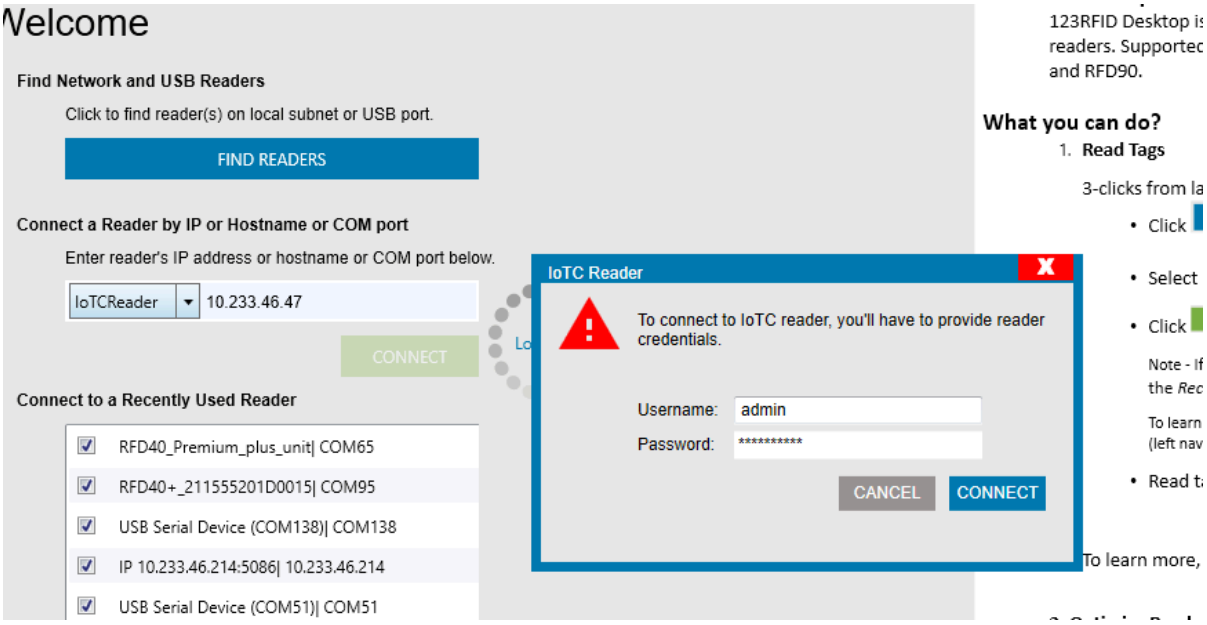


Connect Reader Manually

If the reader is not listed, one can connect manually.

Select reader type, enter the reader's IP address, hostname, or COM port, and click Connect. Enter the Username and Password for the reader to connect.

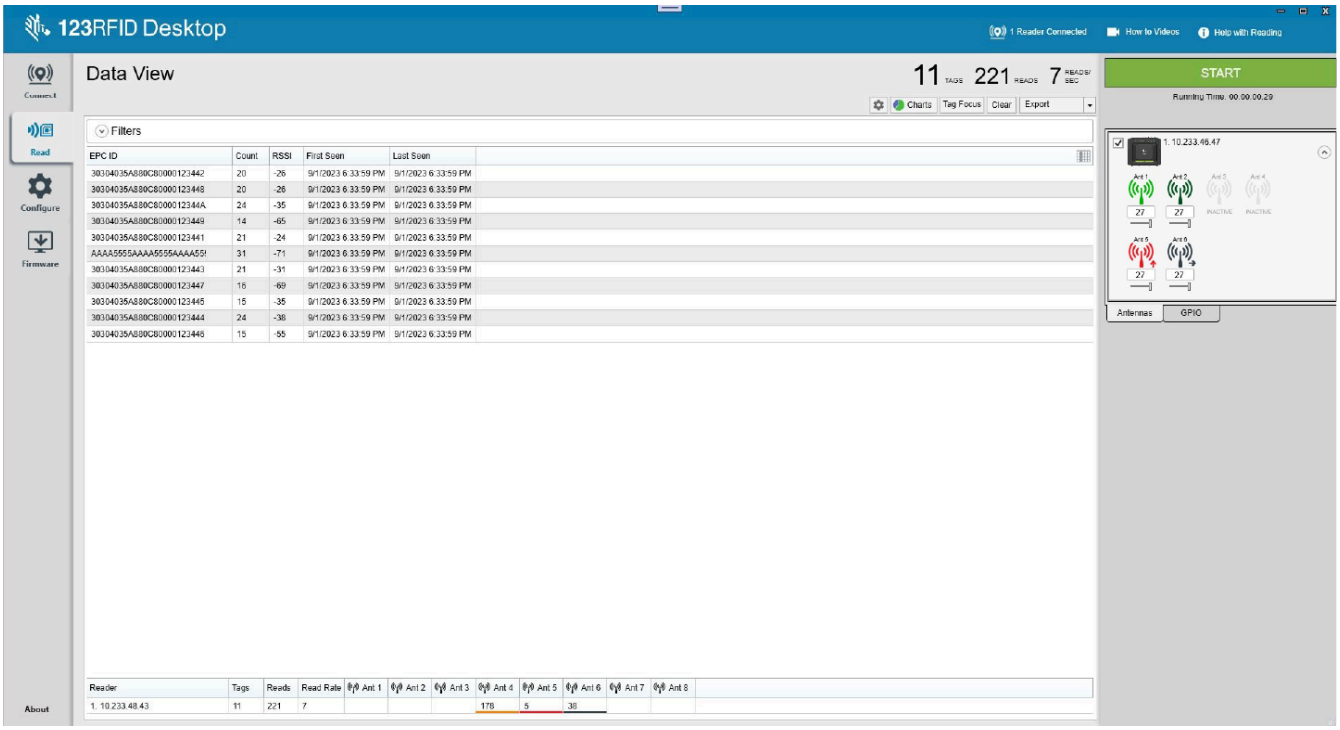
Figure 13 Log In to the IOTC reader



Read

The read feature allows users to start an inventory. Users can view summary metrics on tag reads by the reader, sort, filter, and export tag data to a file. Select the antenna and set the power level to start an inventory.

Figure 14 FXR90 Data View



Click **Start** to start reading tags and recording an inventory.

Click the Gear icon to highlight tags based on the last time it was seen.

Click Tag Focus to enable this capability of applicable tags such Monza4, 5 and R6 tags.

To download the inventory data for offline viewing, click **Export** to export tag data to Excel.

- Export Summary - save a snapshot of all the tag reads displayed on the Read screen in Excel.
- Export History – save timeline data for tags read in Excel.

Click the spreadsheet icon to view tag details such as Tag ID and User Memory data.

Click Charts to view tag performance data.

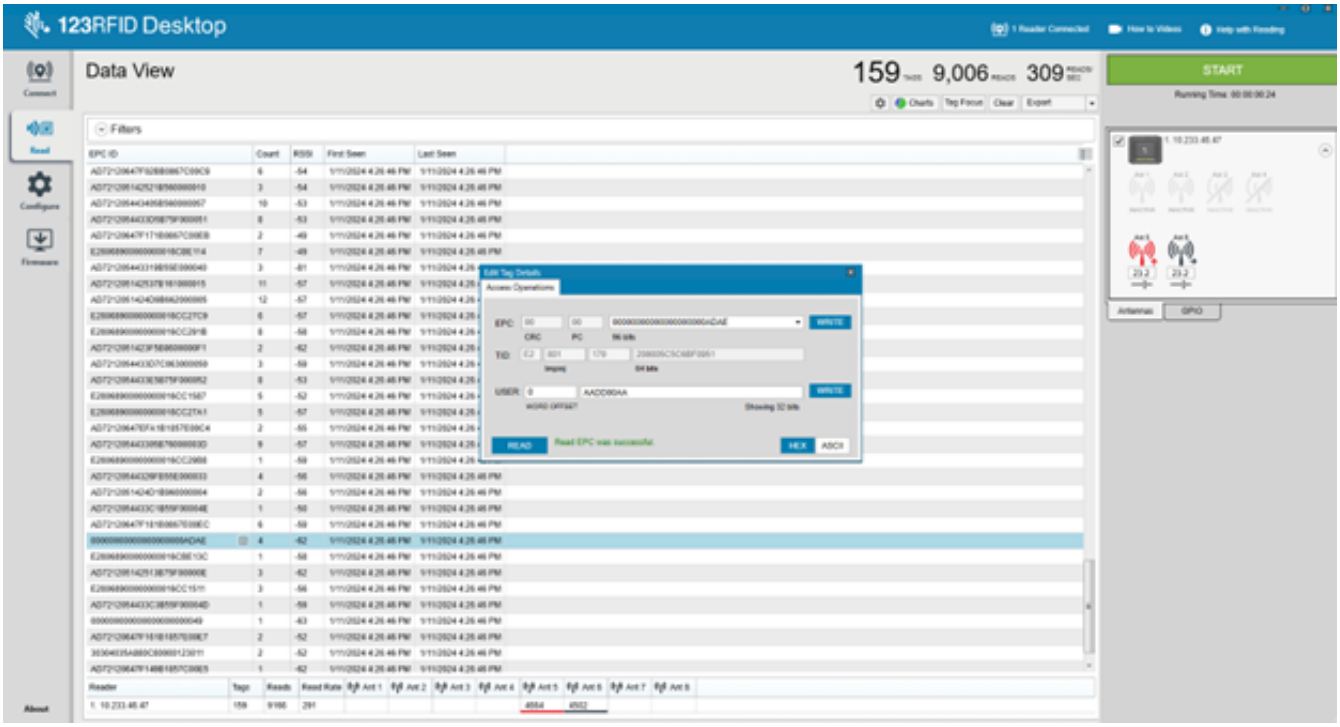
- Pie Charts visualize a distribution of tag reads across enabled devices.

Editing Tag Details

This section provides an overview of tag detail operations.

Select the tag row and click the icon or double-click on the tag row to Edit Tag Details. Read and write access operations can be performed using this option.

Figure 15 Edit Tag Details Dialogue Box



Filtering Tags

Click the Filters icon to select the following filter options.

- Select a file from Asset Tag List drop down menu to filter tags based on an Asset Tag List (ATL) file.
- Select reader(s) from the Show data from drop down menu to the tags by filter by reader.

- Click the cylinder icon to filter tag data at the application level by:
  - EPC Pattern - specify whether the EPC data will include or exclude the string.
  - RSSI Value - filter tags that have a RSSI value greater than the RSSI filter specified.
  - Time Last Seen - filter tags that were last seen in the time duration specified.

Online Reader Configuration

Click **Edit Configuration on Reader** to edit the reader's settings and use the configuration tool to do the following:

- Assign names to the reader and the connected antennas.
- Set reader settings or reset them to factory defaults.
- Change the reader's region configuration.
- Create rules for your GPIO (General Purpose Input/Output) accessories on when to trigger inventory and output results.
- Save/print configurations to a file.
- Deploy the configuration file to a new device.

Click **Load a Saved Config File to a Reader** to load a saved configuration file to another connected reader from the PC.

Region Configuration for Online Devices

Configure the appropriate settings based on the region where the reader is used. Different countries have different regulatory requirements on RF radiation, it is necessary to correctly set the country in which the reader is being used, to assure regulatory compliance. Due to differing frequency requirements, there are several versions of the hardware.

The list of choices presented is limited by the software to those selections compatible with the hardware in use. Note that if only one option is compatible with the hardware, that option is selected automatically.

Following are the definitions of different fields that can be set.

- **Region of Operation** choose the region for the country of operation. This must be selected from the dropdown list that presents the regions which have given regulatory approval to be used with the current board.

NOTE: Region of operation configuration is applicable to Worldwide readers only.

- **Communication Standard** choose the communication standard from the list of standards supported by the chosen region. If a region supports only one standard the same is chosen automatically.
- **Frequency Hopping** turn the frequency hopping option On or Off. This option is displayed only if the chosen region of operation supports this.
- **Selected Channels** select a subset of channels to operate upon (from the list of supported channels). This option is displayed only if the chosen region of operation supports this.

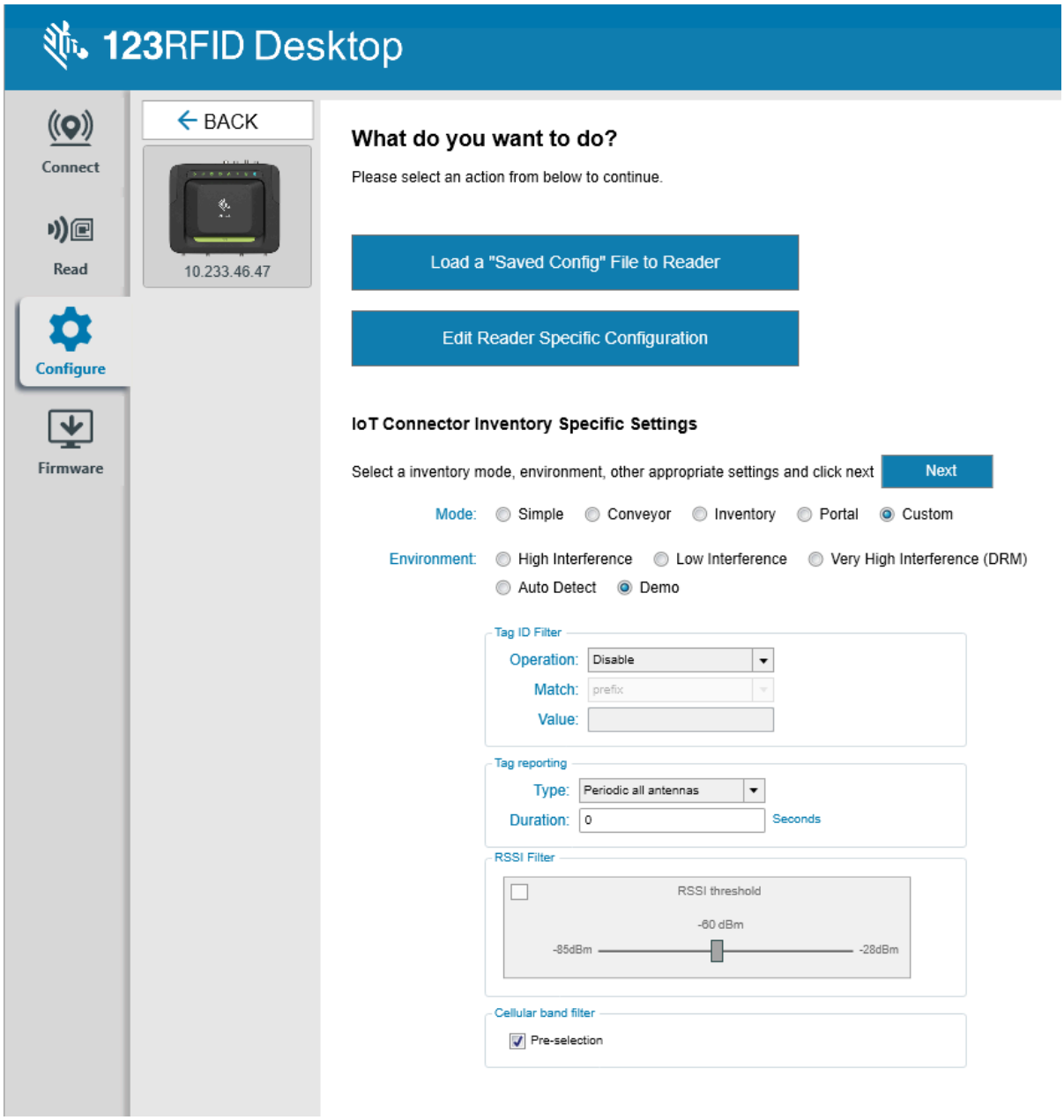
Click **Set** to send the user changes to the reader.

Confirm that your choices comply with local regulatory requirements by checking the **I understand** checkbox.

Operating Mode Configuration

This section provides details about the operating mode.

Figure 16 FXR90 Operating Mode



Antenna Configuration

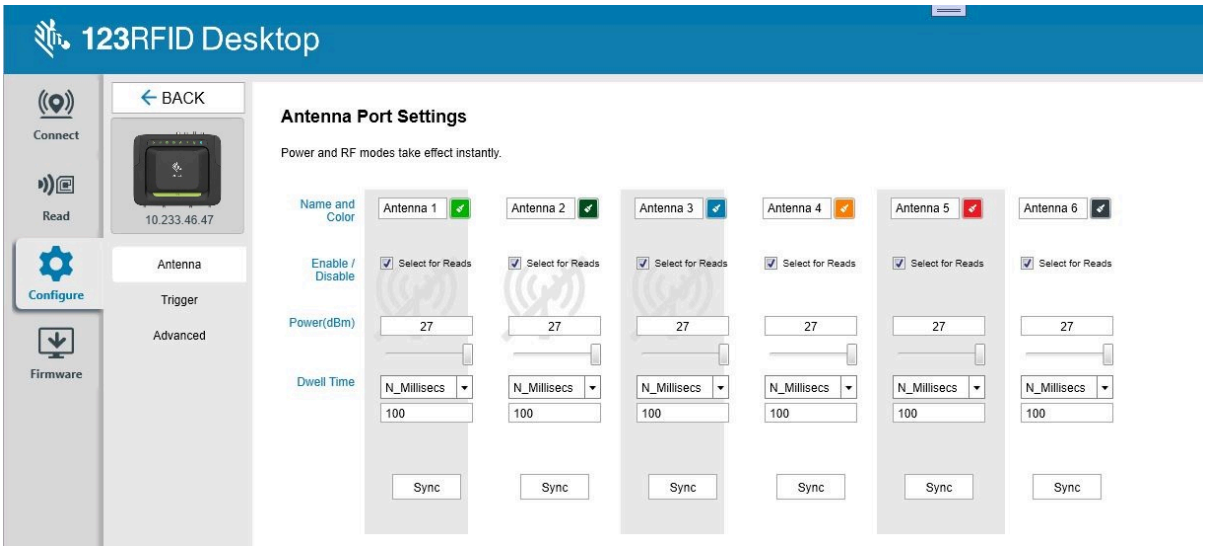
Configure Antenna Port settings for RFID sleds and fixed readers using 123RFID Desktop. The number of antennas is dependent upon reader type.

NOTE: Power and RF Mode changes are applied to the device instantly.

Configurable antenna settings for FXR90 fixed reader settings include:

- Name and Color
- Enable/Disable
- Power (dBm)
- Dwell Time

Figure 17 FXR90 Antenna Port Settings



Trigger Configuration

Configure start and stopping conditions for reading tags and identify tag reporting parameters.

Specify the start condition for a read:

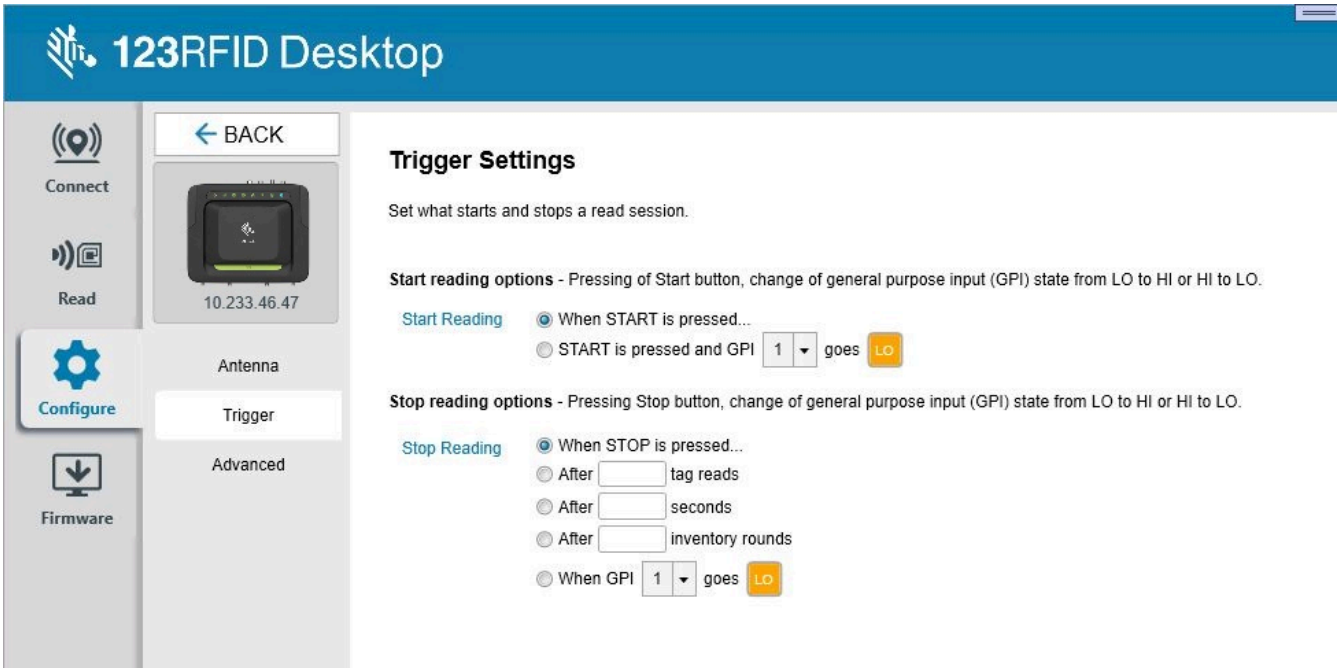
- When Start is clicked from the Read panel.
- When Start is clicked from the Read panel and the specified GPI pin goes to Lo or HI state.
- The specified GPI pin goes to Lo or Hi state.

Configure Report Tag Data to occur after a specified number of tag reads or after each tag is read for a specified number of seconds.

- When Stop is clicked from the Read panel
- After a specified number of total tag reads.
- After a specified time (ms) has elapsed after tag reading was initiated.

- After a specified number of inventory rounds. An inventory round consists of reading a tag on each selected antenna port.
- After the GPI trigger of the handheld device is released

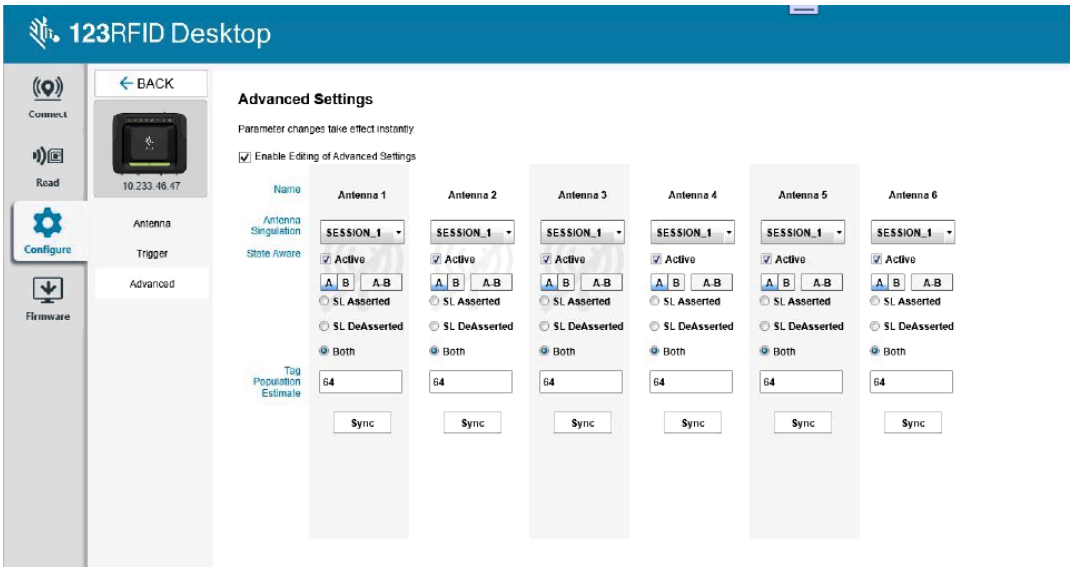
Figure 18 FXR90 Trigger Settings



Configuring Advanced Reader Parameters

Set all the advanced reader parameters, including setting antenna cable compensation values.

Figure 19 FXR90 Advanced Settings



1. Check the **Enable Editing of Advanced Settings** checkbox to edit any parameter.
2. Choose **Antenna Singulation Settings** to specify the reader session.
3. Choose **State Aware Singulation** Settings.
4. Check the **Active** checkbox to enable these settings.
5. Specify an expected **Tag Population** in the field of view of the antenna.
6. Set Antenna Cable Compensation values:
   a. Specify the cable loss in terms of dB per 100 feet for the antenna cable used to connect the antenna port to the antenna.
   b. Specify the cable length in feet of the cable used to connect this antenna port to the antenna.

NOTE: Setting a non-zero cable loss compensation value enables the reader to automatically increase the transmit power on this antenna port equivalent to the loss value specified. Setting an inappropriate value of cable loss can break the regulatory setting and is illegal.

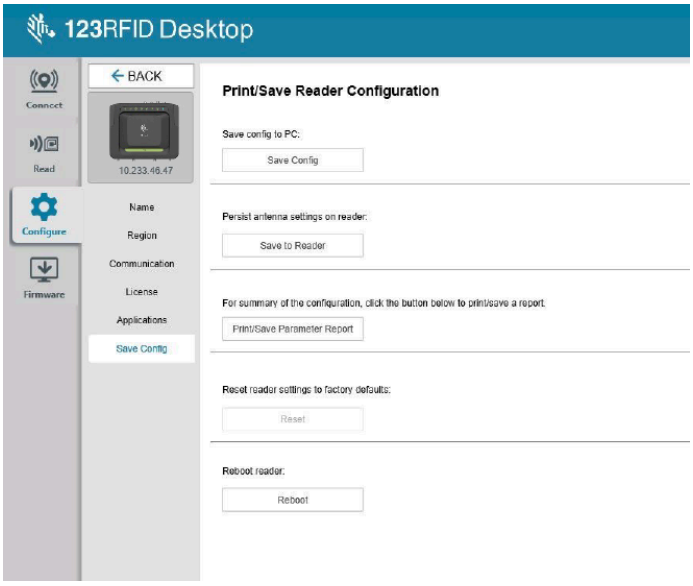
   c. Press Enter after entering the value in the textbox to set the cable loss compensation value.

NOTE: Setting the cable loss compensation value requires restarting the reader server. The default antenna settings are applied after setting the cable loss compensation value. Accessing cable compensation values requires logging in to the reader.

Saving an Online Configuration

Save or print reader configuration settings to a file, export IoT Connector configurations, or reset the sled to factory defaults.

Figure 20 FXR90 Reader Configuration



- Click **Save Config** to save settings to a file on PC.
- Click **Save to Reader** to push antenna settings on to the reader.

- Click **Export** to export IoT Connector configurations.
- Click **Print/Save Parameter Report** to print settings to a report.
- Click **Reset** to reset antenna settings to factory defaults
- Click **Reboot** to reboot reader

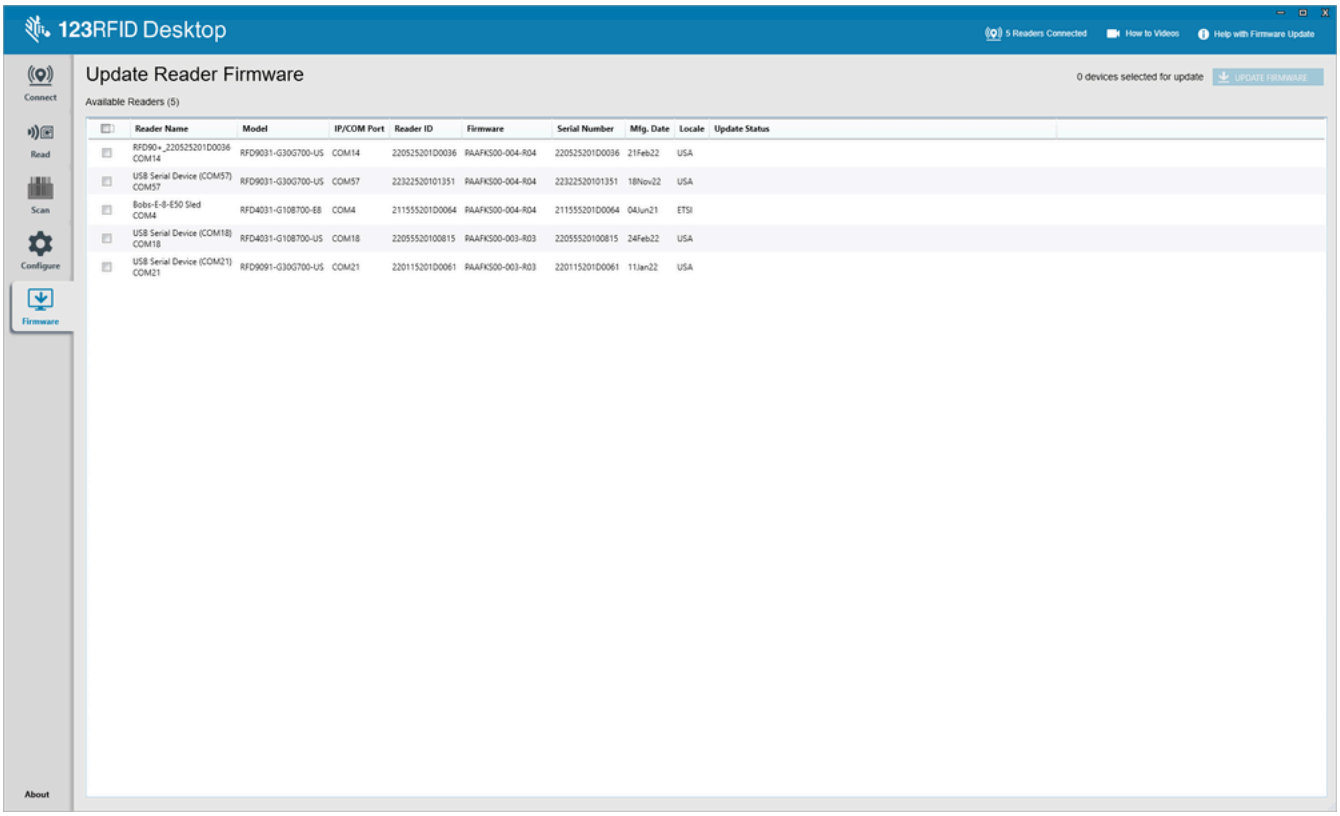
NOTE: Reset to factory default is available for connected readers under the save config tab.

For information on extending the export to the IoT Connector operating configuration with additional settings such as operation triggers and GPO, refer to zebradevs.github.io/rfid-ziotc-docs/.

Firmware Management

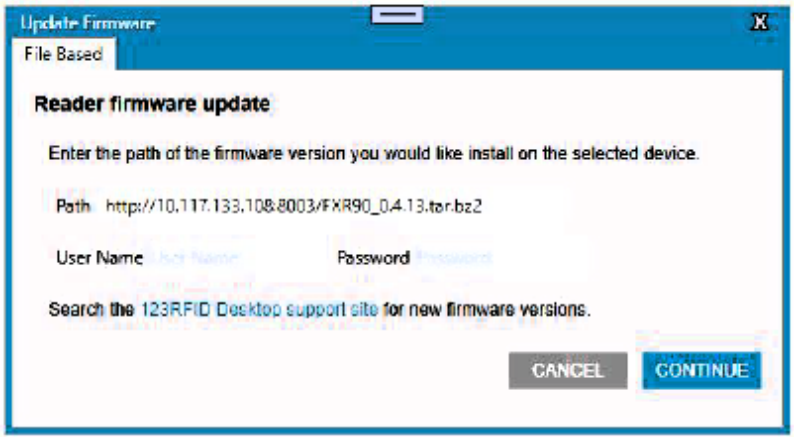
To update reader firmware on up to five devices simultaneously, select the devices on the table by clicking the associated checkbox and clicking. **Update Firmware**.

Figure 21 Update Reader Firmware



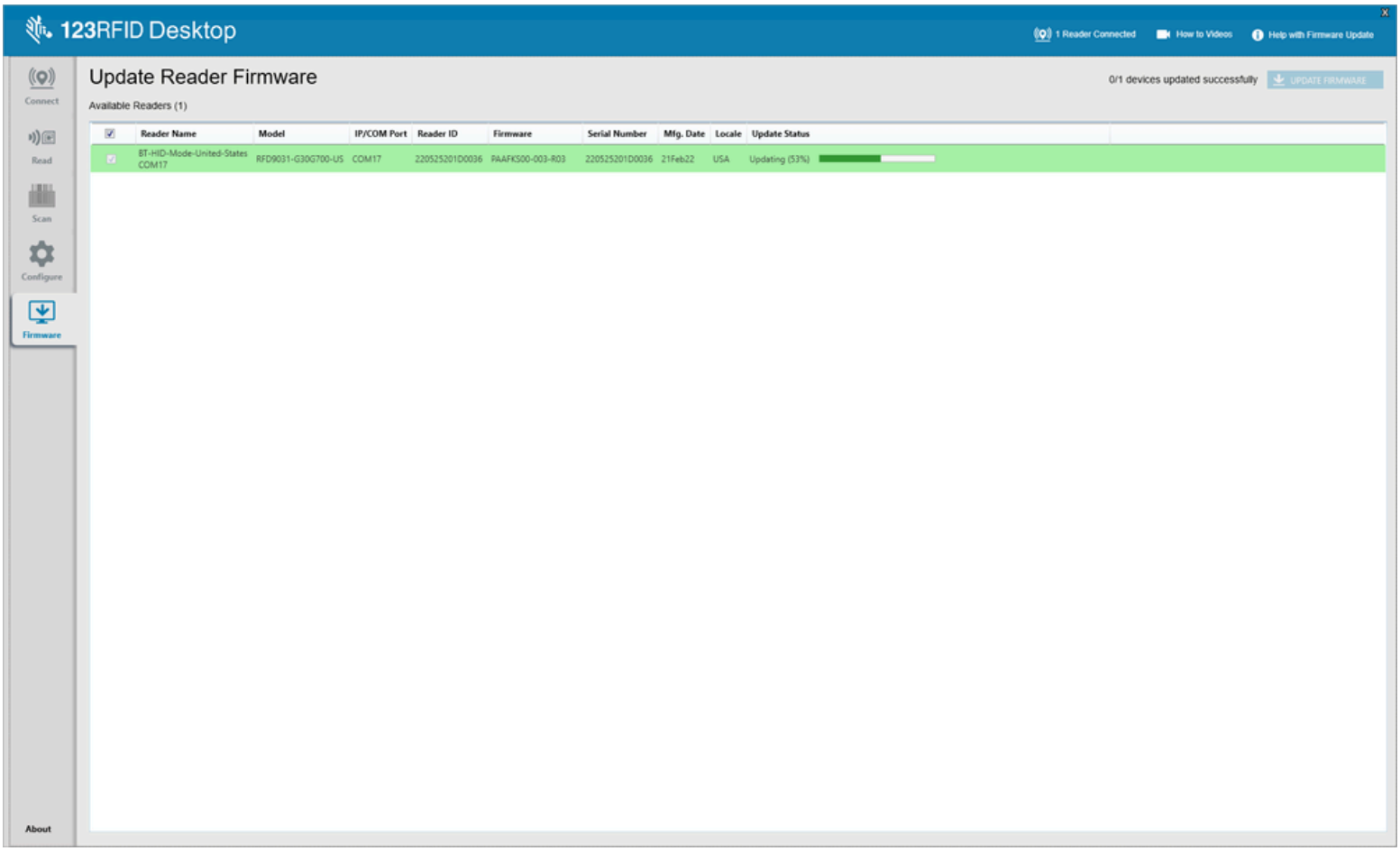
Observe the **Update Reader Firmware** window and click **Browse** to select the firmware version to enable on the device.

Figure 22 FXR90 Firmware Update



The progress bar next to the associated reader indicates the completion percentage of the firmware update.

Figure 23 Firmware Update in Progress



Administrator Console

This section describes the web-based Reader Administrator Console functions and procedures. Access the Administrator Console using a web browser from a host computer and use it to manage and configure the readers.

NOTE: The screens and windows in this section may differ from actual screens and windows. The applications described may not be available on (or applicable to) all devices. Procedures are not device-specific and are intended to provide a functional overview.

Reader Administrator Console

Review the layout for the Reader Administrator Console.

Figure 24 Reader Administrator Console Home Screen

The following information is available from the home screen tiles.

- Up Time - Displays the amount of time since the last device reboot.
- CPU load - Displays a percent of resources being used by the device at a particular time.

- Resource Utilization- Displays memory usage and disk usage.
- Temperature- Displays ambient temperature in Celsius.
- System Info- Displays Ethernet, Wi-Fi, Bluetooth, MAC, Source, and PoE+ status.
- GPIO Ports- Displays port status.
- Antenna- Displays antenna status.
- Reader Information- Displays Model Number, Software version, Hardware ID, Host Name, Serial Number, Radio Firmware, and USB Port status.
- Regulatory- Displays Country and Communication Standard.
- Radio Status - Indicates the state as either active or in-active.

Auto Discovery

The reader supports WS-Discovery to readers in a subnet. The reader implements WS-Discovery conforming to RFID Reader Management Profile (RDMP) specification in ISO 24791-3. RDMP is based on an extension for Device Profile for Web Services (DPWS). The discovery mechanism is limited to subnets and does not work across subnets. The 123RFID Desktop application supports this feature and lists the discovered reader using reader host names. Because this feature is based on WS-Discovery, the readers can also be discovered on Windows computers by selecting the Network icon in a file browser.

Connecting to the Reader

Overviews different methods for connecting to the reader.

To use the Administrator Console to manage the reader, power up the reader, and connect it to an accessible network. The green power LED indicates that the reader is ready. If the green power LED is not lit, reset the reader. See Resetting the Reader.

Connect to the reader in one of two ways:

- Connecting via Host Name
- Connecting via IP Address

NOTE: See Obtaining the IP Address via Command Prompt for more information.

There are three ways to assign an IP address to the reader:

- Using DHCP on the network.
- Using Link Local Networking when DHCP Server is Not Available
- Statically assigning an IP.

Assigning the IP supports connection using the host name or IP address. Alternatively, connect the reader directly to a local computer using zero-configuration networking.

NOTE: When using Link Local networking, the readers cannot communicate with computers on different subnets or with computers that do not use automatic private IP addressing.

Connecting to the Reader via Command Prompt

This section provides command prompt summary instructions for accessing the IP address/hostname.

To obtain the reader IP address without logging into the reader, open a command window and ping the reader hostname. Go to Connecting via Host Name for detailed instructions.

Connecting via the Host Name

This section provides information and instructions for connecting the reader using the hostname.

CAUTION: Reader hostname is not guaranteed to work at all times. Its recommended use is only in networks where the probability for IP collisions is low, such as a network in which a DNS server is configured to work together with DHCP to register host names. Host name usage is not recommended in a network without strict control to prevent IP collisions, such as informal networks that use static IP configuration.

NOTE: Connect the reader to a network that supports hostname registration and lookup to ensure the network can access the reader using the hostname. For instance, some networks can register host names through DHCP. When first connecting to the reader, it is recommended to keep DHCP enabled in both the PC and the reader. Use the hostname printed on the reader label, or construct it using the reader MAC address on the reader back label. The hostname is a string with an FXR90 prefix followed by the last three MAC address octets. For example, for a MAC address of 00:15:70:CD:3B:0D, use the prefix FXR90, followed by the last three MAC address octets (CD, 3B, and 0D), for the hostname FXR90CD3B0D. Type https://FXR90CD3B0D in the browser address bar to access the reader.

1. Open a browser.

   It is recommended to use the most up-to-date version of Chrome, Firefox, Safari, or Edge.

2. Enter the hostname provided on the reader label in the browser (for example, https://fxr907cd3b0d) and press Enter.

   The Console Login window appears, and the reader is ready.

Go to Administrator Console Login to log in to the reader.

Connecting via IP Address

To use the IP address to connect to the reader:

1. Open a browser.

   It is recommended to use the most up to date version of Chrome, Firefox, Safari, or Edge.

2. Enter the IP address in the browser (for example, https://157.235.88.99) and press Enter.

   The Console Login window appears and the reader is ready.

Proceed to Administrator Console Login to log in to the reader.

Using Link Local Networking when DHCP Server is Not Available

If a DHCP server is not available, the reader can use Link Local networking to automatically provide a unique network IP address. The reader can then use TCP/IP to communicate with other computers also using a Link Local networking-generated IP address.

NOTE: When using Link Local networking, the reader cannot communicate with computers on different subnets, or that do not use automatic private IP addressing. Automatic private IP addressing is enabled by default.

Use the Link Local networking procedure when the reader is connected directly to a PC. It reduces the overhead needed to configure the reader to a static IP address.

When Link Local networking executes after failing to detect a DHCP server, the reader automatically assigns an IPv4 IP address to the Ethernet interface in the form `169.254.xxx.xxx`. This IP address is predictable because it uses the last 2 bytes of the MAC address, usually represented as HEX values, to complete the IPv4 address. These values are converted to decimal format (for example, if the MAC address ends with `55:9A`, the IPv4 address assigned by the Link Local algorithm is `169.254.85.148`.

Windows-based computers support APIPA/Link Local networking by default when DHCP fails. To enable APIPA for a Windows PC, go to support.microsoft.com/ and search for APIPA.

Administrator Console Login

Introduces the protocol to login to the administrator console.

NOTE: Use the most up-to-date version of Chrome, Firefox, Safari, or Edge. These browsers were tested and validated to work properly. Other browsers may or may not work correctly.

First Time / Start-up Login

This section provides the necessary information for first-time login to the administrator console.

When starting the reader for the first time, set the region of reader operation.

NOTE: Setting the reader to a different region is illegal.

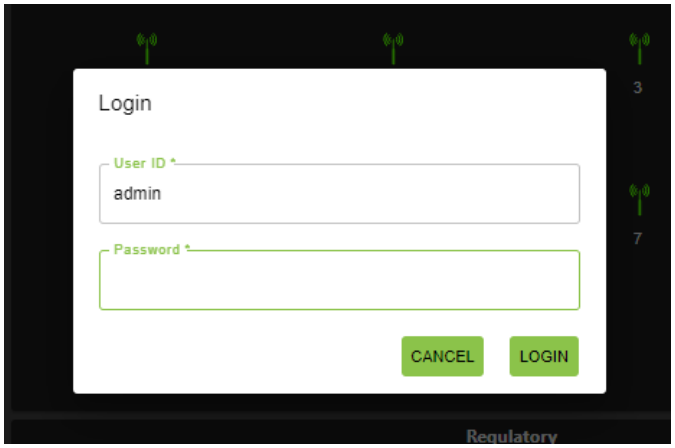
Logging In with Default User ID and Password

This section provides instructions for default login.

The User Login window displays upon connecting to the reader with a web browser.

1. In the **User ID** field auto-populates admin. Enter change in the **Password** field.

   Figure 25 User Login Screen

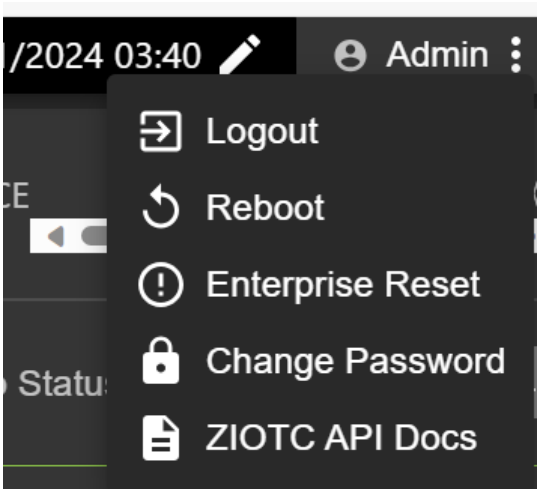


2. Click **Login**.
3. As a first-time user, you will be prompted to change your password.

Admin Drop-down Menu

This section describes the features accessible from the Admin Drop-down menu.

Figure 26 Admin Drop-down Menu



The Administrator Drop-down menu provides the following options:

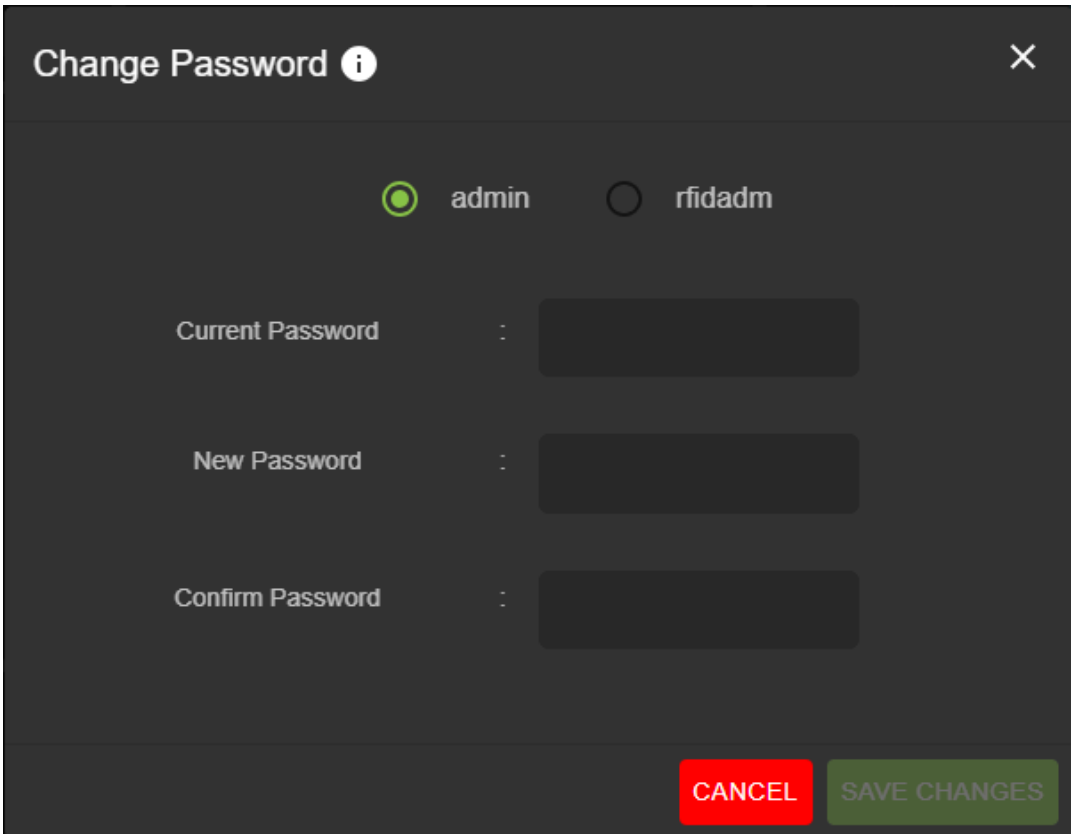
- **Logout** - This option allows the user to logout of the reader.
- **Reboot** - This option shuts the reader off and then has it automatically turn back on.
- **Enterprise Reset** - This option returns the reader to factory settings.
- **Change Password** - This option allows the user to change the login password.
- **ZIOTC API Docs**- This option allows the user to access the ZIOTC API Documentation.

Change Password

Instructions to change the user password for the reader administrator console.

Select **Change Password** from the admin menu to view the Change Password window.

Figure 27 Change Password Window



1. In the **Current Password** field, enter the existing password.
2. In the **New Password** field, enter the desired new password.
3. In the **Confirm Password** field, reenter the desired new password.
4. Click **Save Changes**.

Setting the Region

For the global reader configurations, set the region of operation.

IMPORTANT: Setting the unit to a different region is illegal.

NOTE: Region configuration is not available for the readers to operate in the United States (under FCC rules). Skip this step if you are configuring the readers to be used in the US.

- Region of Operation - Select the region for the country of operation from drop-down list. This list includes regions with regulatory approval to use with the current board.

- Communication Standard - Select the communication standard from the list of standards that the chosen region supports. If a region supports only one standard, it is automatically selected.
- Channel Hopping - Check to select Channel Hopping. This option appears only if the chosen region of operation supports this.
- Operating Channels - Select a subset of channels to operate (from the list of supported channels). This option appears only if the chosen region of operation supports this.

1. Click the pencil icon in the regulatory title to open the settings editor.

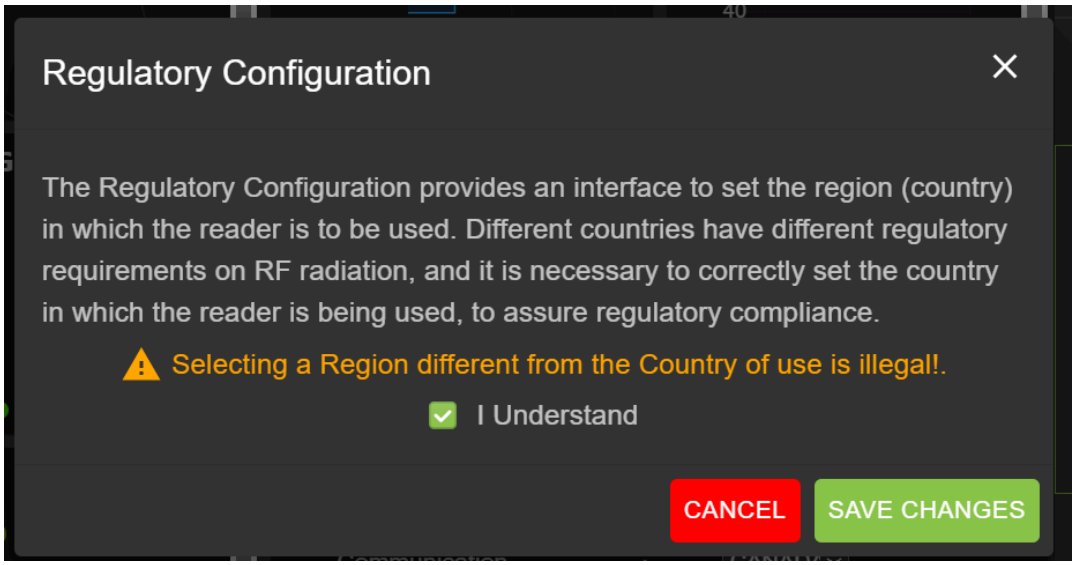
Figure 28 Configure Country Settings

2. In the same window, select the Communication Standard, if applicable.
3. In the same window, select Frequency Hopping, if applicable.
4. In the same window, select the appropriate channels if applicable.

5. Click the check icon to finalize changes.

   The confirmation dialogue box appears.

   Figure 29 Regulatory Confirmation Dialogue



6. Check the I Understand statement and click save changes.

The screen will reflect the selections.

Administrator Console Option Selections

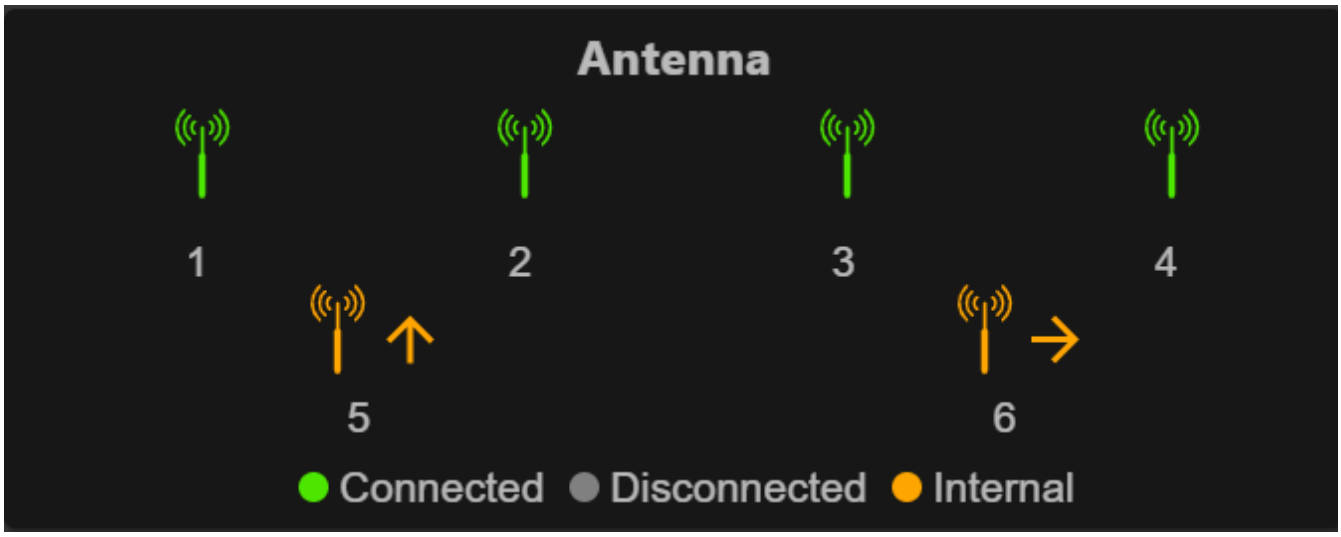
An overview of the sections for the Administrator Console.

- Configure Reader - go to Configure Reader
  - Antenna- go to Antenna status and Antenna configuration
  - Region - see Configure Region
- Change Password - go to Change Password
- GPIO - go to GPIO
- Applications - go to Applications
- Firmware - go to Firmware Update
- System Log - go to System Log

Antenna Status

Status buttons indicate the status of the reader's read points.

Figure 30 Antenna Status



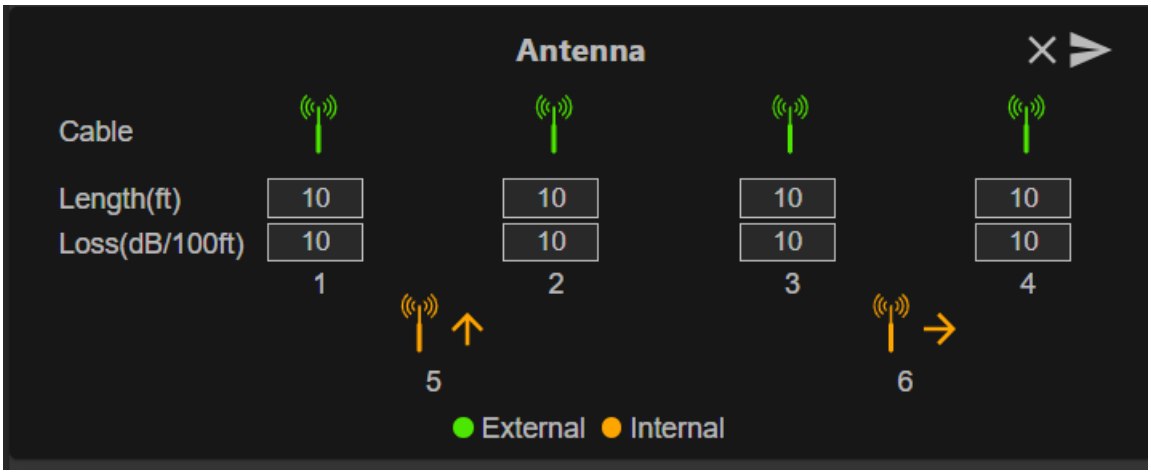
Status button color indications follow.

- Green: Indicates an externally connected antenna.
- Yellow: Indicates an internally connected antenna.
- Gray: Indicates that the antenna is not connected.

Antenna Configuration

Reviews the configuration settings for the Antenna.

Figure 31 Antenna Default Configuration



- Cable loss (dB/100 ft) - Specifies the cable loss in terms of dB per 100 feet length for the antenna cable that is used to connect this read point port to the antenna. Refer to the specification of the

antenna cable for this information. The default value is 10. Setting this and the cable length to non-zero values allows the compensating for the RF signal loss in the cable due to attenuation by specifying an appropriate increase in the transmit power for this read point. The reader uses this and the cable length value to internally calculate the cable loss. The calculated cable loss is internally added to the power level configured on the read point.

- Cable length (ft) - Sets the cable length in feet of the physical cable that connects the read point port to the antenna. The default cable length is 10 feet.

Set Properties by clicking the arrow button.

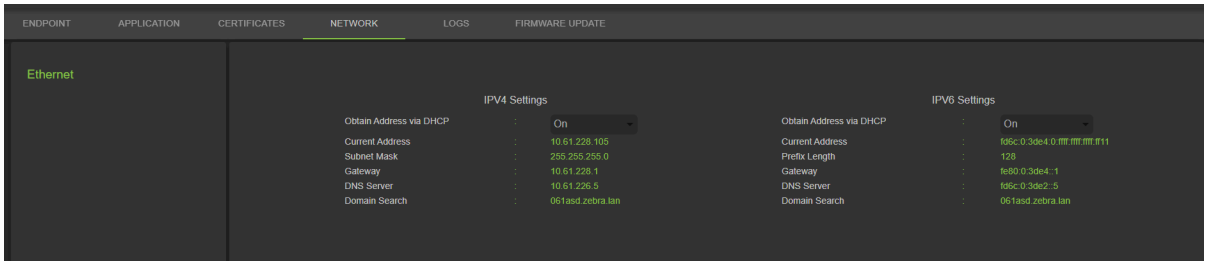
Network Settings

Click the gear icon to open Settings, then click the Network tab. This window has tabs for Ethernet, Wi-Fi, and Bluetooth. Ethernet has options for IPv4 and IPv6. Bluetooth is only IPv4.

Configure Network Settings - Ethernet Tab

This section provides details about the configuration options for Ethernet connection.

Figure 32 Configure Network Settings- Ethernet Tab



Ethernet IPv4

The section describes Ethernet IPv4 connection with the reader.

- Obtain IPv4 Address via DHCP - The reader supports both automatic TCP/IPv4 configuration via DHCP and manual configuration. The DHCP button turns DHCP on and off.

NOTE: If **Obtain Address Via DHCP** is turned on, this window displays actual current values of the reader's IPv4 address, subnet mask, default gateway, DNS server, and domain name search. Because these are obtained from the DHCP server, they cannot be changed manually. If DHCP is turned off, you can set the following values for these fields.

- Current IPv4 Address - IP address (in dotted notation) at which the reader is assigned.
- IPv4 Subnet Mask - Subnet mask (in dotted notation) appropriate for the network in which the reader resides.
- IPv4 Default Gateway - Default gateway (in dotted notation) appropriate for the network in which the reader resides.
- IPv4 DNS Server - DNS server (in dotted notation) appropriate for the network in which the reader resides.
- Domain Name Search- The domain name for which a reader is assigned.

NOTE: You must select the arrow button to update the network configuration. If saving changes is unsuccessful, the system indicates the problem and allows correcting it by repeating the operation. DHCP and IP address updates are immediately applied.

Ethernet IPv6

The section describes the Ethernet IPv6 connection with the reader.

- Obtain IPv6 Address via DHCP - The reader supports both automatic TCP/IPv6 configuration via DHCP and manual configuration. The DHCP button turns DHCP on and off.

NOTE: If **Obtain Address via DHCP** is turned on, this window displays the current values of the reader's IPv6 address, subnet mask, default gateway, DNS server, and domain name search. Because these are obtained from the DHCP server, they cannot be changed manually. If DHCP is turned off, you can set the following values for these fields.

- Current IPv6 Address - IP address (in colon notation) at which the reader is assigned.
- Prefix Length - Prefix length appropriate for the reader's network.
- IPv6 Default Gateway - Default gateway (in colon notation) appropriate for the network in which the reader resides.
- IPv6 DNS Server - DNS server (in colon notation) appropriate for the network in which the reader resides.
- Domain Name Search- The domain name assigned to the reader.

NOTE:

You must select the arrow button to update the network configuration. If saving changes is unsuccessful, the system indicates the problem and allows correcting it by repeating the operation. DHCP and IP address updates apply immediately.

802.1x Configuration

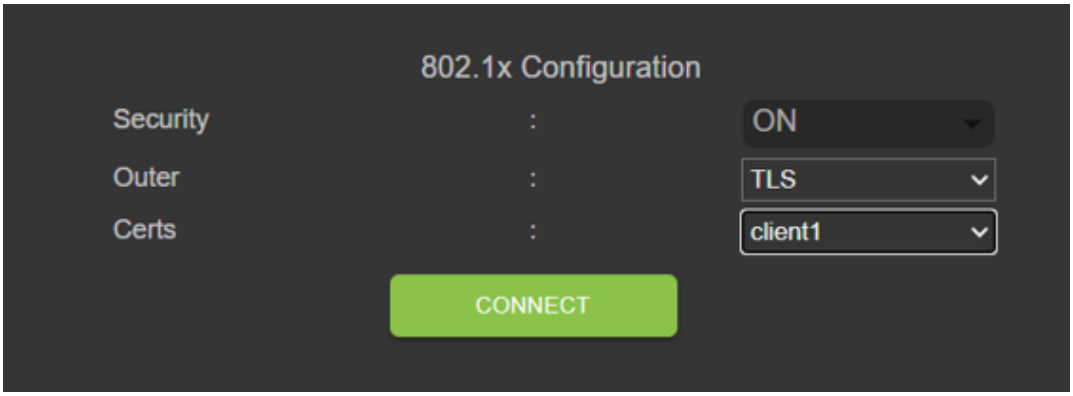
The section describes the Ethernet 802.1x connection of the reader for a secured network.

NOTE: For secured network access on the reader, authentication/authorization is fulfilled by the remote Radius server. Dynamically IPv4/IPv6 address(es) are obtained on successful authentication. Connection to secured network and user must select inner/outer authentication. Following are inner/outer authentication combinations.

802.1x - TLS Authentication

This section shows settings for outer authentication as TLS; there is no inner authentication option. A client-type installed certificate is required.

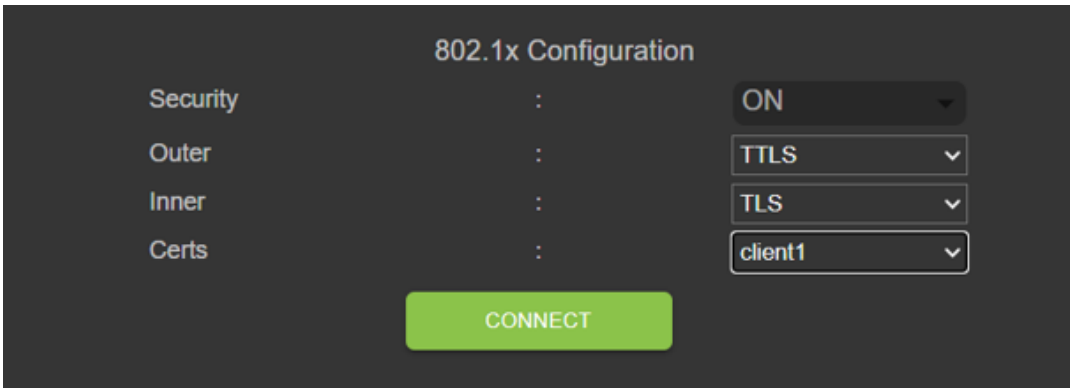
Figure 33 802.1x Configuration - TLS



802.1x - TTLS/TLS Authentication

This section shows settings for outer authentication as TTLS and inner authentication as TLS. A client-type installed certificate is required.

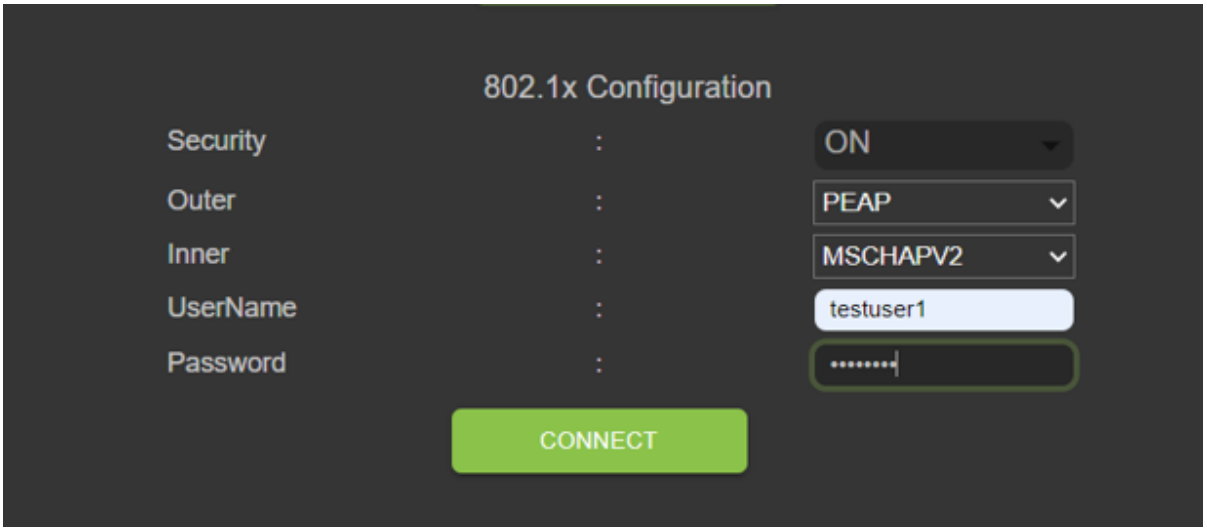
Figure 34 802.1x Configuration - TTLS/TLS



802.1x - PEAP/MSCHAPV2

This section shows settings where outer authentication is PEAP and inner authentication is MSCHAPV2. User name and password are required.

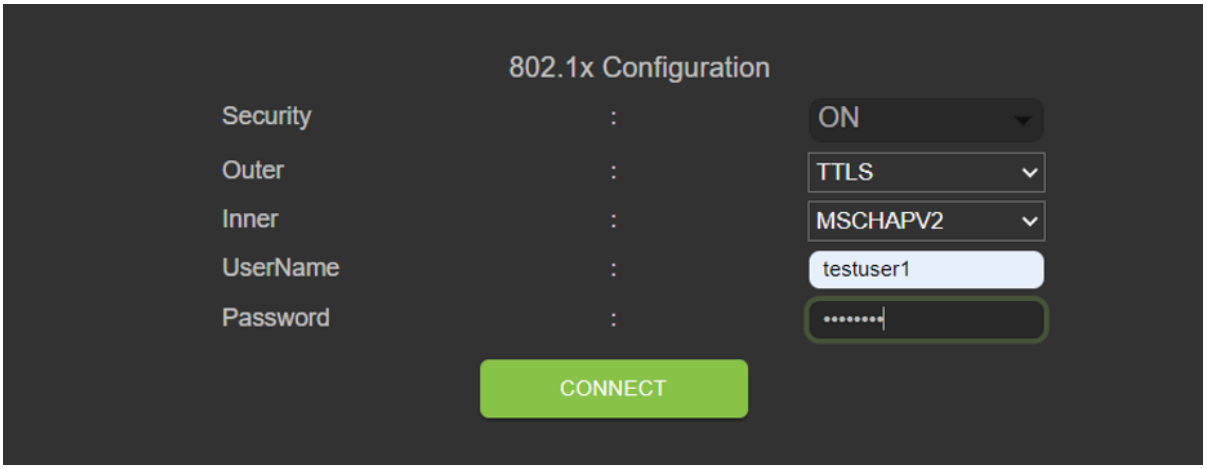
Figure 35 802.1x Configuration - PEAP/MSCHAPV2



802.1x - TTLS/MSCHAPV2

This section shows settings where outer authentication is TTLS and inner authentication is MSCHAPV2. User name and password are required.

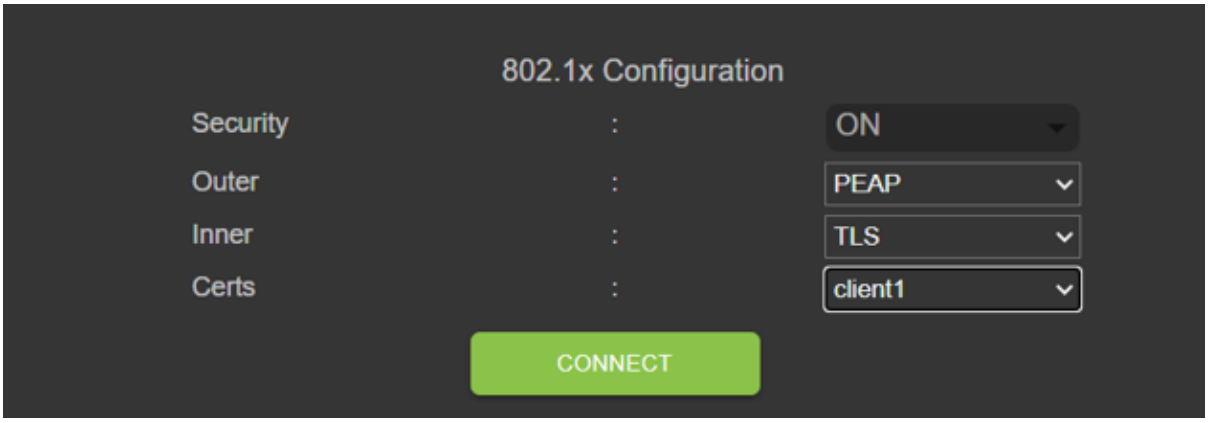
Figure 36 802.1x configuration - TTLS/MSCHAPV2



802.1x - PEAP/TLS

This section shows settings where outer authentication is PEAP and inner authentication is TLS. User name and password are required.

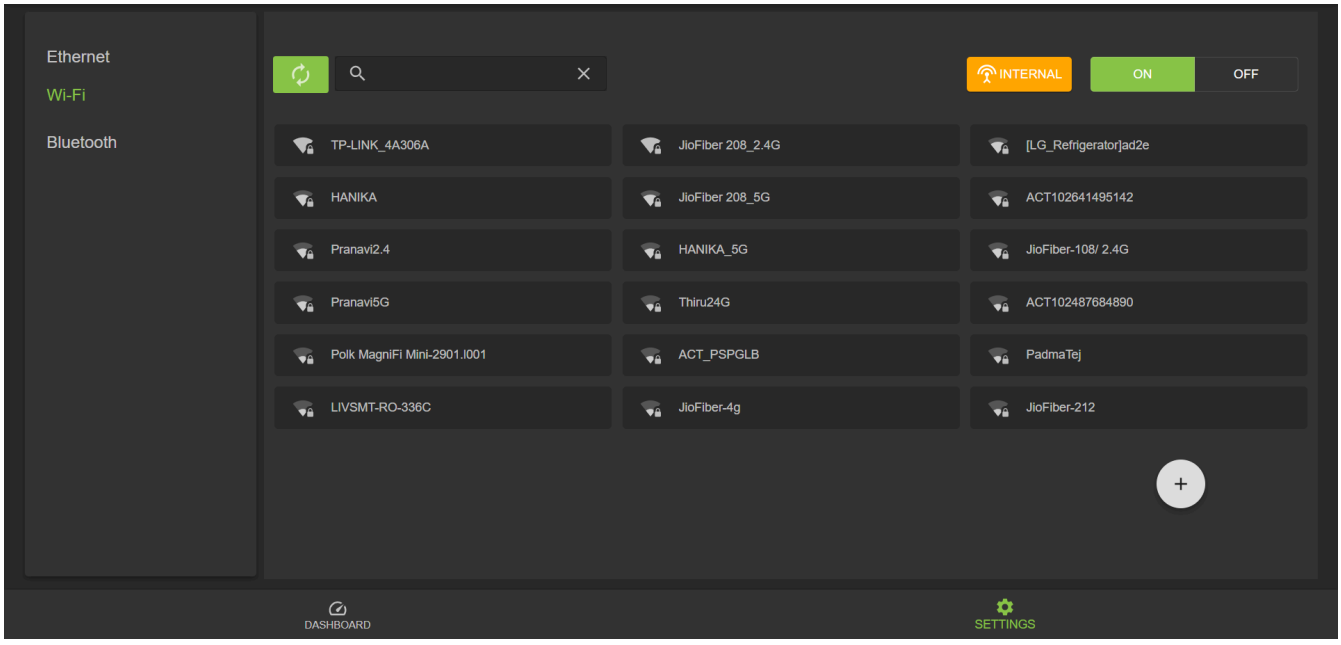
Figure 37 802.1x Configuration - PEAP/TLS



Wi-Fi Configurations

The console acts as a Wi-Fi client that can connect to available Wi-Fi networks. SSID names are listed for available networks on the Wi-Fi default page. Each SSID can have different configurations available for security.

Figure 38 Wi-Fi Default Page



Connecting to the WPA2 Personal

To connect to the network:

1. Click the SSID name from the available list for the network configured with WPA2 security.
2. In the dialog box, enter the passkey.
3. Click **Connect**.

Figure 39 WPA2 PSK Configuration

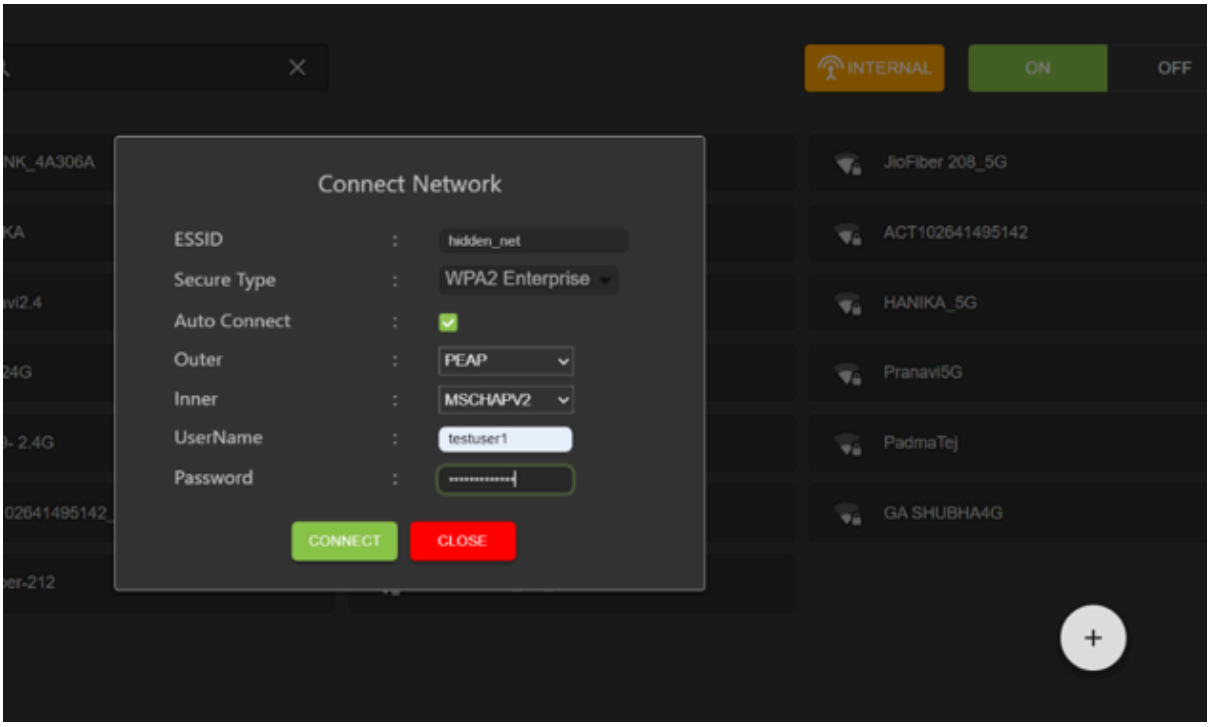
Connecting to Hidden WiFi Network

This explains how to connect to a hidden network.

NOTE:

The reader supports connection to an access point based on OWE (Opportunistic Wireless Encryption). Connecting to an access point of unsecured open network/WPA is denied. Dynamically, IPv4/IPv6 addresses are obtained after a successful connection to an access point.

Figure 40 Connect Network Dialogue Box



1. From the Wifi settings tab, click the plus button in the lower corner.

   The Connect Network dialogue box will display.

2. Enter the ESSID and applicable security information.
3. Click **Connect**.

WPA2 Enterprise Configurations

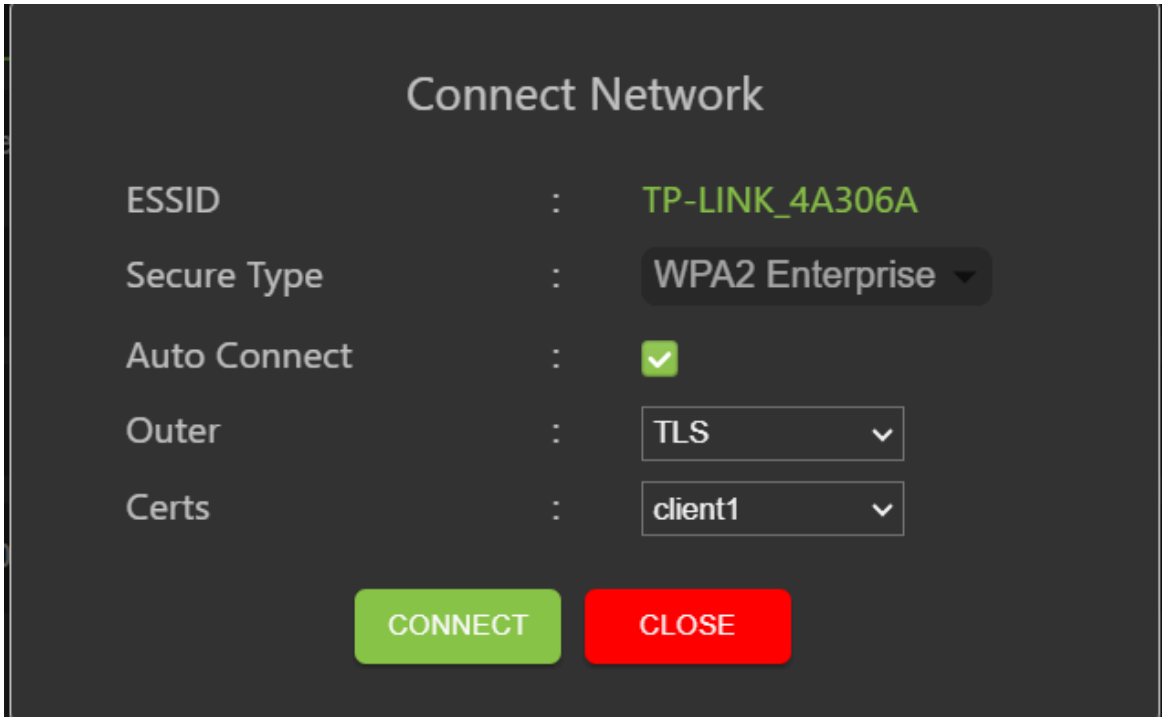
Connection to access point with SSID and user-selected inner/outer authentication. Following are inner/outer authentication combinations.

NOTE: WPA3 Enterprise authentication combinations are the same as those shown for WPA2 Enterprise connections.

TLS

With outer authentication as TLS, there is no inner authentication option. Client-type installed certificate is required

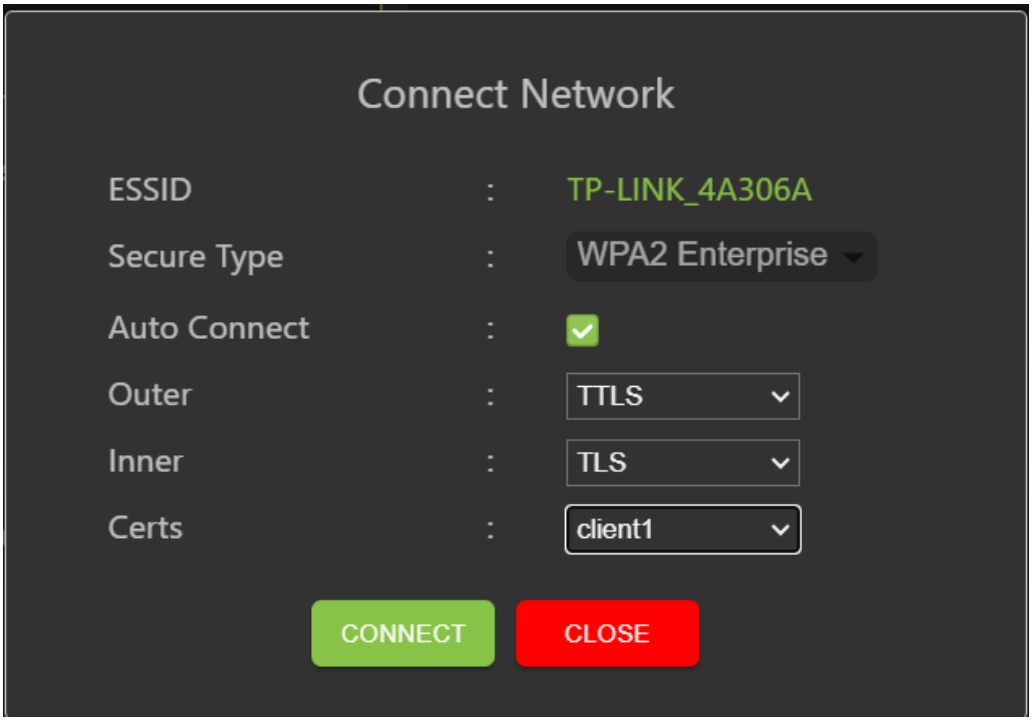
Figure 41 WPA2 Enterprise TLS



TTLS/TLS

When outer authentication is TTLS and inner authentication is TLS, Client type installed certificate is required.

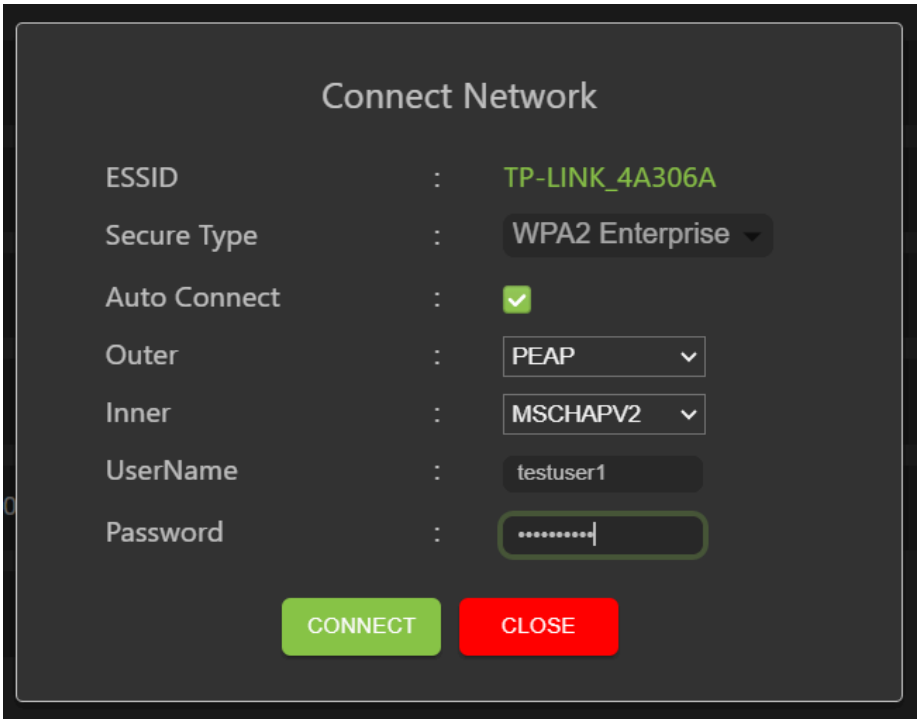
Figure 42 TTLS Authentication



PEAP/MSCHAPV2

When outer authentication is PEAP and inner authentication is MSCHAPV2, user name, and password are required.

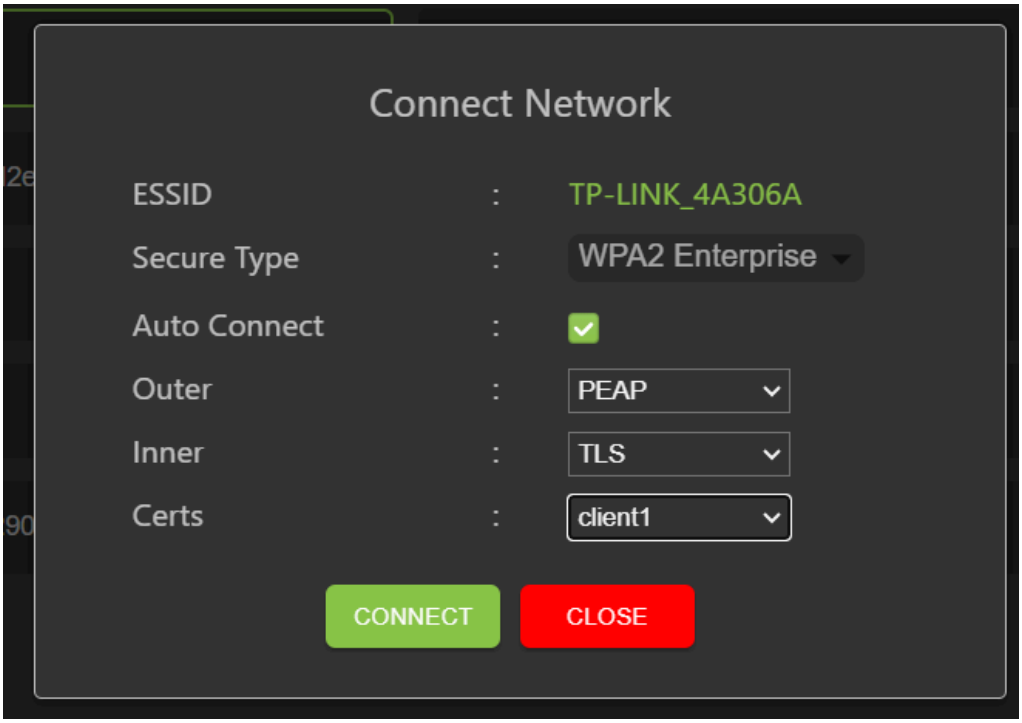
Figure 43 Outer Authentication: PEAP Inner Authentication: MSCHAPV2



PEAP/TLS

When outer authentication is PEAP and inner authentication is TLS, a Client type installed certificate is required.

Figure 44 PEAP Authentication



WPA3 Personal

Connect to access point with SSID and user-supplied passkey.

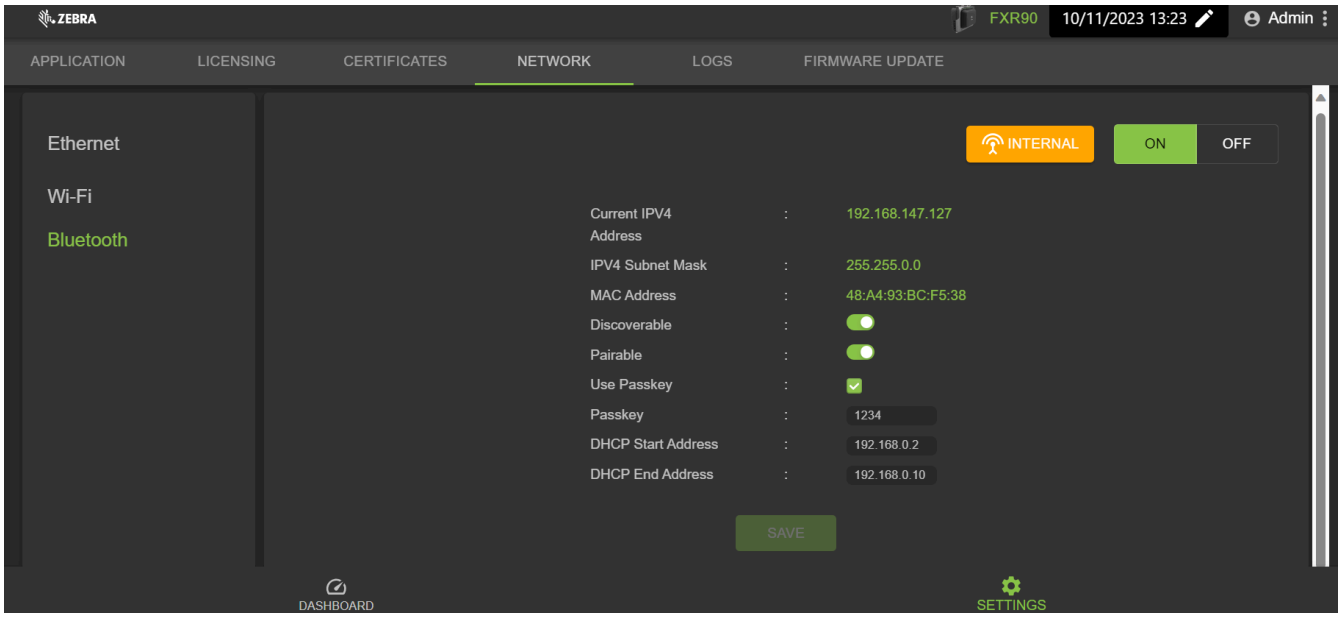
Figure 45 WPA3 Personal

NOTE: Use the "Auto Connect" option to connect automatically to stored SSID when the network is disconnected and to connect on boot.

Configure Network Settings - Bluetooth Tab

This section reviews the configuration settings for Bluetooth in the reader administrator console.

Figure 46 Configure Network Settings - Bluetooth Tab



The reader supports only automatic IP configuration of the Bluetooth interface.

Because these are automatically configured for a reader, they cannot be changed manually.

- Current IPV4 Address - Displays the IPV4 Address of the reader and is set automatically.
- IPV4 Subnet Mask - Displays the IPV4 Subnet mask address of the reader and is set automatically.
- MAC Address - Displays the MAC Address of the reader hardware and is set automatically.
- Discoverable - Select whether other Bluetooth-enabled devices see the reader on discovery.
- • Pairable - Select whether any Bluetooth-enabled device can pair with reader.
- Use Passkey - Enable this option to mandate the connecting device to supply a pre-determined passkey to use for authentication while pairing.
- • Passkey - The passkey to use for authentication.
- DHCP start address - The starting address of the DHCP IP range out of which an IP is assigned to the connecting device.
- DHCP end address - The end address of the DHCP IP range out of which an IP is assigned to the connecting device.

NOTE: The DHCP IP range specified using the DHCP start address and DHCP end address options determines the client's IP connecting to the reader. The first two octets of the IP address of the reader Bluetooth interface are fixed to 192.168, and the last two octets are the decimal equivalent to the last two octets of the reader's ethernet MAC address.

Bluetooth Connection

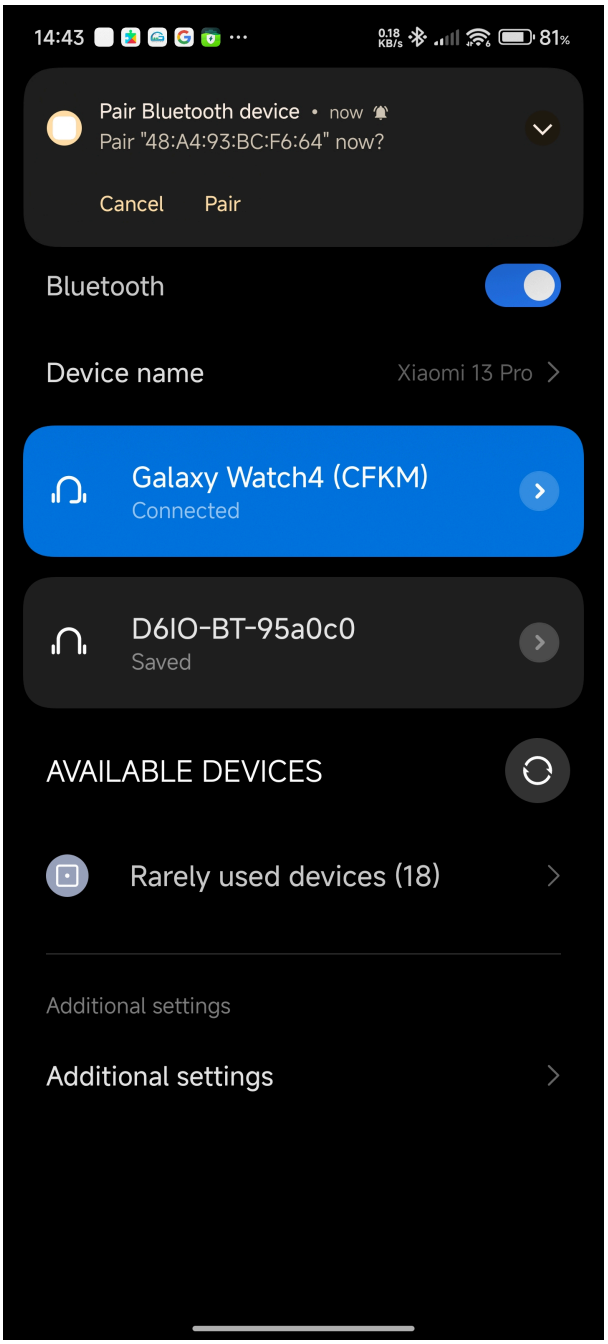
Bluetooth can connect Android, Windows, and iOS mobile devices to the reader administrator console in the browser.

Connecting via an Android Device

This section provides information about Bluetooth connection to an Android device with an NFC tag.

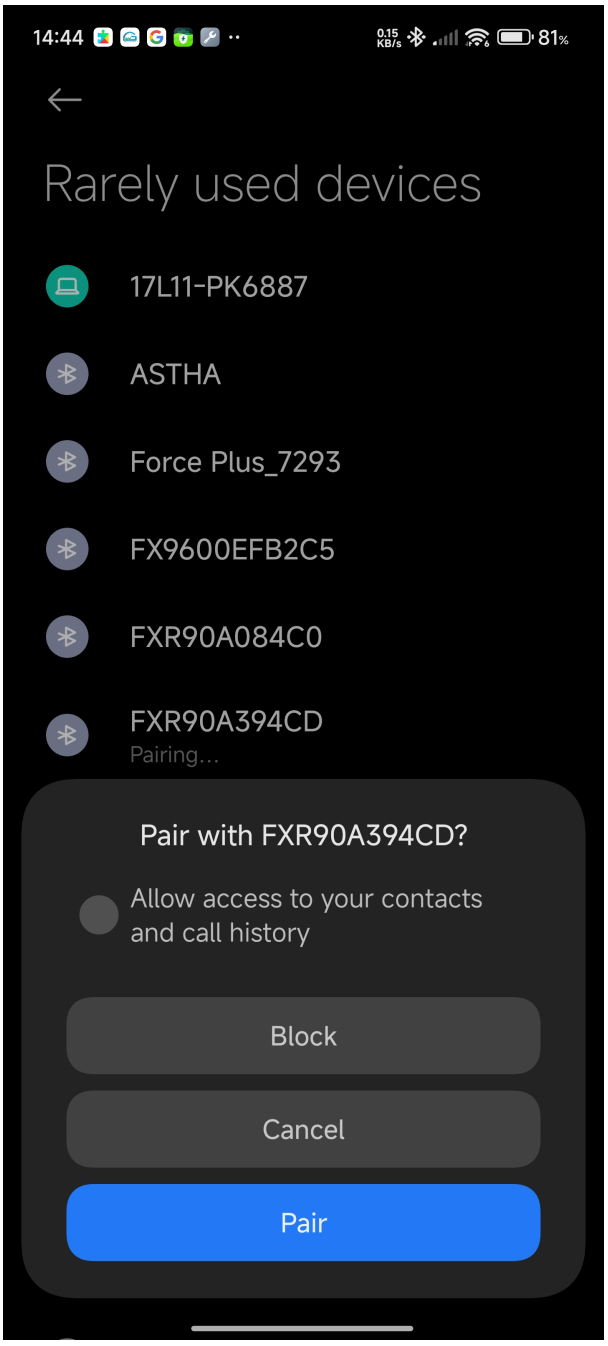
1. To connect:
   - For a first-time connection, tap the device tag near the reader.

Figure 47 New Device Pair Prompt



- For a previously connected device, click the device title in the available devices menu.

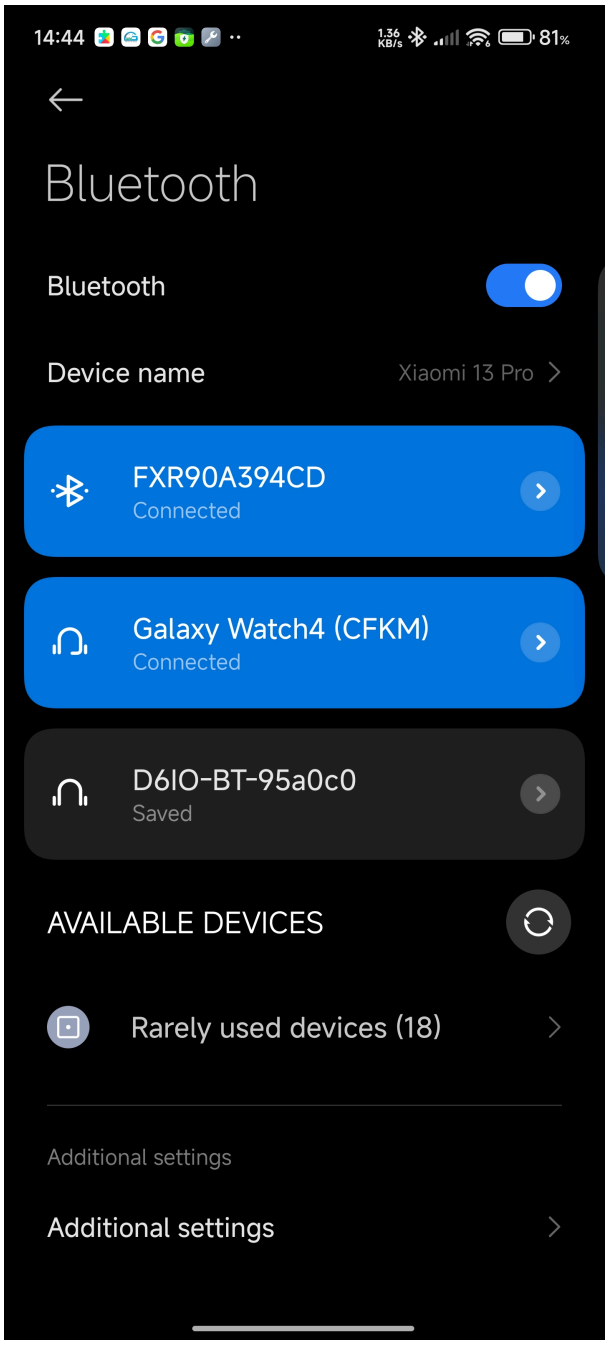
Figure 48 Device Pair Dialogue Box



A dialog box will display with an NFC pair prompt.

2. Follow the pairing instructions on the device screen.

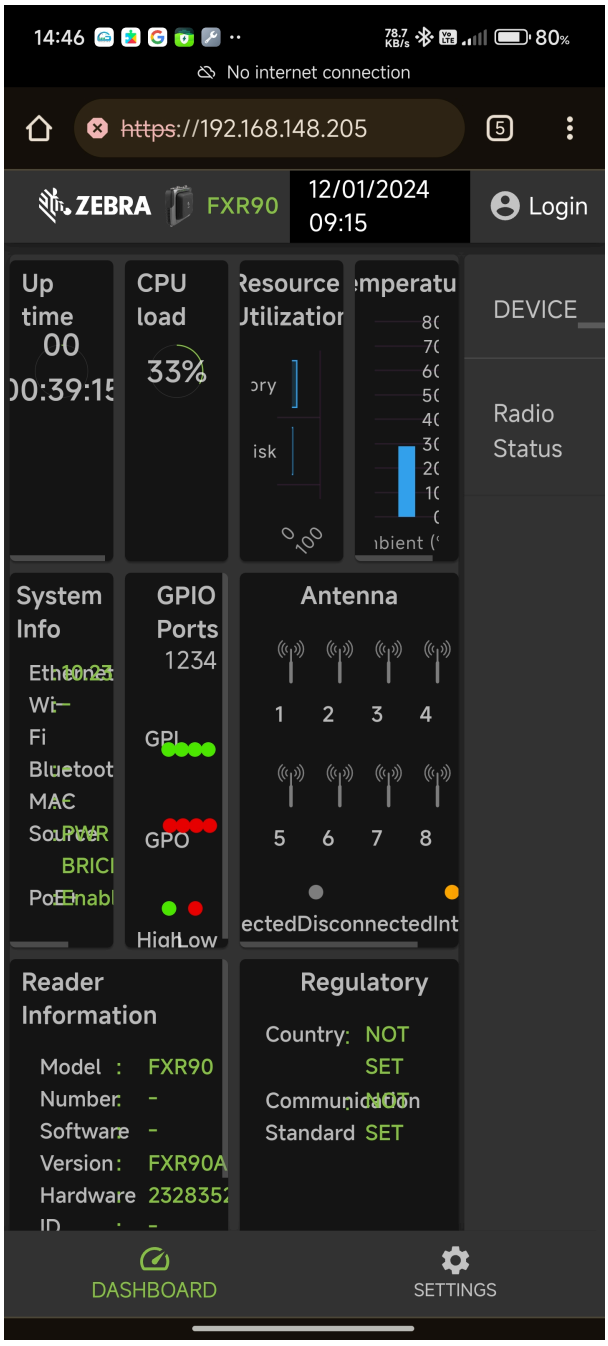
Figure 49 Device Pair Successful



3.

4. Access the reader administrator console using the Bluetooth IP address.

Figure 50 Reader Administrator Console



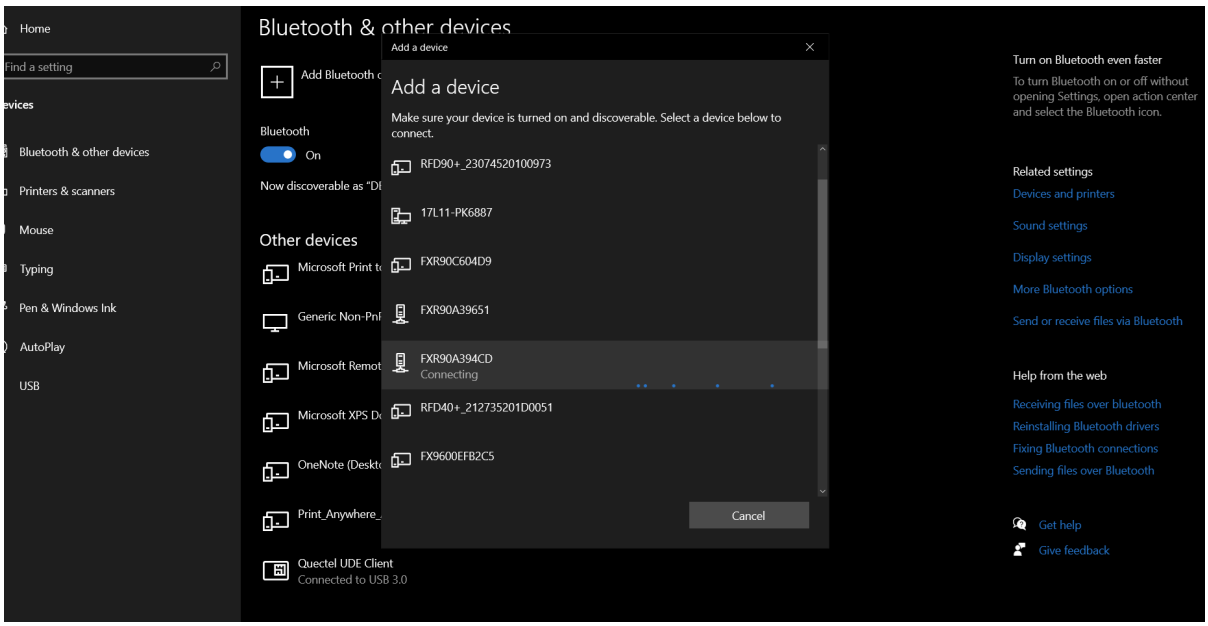
Connect via Windows Device

This section provides information about Bluetooth connection to a Windows device.

1. From the Bluetooth and other devices page, click **Add A Device**.

   A dialogue box displays.

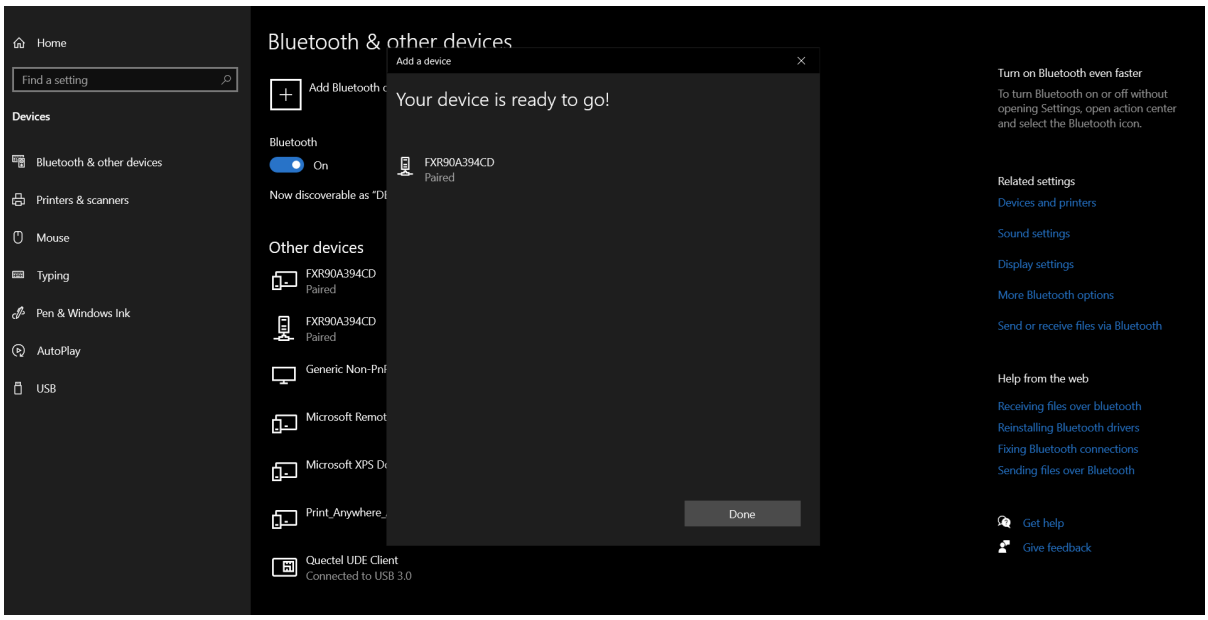
   Figure 51 Windows Add Bluetooth Device



2. Click the device name to connect.

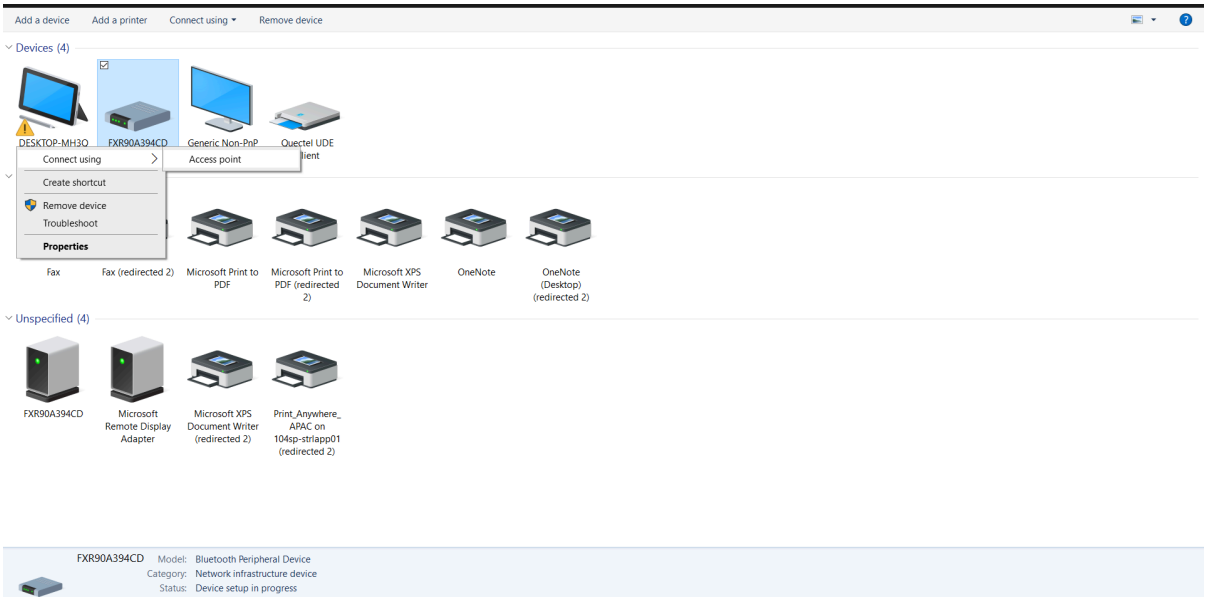
   A dialogue box displays indicating a successful connection.

   Figure 52 Windows Successful Connection



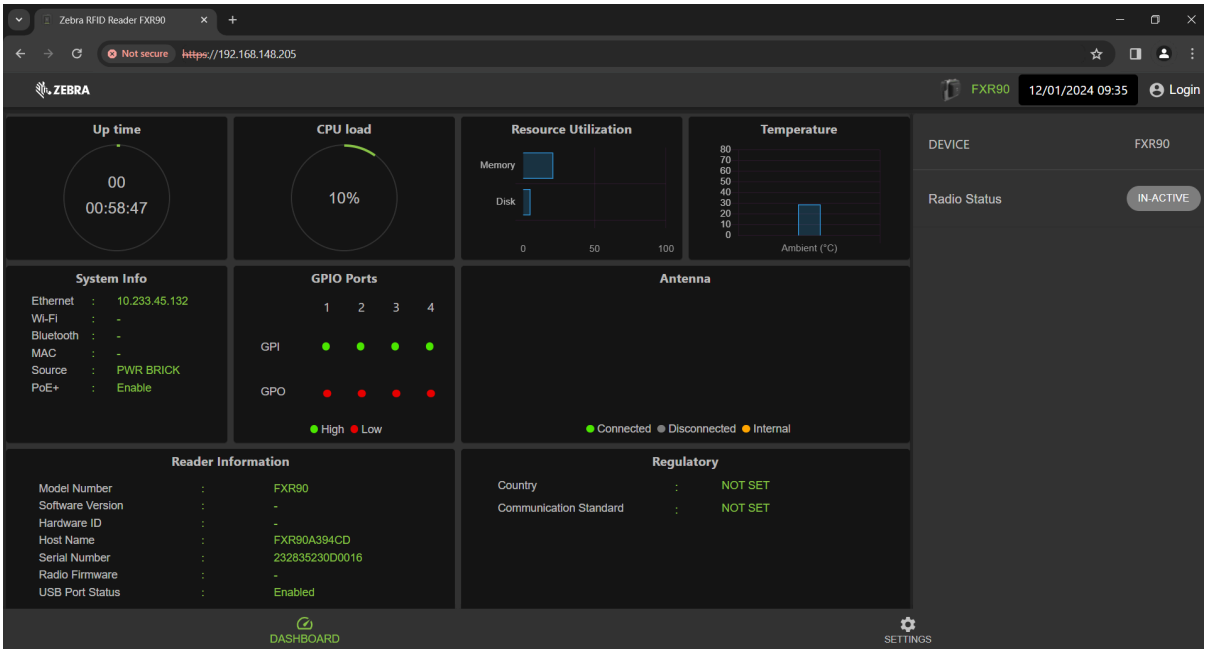
3. Click the device in the file explorer to open drop-down settings. Click **Connect using** and **Access point** to join the PAN network.

Figure 53 Windows Access Point



4. Access the reader console using the Bluetooth IP address.

Figure 54 Windows Tablet: Reader Administrator Console

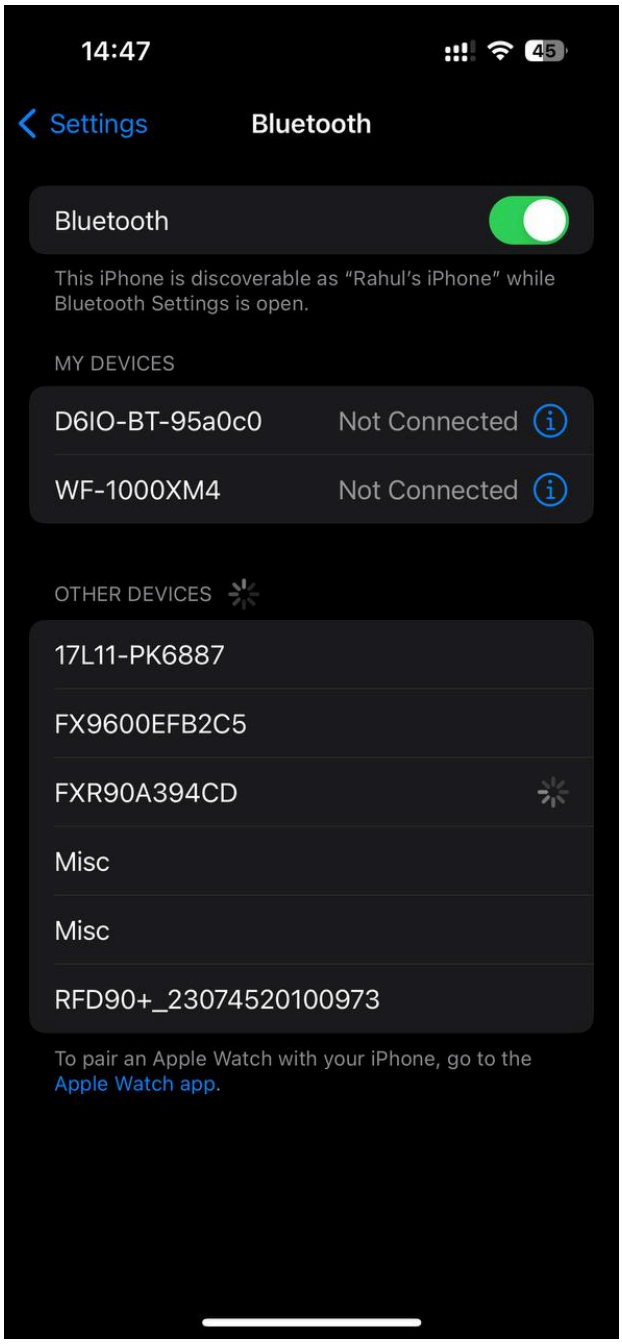


Connecting via an iOS Device

This section provides information about Bluetooth connection to an iOS device.

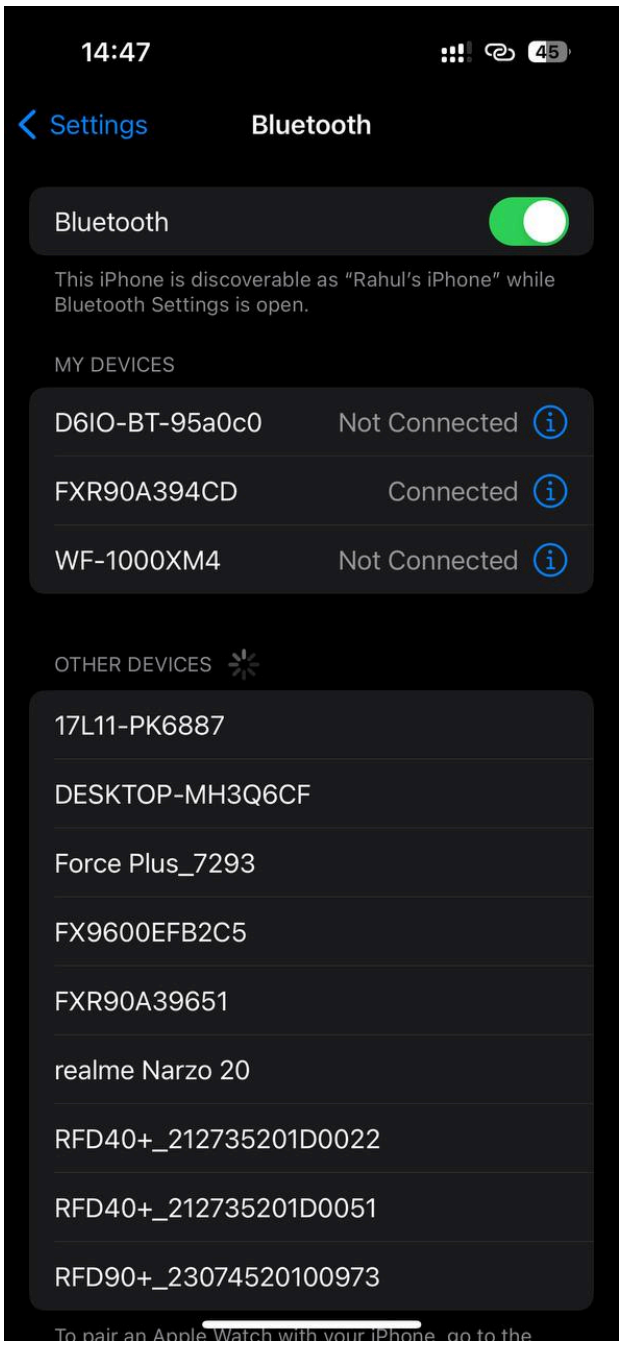
1. Using the iOS device, identify the device name on the Bluetooth other devices section and click it.

Figure 55 iOS Bluetooth Pair



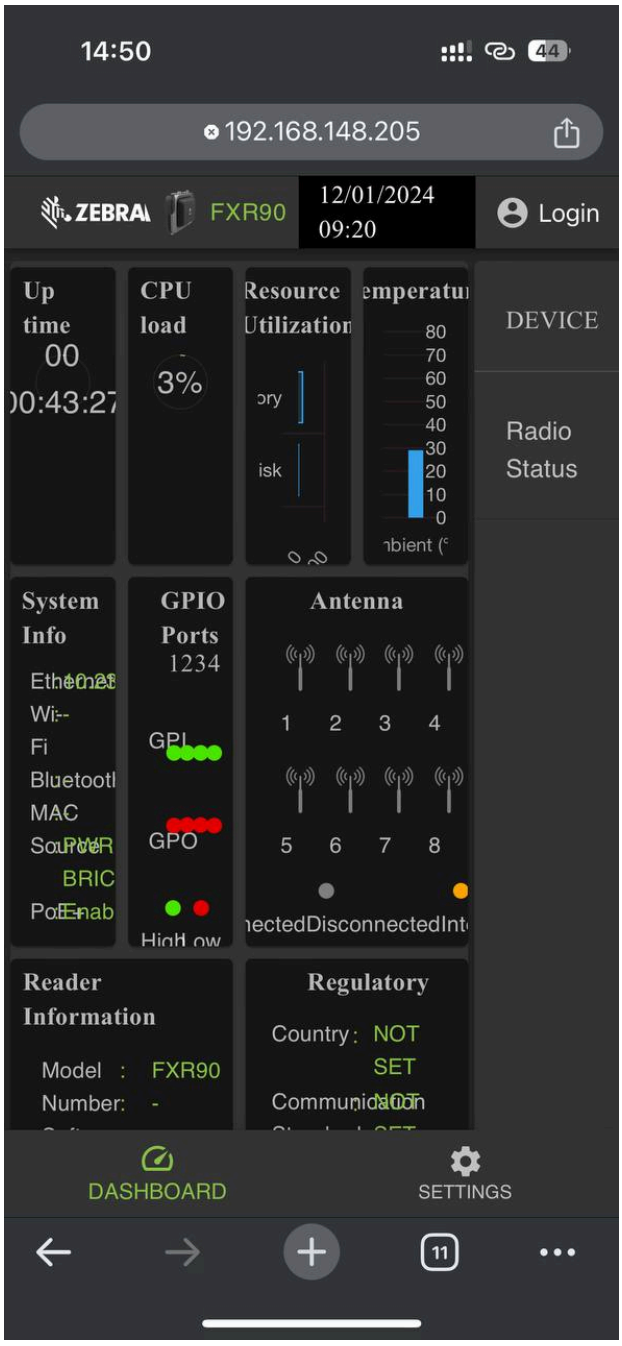
2. Confirm the device is paired successfully. The reader's name will now be included in the **My Devices** menu.

Figure 56 iOS Bluetooth Pair Successful



3. Use the Bluetooth IP address to access the reader administrator console.

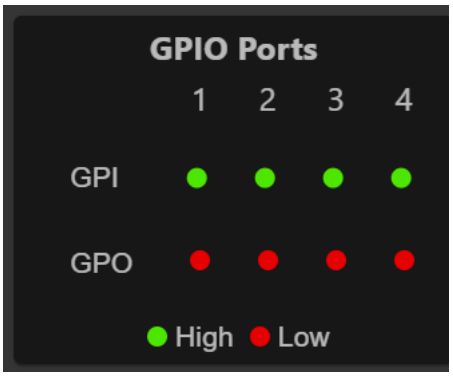
Figure 57 iOS Administrator Console



GPIO

The GPIO Control Page allows viewing and setting the status for GPI pins

Figure 58 Example GPIO tile



Click the pencil icon of the GPIO tile on the home page to edit settings.

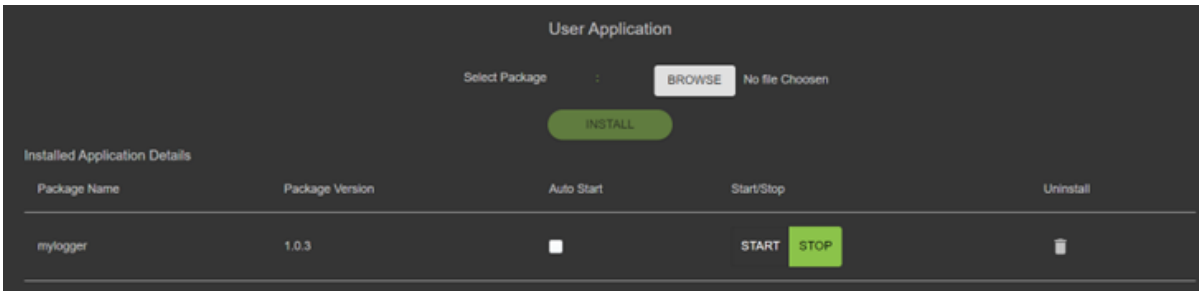
- To set a GPO pin high or low, select the image next to the required pin number.:
  - Green indicates GPIO HIGH
  - Red indicates GPIO LOW

Applications

The console's application page displays upload and installation information for user applications.

Select **Applications** to view the User Application Page. This window allows installing applications on the reader and provides details of the installed application.

Figure 59 User Application Page



The Existing Packages section includes the following:

- Select Package - Click **Browse** to select an application file for installation. Click **Install** to start the installation.
- List of Installed Apps - The menu lists the current packages installed in the reader with their names and versions.
- AutoStart - Select this check box to run the application at startup.

- Start/Stop - The image displays the running status as follows. Select the image to toggle the status.
  - Green indicates the application is running.
  - Red indicates the application is not running.
- Uninstall - Removes the package from the reader.

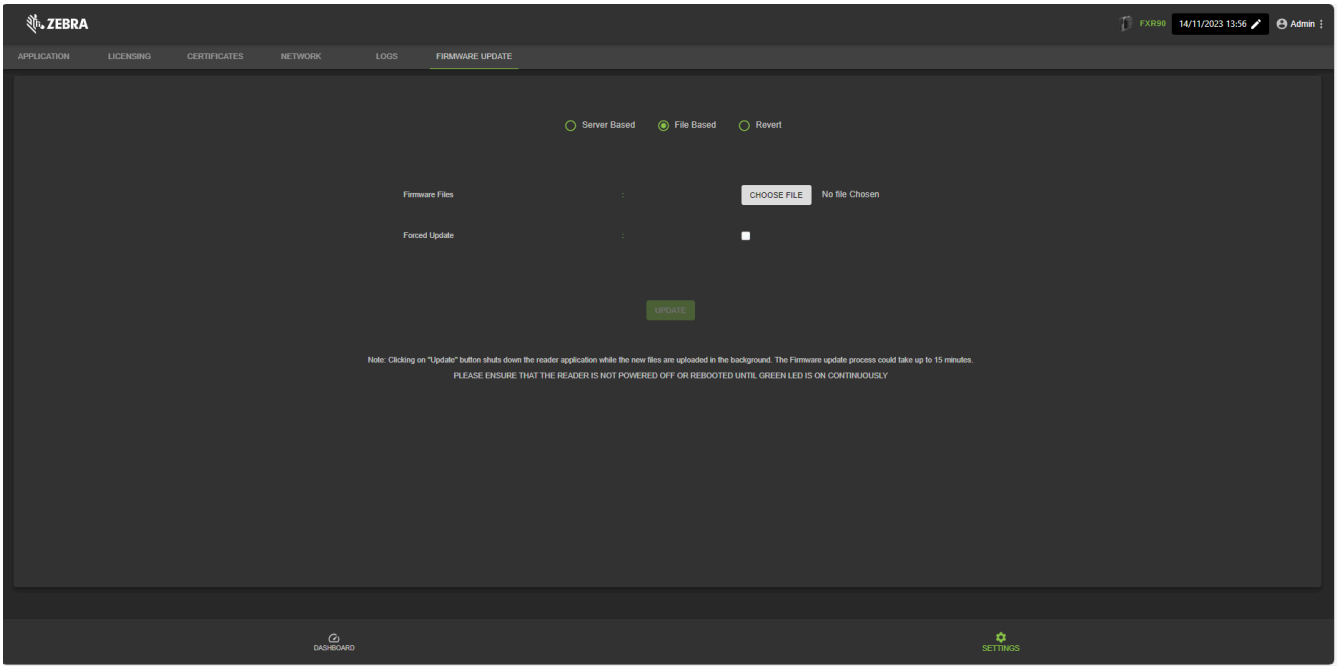
Firmware Update

The console's firmware update page provides the user access to select the method of uploading and appropriate files for updates.

NOTE: When the reader firmware is updated, the outdated web page may display due to cached information. Refresh the browser to update the browser web page.

Select **Firmware Update** from the to view the Firmware Update window.

Figure 60 Firmware Update Screen Capture



NOTE: You must log in as an Administrator to have access to this window.

The reader supports three firmware update methods:

- Using a USB drive.
- File-based update that allows uploading the firmware files from the PC (or a network location) to the reader and running the update.
- HTT/HTTPS, FTP, FTPS, or SCP server-based update

The revert option allows the firmware to be reset to a prior version.

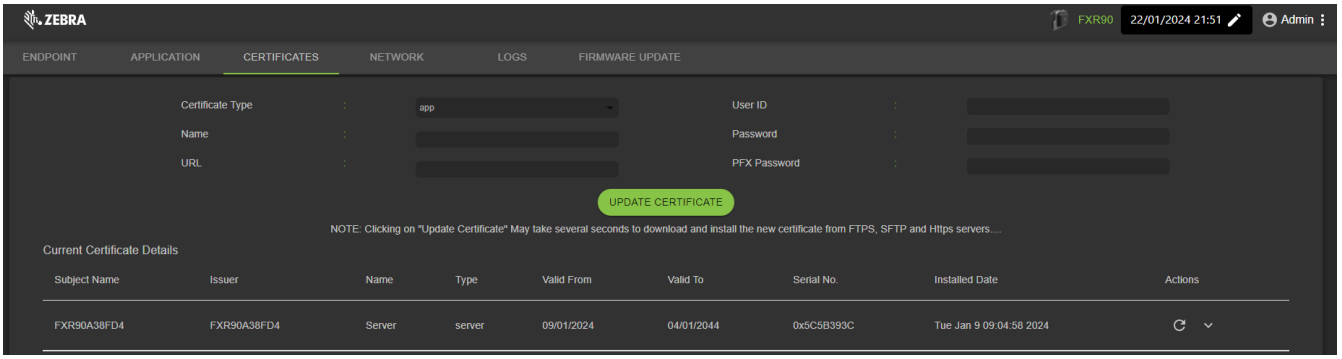
Reader Certificates

This page can update, delete, and refresh the digital certificates of the reader and display the installed certificate details.

The current certificates installed in the reader are shown along with the following properties.

- Subject Name.
- Issuer Name.
- Name(only for 'client/app' type certificates).
- Type.
- Validity From and To dates.
- Serial Number.
- Date of installation.
- Delete option(only for 'client/app' type certificates).
- Refresh option. (download the certificate from the same remote server if previously updated using the Update Certificate option).
- Public Key option. (only for 'client/app' type certificates).

Figure 61 Certificates



To update the certificate, the following fields has to be provided,

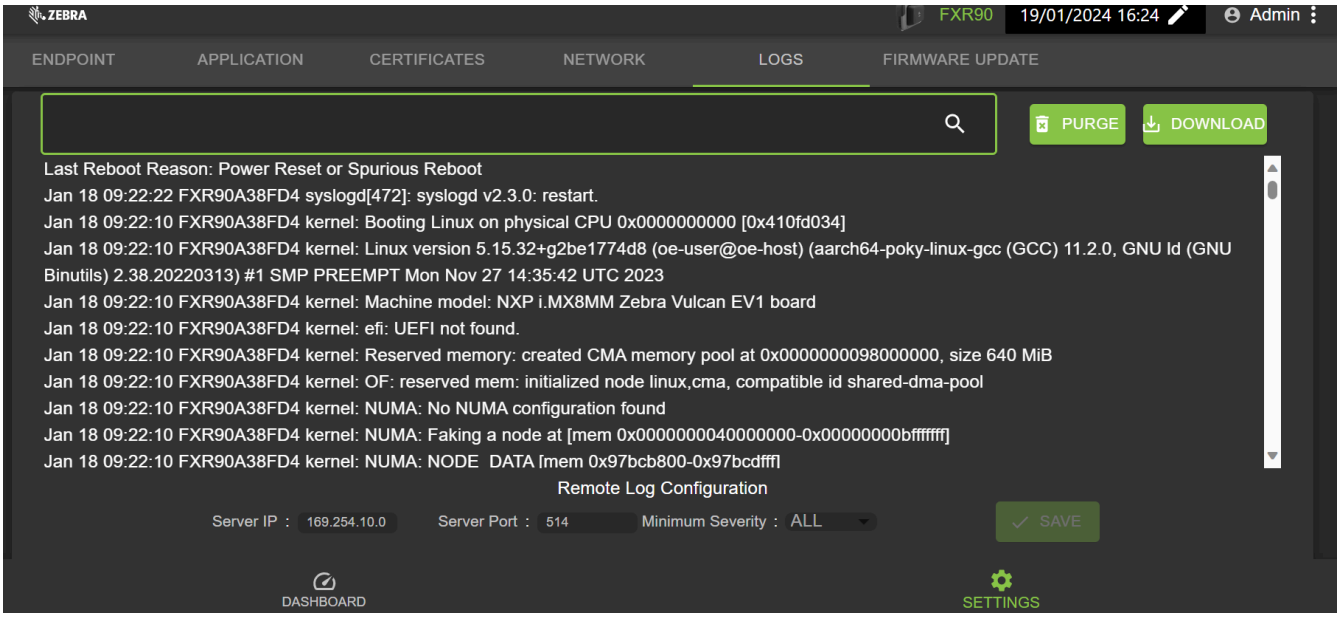
- Server Based
  - **Certificate Type** - Select the certificate type: server, client/app. The server denotes the reader's services like https/ftps/ssh. The type client/app denotes the reader as a client to connect for remote service like 802.1x EAP authentication.
  - **Name** - Provide a name for selected certificate type.
  - **URL** - Provide the complete URL of the FTPS/HTTPS/SFTP server, including the certificate file name and its path.
  - **User ID** - Provide the user name of FTPS/HTTPS/SFTP server.
  - **Password** - Provide the password of FTPS/HTTPS/SFTP server
  - **PFX Password** - Provide the private key password for the alias PFX file password of the PFX file.

System Log

This window lists the reader's log information.

Click the **Settings** gear icon from the Home Screen, then click **Logs** from the top menu to access the page.

Figure 62 System Log Window



Troubleshooting

This section overviews common issues, their causes, and solutions.

Problem	Cause	Solution
The IoTC connection failed.	The regulatory settings have not been configured.	Set the RFID regulatory information. See Setting the Region for more details.
Reader Administrator Console and 123RFID are not reading tags.	• The operating mode is not set to CUSTOM. • The Data endpoint changed from the default WebSocket.	• Set the operating mode to CUSTOM. • Update Reader Administrator Console and 123 RFID settings to the WebSocket endpoint. • Ensure that Tag Data Channels are set properly. • Enterprise Reset option resets to factory defaults.
iOS devices are unable to pair via Bluetooth.	iOS does not allow the use of a fixed PIN (passkey).	Disable passkey from the Bluetooth settings.
The Bluetooth connection fails on a Windows laptop.	The computer is running an older Windows OS.	• Upgrade to the latest Windows 11 • Disable passkey from the Bluetooth settings.
There is no SSH/SFTP for a rfidadm user.	The password is not set for rfidadm.	Set the password for rfidadm which is mandatory to access the applications partition via SSH/ SFTP.
A issue occurs that needs debugging	This is a result of deployment challenges.	Collect the syslogs from the Reader Administrator Console or ZIOTC for analysis.

Technical Specifications

The following tables summarize the RFID reader intended operating environment and technical hardware specifications.

Table 8 Technical Specifications

Item	Description
Physical and Environmental Characteristics	
Dimensions	335 mm x 254 mm x 73.8 mm (13.2 in. x 10.0 in. x 2.9 in.) with the RFID antenna and mounting bracket. 291 mm x 254 mm x 70.8 mm (11.5 in. x 10.0 in. x 2.8 in.) with the RFID antenna and without the mounting bracket. 335 mm x 254 mm x 55 mm (13.2 in. x 10.0 in. x 2.2 in.) for models with the bracket and without the RFID antenna. 291 mm x 254 mm x 52 mm (11.5 in. x 10.0 in. x 2.0 in.) for models with neither the bracket nor antenna.
Weight	2.70 kg (5.95 lbs) 8 Port with Mounting Bracket 2.50 kg (5.50 lbs) 8 Port without Mounting Bracket 3.07 kg (6.75 lbs) Integrated Antenna with 4 External RP-TNC Antenna Ports without Mounting Bracket 2.86 kg (6.30 lbs) Integrated Antenna with 4 External RP-TNC Antenna Ports with Mounting Bracket
Base Material	Die-cast aluminum and plastic
Visual Status Indicators	Multi-color LEDs: Power, Activity, Status, Application, Ethernet, Wi-FI, WAN (4G/5G), and Bluetooth
Mounting	Flush Mount Brackets and Articulating VESA Mount for Wall or Pole Mounting.
Environmental Specifications	

Table 8 Technical Specifications (Continued)

Item	Description
Operational Temperature	-40° to +65° C/ -40° to +149° F
Storage Temperature	-40° to +70° C/ -40° to + 158° F
Humidity	5% - 95% relative humidity non-condensing
Ingress Protection	IP65 and IP67
Vibration	MIL STD 810 Method 514, Procedure I-Random .04g2/Hz (20 Hz to 2000 Hz), 6 grms-Sine sweep 4g peak, 5Hz to 2 kHz
Altitude	MIL STD 810 Method 500
Solar Radiation	IEC 60068-2-5 Procedure A
Salt Fog	MIL STD 810H Method 509.7
ESD	
Connectivity	
Communications	10/100/1000 BaseT Ethernet (M12 Connector) w/ PoE support, PoE+, USB Client, USB Host(x2)(M12 Connector)
General Purpose I/O	4 GPI/4GPO Optically Isolated Aux Voltage Output up to 1A 12 Pin M12 A-Coded Connector
Power	DC Input (12V to 24V, M12 DC Input Connector) PoE(802.3af), PoE+ (802.3at)(M12 Ethernet Connector) 24Vdc,3.25A PoE 55V
Antenna Ports	FXR90-4: 4 mono-static ports (reverse polarity TNC) FXR90-4: Integrated Antenna with 4 External RP-TNC Antenna Ports FXR90-8: 8 mono-static ports (reverse polarity TNC)
Hardware/OS and Firmware Management	
Memory	Flash 16GB EMMC; LPDDR4 2GB
Operating System	Linux
Firmware Upgrade	Web-based and remote firmware upgrade capabilities
Network Services	DHCP, HTTPS, SFTP, SSH, and NTP
Network Slack	IPv4, IPv6
Security	Transport Layer Security Ver. 1.3, FIPS 140-2 Level 1

Table 8 Technical Specifications (Continued)

Item	Description
Air Protocols	EPCglobal UHF Class 1 Gen2, ISO/IEC 18000-63
Frequency (UHF Band)	Global Reader: 902 MHz to 928 MHz (Maximum, supports countries that use a part of this band) 865 MHz to 868 MHz US (only) Reader: 902 MHz to 928 MHz
Transmit Power Output	0dBm to +33dBm (PoE+,802.3at), DC Input) 0dBm to +31.5dBm(PoE, 802.3af)
Max Receive Sensitivity	-92 dBm RFID receive sensitivity
IP Addressing	Static and Dynamic
Warranty	
For the complete Zebra hardware product warranty statement, go to: zebra.com/warranty.	
Recommended Services	
Support Services	Zebra One Care Select and Zebra One Care On-Site
Advanced Services	RFID Design and Deployment Services