# FX7500 RFID READER INTEGRATOR GUIDE



## FX7500 RFID READER INTEGRATOR GUIDE

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## Warranty

For the complete Zebra hardware product warranty statement, go to: http://www.zebra.com/warranty.

## **Revision History**

Changes to the original manual are listed below:

Change	Date	Description
-01 Rev A	1/2014	Initial release
-02 Rev	2/2015	Zebra Re-Branding

## **TABLE OF CONTENTS**

#### About This Guide

Introduction	. ix
Configurations	. ix
Chapter Descriptions	. х
Notational Conventions	. xi
Related Documents and Software	. xi
Service Information	. xii

#### **Chapter 1: Quick Start**

ntroduction1-	-1
Quick Start Demonstration1-	-1
Step 1, Setup 1-	-1
Step 2, Connecting to the Reader 1-	-2
Step 3, First Time / Start-Up Login 1-	-3
Step 4, Set Region 1-	-4
Step 5, Read Tags 1-	-6

#### **Chapter 2: Getting Started**

Introduction	
RFID Technology Overview	2-1
RFID Components	2-2
FX7500 RFID Readers	2-3
Versions and Kits	2-4
FX7500 RFID Reader	2-4
FX7500 RFID Reader Rear Panel	2-5
FX7500 RFID Readers LEDs	2-6
FX7500 RFID Reader Features	2-7
Configuration and Upgrading	2-7
Tag Management	2-7
Device Management	2-7
Logging	2-7
Connection Options	2-7

#### Chapter 3: Installation and Communication

Introduction	3-1
Unpacking the Reader	3-1
Mounting and Removing the Reader	3-2
Mounting Tips	3-2
Mounting Using the Mounting Plate	3-2
Direct Mounting (Without the Mounting Plate)	3-3
Connecting Antennas	3-4
Communications Connections	3-5
Ethernet Connection	3-5
USB Connection	3-6
GPIO Interface Connection	3-9
Powering the Reader	3-10
Powering the Reader via AC Power Supply	3-10
Powering the Reader via Power-over-Ethernet (POE)	3-10
LED Sequences	3-11
System Start-up/Boot LED Sequence	3-11
PWR LED Sequence to Indicate IPv4 Status after Booting	3-11
Reset to Factory Defaults LED Sequence	3-11
LED Sequence for Software Update Status	3-11
Reading Tags	3-12
	Introduction Unpacking the Reader Mounting and Removing the Reader Mounting Using the Mounting Plate Direct Mounting (Without the Mounting Plate) Connecting Antennas Communications Connections Ethernet Connection USB Connection GPIO Interface Connection Powering the Reader Powering the Reader via AC Power Supply Powering the Reader via Power-over-Ethernet (POE) LED Sequences System Start-up/Boot LED Sequence PWR LED Sequence to Indicate IPv4 Status after Booting Reset to Factory Defaults LED Sequence LED Sequence for Software Update Status Reading Tags

## Chapter 4: Administrator Console

Introduction	4-1
Profiles	4-2
Resetting the Reader	4-2
Connecting to the Reader	4-3
Connecting via Host Name	4-3
Auto Discovery	4-4
Connecting via IP Address	4-4
Using Zero-Configuration Networking when DHCP Server is Not Available	4-5
Obtaining the IP Address via Command Prompt	4-5
Administrator Console Login	4-6
First Time / Start-Up Login	4-6
Setting the Region	4-7
Reader Administrator Console	4-9
Administrator Console Option Selections	4-9
Status	4-10
Reader Statistics	4-11
Reader Gen2 Optional Operation Statistics	4-12
NXP Custom Command Operation Statistics	4-13
Event Statistics	4-14
Other Custom Command Operation Statistics	4-15
Configure Reader	4-16
Reader Parameters (General)	4-16
Read Points	4-17
Read Points - Advanced	4-19
Configure Region	4-20
Certificates	4-21
Read Tags	4- 31

Communication Settings	4-32
Configure Network Settings - Ethernet Tab	4-32
Configure Network Settings - Wi-Fi Tab	4-34
Configure Network Settings - Bluetooth Tab	4-35
Configure LLRP Settings	4-36
SNMP Settings	4-37
Wireless Settings	4-38
Network Services Settings	4-39
System Time Management	4-40
IPV6 IP Sec	4-41
Change Password	4-42
FX7500 User Accounts	4-42
Managing User Login and Logout	4-43
GPIO	4-44
Applications	4-45
Reader Profiles	4-46
FIPS Support on FX7500	4-47
Firmware Version/Update	4-48
Firmware Update	4-49
Commit/Discard	4-50
System Log	4-51
Configure System Log	4-52
Reader Diagnostics	4-53
Shutdown	4-54

## Chapter 5: Wi-Fi Configuration

Wireless Network Advanced Configuration	. 5-1
Sample Configuration Files	. 5-2
Preferred Configurations for Access Points	. 5-4
AP: Zebra AP 5131	. 5-4
AP: Android Device	. 5-8
iPhone	. 5-10
Copying Files to the Reader	. 5-11

#### **Chapter 6: Application Development**

Introduction	. 6-	-1	
Reference Guides	. 6-	-1	

## Chapter 7: Firmware Upgrade

Introduction	
Prerequisites	
Failsafe Update	7-2
Update Phases	
Updating FX7500 Reader Software	7-3
Verifying Firmware Version	
Updating Methods	
Verifying Firmware Version	

#### **Chapter 8: Troubleshooting**

#### Appendix A: Technical Specifications

FX7500 Kits	. A-1
KT-FX75004US-01 4-Port US Reader Kit	. A-1
KT-FX75002US-01 2-Port US Reader Kit	. A-1
KT-FX75004WR-01 4-Port Global Reader Kit	A-1
KT-FX75002WR-01 2-Port Global Reader Kit	A-2
Technical Specifications	. A-2
Cable Pinouts	. A-4
10/100bT Ethernet / POE Connector	A-4
USB Client Connector	. A-5
USB Host Connector	A-5
GPIO Port Connections	. A-6
	FX7500 Kits KT-FX75004US-01 4-Port US Reader Kit KT-FX75002US-01 2-Port US Reader Kit KT-FX75004WR-01 4-Port Global Reader Kit KT-FX75002WR-01 2-Port Global Reader Kit Technical Specifications Cable Pinouts 10/100bT Ethernet / POE Connector USB Client Connector USB Host Connector GPIO Port Connections

#### Appendix B: Static IP Configuration

Introduction	B-1
Reader IP Address or Host Name is Known - Set the Static IP Using the Web	
Console	B-1
Reader IP is Not Known (DHCP Network Not Available) -	
Set the Static IP Using the Web Console	B-3

#### Appendix C: RF Air Link Configuration

Introduction	C-1
Radio Modes	C-1

## Appendix D: Connecting Wi-Fi and Bluetooth Dongles

	0	0	
Introduction			D-1
Connecting	to a Wireless Network Using a V	Vi-Fi Dongle	D-1
Connecting	to a Peer Device over Bluetooth	Using a Bluetooth Dongle	D-5
0		0 0	

#### Appendix E: Copying Files To and From the Reader

Introduction	E-1
SCP	E-1
FTP	E-1
FTPS	F-2

#### **Appendix F: Data Protection**

Introduction	F-	·1
--------------	----	----

#### Index

## **ABOUT THIS GUIDE**

## Introduction

This Integrator Guide provides information about installing, configuring, and using the FX7500 RFID readers and is intended for use by professional installers and system integrators. The FX7500 readers provide real time, seamless tag processing for EPC Class1 Gen2 compliant tags.

**NOTE** Screens and windows pictured in this guide are samples and may differ from actual screens.

### Configurations

This guide includes the following FX7500 RFID reader configurations:

- FX7500-42320A50-US: 4-Port FCC
- FX7500-22320A50-US: 2-Port FCC
- FX7500-42325A50-WR: 4-Port Worldwide
- FX7500-22325A50-WR: 2-Port Worldwide

## **Chapter Descriptions**

Topics covered in this guide are as follows:

- Chapter 1, Quick Start provides a Quick Start tag reading demonstration.
- Chapter 2, Getting Started provides an overview of RFID technology/components and a description of the FX7500 reader and features.
- Chapter 3, Installation and Communication provides information on installing and setting up the FX7500 readers.
- Chapter 4, Administrator Console describes how to connect to the reader and how to use the web-based Administrator Console to configure and manage FX7500 readers.
- Chapter 5, Wi-Fi Configuration details wireless network advanced configuration and preferred configurations for access points.
- *Chapter 6, Application Development* provides information on developing applications for the FX7500, and includes references to the appropriate guides.
- *Chapter 7, Firmware Upgrade* provides reader firmware upgrade information on using the web-based **Administrator Console** and an FTP or FTPS server running a host computer.
- Chapter 8, Troubleshooting describes FX7500 readers troubleshooting procedures.
- Appendix A, Technical Specifications includes the technical specifications for the reader.
- Appendix B, Static IP Configuration describes three methods of setting the static IP address on an FX7500 RFID Reader.
- Appendix C, RF Air Link Configuration describes how to select air link configuration from a set of available air link profiles.
- Appendix D, Connecting Wi-Fi and Bluetooth Dongles describes how to connect to a wireless network using a USB Wi-Fi dongle on the FX7500, and how to connect to a peer device over Bluetooth using a USB Bluetooth dongle.
- Appendix E, Copying Files To and From the Reader describes the SCP, FTP, and FTPS protocols for copying files.
- Appendix F, Data Protection describes how the FX7500 protects RFID data in transition.

## **Notational Conventions**

The following conventions are used in this document:

- "RFID reader" or "reader" refers to the Zebra FX7500 RFID readers.
- Italics are used to highlight the following:
  - · Chapters and sections in this and related documents
  - Dialog box, window, links, software names, and screen names
  - Drop-down list, columns and list box names
  - Check box and radio button names
  - Icons on a screen
- **Bold** text is used to highlight the following:
  - Dialog box, window and screen names
  - Drop-down list and list box names
  - Check box and radio button names
  - · Icons on a screen
  - Key names on a keypad
  - Button names on a screen
- Bullets (•) indicate:
  - · Action items
  - · Lists of alternatives
  - · Lists of required steps that are not necessarily sequential.
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

### **Related Documents and Software**

The following documents provide more information about the reader.

- FX7500 RFID Reader Quick Start Guide, p/n MN000070A01
- *FX Series Reader Software Interface Control Guide,* p/n 72E-131718-xx. Describes Low Level Reader Protocol (LLRP) and Reader Management (RM) extensions for the FX7500 reader.
- *RFID Demo Applications User Guide*, p/n 72E-160038-01. Provides instructions for using sample applications which demonstrate how to use Zebra RFID readers.
- FX7500 Embedded SDK Installation Guide. Provides instructions for installing the embedded SDK for C and Java.
- *FX7500 Embedded SDK Sample Application Guide*. Explains how to use the embedded sample application with an integrated development environment.
- *FX7500 Embedded SDK Programmers Guide*. Provides instructions for creating new embedded applications.
- RFID3 API
- EPCglobal Low Level Reader Protocol (LLRP) Standard

For the latest version of these guides and software, visit: http://www.zebra.com/support.

## **Service Information**

If you have a problem using the equipment, contact your facility's technical or systems support. If there is a problem with the equipment, they will contact the Zebra Global Customer Support Center at: http://www.zebra.com/support.

When contacting Zebra 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 e-mail, telephone or fax within the time limits set forth in support agreements.

If your problem cannot be solved by Zebra 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 business product from a Zebra business partner, contact that business partner for support.

## **CHAPTER 1 QUICK START**

## Introduction

This chapter provides a Quick Start setup demonstration.

## **Quick Start Demonstration**

The Quick Start demonstration offers a simple, temporary way to quickly set up the reader and read tags. The demonstration includes:

- Step 1, Setup on page 1-1
- Step 2, Connecting to the Reader on page 1-2
- Step 3, First Time / Start-Up Login on page 1-3
- Step 4, Set Region on page 1-4
- Step 5, Read Tags on page 1-6

#### Step 1, Setup

For information on complete component kits available from Zebra, see Appendix A, Technical Specifications.

- 1. Unpack the reader. See Unpacking the Reader on page 3-1.
- 2. Set up the reader and tags on a desktop.
- 3. Connect the antenna to antenna Port 1. See Figure 1-1.
- 4. Connect the Ethernet cable to the Ethernet port. See Figure 1-1. Connecting the reader to a subnet that supports DHCP is recommended. This Quick Start procedure is not guaranteed to work if DHCP is disabled in the reader and if the reader is connected directly to a PC.
- 5. Connect the AC power supply to a power outlet and connect to the power port. See Figure 1-1.

**NOTE** This step is not required for networks supporting Power-over-Ethernet (POE).

6. Wait for the green power LED to stay lit. See *System Start-up/Boot LED Sequence on page 3-11* for boot-up details.



Figure 1-1 FX7500 RFID Reader Rear Panel Connections

#### Step 2, Connecting to the Reader

To connect via host name:

- 1. Open a browser. Recommended browsers are IE10 (disabling Compatibility View is recommended), Chrome v29, and FireFox 24.
- 2. Enter the host name, printed on the host name label on the reader, in the browser (e.g., http://fx7500cd3b0d) and press Enter. The User Login window appears and the reader is ready.
  - **NOTE** Connect the reader to a network that supports host name registration and lookup to ensure the network can access the reader using the host name. For instance, some networks can register hostnames through DHCP. When first connecting to the reader, it is recommended to keep DHCP enabled in both the PC and in the reader, although it is not guaranteed that hostname will work all the time. Use the host name printed on the reader label, or construct it using the reader MAC address on the bottom of the reader. The host name is a string with the prefix FX7500, followed by the last three MAC address octets. For example, for a MAC address of 00:15:70:CD:3B:0D, use the prefix FX7500, followed by CD, 3B, and 0D, to create the host name FX7500CD3B0D. Enter http://FX7500CD3B0D in the browser address bar to access the reader.

To connect using the USB port for network connection, see Wireless Intrusion Protection System. The default USB RNDIS IP address for the reader is 169.254.10.1

#### Step 3, First Time / Start-Up Login

When starting the reader for the first time:

1. In the User Login window, enter admin in the User Name: field and enter change in the Password: field.

	FX7500
 Reader Administration Console	
User Login	
User Name: admin  V Password:	
Login	

Figure 1-2 User Login Window

**NOTE** If you forget the user ID and/or password, see *Reset to Factory Defaults LED Sequence on page 3-11* to reset the reader to factory defaults, and then select **admin** for the user name and enter **change** in the password field to regain access.

2. Click Login. The Region Configuration window appears.



**NOTE** The Region Configuration window does not appear for US reader configurations. For these models, the Administrator Console main window appears. See *Figure 4-1 on page 4-2*.

#### Step 4, Set Region

Set the region of operation. Setting the unit to a different region is illegal.



**NOTE** Region configuration is not available for readers configured to operate in the United States region (under FCC rules). In this case, skip this step.

1. In the Configure Region Settings window, select the region from the drop-down menu.



Figure 1-3 Selecting the Region

- 2. Select the Communication Standard, if applicable.
- 3. Select Frequenc Wireless IPSy Hopping, if applicable.
- 4. Select the appropriate channel(s), if applicable.
- 5. Select the I understand check box.

6. Select Set Properties to complete the region selection. The Operation Successful window appears.

				FX7500	
Ноте	^	Region Configuration	RF Reg	ion 💈	^
Status <ul> <li>Operation</li> <li>Statistics</li> <li>Configure Reader</li> </ul>		Operation Successful	The RF Reg (country) in countries ha radiation, ar	Ion page provides an interface to set the region which the reader is to be used. Different ve different regulatory requirements on RF id its necessary to correctly set the country in	
Konguite Readem     F Read points     Region     Read Tags     F Communication     Date Time     IP Sec     Change Password     GPIO     Applications     Profiles     Firmware     *Commit/Discarc     System Log     Diagnostics     Shutdown     Logout	~	Configure Region Settings Region of operation: Communication Standard: Eu 300:208 Selected Channels: Varning - Selecting a Region different from the count Please confirm: I understand	which the replance of the second s	ader is being used, to assure regulatory the differing frequency requiroments, there are one of the hardware. The last of choices on hable by the hardware is the last of choices on hable by the hardware, that option is selected with the hardware, that option is selected by to fitnese pages, setting selections first affects larg. Selections must be committed, in the case they take endowed and on the Committed is the case of the set of the selected the drop down list that presents the regions the country of operation. This must be selected the drop down list that presents the regions the country of operation. This must be selected the drop down list that presents the regions the area the same is chosen automatically and the chosen region. If a region subports one standard the same is chosen automatically chosen region. This option is deplayed only chosen region. This option is deplayed only in before Talk - Allows turing 'or or Or the unersh hopping. Allows turing or or or or the unersh hopping. Allows submit on a subbet of and chosen region or of paration supports his cenced hopping option of operation supports his cenced channels. Allows submit on a subbet of and the subset of supported must his of supported must). This option is deplayed only if the chosen in of operation supports his. Properties - Clutting on Str. Properties ! button	~

Figure 1-4 Region Configuration, Operation Successful Window

7. Select Commit/Discard.

Home Configuration Commit/Discard	Save Changes (or Revert to Backup)
Status         > Operation Statistics         > Configure Reader         > Read points         Region         Read Tags         > Communication         Discard the Configuration Changes         > Communication         Date Time         IP Sec         Change Password         GPIO         Applications         Profiles         > Firmware         * Commit/Discard         > System Log         Diagnostics         Shutdown         Logout	<ul> <li>The second sec</li></ul>

Figure 1-5 Commit/Discard Window

8. Click Commit to save the new region configuration and apply these changes to the reader configuration file, or click Discard to discard the region configuration changes. When the commit completes, the Commit Successful window appears.

#### Step 5, Read Tags

Select Read Tags to view the Reader Operation window.

- **NOTE** Enable Java JRE support on the browser for this page to function properly.
- $\checkmark$

**NOTE** For security reasons browsers may block the **Read Tags** page. Look for a pop window that can be hidden behind the browser or at the bottom of the screen (the taskbar in Windows) and allow the applet to run.



**NOTE** With older browsers, when upgrading/downgrading the FX7500, close the browser and re-open it to clear the old version of files cached. If the java cache for applets is on, clear the cached applet before starting the browser to use the **Read Tags** page.

			FX7500
Home Status • Operation Statistics • Configure Reader Read Tags • Communication Date Time IP Sec Change Password GPIO Applications Profiles • Firmware Commit/Discard • System Log Diagnostics Shutdown Logout	^	Reader Operation         Inventory Tags         Start Inventory       Clear Tag List         Total Unique Tags       Image: Clear Tag List       Image: Clear Tag List         EPC Id       TagSeen Count       RSSI       Antenna Id       FirstSeen       LastSeen	<section-header><text><text><text><list-item><list-item><list-item><list-item><text><text></text></text></list-item></list-item></list-item></list-item></text></text></text></section-header>
	~		

Figure 1-6 Read Tags Window

- Click Start Inventory to initiate an on-demand scan on the connected antennas that are enabled.
- Click Stop Inventory to stop the inventory operation.
- Select the Clear Tag List check box to clear the current tag list.

The list of tags appears in a table with the following attributes for each tag:

- EPC Id: Unique tag EPC ID.
- TagSeen Count: Number of times the tag is identified on the specific antenna.
- RSSI: Received Signal Strength Indication.
- Antenna Id: Antenna ID on which the tag is seen.
- FirstSeen time stamp: UTC time (in microseconds) when the tag was first seen.
- · LastSeen time stamp: UTC time (in microseconds) when the tag was last seen.

## **CHAPTER 2 GETTING STARTED**

## Introduction

This chapter provides an overview of RFID technology and components, and describes the FX7500 reader and its features.

## **RFID Technology Overview**

RFID (Radio Frequency Identification) is an advanced automatic identification (Auto ID) technology that uses radio frequency signals to identify *tagged* items. An RFID tag contains a circuit that can store data. This data may be pre-encoded or can be encoded in the field. The tags come in a variety of shapes and sizes.

A typical RFID system consists of transponders (called tags), readers, and antennas. To read a tag the reader sends out radio frequency waves (using attached antennas). This RF field powers and charges the tags, which are tuned to receive radio waves. The tags use this power to modulate the carrier signal. The reader interprets the modulated signal and converts the data to a format for computer storage. The computer application translates the data into an understandable format.



Figure 2-1 RFID System Elements

#### **RFID Components**

Zebra RFID offer low cost, long read range, and a high read rate. These features provide real time, end-to-end visibility of products and assets in the factory, distribution center, retail outlet, or other facility. A typical Zebra RFID system consists of the following components:

- Silicon based RFID tags that attach to retail products, vehicles, trailers, containers, pallets, boxes, etc.
- Different antenna types to support applications such as dock door (area antennas) and conveyor.
- Readers power and communicate with the tags for data capture and provide host connectivity for data migration.

#### Tags

Tags contain embedded chips that store unique information. Available in various shapes and sizes, tags, often called **transponders**, receive and respond to data requests. Tags require power to send data, and are available with two power options:

- Active Tags: typically powered by light-weight batteries and have limited life.
- Passive Tags: the RFID reader generates an RF field that powers the tag. Passive tags are much lighter, less expensive, and have a much longer life than active tags.

#### Antennas

Antennas transmit and receive radio frequency signals. A read point is the RF range of an antenna.

#### Readers

Readers communicate with the tags and can transfer the data to a host computer. Readers also provide features such as filtering and tag writing. FX7500 readers read Gen2 (dense reader mode) RFID tags.

## **FX7500 RFID Readers**

The Zebra FX7500 RFID readers are intelligent, C1G2 UHF RFID readers with RFID read performance that provides real-time, seamless EPC-compliant tags processing. FX7500 RFID readers are designed for indoor inventory management and asset tracking applications in large scale deployments. The readers can host third-party customer-driven embedded applications.

FX7500 RFID readers are based on Zebra's strategic FX7500 reader platform and are easy to use, deploy, and manage. The readers offer a variety of options for connecting to corporate networks using Ethernet or USB connections. Features include:

- ISO 18000-6C standard (EPC Class 1 Gen 2)
- Dense reader mode capability
- Enterprise-class performance
- · Application-specific setup for ease of installation
- Power over Ethernet (POE) to eliminate the need for a power drop
- SSL/SSH based security for secure data transmission
- Linux operating system
- Support for custom or third-party applications
- Feature set for event and tag management
- Support for NXP custom commands over LLRP
- Radio mode support via LLRP v1.0.1



Figure 2-2 FX RFID Reader

The reader provides a wide range of features that enable implementation of complete, high-performance, intelligent RFID solutions.

FX7500 RFID reader configurations include either two or four monostatic antenna ports. The monostatic ports are used only with monostatic antennas.

#### **Versions and Kits**

FX7500 RFID readers are available in a 2-port or 4-port version, individually (reader and mounting bracket) or in a kit that includes the reader, mounting bracket, an antenna, and a power supply. For detailed kit information, see *FX7500 Kits on page A-1*.



WARNING! For Mounting in Environmental Air Handling Space (EAHS): Do not install the Mounting Bracket, Antenna, Cables, PSU, and PoE (Power Injector) in the EAHS unless they are suitable for use in EAHS per UL 2043.

## FX7500 RFID Reader



Figure 2-3 FX7500 RFID Reader



Figure 2-4 FX7500 RFID Reader Rear Panel Connections



**CAUTION** Use only parts provided with the FX7500 RFID readers, or Zebra approved/recommended parts. Substituting other cables or parts can degrade system performance, damage the reader, and/or void the warranty.

## FX7500 RFID Reader Rear Panel

Port	Description	
Antenna Ports (Reverse TNC)	Two port version: Connect up to two antennas. Four port version: Connect up to four antennas. See <i>Table A-1 on page A-2</i> for the maximum antenna gains and RF output powers for both US/Canada and EU. See <i>Connecting Antennas on page 3-4</i> for connection information.	
Reset	To reset the reader insert a paper clip into the reset hole, press and hold the reset button for not more than 2 seconds. This resets the reader, but retains the user ID and password.	
GPIO	See GPIO Interface Connection on page 3-9 for more information.	
USB Client	The USB client port supports (by default) a network mode of operation. This enables a secondary network interface as a virtual adapter over USB. Advanced users can create a custom communication protocol on the USB port. See USB Connection on page 3-6 for connection information.	
USB Host	Use the USB host port to connect USB devices such as WiFi / Bluetooth over USB dongles and flash memory drives.	
10/100BaseT Ethernet	Insert a standard RJ45 Ethernet cable to connect to an Ethernet network with or without POE capability, or to a local computer. See <i>Ethernet Connection on page 3-5</i> for connection information.	
Power	DC connector connects to a Zebra approved power supply AC adapter (varies depending on the country). Maximum power 24 VDC, 1.2 A. See <i>Powering the Reader on page 3-10</i> for connection information.	

#### Table 2-1 Rear Panel Descriptions

#### FX7500 RFID Readers LEDs

The reader LEDs indicate reader status as described in *Table 2-2*. For the LED boot up sequence see *System Start-up/Boot LED Sequence on page 3-11*.



Table 2-2 LED Indications

LED	Function	Color/Status	Description
PWR	Power	Off	Reader is powered off
		Amber Solid	Booting
		Red Flashing	Firmware upgrade
		Amber Solid	Application initialization after booting
		Green Solid	Reader is powered on and operational
ACTV	Activity	Off	No RF operations
		Amber Flashing	On for 500 mSec indicates another tag operation
		Green Flashing	On for 500 mSec indicates a tag is inventoried or read
STAT	Status	Off	No errors or GPIO events
		Red Solid	Firmware update failure
		Red Flashing	On for 500 mSec indicates an error in RF operation
		Green Flashing	On for 500 mSec indicates a GPI event
APP	Application	Green/Red/Amber	Controlled through RM

## **FX7500 RFID Reader Features**

#### **Configuration and Upgrading**

Use the Administrator Console to reconfigure the reader. See *Chapter 4, Administrator Console*. The reader can also accept new firmware and configuration updates.

#### **Tag Management**

The Administrator Console provides the Read tags feature. See *Read Tags on page 4-31*. Use client applications based on Zebra EMDK (Enterprise Mobility Development Kit) such as Power Session, or LLRP (EPCGlobal Low Level Reader Protocol) for additional tag management operations such as Write, Lock, Filtering, Event Management and Kill.

#### **Device Management**

#### **Quick Backup and Recovery**

Use a web browser to back up and restore reader configuration by downloading the configuration XML file. Use the **Administrator Console** to download the file to the reader.

#### **SNMP Integration**

The reader can send real time notification of specific events and failures to an SNMP server.

#### Logging

The reader keeps a log of all system-related activities for security and troubleshooting. The log includes time-stamped system activities such as login attempts and hardware failures. Use the log to pinpoint problems, to facilitate quick resolution, and to identify administrators who may require additional training to prevent future problems. See *System Log on page 4-51*.

#### **Connection Options**

The FX7500 provides flexibility for connecting to networks through an Ethernet connection or the USB client port. The reader's primary network interface is Ethernet. The Ethernet interface accesses each reader from anywhere on the network using the unique host name or IP address.

Additionally, the USB client port supports (by default) a **Network** mode of operation. This enables a secondary network interface as a virtual adapter over USB. The interfaces co-exist and if the Ethernet connection fails, the application can switch to USB using a specific IP and can control the reader.

See *Communications Connections on page 3-5*. To use the USB port for network connection, see Wireless Intrusion Protection SystemI Wireless IPS.

## CHAPTER 3 INSTALLATION AND COMMUNICATION

## Introduction

This chapter includes the following FX7500 RFID reader installation and communication procedures:

- Unpacking the Reader on page 3-1
- Mounting and Removing the Reader on page 3-2
  - Mounting Tips on page 3-2
  - Mounting Using the Mounting Plate on page 3-2
  - Direct Mounting (Without the Mounting Plate) on page 3-3
- Connecting Antennas on page 3-4
- Communications Connections on page 3-5
  - Ethernet Connection on page 3-5
  - USB Connection on page 3-6
  - GPIO Interface Connection on page 3-9
- Powering the Reader on page 3-10
  - Powering the Reader via AC Power Supply on page 3-10
  - Powering the Reader via Power-over-Ethernet (POE) on page 3-10
- System Start-up/Boot LED Sequence on page 3-11



CAUTION FX7500 RFID readers must be professionally installed.



*WARNING!* For Mounting in Environmental Air Handling Space (EAHS): Any cables used to interconnect to other equipment must be suitable for use in EAHS as per UL2043.

## **Unpacking the Reader**

Remove the reader from the shipping container and inspect it for damage. Keep the shipping container, it is the approved shipping container and should be used if the reader needs to be returned for servicing.

## Mounting and Removing the Reader



WARNING! When installing the antenna ensure a minimum separation distance of 9.1 in (23 cm) between the antennas and all persons.

#### **Mounting Tips**

Mount the reader in any orientation. Consider the following before selecting a location for the FX7500 reader:

- Mount the reader indoors, in operating range and out of direct sunlight, high moisture, and/or extreme temperatures.
- 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.
- Mount the reader within 15 feet of the antennas.
- Ensure that power can reach the reader.
- The recommended minimum horizontal mounting surface width is 7 1/2 inches. However, the unit can mount on surfaces as narrow as 6 inches (in locations where unit overhang is not an issue). For vertical mounting the unit can mount on a surface as small as 6 inches by 6 inches.
- Mount the reader onto a permanent fixture, such as a wall or a shelf, where it is not disturbed, bumped, or damaged. The recommended minimum clearance on all sides of the reader is five inches.
- · Use a level for precise vertical or horizontal mounting.

#### **Mounting Using the Mounting Plate**



WARNING! For Mounting in Environmental Air Handling Space (EAHS): Do not install the Mounting Bracket in the EAHS.

- 1. Position the mounting plate on a flat surface (wall or shelf). Position the release tab on the top. See *Figure* 3-1.
- 2. Mark the hole locations using the mounting plate as a guide. See *Figure 3-1*. Remove the mounting plate and drill holes (appropriate for the surface material) at the marked locations.



**NOTE** For wood surfaces, drill two 1/8" diameter by 7/8" deep holes. For drywall/masonry surfaces, drill two 3/16" diameter by 7/8" deep (min) holes and install using the provided anchors.



Figure 3-1 Mounting Plate, Front

- **3.** Reposition the mounting plate over the mounting holes and secure using the supplied fasteners (as appropriate for the surface material).
  - **NOTE** Mount the reader with the cable connections up or down, depending on the installation requirements.



**CAUTION** Use a hand screw driver to install the mounting plate (do not use a power driver). Do not use excessive torque, and tighten the screws so that they are just snug on the screw head stops (see *Figure 3-1*). If the reader does not engage the mounting plate, loosen the screw(s) 1/8 to 1/4 turn and try again.

- 4. Position the reader by aligning the markers on the metal base plate and the wall bracket, with the key-slot holes over the mounting screws. Gently slide the reader down to lock into place.
- 5. To remove the reader, press the release tab and slide the reader up while gently pulling out.

#### **Direct Mounting (Without the Mounting Plate)**



**CAUTION** Not using the mounting plate can affect read performance at elevated temperatures. Also, if not using the mounting plate, secure the reader to prevent it from coming off of the mounting screws.

To mount the unit without using the mounting bracket:

- 1. Use the mounting bracket as a template to locate the holes, or locate and mark the holes on 4 3/16" centers, +/- 1/32".
- For wood surfaces, drill two 1/8" diameter by 7/8" deep holes on 4.192" centers. For drywall/masonry surfaces, drill two 3/16" diameter by 7/8" deep (min) holes on 4.192" centers and install using the provided anchors.
- 3. Position the reader with the key-slot holes over the mounting screws and gently slide the reader down to lock into place.
- 4. Adjust the screw head height to assure a snug fit. Or if the screws are accessible from the back, use machine screws with a lock washer/nut and tighten the nut (from the back) to secure the reader.

## **Connecting Antennas**



*WARNING!* When installing the antenna ensure a minimum separation distance of 9.1 in (23 cm) between the antenna and all persons.



**CAUTION** Power off the reader before connecting antennas. See *Powering the Reader on page 3-10*. 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 dBiL.

When mounting the antennas outside the building, connect the screen of the coaxial cable to earth (ground) at the entrance to the building. Perform this in accordance with applicable national electrical installation codes. In the U.S., this is required by Section 820.93 of the National Electrical Code, ANSI/NFPA 70.



*WARNING!* For Mounting in Environmental Air Handling Space (EAHS): Do not install Antennas and Antenna Cables in the EAHS unless they are suitable for use in EAHS as per UL 2043.

#### Table 3-1 Antenna Gain and Radiated Power

FX7500	US	EU
Max Conducted RF Power at Antenna Input	+ 30.0 dBm	+29.2 dBm
Max Antenna Gain Allowed	+ 6dBiL	+ 5.5 dBiL
Max Radiated Power Allowed	4W EIRP	2W ERP
Antenna Type	Circularly Polarized Plate	N/A

To connect the antennas to the reader (see Figure 3-2):

- 1. For each antenna, attach the antenna reverse TNC connector to an antenna port.
- 2. Secure the cable using wire ties. Do not bend the cable.



Figure 3-2 FX7500 RFID Reader Antenna Connection

### **Communications Connections**

Use a standard Ethernet connection, a standard POE, or POE + Ethernet connection to connect the FX7500 reader to a host or network.

#### **Ethernet Connection**

The reader communicates with the host using an Ethernet connection (10/100Base-T Ethernet cable). This connection allows access to the **Administrator Console**, used to change reader settings and control the reader. With a wired Ethernet connection (10/100Base-T cable), power the FX7500 reader using either the reader Zebra AC power supply, or by Power-Over-Ethernet through the Ethernet cable.

#### **Ethernet: Power through AC Outlet**

The FX7500 reader communicates to the host through a 10/100Base-T Ethernet cable and receives power through a Zebra AC power supply.

- 1. Route the Ethernet cable.
- 2. Route the power cable.
- 3. Terminate the Ethernet cable according to Table A-2 on page A-4.
- 4. Connect the Ethernet cable to the LAN port on the FX7500 reader. See Figure 2-4 on page 2-5.
- 5. Connect the other end of the Ethernet cable to the host system LAN port.
- 6. Connect the Zebra AC power supply to a wall outlet.
- 7. Insert the power supply barrel connector into the FX7500 reader power port. See Figure 2-4 on page 2-5.
- 8. Verify that the unit booted properly and is operational. See *System Start-up/Boot LED Sequence on page 3-11*.
- **9.** On a networked computer, open an internet browser and connect to the reader. See *Connecting to the Reader on page 4-3*.
- 10. Log in to the Administrator Console. See Administrator Console Login on page 4-6.

#### Ethernet: Power through Standard POE or POE+

The POE installation option allows the FX7500 reader to communicate and receive power on the same 10/100Base-T Ethernet cable.

- 1. Insert the POE Ethernet connector on the RJ45 Ethernet cable into the reader 10/100BaseT Ethernet port. See *Figure 2-4 on page 2-5*.
- 2. Connect the other end of the cable to an Ethernet network with POE capability.
- 3. Verify that the reader booted properly and is operational. See *System Start-up/Boot LED Sequence on page 3-11*.
- 4. On a networked computer, open an internet browser and connect to the reader. See *Connecting to the Reader on page 4-3*.
- 5. Log in to the Administrator Console. See Administrator Console Login on page 4-6.



**CAUTION** Do not connect to PoE networks outside the building.

To connect to a network that is not POE capable:

- 1. Terminate the Ethernet cable according to Table A-2 on page A-4.
- 2. Connect the Ethernet cable to the FX7500 reader 10/100BaseT Ethernet port. See Figure 2-4 on page 2-5.
- 3. Connect the other end of the Ethernet cable to a POE power injector.
- 4. Connect a patch cable from the POE power injector to the host system LAN port.
- 5. Verify that the unit booted properly and is operational. See *System Start-up/Boot LED Sequence on page* 3-11.
- 6. On a networked computer, open an internet browser and connect to the reader. See *Connecting to the Reader on page 4-3*.
- 7. Log in to the Administrator Console. See Administrator Console Login on page 4-6.

#### **USB** Connection

The USB client port supports (by default) a **Network** mode of operation. This enables a secondary network interface as a virtual adapter over USB. The interfaces co-exist and if the Ethernet connection fails, the application can switch to USB using a specific IP and can control the reader. To use the USB port for network connection, install the USB RNDIS Driver on the Windows XP PC or follow the instructions to install the Microsoft RNDIS driver for Windows 7 below.

To connect the FX7500 to the host PC, insert a USB cable into the USB client port on the reader. See *Figure 2-4 on page 2-5*. Connect the other end of the cable to a USB port on the host PC.

#### Zebra USB RNDIS Driver

To use the USB port for network connection, install the Zebra USB Remote Network Device (RNDIS) driver and enable the driver on the FX7500. The Zebra RNDIS driver supports 32-bit version operating systems Windows XP, Windows Vista, Windows 7, and Windows Server 2008. For Windows 7 32-bit and 64-bit systems, it is recommend to use Microsoft RNDIS driver (see *Microsoft RNDIS Driver for Windows 7 on page 3-7*).

To install the RNDIS driver on the host.

- 1. Download the installer file Zebra RNDIS.msi from http://www.zebra.com/support to the host PC.
- 2. Select this file on the host PC to install the host side drivers for using the USB Remote Network Device Interface on the FX7500.
- 3. Connect a USB cable between the host and the reader. The Welcome to the Found New Hardware Wizard screen appears.
- 4. Select the No, not this time radio button and click Next.
- 5. Select the default option Install Software Automatically (Recommended).
- 6. In the Hardware Installation pop-up window, select Continue Anyway.
- 7. Select **Finish** to complete the installation. This assigns the host an auto-configured IP address. The network is now ready to use and the reader's IP address is fixed to 169.254.10.1.

#### **Microsoft RNDIS Driver for Windows 7**

If using Windows 7:

After connecting a USB cable between the PC and reader, the RNDIS driver automatically installs. If it does not, right-click on Computer and select Manage. From System Tools, select Device Manager. Under Other Devices, look for an entry for RNDIS with an exclamation icon indicating that the driver was not installed.



Figure 3-3 Computer Management Window

- 2. Right-click the icon and select **Update Driver Software**. Search for the device driver software by clicking on **Browse my computer for driver software**.
- 3. Select Let me pick from a list of device drivers on my computer.

4. Select Network adapters.

Select your device's type from the list below.	
Common hardware types:	
Common Controller For Windows Class	•
Mobile devices	
Modems	
Monitors	
Multifunction adapters	
T Multi-port serial adapters	
Network adapters	=
Network Client	
Network Protocol	
B Network Service	
Non-Plug and Play Drivers	
PCMCIA adapters	-

Figure 3-4 Selecting Device Type

- 5. Select Microsoft Corporation from the manufacturer list.
- 6. Under Network Adapter, select Remote NDIS Compatible Device, and click Next.

After installation, the PC recognizes the reader as an RNDIS device. The PC obtains the IP address 169.254.10.102, and the reader is reachable at the IP address 169.254.10.1.

#### **Sample Implementation**

This implementation assumes that only one FX7500 reader is connected to a host PC via USB. This feature does not function with multiple readers connected to the host. Zebra recommends disabling any other network interface on the PC.

Use an application that uses RFID3 APIs such as Power Session, or use an LLRP application to connect to the reader to read tags.

- 1. The primary RFID server connects to the FX7500 via the Ethernet interface.
- 2. The host PC connects to the FX7500 via the USB port. An application on the host PC monitors communication between the primary RFID server and FX7500 reader.
- 3. When the application on the host PC detects a communication failure between the primary RFID server and the reader, it connects to and controls the reader using the USB virtual interface.
The FX7500 listens on the USB virtual interface on a fixed port (49152) as well as on the standard LLRP port (5084). To enable this, select the Allow LLRP Connection Override check box in Configure LLRP Settings console window.

			FX7500
Home	Reader Communication	Parameters	LLRP Settings
► Operation Statistics	Configure LLRP Setti	ings	This page supports setting the LLRP configuration on the reader.
<ul> <li>▶ Configure Reader Read Tags</li> <li>▼ Communication LLRP</li> <li>SNMP</li> <li>Wireless</li> <li>Services</li> <li>Date Time</li> <li>IP Sec</li> <li>Change Password</li> <li>GPIO</li> <li>Applications</li> <li>Profiles</li> <li>▶ Firmware</li> <li>CommitDiscard</li> <li>&gt; System Log</li> <li>Diagnostics</li> <li>Shutdown</li> <li>Logout</li> </ul>	LLRP Status: Operation Mode: Client IP: Enable Secure mode: Validate peer: Client Port: Allow LLRP Connection Override (From USB IF): Connect Status:	LLRP is running. Server • 0.0.0 5084 ? Disconnect LLRP Set Properties	ELRP Status - Shows the current state of the LLRP     server on the reader. Indicates whether LLRP is     running or not.     Operation Mode - Allows the user to choose the     LLPR mode in the reader. Can be set to either     "Server" or "Client".     Configuration options when LLRP in the reader is in     "Server" mode.     Client IP - Displays the currently connected LLRP     clients IP address. If there is no LLRP client     connection this will be 0.0.0     Client Port - Allows configuring the LLRP listening     port on the reader. Default is 5084.     Configuration options when LLRP in the reader is in     connected to the reader, this button will be enabled     and clicking on the same will disconnect the client     connect to the reader, this button will be enabled     and clicking on the same will disconnect the lient     to connect to.     Clent Port - Allows configuring the LLRP host port     to connect to.     Clent Port - Allows configuring the LLRP host port     to connect to.     Clent Port - Allows configuring the LLRP host port     to connect to. Default is 5084.     Allow LLRP Connection Override (from USB IF).     This allows the reader to listen on an alternate port     (49152) on the virtual Network (over USB) interface.     When an LLRP client is connect on the proter or the primary     interface (Ethernet and primary LLRP port) it is

Figure 3-5 Communication / Configure LLRP Settings Window

Only one LLRP session can be active on the reader, either through the primary Ethernet interface or through the virtual network over USB interface.

If a connection is active on one interface, a subsequent connection attempt on a second interface disconnects the first. The second connection attempt always prevails and creates a new session.

## **GPIO Interface Connection**

This pluggable terminal block type allows connecting individual wires independently. A single connector accommodates both inputs and outputs. See *Table A-5 on page A-6* for pinout information.

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. This allows driving them directly via simple relay or switch contacts. Alternatively, 5V logic can drive inputs. In the logic low state, the current sourced from the reader is approximately 3 mA, so standard gates in most logic families can drive them. Current flow in the high state is negligible. When the equipment uses an external +24 VDC power supply, a +24 VDC connection is provided. This output is not available when an external 24 VDC supply is not present.



**NOTE** Do not connect the +24 VDC output directly to either general purpose input that tolerates voltages in excess of 5V but is designed to operate optimally within the range of 0 to +5 VDC.

The general purpose outputs are open-drain drivers, pulled up to 5V. Each output can withstand voltages up to +30 VDC but should not be driven negative. For best results use the +24 VDC supply as a source of external current and use the outputs directly to drive 24V relays, indicator lamps, etc., wired between the 24V supply

and individual general purpose outputs. Although each output can sink up to 1A, the maximum current that can be drawn from the internal 24V supply is 1A, so use an external power supply if the current requirement exceeds this. Note that the state of the general purpose outputs is inverted, e.g., driving a GPO line high at the processor pulls the corresponding output low.

# **Powering the Reader**



**CAUTION** Connect the antennas before supplying power to the reader.



WARNING! For Mounting in Environmental Air Handling Space (EAHS): Do not install Power Supplies and PoE (Power Injector) in the EAHS unless they are suitable for use in EAHS as per UL 2043.

# Powering the Reader via AC Power Supply

The approved AC power supply connects to the power port on the FX7500 reader using a locking connector (see *Figure 2-4 on page 2-5*). The power supply is compatible with:

- 120V 60 Hz (North America)
- 230V 50 Hz (International excluding Japan)
- 100V 50/60 Hz (Japan).
- 1. Insert the power supply barrel connector into the reader power port (see *Figure 2-4 on page 2-5*). Rotate the connector to lock it in place.
- 2. Apply power to the power supply. The green Power LED stays on to indicate the reader is powered and ready. See *System Start-up/Boot LED Sequence on page 3-11*.

To power down the reader, unplug the power supply from its power source. The green Power LED turns off to indicate that the device is off and the system is not operational. Remove the connector from the reader power port.

#### **Powering the Reader via Power-over-Ethernet (POE)**

Connect the reader to either a standard POE or POE+ injectors.

- Insert the POE Ethernet connector on the RJ45 Ethernet cable into the reader 10/100BaseT Ethernet port. See Figure 2-4 on page 2-5.
- 2. Connect the other end of the cable to an Ethernet network with POE capability. See System Start-up/Boot LED Sequence on page 3-11.

To power down the reader, remove the Ethernet cable from the network. The green Power LED turns off to indicate that the device is off and the system is not operational. Remove the connector from the 10/100BaseT Ethernet port.

# **LED Sequences**

# System Start-up/Boot LED Sequence

See Figure 2-5 on page 2-6 for LED locations. During system start-up:

- 1. All LEDs turn on for a few seconds when power is applied to the reader.
- 2. All LEDs turn off and the PWR LED turns amber.
- 3. The PWR LED turns green to indicate successful RFID application initialization.
- 4. When the sequence completes, the green PWR LED remains on and all other LEDs are off.

## **PWR LED Sequence to Indicate IPv4 Status after Booting**

After the RFID application initializes:

- 1. The PWR LED turns green for 5 seconds to indicate success (following the sequence from *System Start-up/Boot LED Sequence*).
- 2. The reader checks the eth0 IPv4 address and indicates the IPv4 status using the LEDs:
  - If the reader has a DHCP address, the PWR LED blinks green for 3 seconds.
  - If the reader has static IP address, the PWR LED blinks amber 3 seconds.
  - If the reader has an IP address from zero-configuration networking algorithm, the PWR LED blinks red for 3 seconds.
  - If the reader doesn't have valid IP, the PWR LED blinks amber and green using a 90-second timeout to indicate that it is waiting to acquire an IP address.
    - If it obtains a valid IP within the timeout period, the reader indicates the status as described above.
    - If the timeout expires before the reader obtains an IP, the PWR LED stops blinking.
- 3. The PWR LED again turns solid green.

#### **Reset to Factory Defaults LED Sequence**

Holding the reset button for 8 seconds resets the reader to the factory default configuration.

- 1. All LEDs turn on as usual when you press and hold the reset button.
- 2. The PWR LED blinks amber when the reset button is held.
- 3. The PWR LED blinks green fast 5 times to indicate that the reader detects a reset operation.
- 4. Release the reset button to reset the reader to factory defaults.

#### **LED Sequence for Software Update Status**

- 1. The PWR LED blinks red during the software update process.
- 2. After reset, the STAT LED blinks red if the radio module requires a firmware update.

# **Reading Tags**

After the reader powers up, test the reader. See System Start-up/Boot LED Sequence on page 3-11.

- 1. Enable tag reading using the web-based Administrator Console (see *Read Tags on page 4-31*) or control the reader through a real-time application such as Power Session.
- 2. Present a tag so it is facing the antenna and slowly approach the antenna until the activity LED turns green, indicating that the reader read the tag. See *Figure 2-5 on page 2-6*. The distance between the tag and the antenna is the approximate read range.



**NOTE** For optimal read results, do not hold the tag at an angle or wave the tag, as this can cause the read distance to vary.

# **CHAPTER 4 ADMINISTRATOR CONSOLE**

# Introduction



**NOTE** The screens and windows in this chapter 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.

This chapter describes the FX7500 **Reader Administrator Console** functions and procedures. Access the **Administrator Console** using a web browser from a host computer, and use this to manage and configure the readers. The **Administrator Console** main window and support windows have four areas, each containing unique information about the reader.

- Selection Menu selects the function for the primary information window.
- Primary Information Window provides the primary function information.
- Product Identification Header identifies the product.
- USB Port Status provides details on the USB device connected to the USB host port. Hover the mouse
  pointer over the blue link, available only when a device is detected.
- Help Information Window:
  - · provides detailed information to support the primary information window
  - · includes a scroll bar to scroll through information
  - · includes a toggle button to turn on/off the help information window

# 4 - 2 FX7500 RFID Reader Integrator Guide



Figure 4-1 Reader Administrator Console Main Menu

#### Profiles

Use profiles for multiple reader deployments to save configuration time, as only a few APIs are needed to completely configure a reader. See *Reader Profiles on page 4-46*.

# **Resetting the Reader**

To reset the reader, press and hold the reset button for not more than 2 seconds. See *Figure 2-4 on page 2-5* for the reset button location. The reader reboots but retains the user ID and password. See *System Start-up/Boot LED Sequence on page 3-11*.



**NOTE** Hard rebooting the reader (disconnecting power) is not recommended as this discards all the tag events and system log information.

# **Connecting to the Reader**



NOTE This section describes procedures in a Windows environment.

To use the Administrator Console to manage the reader, first power up the reader and connect it to an accessible network. See *Powering the Reader on page 3-10* and *Ethernet Connection on page 3-5*. 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 on page 4-2*.

Connect to the reader in one of two ways:

- 1. Connecting via Host Name on page 4-3
- 2. Connecting via IP Address on page 4-4

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

- 1. Using DHCP on the network
- 2. Using Zero-Configuration Networking when DHCP Server is Not Available on page 4-5
- 3. Statically assigning an IP

Any method of assigning the IP supports connection using host name or IP address. Alternatively, connect the reader directly to a local computer using zero-configuration networking. See *Using Zero-Configuration Networking when DHCP Server is Not Available on page 4-5*.

**NOTE** When using zero-configuration networking, the FX7500 reader cannot communicate with computers on different subnets, or with computers that do not use automatic private IP addressing.

## **Connecting via Host Name**

To connect to the reader using the host name:



**CAUTION** Reader host name 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 where there is no strict control to prevent IP collisions, such as informal networks that use IP static configuration without strict control.

- 1. Open a browser. Recommended browsers are IE10 (disabling Compatibility View is recommended), Chrome v29, and FireFox 24.
- Enter the host name provided on the reader label in the browser (e.g., http://fx7500cd3b0d) and press Enter. The Console Login window appears and the reader is ready.

- 3. Proceed to Administrator Console Login on page 4-6 to log in to the reader.
  - **NOTE** Connect the reader to a network that supports host name registration and lookup to ensure the network can access the reader using the host name. 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, although it is not guaranteed that the host name will work all the time. Use the host name printed on the reader label, or construct it using the reader MAC address on the reader back label. The host name is a string with prefix FX7500, followed by the last three MAC address octets. For example, for a MAC address of 00:15:70:CD:3B:0D, use the prefix FX7500, followed by the last three MAC address octets (CD, 3B, and 0D), for the host name FX7500CD3B0D. Type http://FX7500CD3B0D in the browser address bar to access the reader.

For a network that does not support host name registration and lookup, use the Power Session auto discovery feature to obtain the IP address, and use the IP address connect method.

## **Auto Discovery**

The FX7500 can automatically belong to a network. 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 Power Session application supports this feature, and it lists the discovered reader using reader hostnames. Because this feature is based on WS-Discovery, the readers can also be discovered in Windows Vista and Windows 7 computers by clicking on the **Network** icon in a file browser.

# **Connecting via IP Address**

To use the IP address to connect to the reader:

- 1. Open a browser. Recommended browsers are IE10 (disabling Compatibility View is recommended), Chrome v29, and FireFox 24.
- 2. Enter the IP address in the browser (e.g., http://157.235.88.99) and press Enter. The Console Login window appears and the reader is ready.
- 3. Proceed to Administrator Console Login on page 4-6 to login to the reader.

## Using Zero-Configuration Networking when DHCP Server is Not Available

If a DHCP server is not available, the FX7500 reader can use zero-configuration networking to automatically provide a unique network IP address. The reader can then use TCP/IP to communicate with other computers also using a zero-configuration networking-generated IP address.



**NOTE** When using zero-configuration networking, the FX7500 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.

The zero-configuration networking procedure is recommended when the reader is connected directly to a PC. It reduces the overhead needed to configure the reader to a static IP address.

When zero-configuration 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 (e.g., if the MAC address ends with **55:9A**, the IPv4 address assigned by the zero-configuration algorithm is **169.254.85.148**.

Windows-based computers support APIPA/zero-configuration networking by default when DHCP fails. To enable APIPA for a Windows PC, visit http://support.microsoft.com/ and search for APIPA.

## **Obtaining the IP Address via Command Prompt**

The Administrator Console provides the reader IP address. See *Figure 4-1 on page 4-2*. To obtain the reader IP address without logging into the reader, open a command window and ping the reader host name. See *Connecting via Host Name on page 4-3*.



Figure 4-2 IP Ping Window

# Administrator Console Login

The reader has a unique first time startup sequence that requires setting a unique user ID and password and as well as the region (regulatory requirement).



**NOTE** The recommended browsers are IE10 (disabling Compatibility View is recommended), Chrome v29, and FireFox 24. These browsers were tested and validated to work properly. Other browsers may or may not work properly.

# First Time / Start-Up Login

When starting the reader for the first time, set a unique user ID and password and set the region of reader operation. Setting the reader to a different region is illegal.

#### Logging In with Default User ID and Password

1. Upon connecting to the reader with a web browser, the User Login window appears.

	FX7500
Reader Administration Console	
User Login	
User Name: admin V Password:	
Login	

Figure 4-3 User Login Window

2. Enter admin in the User Name: field and change in the Password: field and click Login.

For global reader configurations, the **Region Configuration** window appears. For US reader configurations, the **Administrator Console** main window appears.

## **Setting the Region**

For global reader configurations, set the region of operation. Setting the unit to a different region is illegal.



**NOTE** Region configuration is not available for readers configured to operate in the United States region (under FCC rules). In this case, skip this step.

1. In the Configure Region Settings window, select the region from the drop-down menu.



Figure 4-4 Selecting the Region

- 2. Select the Communication Standard if applicable.
- 3. Select Frequency Hopping, if applicable.
- 4. Select the appropriate channel(s), if applicable.
- 5. Click the I understand check box.
- 6. Click Set Properties to complete the region selection. The Operation Successful window appears.
- 7. Select Commit/Discard from the selection menu.



**NOTE** Most changes to the reader require a commit to save them.

Home         Status         > Operation         Status         > Configuration Commit/Discard         Status         > Configuration Commit/Discard         Status         > Configuration Changes         > Communication         Date Time         P See         Change Password         GPIO         Applications         Profiles         > Firmware         * Commit/Discard         > System Log         Diagnofics         Shudown         Logout				FX7500	
	Home Status > Operation Statistics - Configure Reader > Read points Read Tags > Communication Date Time IP Sec Change Password GPIO Applications Profiles > Firmware - Commit/Discarc > System Log Diagnostics Shutdown Logout	<	Configuration Commit/Discard Commit the Configuration Changes Commit Discard the Configuration Changes Discard Reset reader to factory defaults Factory Reset	<text><text><text><text><text><text><list-item><list-item><list-item></list-item></list-item></list-item></text></text></text></text></text></text>	

Figure 4-5 Commit/Discard Window

8. Click **Commit** to apply the changes to the reader configuration file, or **Discard** to discard the new region configuration changes.

When the commit completes, the **Commit Successful** window appears. The region is now set and stored in the reader.

# **Reader Administrator Console**

The Reader Administrator Console main window appears after successfully logging into the reader.

				FX7500
Home	^	Reader Administra	tion Console	Help
Operation     Statistics		Welcome to the FX Series (4 port) Reader Administration	Console.	- <u>Check Status</u> <u>Check Statistics</u> <u>Check Statistics</u>
<ul> <li>Configure Reader</li> <li>Read Tags</li> <li>▶ Communication</li> </ul>		Reader Software Version :	1.1.68	NXP Custom Operation Statistics Events Statistics Other Custom Operation Statistics
Date Time IP Sec Change Deservert		Reader Host Name : Reader Network IP Address :	FX7500065D22	Centre at Readed Ford Configuration Read Ford Configuration Advanced Anterna Configuration Region Configuration
GPIO Applications		Reader Serial Number :	13246010501029	Certificates Inventory and Read Tags Communication Settings
Profiles ▶ Firmware		USB Port Status :	No Device Found	<u>SNMP</u> Wireless <u>Services</u> Date and Time Settings
<ul> <li>System Log</li> <li>Diagnostics</li> </ul>				IPSec Settings Change Password GPT0 Settings User Application Deployment
Shutdown Logout				Manage Profiles on the reader Firmware Version Information Firmware Update Commit/Revert
				System Log Configuration Diagnostics Shut Down Error Messages
	~			<u>Third Party Software</u>

Figure 4-6 Reader Administrator Console Main Window

## **Administrator Console Option Selections**

Click an item from the selection menu on the left to select:

- Status see Status on page 4-10
- Operation Statistics see Reader Statistics on page 4-11
  - Gen2 Optional see Reader Gen2 Optional Operation Statistics on page 4-12
  - NXP see NXP Custom Command Operation Statistics on page 4-13
  - Events see Event Statistics on page 4-14
  - Other Custom see Other Custom Command Operation Statistics on page 4-15
- Configure Reader see Configure Reader on page 4-16
  - Read Points see Read Points on page 4-17
  - Advanced see Read Points Advanced on page 4-19
  - Region see Configure Region on page 4-20
  - Certificates see Certificates on page 4-21
- Read Tags see Read Tags on page 4-31
- Communication see Communication Settings on page 4-32
  - LLRP see Configure LLRP Settings on page 4-36
  - SNMP see SNMP Settings on page 4-37
  - Wireless see Wireless Settings on page 4-38
  - Services see Network Services Settings on page 4-39
- Date/Time see System Time Management on page 4-40

- IP Sec see IPV6 IP Sec on page 4-41
- Change Password see Change Password on page 4-42
- GPIO see GPIO on page 4-44
- Applications see Applications on page 4-45
- Profiles see Reader Profiles on page 4-46
- Firmware see Firmware Version/Update on page 4-48
  - Update see Firmware Update on page 4-49
- Commit/Discard see Commit/Discard on page 4-50
- System Log see System Log on page 4-51
  - Configure see Configure System Log on page 4-52
- Diagnostics see Reader Diagnostics on page 4-53
- Shutdown see Shutdown on page 4-54
- Logout click Logout to immediately log out of the Administrator Console.

# Status

Click **Status** on the selection menu to view the **Reader Status** window. This window displays information about the reader and read points (antennas).

						FX7500	
Home Status	<b>^</b>		Reader	Status		 Check Status	idated status
<ul> <li>Operation Statistics</li> <li>Configure Reader Read Tags</li> </ul>		System Clock Up Time 1	012-12-31T07 3 Days 1 Hour	: <u>13:00+13:00</u> 's 51 Minutes 2	24 Seconds	information about the reader's kernel. • System Clock: The current system cl the format of "[Year] [Month] [Day] [Ho Second] [Time Difference with UTC]".	ock value, in vur: Minute: Clicking on this
Communication Date Time IP Sec		Use 14	CPU Usa	i <b>ge (%)</b> Syst 2	em	link will take you to the interface for ad and time setting of this reader • System Up Time: Shows how long th been running, in the format of "[Numbr [Number of Hours] [Number of Minute:	justing date ne reader has er of Days] s] [Number of
Change Password GPIO Applications Profiles		Total 261201920	RAM Usage Use	e (bytes) d 3280 1	Free 59088640	Seconds]" • CPU Usage: Shows the CPU usage b application and customer applications the usage by the Operating System • RAM Usage: Shows the total allocate	y the reader (if any), and d RAM for the
<ul> <li>▶ Firmware</li> <li>Commit/Discard</li> <li>▶ System Log</li> </ul>		Partition	Flash Usag Total	e (bytes) Used	Free	reader application and customer appli the memory used, and the free memor Flash Usage: Shows the usage of the by partition. Befresh interval: Allows the user to s	cations (if any), ry flash memory et the refresh
Diagnostics Shutdown Logout		rootts platform readerconfig	192937984 33554432 4194304	113573888 13541376 700416	79364096 20013056 3493888	interval (in seconds) for this page. The information is refreshed every 'N' seco is the user configured value for the ref The minimum value of the refresh inte concord while the maximum value all.	e status inds (where N resh interval). rval is 10 wwod is 96400
		data Refresh I	67108864 nterval (secs):	2609152	64499712 ange	seconds.	
	<b>~</b>						

Figure 4-7 Reader Status Window

The Reader Status window provides consolidated reader status information:

• System Clock: The current system clock value, in the format of [Year] [Month] [Day] [Hour: Minute: Second] [Time Difference with UTC]. Click the link to adjust the reader date and time settings.

- Up Time Displays how long the reader has been running, in the format [Number of Days] [Number of Hours] [Number of Minutes] [Number of Seconds].
- CPU Usage: Displays the CPU usage for the system and reader applications, including customer applications.
- RAM Usage: Displays the total allocated RAM for the reader application and customer applications (if any), the memory used, and the free memory.
- Flash Usage: Displays the flash memory usage by partition.
- **Refresh Interval** Sets the refresh interval (in seconds) for the window. The status information refreshes every **N** seconds (where **N** is the user configured value for the refresh interval). The minimum refresh interval value is 10 seconds; the maximum allowed is 86,400 seconds.

# **Reader Statistics**

Select **Operation Statistics** to view the **Reader Operation Statistics** window. This window provides options to view the statistics of individual read points or combined statistics for all read points, including the success and failure values of statistics for each read point. The statistic count is cumulative once the reader starts or the **Reset Statistics** button is selected.

						FX7500
Home Status ▶ Operation Statistics	^	Choose ReadPoint:	Reader C	Gen2 Operation	Statistics	 Reader Statistics The Reader Statistics page provides options to view he statistics of individual read points. The user can choose "AIT read point option to view the combined
Gen2 Optional NXP Events Other Custom		Operation Statistics:		Read Point 1 -		statistics for all the read points. The success and ailure values of following statistics can be viewed fo sach read point. • Identification count - Shows the number of
Configure Reader			OperationName	Success (# of Times)	Failure (# of Times)	successful (and failed) tag inventory. <ul> <li>Read count - Shows the number of successful (and successful)</li> </ul>
ead Tags			ReadCount	0	0	<ul> <li>tailed) tags reads.</li> <li>Write count - Shows the number of successful (ar</li> </ul>
Communication			WriteCount	0	0	failed) tags written to. • Lock count - Shows the number of successful (an
Sec			LockCount	0	0	failed) lock operation on tags. • Kill count - Shows the number of successful (and
hange Password			KillCount	0	0	failed) kill operation on tags.
PIO pplications rofiles Firmware Commit/Discard System Log Diagnostics Shutdown conout			Refresh I	Reset Statistics	Change	"all") readpoint whose statistics are displayed. Reset Statistics - Reset Statistics are designed. counts (including the optional Gen2 and Custom statistics) for all the read points. Refresh Interval - Alows the user to set the refres interval (in seconds) (or this page. The statistics information for the chosen read point is refreshed every "N" seconds (where the 16 the user configured value for the refresh interval). The minimum value the refrest interval is 00-econds while the maxim value atlowed is 80400 secs.
ngout	~					

Figure 4-8 Reader Operation Statistics Window

- Choose ReadPoint Select a specific read point or select All from the drop-down list to display the statistics.
- IdentificationCount Displays the number of successful (and failed) tag inventories.
- ReadCount Displays the number of successful (and failed) tag reads.
- WriteCount Displays the number of successful (and failed) tag writes.
- Lockcount Displays the number of successful (and failed) lock operations on tags.
- KillCount Displays the number of successful (and failed) kill operations on tags.

- Reset Statistics Resets all success and failure counts (including the optional Gen2 and Custom statistics) for all read points.
- **Refresh Interval** Sets the refresh interval (in seconds) for this window. The statistics information for the chosen read point is refreshed every **N** seconds (where **N** is the set refresh interval). The minimum value is 10 seconds and the maximum value allowed is 86,400 seconds. Input a new value and click **Change** to set a new interval.

## **Reader Gen2 Optional Operation Statistics**

Select **Gen2 Optional** to view the **Reader Gen2 Operation Statistics** window. This window provides options to view the statistics of read points for the optional Gen2 operations the reader supports.

						FX7500
Home	^		Reader	Gen2 Operation	Statistics	Reader Gen2 Optional operation
tatus Operation tatistics		Choose ReadPoint:		Read Point 1 -		The Reader Gen2 Block Statistics page provides options to view the statistics of individual read points
NXP Events		Operation statistics:		Nobul Former F		for the optional Gen2 Operations supported by the reader. The user can choose "All" read point option view the combined statistics for all the read points. T success and failure values of following statistics can
Other Custom			OperationName	Success (# of Times)	Failure (# of Times)	viewed for each read point.
onfigure Reader			BlockErase	0	0	Block Erase count - Shows the number of
ommunication			BlockWrite	0	0	successful (and failed) Block Erase operations. • Block Write count - Shows the number of succes
e Time			BlockPermalock	0	0	(and failed) Block Write operations.
ec nge Password O Dications files rmware nmit/Discard ystem Log gnostics			Refresh	Reset Statistics	Change	successful (and failed) Block Permahock operation • Choose Read point - Allows choosing a specific "all" readpoint whose statistics are displayed • Reset Statistics - Resets all the success and failu counts (including the standard Gen2 and Custom statistics) (or all the read point) read the read point. Referent Interval a horse prage. The statistics information for the choose need point is refereable every 'V' seconds (where N is the user configurer value for the refersh interval). The minimum value the refersh interval is 10 seconds while the maxim value allowed B0400 seconds.
tdown out	~					

Figure 4-9 Reader Gen2 Operation Statistics Window

- Choose ReadPoint Select a specific read point from the drop-down list to display the statistics, or select All to view the combined statistics for all read points.
- BlockErase Displays the number of successful (and failed) block erase operations.
- BlockWrite Displays the number of successful (and failed) block write operations.
- BlockPermalock Displays the number of successful (and failed) block permalock operations.
- Reset Statistics Resets all success and failure counts (including the standard Gen2 and custom statistics) for all read points.
- **Refresh Interval** Sets the refresh interval (in seconds) for this window. The statistics information for the chosen read point is refreshed every **N** seconds (where **N** is the set refresh interval). The minimum value is 10 seconds and the maximum value allowed is 86,400 seconds. Input a new value and click **Change** to set a new interval.

#### **NXP Custom Command Operation Statistics**

Select **NXP** to view the **NXP Custom Command Operation Statistics** window. This window provides options to view the statistics of read points for the custom NXP operations the reader supports.

Figure 4-10 NXP Custom Command Operation Statistics Window

- Choose ReadPoint Select a specific read point from the drop-down list to display the statistics, or select All to view the combined statistics for all read points.
- ChangeEAS Displays the number of successful (and failed) change EAS operations performed on NXP tags.
- EASAlarm Displays the number of successful (and failed) EAS alarms received from tags.
- SetQuiet Displays the number of successful (and failed) set quiet operations performed on NXP tags.
- ResetQuiet Displays the number of successful (and failed) reset quiet operations performed on NXP tags.
- ChangeConfig Displays the number of successful (and failed) change configuration operations performed on NXP tags.
- Reset Statistics Resets all the success and failure counts (including the standard and optional Gen2 operation statistics) for all the read points.
- **Refresh Interval** Sets the refresh interval (in seconds) for this window. The statistics information for the chosen read point is refreshed every **N** seconds (where **N** is the set refresh interval). The minimum value is 10 seconds and the maximum value allowed is 86,400 seconds. Input a new value and click **Change** to set a new interval.

#### **Event Statistics**

Select **Events** to view the **Events Statistics** window. This window provides options to view the statistics of events.

					FX7500
Home	^		Event Statis	tics	Event Statistics
Status ▶ Operation Statistics		Event Statistics:			The Event Statistics page provides options to view th statistics of events.
Gen2 Optional			EventName	Count (# of Times)	Ambient Temperature High Alarm - Shows the     sumber of events relies of for embient temperature
NXP			AmbientTemperatureHighAlarm	0	high alarm.
Events			AmbientTemperatureCriticalAlarm	0	<ul> <li>Ambient Temperature Critical Alarm - Shows the number of events raised for ambient temperature</li> </ul>
Other Custom			PATemperatureHighAlarm	0	critical alarm.
Configure Reader			PATemperatureCriticalAlarm	0	events raised for PA temperature high alarm.
Communication			ForwardPowerHighAlarm	0	<ul> <li>PATemperatureCriticalAlarm - Shows the number of events raised for PA temperature critical alarm.</li> </ul>
ate Time			ForwardPowerLowAlarm	0	<ul> <li>Forward Power High Alarm - Shows the number events raised for forward power high alarm</li> </ul>
P Sec			ReversePowerHighAlarm	0	Forward Power Low Alarm - Shows the number of
Change Password			EchoThresholdAlarm	0	Reverse Power High Alarm - Shows the number of the second se
<b>iPIO</b>			DatabaseWarning	0	events raised for reverse power high alarm. • Echo Threshold Alarm - Shows the number of
pplications			DatabaseError	0	events raised for echo threshold alarm.
Profiles			BadioGPIInformation	0	raised for database warning.
Firmware				-	<ul> <li>Database Error - Shows the number of events rais for database error.</li> </ul>
System Log			Reset Statistics		<ul> <li>GPI Information - Shows the number of radio GPI events raised</li> </ul>
Diagnostics					Reset Statistics - Resets all the success and failu
Shutdown					statistics) for all the read points.
_ogout	~		Refresh Interval (secs): 10	Change	<ul> <li>Refresh interval - Allows the user to set the refres interval (in seconds) for this page. The statistics information for the chosen read point is refreshed every "Ty seconds (where his its the user configured value for the refresh interval). The minimum value the refresh interval is 10 seconds while the maximu value allowed is 86400 secs.</li> </ul>
					http://www.motorolasolutions

Figure 4-11 Event Statistics Window

- AmbientTemperatureHighAlarm Displays the number of events raised for ambient temperature high alarm.
- AmbientTemperatureCriticalAlarm Displays the number of events raised for ambient temperature critical alarm.
- **PATemperatureHighAlarm** Displays the number of events raised for PA temperature high alarm.
- **PATemperatureCriticalAlarm** Displays the number of events raised for PA temperature critical alarm.
- ForwardPowerHighAlarm Displays the number of events raised for forward power high alarm.
- ForwardPowerLowAlarm Displays the number of events raised for forward power low alarm.
- ReversePowerHighAlarm Displays the number of events raised for reverse power high alarm.
- EchoThresholdAlarm Displays the number of events raised for echo threshold alarm.
- DatabaseWarning Displays the number of warning events raised whenever the radio tag list buffer is almost full.
- DatabaseError Displays the number of events raised when the radio tag list buffer is full.
- GPIInformation Displays the number of events raised for radio GPI events.
- Reset Statistics Resets all the success and failure counts for all the read points.
- Refresh Interval Sets the refresh interval (in seconds) for this window. The statistics information for the chosen read point is refreshed every N seconds (where N is the set refresh interval). The minimum value is 10 seconds and the maximum value allowed is 86,400 seconds. Input a new value and click Change to set a new interval.

#### **Other Custom Command Operation Statistics**

Select **Other Custom** to view the **Other Custom Command Operation Statistics** window. This window provides options to view the statistics of read points for the custom operations the reader supports.

							FX7500	
Home Status • Operation Statistics Gen2 Optional NXP Events Other Custom • Configure Reader Read Tags • Communication Date Time IP Sec Change Password GPIO Applications Profiles • Firmware Commit/Discard • System Log Diagnostics Shutdown Logout	^	Choose ReadPoint: Operation statistics:	OperationName QTOperation Refresh	Read Point 1 - Success (# of Times) Reset Statistics Interval (secs): 10	Failure (# of Times) 0 Change	cs	<ul> <li>Reader Statistics for Other Custor</li> <li>Paradian Statistics for Other Custor</li> <li>The Reader Other Custor Statistics page provides for the Custor Operations supported by the reader for the Custor Operations performed on Monza4 Or failed Of Operations performed on Monza4 Or custor operation statistics for different for the Statistics - Reset saltistics are displayed.</li> <li>Reset Statistics - Resets all the success and failure custor operation statistics) for all the read points.</li> <li>Refer Istiffica - Reset saltistics are the reflection interval (in seconds) for this page. The statistics interval in the reader for the support read points.</li> <li>Refer Istiffication for the reader for the support water interval - Aldws the uset to set the reflection interval in the reader interval. All means the reader were by the readers in the user configured operative readers in the user configured operative readers in the user configured by the readers interval. All means the means the means interval in seconds (where N is the use to reader of the readers interval. All means the means the means interval in seconds (where N is the user configured operative readers in the user configured by the readers interval. All means the means the means interval in seconds (where N is the user configured operative readers in the user configured by the readers in the user configured by</li></ul>	
	~							~

Figure 4-12 NXP Custom Command Operation Statistics Window

- Choose ReadPoint Select a specific read point from the drop-down list to display the statistics, or select All to view the combined statistics for all read points.
- QTOperation Displays the number of successful (and failed) QT operations performed on Monza4 QT tags.
- Reset Statistics Resets all the success and failure counts for all the read points.
- **Refresh Interval** Sets the refresh interval (in seconds) for this window. The statistics information for the chosen read point is refreshed every **N** seconds (where **N** is the set refresh interval). The minimum value is 10 seconds and the maximum value allowed is 86,400 seconds. Input a new value and click **Change** to set a new interval.

# **Configure Reader**

Use the Configure Reader submenus to access the following functions.

#### **Reader Parameters (General)**

Select Configure Reader in the selection menu to configure reader settings using this window.

				FX7500
Ноте	^	Reade	r Parameters	Configure Reader
Status ▶ Operation Statistics ✔ Configure Reader ▶ Read points		Motorola - FX7500	1324601050102 igure Reader	The reader settings can be configured using this page 19 19 19 19 10 10 10 10 10 10 10 10 10 10
Region Read Tags ▶ Communication Date Time		Name: Description: Location:	FX7500065D22 FX7 FX7500065D22 Advanced Reader	maximum size of 32 characters. • Location • User specified information regarding the location of the reader. Accepts alpha numeric characters with a maximum size of 32 characters. • Contact. Name of the contact who manages the reader. Accepts alpha numeric characters with a
IP Sec Change Password GPIO Applications		Contact: Operation Status:	Motorola Inc Enabled Enabled -	maximum size of 32 characters. • Operation status - Displays the current operation status of the reader. Can be 'Enabled', 'Disabled' or 'Unknown'. • Antenna check - Option to control the antenna sensing feature on the reader. If this feature is
Profiles ▶ Firmware Commit/Discard ▶ System Log		Idle Mode Timeout (secs):	0 Dn Set	Disabled the reader does not attempt to check if any antenna is connected on the ports. When "Enabled" the reader will monitor the presence of antenna on the port and will teramik RF only if an antenna is connected • Idle Mode Timenut (sers) - Chiona to turn off ratio
Diagnostics Shutdown Logout			Properties	when the reader is ide for the specified time interval Timeout value of disables this feature. Enabling ide mode timeout will also turn of the antenna check feature when invertory is not going on. Ide mode values can be set between 10 to 60000 seconds when the feature is turned on.
	~			<ul> <li>Kation Vyweith Statio - Displays time Currient state (UVR or 'OFP) of the radio. The radio can be turned off if ide mode timeout is set to non zero value and the radio is not doing IRP operations for a time period greater than the time specified by kide mode timeout. The radio will be turned on automaticady when starting RF operation if it is turned off.</li> <li>Set Properties - Okking on Set Properties' button</li> </ul>

Figure 4-13 Reader Parameters

- Name Sets the user-configured reader name. Accepts up to 32 alphanumeric characters.
- Description Sets a user-configured reader description. Accepts up to 32 alphanumeric characters.
- Location Enter information on the reader location. Accepts up to 32 alphanumeric characters.
- Contact Enter the name of the reader manager contact. Accepts up to 32 alphanumeric characters.
- GPI Debounce Time Delays input events up to this time, and delivers these events only if the PIN states
  remains on the same level.
- Operation Status Displays the current operation status of the reader (Enabled, Disabled, or Unknown).
- Antenna Check Controls the antenna sensing feature on the reader. Disabled indicates that the reader does not attempt to check if an antenna is connected on the ports. When Enabled, the reader monitors the presence of an antenna on the port and only transmits RF if an antenna is connected.
- Idle Mode Timeout (secs) Turns off the radio when the reader is idle for the specified time interval. A value of 0 disables this feature. Enabling this also turns off the antenna check feature when idle mode is entered after time out.
- Radio Power State Displays the current state (On or Off) of the radio. The radio can be turned off if the Idle Mode Timeout is set to a non-zero value and the radio is not performing RF operations for a time period greater than the time specified by this timeout. The radio turns on automatically when RF operation starts.
- Set Properties Click to send the changes to the reader.

These settings only affect the display. Use Commit/Discard on page 4-50 to save the changes.

#### **Read Points**

Click **Read points** in the selection menu to configure the read point settings and view the current read points state.

			FX7500
Home	^	Reader Parameters	Read point
Status > Operation Statistics - Configure Reader > Read points Advanced Region Read Tags > Communication		Antenna Status Antenna #: 1 2 3 4 Antenna Status: • • • • • • • • • Refresh Interval (secs): 10 Change Maintenance mode	The read point settings can be configured using this page. The current state of the read points can also be viewed in this page. • Antenna Status - Shows the status of the read points on this reader. There can be three possible state of a specific read point. Connected - Read point is enabled and an antenna is connected to the port. (Shown using the green button). Not Connected - Read point is enabled, however on antenna is connected to the port. (Shown using the red button)
IP Sec Change Password GPIO Applications Profiles Firmware Commit/Discard System Log Diagnostics Shutdown Logout	~	Antenna Configuration         Choose ReadPoint:       Read Point 1 •         Description:       Image: Configuration:         User Configuration:       Enabled •         Air Protocol:       GEN2         Cable Loss(dB/100 ft):       0         Cable Length(ft):       0         Set Properties	User Disabled - Read point is disabled by the user. (Shown using the yellow button). Clicking on the status button of a read point will allow the user to see / change the selected antenna's configuration. Refresh Interval - Allows the user to set the refresh interval (in seconds) to update the readpoint status on this page. The minimum value of the refresh interval is 10 seconds while the maximum value allowed is 86400 seconds. Maintenance mode - Places the reader in maintenance mode - not not minimet in the second PWR, ACT and STAT LEDs to enable easily locating the reader. Also enables quick reporting of Antenna status by setting the refresh interval to 2 seconds. Note that user is no allowed to modify the refresh interval in this mode. Choose Read point - Allows choosing a specific readpoint whose configuration is displayed. Description - User specified description of the read point. Accepts alpha numeric characters with a maximum size of 32 characters.

Figure 4-14 Configure Read Points

#### Antenna Status

- Status buttons indicate the status of the reader read points:
  - Green: Connected Read point is enabled and an antenna is connected to the port.
  - Red: Not connected Read point is enabled, but no antenna is connected to the port.
  - Yellow: User disabled The user disabled the read point.

Click a read point's status button to view and/or change the selected antenna configuration.

- **Refresh Interval** Sets the refresh interval (in seconds) to update the readpoint status. The minimum value is 10 seconds and the maximum value allowed is 86,400 seconds. Input a new value and click **Change** to set a new interval.
- **Maintenance mode** Places the reader in maintenance mode which intermittently drives PWR, ACT, and STAT LEDs to easily locate the reader. Also enables quick reporting of antenna status by setting the refresh interval to 2 seconds. Note that you can not modify the refresh interval in this mode.

#### **Antenna Configuration**

- Choose Read Point Select a read point to display the configuration.
- Description Enter a read point description of up to 32 alphanumeric characters.
- User Configuration Enable or disable the read point. Disabling a read point blocks RF operation using the port/antenna.
- Air Protocol Displays the air protocols the read point supports. The reader currently supports only EPC Class1 GEN2 air protocol.
- **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 **0**. 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.
- Set Properties Select Set Properties to apply the changes. Select Commit/Discard on page 4-50 to save the changes to the reader.

## **Read Points - Advanced**

Click **Advanced** under **Read points** in the selection menu to view the **Advanced Antenna Configuration** window. Use this window to modify the transmission power and frequency configuration elements of the antenna.



**NOTE** This page is not supported when LLRP is configured in secure mode.

			FX7500
Home Status • Operation Statistics • Configure Reader • Read points Advanced Region Read Tags • Communication Date Time IP Sec Change Password GPIO Applications Profiles • Firmware Commit/Discard • System Log Diagnostics Shutdown Logout	~	Advanced Antenna Configuration          Antenna Configuration         Select Antenna         Antenna 1         Transmit Power(dBm)         29.2         YAntenna 1         Antenna 2         Antenna 3         Antenna 4         Save Settings Permanently         Apply	<ul> <li>Advanced Antenna Configuration at the done using this page. The current configuration of an antenna has the strethweed before the advanced configuration settings are applied to one or more selected antenna to get the current configuration. Select an antenna has the configuration of a selected antenna. It is necessary to get antenna configuration, after login, for one of the antennas, before the settings or applied. The antenna configuration are used at the antennas. The selected antenna to get the applied. The antenna configuration is able to easily a the configuration of a selected antenna to the resting after configuration in the settings per the current transmit power setting after configuration in the settings per the current transmit power setting after configuration or the settings per the current transmit power setting after configuration is deviaved.</li> <li>Tamsmit Forquercy - Displays the current transmit power settings after configuration is deviaved.</li> <li>Tamsmit Forquercy - Displays the current that the settings per present watcher the forquency for non-frequency configuration is a deviaved.</li> <li>Tamsmit Forquercy - Displays the current settings with the settings per manently. The settings with be persisted across reboots.</li> <li>Apply - Clotk this to apply the settings for selected antennas. The selected transmit power and threquency/access operations. If Save Setting Permanently is also checked then these setting with explicit on all the selected antennas. The settings with explicit on all the selected antennas. The settings with explicit on all the selected then these settings and presisted across reboots unless modified by any other client.</li> </ul>

Figure 4-15 Advanced Antenna Configuration

Retrieve the current configuration of an antenna before applying the advanced configuration settings.

- **Get Configuration** Select an antenna to get the current configuration for that antenna. After login, you must get the antenna configuration for an antenna before settings can be applied. The antenna configuration page retains the retrieved settings after login if you do not refresh the page using browser refresh.
- Transmit Power Displays the current transmit power setting after selecting Get Configuration, and allows changing the transmit power for that antenna. This transmit power level does not include cable loss compensation.
- Transmit Frequency Displays the active frequency configuration on the reader, and allows changing the frequency for non-frequency hopping enabled regulatory regions. If hopping is enabled, the combo box displays the hop table ID.
- Save Settings Permanently Check this to save the settings permanently and persist them across reboots.
- Apply Click to apply the settings for the selected antennas. This applies the selected transmit power and frequency/hop table configuration to all selected antennas. The settings are applied immediately and have immediate effect on Inventory/Access operations. Also check Save Setting Permanently to persist these settings across reboots unless modified by another client.

#### **Configure Region**

Different countries have different RF regulatory requirements. To assure regulatory compliance, select **Region** to set the reader for specific regulatory requirements in the country of reader operation using the **Configure Region Settings** window.



**NOTE** Region configuration is not required for readers configured to operate in the United States region (under FCC rules).

Because of the differing frequency requirements, there are several versions of the hardware. The list of choices on this page 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.

				FX7500
Home Status	^ -	Region C	configuration	RF Region
<ul> <li>▶ Operation Statistics</li> <li>▼ Configure Reader</li> <li>▶ Read points</li> </ul>		Configure Region of operation:	Region Settings	(country) in which the reader is to be used. Different country is which the reader is to be used. Different countries have different regulatory requirements on RF radiation, and it is necessary to correctly set the country in which the reader is being used, to assure regulatory compliance.
Region Read Tags ▶ Communication Date Time		Communication Standard: Frequency Hopping: Selected Channels:	EU 302.208 -	Because of the differing frequency requirements, there are several versions of the hardware. The list of choices on this page is limited by the software to those selections compatible with with the hardware in use. Note that if only one option is compatible with the hardware, that option is selected
IP Sec Change Password GPIO Applications		Warning - Selecting a Region diffe	rent from the country of use is illegal! I understand	automatically. As with most of these pages, setting selections first affects only the display. Selections must be committed, in this case using the Commit Change button on the Commit / Revert nace, before there take effect.
Profiles ▶ Firmware Commit/Discard				<ul> <li>Region of Operation - Allows choosing the region for the country of operation. This must be selected from the drop down list that presents the regions which have given regulatory approval to be used with the current board.</li> </ul>
▶ System Log Diagnostics Shutdown Logout				Communication Standard - Allows choosing 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 . Listen before Talk - Allows luming for of Off the Listen before talk option. This option is deplayed only
				<ul> <li>Frequency Hopping - Allows turning for or Off the Frequency hopping - Allows turning for or Off the Frequency hopping option. This option is displayed only if the chosen region of operation supports this.</li> <li>Selected Channels - Allows selection of a subset of channels to operate upon (from the list of supported</li> </ul>
	~			channels). This option is displayed only if the chosen region of operation supports this • Set Properties - Clicking on "Set Properties' button

Figure 4-16 Configure Region Settings Window

- **Region of Operation** Select the region for the country of operation from the drop-down list. This list includes regions which have 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.
- Frequency Hopping Check to select frequency hopping. This option appears only if the chosen region of
  operation supports this.
- Selected Channels Select a subset of channels on which to operate (from the list of supported channels). This option appears only if the chosen region of operation supports this.
- Please confirm Check the I understand check box to confirm your understanding that the choices are in compliance with local regulatory requirements.
- Set Properties Click to apply the changes. Select Commit/Discard on page 4-50 to save the changes to the reader.

#### Certificates

You can protect network services on the reader using SSL/TLS to secure the communication channel against eavesdropping or tampering, and optionally authenticate peer networked nodes involved in the communication. SSL/TLS protocol uses Public Key Infrastructure digital certificates. The following services on the reader support SSL/TLS:

- Web Administrator Console service (HTTPS). See Network Services Settings on page 4-39.
- File Transfer Service (FTPS explicit SSL/TLS over FTP). See Network Services Settings on page 4-39.
- Shell Service (SSH by default always in secure mode).
- Secure LLRP Service (refer to the EPC Global LLRP Standard, Security in TCP Transport). See the Enable Secure Mode option in Configure LLRP Settings on page 4-36.



**NOTE** The supported version of SSL/TLS varies between services. Different services support SSL v3 and TLS 1.0 and above.

**NOTE** The **Validate Peer** option in Secure LLRP Service configuration enables authentication of reader and/or clients using digital certificates. You must import a custom certificate (instead of the default self-signed certificate) to the reader to enable this option. See *Configure LLRP Settings on page 4-36* for details. Services other than Secure LLRP rely on password-based authentication.

NOTE The SNMP service on the reader supports SNMP v2c and does not support security.

#### **Certificate Configuration**

The Certificate Configuration page is available under the Configure Reader menu when the Administrator Console is in HTTPS mode only. To enable HTTPS mode, select Communication > Services, and on the Reader Communication Parameters page select HTTPS from the Web Server drop-down menu.

			FX7500
Home	^	Reader Communication Parameters	Service Settings
Status <ul> <li>Operation</li> <li>Statistics</li> <li>Configure</li> </ul>		Configure Network Settings	Network Services
Reader Read Tags Communication		Web Server: HTTPS - Shell: SSH -	rne reader supports the tollowing network services.
LLRP SNMP Wireless		File Server: FTPS ▼ Disable IPV6 Stack:	Web Server - This allows configuring the web server in either HTTP (Unsecure) or HTTPS (Secure) mode.     Shell - This allows configuring the Shell to Shell - This allows configuring the Shell to
Services Date Time IP Sec		Neceive KA packets: V	SIM (Secure) mode or disabled state.     File Server This allows configuring the     File server to either FTP (Unsecure) or     FTPS (Secure) mode.     Disable IPV6 Stack. This allows the user
Change Password GPIO			to enable or disable the reader's IPV6 stack. • Receive RA packets - This option is only valid when IPV6 stack is enabled. If
Applications Profiles ▶ Firmware			enabled this allows for IPV6 IP configuration through RA packets else the IP will have to be obtained via DHCP in the communications page or assigned cteticath.
*Commit/Disc ▶ System Log			statically. Note: The service configuration is not updated until you click Commit (see <u>Save</u>
Diagnostics Shutdown Logout			Changes.) If the Commit is not successful, the system should indicate the problem and allow you to correct it by repeating the operation.
< >	Y		· · · · · · · · · · · · · · · · · · ·

Figure 4-17 Setting HTTPS Mode

Select **Configure Reader > Certificates.** The **Certificate Configuration** page provides the current certificate details and an option to update to a custom certificate.

						FX7500		
Home	(	Certificates Con	ifigurati	ons		Certificates ?		
Status ▶ Operation Statistics ▼ Configure Reader	Current certificate details					This option is available only in HTTPS mode. This page can used to update the digital certificate of the reader as well as to display the current certificate details. The current certificate installed in the reader is shown atong with the following		
▶ Read points Region	Subject Name	suer Validity From	Validity To	Serial	Installed date	properties Subject Name of the certificate.		
Certificates Read Tags ▶ Communication	FX75000657E5 FX	75000657E5 11/12/2013	06/12/2033	1676016974	Wed Dec 11 02:03:30 2013	to sole marine.     Validity From and To dates.     Serial number of the certificate.     Date of installation of the certificate.     To under the certificate in the following fields has to be provided.		
Date Time IP Sec Change Password GPIO		Update Cert	FTPS URL - Provide the complete URL of the FTPS server including the certificate tile name FTPS user name - Provide the user name of FTPS server					
Applications Profiles Firmware	FTPS URL:	ftps://157.235.207.170/0	ert/FX75000	657E5.pfx		<ul> <li>FTPS Password - Provide the password of FTPS server</li> <li>DEX password - Provide the private key password of</li> </ul>		
	FTPS User ID:	guest				the PFX file. This field can be left empty if the private key password is null		
Commit/Discard ▶ System Log	FTPS Password:	••••				Note: The web browser might prompt the user		
Diagnostics Shutdown Logout	FFA Fassword.	Update Cert	ificate			instalu'accept the new certricate on successful certricate update.		
	NOTE: Clicking on "Update Certificate" May take several seconds to download and install the new certificate from FTPS server .					w		
	PLEASE ENSURE THAT THE READER IS NOT POWERED OFF OR REBOOTED UNTIL CERTIFICATE INSTALLATION IS COMPLETE!							
	After successful certificate	e update, please manua	ally reboot	reader to us	e updated certificate			

Figure 4-18 Certificate Configuration Page

The **Current certificate details** section displays the installed certificate's details such as issuer, serial number, and validity information.

By default, the reader uses self-signed certificates (characterized by **Subject name** and **Issuer** in **Current** certificate details) for all secure interfaces using SSL/TLS.

Self-signed certificates have restrictions, such as by default clients do not trust them because they are not issued by a trusted Certification Authority (CA). Custom trusted certificates may be beneficial in certain use cases, for example:

- LLRP by default does not authenticate the client or reader. Security extensions to the standard allow client or reader authentication using digital certificates. The entities involved validate digital certificates by confirming the certificates were issued from a trusted source. Therefore a custom certificate is required to authenticate the client or reader. See the **Validate Peer** option in *Configure LLRP Settings on page 4-36*.
- By default web browsers display a warning or prevent connection to the **Administrator Console** when the console service is in HTTPS mode. See *Network Services Settings on page 4-39*. This can be an inconvenience for certain environments, particularly when browsers are configured to reject connection to servers that do not publish a trusted certificate.

FX7500 reader does not allow automatic certificate request and updating. The reader certificate must be issued externally and imported to the reader.

The **Update Certificate** section allows importing a custom certificate to the reader. You must use one of the digital certificate generation mechanisms to create the certificate (see *Creating a Custom Certificate*). The reader only supports certificates in PKCS#12 format (typically with a **.pfx** extension). This format uses a signed certificate, with a private key (optionally encrypted) bundled into a single file. The certificate must be hosted on a secure FTP server (running in **Explicit SSL/TLS over FTP mode**). The following options are used to perform the update:

- FTPS URL: Full path to server, including ftps:// prefix, where the .pfx file is hosted.
- FTPS User ID: User login ID to secure FTP server.
- FTPS Password: Password for specified user.
- **PFX Password**: Password for encrypted key in the .pfx file, if the key is encrypted.
  - **NOTE** The FX7500 supports only a single digital certificate. If a custom certificate is installed, the issuer of the certificate is trusted by the reader, so any client attempting to connect to the reader over secure LLRP mode is trusted if the certificate issued to the client is from the same issuer.
  - **NOTE** The FX7500 only supports certificates using the RSA public key algorithm. When obtaining a certificate issued from the reader or clients, ensure that RSA is the selected key algorithm.
    - **NOTE** A manual reboot of the reader is required after updating the certificate for the services using SSL/TLS.

#### **Creating a Custom Certificate**

FX7500 reader requires that custom certificates are created externally and imported to the reader using a secure FTP, as described previously. The certificate and key used by the reader must be in PKCS#12 format (a single **.pfx** file), while the certificate and keys used by clients interfacing to the LLRP service on the reader must be in PEM format. If you obtain a certificate in a different format it must be converted to the appropriate format using a tools such as **OpenSSL** (www.openssl.org).

Digital certificates are typically requested and issued from a certification authority hosted internally in an enterprise environment or by a trusted third party certification authority. The process of requesting and creating certificates varies between platforms. For example, a Windows Server environment typically uses Microsoft Certification Server to process certificate requests and issue certificates. Unix-based systems typically use OpenSSL. This guide can not document all options. The following example illustrates one method of creating custom certificates.

#### **Custom Certificate Creation Example**

The following example illustrates how to set up an OpenSSL-based certification authority to issue reader and client certificates. These scripts can be executed in a Unix operating system or on Windows with a Unix shell scripting environment such as Cygwin:

Create the following text files in a suitable folder:

- caconfig.cnf OpenSSL configuration file for Certification Authority certificate creation and signing
- samplereader.cnf OpenSSL configuration file for reader certificate creation
- samplehost.cnf OpenSSL configuration file for reader certificate creation
- InitRootCA.sh Script for initializing a new Root Certification Authority
- CreateReaderCert.sh Script for creating reader certificate
- CreateClientCert.sh Script for creating client certificate

File contents are as follows. Refer to **OpenSSL** (www.openssl.org) documentation for details on configuration options. Edit configuration options to accommodate the deployment environment.

```
caconfig.cnf
   # Sample caconfig.cnf file for XYZ certification authority
   #
   # Default configuration to use when one is not provided on the command line.
   #
   [ ca ]
   default_ca
                 = local_ca
   #
   #
   # Default location of directories and files needed to generate certificates.
   #
   [local_ca]
   dir
              = .
   certificate = $dir/cacert.pem
   database
                 = $dir/index.txt
   new_certs_dir = $dir/signedcerts
   private key = $dir/private/cakey.pem
   serial
               = $dir/serial
   #
   #
   # Default expiration and encryption policies for certificates.
   #
   default_crl_days
                        = 365
   default_days
                       = 1825
   default_md
                       = sha1
   #
   policy
               = local_ca_policy
   #
   #
   # Default policy to use when generating server certificates. The following
   # fields must be defined in the server certificate.
   #
   [local_ca_policy]
   commonName
                          = supplied
   stateOrProvinceName = supplied
   countryName
                        = supplied
   emailAddress
                        = supplied
                          = supplied
   organizationName
   organizationalUnitName = supplied
```

```
#
#
# The default root certificate generation policy.
#
[req]
default bits = 2048
default_keyfile = ./private/cakey.pem
default_md = sha1
#
prompt
                = no
distinguished_name
                     = root_ca_distinguished_name
x509_extensions
                    = v3_ca
#
#
# Root Certificate Authority distinguished name. Change these fields to match
# your local environment!
#
[root_ca_distinguished_name]
commonName
                     = XYZ Root Certification Authority
stateOrProvinceName = IL
                   = US
countryName
emailAddress
                   = ca@xyz.com
                     = XYZ
organizationName
organizationalUnitName = ABC Dept
#
[root_ca_extensions]
basicConstraints
                   = CA:true
[v3_req]
basicConstraints
                   = CA:FALSE
keyUsage
                 = nonRepudiation, digitalSignature, keyEncipherment
[v3_ca]
basicConstraints
                   = critical, CA:true, pathlen:0
nsCertType
                = sslCA
keyUsage
                  = cRLSign, keyCertSign
extendedKeyUsage
                      = serverAuth, clientAuth
nsComment
                   = "CA Certificate"
[ssl_client_server]
basicConstraints
                   = CA:FALSE
nsCertType
                  = server, client
```

```
keyUsage = digitalSignature, keyEncipherment
extendedKeyUsage = serverAuth, clientAuth, nsSGC, msSGC
nsComment = "SSL/TLS Certificate"
```

#### samplereader.cnf

#### #

# samplehost.cnf - customized for a reader. Edit last 4 octets after FX7500 to suit hostname of reader to which certificate is issued

#

[ req ] prompt = no distinguished\_name = FX7500123456.ds

[FX75000657E5.ds]

commonName	= FX7500123456
stateOrProvinceName	e = IL
countryName	= US
emailAddress =	= root@FX7500123456
organizationName	= Company Name
organizationalUnitNar	ne = Department Name

#### samplehost.cnf

#### #

# samplehost.cnf - customized for a client that will connect to the reader's LLRP port. Edit hostname to match FQDN of client.

#

[ req ] prompt = no distinguished\_name = clienthostname.mycompany.com

[clienthostname.mycompany.com ] commonName = CLIENTHOSTNAME stateOrProvinceName = IL countryName = US emailAddress = root@clienthostname.mycompany.com organizationName = Company Name organizationalUnitName = Department Name

#### InitRootCA.sh

#Initialize from current directory

#Enable definition for environment variable OPENSSL\_FIPS to execute in FIPS mode on system with FIPS compliant OpenSSL build

#export OPENSSL\_FIPS=1

export WORKSPACE\_DIR=\$( cd "\$( dirname "\$0" )" && pwd )

#Make sure CA key password is unique and secret

export CA\_KEY\_PASSWORD=CA-abcd12345

#Cleanup Certificate Store folder

rm -rf \$WORKSPACE\_DIR/CA-Certs

#Change directory to CA-Certs and create folders for certificate and key storage in myCA

mkdir -p \$WORKSPACE\_DIR/CA-Certs

cd \$WORKSPACE\_DIR/CA-Certs

mkdir -p myCA/signedcerts

mkdir -p myCA/private

cd myCA

#Initialize serial number

echo '01' > serial && touch index.txt

#Create CA private key and certificate

export OPENSSL\_CONF=\$WORKSPACE\_DIR/caconfig.cnf

echo 'Creating CA key and certificate ....'

openssl req -x509 -newkey rsa:2048 -out cacert.pem -outform PEM -days 1825 -passout pass:\$CA\_KEY\_PASSWORD

openssl x509 -in cacert.pem -out cacert.crt

echo 'Test Certificate Authority Initialized. CA certificate saved in cacert.crt. Install it to trusted CA certificate store'

#### CreateReaderCert.sh

#Initialize from current directory

#Enable definition for environment variable OPENSSL\_FIPS to execute in FIPS mode on system with FIPS compliant OpenSSL build

#export OPENSSL\_FIPS=1

export WORKSPACE\_DIR=\$( cd "\$( dirname "\$0" )" && pwd )

#Make sure passwords are unique and secret

export CA\_KEY\_PASSWORD=CA-abcd12345

export GENERATED\_CERT\_KEY\_PASSWORD=abcd12345

cd \$WORKSPACE\_DIR/CA-Certs/myCA

#Create sample reader key and certificate

export OPENSSL\_CONF=\$WORKSPACE\_DIR/samplereader.cnf

echo 'Creating reader key and certificate with its signing request ....'

openssl req -newkey rsa:1024 -keyout reader\_key.pem -keyform PEM -out tempreq.pem -outform PEM -passout pass:\$GENERATED\_CERT\_KEY\_PASSWORD

#CA now signs client certificate by processing its certificate sigining request

echo 'CA Signing reader certificate .... '

export OPENSSL\_CONF=\$WORKSPACE\_DIR/caconfig.cnf

openssl ca -extensions ssl\_client\_server -in tempreq.pem -out reader\_crt.pem -passin pass:\$CA\_KEY\_PASSWORD -batch

rm -f tempreq.pem

echo 'Exporting reader certificate and key to PKCS#12 format....'

openssl pkcs12 -export -out reader.pfx -inkey reader\_key.pem -in reader\_crt.pem -certfile cacert.crt -passin pass:\$GENERATED\_CERT\_KEY\_PASSWORD -passout pass:\$GENERATED\_CERT\_KEY\_PASSWORD

echo 'Reader certificate, key and export to PKCS#12 format (.pfx) completed.'

echo 'Note: PFX protected with password: '\$GENERATED\_CERT\_KEY\_PASSWORD

#### CreateClientCert.sh

#Initialize from current directory

#Enable definition for environment variable OPENSSL\_FIPS to execute in FIPS mode on system with FIPS compliant OpenSSL build

#export OPENSSL\_FIPS=1

export WORKSPACE\_DIR=\$( cd "\$( dirname "\$0" )" && pwd )

#Make sure passwords are unique and secret

export CA\_KEY\_PASSWORD=CA-abcd12345

export GENERATED\_CERT\_KEY\_PASSWORD=abcd12345

cd \$WORKSPACE\_DIR/CA-Certs/myCA

echo 'Current dir:'\$( cd "\$( dirname "\$0" )" && pwd )

#Create sample client key and certificate

export OPENSSL\_CONF=\$WORKSPACE\_DIR/samplehost.cnf

echo 'Creating client key and certificate with its signing request ....'

openssl req -newkey rsa:1024 -keyout client\_key.pem -keyform PEM -out tempreq.pem -outform PEM -passout pass:\$GENERATED\_CERT\_KEY\_PASSWORD

#CA now signs client certificate by processing its certificate sigining request

echo 'CA Signing client certificate....'

export OPENSSL\_CONF=\$WORKSPACE\_DIR/caconfig.cnf

openssl ca -in tempreq.pem -out client\_crt.pem -extensions ssl\_client\_server -passin pass:\$CA\_KEY\_PASSWORD -batch

rm -f tempreq.pem

echo 'Client key, certificate creation and signing completed. Use files client\_key.pem and client\_crt.pem'

#### **Script Usage**

The following section illustrates how to use the previous scripts.

#### **Certification Authority Initialization**

- Edit caconfig.cnf to change the configuration for CA if necessary.
- Execute CA initialization command sequence by invoking ./InitRootCA.sh.

#### Issue Reader certificate:

- Edit samplereader.cnf to update any configuration such as hostname if necessary.
- Execute CreateReaderCert.sh by invoking ./CreateReaderCert.sh.

#### Issue Client certificate:

- Certificate and key issued using this method can be directly used with the LLRP client.
- Edit samplehost.cnf to update any configuration such as hostname for the client, if necessary.
- Execute CreateClientCert.sh by invoking ./CreateClientCert.sh.

# **Read Tags**

Select **Read Tags** to view the **Reader Operation** window. Use this window to perform inventory on the connected antennas and view the list of inventoried tags.



**NOTE** Enable Java JRE support on the browser in order for this window to function properly.



**NOTE** This page is not supported when LLRP is configured in secure mode.

s ration trues of the read lags page uses applet to connect to a farma and view the list of lags that all with the rows page to function property. This page facilitates the user to perform inventory or connected antennas and view the list of lags that all with the rows page to function property. This page facilitates the user to perform inventory or connected antennas and view the list of lags that all with the rows page to function property. This page facilitates the user to perform inventory or connected antennas and view the list of lags that all with the rows page to function property. This page facilitates the user to perform inventory or connected antennas if the normal page in FOV or a start inventory. Click this button to start in operation on the connected antennas. If the normal page is 276,2276,2276,2276,2276,2276,2276,2276,
Start Inventory Tags       Internet Tags     Inventory Tags       Internet Tags       Innunctation       Time       C       D220227b227b2       260       D22027b227b2       260       D22027b227b2       260       D22027b227b2       260       D22027b227b2       260       D22027b227b2       260       D2000000000000       2677       111122223334a.       268       -38       1138122540956b.       138122540956b.       138122540257b2       Dedddeat11223.       268       -38       1138122540956b.       138122540956b.       138122540956b.       138122540956b.       138122540956b.       138122540956b.       12812540956b.       12812540956b.       12812540956b.       138122540956b.       138122540956b.       13812254095
figure Reader       Tags       Start Inventory       Clear Tag List         Tags       nnunication       Total Unique Tags       B         C       EPC:id       TagSeen Count,       FirstSeen       LastSeen         pe Password       EPC:id       TagSeen Count,       FirstSeen       LastSeen         0 2027:27b22/b2:27b2:27b2:22b2:22b2:22b2:22b
Start Inventory       Start Inventory       Clear Tag List       page to function property.         munication ime       Total Unique Tags 8 <ul> <li>Start Inventory - Click this button to start in operation on the connected antennas or no tags in FXOV antenna id FirstSeen</li> <li>LastSeen</li> <li>La</li></ul>
munication ime is te Password       Total Unique Tags 8       • Start Inventory - Click this button to start in operation on the connected antennas. If the poztb2ztb2ztb2ztb2ztb2ztb2ztb2ztb2ztb2ztb2
Ime         Total Unique Tags         8           E Password         EPC Id         TagSen Count         RSSI         Antenna Id         FirstSeen         LastSeen         LastSeen         Set Use Count         FirstSeen         LastSeen         LastSeen         Set Use Count
EP assword         EPC Id         TagSeen Count         RSSI         Antenna Id         FirstSeen         LastSeen           atoms         5228227b22/b2         269         -38         11381225409542         138122540525210         0 antennas are user disabled, then ReadTags show that inventory has started successfully tags will be displayed.           atoms         1500400.00100         267         -42         113812254095542         13812254252152         1381225409552         1381225409552         1381225409552         13812254252152         1381225409555         13812254252152         1381225409555         13812254252152         1381225409555         13812254252152         -500 flowenory - Click this button to stop th inventory operation         - Clear Tag List - Check this button to dear to current tag list           ware         11111111111111         268         -38         11381225409566         1381225452175         - Clear Tag List - Check this button to dear to current tag list           wirt         11111111111111         268         -38         11381225409569         1381225452175         - Clear Tag List - Check this button to dear to current tag list           ware         11102223334         268         -46         11381225409569         1381225452175         - Clear Tag List - Check this button to dear to current tag list
e Password         be Count         Taggeen Count         No         Taggeen Count         No         and the manual of the the manual of the the manual of the manual of the tage of
22f822f82282       288       -36       1 381225409542       1381225425252       1381225409542       1381225425252       1381225409542       1381225409542       1381225409542       1381225409563       13812
tions f640f60f80f800_ 267 -42 1 1381225409543. 13812254252188. f640f60f80f80f64064. 268 -38 1 1381225409565. 1381225452152. ware bedddead11223. 268 -38 1 1381225409566. 1381225452175. 111112223334 268 -38 1 1381225409566. 1381225452175. 11111111111 268 -38 1 1381225409568. 1381225452175. e20090002600 268 -46 1 1381225409569. 1381225452175. e20090002600 268 -46 1 1381225409569. 1381225452175. wm Log stics start menotory will fail if there is already connected LLRP client to the reader. To force dick on Disconnect LLRP button. The list of tags is displayed in a tabular format with following attributes for each tag - EPC Id - Unique EPC Id of the tag. - TagSee no unit the connected antemas. - RSS I Received Signal strength indicatory of - RSS I Received Signal str
Mons pare         160/0540/054.0/14
s         111122223334
ware         bedddead11223         268         -37         11381225409566.         1381225452175.         Note: Start memory will fail if there is already connected LLRP cleant to the reader. To force disconnection.go to Communication->LLRP put cick on Disconnect LLRP button.           wn
ubicsard m Log stics       208       -39       10.381225409500       1381225452175       Note: Start Inventory will fail if there is a laready connected LIPP cleant to the reader. To force disconnection.go to Communication-LLPP participation for a start with the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will fail if there is a laready clean Discourse of the start inventory will faily there is a laready clean Discourse of the
em Log stics t t t t t t t t t t t t t
stics wn click on Disconnect LLRP button. The list of tage is displayed in a tabular format with following attributes for each tag. EPC Id - Unique EPC Id of the tag. TagSeen count - Total number of times the been seen on all the connected antemnas. RSSI - Received Signal strength indicators of
own     The list of tags is displayed in a tabular format with following attributes for each tag.       t     • EPC Id - Unique EPC Id of the tag.       • TagSeen count - Total number of times the been seen on all the connected antemas.       • RSSI - Roceived Signal strength indicator v
t t t t t t t t t t t t t t t t t t t
EPC Id - Unique EPC Id of the tag.     TagSeen count - Total number of times the been seen on all the connected antennas.     RSSI - Received Signal strength indicator v
Erector - unique Erector or the tag:
been seen on all the connected antennas. • RSSI - Received Signal strength indicator w
RSSI - Received Signal strength indicator va
Antenna Id on which the tag has     access last
Seen last.     FirstSeen time stamp - UTC time in Microse
which the tan was first seen

Figure 4-19 Read Tags Window

- Start Inventory Click to starts inventory operation on the connected antennas. If the there are no
  connected antennas, no tags in the field of view, or all the antennas are user-disabled, the Read Tags
  window indicates that inventory successfully started but no tags display.
- Stop Inventory Stops the ongoing inventory operation.
- Clear Tag List Clears the current tag list.
- Total Unique Tags Indicates the number of unique tags read.

The list of tags appears in a table with the following attributes for each tag:

- EPC Id Unique tag EPC ID.
- TagSeen Count Number of times the tag was identified on the specific antenna.
- RSSI Received Signal Strength Indication.
- Antenna Id Antenna ID on which the tag is seen.
- FirstSeen time stamp UTC time (in microseconds) when the tag was first seen.
- LastSeen time stamp UTC time (in microseconds) when the tag was last seen.

# **Communication Settings**

Select **Communication** to view the **Configure Network Settings** window. This window has tabs for Ethernet, WiFi, and Bluetooth. Each tab has options for IPV4 and IPV6.

# **Configure Network Settings - Ethernet Tab**

			FX7500
Home	^	Reader Communication Paramete	rs Communication Settings
Status     Operation     Statistics     Configure Reader     Read Tags		Configure Network Settings Ethemet Wi-Fi Bluetooth	Ethernet
← Communication LLRP SNMP Wireless Services Date Time IP Sec		IPv4         Obtain IPV4 Address via DHCP:         On •           IPv6         Current IPV4 address         157 235.88.10           IPV4 Subnet Mask:         255 255.255.0         IPV4 Gateway:           IPV4 Gateway:         157 235.88.24           IPV4 Gateway:         157 235.83.40           IPV4 Gateway:         157 235.83.40           IPV4 ORS Server:         10 176.0.3           MAC Address:         84 24 80.06.5	The reader supports both automatic TCP/IP configuration via DHCP2 and manual configuration. The first button turns DHCP on or off, depending on current state. If DHCP is turned on, actual current values of the reader's IP address, subnet mask, default gateway, and ONS server are displayed on this page. Since these have been obtained from the DHCP server, they cannot be changed manually.
GPIO Applications Profiles Firmware Commit/Discard System Log Diagnostics			Set       If DHCP is turned off, you can set values for these fields:         Properties       IP Address (in dotted notation) at which the reader is assigned.         Subnet Mask (in dotted notation) appropriate for the network the reader reades in.       Default Gateway (in dotted notation) appropriate for the network the reader reades in.         DNS server (in dotted notation) appropriate for the network the reader reades in.       DNS server (in dotted notation) appropriate for the network the reader reades in.         MAC Address - Specifies the MAC address of the reader.       MAC address - Specifies the MAC address of the reader.
Shuldown Logout	~		Note: The network configuration is not updated until you click Commit (see <u>Save Changes</u> ) if the Commit is not successful, the system should indicate the problem and allow you to correct it by repeating the operation. DHCP and IP address changes do not get affected until the reader is rebooted.

Figure 4-20 Configure Network Settings - Ethernet Tab

#### IPV4

 Obtain IPV4 Address via DHCP - The reader supports both automatic TCP/IP configuration via DHCP and manual configuration. The DHCP button turns DHCP on and off.

If DHCP is turned on, this window displays actual current values of the reader's IP address, subnet mask, default gateway, and DNS server. 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.
- MAC Address The MAC address of the reader.
  - **NOTE** You must click **Commit** to update the network configuration (see Save Changes.) If the Commit is not successful, the system indicates the problem and allows correcting it by repeating the operation. DHCP and IP address updates do apply until the reader is rebooted.
#### IPV6

• **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.

If DHCP is turned on, this window displays actual current values of the reader's IPV6 address, prefix length, default gateway, and DNS server. 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 dotted notation) at which the reader is assigned.
- Prefix Length Prefix length appropriate for the network in which the reader resides.
- IPV6 Default Gateway Default gateway (in dotted notation) appropriate for the network in which the reader resides.
- IPV6 DNS Server DNS server (in dotted notation) appropriate for the network in which the reader resides.
- MAC Address The MAC address of the reader.



**NOTE** You must click **Commit** to update the network configuration (see Save Changes.) If the Commit is not successful, the system indicates the problem and allows correcting it by repeating the operation. DHCP and IP address updates do apply until the reader is rebooted.



**NOTE** Also enable automatic configuration for IPV6 through RA packets configuration. To enable or disable RA packet configuration go to the Services window (see Services).

#### 4 - 34 FX7500 RFID Reader Integrator Guide

#### **Configure Network Settings - Wi-Fi Tab**

					FX7500	
Home Status	^	Read	er Communication P	arameters	Communication Settings	^
Operation     Statistics     Configure Reader     Read Tags		Ethernet Wi-Fi Bluetooth	Configure Network Setti	ngs	WI-FI	
← Communication LLRP SNMP Wireless Services Date Time		IPv4 IPv6	Current IPV4 address IPV4 Subnet Mask: IPV4 Gateway: IPV4 DNS Server: MAC Address:	0.0.0.0 0.0.0 0.0.0.0 0.0.0.0 0.0.0.0	The reader supports only DHCP based configuration for WIFI. The current values of the readers IP address, subnet mask, default advelues, and DNS ener are displayed on this page. Since these have been obtained from the DHCP server, they cannot be changed manual.	
IP Sec Change Password GPIO Applications				Set Properties		
Profiles Firmware Commit/Discard System Log Diagnostics Shutdown						
Logout	~					~

Figure 4-21 Configure Network Settings - Wi-Fi Tab

#### IPV4

The reader supports only DHCP-based configuration for WIFI. This window displays the current values of the reader's IP address, subnet mask, default gateway, and DNS server. Since these are obtained from the DHCP server, they cannot be changed manually.

#### IPV6

The reader supports only DHCP based configuration for WIFI. This window displays the current values of the reader's IPV6 address, prefix length, default gateway, and DNS server. Since these are obtained from the DHCP server, they cannot be changed manually.

#### **Configure Network Settings - Bluetooth Tab**

		FX7500
Home	Reader Communication Parameters	Communication Settings
Status  Operation Statistics  Configure Reader  Read Tags  Communication	Configure Network Settings Ethernet Wi-Fi Bluetooth	Bluetooth The reader supports only automatic IP configuration of Bluetooth interface.
LLRP SNMP Wireless Services	IPv4         Current IPV4 address:         0.0.0.0           IPv6         IPV4 Subnet Mask:         0.0.0.0           MAC Address:         Discoverable:         Off ▼	If a bluetooth client is connected to the reader then the actual current values of the reader's IPV4 address, Subnet mask and IPV5 address and Prefix Length are diplayed on this page in the appropriate tabs. Since these are automatically configured and fixed for a reader, they cannot be changed manually.
Date Time IP Sec Change Password GPIO Applications	Pairable: Off - Use PassKey: PassKey: PloD is in the second sec	If a bluetooth USB dongle is connected to the reader then the following bluetooth properties can be set in this page • Discoverable Whether the reader will be seen by other bluetooth enabled delyces on a discovery.
Profiles Firmware Commit/Discard System Log	DHCP start 192.168.0.2 DHCP end address: 192.168.0.3	<ul> <li>Pairable Whener any buletoon enabled device will allowed to pair with reader.</li> <li>Use Passkey This option when enabled mandates the connecting device to supply a predetermined passkey which will be used for authentication while pairing.</li> </ul>
Diagnostics Shutdown Logout	Properties	<ul> <li>Passkey Passkey marking be used for authentication.</li> <li>DHCP start address The starting address of the DHCP! Prange out of which an IP will be assigned to the connecting device.</li> <li>DHCP end address The end address of the DHCP IP range out of which an IP will be assigned to the connecting device.</li> </ul>

Figure 4-22 Configure Network Settings - Bluetooth Tab

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

If a Bluetooth client is connected to the reader, this window displays the current values of the reader's IPV4 address, Subnet mask, IPV6 address, and prefix length in the appropriate tabs. Because these are automatically configured for a reader, they cannot be changed manually.

If a Bluetooth USB dongle is connected to the reader, you can set the following Bluetooth properties in this window:

- Discoverable Select whether the reader is seen by other Bluetooth-enabled devices 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 also determine the IP of the Bluetooth interface of the reader. The first two octets of the IP address of the reader Bluetooth interface are taken from the IP range specified and the last two octets use the reader BD address.

#### **Configure LLRP Settings**

Select **LLRP** to view and set the LLRP settings. By default, LLRP activates in server mode, where LLRP clients can connect to the reader using the port number specified in the **Client** port field. You can also configure the reader in LLRP client mode. In this case, configure the LLRP server address in this web page as well. LLRP cannot be disabled since it is the primary native protocol for RFID for the reader.

lome	^	Reader Communication F	Parameters	LLRP Settings
Operation Statistics		Configure LLRP Settir	ngs	This page supports setting the LLRP configuration on the reader.
Configure Reader		LLRP Status:	LLRP is running	server on the reader. Indicates whether LLRP is
Communication		Operation Mode:	Server -	Operation Mode - Allows the user to choose the
LLRP				LLPR mode in the reader. Can be set to either "Server" or "Client".
SNMP		Client IP:	0.0.0	Configuration ontions when LLRP in the reader is in "Serve
Wireless		Enable Secure mode:		mode.
Services		Validate peer:		Client IP - Displays the currently connected LLRP
ite Time		Client Port:	5084	client's IP address. If there is no LLRP client connection this will be 0.0.0.0
Sec		Allow LLRP Connection Override (From USB IF):		Client Port - Allows configuring the LLRP listening
ange Password		Connect Status:	Disconnect LLRP	Connect Status - Indicates whether the client is
onlications			Set Properties	connected or not. This button will be grayed out if there is not client connected. If an LLRP client is
ofiles				connected to the reader, this button will be enabled
Firmware				and clicking on the same will disconnect the client.
ommit/Discard				Configuration options when LLRP in the reader is in "Clien' mode.
System Log				Somer ID. Allows configuring the ID address of the
agnostics				server to connect to.
nutdown				<ul> <li>Client Port - Allows configuring the LLRP host port connect to. Default is 5084.</li> </ul>
ogout				Allow LLRP Connection Override (From USB IF This allows the reader to listen on an allowable ped
				I his allows the reader to listen on an alternate port

Figure 4-23 Configure LLRP Settings Window

This window offers the following fields:

- LLRP Status Displays the current state of the LLRP server on the reader. Indicates whether LLRP is
  running.
- Operation Mode Sets the LLPR mode in the reader to either Server or Client.

LLRP configuration options when the reader is in Server mode:

- Client IP Displays the currently connected LLRP client's IP address. If there is no LLRP client connection, this is 0.0.0.0.
- Client Port Configures the LLRP listening port on the reader. The default is 5084.
- Connect Status Indicates whether the client is connected. This button is grayed out if there is no client connected. If an LLRP client is connected to the reader, this button is enabled; click this button to disconnect the client.

LLRP configuration options when the reader is in Client mode:

- Server IP Configures the IP address of the server to connect to.
- Client Port Configures the LLRP host port to connect to. The default is 5084.
- Allow LLRP Connection Override (From USB IF) This allows the reader to listen on an alternate port (49152) on the virtual network (over USB) interface. When an LLRP client is connected over the primary interface (Ethernet and primary LLRP port), a different client can override this connection on the alternate interface (Virtual Network and alternate port 49152) if this option is enabled. This also permits overriding a connection from a primary interface over an existing connection on an alternate interface. This option is off by default. Changing this option restarts the LLRP service on the reader.

 Connect Status - Indicates whether the reader is connected to the LLRP host. This button toggles between ConnectLLRP and DisconnectLLRP. Clicking ConnectLLRP initiates an LLRP connection to the host server.

LLRP configuration options when the reader is in Secure mode:

- Security Mode Specifies whether LLRP communicates in secure or unsecure mode. Checking Enable Secure Mode switches the LLRP port to 5085 by default. You can override the port value. LLRP in secure mode supports ciphers that are compliant with TLS1.2.
- Validate Peer Specifies whether the validation of peer against the same certification authority issued certificate is required. If you select the validate peer option, the secure LLRP service on the reader allows connection for valid secure peer entities only if the certificate of the peer is issued from the same certification authority that issued the certificate for the reader. By default the reader uses self-signed certificates, and peer certificate based validation is disabled.

#### **SNMP Settings**

Select SNMP to view the Configure SNMP Settings window.

Home         Status         Operation         Status         Operation         Status         Configure Reader         Read Tags         Communication         LLRP         Status         Services         Date Time         Pose         Change Password         GPNO         Applications         Profiles         Finimwate         CommutiDiscard         System Log         Dagnostics         Shutdown         Logout				FX7500	
	Home Status • Operation Statistics • Configure Reader Read Tags • Communication LLRP SMMP Wireless Services Date Time IP Sec Change Password GPIO Applications Profiles • Firmware Commit/Discard • System Log Diagnostics Shutdown Logout	^	Configure SNMP Settings   Send SNMP Trap To:   SNMP Community String:   SNMP Version:   VI•   Send Server Heartbeat:   Set Properties	SNMP Settings The page supports setting the SNMP configuration on the Network Status Events will be sett. If you want to recease the varies to which the SNMP trad status Events will be sett. If you want to recease the setting the SNMP trad status Events will be setted to you want to precease to which the SNMP trad school be setting to the SNMP trad school be used in the school be setting to the school be setting to the SNMP trad school be setting to the sch	c c c c c c c c c c c c c c c c c c c

Figure 4-24 Configure SNMP Settings Window

Use this window to configure the SNMP host settings to allow sending network status events and receiving network status event notifications:

- Send SNMP Trap To Configures the host IP address to which the SNMP trap is sent. Leave this blank to send no traps to any host.
- SNMP Community String SNMP community string to use for SNMP set and get.
- SNMP Version SNMP version to use in the reader. Supported versions are V1 and V2c.
- · Send Server Heartbeat Sends a heartbeat message periodically to the configured SNMP host.



#### **Wireless Settings**

		FX7500
Home Status > Operation Statistics > Configure Reader Read Tags < Communication LLRP SNMP Wireless Services Date Time IP Sec Change Password	Existing Connection: Existing Connection: Connection Status Get Details ESSID: Signal Strength: 0% Status: Scanning IP Address: 192:163.2.113	Wheeless Settings     This page supports setling the wireless configuration on the reader. Motorola provides native support for USB WFI adapters with the Reatlek chapterR1. 8137.     The following adapters have been tested by Motorola - Alfa AVUS02081 - OCTane Versa Will USB Adapter II     estical signal strength and connection status are used signal strength and connected network. The escal signal strength and connected network. The escal signal strength and connected network. Consequence - Discormed from a connected network. Second signal strength and connected network is used to be a scale to acculate here/orse (SSB) shall be listed in the drop drow meru upon pressing the fullion of the CSB) is hidderyed hera/docked.     Passate wy. Pre shared key for the WPMP2 network.     Connect automatically - Persist network setting aroose networks and adomination with
GPIO Applications Profiles Formware CommitDiscard Signal Control Diagnostics Stutidown Legont	Connect to wireless Network: Connect to wireless network Connect to wireless network ESSID: M-Guest (100%) Passkey: Connect Automatically: Connect	configured AP After Clicking on 'Connect', to save the chosen AP settings persistently user can perform commit operation by makigating to the Commit-Olicaci page. The pending commit is indicated to the use by a "next to Commit-Olicaciand ink in Menu." Clicking on Disconnect will remove the Connect automatically attribute from the currently chosen AP. To make this setting persistent user can perform commit operation. Note: The scan function may take several seconds. All bottoms in the page shall be disabled while scan is in progress and enabled back once scan is completed.

Select Wireless to view the Reader Wireless Settings Parameters window.

Figure 4-25 Wireless Settings Window

Use this window to set the wireless configuration on the reader. Zebra provides native support for USB WiFi adapters with the Realtek chipset RTL 8187, and tested the following adapters:

- Alfa AWUS036H
- CCrane Versa Wifi USB Adapter II

The Wireless Settings window offers the following options:

- Get Details Click to get details of the connected network, including the ESSID, signal strength, and connection status.
- Disconnect Click to disconnect from a connected network.
- Scan and Choose Network Scan the available networks. Clicking this lists the ESSID in the drop-down menu. If the ESSID is hidden (not broadcasted), enter the ESSID in the text box provided.
- Passkey Pre-shared key for the WPA/WPA2 network.
- Connect Automatically Persist network setting across reboots and automatically retain association with the configured AP.



**NOTE** The scan function can take several seconds. All buttons on the page are disabled while the scan is in progress, and re-enabled when the scan completes.

#### **Network Services Settings**

lome	Reader Communication Parameters	Service Settings
Operation tatistics Configure Reader eaded Tags Communication LLRP SNMP Wireless Services state Time P Sec hange Password SPIO piplications trofiles Firmware Commit/Discard System Log Nagnostics huiddown ogout	Configure Network Settings         Web Server:       HTTF•         Shell:       SSH•         File Server:       FTPS•         Disable IPV6 Stack:       .         Receive RA packets:       ✓	Set periors         Network Services           Set periors         Web Server - This allows configuring the web s in either HTTP (Unsecure) or HTTP's (Secure) in there HTTP (Unsecure) or HTTP's (Secure) in Secure) mode or disabled state.           Set periors         File Server - This allows configuring the File is Secure) mode or disable state.           Set periors         File Server - This allows configuring the File is Secure) mode or disable state.           Note: Receive RA packets - This option is only valid PVG stack is enable HTP date. I renable this allows for IP configuration through RA packets lese the IP have to be obtained val DHCP in the communic page or assigned statically.           Note: The service configuration is not updated un you click Commit (see Save Changes) If the Cor is not successful, the system should indicate the problem and allow you to correct it by repeating the operation.

Select Services to view the Configure Network Service Settings window.

#### Figure 4-26 Configure Network Service Settings Window

The reader supports the following network services.

- Web Server Configures the web server in either HTTP (unsecure) or HTTPS (secure) mode.
- Shell Sets the shell to SSH (secure) mode or a disabled state.
- File Server Sets the file server to either FTP (unsecure) or FTPS (secure) mode.
- Disable IPV6 Stack Select this to disable the reader's IPV6 stack.
- Receive RA packets This option is only valid when the IPV6 stack is enabled. Enable this to allow IPV6 IP configuration through RA packets; otherwise obtain the IP via DHCP in the Communication window or assign statically.



**NOTE** You must click **Commit** to update the service configuration (see Save Changes.) If the Commit is not successful, the system indicates the problem and allows correcting it by repeating the operation.

#### 4 - 40 FX7500 RFID Reader Integrator Guide

### **System Time Management**

Select **Date Time** to view the **System Time Management** window. Use this window to set the date and time value of the reader, or to specify an NTP server for the reader to synchronize with.

			FX7500	
Home Status • Operation Statistics • Configure Reader Read Tags • Communication Date Time IP Sec Change Password GPIO Applications Profiles • Firmware Commit/Discard • System Log Diagnostics Shutdown Logout	^	System Time Management         SNTP Configuration         SNTP Server Name or IP Address:         Image:	<text><text><text><text><text><text></text></text></text></text></text></text>	
	~			,

Figure 4-27 System Time Management Window

To specify an SNTP server, enter the SNTP server's IP address or name in the **SNTP Server Name or IP** Address box, and then click **Set SNTP Parameters**. You must select Commit for the change to take effect.

To adjust the time manually, select the appropriate value for the user's local time, and click the **Set Date and Time** button. This adjusts the reader's clock to the value provided if the operation is successful. Otherwise, an appropriate message indicates the reason for the failure.

You can also set the **Time Zone** (including use of Daylight Savings) using the drop-down menu.

**NOTE** The date/time and time zone changes take effect immediately, and do not require a Commit.

## **IPV6 IP Sec**

Select **IP Sec** to view the **IPV6 IP Sec** window. IP Sec settings allow adding IPSec pairing of the reader with a partner with a pre-shared key.

			FX7500	
Home	^	IPV6 IP Sec	IPSEC ?	^
Status • Operation Statistics • Configure Reader Read Tags • Communication Date Time IP Sec Change Password GPIO Applications Profiles • Firmware Commit/Discard • System Log Diagnostics Shutdow Logout	•	Settings • Add IP Sec Entry • Delete IP Sec Entry IP Address: Passkey: Access Level: Transport • Add IP Sec Entry	IPSEC settings allow the user to add IPSec pairing of the reader with a partner with a pre-shared key. Add IP Sec Entry <ul> <li>IP Address - Specify the IP Address of the partner with whom the IP SEC communication is intended.</li> <li>Passkey - Enter the pre shared passkey to be used with the partner IP Address Minimum allowed characters are 6 and maximum is 15.</li> <li>Access Level - Specify the IPSec access level. Can be ther Transport or Tunnel mode. Currently the reader supports only Transport mode.</li> </ul> Delete IP Sec Entry <ul> <li>IP Address - Specify the IP Address of the partner with whom the IP SEC communication is already configured and which needs to be deleted.</li> </ul>	
				_

Figure 4-28 IPV6 IP Sec Window

To add an IP Sec entry:

- 1. Click the Add IP Sec Entry radio button.
- 2. In the IP Address field, specify the IP address of the partner with whom the IP SEC communication is intended.
- 3. In the **Passkey** field, enter the pre-shared passkey (from 6 to 15 characters) to use with the partner IP address.
- 4. In the Access Level drop-down list, select the IPSec access level. Options are Transport and Tunnel mode. Currently the reader only supports Transport mode.
- 5. Click the Add IP Sec Entry button.

To delete an IP Sec entry:

- 1. Click **Delete IP Sec Entry** radio button.
- In the IP Address field, specify the IP address of the partner with whom the IP SEC communication is configured and is to be deleted.
- 3. Click the Delete IP Sec Entry button.

#### **Change Password**

To ensure the controlled and secured access to reader **Administrator Console** functions, designate which users and computers are authorized to have system access by setting up authorized user accounts. Only users logging in with a registered user name and password can successfully access **Administrator Console** functions.

#### **FX7500 User Accounts**

The FX7500 supports the different user accounts:

- **admin** This user has web access but no shell access, with full privileges to make changes on the reader using the Administrator Console interface and to access to the reader using the FTP interface.
- guest This user has web access but no shell access, with read-only privileges in the Administrator Console and can not make configuration changes. The guest user does not need a password to log in to the Administrator Console.



*NOTE* The Change Password function is not supported for the user guest.

• **rfidadm** - This is the reader administrator, with shell access but no Administrator Console access. **rfidadm** has full access to the **/apps** directory and read-only access to most of the other directories, including the **/platform**, **/usr**, **/lib**, **/etc**, and **/bin** directories. The **rfidadm** user can use this account to install and uninstall RFID programs and upload user applications.

		FX7500
Home	Change Password	System Access ?
Status > Operation Statistics > Configure Reader Read Tags > Communication Date Time IP Sec Change Password GPIO Applications Profiles > Firmware Commit/Discard > System Log Diagnostics Shutdown Logout	User Name: admin - Old Password: New Password: Re-enter Password: Change Password	To ensure the controlled and secured access to Reader Administrator Console functions, you should designate which users and computers are authorized to have system access. You do this by setting up authorized user accounts. Only users logaing in with a registered user name and password, can successfully access the Administrator Console functions. <u>Change Password</u> <u>Managing User Login and Logout</u> Change Password Managing User Login and Logout Setting the drop dpwn menu. Type the old password, and the new password (twice) on the Change Password page, and then click Change Password, This option does not need a commit operation, password shall be changed with immediate effect. 'guest' user does not need a password to login and hence is not listed for the change password operation. Managing User Login and Logout Users must "Login" and "Logout" of the system to ensure that: 1) System access is granted only to authorized users, and 2) Only one user is logged in at a time to ensure that multiple users do not make conflicting changes to the system. If the user performs no action for a period of time, he must log in again to use the Administrator Console.

Select Change Password to view the Change Password window.

Figure 4-29 Change Password Window

To set a user password:

- 1. In the User Name drop-down list, select the user for whom to change the password.
- 2. In the Old Password field, enter the existing password for that user.
- 3. In the New Password field, enter the new password, and again in the Re-Enter Password field.
- 4. Click Change Password. The password changes immediately and does not require a Commit operation.

#### **Managing User Login and Logout**

Users must log in and log out of the system to ensure that system access is granted only to authorized users, and that only one user is logged in at a time to ensure that multiple users do not make conflicting changes to the system.

If the user performs no action for a period of time, the system automatically logs him or her out. The user must log in again to use the Administrator Console.

## GPIO

Select GPIO to view the GPIO Control Page. This window allows viewing and setting the status for GPI pins.

					FX7500
Home	^		GPIO Control Page	e	GPIO
Status ▶ Operation Statistics ▶ Configure Reader		GPIO Pin #	Settings	Status	GPIO settings page provides the status for GPI pins and also helps the user to set the status of GPO pins. To set a GPO pin HIGH/LOW click on the image of the required pin number.
Read Tags ▶ Communication Date Time IP Sec		GPI1: GPI2:	Host GPI - Host GPI -	•	Indicates GPIO HIGH
Change Password GPIO Applications Profiles		GPO1:	Host GPO -	•	<ul> <li>GPI debounce time - Many of the devices connecting to GPIO port of the FX reader would create spikes during the connection. GPIO Debounce would help to handle the situation. GPIO debounce does not have impact on GPO</li> </ul>
<ul> <li>Firmware</li> <li>Commit/Discard</li> <li>System Log</li> <li>Discussion</li> </ul>		GPO2: GPO3:	Host GPO -	•	operations and input operation when the debounce time is set to 0. Also, debounce time is applied in all input pins and pins must work independently of each other. The user can enter the debounce time in millisconds. The upper limit of GPI debounce value is 1000 and default value 50 is set if it is
Shutdown Logout		GPI Debounce Time	(ms): 0		not in the range. Once the time is set the events are delivered as wells as callback functions are called only after the debounce time expires provided the pin state stays in the same level for the debounce time duration • GPIO Settings - GPIO Settings selection shall help to provide the operation of the operation of the operation of the operation of the operation of the operat
				Set Properties	map the PA reader CHT and/of CHO with Patho GHO. User allowed to select "Radio CHO(X)" for either Host CH(X)" or "Host GPO(X)". Where $x = 0$ (or) 1. If user try to violate this condition, then previous selection will be changed to either "Host GPI(X)" or 'Host GPI(X)" automatically. GPIO setting is valid for FX7500 Four port reader. GPIO settings options will be disabled, if not supported.
	~				

Figure 4-30 GPIO Control Page

- Settings Map the reader GPI and/or GPO with the radio GPIO. Select either Radio or Host for GPIx or GPOx where x = 0 or 1. An attempt to violate this condition changes the selection to either Host GPIx or Host GPOx automatically. These settings are valid for FX7500 four port readers and are disabled if not supported.
- Status To set a GPO pin high or low, click on the image next to the required pin number:



- Red indicates GPIO LOW
- Yellow log indicates GPIO unknown
- GPI Debounce Time Enter a value of up to 1000 milliseconds to minimize spikes that can occur when a device connects to the GPIO port of the FX reader. The default is 50. Debounce time applies to all input pins, and pins must work independently of each other. Events and callback functions occur only after the debounce time expires, provided the pin state remains at the same level for the debounce time duration. GPIO debounce does not impact GPO and input operations when set to 0.
- Set Properties Click this when all selections are made.

## **Applications**

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

			FX7500
Home	^	User Application Page	Applications
Status > Operation Statistics > Configure Reader Read Tags > Communication Date Time IP Sec Change Password GPIO Applications Profiles > Firmware Commi/Discard > System Log Diagnostics > Firmere		Existing Packages: List of Installed apps Start/Stop AutoStart Uninstall Meta Data Meta Data Install New Package: Current Status: Select package from the browse button package: Install	This page provides the details of installed application and also to install applications in the reader.   List of installed Apps - This drop down menu shall list the current packages installed in the reader.  Start/Stop - The image displays the running status as indicated below. Click the image to loggle the status. Indicates App is running Indicates App is NOT running  Auto Start - Selecting this check box shall enable the application to run at startup.  Munistall - Shall remove the package scan be created using any of standard debain package creation tools or manualy. The guidelines for package caston tools or manualy. The guidelines for package compatible of the package to part to the status.
Silutioni Logout	~		<ol> <li>The name of the binary executable must match the name of the package, excluding version name. For example, if the package name is package-1, 21, all (package-1 version 2.1), then the name of banary executable must be package. There can be more binaries apart from the above said one in the package.</li> <li>The package shall contain a startup script in the name of start_packageball. There can be more binaries apart from the above said one in the package.</li> <li>The package shall contain a startup script in the name of start_packageball. The package the above said binary ( and/or other binaries in the package the above said binary ( and/or content binaries in the package the said contain a stop script in the name of stop_packageball.</li> </ol>

Figure 4-31 User Application Page

The Existing Packages section includes the following options:

- List of Installed apps The drop-down menu lists the current packages installed in the reader.
- Start/Stop The image displays the running status as follows. Click the image to toggle the status.
  - Green U indicates application is running
  - Red indicates application is not running
- AutoStart Select this check box to run the application at startup.
- Uninstall Removes the package from the reader.

To create packages for the FX7500 reader, use any of the standard Debian package creation tools, or create them manually. The *FX7500 Embedded SDK Programmers Guide* provides details on creating application packages to install on the reader.

- The package must contain a binary executable compatible with ELF 32-bit LSB executable, ARM, version 1, GNU Linux.
- The name of the binary executable must match the name of the package, excluding the version name. For example, if the package name is **package-1\_2.1\_all** (package 1 version 2.1), the name of the binary executable must be **package-1**. There can be more than one binary in the package.
- The package must contain a startup script in the name of **start\_packageName.sh** to start the binary or binaries in the package. For example, if the package name is **package-1\_2.1\_all.deb** (package 1 version 2.1), the name of the startup script must be **start\_package-1.sh**.

• The package must contain a stop script in the name of **stop\_packageName.sh** to stop the binary or binaries in the package. For example, if the package name is **package-1\_2.1\_all.deb** (package 1 version 2.1), the name of stop script must be **stop\_package-1.sh**.



**NOTE** The reader executes the packages with the privileges of **rfidadm** user account. See the user accounts section for information on **rfidadm** user privileges.

## **Reader Profiles**

Select **Profiles** in the selection menu to view the **Reader Profiles** window, which shows the current profiles on the reader and allows performing profile-related operations.



**NOTE** Because the **Reader Profiles** window uses an applet to connect to the reader, enable JVM support on the browser in order for this window to function properly.

The window displays a set of provided configuration files, or profiles, that a user can re-use and/or modify depending on the reader application or use case. The profiles serve as configuration examples.

			FX7500	
Home	^	Reader Profiles	Reader Profiles	^
Status <ul> <li>Operation</li> <li>Statistics</li> <li>Configure Reader</li> <li>Read Taos</li> </ul>		Profile Operations	The Reader profiles page shows the current profiles on the reader and allows the user to perform profile related operations. Since the reader profiles page uses applet to connect to the reader, JVM support must be enabled on the browser for this page to function property.	
<ul> <li>Communication Date Time</li> <li>IP Sec</li> <li>Change Password</li> <li>GPIO</li> <li>Applications</li> <li>Profiles</li> <li>Firmware</li> <li>Commit/Discard</li> <li>System Log</li> <li>Diagnostics</li> <li>Shutdown</li> <li>Logout</li> </ul>		Available Profiles in the Reader         Default         Medium Tag Population         Large Tag Population         Current Config*         Import       Export         Set Active       Delete	<ul> <li>Available profiles on the reader - The set of currently available profiles on the reader is shown in this list.</li> <li>Import - This allows the user to "Import profile onto the reader". Clicking on Import button opens a file dialog allowing the user to pick a profile flex (XML file) from the local PC and import it into the reader.</li> <li>Export - This allows the user to brick a profile flex (XML file) from the local PC and import it into the reader.</li> <li>Export - This allows the user to brick a profile flex (XML file) from the local PC and import it into the reader.</li> <li>Set Active - Allows activation of a selected profile. Select one of the available profiles and click on "Set Heating around the reader.</li> <li>Detect - Allows deleting a profile from the reader. Choose one of the available profiles and click on the Delete button. This will delete from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> <li>Detect - Allows deleting a profile from the reader.</li> </ul>	
	~			~



The Reader Profiles window functions are:

- Available Profiles in the Reader Displays the available reader profiles.
- Import Click to open a file dialog and pick a profile (XML file) from the local PC and import it into the reader.
- Export Select an available profile and click Export to export profile information and save an XML file onto the local drive.

 Set Active - Activates a selected profile. Select an available profile and click Set Active to load the profile content in the reader.



**CAUTION** Swapping profiles between readers using static IP addresses is not recommended. Activating a profile with a static IP address changes the IP of the reader, and if not done properly can make the reader inaccessible.

• Delete - Select an available profile and click Delete to delete the profile.



**NOTE** Current Config is a special logical profile that can only be exported to the PC. This cannot be imported, activated, or deleted. Only the profile name indicates that it is the active profile.

Profiles can specify a number of reader parameters, including RF air link profiles. Air link profiles cannot be configured using LLRP or web page interface. See *Appendix C, RF Air Link Configuration* for more information about air link profile configuration.

#### **FIPS Support on FX7500**

The FX7500 supports FIPS 140-2 Level 1 for the following interfaces:

- HTTPS
- FTPS
- SSH
- LLRP Server
- IPSec

To enable or disable FIPS support in the reader profile, export the profile XML (**CurrentConfig**) from the reader and set **FIPS\_MODE\_ENABLED** to **1** to enable FIPS, or **0** to disable FIPS. Then import the XML to the reader and activate. Changing the FIPS mode restarts the reader. By default, FIPS is disabled.

#### 4 - 48 FX7500 RFID Reader Integrator Guide

## **Firmware Version/Update**

The **Firmware Version** window displays the current software and firmware versions and allows upgrading to new firmware. From the selection menu, click **Firmware**.

				FX7500
Home Status	^	Firmwar	e Version	Firmware Version
Operation     Statistics     Configure Reader		Current Version:	nformation	firmware versions and provides a facility to upgrade the software.
P configure reader Read Tags		Boot Loader OS File System Reader Application LLRP Radio Firmware Radio API	1.1.15 1.1.26 1.1.64 1.1.68 1.3.28 1.3.14	Current version indicates the versions of the binaries that are currently running in the reader and 'last known version' indicates versions of binary images stored in the backup partition. Pressing rever back shall switch the reader to use the firmware binary images which are stored in the backup partition. The version section of the page currently has the following fields: Boot loader - The current version of the system boot loader. OS - The current version of the Operating System
Profiles → Firmware Update Commit/Discard → System Log Diagnostics Shutdown Logout		Last Known Version: Revert ba Boot Loader OS File System Reader Application Rever	ck Firmware 1.1.15 1.1.26 1.1.64 1.1.65 ert Back	Duild - File System - The current version of the file system build. - Reader Application - The current version of the Reader Application software. - LLRP - The current version of LLRP stack. - Radio Firmware - The current version of the RFID Radio Firmware - The current version of the Radio API. - Revertback The Revertback option is provided to revert back the reader to last known firmware version. Up on pressing this buttor, reader will revertback the firmware image to last known version and reader will be automatically rebooted. Revertback option is not enabled if the reader detects an error in previous firmware undate
	~			

Figure 4-33 Firmware Version

**Current Version** indicates the binary versions currently running in the reader. **Last Known Version** indicates binary image versions stored in the backup partition. This window provides version information on the following firmware:

- Boot Loader
- OS
- · File System
- Reader Application
- LLRP
- Radio Firmware
- Radio API

Select **Revert Back** to revert the firmware to last known version. The reader automatically reboots. This option is not enabled if the reader detects an error in the previous firmware update.

#### **Firmware Update**

The Firmware Update window allows upgrading to new firmware. From the selection menu, click Update.



**NOTE** You must be logged in with Administrator privileges in order to access this window. See *Change Password on page 4-42*.

The reader supports three different methods of updating the firmware:

- Update 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.
- FTP / FTPS / SCP server-based update.

For instructions on updating the firmware, see Chapter 7, Firmware Upgrade.

## **Commit/Discard**

Changes made to the logical view of the reader network using the Administrator Console do not immediately apply to the reader and network connections. To apply reader configuration modifications, select **Commit/Discard**, then click **Commit** to save the changes to the reader configuration file, and to update the running physical reader network. While a successful update can take up to a minute to complete, the system continues to operate with a brief one or two second pause.

			FX7500
Home Status • Operation Statistics • Configure Reader • Read points Region Read Tags • Communication Date Time IP Sec Change Password GPIO Applications Profiles • Firmware • Commit/Discarc • System Log Diagnostics Shutdown Logout	<	Configuration Commit/Discard Commit the Configuration Changes Commit Discard the Configuration Changes Discard Reset reader to factory defaults Factory Reset	<section-header><section-header><text><text><text><text><text><list-item></list-item></text></text></text></text></text></section-header></section-header>

Figure 4-34 Configuration Commit/Discard Window

To discard changes to the server's configuration file made to the reader network during this session, click **Discard**.

Click **Factory Reset** to reset the reader to factory defaults. This clears all customized user settings, including configuration, and installed applications. The reader reboots automatically.

## **System Log**

The System Log window lists reader log information.

		FX7500
Home Status > Operation Statistics > Configure Reader Read Tags > Communication Date Time IP Sec Change Password GPIO Applications Profiles > Firmware Commit/Discard > System Log Diagnostics Shutdown Logout	System Log         Apply Filter:       None ▼         Minimum Severity:       Debug ▼         Process Selection:	System Log     The System Log page provides an interface to see the log information stored in the reader. There are two types of log information stored in the reader. There are two types of log and generated by the reader's internal instructions. The system log allows for storage of a maximum of H MB of log and overwrites the oldest logs first. The log information is saved and rectored back on proper system rebod (using the web console)     The other one is the Access History. This provides a history to for the access to this reader. Every successful access to the reader through the web interface will be recorded in this log.     User can select the filter option to see the logs for particular process and process ting with comma separated is considered to filter out the log. If "Process only option is selected then selected processes" option is selected then selected processes and process sing with comma separated is considered to filter out the logs. If Both severity and process' option is selected then shorted processes and process ting with comma separated is considered to filter out the logs.
	Dec 31 05.20.24 miserver.ell:     https://docs.it/f0.30.2004 miserver.ell:     https://docs.it/f0.300.2004 miserver.ell:       Dec 31 08.20.24 miserver.ell:     https://docs.it/f0.3046ress in f600.3466ress in f600.3624.86ff.f606.5222 for eth0       Dec 31 08.20.24 miserver.ell:     https://docs.it/f0.3046ress in f600.3624.86ff.f606.5222 for eth0       Dec 31 08.20.24 miserver.ell:     https://docs.it/f0.3046ress in f600.3624.86ff.f606.5222 for eth0       Gateway=157.235.88.246     DNs=10.176.0.3       Refresh Log       Purge Logs	If 'Process only' or 'Both severity and process' is selected and process string is empty with no pre defined processes selection, then pre defined process list will be considered to fifter out the logs. If user want to fifter out for the specific processes, 'Other process' text box will be used. Comma separated process list stimg without any space shall be used for this purpose. If log file is empty for the selected filter option, error message will be shown in log text area. Save button shall be used to save the filter settings. Saved filter settings shall be restored upon reader reboot. Log files can be copied to specific location of the host by selecting the option from "Export" and cicking the "Export File" button. Export log file option is not supported for "guest".

Figure 4-35 System Log Window

This window offers the following options:

- Apply Filter Select a filter option from the drop-down menu to view logs for particular process and/or severity:
  - None Do not apply a filter.
  - Minimum Severity only The severity level filters the log.
  - **Process Selection only** Selected pre-defined processes and comma-separated process strings filters the logs.
  - Minimum Severity & Process Selection both severity and process selection are considered in the filter.

If you select **Process Selection only** or **Minimum Severity & Process Selection** and the process string is empty with no pre-defined process selection, then the pre-defined process list filters the logs.

- · Minimum Severity Select the severity level on which to filter.
- Process Selection Select the types of processes to filter upon.
- Other process To filter for specific processes, enter the process in this text box using a comma-separated process list string with no spaces. If the log file is empty for the selected filter option, an error message appears in the log text area. Click **Save** to save the filter settings, which persist upon reader reboot.

- Log area Select a radio button for one of the two types of log information offered:
  - System Log Includes the log information generated by the reader internal instructions. This stores up to 1 MB of log information, and overwrites the oldest logs first. The log information is saved and restored on proper system reboot (via the Administrator Console).
  - Access History Provides a history log for reader access, including every successful access to the reader through the Administrator Console.
- Select the Refresh Log to refresh the information in the log, or Purge Logs to clear the information.
- To copy the log file to a specific location on the host select an option from the Export drop-down. Enter the location in the File Path field, then select the Export File button.

#### **Configure System Log**

This window configures system log settings. If the system log host is not set (or is not valid), log messages are not sent.

			FX7500
Home	System Log Conf	iguration Console	Syslog Settings
Status > Operation Statistics > Configure Reader Read Tags > Communication Date Time IP Sec Change Password GPIO Applications Profiles > Firmware Commit/Discard > System Log Configure Diagnostics Shutdown Logout	Configure S Remote Log Server IP: Remote Log Server Port: System Log Minimum Severity:	System Log 0.0.0 514 Debug • Set Properties	This page supports setting the Syslog configuration on the reessages will be not be sent. • Remote Log Server IP - Supports configuring the host IP address to which Log Messages to be send. • Remote Log Server Port - Remote Log server lots is configured. • Remote Log Server Port - Remote Log server lots is configured. • System Log Minimum Severity - The Minimum severity of the host is parameter does not have any impact on the Remote Logging. This parameter does not have any impact on the Remote Logging this parameter does not affect the logs which is already stored in the log file. Note: These parameters will be effective after the Commit.

Figure 4-36 Configure System Log Window

This window offers the following options:

- Remote Log Server IP Configures the host IP address to which log messages are sent. IP address 0.0.0.0 indicates that no host is configured.
- Remote Log Server Port Remote log server listening port. The default port is 514.
- System Log Minimum Severity The minimum severity above which data is stored in the log file. This
  option does not impact remote logging or the logs already stored in the log file.

You must select **Commit** to activate these settings.

## **Reader Diagnostics**

Select **Diagnostics** to view the **Reader Diagnostics** window, which allows running diagnostics and viewing the diagnostics report.

			FX7500
Home Status • Operation Statistics • Configure Reader Read Tags • Communication Date Time IP Sec Change Password GPIO Applications Profiles • Firmware Commit/Discard • System Log Diagnostics Shutdown Logout	<	Start Diagnostics Console         Start Diagnostics         Oct 111:25:33       Nand Flash Running System Command nandtest /dev/mtd0 -1 0x0 -k         Oct 111:25:33       ECC failures : 0         Oct 111:25:33       BGD blocks : 0         Oct 111:25:33       Nand Flash Running System Command nandtest /dev/mtd1 -1 0x0 -k         Oct 111:25:33       ECC corrections: 0         Oct 111:25:33       BGD blocks : 0         Oct 111:25:33       BGD blocks : 0         Oct 111:25:33       BBT blocks : 0         Oct 111:25:33       BCC failures : 0       Oct 111:25:33       BCC fai	Reader Diagnostics page provides an interface to start the diagnostics and display the diagnostics report will be display the diagnostics report will be display the diagnostics report will be displayed in the Diagnostics page when the diagnostics is progress. Reader will be restarted after the completion of Diagnostics report on a the accessed in the Diagnostics page after the restart subsect of the other process and enter 'Other process' text box with miserver.eff: N-D.IIrpserver.eff: N-D.IIrpserv

Figure 4-37 Reader Diagnostics Window

Selecting **Start Diagnostics** clears the system log and displays the diagnostics report. The reader reboots when the diagnostics completes. Return to the **Diagnostics** window to view the diagnostics report.

To export the diagnostics report to a file, on the *System Log* window, select **Process Selection only** in **Apply Filter**, de-select all other processes, and in the **Other Process** text box enter: **rmserver.elf: N-D,IIrpserver.elf: N-D** 

## Shutdown

To protect the integrity of the reader data, gracefully reboot the reader via the Administrator Console when necessary.

		FX7500
Home Status > Operation Statistics > Configure Reader Read Tags > Communication Date Time IP Sec Change Password GPIO Applications Profiles > Frimware Commit/Discard > System Log Diagnostics Shutdown Logout	System Shutdown/Restart Marning: Shutting Down System May Interrupt Normal Operations Please confirm: lunderstand What do you want to do: Restart Reader Shut down Reader server will only close the reader server application. © 2015 Symbol Technologies, Inc. Disable Watchdog	Shut Down and/or Restart the Reader     In order to protect the integrity of the data in the reader, it is through this interface when it is necessary.     Click the Shutdown link to display the Shut Down System and/or restart the Piesae confirm checkbox to nardor restart the system, which may interrupt normal system operation.     Select either Restart or Shut Down from the Mhat do you want to do doro-down list, and then click Go.     The Restart option will let the reader save the user data and stop all reader functionalities and then wait to be powered or.     This page also provides an option to "Enable/Disable" watchdog on the reader.

Figure 4-38 System Shutdown/Restart Window

To shut down or restart the reader:

- 1. Click the Shutdown link to display the System Shutdown/Restart window.
- 2. Check the Please Confirm check box to accept the system shut down and/or restart the system (this may interrupt normal system operation).
- 3. Select one of the following options from the What do you want to do drop-down list:
  - Restart Reader saves the user data and then restarts.
  - Shut down Reader server the reader saves the user data, stops all reader functions, and waits to be powered off.
- 4. Click Go.

This window also provides an option to enable or disable the reader watchdog.

## **CHAPTER 5 WI-FI CONFIGURATION**

## **Wireless Network Advanced Configuration**

FX7500 uses the **wpa\_supplicant** application to connect with wireless networks. Advanced users can place their own configuration file in the **/apps** folder to connect to wireless networks. This configuration file is **wpa\_supplicant.conf**. The parameters of this file are well documented in the public domain. Refer to http://linux.die.net/man/5/wpa\_supplicant.conf for the most commonly used parameters and http://www.daemon-systems.org/man/wpa\_supplicant.conf.5.html for all available parameters. Also see *Appendix E, Copying Files To and From the Reader* for instructions on copying files to **/apps** directory.

If /apps/wpa\_supplicant.conf is present in the reader, the reader uses this file to connect to a wireless network. This supersedes the configuration in the Administrator Console, which changes to reflect the custom configuration file.

- Communication	Get Details
LLRP	
SNMP	ESSID: WEP128
Wireless	Signal Stepath, 100%
Services	Status: Completed
Date Time	
IP Sec	Address: <sup>192.168.2.82</sup>
Change Password	
GPIO	Disconnect
Applications	
Profiles	
▶ Firmware	
*Commit/Discard	Connect to wireless Network:
▶ System Log	Connect to wireless network
Diagnostics	
Shutdown	Connect Automatically:
Logout	
	Connect

Figure 5-1 Administrator Console Update

Note that there are no text boxes in the user interface for ESSID and password. The console obtains these directly from the custom configuration file.

#### **Sample Configuration Files**

Wireless network with WPA2 encryption type (AP name is "DEV"):

```
ctrl_interface=/var/run/wpa_supplicant
ctrl_interface_group=0
ap_scan=1
```

```
network={
```

```
ssid="DEV"
proto=RSN WPA
key_mgmt=WPA-PSK
pairwise=CCMP TKIP
group=CCMP TKIP
psk="my secret password"
```

}

Open wireless network (AP Name is DEV\_Open):

```
ctrl_interface=/var/run/wpa_supplicant
ctrl_interface_group=0
ap_scan=1
network={
ssid="DEV_Open"
key_mgmt=NONE
```

}

Wireless network with WEP encryption type (AP Name is WEP128):

```
ctrl_interface=/var/run/wpa_supplicant
ctrl_interface_group=0
ap_scan=1
```

#### network={

```
ssid="WEP128"
key_mgmt=NONE
wep_key0= "my secret password "
wep_tx_keyidx=0
priority=5
}
```

Configuration file with multiple network blocks:

```
# Simple case: WPA-PSK, PSK as an ASCII passphrase, allow all valid ciphers
network={
    ssid="RFID_TNV"
    psk="123456789"
    priority=1
}
network={
    ssid="RFID_TNV_WPA/WPA2"
    psk="123456789"
    priority=2
}
```

}

Refer to http://linux.die.net/man/5/wpa\_supplicant.conf for further examples.

## **Preferred Configurations for Access Points**

The FX7500 reader supports WPA/WPA2 (http://en.wikipedia.org/wiki/Wi-Fi\_Protected\_Access) and also WEP128 (http://en.wikipedia.org/wiki/Wired\_Equivalent\_Privacy) by default over the **Administrator Console**.

Other supported protocols are explained in previous sections. This section provides details on the preferred configurations for access points.

#### AP: Zebra AP 5131

#### **Network Type: WPA/TKIP**

AP-5131 AC	CESS P <u>OINT</u>	
Image: Second Secon	Image: Security Policy         Name       WPA         Authentication         Authentication         Image: No authentication         Image: Kerberos         802.1x EAP         Encryption         Image: WEP 64 (40 bit key)         Image: WEP 128 (104 bit key)         Image: KeyGuard         Image: WPA2/CCMP (802.11i)	Authentication Encryption WPATKIP Settings Key Rotation Settings Broadcast Key Rotation Update broadcast keys every 86400 (300-604800) seconds Key Settings ASCII Passphrase ####################################
		Martin Cancer Theip

Figure 5-2 AP 5131, WPA/TKIP

Create a security policy **WPA** and select **WPA/TKIP** from the **Encryption** menu. Enter an ASCII password between 8 and 63 characters or 64 hex characters. Select **Apply** and associate the ESSID with a security policy.

#### Network Type: WPA2/CCMP

AP-5131	ACCESS P	OINT		
AP-5131	ACCESS P stion agement ction	Edit Security Policy         Name       WPA2         Authentication            • Manually Pre-shared key / No authentication            • Kerberos            • 802.1x EAP          Encryption            • No Encryption            • WEP 64 (40 bit key)            • WEP 128 (104 bit key)	Authentication       Encryption         WPA2/CCMP Settings         Key Rotation Settings         Broadcast Key Rotation         Update broadcast keys evolution         Key Settings         ASCII Passphrase         ####################################	ery 86400 (300-604800) seconds
← 🚱 Firmware Update ៚ 🛺 [Status & Statistics]	_	WEP 128 (104 bit key)     KeyGuard	Enter 16 hex characters per fie	Id
System Name AP-5131		WPA2/CCMP (802.11i)	Allow WPA-TKIP clients	Pre-Authentication
				Apply Cancel Help

Figure 5-3 AP 5131, WPA2/CCMP

Create a security policy **WPA2** and select **WPA/TKIP** from the **Encryption** menu. Enter an ASCII password between 8 and 63 characters or 64 hex characters. Select **Apply** and associate the ESSID with a security policy.

#### Network Type: WEP128

AP-5131 ACCESS	POINT	
AP-5131 ACCESS I	Edit Security Policy          Edit Security Policy         Name       WEP128         Authentication         Manually Pre-shared key /         No authentication         Kerberos         802.1x EAP         Encryption         WEP 64 (40 bit key)         WEP 128 (104 bit key)         KeyGuard         WPA/TKIP         WPA2/CCMP (802.11i)	Authentication Encryption WEP 128 Settings Enter 4-32 characters Pass Key Generate Enter 26 hexadecimal characters or enter 13 ASCII chars Hexadecimal Key #1 Key #2 HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
		Apply Cancel Help

Figure 5-4 AP 5131, WEP128

Create a security policy **WEP128** and select **WEP** from the **Encryption** menu. Enter an ASCII password between 13 characters or HEX password of 26 characters. Select **Apply** and associate the ESSID with a security policy.

## **Open Network**

					×
Edit Security Policy					
Name Open	]				
	Authontication	Encountion	1		
, automodulon	Authentication	Encryption			
👝 Manually Pre-shared key /					
No authentication					
○ Kerberos					
O 802.1x EAP					
Encryption					
No Encryption					
O WEP 64 (40 bit key)					
<ul> <li>WEP 128 (104 bit key)</li> </ul>					
KevGuard					
U WPAVI KIP					
WPA2/CCMP (802.11i)					
				Appl	Cancel Holp
				[App]	

Figure 5-5 Open Network

#### **AP: Android Device**

Enable the wireless tethering from the settings menu.

#### **Open Network**



Figure 5-6 Android Device, Open Network

Select Open from the Security drop-down menu and select Save.

#### Network Type: WPA2 PSK

🛜 🗘	<b>1</b> 1 92% 🗖	2:41 PM			
Configure portab	le Wi-Fi				
<b>\$</b>	•	*			
RPSap					
Hide my device					
Security					
WPA2 PSK					
Password					
•••••					
Enter password of at least	8 characters				
Show password	Show password				
Show advanced options					
Cancel Save					
	1				

Figure 5-7 Android Device, WPA2 PSK

Select **WPA2PSK** from the **Security** drop-down menu and enter a password. Select **Save** to start the wireless hotspot.

#### **WPA PSK**

🛜 ⊾ 🕅	192% 2:41 PM
Configure portable Wi-Fi hotspot	
Network SSID	
RPSap	
Hide my device	
Security	
WPA PSK	
Password	
••••••	
Enter password of at least 8 characters	
Show password	
Show advanced options	
Cancel	Save

Figure 5-8 Android Device, WPA PSK

Select **WPA PSK** from the **Security** drop-down menu and enter a password. Select **Save** to start the wireless hotspot.

#### iPhone



Figure 5-9 iPhone Device

Select Personal Hotspot from the Settings menu and enter a password.

## **Copying Files to the Reader**

See Appendix E, Copying Files To and From the Reader for instructions on copying files to /apps directory.

# **CHAPTER 6 APPLICATION DEVELOPMENT**

## Introduction

The primary communication to the Zebra FX7500 RFID reader is via the LLRP protocol interface on TCP port 5084. There are two ways to develop applications for the reader:

- Using the RFID3 API set included in the Zebra RFID SDK. The FX7500 reader supports host-based and embedded RFID3 APIs.
  - Java, C SDK support via the Eclipse IDE for host-based and embedded applications.
  - Microsoft .Net support via the Visual Studio 2005/2008 IDE for host-based applications only.
- Using the LLRP interface directly. Users can either use open source LLRP stacks, or develop their own LLRP stacks. The FX7500 supports host-based and embedded applications.

## **Reference Guides**

The following resources can be found on http://www.zebra.com/support:

- FX Series Reader Software Interface Control Guide, p/n 72E-131718-xx
- Programmer's Guide provided with the Zebra RFID SDK. This introductory guide describes how to perform various functions using the RFID3 API set.
- FX7500 Embedded SDK Installation Guide provided with the Zebra RFID SDK.
- FX7500 Embedded SDK Programmers Guide provides instructions on creating new embedded applications.
- *Related Documents and Software on page xi* for more documentation regarding RFID API and application development.
# **CHAPTER 7 FIRMWARE UPGRADE**

## Introduction

This chapter provides reader firmware update information on using the web-based **Administrator Console**. The following methods are available to update the firmware on the FX7500 reader.

- Update 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.
- FTP / FTPS / SCP server-based update.

Use this procedure to update the following software components:

- uboot
- OS
- Reader Server Application (includes Radio API and Radio firmware)

## **Prerequisites**

The following items are required to perform the update:

- Reader with power supply or POE connection
- Laptop (or other host computer)
- An Ethernet cable
- An FTP server
- Current firmware file examples:
  - OSUpdate.elf
  - response.txt
  - u-boot\_X.X.X.X.bin (uBoot, X.X.X.X is a filename version)
  - ulmage\_X.X.X.X (OS, X.X.X.X is a filename variable)

- rootfs\_X.X.X.X.jffs2 (Root FileSystem, X.X.X.X is a filename variable)
- platform\_X.X.X.X.tar.gz (Platform partition, X.X.X.X is a filename variable)

Refer to the release notes to determine which files were updated; not all of the files are updated in every release.

## **Failsafe Update**

FX7500 provides true failsafe firmware update. Each partition (such as OS and platform) has an active and backup partition.

The firmware update process always writes the new images to the backup partition. This ensures that any power or network outages in the middle of firmware update does not prevent the reader from being operational. In the case of a firmware update failure, the power LED on the reader lights red.

## **Update Phases**

The firmware update takes place in three phases:

- Phase 1 The reader application retrieves the response.txt and OSUpdate.elf files from the ftp server.
- Phase 2 The reader application shuts down and the OSUpdate starts. The files referenced in the response.txt file are retrieved from the FTP server and written to flash.
- Phase 3 The reader resets after all partitions update successfully. It may also update the RFID firmware
  if it detects a different version in the platform partition.

A typical entry in the Response.txt is:

;platform partition

-t5 -fplatform\_1.1.15.0.tar.gz -s8004561 -u8130879

 $\checkmark$ 

**NOTE** The Application Server, Radio API, and Radio firmware code all reside in the **Platform** partition.

The -t parameter is the file type, -f is the name of the file, and -s the size. Ensure the file size is correct. ";" comments out the rest of the line.

## **Updating FX7500 Reader Software**

### **Verifying Firmware Version**

To verify that the FX7500 reader firmware is outdated:

1. Log into the reader. In the User Login window, enter admin in the User Name: field and enter change in the Password: field.

	FX7500
Reader Administration Console	
User Login	
User Name: admin v Password:	
Login	

Figure 7-1 User Login Window

2. Select **Firmware** on the left side panel to verify that the current version of reader software is outdated, e.g., 1.1.66.

				FX7500	
	Home Status	^	Firmware Version	Firmware Version ?	^
Firmware option	<ul> <li>Operation Statistics</li> <li>Configure Reader Read Tags</li> <li>Communication Date Time IP See Change Password GPIO Applications Profiles</li> <li>Firmware Update Commit/Discard</li> <li>System Log Diagnostics Shutdown Logout</li> </ul>	Configure Reader Statistics • Configure Reader Read Tags • Communication Date Time IP Sec Change Password GPIO Applications	Current Version: Version Information Boot Loader 1.1.15 OS 1.126 File System 1.1.64 Reader Application 1.1.66 LLRP 1.1.68 Radio Firmware 1.3.28 Radio API 1.3.14	Version number • Boot loader • 05 The current version of the operating System build.	
			Last Known Version: Revert back Firmware Boot Loader OS 11.126 File System 11.64 Reader Application I1.65 Revert Back	File System - The current version of the file system build     Reader Application - The current version of the Reader Application Software.     LLRP - The current version of LLRP stack.     Radio Firmware - the current version of the RFID Radio Firmware - the current version of the RAdio API. Reader API - The current version of the RAdio API. Reader API - The current version of the RAdio API. Reader API - The current version of the RAdio API. Reader API - The current version of the RAdio API. Reader API - The current version of the RAdio API. Reader ApI. The seven tack opion is provided to the seventback. The seven tack opion is provided to the seventback the seventback version and reader will be automatically rebooted. Revertback opion is not enabled if the reader detects an error in previous firmware ungdate.	
		~			~

Figure 7-2 Firmware Version Window

### **Updating Methods**

Download the reader update files from http://www.zebra.com/support:, then use one of three methods to update the reader software to a later version, e.g., 1.1.45.0 or higher:

- Update Using a USB Drive (Recommended)
- File-Based Update on page 7-6
- FTP-Based Update on page 7-8

#### Update Using a USB Drive (Recommended)

1. Copy all reader update files into the root folder of the USB drive.



Figure 7-3 USB Drive Root Folder

2. Insert the USB drive into the USB host port of the FX7500 RFID reader.



USB Host Port

Figure 7-4 USB Host Port Window

The reader starts the update process in 5-7 seconds, and indicates progress as follows:

- The reader continuously blinks the Power LED red.
- The reader blinks all 4 LEDs orange once.
- The reader Power LED remains steady orange.
- The reader Power LED settles to a steady green to indicate that the update is complete.



Figure 7-5 Reader LEDs

#### **File-Based Update**

1. Copy all reader update files into any folder on a host computer.



Figure 7-6 Host Computer Folder

2. Log into the reader and navigate to the Firmware Update page.

		FX7500	
Home Status ) Operation Statistics ) Configure Reader Read Tags ) Communication Date Time IP Sec Change Password GPIO Applications Profiles + Firmware Update Commit/Discard ) System Log Diagnostics Shutdown Logout	Install New Software Via: • FTP/FTPS Server • File based Upload         Install New Software Via: • FTP/FTPS/SCP Server Name or PP Address:         User Name:         User Name:         Password:         Update All Partitions:         Start Update         NOTE: Clicking on "Start Update" shuts down the reader application while the new files are uploaded in the background. The filmware update process could take up to 15 minutes.         PLEASE ENSURE THAT THE READER IS NOT POWERED OFF OR REBOOTED UNTIL GREEN LED IS ON CONTINUOUSLY!	<text><text><text><list-item></list-item></text></text></text>	
		Note: Downloading all the partitions and	

Figure 7-7 Firmware Update Window

3. Select File based Upload.

4. Click on Browse and navigate to the folder that contains the firmware update files.

🍰 Open		ardanet, 3.1.21.0	-	X
Look In:	.1.45.0	-	a ĉ o	
response.f	xt			
File <u>N</u> ame:	response.txt			
Files of <u>Type</u> :	text files (.txt)			-
			Open C	ancel
			Onen se	alacted file

Figure 7-8 Browsing Update Files

- 5. Select response.txt and click Open.
- 6. Click Start Update. The reader starts the update process and displays the update status as follows:
  - The reader continuously blinks the Power LED red.
  - The reader blinks all 4 LEDs orange once.
  - The reader Power LED remains steady orange.
  - The reader Power LED settles to a steady green to indicate that the update is complete.



Figure 7-9 Reader LEDs

When the update completes, the reader reboots and returns to the FX7500 login screen.

#### **FTP-Based Update**

Copy all the update files into an appropriate FTP location.

1. Log into the reader and navigate to the Firmware Update page.

			FX7500
Home	^	Firmware Update	Firmware Update
Status  • Operation Statistics  • Configure Reader Read Tags		Install New Software Via:  • FTP/FTPS Server  • File based Upload	Motorola RFID reader supports three different methods of updating the firmware FTP FTPFS CP Server Based. FTP FTPFTPSISCP Server - This tails the reader where the number for method for methods reader where the number of the comment.
► Communication Date Time IP Sec		FTP/FTPS/SCP Server Name or IP Address: User Name:	the Reader software and the response file containing the names of the partitions to be updated, as well as the partitions themselves. Note: the IP address (not domain name) must be used in this link, beginning with ftp://
Change Password GPIO Applications Profiles		Update All Partitions:	<ul> <li>(or thp://or scp/i/).</li> <li>User Name User Name must be provided for appropriate access to the FTP/FTP/SCP server.</li> <li>User Password The password for the above FTP/FTP/SCP User Name.</li> </ul>
➡ Firmware Update Commit/Discard N System Log		NOTE: Clicking on "Start Update" shuts down the reader application while the new files are uploaded in the background. The firmware update process could take up to 15 minutes. PLEASE ENSURE THAT THE READER IS NOT POWERED OFF OR REBOOTED UNTIL GREEN LED IS ON	After the "Start Update" button is clicked, the reader will fetch all required files to start firmware update. The firmware update process is then started, the files mentioned in the Response bit file are downloaded,
Diagnostics Shutdown Logout		CONTINUOUSLY:	validated, and then programmed into faish. The teader then techods on its own if all the files are not downloaded or are compiled during the dominatod for any reason, they will firmware will remain if the check box 'update All Partitions' are selected, then timware update process shall force update all partitions irrespective of their present version
	~		In case of any failure during the firmware upgrade process, the firmware update process gets terminated and error is displayed in the web console.

Figure 7-10 Firmware Update Window

- 2. Select FTP/FTPS Server.
- 3. Enter the FTP location where the files are located.
- 4. Enter the User Name and Password for the FTP server login.
- 5. Click Start Update. The reader starts the update process and displays the update status as follows:
  - The reader continuously blinks the Power LED red.
  - The reader blinks all 4 LEDs orange once.
  - The reader Power LED remains steady orange.
  - The reader Power LED settles to a steady green to indicate that the update is complete.



Figure 7-11 Reader LEDs

When the update completes, the reader reboots and returns to the FX7500 login screen.

### **Verifying Firmware Version**

To verify reader update success:

1. Log into the reader. In the User Login window, enter admin in the User Name: field and enter change in the Password: field.

	FX7500
Reader Administration Console	
User Login	
User Name: admin 🗸	
Login	

Figure 7-12 User Login Window

2. Select **Firmware** on the left side panel to verify that the current version of reader software is the new version number, e.g., 1.1.68, which indicates that the update was successful.

			FX7500	
Home Status • Operation Statistics • Configure Reader Read Tags • Communication Date Time IP Sec Change Password GPIO Applications Profiles • Firmware Update Commit/Discard • System Log Diagnostics Shutdown Logout	^	Firmware Version Current Version: Version Information Boot Loader OS File System 1.1.64 File System 1.1.64 Reader Application LLRP Radio Firmware 1.3.28 R	Firmware Version     The Firmware page shows the current software and firmware versions and provides a facility to upgrade the software.     Currently running in the reader and 'task known version' indicates the versions of the binaries that are currently running in the reader and 'task known version' indicates the versions of binary images stored in the backup up to the reader and 'task known version' indicates the version soft binaries that are currently running in the reader and 'task known version' indicates the version soft binaries that are provided by the software.     Software that shale software the software indicates the version software indicates the version software indicates the version of the page currently has the billowing fields:     Software.     Software current version of the operating System	^
	~	Last Known Version: Revert back Firmware Boot Loader 1.1.15 OS 11.26 File System 1.1.64 Reader Application 1.1.65 Revert Back	<ul> <li>build</li> <li>File System - The current version of the file system build</li> <li>Reader Application - The current version of the Reader Application software.</li> <li>LLRP - The current version of LLRP version of the RFID Ratio Firmware.</li> <li>Ratio API - The current version of the RFID Ratio Firmware.</li> <li>Ratio API - The current version of the RAIO API.</li> <li>Revertback The Revertback option is provided to revert back the reader to last known firmware version. Up on pressing this button, reader will revertback the firmware lange to last known version and reader will be automatically reboorded. Revertback option is not enabled the reader blacks an error in previous firmware update.</li> </ul>	~

Figure 7-13 Firmware Version Window

# **CHAPTER 8 TROUBLESHOOTING**

Table 8-1 provides FX7500 troubleshooting information.

#### Table 8-1 Troubleshooting

Problem/Error	Possible Causes	Possible Solutions
Reader error LED lights after the reader is in operation.	The CPU cannot communicate.	Refer to the system log for error messages.
Reader error LED stays lit on power up.	An error occurred during the power up sequence.	Refer to the system log for error messages.
Cannot access the <b>Administrator Console</b> .	User name and password is unknown.	The default user name is <b>admin</b> and the default password is <b>change</b> . To change the user name and password, see <i>Communications Connections on page</i> 3-5.
Reader is not reading tags.	The tag is out of its read range.	Move the tag into read range. See <i>Read</i> <i>Tags on page 4-31</i> .
	Antennas are not connected.	Connect antennas.
	Tags are damaged.	Confirm that tags are good.
	Tags are not EPCgen2.	Confirm that tags are EPCgen2.
	If reading with the reader's web page, Java JRE 1.6 or later is not installed.	Install Java JRE 1.6.
Cannot connect to the reader.	The IP address is unknown.	See Communications Connections on page 3-5 to view the IP address, or use the host name to connect to the reader.

Problem/Error	Possible Causes	Possible Solutions
Certain real time applications are no longer functional.	The node address, IP address, or other reader configuration parameter(s) were changed using the <b>Administrator Console</b> , and the application expects the previous configuration.	Update the settings within the application. Refer to the application manual.
	The user closed the browser without logging out of the <b>Administrator Console</b> , so other applications cannot connect to the reader.	Log out of the Administrator Console. The applications can use the Force Login option to log in even when the user closes the browser without logging out. Force Login option is supported for the administrative user.
Cannot log into Administrator Console.	The user forgot the password.	Press and hold the reset button for more than 8 seconds. This resets the reader configuration to factory defaults, including the password. This also removes the contents of the <b>apps</b> partition.
Unable to add SNTP server, reader returning error:	SNTP server is not reachable.	Ensure the SNTP server is accessible.
specified Host Address	SNTP server name is not resolvable via DNS server.	Ensure the DNS server name is configured in TCP/IP configuration.
	DNS server is not reachable.	Ensure the DNS server is accessible.
Operation failed.	A user operation did not complete, typically due to invalid input.	Validate all inputs and retry the operation. If it is not successful, see <i>Service Information on page xii</i> .
Invalid User Name and/or Password - Try again.	The user name and/or password were not found in the system, or do not match the current user registry.	Accurately retype login information. If this is not successful, see <i>Service Information on page xii</i> .
Session has Timed-out - Log in again.	The current session was inactive beyond the time-out period (15 minutes), so the system automatically logged out.	Log in again. As a security precaution to protect against unauthorized system access, always log out of the system when finished.

Problem/Error	Possible Causes	Possible Solutions
User name is not correct.	The user name does not match the current user registry (illegal characters, too long, too short, unknown, or duplicate).	Accurately retype the user name.
	User forgot the user ID. Web console supports the following users: - Admin (default password is change) - Guest (no password required) - rfidadm - supported over SSH,FTP/FTPS, SCP, but not over Administrator Console.	Reset the reader to factory defaults and select <b>Admin</b> for user name and enter <b>change</b> in the password field to regain access. See <i>Reset to Factory Defaults</i> <i>LED Sequence on page 3-11</i> .
Not a legal IP address (1.0.0.0 - 255.255.255.255). Cannot reach the specified IP address. The SNMP Host Link is not valid.	The IP address entered is either formatted inaccurately or cannot be accessed (pinged).	Accurately retype the IP address, and make sure the host device is connected and online. If this is not successful, see <i>Service</i> <i>Information on page xii.</i>
Invalid network mask.	The network mask entered is not formatted correctly.	Confirm the correct network mask from the network administrator and enter it correctly.
Invalid SNMP version number.	The version number for SNMP protocol is not a supported version.	Use version number 1 for SNMP version 1, and 2 for SNMP version 2c.
Invalid description.	The description contained invalid characters (<,>,or').	Correct the description.
Invalid password.	The password does not match the current user registry (illegal characters, too long, or too short).	Accurately retype the password.
	User forgot the password.	Reset the reader to factory defaults and select <b>Admin</b> for user name and enter <b>change</b> in the password field to regain access. See <i>Reset to Factory Defaults</i> <i>LED Sequence on page 3-11</i> .
The name, serial number, or IP address entered already exists in the system.	The name, serial number, or IP address entered was already used.	Enter a unique value for the new name, serial number, or IP address.
Another administrator is currently logged in. Try again later.	The system does not allow more than one administrator to log in at a time.	Wait until the other administrator logs out (or times out) before logging in or override the current session with the new one.

Problem/Error	Possible Causes	Possible Solutions
Backup configuration file does not exist.	The system cannot revert to a backup configuration unless a backup file exists.	Commit the new configuration to create a backup file.
Failed to confirm the new password.	The system requires entering the password identically two times.	Accurately retype the password twice.
Network configuration change(s) have not been saved.	The user requested log out prior to committing/ discarding the changes made during the session.	Select one of the <b>Commit/Discard</b> options.
New password is the same as the old one.	The system requires entering a new password (different from the existing password) during the <b>Change Password</b> operation.	Enter a password that is different from the existing password.
Old password is not correct.	The system requires entering the existing password during the <b>Change Password</b> operation.	Accurately retype the existing password.
Unspecified error occurred - code: ####	A specific error message is missing for the given status code.	Note the code number, and contact Zebra support. See <i>Service Information on page xii</i> .
The requested page was not found. Internal Web Server Error.	The system experienced an internal web server error.	Contact Zebra support. See Service Information on page xii
Request method was NULL. No query string was provided.	The system does not permit executing a proxy program from the command line rather than the web server.	No action required. The system is reporting that this action is not permitted.
Content length is unknown.	The system cannot accept an incorrectly formatted HTTP POST request (from an unsupported browser application).	Use a GET request instead, or update the software.
Couldn't read complete post message.	The system stopped a POST operation before completion.	Retry the operation, and allow it to complete.
Unhandled reply type.	The system generated an unexpected value.	Contact Zebra support. See Service Information on page xii.

Problem/Error	Possible Causes	Possible Solutions
Failed to open port. Failed to connect. Failed to transmit. Failed to receive. Error during Receive of Command.	Error during receive of command.	Contact Zebra support. See <i>Service Information on page xii</i> .
Invalid Device Address.	The device address information (parent) is invalid, missing, or formatted inaccurately.	Contact Zebra support. See <i>Service Information on page xii</i> .
Command parsing state error. Missing argument for the command. Command internal type cast error. Missing operator. Unknown operator.	A command was formatted inaccurately.	Contact Zebra support. See <i>Service Information on page xii</i> .
The action must be confirmed.	The user must confirm the requested action before it is executed.	Select the confirmation option when issuing this request.
Invalid network adapter when navigating to the Bluetooth configuration page.	The Bluetooth dongle is not plugged in or not supported.	Plug in a supported Bluetooth dongle and refresh the browser.
Wireless scan error.	Wireless dongle is not plugged in or not supported.	Plug in a supported wireless dongle and repeat the wireless scan.
Unable to connect to the wireless network.	Access point is off or unreachable.	Turn on the access point and make sure it is accessible.
	Encryption type is not supported in the access point.	Use one of the following supported encryption types: WEP128, WPA/WPA2 and Open.
	The wireless page displays <b>Adapter not found</b> .	Connect the wireless adapter to the reader.
Wireless connection is complete, but no IP address.	No DHCP server is running in the network.	Add a DHCP server to the network.
OS update in progress.	Firmware update on the reader is ongoing. The current operation is not permitted.	Wait for the firmware update to complete and then retry the operation.
Cannot change password.	Cannot change password for guest.	Guest does not need a password to log in to the Administrator Console.

## 8 - 6 FX7500 RFID Reader Integrator Guide



NOTE If problems still occur, contact the distributor or call the local contact. See page xii for contact information.

# **APPENDIX A TECHNICAL SPECIFICATIONS**

## FX7500 Kits

## KT-FX75004US-01 4-Port US Reader Kit

- FX7500-42310A30-US (4-port US reader)
- AN480-CL66100WR (wide-band AN-480 antenna)
- BRKT-70661-01R (antenna mounting bracket)
- CBLRD-1B4001800R (15-foot RF cable)
- 50-14000-159R (power supply)
- 23844-00-00R (US power cord)

## KT-FX75002US-01 2-Port US Reader Kit

- FX7500-22310A30-US (2-port US reader)
- AN480-CL66100WR (wide-band AN-480 antenna)
- BRKT-70661-01R (antenna mounting bracket)
- CBLRD-1B4001800R (15-foot RF cable)
- 50-14000-159R (power supply)
- 23844-00-00R (US power cord)

## KT-FX75004WR-01 4-Port Global Reader Kit

- FX7500-42315A30-US (4-port global reader)
- AN480-CL66100WR (wide-band AN-480 antenna)
- BRKT-70661-01R (antenna mounting bracket)
- CBLRD-1B4001800R (15-foot RF cable)
- 50-14000-159R (power supply)

### KT-FX75002WR-01 2-Port Global Reader Kit

- FX7500-22315A30-US (2-port global reader)
- AN480-CL66100WR (wide-band AN-480 antenna)
- BRKT-70661-01R (antenna mounting bracket)
- CBLRD-1B4001800R (15-foot RF cable)
- 50-14000-159R (power supply)

## **Technical Specifications**

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

#### Table A-1 Technical Specifications

Item	FX					
Physical and Environmen	Physical and Environmental Characteristics					
Dimensions	7.7 in. L x 5.9 in. W x 1.7 in. D					
	(19.56 cm L x 14.99 cm W x 4.32 cm D)					
Weight	1.9 lbs ± 0.1 lbs (0.86 kg +/- 0.05 kg)					
Base Material	Die cast aluminum, sheet metal and plastic					
Visual Status Indicators	Multi-color LEDs: Power, Activity, Status, and Applications					
Mounting	Keyhole and standard VESA (75 mm x 75 mm)					
FX Environmental Specifie	cations					
Operational Temperature	-4° to +131° F / -20° to +55° C					
Storage Temperature	-40° to +158° F / -40° to +70° C					
Humidity	5 to 95% non-condensing					
Shock and Vibration	MIL-STD-810G					
Connectivity						
Communications	10/100 BaseT Ethernet (RJ45) w/ POE support					
	USB Client (Type B), USB Host (Type A)					
General Purpose I/O	2 inputs, 3 outputs, optically isolated (terminal block)					
	External 12V ~ 48 VDC power available for GPIO					
Power	POE or POE+					
	12 VDC to 48 VDC, or 24 VDC Universal Power Supply					
Antenna Ports	FX 7500-2: 2 mono-static ports (reverse polarity TNC)					
	FX 7500-4: 4 mono-static ports (reverse polarity TNC)					

Item	FX				
Hardware/OS and Firmware	Hardware/OS and Firmware Management				
Memory	Flash 512 MB; DRAM 256 MB				
Operating System	Linux				
Firmware Upgrade	Web-based and remote firmware upgrade capabilities				
Management Protocols	RM 1.0.1 (with XML over HTTP/HTTPS and SNMP binding)				
Network Services	DHCP, HTTPS, FTPS, SFPT, SCP, SSH, HTTP, FTP, SNMP and NTP				
Network Stack	IPv4, IPv6				
Security	Transport Layer Security Ver. 1.2, FIPS 140-2 Level 1				
Air Protocols	EPCglobal UHF Class 1 Gen2, ISO 18000-6C				
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	10 dBm to +31.5 dBm (POE+, 12V ~ 48V External DC,				
	Universal 24 VDC Power Supply; +10 dBm to +30 0 dBm (POE)				
Receive Sensitivity	-82 dBm				
IP Addressing	Static and Dynamic				
Host Intenace Protocol					
API Support	Host Applications – .NET, C and Java EMDK;				
	Embedded Applications – C & Java SDK				

#### Table A-1 Technical Specifications (Continued)

#### Warranty

The FX7500-4 and FX7500-2 are warranted against defects in workmanship and materials for a period of one year (12 months) from date of shipment, provided the product remains unmodified and is operated under normal and proper conditions.

For the complete Zebra hardware product warranty statement, go to:

http://www.zebra.com/warranty

#### **Recommended Services**

Support Services	Service from the Start Advance Exchange On-Site System Support Support		
Advanced Services	RFID Design and Deployment Services		

## **Cable Pinouts**

## 10/100bT Ethernet / POE Connector

The 10/100BT Ethernet / POE connector is an RJ45 receptacle. This port complies with the IEE 802.3af specification for Powered Devices.

12345678



Figure A-1 Ethernet Connections

 Table A-2
 10/100bT Ethernet / POE Connector Pinout

Pin	Pin Name	Direction	Description	POE Mode A Function	POE Mode B Function
Pin 1	TX-P	0	TX Data Positive	Positive Vport	
Pin 2	TX-N	0	TX Data Negative	Positive Vport	
Pin 3	RX-P	I	RX Data Positive Negative Vport		
Pin 4	NC	-	No Connect		Positive Vport
Pin 5	NC	-	No Connect		Positive Vport
Pin 6	RX_N	I	RX Data Negative	Negative Vport	
Pin 7	NC	-	No Connect		Negative Vport
Pin 8	NC	-	No Connect		Negative Vport

## **USB Client Connector**

The USB Client port is supplied on a USB Type B connector.



Figure A-2 USB Client Connector

Table A-3	USB	Client Port Conr	nector Pinout	
Pin		Pin Name	Direction	

Pin	Pin Name	Direction	Description
Pin 1	5.0V_USB	I	5.0V USB Power Rail
Pin 2	USB_DN	I/O	Data Negative
Pin 3	USB_DP	I/O	Data Positive
Pin 4	GND	-	Ground

## **USB Host Connector**

The USB Host port is supplied on a USB Type A flag connector.



Figure A-3 USB Host Connector (J22)

Pin	Pin Name	Direction	Description
Pin 1	V_USB	1	5.0V USB Power Rail
Pin 2	USBH_DN	I/O	Data Negative Rail
Pin 3	USBH_DP	I/O	Data Positive Rail
Pin 4	GND	-	Ground

 Table A-4
 USB Host Port Connector (J22) Pinout

### **GPIO Port Connections**

These plug terminal block types allow connecting and disconnecting individual wires independently. A single connector is used for both inputs and outputs. See *Table A-5* for pin descriptions.



Figure A-4 FX7500 RFID Reader GPIO Connection

Pin #	Pin Name	Direction	Description
1	+24V DC Power	0	Supplies +24V DC at up to 1 Amp
2	GP output #1	0	Signal for GP output #1
3	GP output #2	0	Signal for GP output #2
4	GP output #3	0	Signal for GP output #3
5	GND	-	Ground connection
6	GP input #1	I	Signal for GP input #1
7	GP input #2	I	Signal for GP input #2
8	GND	-	Ground connection

#### Table A-5 GPIO Pin Outs

# **APPENDIX B STATIC IP CONFIGURATION**

## Introduction

This appendix describes three methods of setting the static IP address on an FX7500 RFID Reader.

# Reader IP Address or Host Name is Known - Set the Static IP Using the Web Console

- 1. Browse the device using the host name, e.g., FX7500CD3B1E.
- 2. Log onto the device.

	FX7500
Reader Administration Console	
User Login	
User Name: admin V Password:	
Login	

Figure B-1 Reader Administration Console Login Window

3. Click Communication.

### B - 2 FX7500 RFID Reader Integrator Guide

4. Set Obtain IP Address via DHCP to Off and enter all required information.

					FX7500	
Home Status	^	Reade	er Communicatior	n Parameters	Communication Settings ?	^
Statistics Configure Reader Read Tags		Ethernet Wi-Fi Bluetooth	Configure Network S	Settings	Ethernet	
<ul> <li>Communication</li> <li>Date Time</li> <li>IP Sec</li> <li>Change Password</li> <li>GPIO</li> <li>Applications</li> <li>Profiles</li> <li>Firmware</li> </ul>		IPv4 IPv6	Obtain IPV4 Address via DHCP: Current IPV4 address IPV4 Subnet Mask: IPV4 Gateway: IPV4 Gateway: IPV4 DNS Server: MAC Address:	0 m ▼ 157 235 88 105 255 255 0 157 235 88 246 10 176 0.3 84 24 8D 06:5D 22	The reader supports both automatic TCP/IP configuration via DHCP, and manual configuration. The first button turns DHCP on or off, depending on current state. If DHCP is turned on, actual current values of the reader's IP address, subnet mask, default glateway, and DNS server are displayed on this page. Since these have been obtained from the DHCP server, they cannot be changed manually. If DHCP is turned off, you can set values for these fields:	
*CommitUiscaro > System Log Diagnostics Shutdown Logout	~			Set Properties	IP Address (in dotted notation) at which the reader is assigned.     Submet Mark (in dotted notation) appropriate for the      Submet Mark (in dotted notation) appropriate for the      henrick the reader reades in.     Default Gateway (in dotted notation) appropriate for      the network the reader reades in.     DNS server (in dotted notation) appropriate for the      network the reader reades in.     MAC Address - Specifies the MAC address of the      reader.     Note: The network configuration is not updated until      you click Commit (see <u>Save Changes</u> ) If the Commit      is not successful, the system should indicate the      problem and allow you to correct it by repeating the      operation. DHCP and IP address changes do not get      affected until the reader is rebooted.	~

Figure B-2 Reader Communication Parameters Window

- 5. Click Set Properties. You can set a static IP that doesn't belong to this DHCP network.
- 6. Click Commit/Discard, then click the Commit button.

			FX7500
Home	^	Configuration Commit/Discard	Save Changes (or Revert to Backup)
Status > Operation Statistics > Configure Reader > Read points Region Read Tags > Communication Date Time IP Sec Change Password GPIO Applications Profiles > Firmware * Commit/Discarc > System Log Diagnostics Shutdown Logout	~	Commit the Configuration Changes Commit Discard the Configuration Changes Discard Reset reader to factory defaults Factory Reset	<text><text><text><text><text><list-item></list-item></text></text></text></text></text>

Figure B-3 Commit/Discard Window

7. The message Reader IP Address config has changed. Needs reader reboot to take effect appears. Reset the device and use the reader with the static IP network.

# Reader IP is Not Known (DHCP Network Not Available) - Set the Static IP Using the Web Console

- 1. Connect the device and a PC running Windows XP to the same network that doesn't have a DHCP server, or connect the device directly to the PC.
- 2. Ensure both the device and PC Ethernet jack use at least one LED to indicate network connection detect.
- 3. If the PC uses an assigned static IP, update it to use DHCP. The PC obtains an IP that starts with 169.



Figure B-4 Obtain IP Address

4. When possible, ping the host name of the device.



Figure B-5 Ping the Host Name

- Use a browser to connect to the device with the host name, e.g., FX7500CD3B1E, or use the IP address obtained from ping replies (e.g. 169.254.62.74).
- 6. Log onto the device.
- 7. Click Communication.

### B - 4 FX7500 RFID Reader Integrator Guide

8. Set Obtain IP Address via DHCP to Off and enter all required information.

					FX7500
Home Status I Operation Statistics I Configure Reader	^	Read	er Communicatio	n Parameters Settings	Communication Settings
Read Tags Communication Date Time IP Sec Change Password GPIO Applications Profiles Firmware		Ethernet Wi-Fi Bluetooth	Obtain IPV4 Address via DHCP: Current IPV4 address IPV4 Subnet Mask: IPV4 Gateway: IPV4 DNS Server: MAC Address:	0 m ▼ 157 235 88 105 255 255 255 0 157 235 88 246 10 176 0.3 84 24 80:06 5D 22	IPV4 The reader supports both automatic TCP/IP configuration via DHCP, and manual configuration. The first button turns DHCP on or off, depending on current state. If DHCP is turned on actual current values of the reader's IP address, subnet mask, default gateway, and DNS server are deptayed on this page. Since these have been obtained from the DHCP server, they cannot be changed manually. If DHCP is turned off, you can set values for these fields:
*CommitDiseard ▶ System Log Diagnostics Shurdown Logout	~			Set Properties	P Address (in dotted notation) at which the reader is a signed     Subnet Mask (in dotted notation) appropriate for the network the reader resides in     Default Gateway (in dotted notation) appropriate for the network the reader resides in.     DNS server (in dotted notation) appropriate for the network the reader resides in.     MAC Address - Specifies the MAC address of the reader.     Note: The network configuration is not updated until you click Commit (see <u>Save Changes</u> ) if the Commit is not successful, the system should indicate the problem and allow you to correct it by repeating the operation. DHCP and IP address - sneeding the address of not get affected until the reader is rebooted.

Figure B-6 Reader Communication Parameters Window

- 9. Click Set Properties.
- 10. Click Commit/Discard, then click the Commit button.

iome	Configuration Commit/Discard	Save Changes (or Revert to Backup
Status Status Operation Statistics Configure Reader P Read Doints Read Tags Communication Date Time P Sec Change Password GPIO Applications Profiles P Firmware Commit/Discarc System Log Daignostics Shutdown Logout	Commit the Configuration Changes Commit Discard the Configuration Changes Discard Reset reader to factory defaults Factory Reset	<ul> <li>When you add or make modifications to the logical view of your Reader Network using the Motorola RFD reader Administrator Consoles, the changes are not immediately applied to your underlying physical Reader and network connections.</li> <li>You must click the Commit button on the Commit/Revert page to save the changes to the Motorola RFD reader confluention of the Commit/Revert page to save the changes to the Motorola RFD reader Confluention of the Commit/Revert page to save the changes to the Motorola RFD reader confluention of the Commit/Revert page to save the changes to the Motorola RFD reader confluention of the Commit/Revert page to save the changes to the Commit/Revert page to save the changes to the Server's configuration file that you've made to the Reader Network during this session, click the Discard button and your most recent changes are discarded.</li> <li>Conmit changes - Allows the user to save the configuration changes existently to the reader.</li> <li>Discard changes - Allows the user to base to configuration changes.</li> <li>Factory Reset - All customized user settings mcbuding configuration and installed application are cleared. The action will cause the reader to reboot.</li> </ul>

Figure B-7 Commit/Discard Window

11. The message Reader IP Address config has changed. Needs reader reboot to take effect appears. Reset the device and use the reader with the static IP network.

# **APPENDIX C RF AIR LINK CONFIGURATION**

## Introduction

This appendix lists the different air link configurations supported. The air link configuration is available through LLRP and RFID3 API interfaces.

## **Radio Modes**

The supported modes are exposed as a list of individual UHFC1G2RfModeTableEntry parameters in regulatory capabilities as shown in *Table C-1* and *Table C-2*. The Mode Index column refers to the index used to walk the C1G2UHFRFModeTable. Refer to the EPCglobal *Low Level Reader Protocol (LLRP) Standard*.

RF Mode Index	Divide Ratio	BDR Value	M Value M2=2, FM0=1, M4=4, M8=8	FLM Value	PIE Value	Min Tari	Max Tari	Step Tari	Spectral Mask Indica- tor**	EPC HAG T&C Conform- ance
1	64/3	640000	1	PR_ASK	1500	6250	6250	0	Dense	false
2	64/3	640000	1	PR_ASK	2000	6250	6250	0	Dense	false
3	64/3	120000	2	PR_ASK	1500	25000	25000	0	Dense	false
4	64/3	120000	2	PR_ASK	1500	12500	23000	2100	Dense	false
5	64/3	120000	2	PR_ASK	2000	25000	25000	0	Dense	false
6	64/3	120000	2	PR_ASK	2000	12500	23000	2100	Dense	false
7	64/3	128000	2	PR_ASK	1500	25000	25000	0	Dense	false
8	64/3	128000	2	PR_ASK	1500	12500	23000	2100	Dense	false
9	64/3	128000	2	PR_ASK	2000	25000	25000	0	Dense	false

Table C-1 Radio Modes for FCC Readers

\*RF Mode 23 is the automac air link profile which is also the default. \*\*Spectral mask indicator may vary for certain Tari values. Detailed information is available upon request.

RF Mode Index	Divide Ratio	BDR Value	M Value M2=2, FM0=1, M4=4, M8=8	FLM Value	PIE Value	Min Tari	Max Tari	Step Tari	Spectral Mask Indica- tor**	EPC HAG T&C Conform- ance
10	64/3	128000	2	PR_ASK	2000	12500	23000	2100	Dense	false
11	64/3	160000	2	PR_ASK	1500	12500	18800	2100	Dense	false
12	64/3	160000	2	PR_ASK	2000	12500	18800	2100	Dense	false
13	64/3	60000	4	PR_ASK	1500	25000	25000	0	Dense	false
14	64/3	60000	4	PR_ASK	1500	12500	23000	2100	Dense	false
15	64/3	60000	4	PR_ASK	2000	25000	25000	0	Dense	false
16	64/3	60000	4	PR_ASK	2000	12500	23000	2100	Dense	false
17	64/3	64000	4	PR_ASK	1500	25000	25000	0	Dense	false
18	64/3	64000	4	PR_ASK	1500	12500	23000	2100	Dense	false
19	64/3	64000	4	PR_ASK	2000	25000	25000	0	Dense	false
20	64/3	64000	4	PR_ASK	2000	12500	23000	2100	Dense	false
21	64/3	80000	4	PR_ASK	1500	12500	18800	2100	Dense	false
22	64/3	80000	4	PR_ASK	2000	12500	18800	2100	Dense	false
*23	64/3	variable	variable	PR_ASK	variable	6250	25000	variable	variable	false
24	64/3	320000	1	PR_ASK	1500	12500	18800	2100	Dense	false
25	64/3	320000	1	PR_ASK	2000	12500	18800	2100	Dense	false
26	64/3	30000	8	PR_ASK	1500	25000	25000	0	Dense	false
27	64/3	30000	8	PR_ASK	1500	12500	23000	2100	Dense	false
28	64/3	30000	8	PR_ASK	2000	25000	25000	0	Dense	false
29	64/3	30000	8	PR_ASK	2000	12500	23000	2100	Dense	false
30	64/3	32000	8	PR_ASK	1500	25000	25000	0	Dense	false
31	64/3	32000	8	PR_ASK	1500	12500	23000	2100	Dense	false
32	64/3	32000	8	PR_ASK	2000	25000	25000	0	Dense	false
33	64/3	32000	8	PR_ASK	2000	12500	23000	2100	Dense	false
34	64/3	40000	8	PR_ASK	1500	12500	18800	2100	Dense	false
35	64/3	40000	8	PR_ASK	2000	12500	18800	2100	Dense	false

Table C-1 Radio Modes for FCC Readers (Continued)

\*RF Mode 23 is the automac air link profile which is also the default. \*\*Spectral mask indicator may vary for certain Tari values. Detailed information is available upon request.

RF Mode Index	Divide Ratio	BDR Value	M Value M2=2, FM0=1, M4=4, M8=8	FLM Value	PIE Value	Min Tari	Max Tari	Step Tari	Spectral Mask Indica- tor**	EPC HAG T&C Conform- ance
1	64/3	120000	2	PR_ASK	1500	25000	25000	0	Dense	false
2	64/3	120000	2	PR_ASK	1500	12500	23000	2100	Dense	false
3	64/3	120000	2	PR_ASK	2000	25000	25000	0	Dense	false
4	64/3	120000	2	PR_ASK	2000	12500	23000	2100	Dense	false
5	64/3	128000	2	PR_ASK	1500	25000	25000	0	Dense	false
6	64/3	128000	2	PR_ASK	1500	12500	23000	2100	Dense	false
7	64/3	128000	2	PR_ASK	2000	25000	25000	0	Dense	false
8	64/3	128000	2	PR_ASK	2000	12500	23000	2100	Dense	false
9	64/3	160000	2	PR_ASK	1500	12500	18800	2100	Dense	false
10	64/3	160000	2	PR_ASK	2000	12500	18800	2100	Dense	false
11	64/3	60000	4	PR_ASK	1500	25000	25000	0	Dense	false
12	64/3	60000	4	PR_ASK	1500	12500	23000	2100	Dense	false
13	64/3	60000	4	PR_ASK	2000	25000	25000	0	Dense	false
14	64/3	60000	4	PR_ASK	2000	12500	23000	2100	Dense	false
15	64/3	64000	4	PR_ASK	1500	25000	25000	0	Dense	false
16	64/3	64000	4	PR_ASK	1500	12500	23000	2100	Dense	false
17	64/3	64000	4	PR_ASK	2000	25000	25000	0	Dense	false
18	64/3	64000	4	PR_ASK	2000	12500	23000	2100	Dense	false
19	64/3	80000	4	PR_ASK	1500	12500	18800	2100	Dense	false
20	64/3	80000	4	PR_ASK	2000	12500	18800	2100	Dense	false
*21	64/3	variable	variable	PR_ASK	variable	12500	25000	variable	variable	false
22	64/3	320000	1	PR_ASK	1500	12500	18800	2100	Dense	false
23	64/3	320000	1	PR_ASK	2000	12500	18800	2100	Dense	false
24	64/3	30000	8	PR_ASK	1500	25000	25000	0	Dense	false
25	64/3	30000	8	PR_ASK	1500	12500	23000	2100	Dense	false
26	64/3	30000	8	PR_ASK	2000	25000	25000	0	Dense	false

Table C-2 Radio Modes for ETSI Readers

\*RF Mode 21 is the automac air link profile which is also the default. \*\*Spectral mask indicator may vary for certain Tari values. Detailed information is available upon request.

RF Mode Index	Divide Ratio	BDR Value	M Value M2=2, FM0=1, M4=4, M8=8	FLM Value	PIE Value	Min Tari	Max Tari	Step Tari	Spectral Mask Indica- tor**	EPC HAG T&C Conform- ance
27	64/3	30000	8	PR_ASK	2000	12500	23000	2100	Dense	false
28	64/3	32000	8	PR_ASK	1500	25000	25000	0	Dense	false
29	64/3	32000	8	PR_ASK	1500	12500	23000	2100	Dense	false
30	64/3	32000	8	PR_ASK	2000	25000	25000	0	Dense	false
31	64/3	32000	8	PR_ASK	2000	12500	23000	2100	Dense	false
32	64/3	40000	8	PR_ASK	1500	12500	18800	2100	Dense	false
33	64/3	40000	8	PR_ASK	2000	12500	18800	2100	Dense	false

 Table C-2
 Radio Modes for ETSI Readers (Continued)

\*RF Mode 21 is the automac air link profile which is also the default. \*\*Spectral mask indicator may vary for certain Tari values. Detailed information is available upon request.

# APPENDIX D CONNECTING WI-FI AND BLUETOOTH DONGLES

## Introduction

This appendix describes how to connect to a wireless network using a USB Wi-Fi dongle on the FX7500, and how to connect to a peer device over Bluetooth using a USB Bluetooth dongle.

## **Connecting to a Wireless Network Using a Wi-Fi Dongle**

To connect to a wireless network using a USB Wi-Fi dongle on the FX7500:

- 1. Plug the supported wireless dongle into the USB host port on the FX7500. Supported dongles are:
  - · Wi-Fi over USB adapters with Realtek chipset RTL 8187
  - The following devices were tested:
    - Alfa AWUS036H, visit http://www.alfa.com.tw/in/front/bin/ptlist.phtml?Category=10541
    - CCrane Versa Wifi USB Adapter II, visit http://www.ccrane.com/antennas/wifi-antennas/versa-wifi-usb-adapter-II.aspx



Figure D-1 USB Host Port Location for Dongle

### D - 2 FX7500 RFID Reader Integrator Guide

 To confirm that the Wi-Fi dongle is detected properly, log in to the reader Administrator Console. On the Home page ensure the USB Port Status displays Device Connected. Hover the mouse pointer over this link to display the WiFi dongle information shown in *Figure D-2*.

				FX7500
Home	^	Reader Administration C	onsole	? Help
Status <ul> <li>Operation</li> <li>Statistics</li> </ul>		Welcome to the FX Series (2 port) Reader Administration Conso	le.	Check Status Check Statistics Gen2 Optional Operation Statistics
Read Tags		Reader Software Version :	1.1.68	NXP Custom Operation Statistics Events Statistics Other Custom Operation Statistics
Date Time		Reader Host Name :	FX7500060C17	General Reader Configuration Read Point Configuration
IP Sec Change Password		Reader Network IP Address :	157.235.208.232	Advanced Antenna Configuration Region Configuration Certificates
GPIO Applications		Reader Serial Number :	13219010500509	Inventory and Read Tags Communication Settings LLRP
Profiles ▶ Firmware		USB Port Status :	Device Connected	<u>SNMP</u> <u>Wreless</u> Services
*Commit/Discard ▶ System Log		Connected USB Devices Information		Date and Time Settings IPSec Settings Change Password GPIO Settings
Diagnostics Shutdown		Wireless LAN Adapter		User Application Deployment Manage Profiles on the reader
Logout		Model : RTL8187_Wireless_L Vendor : Manufacturer Realtel	AN_Adapter	Firmware Version Information Firmware Update Commit/Revert
		SerialNumber : Manufacturer Realtel Wireless_LAN_Adapt	RTL8187RTL8187_ er_000A5224C441	System Log System Log Configuration Diagnostics Stut Down Error Messages Tind Park Software
	~			

Figure D-2 Wi-Fi Dongle Connected

3. Select Communication > Wireless.

		FX7500
Home	Reader Wireless Settings Parameters	Wireless Settings
Status • Operation Statistics • Configure Reader Read Tags • Communication LLRP SMMP Wireless Services Date Time IP Sec Change Password GPIO Applications	Existing Connection: Connection Status Get Datalls ESSID: Signal Strength: Status: IP Address: Disconnect	<ul> <li>This page supports setting the wireless configuration on the reader. Molorola provides naive support for USB WF1 adapters with the Realatic charged F11.8 187.</li> <li>The following adapters have been fielded by Motorola - Afa AVUSDS0+ Cerame Versa Will USB Adapter 11.0 197.</li> <li>The following adapters have been fielded by Motorola - Afa AVUSDS0+ Cerame Versa Will USB Adapter 11.0 197.</li> <li>The following adapters have been fielded by Motorola - Afa AVUSDS0+ Cerame Versa Will USB Adapter 11.0 197.</li> <li>The following adapters have been fielded by Motorola - Afa AVUSDS0+ Cerame Versa Will USB Adapter 11.0 197.</li> <li>The connect - Disconnect from a connected network.</li> <li>Scan - Scan the available networks. ESSID shall be lated in the drop down menu upon pressing them button. If the ESSID is hidden(not broadcasted), then betworks and be typed in the Lick by provided networks.</li> <li>Connect automatically - Persist networks certain across rebools and automatically relain association with configured Department of the Cerame Adapter 10.0 197.</li> </ul>
Profiles Firmware *Commit/Discarc > system Log Diagnostics Shutdown Logout	Connect to wireless Network: Connect to wireless network © Enter ESSID © Scan and Choose network ESSID: Passkey: Connect Automatically: Connect	settings peristionity user can perform commit operation by navigaling to the Commit/Discard page. The pending commit is indicated to the user by a * next to Commit/Discard link in Menu Clicking on 'Disconnect' will remove the 'Connect automatically' attribute from the currently chosen AP. To make this setting persistent user can perform commit operation, Note: The scan function may take several seconds. All buttons in the page shall be disabled while scan is in progress and enabled back once scan is completed

Figure D-3 Wireless Settings

The WiFi dongle can connect to the wireless network in one of two ways:

- Manually entering the ESSID (if known).
- Scanning the current list of APs and choosing the correct one to connect to.

4. Once the APs are scanned, enter the appropriate passkey and enable **Connect Automatically** (if required to connect to the AP automatically if the connection is lost).

			FX7500
Home	^	Reader Wireless Settings Parameters	Wireless Settings
Status		Existing Connection: Connection Status Get Details ESSID: Signal Strength: Status: IP Address: Disconnect	This page supports satting the windless configuration on the readents states to be addent angles of the 1847 MS MS addents be used and the support for the SMF addents and the states of the SMF addent and AWUS030H - COrane Versa WHI USB Adapter II - Get Details - Get the details of connected network. The sound adapters have method and connected network - Bacconnect - Disconnect from a connected network - SmF - SmF adapter and the sound adapter - Bacconnect - Disconnect from a connected network - Bacconnect - Disconnect from a connected network - SmF - SmF - SmF - Backonnect - Disconnect
Profiles Firmware *Commit/Discard System Log Diagnostics Shutdown Logout		Connect to wireless Network Connect to wireless network ESSID: DEV (98 %) Passkey:	After Clicking on Connect, to save the chosen AP settings persistently user can perform commitging operation by navigating to the CommitUBcard page. The pending commit is indicated to the user by a "next to CommitUBcard link in Menu. Clicking on Disconned" will remove the Connect automatically attribute from the currently chosen AP. To make this setting persistent user can perform commit operation.
	~	Connect Automatically:  Connect	buttons in the page shall be disabled while scan is in progress and enabled back once scan is completed.

Figure D-4 Entering Connect Information

5. Select Connect. When the connection to the AP succeeds, an IP is assigned and appears in the IP Address field.

ome	^	Reader Wireless Settings Pa	rameters	Wireless Settings
tatus Operation tatistics Configure Reader		Existing Connection:		This page supports setting the wireless configuration on the reader. Motorola provides native support for USB WiFi adapters with the Realank chapter RTL 1817. The following adapters have been tested by Motorola - Alfa AWUS036H - Occame Versa Wift USB Adapter II
ead Tags Communication LLRP		Connection Status		Get Details - Get the details of connected network. The essid, signal strength and connection status are provided.
SNMP Wireless Services		Get Details ESSID: DEV		<ul> <li>Disconnect - Disconnect from a connected network</li> <li>Scan - Scan the available networks. ESSID shall be listed in the drop down menu upon pressing the button. If the ESSID is hidden(not broadcasted), there</li> </ul>
ate Time 9 Sec		Signal Strength: 0% Status: Completed IP Address: 157 235 2	I 17 24	the same can be typed in the text box provided • Passkey - Pre shared key for the WPA/WPA2 network. • Connect automatically - Persist network setting
hange Password PIO pplications		Disconnect		across reboots and automatically retain association with configured AP
rofiles Firmware Commit/Discard		Connect to wireless Network:		After Clicking on 'Connect', to save the chosen AP settings persistently user can perform commit operation by navigating to the Commit/Discard page. The pending commit is indicated to the user by a * nex to Commit/Discard link in Monard link in Monard
System Log agnostics nutdown		Connect to wireless networ	k	Clicking on 'Disconnect' will remove the 'Connect automatically' attribute from the currently chosen AP.
gout		Enter ESSID  Scan and Choose I Scan and Choose I	network	commit operation,
		ESSID: DEV (98 %)	• 0	
		Passkey: ••••••• Connect Automatically:		Note: The scan function may take several seconds. A buttons in the page shall be disabled while scan is in progress and enabled back once scan is completed.

Figure D-5 Assigned IP Address

The reader is now accessible using the wireless IP shown in the **IP Address** field (157.235.207.24 in this case). The WiFi interface supports dynamic addressing mechanisms for both IPV4 and IPv6. There is no provision to set a static IP address.

For wireless IP address details, select Communication > Wi-Fi tab.

					FX7500
Home Status ▶ Operation Statistics ▶ Configure Reader Read Tags	^	Reade	er Communication Pa	arameters	Communication Settings
← Communication LLRP SNMP Wireless Services Date Time ID Scc		IPv4 IPv6	Current IPV4 address IPV4 Subnet Mask: IPV4 Gateway: IPV4 DNS Server: MAC Address:	157 235 207 24 255 255 255 0 157 235 208 246 157 235 187 3 00:0A:52:24:C4:41	The reader supports only DHCP based configuration for WIFI. The current values of the reader's IP address, subnet mask, default gateway, and DNS server are displayed on this page. Since these have been obtained from the DHCP server, they cannot be changed manually.
IP sec Change Password GPIO Applications Profiles ▶ Firmware				Set Properties	
Commit/Discard ▶ System Log Diagnostics Shutdown Logout					
	~				~

Figure D-6 Wi-Fi Tab - IPV4

The reader can also be accessed via Wi-Fi using an IPV6 address if supported by the network to which the API is connected.

			FX7500
Ноте	^	Reader Communication Parameters	Communication Settings
Status		Configure Network Settings Ethernet Wi-Fi Bluetooth	WI-FI IPV6
Communication Date Time IP Sec Change Password GPIO Applications Profiles		IPv4         Obtain IPV6 Address via DHCP:         On ▼           IPv6         Current IPV6 address:         deca 2012::20a:52ff fe24:c4f5           Prefix Length:         64           IPv6 Gateway:         fe80::10           IPV6 DNS Server:         fe80::20           MAC Address:         84:24:80:06:0F:6C	The reader supports only DHCP based configuration for WIFI. The current values of the reader's IPV6 address, Prefix Length default geteway, and DNS server are displayed on this page. Since these have been obtained from the DHCP server, they cannot be changed manually.
<ul> <li>Firmware</li> <li>*Commit/Discare</li> <li>System Log</li> <li>Diagnostics</li> <li>Shutdown</li> <li>Longout</li> </ul>		Set Properties	
Loyout	~		
	~		

Figure D-7 Wi-Fi Tab - IPV6

## **Connecting to a Peer Device over Bluetooth Using a Bluetooth Dongle**

To connect to a peer device over Bluetooth using a USB Bluetooth dongle on the FX7500:

- 1. Plug the supported Bluetooth dongle into the USB host port on the FX7500. The following Bluetooth dongles are supported on the FX7500:
  - Asus Mini Bluetooth Dongle USB-BT211.
  - MediaLink Bluetooth Dongle MUA-BA3.



Figure D-8 USB Host Port Location for Dongle

 To confirm that the Bluetooth dongle is detected properly, log in to the reader Administrator Console. On the Home page ensure the USB Port Status displays Device Connected. Hover the mouse pointer over this link to display the Bluetooth dongle information.

Home Status     A     Reader Administration Console       Image: Status        • Operation Statistics         • Operation Statistics         • Operation Statistics        Image: Construction Statistics        • Configure Reader Reader Software Version : 1.1.68         • Configure Reader Statistics        Image: Construction Statistics        • Reader Administration Console.         • Configure Reader Statistics        Image: Construction Statistics        • Reader Software Version : 1.1.68         • Configure Reader Statistics        Image: Construction Statistics        • Reader Hots Name : FX7500060C17         • Reader Serial Number : 157.235.208.232        Change Password GPIO Applications Profiles        USB Port Status : Device Connected         • Device Connected        Image: Connected USB Devices Information Diagnostics        Wireless LAN Adapter         • Wireless LAN Adapter		FX7500				-
Satus     Voperation Statistics     Welcome to the FX Series (2 port) Reader Administration Console.     Check Status Check Status	^	? Help	Console	Reader Administration (	^	Home
Image: Contigure Keader     NXEP Control Operations Statistics       Read rags     Reader Software Version :     1.1.68       Image: Control Operations Statistics     Other Custom Operations Statistics       Image: Control Operations Statistics     Other Custom Operations Statistics       Image: Control Operations     Other Custom Operations       Image: Control Operations     Reader Host Name :     FX7500060C17       Image: Control Operations     Reader Network IP Address :     157.235.208.232       Change Password     Reader Network IP Address :     157.235.208.232       GPIO     Reader Serial Number :     13219010500509       Profiles     USB Port Status :     Device Connected       Yinteless     USB Port Status :     Device Connected       'Commit/Discard     Connected USB Devices Information       - System Log     Optionations       Diagnostics     Wireless LAN Adapter		<u>Check Status</u> <u>Check Statistics</u> <u>Gen2 Optional Operation Statistics</u>	sole.	me to the FX Series (2 port) Reader Administration Cons		Status ▶ Operation Statistics
Date Time     General Reader Configuration       IP Sec     Reader Network IP Address:     157.235.208.232     Reader Configuration       Change Password     Reader Network IP Address:     157.235.208.232     Reading Configuration       GPPO     Reader Serial Number:     13219010500509     Inventory, and Read Tasis       Applications     USB Port Status:     Device Connected     Wireless       Finitware     Connected USB Devices Information     Date and Times Settings     Date and Times Settings       > System Log     Connected USB Devices Information     Insertions     Date and Times Settings       > System Log     Wireless LAN Adapter     Connected USB Devices Information		NXP Custom Operation Statistics Events Statistics Other Custom Operation Statistics	1.1.68	Reader Software Version :		<ul> <li>Configure Reader</li> <li>Read Tags</li> <li>Communication</li> </ul>
Change Password         Certificates           GPIO         Reader Network in Address - 107.250.206.202         Certificates           GPIO         Reader Serial Number : 13219010500509         Inventory and Read           Applications         USB Port Status : Project Connected         SNMP           Profiles         USB Port Status : Project Connected         SNMP           * Commit/Discarc         Connected USB Devices Information         Basic Connected USB Devices Information           * system Log         Connected USB Devices Information         Basic Connected USB Devices Information           Diagnostics         GPIO Settings         Change Password           Diagnostics         Utilities Utilities LAN Adapter         User Connected USB Devices Information		General Reader Configuration Read Point Configuration Advanced Antenna Configuration Region Configuration	FX7500060C17	Reader Host Name :		Date Time IP Sec
Applications     LLRP       Profiles     USB Port Status :     Device Connected     ShMP-       Virreless     Services     Services       * Commit/Discard     Date and Time Settings       * System Log     Change Password       Diagnostics     OPIO Settings       Envices     User Application Dedocrander		Certificates Inventory and Read Tags Communication Settings	13219010500509	Reader Serial Number :		Change Password GPIO
*Commit/Discard     Date and Time Settings       ▶ System Log     IPSec Settings       Diagnostics     OPIO Settings       Fourthere     Wireless LAN Adapter		LLRP <u>SNMP</u> <u>Wireless</u> Services	Device Connected	USB Port Status :		Profiles Firmware
Diagnostics OrrOsanna Wireless LAN Adapter User Analkadion Deskorment		Date and Time Settings <u>IPSec Settings</u> <u>Change Password</u> OPIO Settinger		ected USB Devices Information	d	*Commit/Discar ▶ System Log
shutuowii mialade i romes ora intereade Firmware Version Information		User Application Deployment Manage Profiles on the reader Firmware Version Information		Wireless LAN Adapter		Diagnostics Shutdown
Logout Model : RTL8187_Wireless_LAN_Adapter Einnware Update Vendor : Manufacturer_Realtek_RTL8187_ SerialNumber : Manufacturer_Realtek_RTL8187_ Wireless_LAN_Adapter_000A5224C441 Diagonatics Shut Down Error Messages Third Party Software		Commit/Revert Commit/Revert System Log Diagnostics Shut Down Error Messages Third Party Software	_LAN_Adapter iek_RTL8187_ iek_RTL8187_ pter_000A5224C441	Model : RTLB187_Wireless_ Vendor : Manufacturer_Realt SerialNumber : Manufacturer_Pealt Wireless_LAN_Adar		Logout
	~				~	

Figure D-9 Bluetooth Dongle Connected

3. Select Communication > Bluetooth.

4. Change the Discoverable and Pairable properties to On.

Home	Reader Communication Parameters	Communication Settings	
Operation Statistics     Configure Reader	Configure Network Settings		
<ul> <li>Configure Reader Read Tags</li> <li>Communication LLRP</li> <li>SMMP</li> <li>Wrieless</li> <li>Date Time</li> <li>IP Sec</li> <li>Change Password</li> <li>GPI0</li> <li>Applications</li> <li>Profiles</li> <li>Firmware</li> <li>Commit/Discard</li> <li>System Log</li> <li>Shutdown</li> <li>Logost</li> </ul>	Configure Network Settings  Ethemet Wr-Fi Bluetooth  IPV4 Obtain IPV4 Address via DHCP: on  Current IPV4 address IPV4 Subnet Mask: IPV4 Subnet Mask: IPV4 ONS Server: MAC Address: Discoverable: On  Pairable: On  Pairable: On  Pairable: On  Set Properties	<ul> <li>Network</li> <li>The reader supports both automatic TCPIP configuration the function of an annual configuration. The first button hums DHCP on or all configuration. The first button hums DHCP on or all configuration. The first button hums DHCP on or all configuration. The first button hums DHCP on or all configuration. The first button hums DHCP on or all configuration. The first button hums DHCP on or all configuration. The first button hums DHCP on or all configuration. The first button hums DHCP on or all configuration that be changed manuals.</li> <li>DTCPC PI is turned on, actual current values of the reader of the set button hum and the page. Since all configuration of the set button hums DHCP on or all configuration of the set button hums DHCP on or all configuration.</li> <li>Pinder Steff (no dDted notation) appropriate for the fiber of the set button hum reader readers in the fiber of the fiber of the fiber of the set of the</li></ul>	
		<ul> <li>Allow LLRP Connection Override (from USB IP). This allows the reader to listen on an alternate port (49152) on the virtual Network (over USB) interface. When an LLRP client is connected over the primary interface (Ethernet and primary LLRP port) it is possible for a different client to override this connection on the alternate interface (Virtual Network and alternate port 49152) (this option is enabled. The reverse overriding of connection from a primary interface over existing</li> </ul>	

Figure D-10 Changing Discoverable and Pairable Properties

- Optionally select Use Passkey and enter a passkey to validate the Bluetooth connection. The default passkey for the FX7500 is 0000.
- 6. Discover the reader from a Bluetooth-enabled device (such as a laptop). Use the host name to identify the reader among the discovered devices (e.g., FX7500060C17).
- After a successful connection, right-click the reader icon (e.g., FX7500060C17) in the list of Bluetooth devices and select Connect using > Ad hoc network. This establishes the network connection for later.

🗩 🖉 - 🛃 - Ca	ontrol Panel 🕨 Hardware ar	d Sound 🕨 Devices and Printers	Bluetooth Devices	<b>▼</b> 49	Search Devices and Prin
Add a device A	dd a printer Connect u	sing 🔻 Remove device			
Devices (2)					
FX7500060C17	Connect using	Ad hoc network			
	Create shortcut		-		
	Troubleshoot				
	Remove device				
	Properties				

Figure D-11 Connecting to the Reader
8. The IP address assigned to the Bluetooth interface is 192.168.XX.XX. The last 2 octets are the last 2 octets of the Bluetooth MAC address (found in the Properties window on the PC once the Bluetooth connection is established). Also find this in the Communication > Bluetooth page. Both IPV4 and IPV6 based IP address are supported for adhoc Bluetooth connection between the reader and the client.

Home	Reader Communication Parameters	Communication Settings
<ul> <li>&gt; Operation Statistics</li> <li>&gt; Configure Reader</li> <li>Read Tags</li> <li>&gt; Communication</li> </ul>	Configure Network Settings Ethemet Wi-Fi Bluetooth	Bluetooth The reader supports only automatic IP configuration of Bluetooth interface.
LLRP SHMP Wirreless Services Date Time P Sec Change Password SPO Applications Profiles Firmware Commit/Discard System Log Diagnostice Shutdown Logout	IPA         Current IPV4 address:         192.168.67.21           IPV6         IPV4 Subnet Mask:         255.25.0           MAC Address:         00.02.72.38.43.15           Discoverable:         On •           Pairable:         On •           Use PassKey:         IPV4 Babet Address:           DHCP start address:         192.168.0.2           DHCP end address:         192.168.0.3	<ul> <li>The reserve Trive space is the approximate and Problem Linking and the approximate and Problem Linking and the approximate approximate and the approximate approx</li></ul>

Figure D-12 Communication Bluetooth Tab

**9.** Open the web page or sample application to connect to the Bluetooth IP (192.168.67.21 in *Figure D-12*) and read tags.

# APPENDIX E COPYING FILES TO AND FROM THE READER

#### Introduction

The FX7500 reader supports the SCP, FTP, and FTPS protocols for copying files.

#### SCP

The following examples illustrate SCP use:

scp SourceFileName rfidadm@MyReaderIP:/apps scp rfidadm@MyReaderIP:/apps/SourceFileName userid@MyLinuxMachineIP:/MyFolderName

#### FTP

The following examples illustrate FTP use:

ftp> open To 157.235.207.146 Connected to 157.235.207.146. 220 Welcome to Thredbo FTP service. User (157.235.207.146:(none)): rfidadm 331 Please specify the password. Password: 230 Login successful. ftp>

Use FTP commands such as **is**, **get**, and **put** to manage files. For more information on FTP commands refer to http://www.cs.colostate.edu/helpdocs/ftp.html. GUI applications such as **FileZilla** are also supported on Windows and Linux machines to connect to the FX7500.

# FTPS

Use any standard GUI tool such as FileZilla to connect to the FX7500 reader over FTPS.

# **APPENDIX F DATA PROTECTION**

#### Introduction

The FX7500 stores data in transition when it detects a network condition that prevents the reader from sending data. This applies to RFID tag data that the reader application is transmitting to the outbound TCP socket, and is no longer owned by the RFID application because it was sent to the network layer for transmission.

When the reader cannot queue RFID data in the outbound TCP socket when an LLRP connection is already established, it stores all outbound LLRP messages in the data protection queue. The queue can store up to 66,000 messages, which represents more than 5 minutes worth of data when reading 200 tags/second (the nominal data rate in DRM (dense reader mode) configuration). If the network is still unavailable when the data protection queue is full, the oldest messages are discarded to accommodate the most recent tag reports.

This feature can not be disabled and operates regardless of the physical network interface used, meaning RFID data over WiFi and Bluetooth is also protected.

# **INDEX**

#### Numerics

10/100BaseT	Ethernet	1-2, 2-5
2-port reader		2-4
4-port reader		2-4

### A

administrator console	4-1
applications 4	-45
committing changes 4	-50
communication settings 4	-32
configure network services	-39
configure network settings 4-32, 4-34, 4	-35
configuring system log 4	-52
discarding changes 4	-50
firmware version	-49
GPIO	-44
IPV6 sec 4	-41
login	4-6
main screen	4-9
managing login 4	-43
reader diagnostics 4	-53
reader profiles 4	-46
scan control1-6, 4	-31
set password 4	-42
setting date and time 4	-40
shutting down 4	-54
status 4	-10
system log 4	-51
air link	C-1
antennas	2-2
configuring 4	-18
installing	3-4
ports	2-5
applications 4	-45

#### В

backup	2-7
bluetooth	D-5
connecting	D-5

# C

cable pinoutsA-4
ethernetA-4
GPIO
USB
USB clientA-5
USB hostA-5
chapter descriptions
client applications
commit region change
committing changes 4-50
communication
ethernet wired 3-5
communication settings 4-32
configurations
configure
administrator console
antenna 4-18
LLRP 4-36
read points 4-17 4-19
reader 4-16
region 4-20
SNMP 4-37
static IP B-1
static IP via web console B-1 B-3
wireless 4-38
configuring network
bluetooth 4-35
ethernet 4-32
361 1063

wi-fi	4-34
to reader	4-3
via bluetoeth	
	D-5
via host name	
via IP address	
via wi-fi	D-1
connection	
antennas	3-4
communication	3-5
nort diagram	
ports	
powering	
wired ethernet	
conventions	
notational	vi
	Г 1
copying mes	E-I
country list	

# D

data protection	. F-1
date	4-40
deployments	. 4-2
discarding changes	4-50

# Ε

ethernet	
Bias-T port connection	-6
pinouts A-	4
POE	-5
port	-5
setup	-5
wired	-5
event management, tags 2-	-7
event statistics 4-1	4

# F

files
copying E-1
filtering, tags 2-7
firmware
updating 2-7
version
firmware update
prerequisites 7-1
first time login
FTP
copying files E-1
FTPS
copying files E-2

#### G

GPIO	 	 	 	1-2, 2-5
pinouts	 	 	 	A-6
port	 	 	 	2-5
GPIO control .	 	 	 	4-44

#### Η

host communication	
ethernet, wired	3-5
host name connect	1-2

#### I

information, servicexii
initiating reads
installation
antennas
communication connection
mounting
powering
IP address
IP ping

# K

kill tag	 
kits	 2-4, A-1

# L

.EDs	6
LRP	7
configure	6
radio modesC-1, C-	3
ock tag	7
og	1
configuring	2
ogging	7
ogin	6
first time	6
managing4-4	3

#### Μ

mono-static	2-4
mounting	3-2
mounting plate	3-2
multiple reader deployments	4-2

#### Ν

NXP	
statistics	 4-13, 4-15

# 0

obtain reader IP address .		1-5
----------------------------	--	-----

#### Ρ

Password 1-3, 7-3, 7-9
password
changing 4-42
pinouts A-4
ethernet A-4
GPIO
USB A-5
USB client A-5
USB host A-5
POE
ports 2-4
descriptions 2-5
ethernet
power
AC power supply 3-10
applying 3-10
options
POE
port
profiles 4-46

# R

read points
reader
configuration 4-16
configurationsix
connecting 4-3
description 2-2
GEN2 statistics 4-12
kits 2-4 A-1
nrofiles 4-46
statistics 4 11
event 4-14
NXP
status 4-10
versions
reading tags
initiating 1-6 4-31
rear nanel 1.2.2.5
leal parlet
repoot
recovery
region

region configuration
region control
region setting
region settings 1-4
reset
RFID
FX reader
overview
RFID components
antennas
readers
tags
RJ45

# S

#### SCP

copying files E-1
service informationxi
set region 1-4, 4-7
setting date
setting time
setup
POE
power supply 3-10
wired ethernet
wired ethernet AC outlet
wired ethernet, power-over
shutdown
SNMP
configure 4-37
software update
specifications
start-up
static IP configurationB-1
via web console B-1, B-3
Statistics
statistics
event
GEN2
NXP
status
system log
configuring
system time

# Т

tags	2-2
management	2-7
reading	3-12, 4-31
technical specifications	A-2
time	4-40
troubleshooting	8-1

# U

unpacking	3-1
updating firmware 2-7, 4-48, 4-49,	7-3
prerequisites	7-1
updating software	7-3
USB 1-2, 2-5,	7-4
client pinouts	A-5
host pinouts	A-5
pinouts	A-5
user ID	4-6
user name 1-3, 7-3,	7-9
user password	4-6

#### V

version control																							.4-4	8.	4-4	49
	•••	•	•	•	•	•	•	•	•	•	•	•	•	•	•••	•	•	•	•	•	•	•	••••	٠,	•	

#### W

wi-fi																															D	)_1	1
connecting																															D	)_1	1
wired ethernet wireless	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	3	-5	5
configure . write tag	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		4	1-; 2	38 ?-7	3

# Ζ

zero-configuration	networking		4-5
--------------------	------------	--	-----



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