FX Series RFID Readers

Integrator Guide

FX Series RFID Readers
Integrator Guide

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Motorola, Inc.
One Motorola Plaza
Holtsville, New York 11742-1300
http://www.motorola.com/enterprisemobility

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Warranty

For the complete Motorola hardware product warranty statement, go to: http://www.motorola.com/enterprisemobility/warranty.

Revision History

Changes to the original manual are listed below:

Change	Date	Description
-01 Rev .1	06/2009	Beta release
-01 Rev .2	08/2009	Reviewer updates

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About This Guide

Introduction

This Integrator Guide provides information about installing, configuring, and using the FX Series RFID readers and is intended for use by professional installers and system integrators. The FX Series 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 FX Series RFID reader configurations:

- FX7400-2 RFID Reader
- FX7400-4 RFID Reader

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 FX Series reader and the features.
- *Chapter 3, Installation and Communication* provides information on installing and setting up the FX Series 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 FX Series readers.
- *Chapter 5, Setup Examples* provides sample setups and describes how to apply these to a user installation.
- *Chapter 6, Troubleshooting* describes FX Series readers troubleshooting procedures.
- *Appendix A, Technical Specifications* includes the technical specifications for the reader.
- *Appendix B, Firmware Upgrade Procedures* describes how to upgrade the reader with new firmware.
- *Appendix C, Java Upgrade Procedures* describes how to upgrade the host computer with a new Java update.
- *Appendix D, Static IP Configuration* describes three methods of setting the static IP address on an FX7400 RFID Reader.

Notational Conventions

The following conventions are used in this document:

- “RFID reader” or “reader” refers to the Motorola FX Series 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.

- *FX Series RFID Reader Regulatory Guide, p/n 72-125267-xx*
- *Application Guide for Motorola Enterprise* Mobility Devices, p/n 72E-68902-xx

For the latest version of this guide and all guides, go to: http://www.motorola.com/enterprisemobility/manuals.

Service Information

If you have a problem with your equipment, contact Motorola Enterprise Mobility support for your region. Contact information is available at: http://www.motorola.com/enterprisemobility/contactsupport.

When contacting Enterprise Mobility support, please have the following information available:

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

Motorola responds to calls by e-mail, telephone or fax within the time limits set forth in service agreements.

If your problem cannot be solved by Motorola Enterprise Mobility Support, you may need to return your equipment for servicing and will be given specific directions. Motorola 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 Enterprise Mobility business product from a Motorola business partner, please 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, Host Name Connect 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 1-7*

Step 1, Setup

1. Unpack the reader. See *Unpack 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 AC power supply to a power outlet and connect to the power port. See *Figure 1-1.*
5. Wait for the green power LED to stay lit. See *System Start-up/Boot LED Sequence on page 3-5* for boot-up details.
6. 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.

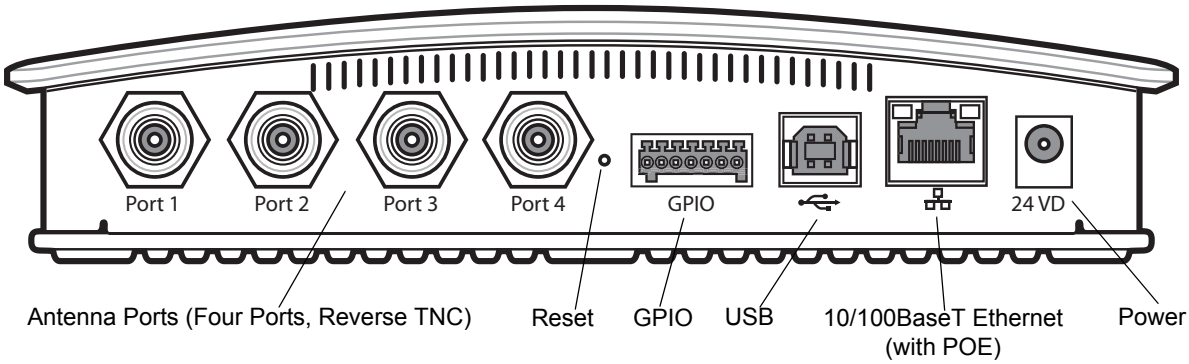

Figure 1-1 *FX Series RFID Reader Rear Panel Connections*

Step 2, Host Name Connect

The product CD provides the Host Name. Connect the reader to the local network and boot it up. See *System Start-up/Boot LED Sequence on page 3-5*. The green power LED indicates that the reader is ready.

1. Open a browser. Recommended browsers are IE 6 or Mozilla 3.
2. Enter the host name provided on the CD in the browser (e.g., http://fx7400cd3b0d) and press **Enter**.
3. The **Console Login** window appears and the reader is ready.
4. Proceed to *Step 3, First Time / Start-Up Login on page 1-3* 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 hostnames through DHCP. When first connecting to the reader, it is recommended to keep DHCP enabled, although it is not guaranteed that hostname will work in this case. Use the host name provided on the CD label, or construct it using the reader MAC address on the reader back label. The host name is a string with prefix FX7400, followed by the last three MAC address octets. For example, for a MAC address of 00:15:70:CD:3B:0D, use the prefix FX7400, followed by the last three MAC address octets (CD, 3B, and 0D), so the host name is FX7400CD3B0D. Type http://FX7400CD3B0D in the browser address bar to access the reader.

Step 3, First Time / Start-Up Login

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

Set the Unique User ID and Password

1. Connect to the reader using a web browser. See *Step 2, Host Name Connect on page 1-2*. The **Default Settings, Console Login Window** appears.

Figure 1-2 *Default Settings, Console Login Window*

2. Enter **admin1** in the **User Name:** field and enter **change** in the **Password:** field. Click **Login**.

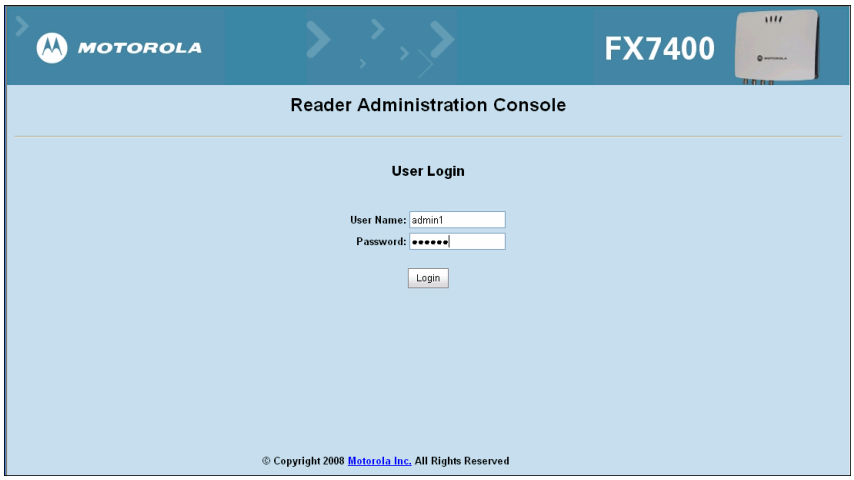

Figure 1-3 *Enter Default Settings, Console Login Window*

NOTE Entering the unique user ID and password disables the factory default settings. Contact Motorola Enterprise Mobility support if you forget the user ID and password. See *Service Information on page xi*.

3. From the **Administrator Console**, select **Configure Reader and Region**.

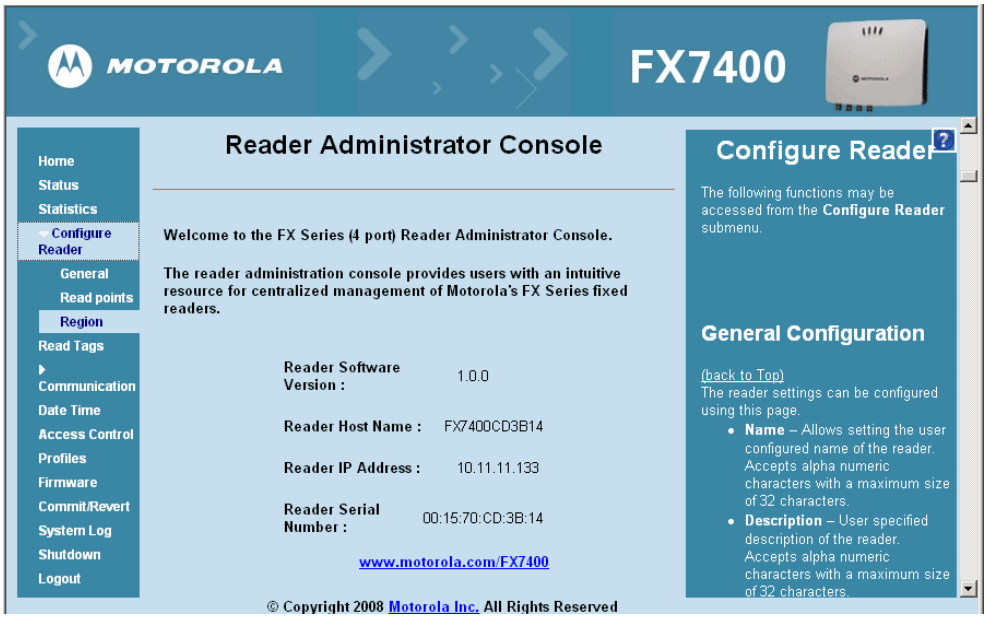

Figure 1-4 *Reader Administrator Console Main Menu*

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.

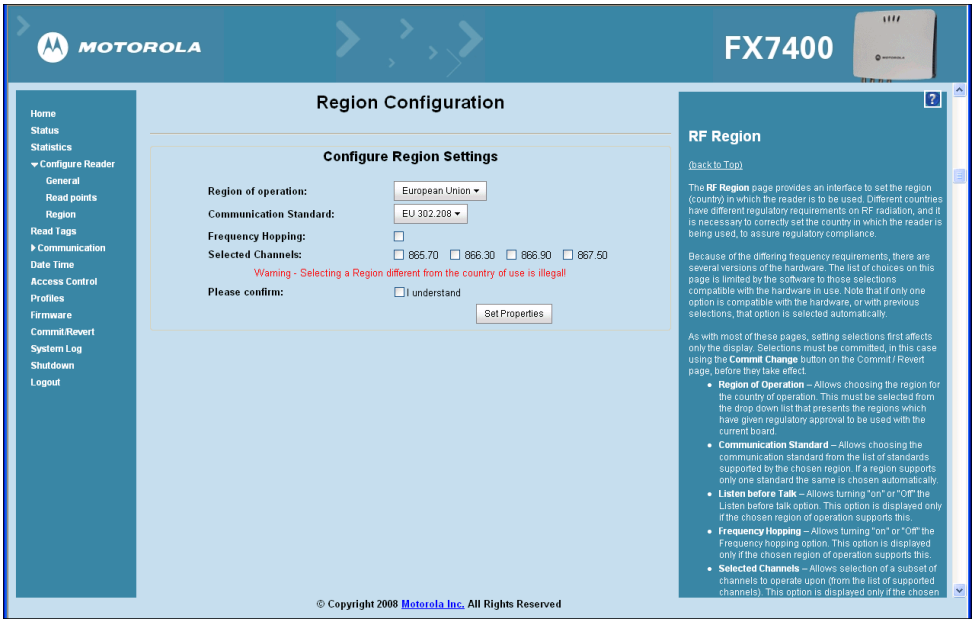

Figure 1-5 *Configure Region Settings Window*

1. In the **Region Configuration** window, select the region from the drop-down menu.

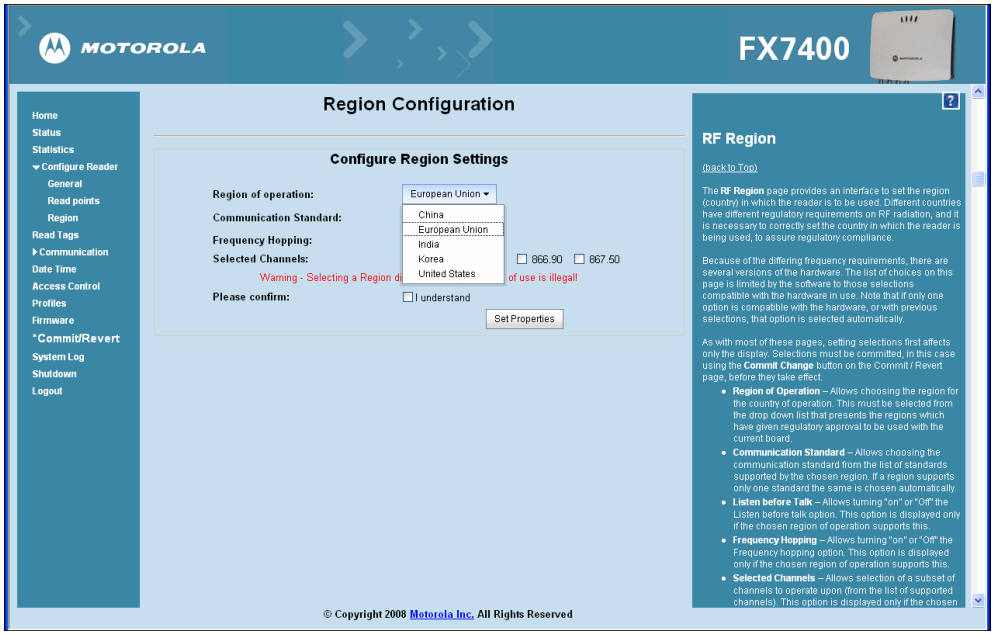

Figure 1-6 *Selecting the Region*

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.

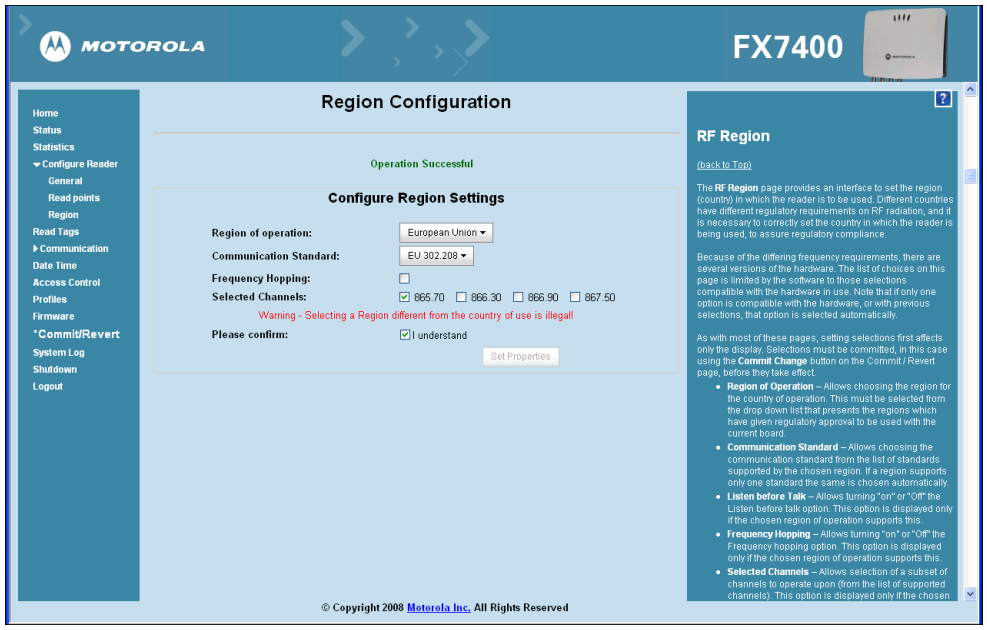

Figure 1-7 *Region Control, Operation Successful Window*

7. From the **Reader Administrator Console** (see *Figure 1-4 on page 1-4*) select **Commit/Revert**.

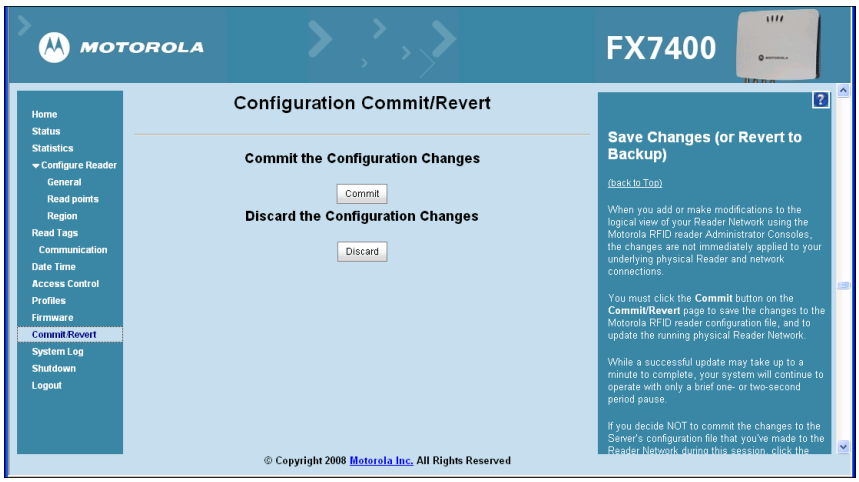

Figure 1-8 *Commit/Revert Window*

8. Click **Discard** to discard the region configuration changes made during this session, or click **Commit** to save the new region configuration and apply these changes to the reader configuration file.

9. When the commit completes, the **Commit Successful** window appears.

Step 5, Read Tags

Click **Start Inventory** on the **Reader Operation** window to initiate an on-demand scan and/or to enable or disable polled read points.

NOTE Enable JVM support on the browser for this page to function properly. See Appendix C, Java Upgrade Procedures.

The polling state displays the current polling setting - **Enabled** or **Disabled**. If enabled from the **Administrator Console**, this displays **Polling State: Enabled from Web**. If enabled from byte stream, this displays **Polling State: Enabled from byte stream**.

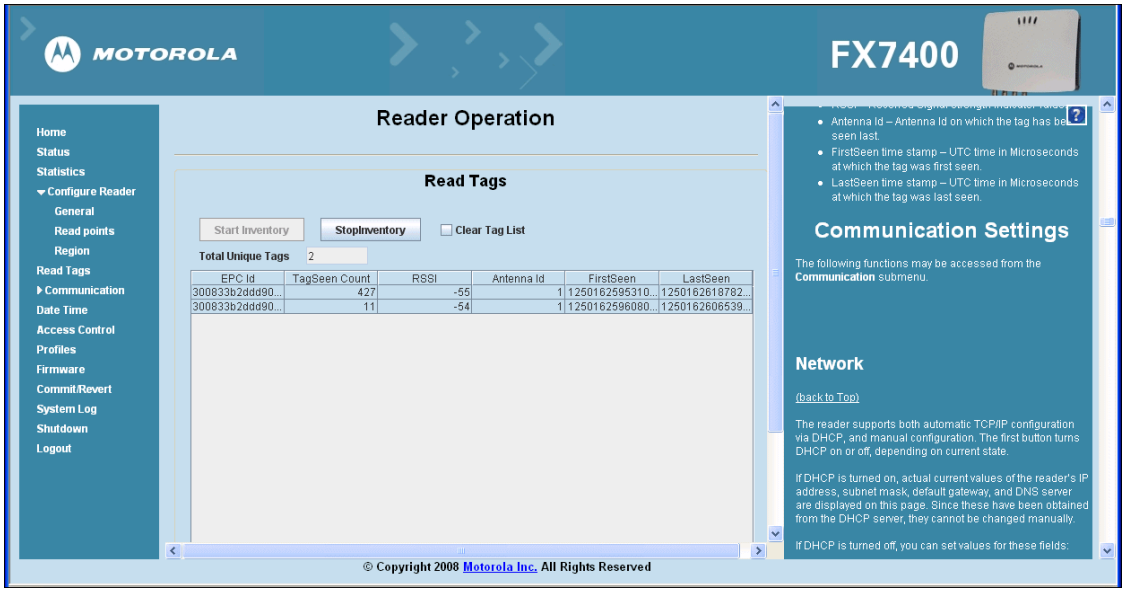

Figure 1-9*Read Tags Window*

- Click **Start Inventory** to start inventory operation on the connected antennas.
- Click **Stop Inventory** to stop the ongoing 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 FX Series 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.

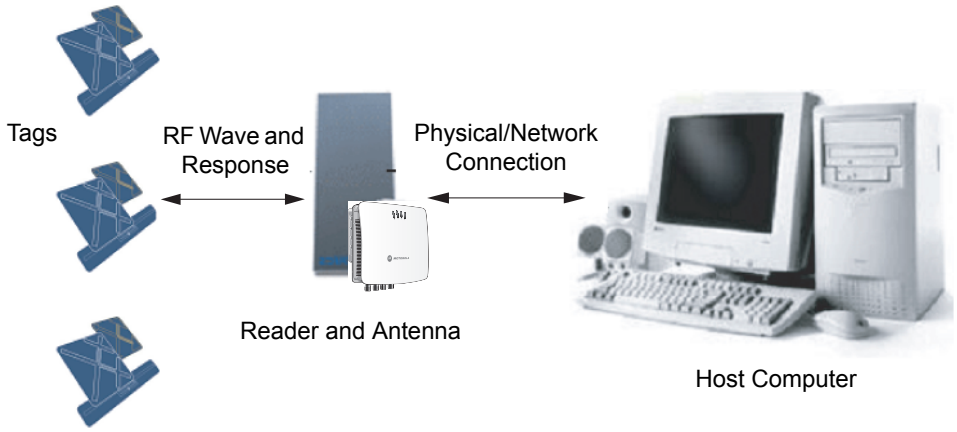

Figure 2-1 *RFID System Elements*

RFID Components

Motorola RFID solutions 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 Motorola 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), 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 transfer the data to a host computer. Readers also provide features such as filtering, CRC check, and tag writing. The FX Series readers read Gen2 (dense reader mode) RFID tags.

FX Series RFID Readers

The Motorola FX Series RFID readers are intelligent, C1G2 UHF RFID readers with RFID read performance that provides real-time, seamless EPC-compliant tags processing. The FX Series 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.

The FX Series RFID readers are based on Motorola's strategic FX Series 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 capable
- Cost-effective
- Enterprise-class performance
- Application-specific set-up for ease of installation
- Power over Ethernet (POE) to eliminate the need for a power drop
- SSL/SSH based security for secure data transmission
- Attractive small package
- Low total cost of ownership (TCO)
- Windows® CE
- Support for custom or third-party applications
- Feature set for event and tag management

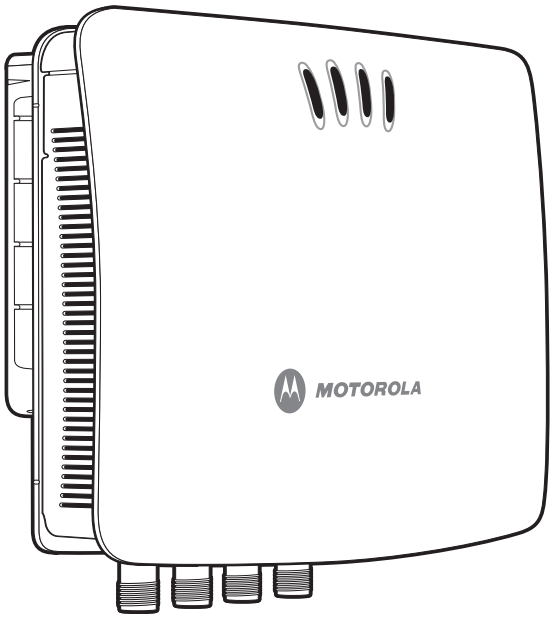

Figure 2-2 *FX RFID Reader*

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

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

Versions and Kits

The FX Series RFID readers are available in either a 2-port or a 4-port version, individually (reader and mounting bracket) or in a kit that includes the reader, the mounting bracket, an antenna and a power supply:

- 2-Port reader, mounting bracket
- 2-Port kit (reader, mounting bracket, antenna, cable, PSU)
- 4-Port reader, mounting bracket
- 4-Port kit (reader, mounting bracket, antenna, cable, PSU)

FX Series RFID Reader

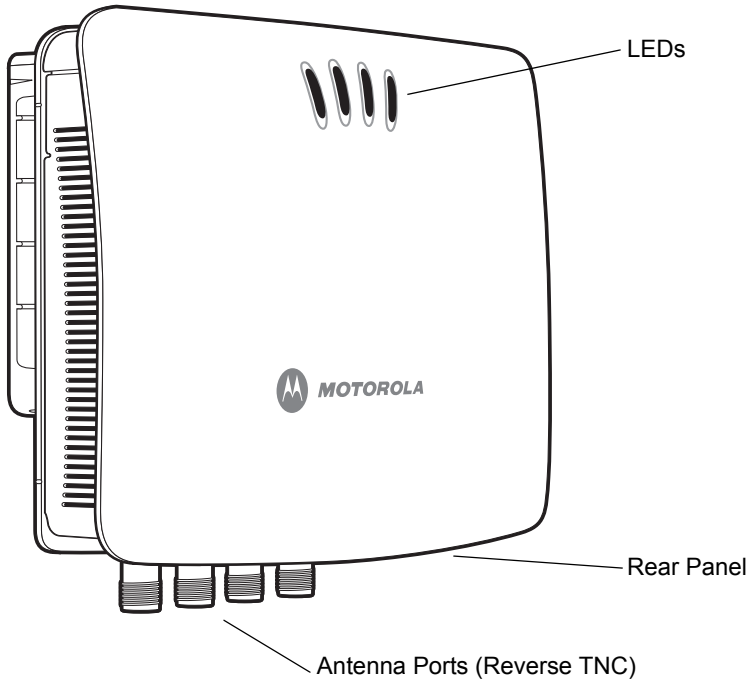

Figure 2-3 *FX Series RFID Reader*

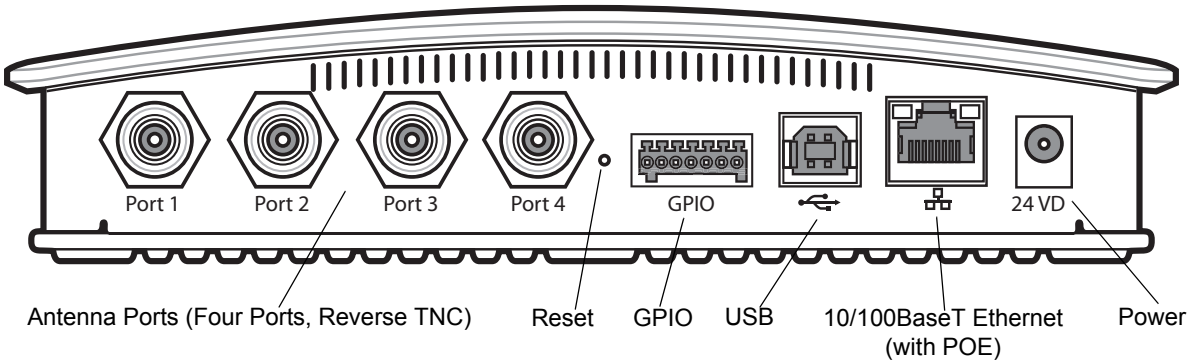

Figure 2-4 *FX Series RFID Reader Rear Panel Connections*

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

FX Series RFID Readers Rear Panel

Table 2-1 *FX Series RFID Readers Rear Panel Description*

Port	Description
Antenna Ports (Reverse TNC)	Two port version: Connect up to two antennas. Four port version: Connect up to four antennas. See *Table A-1 on page A-1* for the maximum antenna gains and RF output powers for both US/Canada and EU.
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	Insert a DE15 serial cable to connect to external devices.
USB	ActiveSync is enabled by default on the USB client port. Use Visual Studio to use the USB port for development. Use a remote display tool to access the Windows CE graphical interface. Advanced users can disable and enable ActiveSync via a registry change in Windows CE, and can create a custom communication protocol on the USB port.
10/100BaseT Ethernet	Insert a standard RJ45 Ethernet cable to connect to an Ethernet network with or without POE capability. Insert a cross-connect Ethernet cable to connect to a local computer.
Power	DC connector connects to a Motorola approved power supply AC adapter (varies depending on the country). Maximum power 24 VDC, 1.2 A.

FX Series 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 3-5*.

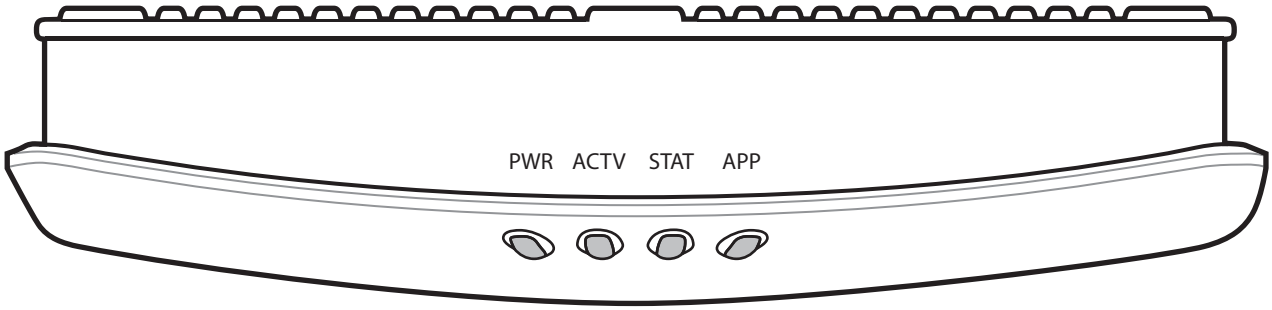

Figure 2-5 *FX Series RFID Readers LEDs*

Table 2-2 *LED Indications*

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

FX Series RFID Readers 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 4-18*. Use client applications based on Showcase II, Motorola EMDK (Enterprise Mobility Development Kit), 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 the SNMP server.

Security

User Level Security

Use this feature to assign different access levels to users, allowing them to perform necessary tasks without compromising security. The reader recognizes three user access levels:

- **View** - view reader configuration settings.
- **Admin** - view and edit configuration settings and perform administrative tasks such as updating reader firmware.

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 4-32*.

Dense Reader Mode

The Gen 2 (or Class 1 G2) Dense Reader Mode allows the reader operate in a range of environments where multiple readers operate simultaneously, where few readers operate, or just one reader operates.

Connection Options

The reader provides flexibility for connecting to networks with an Ethernet connection. Access each reader from anywhere on the network with the unique host name or IP address. See *Connect to the Reader on page 4-3*.

Physical Interfaces

At the physical layer, the FX Series readers use an Ethernet interface (as the default) for command and data communication with the reader.

The USB port enables ActiveSync on the USB client port by default. Use the USB port for development using Visual Studio, and use a remote display tool to access the Windows CE graphical interface.

Advanced users can disable and enable ActiveSync via a registry change in Windows CE, and can create a custom communication protocol on the USB port.

Chapter 3 Installation and Communication

Introduction

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

- *Unpack the Reader on page 3-1*
- *Installation on page 3-2*
  - *Mounting and Removing the Reader on page 3-2*
  - *Connecting Antennas on page 3-4*
  - *Powering the Reader on page 3-5*
  - *Verifying Hardware Functionality on page 3-5*
- *Communications Connections on page 3-6*
  - *Ethernet Connection on page 3-6*
  - *USB Connection on page 3-7*

Unpack 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.

Installation

CAUTION The FX Series RFID readers must be professionally installed.

The FX Series reader has several installation options, including installation with or without the mounting plate, and/or powering either using the AC power supply or POE.

Mounting Tips provides recommendations on locating the reader with respect to environmental conditions and utilities locations. *Mounting and Removing the Reader on page 3-2* provides detailed mounting procedures. Mount the reader with and without the provided mounting plate, however Motorola recommends using the mounting plate whenever possible.

Connecting Antennas on page 3-4 describes how to connect the antennas. *Mounting Tips on page 3-2* also provides information on locating the antennas with regard to the reader.

Powering the Reader on page 3-5 and *AC Power Supply on page 3-5* provide information on reader power options and *Verifying Hardware Functionality on page 3-5* provides a checkout to verify reader functionality.

The *Communications Connections on page 3-6* provide communications information for the reader.

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 FX Series 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

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.

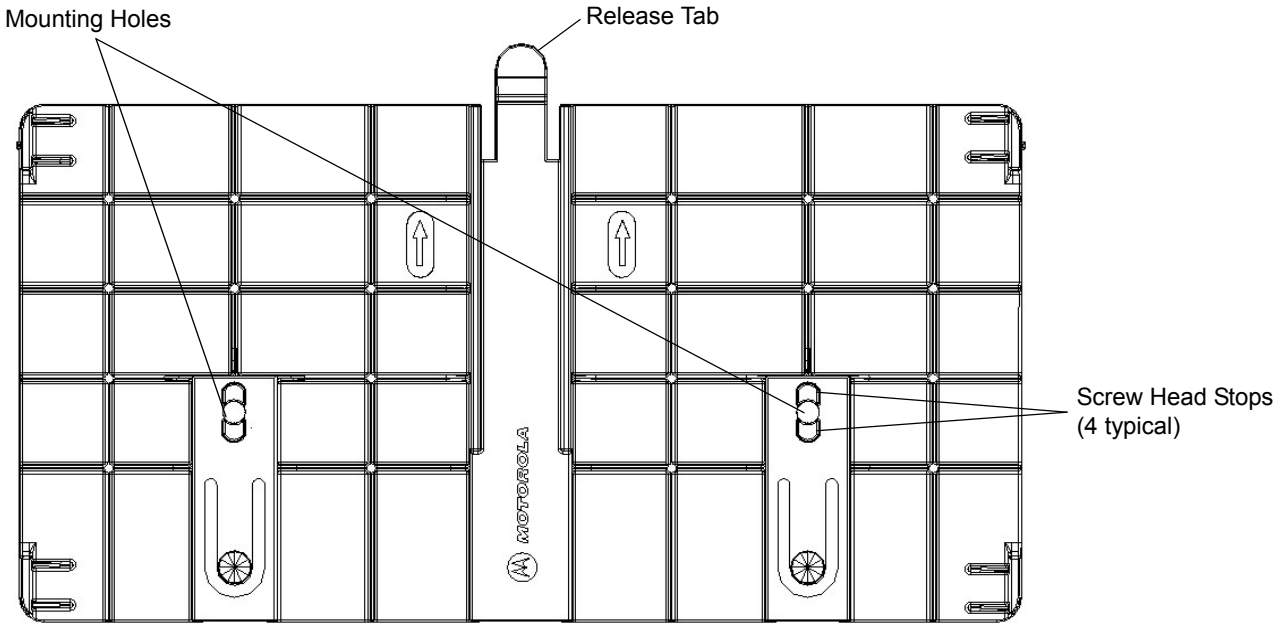

Figure 3-1 *Mounting Plate, Front*

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.

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.

4. Position the reader by aligning the markers on the metal base plate and the wall bracket, positioning the key-slot holes over the mounting screws. Gently slide the reader down (see *Figure 3-1*) 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 result in a read performance issue 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”.
2. 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 antennas and all persons.**

CAUTION Power off the reader before connecting antennas. See *Powering the Reader on page 3-5*. Never disconnect the antennas while the reader is powered on or reading tags. This can damage the reader.

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

CAUTION Maximum antenna gain (including any cable loss) cannot exceed 6 dBiL.

CAUTION For installations where the antennas are mounted externally to the building, the screen of the coaxial cable must be connected to earth (grounded) at the entrance to the building. This should be done 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.

Table 3-1 *Antenna Gain and Radiated Power*

FX Series	US	EU
Max Conducted RF Power	+ 30dBm	+29.2dBm
Max Antenna Gain Allowed (including cable loss)	+ 6dBiL	+ 6dBiL
Max Radiated Power Allowed	4W EIRP	2W ERP

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

1. Attach the antenna reverse TNC connector to an antenna port.
2. Repeat Step 1 to connect the remaining antennas to the reader.
3. Secure the cable using wire ties. Do not bend the cable.

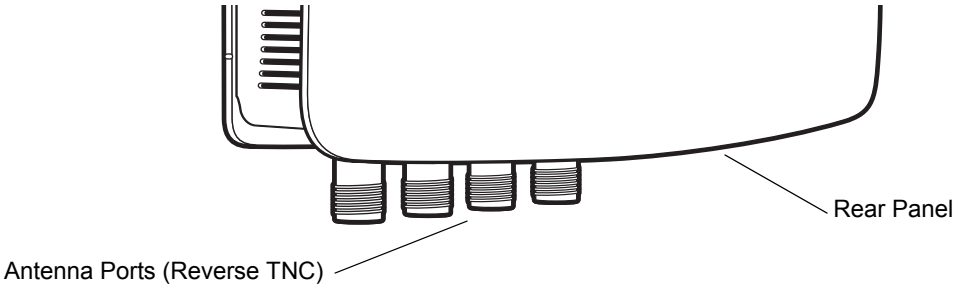

Figure 3-2 *FX Series RFID Reader Antenna Connection*

Powering the Reader

CAUTION Connect the antennas before supplying power to the reader.

To power the reader:

1. Insert either the POE Ethernet connector or the power supply barrel connector into the appropriate reader power (see *Figure 2-4 on page 2-5*). Rotate the power supply barrel connector to lock the connector 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 3-5*.

To power down the reader:

1. Unplug the power supply from its power source to remove power. The green Power LED turns off to indicate that the device is off and the system is not operational.
2. Remove the connector from the reader power port.

AC Power Supply

The Motorola approved AC power supply connects to the power port on the FX Series 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).

Verifying Hardware Functionality

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 green.
2. All LEDs turn off and the PWR LED turns red.
3. The PWR LED turns off and then turns green.
4. When the sequence completes the green PWR LED remains on and all other LEDs are off.

Communications Connections

Use a standard Ethernet connection or a POE Ethernet connection to connect the FX Series 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 FX Series reader using either the reader Motorola AC power supply, or by Power-Over-Ethernet through the Ethernet cable.

Ethernet: Power through AC Outlet

The FX Series reader communicates to the host through a 10/100Base-T Ethernet cable and receives power through a Motorola 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-3*.
4. Connect the Ethernet cable to the LAN port on the FX Series 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 Motorola AC power supply to a wall outlet.
7. Insert the power supply barrel connector into the FX Series reader power port. See *Figure 2-4 on page 2-5*.
8. Verify that the unit booted properly and is operational. See *Verifying Hardware Functionality on page 3-5*.
9. On a networked computer, open an internet browser and connect to the reader. See *Connect to the Reader on page 4-3*.
10. Log in to the **Administrator Console**. See *Administrator Console Login on page 4-8*.

Ethernet: Power through POE

The POE installation option allows the FX Series reader to communicate and receive power on the same 10/100Base-T Ethernet cable. See *Figure 2-4 on page 2-5*.

CAUTION Do not use POE in conjunction with an external power supply connected to the power port on the FX Series reader.

CAUTION Do not connect to PoE networks outside the building.

1. Terminate the Ethernet cable according to *Table A-2 on page A-3*.
2. Connect the Ethernet cable to the FX Series reader Ethernet / Bias-T port. See *Figure 2-4 on page 2-5*.
3. Connect the other end of the Ethernet cable to the Bias-T (POE) module.
4. Connect a patch cable from the Bias-T (POE) module to the host system LAN port.
5. Verify that the unit booted properly and is operational. See *Verifying Hardware Functionality on page 3-5*.

6. On a networked computer, open an internet browser and connect to the reader. See *Connect to the Reader on page 4-3*.
7. Log in to the **Administrator Console**. See *Administrator Console Login on page 4-8*.

USB Connection

The USB port enables ActiveSync on the USB client port by default. Use the USB port for development using Visual Studio, and use a remote display tool to access the Windows CE graphical interface.

Advanced users can disable and enable ActiveSync via a registry change in Windows CE, and can create a custom communication protocol on the USB port.

NOTE The initial release does not expose RFID tag data over the USB client port. Subsequent releases may change the USB default support. The software release notes will announce USB support in the future.

Reading Tags

Read Test

After the reader powers up, test the reader. See *Verifying Hardware Functionality on page 3-5*.

1. Enable tag read using the web-based **Administrator Console**. See *Read Tags on page 4-18*.
2. Control the reader through a real time application such as Showcase II.
3. 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

This chapter describes the FX Series **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 window
- **Primary Information Window** - provides the primary function information
- **Product Identification Header** - identifies the product
- **Help Information Window**:
  - provides detailed information to support the primary information window
  - Use the scroll bar to scroll through information
  - Use the toggle on/off button to turn on/off the help information window

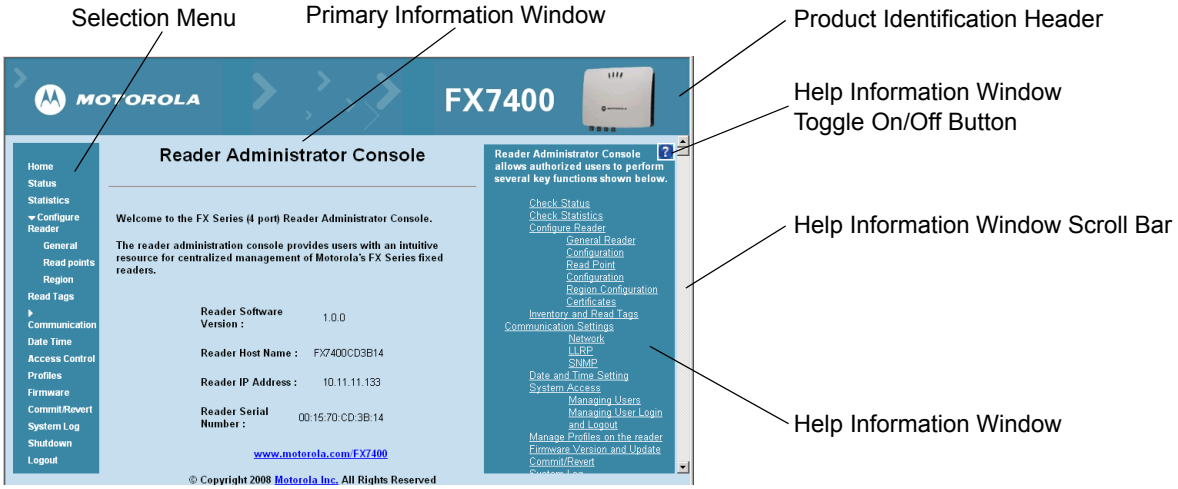

Figure 4-1 *Reader Administrator Console Main Menu*

Managing the FX Series RFID Readers

The reader must be powered up (see *System Start-up/Boot LED Sequence on page 3-5*) and connected to an accessible network. The power LED is green indicating the reader is ready. If the green power LED is not lit, reset the reader. See *Reset Reader on page 4-2*.

The install/startup sequence is:

1. *Installation on page 3-2*
2. *Communications Connections on page 3-6*
3. *Connect to the Reader on page 4-3*
4. *Administrator Console Login on page 4-8*
   a. *First Time / Start-Up Login on page 4-8*
   b. *Normal Login on page 4-11*

NOTE The recommended browsers are IE 6 and Mozilla 3. These browsers have been tested and validated to work properly. Other browsers may or may not work properly.

NOTE The screens and windows are provided for illustration purposes only and may differ from actual screens. 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.

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 4-26*.

Reset 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. This resets the reader and retains the user ID and password. The reader reboots. See *System Start-up/Boot LED Sequence on page 3-5*.

NOTE Hard rebooting the reader (disconnecting power) is not recommended. A hard reboot discards all the tag events and system log information.

Connect to the Reader

When the reader is powered up, connect to the network in one of two ways:

1. *Host Name Connect on page 4-3*
2. *IP Address Connect on page 4-4*

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

1. Using DHCP on the network
2. *APIPA (Automatic Private IP Addressing) on page 4-4*
3. Statically assign an IP

Any method of assigning the IP supports connection using hostname or IP address. Alternatively, connect the reader directly to a local computer using Automatic Private IP Addressing (APIPA). See *APIPA (Automatic Private IP Addressing) on page 4-4*.

NOTE When using APIPA, the FX Series reader cannot communicate with computers on different subnets, or with computers that do not use automatic private IP addressing.

Host Name Connect

The product CD provides the host name. Connect the reader to the local network and boot it up. See *System Start-up/Boot LED Sequence on page 3-5*. The green power LED indicates that the reader is ready.

1. Open a browser. Recommended browsers are IE 6 or Mozilla 3.
2. Enter the host name provided on the CD in the browser (e.g., http://fx7400cd3b0d) and press **Enter**.
3. The **Console Login** window appears and the reader is ready.
4. Proceed to *Administrator Console Login on page 4-8* 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 hostnames through DHCP. When first connecting to the reader, it is recommended to keep DHCP enabled, although it is not guaranteed that hostname will work in this case. Use the host name provided on the CD label, or construct it using the reader MAC address on the reader back label. The host name is a string with prefix FX7400, followed by the last three MAC address octets. For example, for a MAC address of 00:15:70:CD:3B:0D, use the prefix FX7400, followed by the last three MAC address octets (CD, 3B, and 0D), so the host name is FX7400CD3B0D. Type http://FX7400CD3B0D in the browser address bar to access the reader.

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

IP Address Connect

Use the IP address to connect to the reader. Connect the reader to the local network and boot it up. See *System Start-up/Boot LED Sequence on page 3-5*. The green power LED indicates that the reader is ready.

1. Open a browser. Recommended browsers are IE 6 or Mozilla 3.
2. Enter the IP address in the browser (e.g., http://157.235.88.99) and press **Enter**.
3. The **Console Login** window appears and the reader is ready.
4. Proceed to *Administrator Console Login on page 4-8* to login to the reader.

APIPA (Automatic Private IP Addressing)

If a DHCP server is not available, the FX Series readers can use APIPA to automatically provide a unique network IP address. The FX Series readers can then use TCP/IP to communicate with other computers also using an APIPA-generated IP address.

NOTE **APIPA does not function if DHCP is disabled in the reader**. When using APIPA, the FX Series 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. For additional information go to: http://support.microsoft.com/ and search on APIPA

1. Go to **Start** > **Settings** > **Network Connections** > **Local Area Connection Status** and select **Properties**. Set the DHCP to **On** (even though no DHCP server is reachable) and open a browser window.
2. In the **General** tab, select **Internet Protocol (TCP/IP)** and click **Properties**.

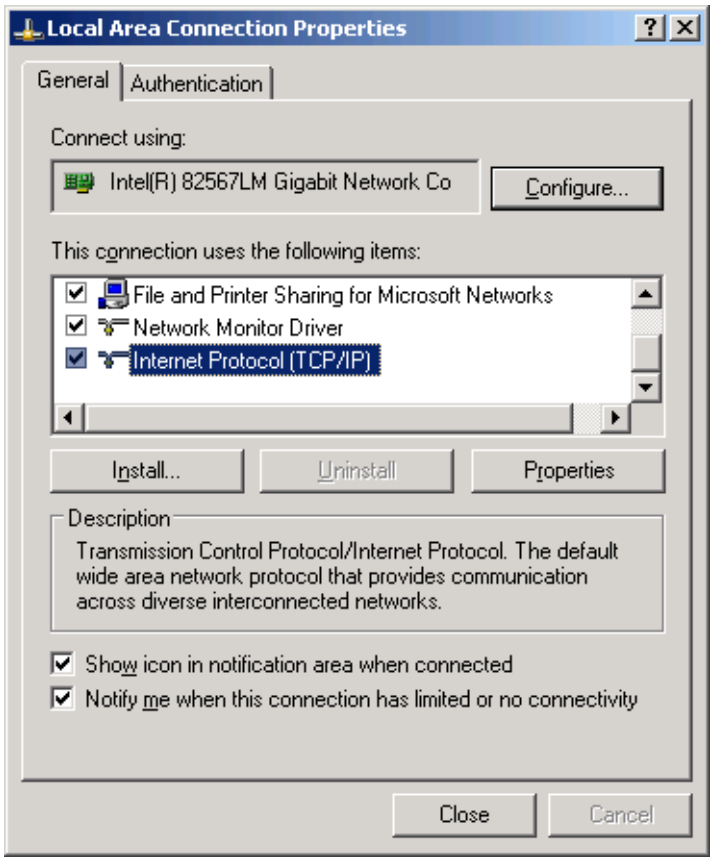

Figure 4-2 *Set Internet Protocol (TCP/IP) Window*

3. Connect the FX Series reader to a local computer using a standard Ethernet cable.

NOTE Do not use an Ethernet crossover cable.

4. In the **Properties** window, select the **General** tab, select **Obtain an IP Address automatically**, and select **Obtain DNS Server address automatically**.

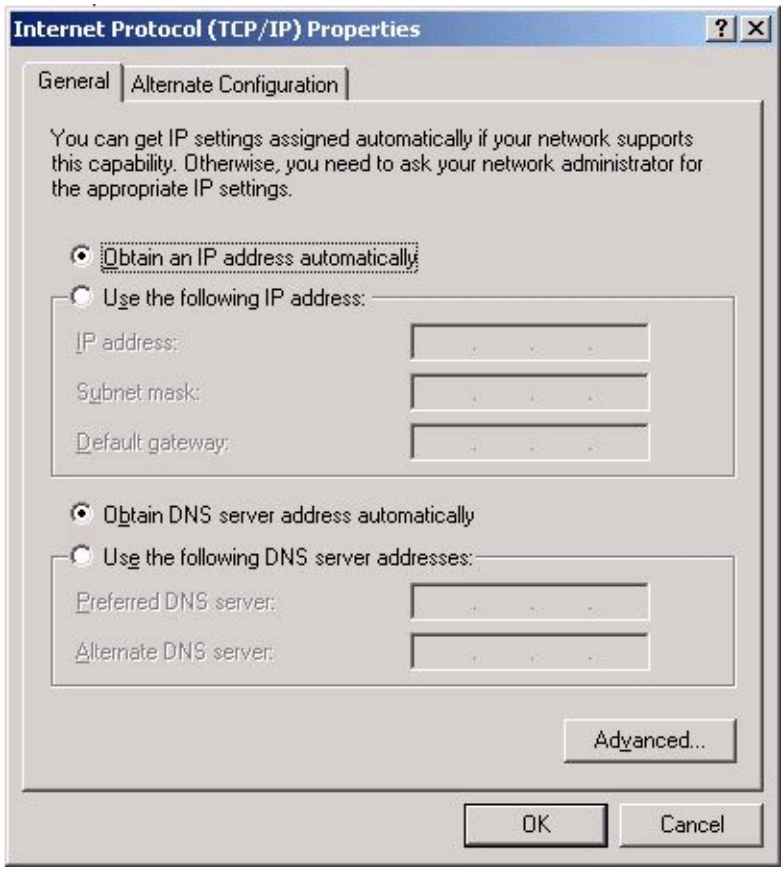

Figure 4-3 *TCP/IP General Properties Window*

5. Confirm that the **Alternate Configuration** tab is set to **Automatic Private IP address** (Windows default).

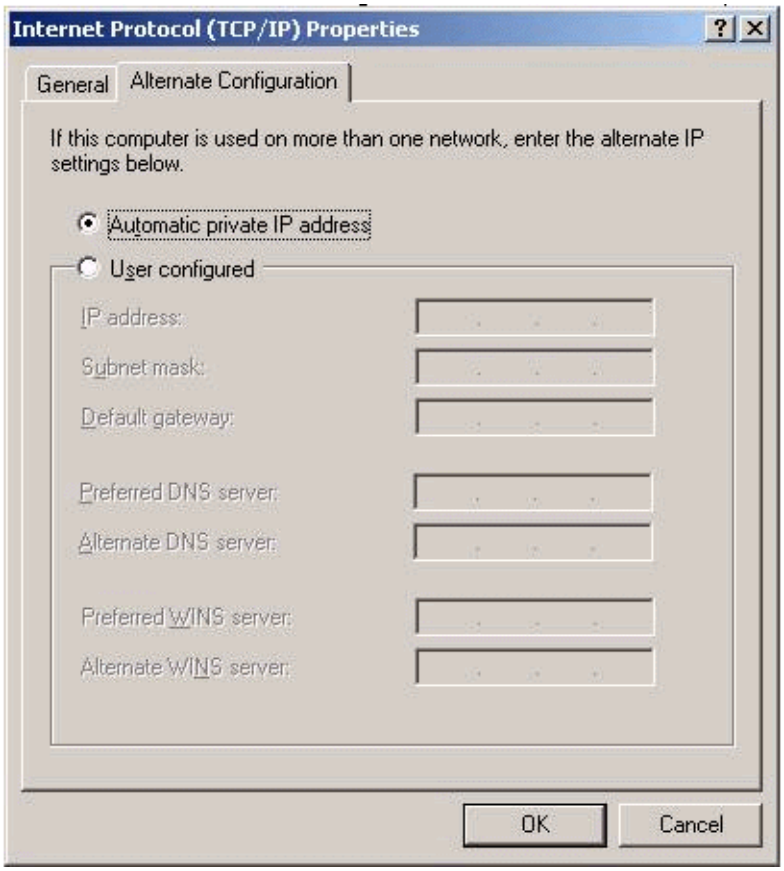

Figure 4-4 *TCP/IP Alternate Configuration Window*

6. Wait until the computer indicates the connection has limited connectivity.

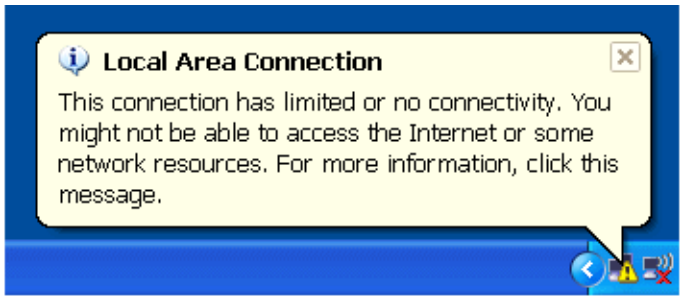

Figure 4-5 *Limited Connectivity Window*

7. Confirm that the computer IP address is now set to the 169.254.x.y (where x.y is the last six characters of the FX Series reader MAC address) with a subnet mask of 255.255.0.0.
8. The CD provides the reader host name. Enter the host name into the browser (e.g., http://fx7400cd3b0d) and press **Enter**. The local computer connects to the reader.
9. The **Console Login** window appears and the reader is ready.
10. Proceed to *Administrator Console Login on page 4-8* to log in to the reader.

IP Address

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

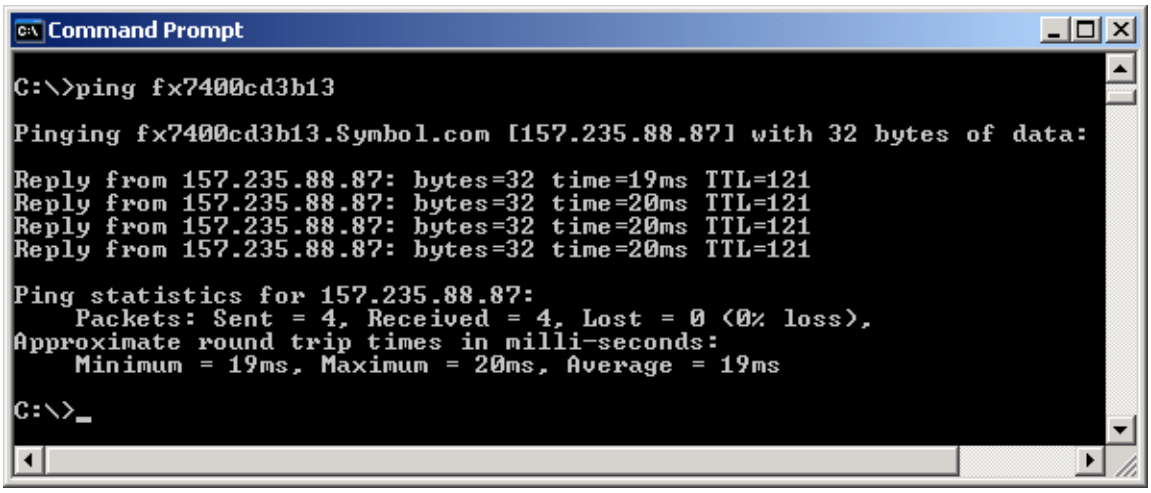

Figure 4-6 *IP Ping Window*

Administrator Console Login

Use a web browser on a local computer to access the **Administrator Console**. See *Managing the FX Series RFID Readers on page 4-2* for the install/setup sequence. The reader has a unique first time startup sequence that requires the installer to set a unique user ID and password and to set the region (regulatory requirement).

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.

Log In with Default User ID and Password

1. Connect to the reader with a web browser. See *Connect to the Reader on page 4-3*. The **User Login** window appears.

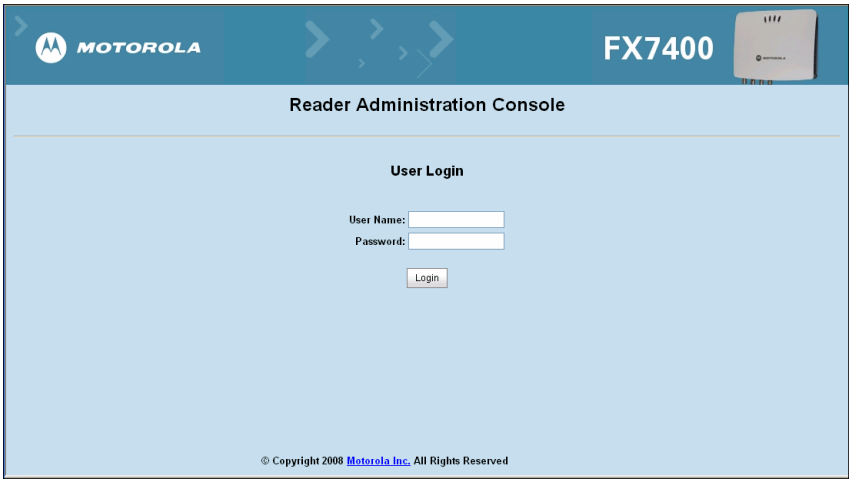

Figure 4-7 *User Login Window*

2. Enter **admin1** in the **User Name:** field and **change** in the **Password:** field and click **Login**.

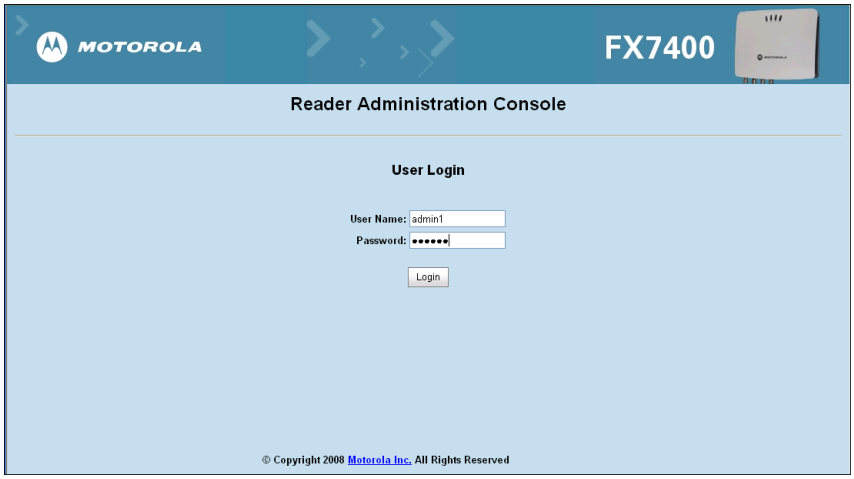

Figure 4-8 *Enter User Name and Password*

3. From the **Administrator Console**, select **Configure Reader** and **Region**. See *Set Region*.

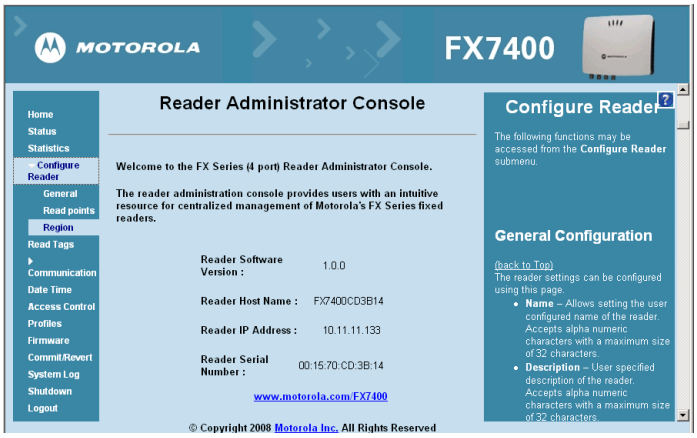

Figure 4-9 *Reader Administrator Console Main Menu*

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.

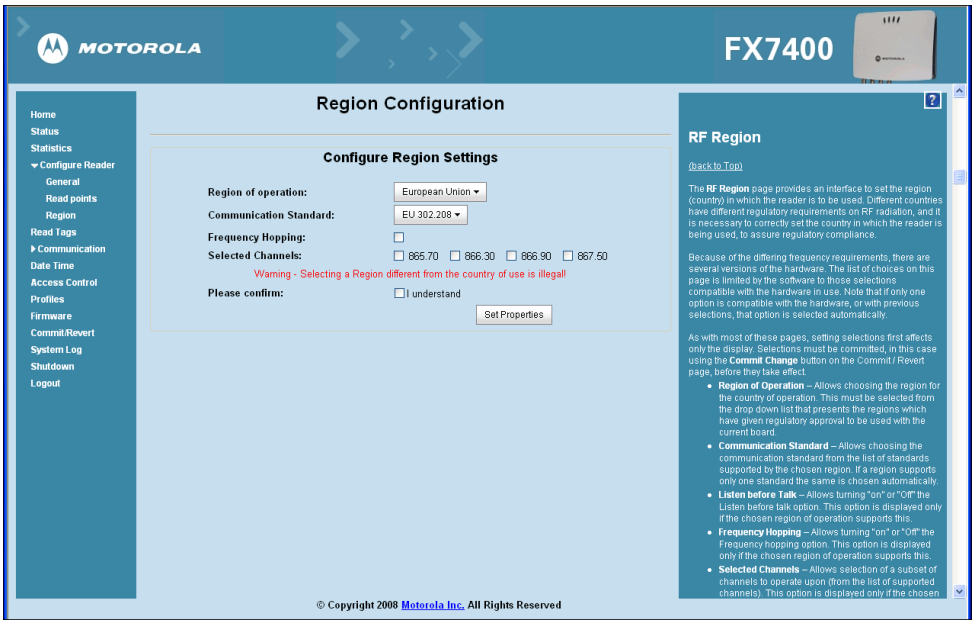

Figure 4-10 *Configure Region Settings Window*

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

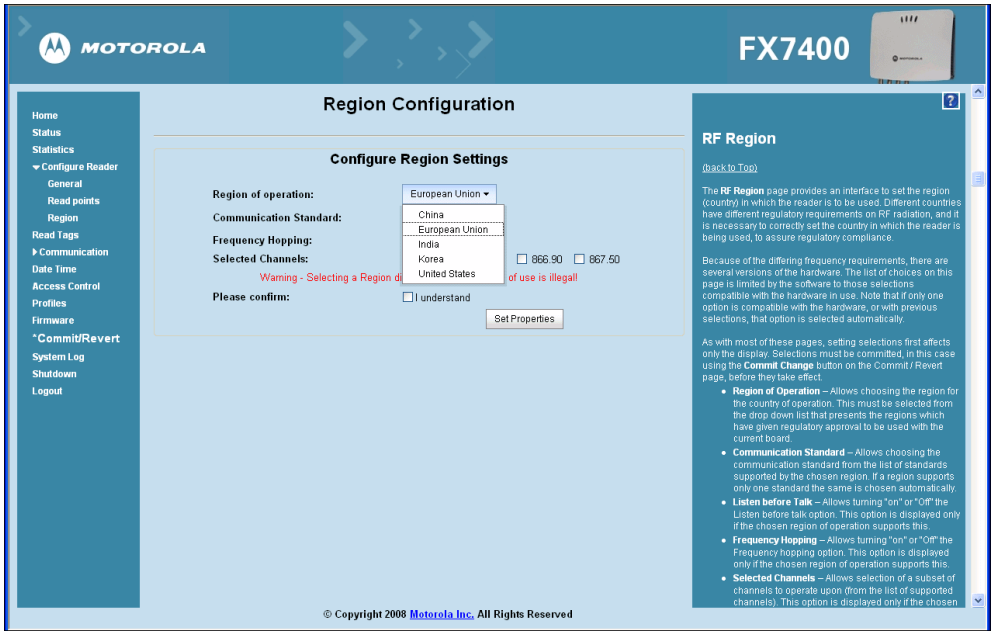

Figure 4-11 *Selecting the Region*

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. From the **Reader Administrator Console** (see *Figure 4-9 on page 4-9*) select **Commit/Revert**.

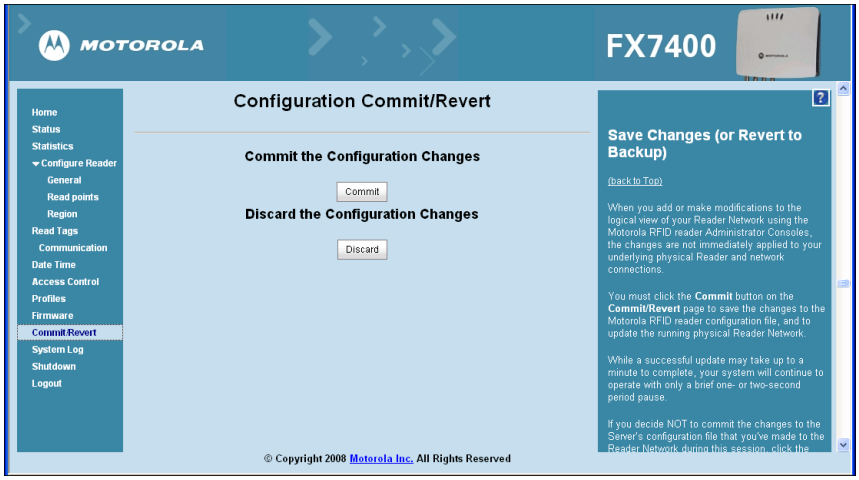

Figure 4-12 *Commit/Revert Window*

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

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

Normal Login

After setting the user ID, password, and region, the reader defaults to the normal login procedure.

1. Connect to the reader with a web browser. See *Connect to the Reader on page 4-3*. The **User Login** window appears.

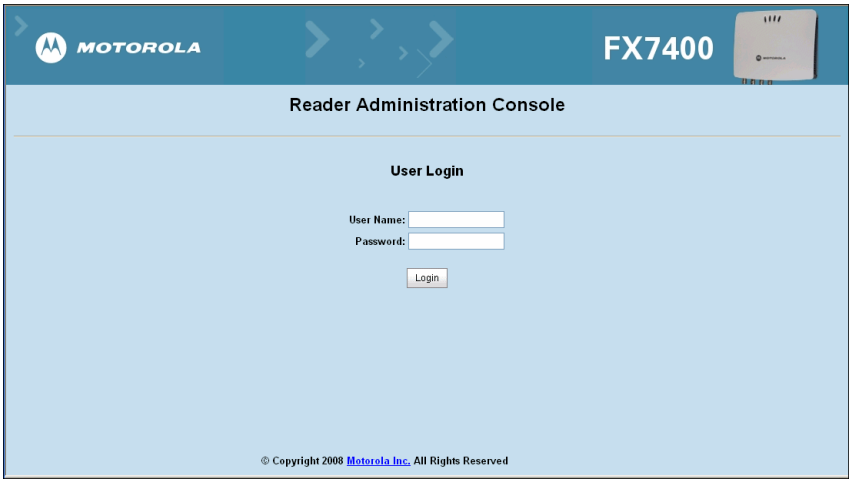

Figure 4-13 *User Login Window*

2. Enter the **User Name:** and **Password:** in the appropriate fields and click **Login**. The reader **Administrator Console Main Menu** window appears (*Figure 4-14*).

Reader Administrator Console

Use a web browser on a local computer to access the **Administrator Console** reader settings and functions. See *Managing the FX Series RFID Readers on page 4-2* for the install/setup sequence. The reader **Administrator Console Main Menu** window appears after successfully logging into the reader. See *Administrator Console Login on page 4-8*.

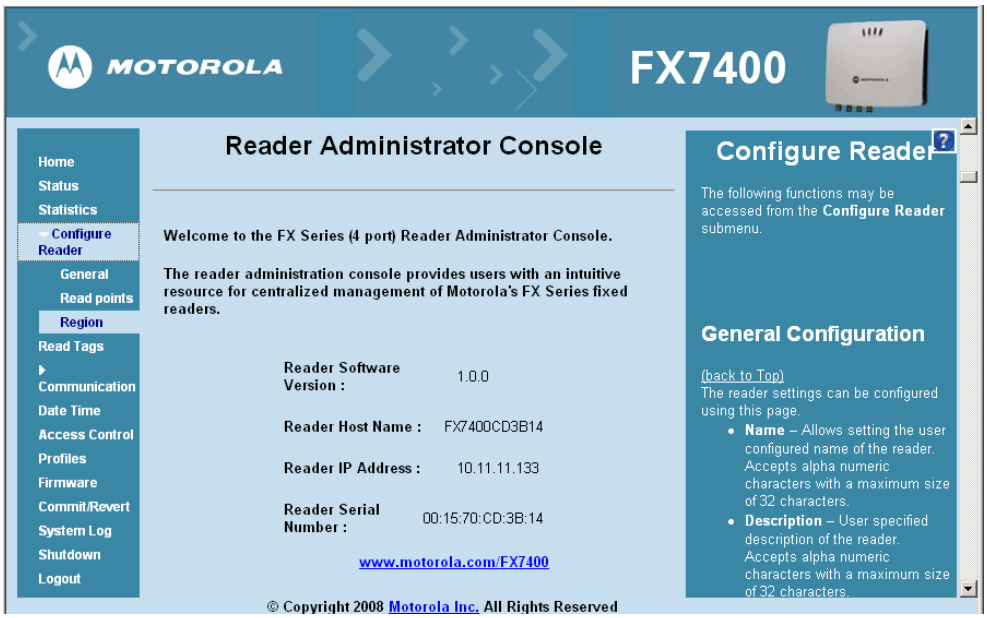

Figure 4-14 *Reader Administrator Console Main Menu*

Administrator Console Option Selections

Click the menu item to select:

- **Status** - see *Status on page 4-13*
- **Statistics** - see *Reader Statistics on page 4-17*
- **Configure Reader** - see *Configure Reader on page 4-14*
  - Click **General** to enter general reader parameters
  - Click **Read Points** to enter the read point settings
  - Click **Region** to set the region of operation
- **Read Tags** - see *Read Tags on page 4-18*
- **Communication** - see *Communication Settings on page 4-19*
  - Click **Communication** > **Network** - see *Configure Network Settings on page 4-19*
  - Click **Communication** > **LLRP** - see *LLRP Communications Protocol on page 4-21*
  - Click **Communication** > **SNMP** - see *SNMP Settings on page 4-23*
- **Date/Time** - see *System Time Management on page 4-24*
- **Access Control** - see *Manage Users on page 4-25*
- **Profiles** - see *Reader Profiles on page 4-26*

- **Firmware** - see *Firmware Version/Update on page 4-28*
- **Commit/Revert** - see *Commit/Revert on page 4-31*
- **System Log** - see *System Log on page 4-32*
- **Shutdown** - see *Shutdown on page 4-33*
- **Logout** - click **Logout** to immediately log out of the **Administrator Console**

Status

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

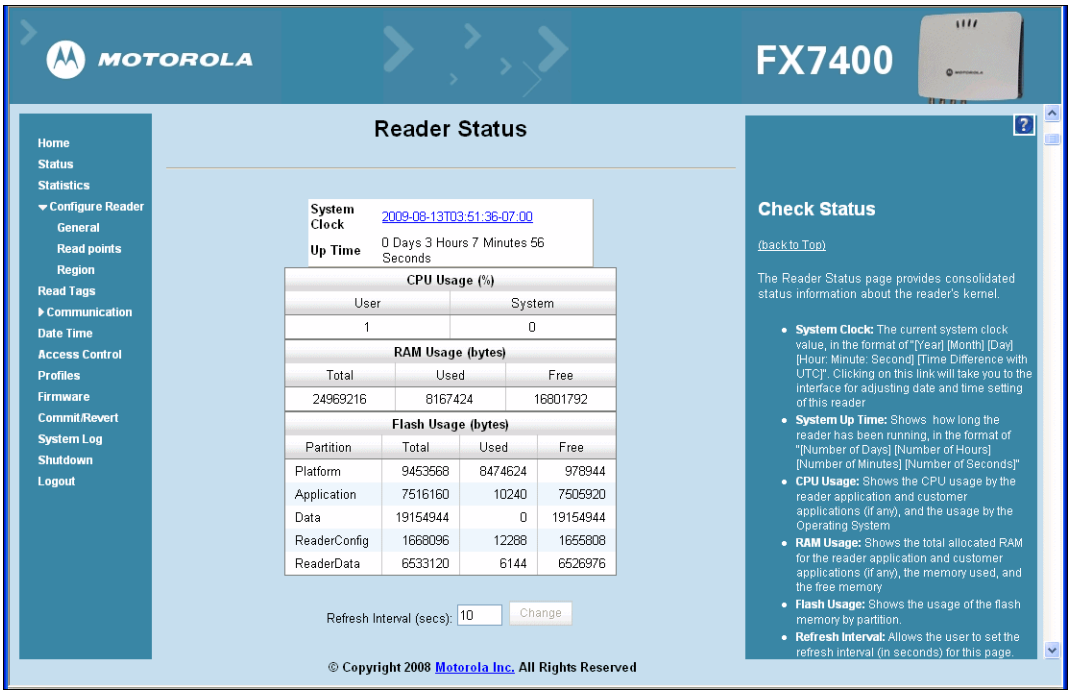

Figure 4-15 *Reader Status Window*

The **Reader Status** window provides consolidated reader status information:

- **System Clock** - The current system clock value, in the format [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 of [Number of Days] [Number of Hours] [Number of Minutes] [Number of Seconds].
- **CPU Usage** - Displays the CPU usage, the user applications (if any), and the system usage.
- **RAM Usage** - Displays the total allocated RAM for the reader, the memory used, and free memory.
- **Flash Usage** - Displays the flash memory usage by partition.
- **Refresh Interval** - Sets the refresh interval (in seconds) for the page. 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.

Configure Reader

Use the **Configure Reader** submenu to access the following functions.

Reader Parameters

Configure reader settings using this window.

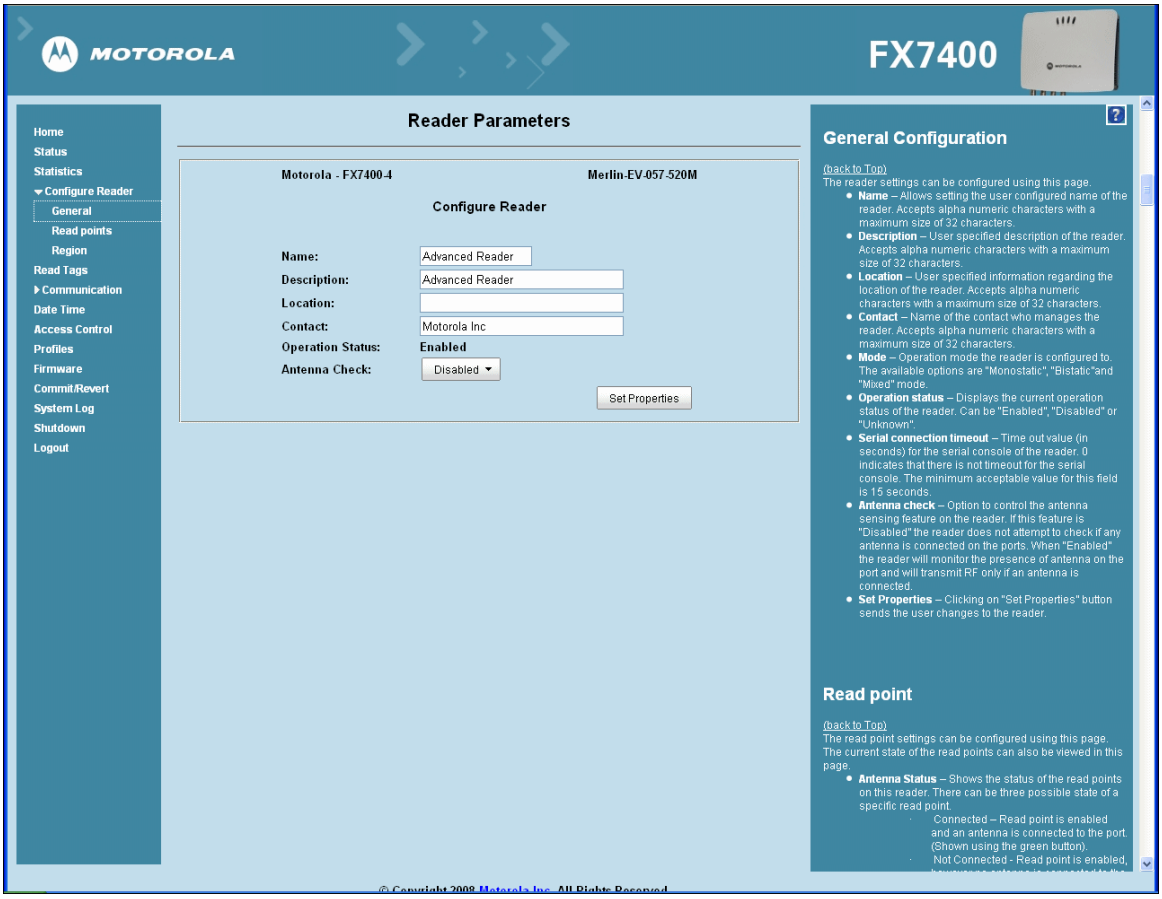

Figure 4-16 *Configure Reader*

- **Name** - Sets the reader name. Accepts up to 32 alphanumeric characters.
- **Description** - Describes the reader. Accepts up to 32 alphanumeric characters.
- **Location** - Provides information on the reader location. Accepts up to 32 alphanumeric characters.
- **Contact** - Name of the reader manager contact. Accepts up to 32 alphanumeric characters.
- **Operation Status** - Displays the reader current operation status (**Enabled**, **Disabled**, or **Unknown**).
- **Serial Connection Timeout** - Timeout value (in seconds) for the serial console of the reader. **0** indicates that there is no timeout for the serial console. The minimum acceptable value for this field is 15 seconds.
- **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.
- **Set Properties** - Sends the changes to the reader.

These settings only affect the display. Use *Commit/Revert on page 4-31* to save the changes.

Configure Read Point

Click **Read points** on the console main menu to view the **Antenna Status and Configuration** window. Use this window to configure the read point settings and view the current read points state.

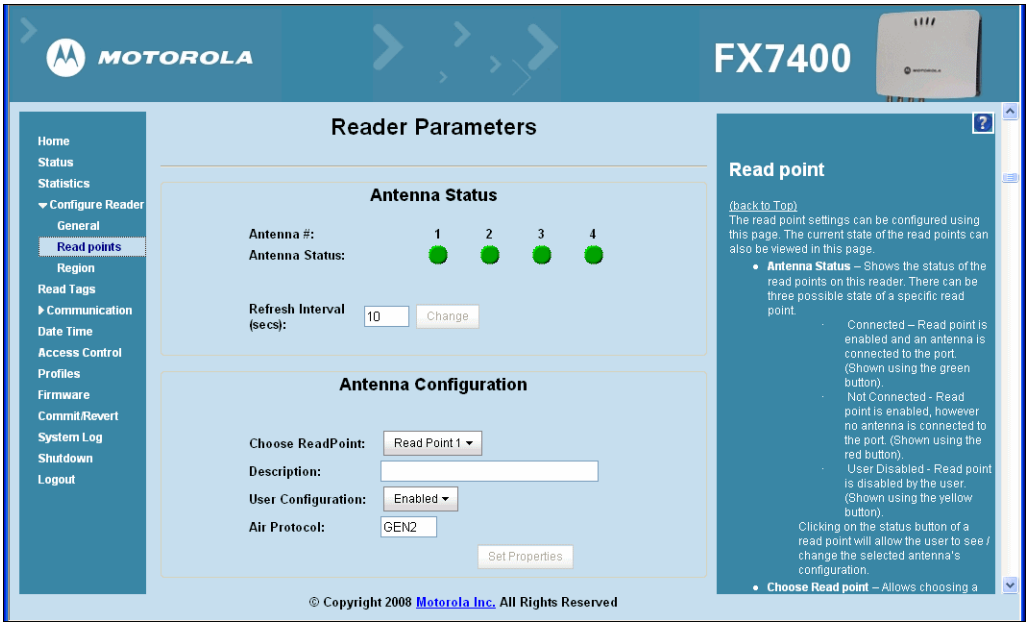

Figure 4-17 *Configure Read Points*

Antenna Status

Displays the status of the reader read points. Click the read point status button to view and/or change the selected antenna configuration.

- Connected (green button):
  Read point is enabled and an antenna is connected to the port.
- Not Connected (red button):
  Read point is enabled, no antenna is connected to the port.
- User Disabled (yellow button):
  Read point is disabled by the user.

Antenna Configuration

- **Choose ReadPoint** - Select a readpoint (or all) to display the configuration.
- **Description** - User-specified read point description. Accepts up to 32 alphanumeric characters.
- **User Configuration** - Enables or disables a specific read point. Disabling a read point blocks RF operation using the port/antenna.
- **Air Protocol** - Displays the list of air protocols the read point supports. Currently only EPC class1 GEN2 air protocol is supported.
- **Set Properties** - Click **Set Properties** to send the changes to the reader.

These settings only affect the display. Use *Commit/Revert on page 4-31* to save the changes.

Configure RF Region

Different countries have different RF regulatory requirements. To assure regulatory compliance, set the reader for specific regulatory requirements in the country of reader operation using the **Configure Region Settings** page. The choices on the page are limited to the selections compatible with the reader.

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

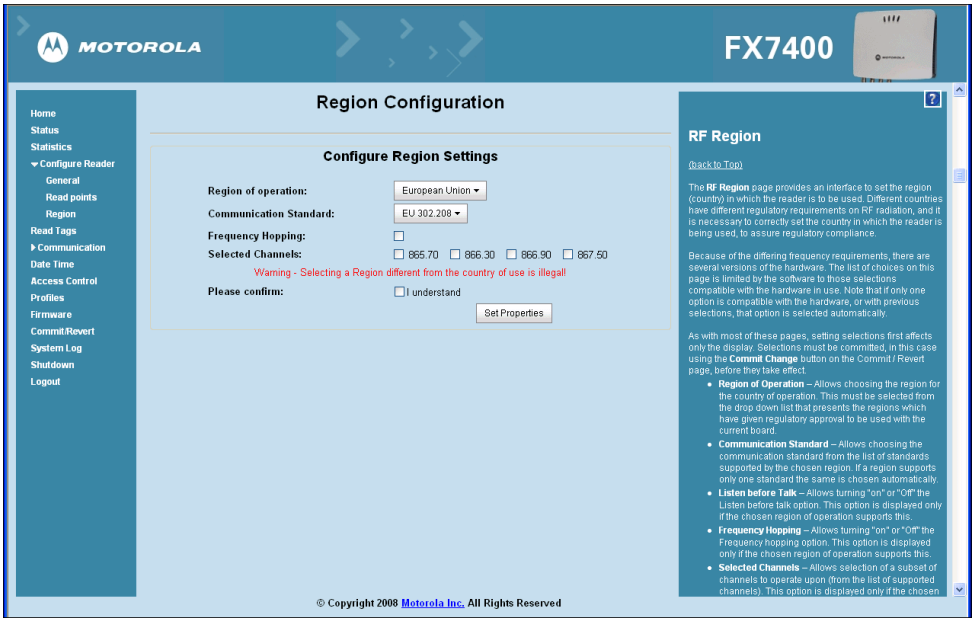

Figure 4-18 *Configure Region Settings Window*

- **Region of Operation** - Sets the country of operation. Select this from the drop-down list which includes countries which have regulatory approval to use with the current board.
- **Communication Standard** - Sets the communication standard from the list of standards chosen region supports. If a region supports only one standard, it is automatically selected.
- **Frequency Hopping** - Check to select frequency hopping.
- **Selected Channels** - Sets the appropriate channel(s).
- **Please confirm** - Check the **I understand** check box.
- **Set Properties** - Sends the changes to the reader. Confirm that the choices are in compliance with local regulatory requirements by checking the **I understand** check box.

These settings only affect the display. Use *Commit/Revert on page 4-31* to save the changes.

Additional Options

- **Listen before Talk** - Turns **On** or **Off** the listen before talk option. This option appears only if the chosen region of operation supports this.
- **Frequency Hopping** - Turns **On** or **Off** the Frequency hopping option. This option appears only if the chosen region of operation supports this.

- **Selected Channels** - Selects a subset of channels to operate on (from the list of supported channels). This option appears only if the chosen region of operation supports this function.

Reader Statistics

The **Reader Statistics** 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.

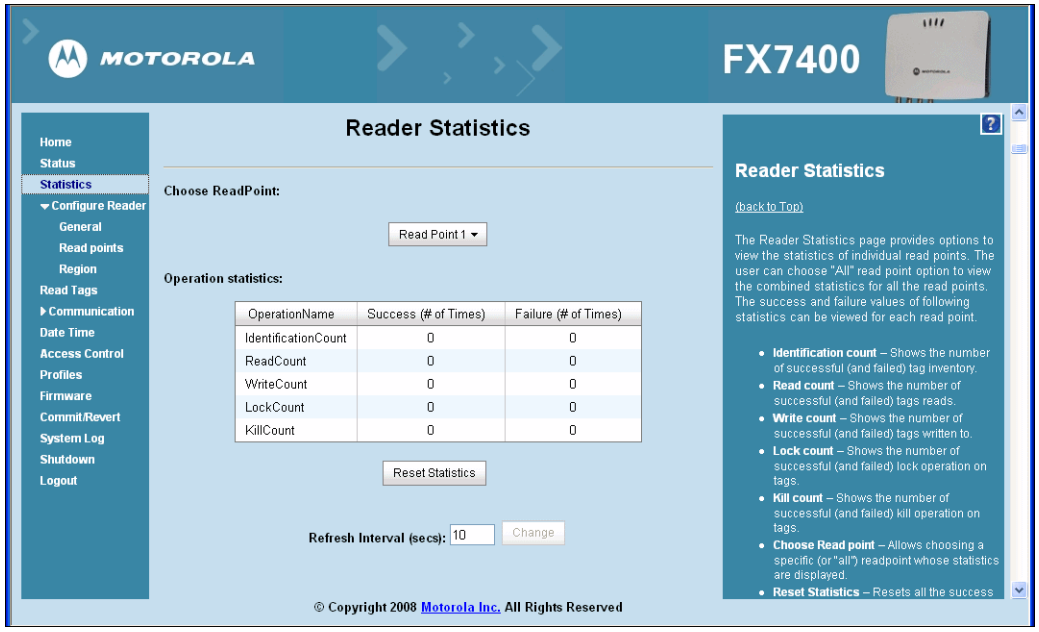

Figure 4-19 *Reader Statistics Window*

- **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 inventory.
- **ReadCount** - Displays the number of successful (and failed) tags reads.
- **WriteCount** - Displays the number of successful (and failed) tags written to.
- **Lockcount** - Displays the number of successful (and failed) lock operation on tags.
- **KillCount** - Displays the number of successful (and failed) kill operation on tags.
- **Reset Statistics** - Resets all the success and failure counts for all the read points.
- **Refresh Interval** - Use to set the refresh interval (in seconds) for this page. The statistics information for the chosen read point is refreshed every **N** seconds (where **N** is the user-configured value for the refresh interval). The minimum value of the refresh interval is 10 seconds. Input a new value and click **Change** to set a new interval.

Read Tags

Click **Start Inventory** to initiate an on-demand scan and/or to enable and disable polled read points.

NOTE Enable JVM support on the browser in order for this page to function properly. See Appendix C, Java Upgrade Procedures.

The polling state displays the current polling setting (**Enabled** or **Disabled***)*.

Enabling polling from the **Administrator** console displays the **Polling State: Enabled from Web** message. Enabling polling from byte stream displays the **Polling State: Enabled from byte stream** message.

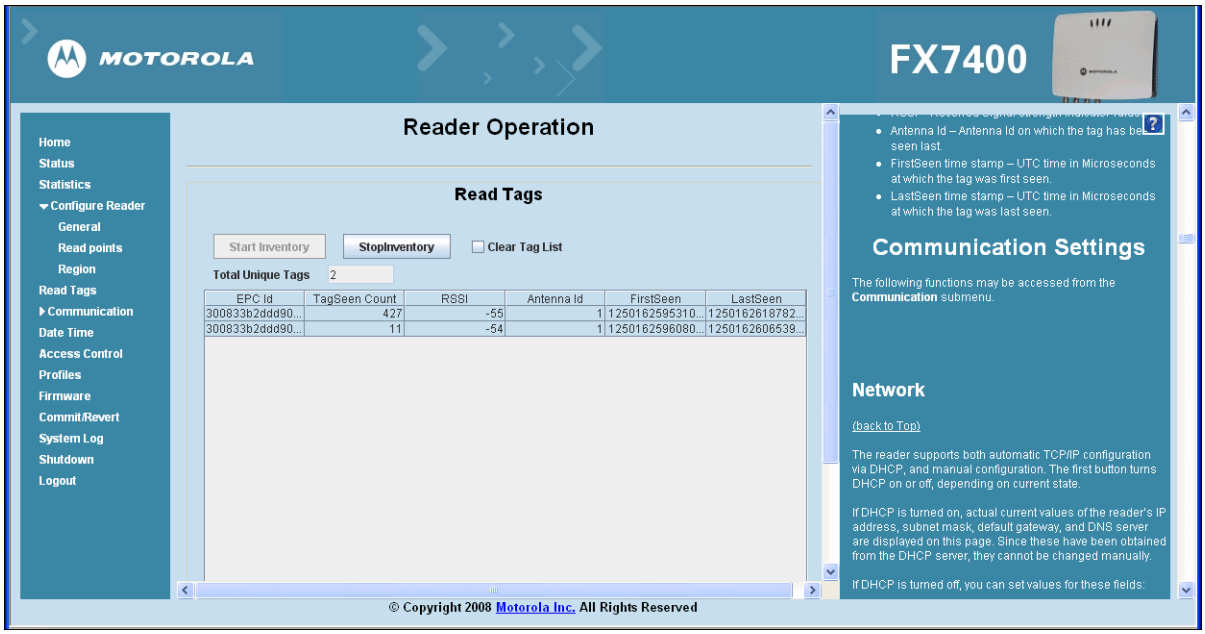

Figure 4-20 *Read Tags Window*

- **Start Inventory** - Starts inventory operation on the connected antennas.
- **Stop Inventory** - Stops the ongoing inventory operation.
- **Clear Tag List** - Clears 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 has been 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

Use the **Communication** submenu to access the following functions.

Configure Network Settings

The reader supports both automatic TCP/IP configuration via DHCP, and manual configuration. The **Obtain IP Address via DHCP:** button toggles the DHCP **On** or **Off**, depending on the current state.

Turning DHCP on displays the current IP address, subnet mask, default gateway, and DNS server. These values are obtained from the DHCP server so cannot be manually changed.

To manually set the values, toggle the DHCP to **Off** and enter the values:

- **Current IP Address** (in dotted notation)
- **Subnet Mask** (in dotted notation)
- **Gateway** (in dotted notation)
- **DNS Server** (in dotted notation)
- **MAC Address** – Specifies the reader MAC address.
- **Web Server** – Configures the web server in either HTTP (unsecure) or HTTPS (secure) mode.
- **Shell** – Configures the Shell to either Telnet (unsecure) or SSH (secure) mode, or disables the shell.
- **File Server** – Configures the File server to either FTP (unsecure) or FTPS (secure) mode, or disables the shell.

NOTE The network configuration updates only upon clicking **Commit**. If the commit is not successful, the system indicates the problem and allows repeating the operation. DHCP and IP address changes update only upon reader reboot.

1. Click **Communication** > **Network**. The **Configure Network Settings** window appears.

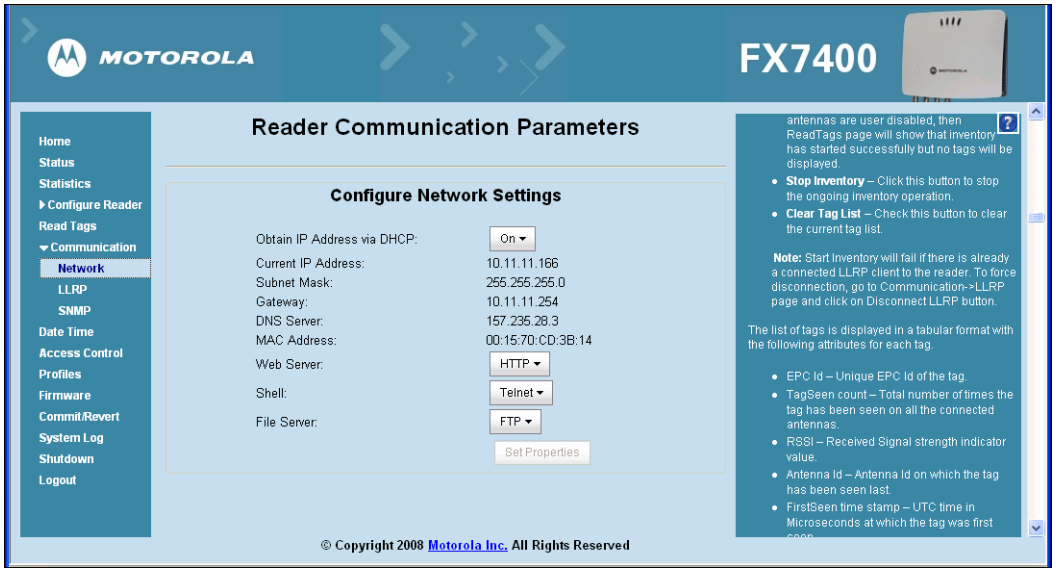

Figure 4-21 *Configure Network Settings Window*

2. Change communication related settings by entering information in the text boxes or using the drop-down lists. See *Table 4-1* for descriptions of available options.

Table 4-1 *Configure Network Settings*

Setting	Description	Possible Values
Obtain IP Address using DHCP	The Dynamic Host Configuration Protocol server running on networks can assign a dynamic IP address to the host and readers. Contact the system administrator to determine if the network supports DHCP.	Select the **On** or the **Off** button.
Current IP Address	If manually assigning an IP address to the reader, check with the system administrator to ensure the IP address is valid in the network.	IP address to assign to the reader.
Subnet Mask	A mask used to determine to what subnet an IP address belongs.	IP address dynamically assigned or user-entered.
Gateway	The reader uses this IP address to access another network.	Depends on network configuration.
DNS Server	The reader uses the Domain Name System (DNS) IP address to translate domain names.	Depends on network configuration.
MAC Address	Reader MAC address.	
Web Server	Select the port type.	
Shell	Select the Shell type. Configure the Shell to either Telnet (unsecure) or SSH (secure) mode, or disable the shell.	
File Server	Configure the file server to either FTP (unsecure) or FTPS (secure) mode, or disable the shell.	Checked (enabled) / unchecked (disabled).

3. Click **Set Properties**.
4. Click **Main** to return to the **Administrator Console** main window.
5. Click **Commit/Revert**. See *Commit/Revert on page 4-31*.
6. Click **Commit** to save the changes or **Discard** to discard the changes. See *Commit/Revert on page 4-31*.

LLRP Communications Protocol

From the **Administrator Console** *(see Figure 4-1 on page 4-1)* click **Communication** > **LLRP**. The **Configure LLRP Settings** window appears *(Figure 4-22)*. To be compatible with older releases, LLRP is not enabled by default. LLRP is not active unless the changes are committed by clicking **Commit** on the **Commit/Revert** page. A successful commit activates LLRP. By default, LLRP activates in server mode listening on port 5084.

NOTE When the reader operates in LLRP server mode, LLRPConnect does not appear on the web page. Only **DisconnectLLRP** appears (it is greyed if there is no LLRP client connected to the reader). **DisconnectLLRP** and **ConnectLLRP** are mechanisms to connect the reader to an LLRP client or disconnect the reader from an LLRP client. When the reader is operating in LLRP Client mode, the **ConnectLLRP** is enabled to allow connection to the LLRP host. Once connection is successful in this mode, the **DisconnectLLRP** is enabled to allow disconnecting from the host.

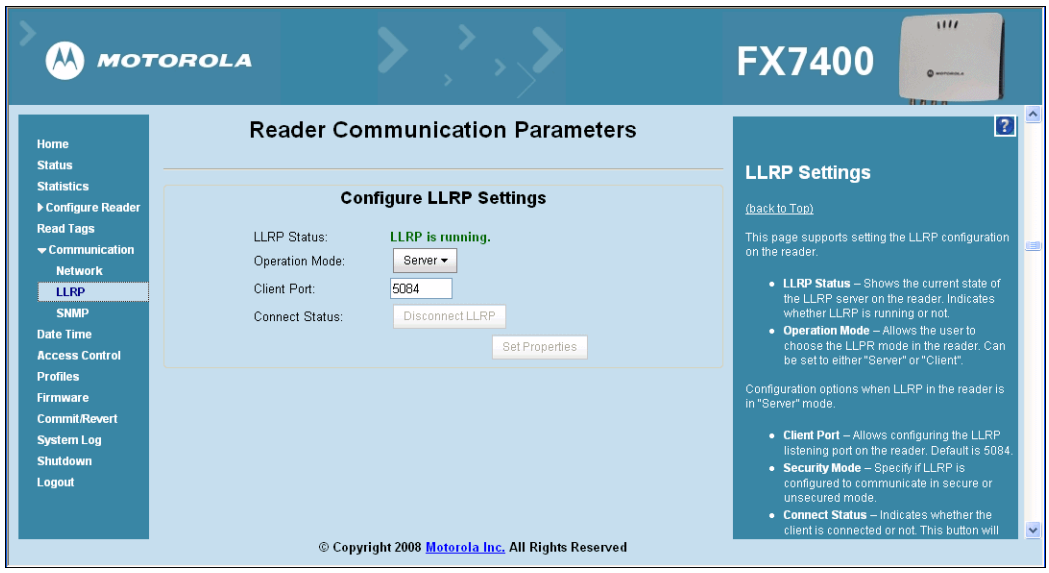

Figure 4-22 *Configure LLRP Settings Window*

The **LLRP Service Settings** Window provides LLRP Status and specific LLRP configuration parameters. The current state (running or not running) appears next to the LLRP Status.

LLRP-specific configuration parameters are separate from other parameters related to communications. The configurable LLRP parameters are listed in *Table 4-2*.

Table 4-2 *LLRP Communication Configuration Options*

Setting	Description	Possible Values
LLRP Status	Displays the current state of the LLRP server on the reader. Indicates whether or not the LLRP is running.	Running Not Running
Operation Mode	Sets the LLPR mode in the reader.	Server Client
Client Port	Configures the LLRP listening port on the reader. The default is 5084.	
Connect Status	Indicates the LLRP client connect status as connected or disconnected. Click the button to toggle between connected or disconnected status. This button is grayed out if there is no client connected.	ConnectLLRP DisconnectLLRP

Configuration options when LLRP in the reader is in **Client** mode:

- **Reconnect to the server** – Enable to attempt reconnection to the specified server if the connection is lost. Disable to not attempt reconnection if the connection is lost.
- **Server IP** – Configures the IP address of the server.
- **Client Port** – Configures the LLRP host port to connect to. Default is 5084.
- **Connect Status** – Indicates whether or not the reader is connected to the LLRP host. This button toggles between **ConnectLLRP** and **DisconnectLLRP**. Click **ConnectLLRP** to initiate an LLRP connection to the host server.
- To select the LLRP Client mode, check the **LLRP Client Mode** check box. This uses LLRPClient IP and LLRPClient/Server Port values to connect to the client.
- When operating in LLRP server mode, incoming requests from the client use only the LLRP Port value as the listening port. After setting the parameters, they persist across reader reboots.

NOTE The web console parameters that affect LLRP are:

- Region Control
- Enable/disable antenna check
- Monostatic configuration using advanced read point configuration page
- Enable/disabled state of a read point class

Use the **Connect LLRP/Disconnect LLRP** button to immediately connect and disconnect LLRP from host.

SNMP Settings

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 heartbeat message periodically to the configured SNMP host.

NOTE Send SNMP Trap To and Send Server Heartbeat take effect immediately after clicking **Set Properties**. However, perform a **Commit** to persist the changes. The modified SNMP Community string and SNMP Version are not affected until the reader reboots.

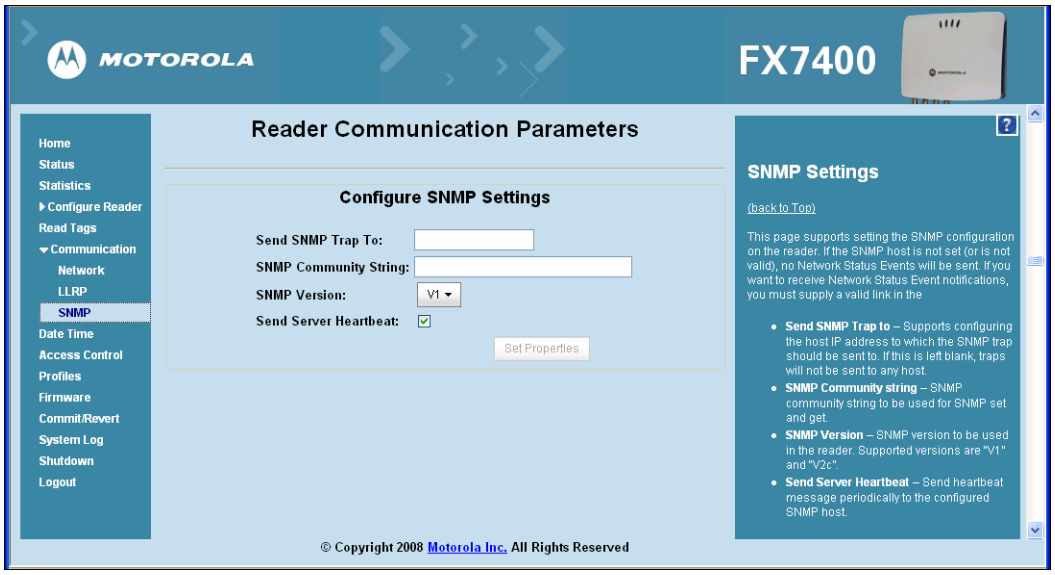

Figure 4-23 *Reader Communications Parameters (SNMP) Window*

System Time Management

Use the Date/Time page to set the date and time value or to specify an NTP synchronization server. To specify an NTP server, enter the NTP Server IP address in the **NTP Server Address** box, and click **Set NTP Server Address**. Perform a **Commit** to affect the change.

To adjust the time manually, select the value for the local time and click the **Set Date and Time**. The reader clock resets to the exact value provided (if the operation is successful or, an appropriate message displays the error). Set time zones (including use of Daylight Savings) from this page. The date/time and time zone changes take effect immediately and do not require a **Commit**.

To set the date and time:

1. Click **Date Time** in the **Administrator Console** window. The **System Time Management** window appears.

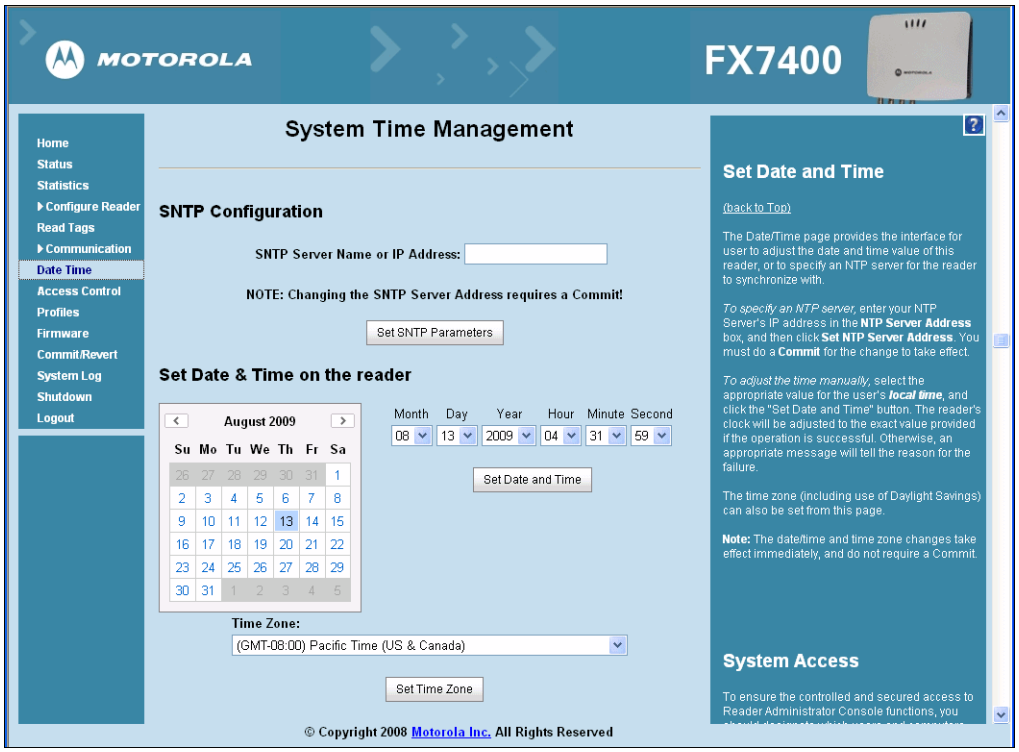

Figure 4-24 *System Time Management Window*

2. To synchronize the clock with a particular SNTP server, enter the server IP address in the **SNTP Server Address:** field, click **Set SNTP Parameters,** and perform a **Commit** (see *Commit/Revert on page 4-31*).

   NOTE SNTP (Simple Network Time Protocol) is an Internet standard protocol (built on TCP/IP) that assures accurate synchronization to the millisecond of computer clock times in a network of computers.

   It is essential to have a DNS server configured to allow adding an SNTP server on this page. If using a static IP address, enter a valid DNS server address in the TCP/IP configuration. If this address is not present, the reader can not add an SNTP server address from this page. Ensure the DHCP server sets up the DNS server address while issuing the IP address.

3. To set the system time manually, use the drop-down lists to select units of time, then click **Set Date and Time**.

4. Use the **Time Zone:** drop-down list to set the time zone, then click **Set Time Zone.**

Access Control

To ensure controlled and secure 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.

Manage Users

Users must log in and out of the system to ensure that:

- System access is granted only to authorized users.
- Only one user is logged in at a time to ensure that multiple users don't make conflicting changes to the system. Users who perform no action for a period of time are automatically logged out of the system and must log in again.

To add or modify users in order to grant rights and permissions:

1. From the **Administrator Console**, click **Access Control**.

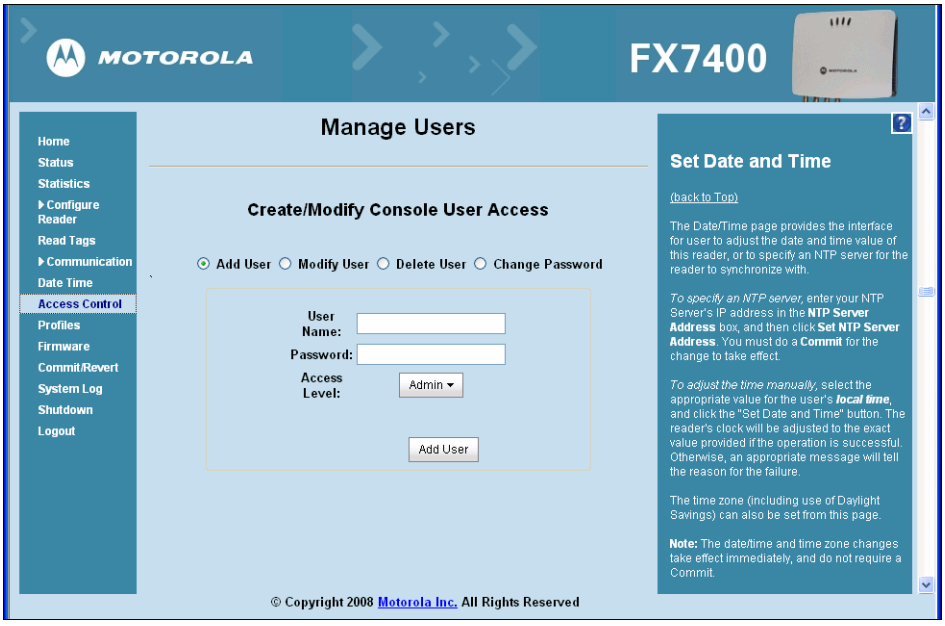

Figure 4-25 *Manage Users Window*

2. Select the user access function:

- **Add User** - Select this radio button and enter a valid user name and password. Select the desired privilege level for this user, then click **Add User**. A valid user name must be unique (assigned to only one user) and both user name and password must be between one and 32 alphanumeric characters. The user name and password are case-sensitive. If the entry is successful, the new user name appears in the user drop-down list. If not successful, the system indicates the problem and allows repeating the operation.
- **Modify User** - Select this radio button and select the user name from the user drop-down list. Select the new access level to set to the user. Click **Modify** to set the new user access level.
- **Delete User** - Select this radio button and select the user name from the user drop-down list. Click **Delete User** to remove this user from the system. This user name is now free to use on a new user.
- **Change Password** - Select this radio button and select the user name from the user drop-down list. On the **Change Password** page, type the old password and the new password (twice) and click **Change Password**.

Reader Profiles

The **Reader Profiles** window shows the current profiles on the reader and allows performing profile-related operations. Profiles are useful for multiple reader deployments. To configure the readers, manually download the proper configuration file, or use APIs to programmatically configure many readers quickly. This procedure saves configuration time because only a few APIs are needed to configure a reader completely.

NOTE Enable JVM 1.6 support on the browser in order for this page to function properly. See Appendix C, Java Upgrade Procedures.

The **Reader Profiles** window uses an applet to connect to the reader. The page displays a set of provided configuration files, or profiles, that a user can re-use and/or modify depending on their specific reader application or use case. The profiles serve as configuration examples.

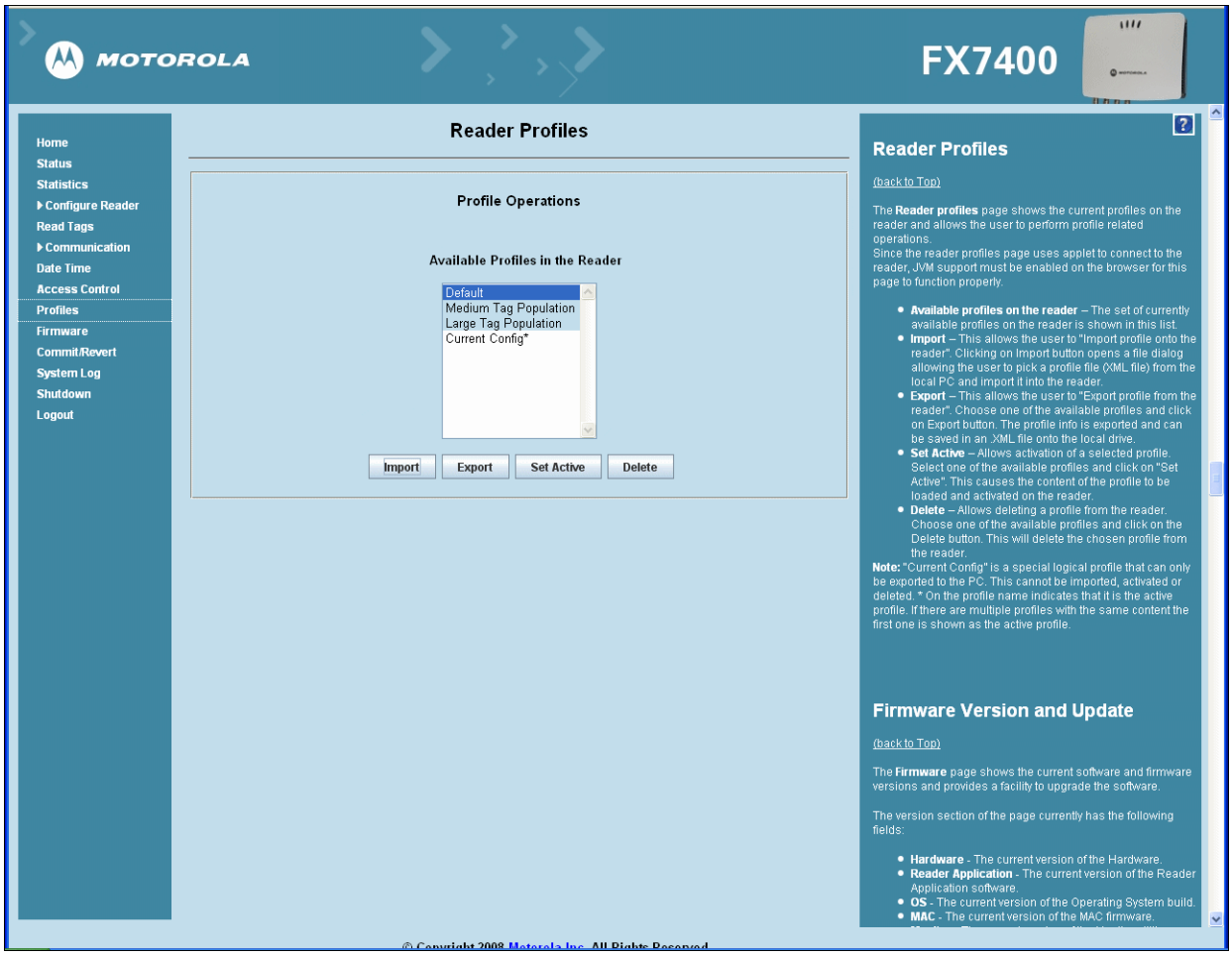

Figure 4-26 *Reader Profiles Window*

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 profiles and click **Set Active** to load the profile content in the reader. Perform a **Commit** to complete (see *Commit/Revert on page 4-31*).
- **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. On the profile name indicates that it is the active profile. If there are multiple profiles with the same content the first one is shown as the active profile.

Create a Custom Profile

The reader includes a set of provided sample profiles. These can not be changed and a new profile with the same name cannot be imported. Export, modify, and import these profiles under a new name to create customized profiles. This keeps the original profiles intact to use as a reference.

To view the contents of a profile, select the profile and click **Export** to export the profile to the PC hosting the **Reader Profiles** web page. The profile files are in XML format. Open the file using a text editor application (such as Notepad) and edit the parameter to modify the reader configuration. Save the modified file under a new name.

Click **Import** and browse to the modified file and import the file back into the **Reader Profile** page. This adds the modified file to the list of profiles. The reader does not perform any checking when importing the file.

To validate the profile file contents, and to activate the modified profile, select the profile and click **Set Active**. The reader performs checking on some of the parameter values and notifies the user if it detects an error. If the check is successful, an asterisk appears on the **Commit/Revert** menu selection (see *Commit/Revert on page 4-31*) to indicate that a commit is required.

Firmware Version/Update

The **Version Information** window displays the current firmware version and allows upgrading to new firmware. From the **Administrator Console**, click **Firmware**.

The firmware version information window displays:

- **Hardware** - The current hardware version.
- **Reader Application** - The current reader application software version.
- **OS** - The current operating system build version.
- **MAC** - The current MAC firmware version.
- **Monitor** - The current monitor utility version.
- **Radio API** - The current radio API version.

The reader supports two different methods of updating the firmware:

- *FTP / FTPS Server on page 4-28*
- *File Upload on page 4-30*

Select either the **FTP / FTPS Server** radio button or the **Firmware Upload** radio button to select the appropriate firmware update method.

Either method shows the current firmware update progress on the same page. After upgrading the necessary partitions the reader reboots with a message **Reboot** to indicate that the firmware upgrade completed.

FTP / FTPS Server

- **FTP / FTPS Server** - Identifies the location of the current software updates, the response file that contains the names of the partitions to update, and the partitions. Use the static IP address (not domain name) in this link, beginning with ftp:// (or ftps://).
- **User Name** - Required for appropriate access to the FTP / FTPS server.
- **User Password** - Password for the above FTP / FTPS **User Name**.
- **Update All Partitions** - Check to force the update of all reader partitions. This increases firmware update time.
- **Start Update** - Click to get the OSUpdateutilityX_Y_Z.zip (X, Y, Z represents the release numbers, e.g., 3.1.6) containing osupdFalcon.exe, the Response.txt file, and the FlashUpdateUtility.dll files. The application shuts down and the files listed in the Response.txt file are downloaded, validated, and programmed into flash. The reader reboots. If files are not downloaded or are corrupted during the download, they are not programmed into flash and the old partitions remain.

Partition download and flash programming takes about 15 minutes. Do not reboot or power off the reader while the green LED is blinking.

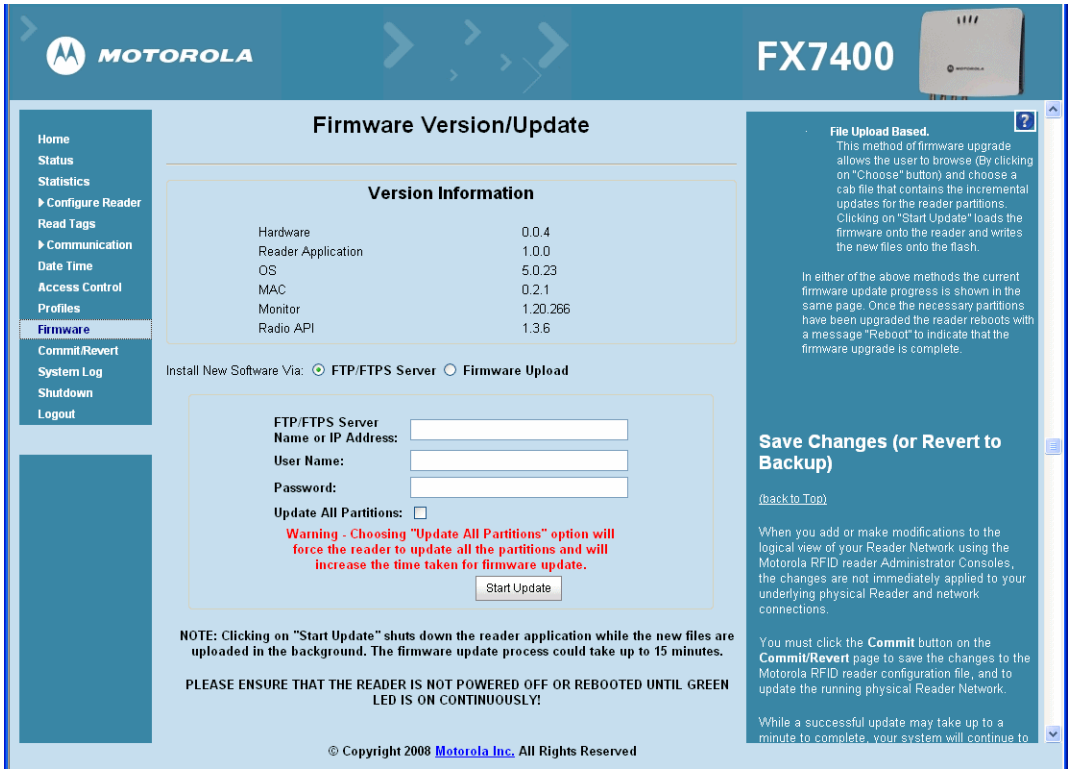

Figure 4-27 *FTP/FTPS Based Firmware Update Window*

File Upload

- Click **Choose** to browse to and choose a cab file containing the incremental updates for the reader partitions.
- Click **Start Update** to load the firmware and write the new files onto the flash. The application shuts down and the files listed in the Response.txt file are downloaded, validated, and programmed into flash. The reader reboots. If all the files are not downloaded or are corrupted during the download, they are not programmed into flash, and the old partitions remain.

Partition download and flash programming takes about 15 minutes. Do not reboot or power off the reader while the green LED is blinking.

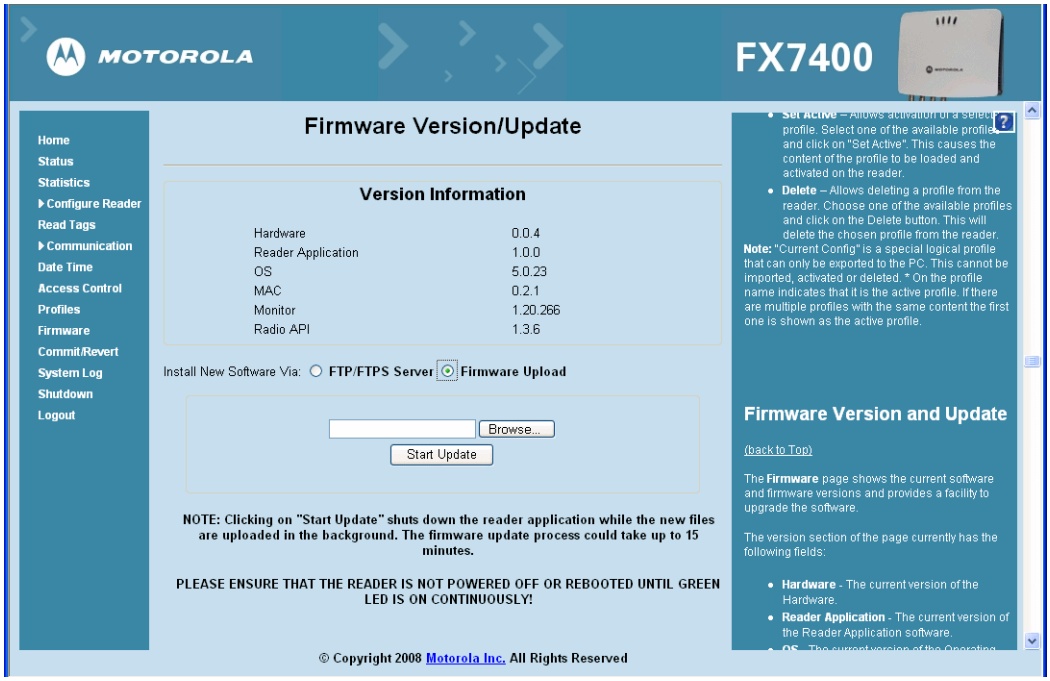

Figure 4-28 *File Based Firmware Update Window*

Commit/Revert

Changes/modifications made to the logical view of the Reader Network using the **Administrator Console** are not immediately applied the reader and network connections.

To apply reader configuration modifications, click **Commit/Revert** to save the changes and notify the reader to update the configuration file. While a successful update can take several seconds, the system continues to operate with only a one or two second period where no polling occurs.

From the **Administrator Console**:

1. Click **Commit/Revert**. The **Commit/Revert** window appears.

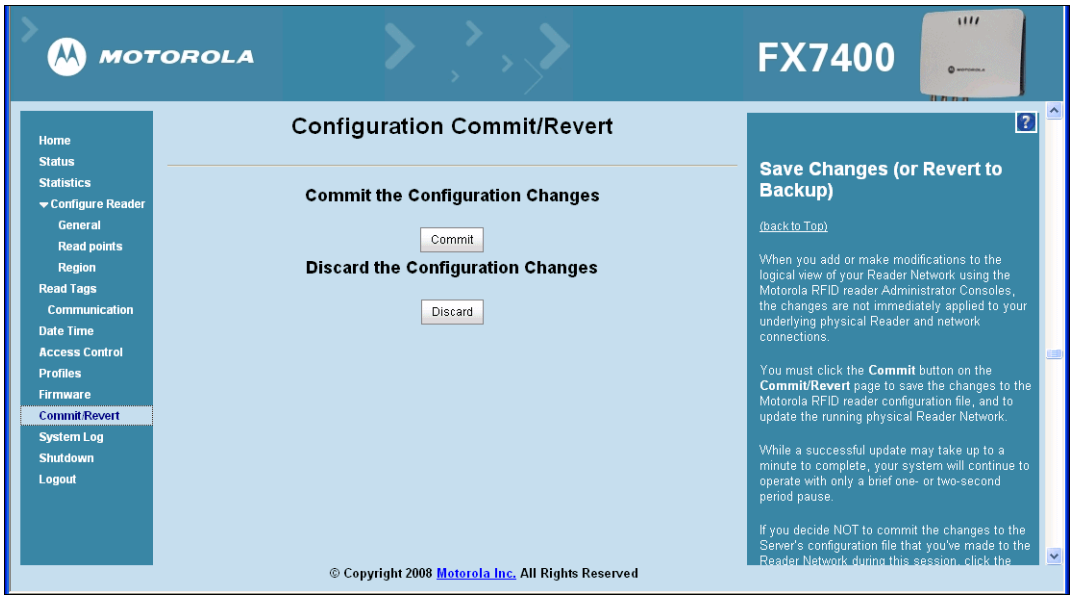

Figure 4-29 *Commit/Discard Window*

2. Click **Commit** to save a new configuration and apply changes to the reader configuration file, to save the changes to the configuration file, and to update the reader/network.
   A successful update can take up to a minute, however the system continues to operate with only a brief one or two second pause.

   Click **Discard** to discard changes made (during this session) to the reader configuration. This discards all uncommitted changes.

System Log

The System Log page provides an interface to view the reader log information. There are two types of log information.

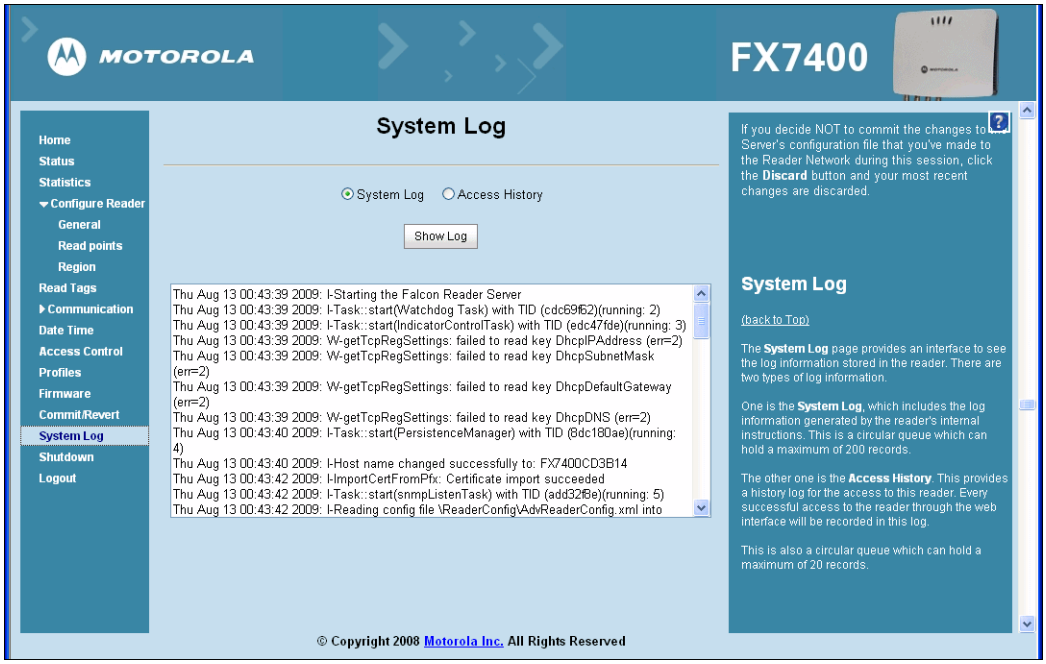

Figure 4-30 *System Log Window*

- **System Log** - Includes the log information generated by the reader internal instructions. This is a circular queue that holds a maximum of 200 records.
- **Access History** - Provides a history log for reader access, including every successful access to the reader through the web interface. This is also a circular queue which can hold a maximum of 20 records.

Shutdown

To protect the integrity of the reader data, gracefully reboot the reader.

Figure 4-31 *System Shutdown/Restart Window*

From the **Administrator Console**:

1. Click the **Shutdown** link to display the **Shut Down System** page.
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 either **Restart** or **Shut Down** from the **What do you want to do** drop-down list, and then click **Go**.
   The **Restart Reader** option saves the user data and then restarts.
   The **Shut down Reader server** option tells the reader to save the user data, stop all reader functions, and wait to be powered off.

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

Chapter 5 Setup Examples

Introduction

The Setup Examples provide examples on how different types of reader configurations can be optimized.

NOTE The screens and windows are provided for illustration purposes only and may differ from actual screens. 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.

Set-Up Examples

The *Set-Up Examples* are:

- *Point of Sale on page 5-2*
- *Back Room Inventory Fill on page 5-3*
- *Exit/Entry on page 5-4*
- *Shelf/Tool Crib Cage on page 5-5*
- *Transition/Impact Door on page 5-6*
- *Back Room Receiving on page 5-7*
- *Shelf/Tool Crib/Cage Inventory (stretched target) on page 5-8*

Point of Sale

POS (Point of Sale) example prameters: Reader reads 10 different tags within 300 ms.

Can be single item, multiple items, or multiple tags. POS readers can be dense or separated/shielded area. Indicate how POS readers can add writing. Indicate how reads can be triggered.

Installation

Identify the unique installation challenges for the POS example. The location of the reader and antennas (under the read table) will be discussed and the procedures to optimize the tag reads.

- Reference *RFID Technology Overview on page 2-1* for RFID overview.
  - Reference *Introduction on page 3-1* for an installation overview.
  - Reference *Communications Connections on page 3-6* for standard communications connections overview and provide the unique communications connections installation for a POS installation.
  - Reference *Reading Tags on page 3-7* for standard overview and provide the unique tag reading installation requirements for a POS installation. Discuss antenna location one foot below the table (other options?) discuss the Mobile Mark (BP6-915LP) antenna and the power setting of 20dBm.

Configuration and Optimization

Identify the unique configuration and optimization challenges for the POS example. Reference *Introduction on page 4-1* for a configuration overview.

- Reference *Reader Administrator Console on page 4-12* for standard procedures.
- Reference *Managing the FX Series RFID Readers on page 4-2* for standard reader management overview and provide the unique reader management configuration optimization requirements for a POS installation.
- Discuss optimization techniques for an under the table reader antenna.

Optimizing Reader Functions

Identify the unique function optimization challenges for the POS example.

For the setup illustrate:

- Filtering (select statement)
- Query tuning (Q, Session, Select bit)
- Post read filtering
- Writing, locking, killing

Troubleshooting

Identify the unique reader troubleshooting challenges for the POS example. Reference *Introduction on page 6-1* for a troubleshooting overview.

- Reference *Troubleshooting on page 6-1* for standard procedures and provide the unique reader troubleshooting requirements for a POS installation.

Back Room Inventory Fill

Back Room Inventory Fill example prameters: Reader reads 50-100 tags in 5 seconds at a distance of 2-6 feet.

Can be single item, multiple items, or multiple tags. Readers can be in a dense environment or separated /shielded area. The opportunity to write is typically a lower priority then speed. Additional filtering may be needed. Indicate how reads can be triggered. Indicate how to show direction with paired antennas.

Installation

Identify the unique installation challenges for the Back Room Inventory Fill example. The location of the reader and antennas (under the read table) will be discussed and the procedures to optimize the tag reads.

- Reference *RFID Technology Overview on page 2-1* for RFID overview.
  - Reference *Introduction on page 3-1* for an basic installation overview.
  - Reference *Communications Connections on page 3-6* for standard communications connections overview and provide the unique communications connections installation for a Back Room Inventory Fill installation.
  - Reference *Reading Tags on page 3-7* for standard overview and provide the unique tag reading installation requirements for a Back Room Inventory Fill installation. Discuss the 2 antenna locations one foot below the table (other options?) and discuss the power setting of 30dBm.
  - Discuss the antenna performance,) 2 AN480 antennas were used.

Configuration and Optimization

Identify the unique configuration and optimization challenges for the Back Room Inventory Fill example. Reader reader was optimized to read 50-100 tags in 5 seconds, within 2-6 feet. Reference *Introduction on page 4-1* for a configuration overview.

- Reference *Reader Administrator Console on page 4-12* for standard procedures.
- Reference *Managing the FX Series RFID Readers on page 4-2* for standard reader management overview and provide the unique reader management configuration optimization requirements for a Back Room Inventory Fill installation.

Optimizing Reader Functions

Identify the unique function optimization challenges for the Back Room Inventory Fill example.

For each setup illustrate:

- Filtering (select statement)
- Query tuning (Q, Session, Select bit)
- Post read filtering
- Writing, locking, killing

Troubleshooting

Identify the unique reader troubleshooting challenges for the Back Room Inventory Fill example. Reference *Introduction on page 6-1* for a troubleshooting overview.

- Reference *Troubleshooting on page 6-1* for standard procedures and provide the unique reader troubleshooting requirements for a Back Room Inventory Fill installation.

Exit/Entry

Exit/Entry example prameters: The reader reads 1-20 tags, moving at 4-7 feet per second at distances between 2-8 feet and a read duration 7 seconds.

Filtering may be required depending on environment. Indicate how to adjust the power is (typically a tuning parameter). This is a short range application, indicate how to optimize this application. Indicate how to write to tags with the possibility of writing to the wrong tag.

Installation

Identify the unique installation challenges for the Exit/Entry example.The location of the reader and antennas will be discussed and the procedures to optimize the tag reads.

- Reference *RFID Technology Overview on page 2-1* for RFID overview.
  - Reference *Introduction on page 3-1* for an installation overview.
  - Reference *Communications Connections on page 3-6* for standard communications connections overview and provide the unique communications connections installation for a Exit/Entry installation.
  - Reference *Reading Tags on page 3-7* for standard overview and provide the unique tag reading installation requirements for a Exit/Entry installation. 2 AN480 were used with power setting to 30dBm.

Configuration and Optimization

Identify the unique configuration and optimization challenges for the Exit/Entry example. Reference *Introduction on page 4-1* for a configuration overview.

- Reference *Reader Administrator Console on page 4-12* for standard procedures.
- Reference *Managing the FX Series RFID Readers on page 4-2* for standard reader management overview and provide the unique reader management configuration optimization requirements for a Exit/Entry installation.

Optimizing Reader Functions

Identify the unique function optimization challenges for the Exit/Entry example.

For each setup illustrate:

- Filtering (select statement)
- Query tuning (Q, Session, Select bit)
- Post read filtering
- Writing, locking, killing

Troubleshooting

Identify the unique reader troubleshooting challenges for the Exit/Entry example. Reference *Introduction on page 6-1* for a troubleshooting overview.

- Reference *Troubleshooting on page 6-1* for standard procedures and provide the unique reader troubleshooting requirements for a Exit/Entry installation.

Shelf/Tool Crib Cage

Shelf/Tool Crib Cage example prameters: The reader reads 500 tags in 4 seconds at a distance of less than 12 feet.

Describe how to optimize filtering to avoid stray tags (outside the solution).

Installation

Identify the unique installation challenges for the Shelf/Tool Crib CageShelf/Tool Crib CageShelf/Tool Crib CageShelf/Tool Crib CageShelf/Tool Crib Cage example.The location of the reader and antennas will be discussed and the procedures to optimize the tag reads.

- Reference *RFID Technology Overview on page 2-1* for RFID overview.
  - Reference *Introduction on page 3-1* for an installation overview.
  - Reference *Communications Connections on page 3-6* for standard communications connections overview and provide the unique communications connections installation for a Shelf/Tool Crib Cage installation.
  - Reference *Reading Tags on page 3-7* for standard overview and provide the unique tag reading installation requirements for a Shelf/Tool Crib Cage installation.
  - 4 AN480 were used with power setting to 30dBm.

Configuration and Optimization

Identify the unique configuration and optimization challenges for the Shelf/Tool Crib Cage example. Reference *Introduction on page 4-1* for a configuration overview.

- Reference *Reader Administrator Console on page 4-12* for standard procedures.
- Reference *Managing the FX Series RFID Readers on page 4-2* for standard reader management overview and provide the unique reader management configuration optimization requirements for a Shelf/Tool Crib Cage installation.

Optimizing Reader Functions

Identify the unique function optimization challenges for the Shelf/Tool Crib Cage example.

For each setup illustrate:

- Filtering (select statement)
- Query tuning (Q, Session, Select bit)
- Post read filtering
- Writing, locking, killing

Troubleshooting

Identify the unique reader troubleshooting challenges for the Shelf/Tool Crib Cage example. Reference *Introduction on page 6-1* for a troubleshooting overview.

- Reference *Troubleshooting on page 6-1* for standard procedures and provide the unique reader troubleshooting requirements for a Shelf/Tool Crib Cage installation.

Transition/Impact Door

Transition/Impact Door example prameters: Reader reads 200 tags moveing at 2~4 ft/sec for 7 seconds.

Can be single item, multiple items, or multiple tags (only interested in one). Readers can be in a dense environment or separated /shielded area. The opportunity to write is typically a lower priority then speed. Additional filtering may be needed. Indicate how reads can be triggered. Indicate how to show direction with paired antennas.

Installation

Identify the unique installation challenges for the Transition/Impact Door example.The location of the reader and antennas will be discussed and the procedures to optimize the tag reads.

- Reference *RFID Technology Overview on page 2-1* for RFID overview.
  - Reference *Introduction on page 3-1* for an installation overview.
  - Reference *Communications Connections on page 3-6* for standard communications connections overview and provide the unique communications connections installation for a Transition/Impact Door installation.
  - Reference *Reading Tags on page 3-7* for standard overview and provide the unique tag reading installation requirements for a Transition/Impact Door installation.
  - 4 AN480 were used with a setting of 30dBm.

Configuration and Optimization

Identify the unique configuration and optimization challenges for the Transition/Impact Door example. Reference *Introduction on page 4-1* for a configuration overview.

- Reference *Reader Administrator Console on page 4-12* for standard procedures.
- Reference *Managing the FX Series RFID Readers on page 4-2* for standard reader management overview and provide the unique reader management configuration optimization requirements for a Transition/Impact Door installation.

Optimizing Reader Functions

Identify the unique function optimization challenges for the Transition/Impact Door example.

For each setup illustrate:

- Filtering (select statement)
- Query tuning (Q, Session, Select bit)
- Post read filtering
- Writing, locking, killing

Troubleshooting

Identify the unique reader troubleshooting challenges for the Transition/Impact Door example. Reference *Introduction on page 6-1* for a troubleshooting overview.

- Reference *Troubleshooting on page 6-1* for standard procedures and provide the unique reader troubleshooting requirements for a Transition/Impact Door installation.

Back Room Receiving

Back Room Receiving example prameters: The reader reads 500 tags in 5 seconds, within a distance of 10 feet.

Can be single item, multiple items, or multiple tags. Readers can be in a dense environment or separated /shielded area. The opportunity to write is typically a lower priority then speed. Additional filtering may be needed. Indicate how reads can be triggered. Indicate how to show direction with paired antennas.

Installation

Identify the unique installation challenges for the Back Room Receiving example. The location of the reader and antennas (under the read table) will be discussed and the procedures to optimize the tag reads.

- Reference *RFID Technology Overview on page 2-1* for RFID overview.
  - Reference *Introduction on page 3-1* for an basic installation overview.
  - Reference *Communications Connections on page 3-6* for standard communications connections overview and provide the unique communications connections installation for a Back Room Receiving installation.
  - Reference *Reading Tags on page 3-7* for standard overview and provide the unique tag reading installation requirements for a Back Room Receiving installation. Discuss the 4 AN480 antenna locations and the 30dBm power setting.

Configuration and Optimization

Identify the unique configuration and optimization challenges for the Back Room Receiving example. Reader reader was optimized to read 50-100 tags in 5 seconds, within 2-6 feet. Reference *Introduction on page 4-1* for a configuration overview.

- Reference *Reader Administrator Console on page 4-12* for standard procedures.
- Reference *Managing the FX Series RFID Readers on page 4-2* for standard reader management overview and provide the unique reader management configuration optimization requirements for a Back Room Receiving installation.

Optimizing Reader Functions

Identify the unique function optimization challenges for the Back Room Receiving example.

For each setup illustrate:

- Filtering (select statement)
- Query tuning (Q, Session, Select bit)
- Post read filtering
- Writing, locking, killing

Troubleshooting

Identify the unique reader troubleshooting challenges for the Back Room Receiving example. Reference *Introduction on page 6-1* for a troubleshooting overview.

- Reference *Troubleshooting on page 6-1* for standard procedures and provide the unique reader troubleshooting requirements for a Back Room Receiving installation.

Shelf/Tool Crib/Cage Inventory (stretched target)

Shelf/Tool Crib/Cage Inventory (stretched target) example prameters: The reader reads 500 tags in 5 seconds, at a distance of 12 feet.

Can be single item, multiple items, or multiple tags (only interested in one). Readers can be in a dense environment or separated /shielded area. Additional filtering may be needed. Indicate how reads can be triggered. Indicate how to show direction with paired antennas.

Installation

Identify the unique installation challenges for the Shelf/Tool Crib/Cage Inventory (stretched target) example.The location of the reader and antennas will be discussed and the procedures to optimize the tag reads.

- Reference *RFID Technology Overview on page 2-1* for RFID overview.
  - Reference *Introduction on page 3-1* for an installation overview.
  - Reference *Communications Connections on page 3-6* for standard communications connections overview and provide the unique communications connections installation for a Shelf/Tool Crib/Cage Inventory (stretched target) installation.
  - Reference *Reading Tags on page 3-7* for standard overview and provide the unique tag reading installation requirements for a Shelf/Tool Crib/Cage Inventory (stretched target) installation.

Configuration and Optimization

Identify the unique configuration and optimization challenges for the Shelf/Tool Crib/Cage Inventory (stretched target) example. Reference *Introduction on page 4-1* for a configuration overview.

- Reference *Reader Administrator Console on page 4-12* for standard procedures.
- Reference *Managing the FX Series RFID Readers on page 4-2* for standard reader management overview and provide the unique reader management configuration optimization requirements for a Shelf/Tool Crib/Cage Inventory (stretched target) installation.

Optimizing Reader Functions

Identify the unique function optimization challenges for the Shelf/Tool Crib/Cage Inventory (stretched target) example.

For each setup illustrate:

- Filtering (select statement)
- Query tuning (Q, Session, Select bit)
- Post read filtering
- Writing, locking, killing

Troubleshooting

Identify the unique reader troubleshooting challenges for the Shelf/Tool Crib/Cage Inventory (stretched target) example. Reference *Introduction on page 6-1* for a troubleshooting overview.

- Reference *Troubleshooting on page 6-1* for standard procedures and provide the unique reader troubleshooting requirements for a Shelf/Tool Crib/Cage Inventory (stretched target) installation.

Associating Tags (writing tags) with BC, Re-Commission

Associating Tags (writing tags) with BC, re-commission example prameters: The reader reads X tags in X seconds at a distance of X feet.

Can be single item, multiple items, or multiple tags (only interested in one). Readers can be in a dense environment or separated /shielded area. Additional filtering may be needed. Indicate how reads can be triggered.

Installation

Identify the unique installation challenges for the Associating Tags (writing tags) with BC, re-commission example.The location of the reader and antennas will be discussed and the procedures to optimize the tag reads.

- Reference *RFID Technology Overview on page 2-1* for RFID overview.
  - Reference *Introduction on page 3-1* for an installation overview.
  - Reference *Communications Connections on page 3-6* for standard communications connections overview and provide the unique communications connections installation for a Associating Tags (writing tags) with BC, re-commission installation.
  - Reference *Reading Tags on page 3-7* for standard overview and provide the unique tag reading installation requirements for a Associating Tags (writing tags) with BC, re-commission installation.

Configuration and Optimization

Identify the unique configuration and optimization challenges for the Associating Tags (writing tags) with BC, re-commission example. Reference *Introduction on page 4-1* for a configuration overview.

- Reference *Reader Administrator Console on page 4-12* for standard procedures.
- Reference *Managing the FX Series RFID Readers on page 4-2* for standard reader management overview and provide the unique reader management configuration optimization requirements for a Associating Tags (writing tags) with BC, re-commission installation.

Optimizing Reader Functions

Identify the unique function optimization challenges for the Associating Tags (writing tags) with BC, re-commission example.

For each setup illustrate:

- Filtering (select statement)
- Query tuning (Q, Session, Select bit)
- Post read filtering
- Writing, locking, killing

Troubleshooting

Identify the unique reader troubleshooting challenges for the Associating Tags (writing tags) with BC, re-commission example. Reference *Introduction on page 6-1* for a troubleshooting overview.

- Reference *Troubleshooting on page 6-1* for standard procedures and provide the unique reader troubleshooting requirements for a Associating Tags (writing tags) with BC, re-commission installation.

Chapter 6 Troubleshooting

Introduction

Table 6-1 on page 6-1 provides the FX Series troubleshooting information.

Troubleshooting

Table 6-1 *Troubleshooting*

Problem	Possible Causes	Possible Solutions
Reader error LED lights after the reader has been 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 connect to the reader.	User name and password is unknown.	The default user name is **admin** and the default password is **change**. To change the user name and password. See *Communications Connections on page 3-6*.
Reader is not reading tags.	1. The tag is out of its read range 2. Antennas not connected 3. Tags are damaged 4. Tags are not EPCgen2 5. If reading with the reader's web page, Java 1.6 or later may not be installed	1. Move the tag into the read range. See *Read Tags on page 4-18*. 2. Connect antennas 3. Confirm that tags are good 4. Confirm that tags are EPCgen2 5. Install Java 1.6. See*Java Upgrade Procedures on page C-1*
Cannot access the **Administrator Console**.	The IP address is unknown.	See *Communications Connections on page 3-6* to view the IP address.

Table 6-1 *Troubleshooting (Continued)*

Problem	Possible Causes	Possible Solutions
Cannot log in to the terminal based **Administrator Console**.	The web based **Administrator Console** is in use for that reader.	Log out of the web based console and restart the terminal software to re-attempt log in.
Certain real time applications are no longer functional.	The node address was changed, the IP address, or other reader configuration parameter(s) using the **Administrator Console**, 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 **Administrator Console**, so other applications cannot connect to the reader.	Log out of the **Administrator Console**.
Cannot log into **Administrator Console**.	User forgot the password.	Press and hold the reset button for more than 5 seconds. This resets the reader configuration to factory defaults, including the password.
Unable to add SNTP server, reader returning error	SNTP server not reachable. SNTP server name not resolvable via DNS server. DNS server not reachable.	Ensure SNTP server is reachable. Ensure DNS server name is configured in TCP/IP configuration. Ensure DNS server is reachable.
Operation failed	A user operation did not complete, typically due to invalid input.	Validate all the inputs and then retry the operation. If it is not successful, see *Service Information on page xi*.
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, contact Service (see *Service Information on page xi*).
Session has Timed-out - Log in again	The current session was inactive beyond the time-out period, 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.
User Name is not correct	1. The User Name does not match the current user registry (may be illegal characters, too long, too short, unknown or duplicate.) 2. User forgot the user ID.	1. Accurately retype the User Name. 2. Contact Service (see *Service Information on page xi*)

Table 6-1 *Troubleshooting (Continued)*

Problem	Possible Causes	Possible Solutions
The user name has already been used.	The User Name is duplicated when adding a new user to the user registry.	Retype a new User Name.
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, contact Service (see *Service Information on page xi*)
Invalid network mask.	The network mask entered is not formatted correctly.	Confirm the correct network mask from network administrator and type it in 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.	1. The password does not match the current user registry (may be illegal characters, too long, or too short.) 2. User forgot the password.	1. Accurately retype the password. 2. Contact Service (see *Service Information on page xi*)
Name has already been used. Serial Number has already been used. IP Address has already been used.	The Name, Serial Number, or IP Address entered already exists in the system.	Enter a unique value for the new Name, Serial Number, or IP Address.
Select an item from the list.	The system requires that an item must be selected from the list box before continuing.	Select an item from the list box, and then continue.
Last command is still pending. Try again later.	The system has not completed processing the previous command.	Wait a few moments for the previous command to complete, before sending another command.
Another Administrator is currently logged in. Try again later.	The system will 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.
Backup configuration file does not exist.	The system cannot revert to a backup of the current configuration unless a backup file exists.	Commit the new configuration to create a backup file.

Table 6-1 *Troubleshooting (Continued)*

Problem	Possible Causes	Possible Solutions
Failed to confirm the new Password.	The system requires that the password must be identically two times.	Accurately retype the password twice.
Network configuration change(s) have not been saved.	The user has requested to log out prior to committing/reverting the changes made during their session.	Select one of the Commit/Revert options.
New Password is the same as the old one.	The system requires the entry of a new password (that is different from the existing password) during the **Change Password** operation.	enter a new password that is different from the existing password.
Old Password is not correct.	The system requires the entry of the existing password during the Change Password operation.	Accurately retype the password the existing password.
Commit Finished - New Configuration Changes have been accepted. Discard Accepted - Configuration reverted to last committed version. Operation was Successful	Requested function was performed.	No action required. The system is reporting that the request was accepted.
Unspecified error occurred - code: ####	A specific error message is missing for the given status code.	Note the code number, and contact Motorola Enterprise Mobility support. See *Service Information on page xi*.
The requested page was not found. Internal Web Server Error.	The system experienced an internal web server error.	Contact Motorola Enterprise Mobility support. See *Service Information on page xi*
Request method was NULL. No query string was provided.	The system does not permit a proxy program to be executed 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.

Table 6-1 *Troubleshooting (Continued)*

Problem	Possible Causes	Possible Solutions
Unhandled reply type.	The system generated an unexpected value.	Contact Motorola Enterprise Mobility support. See *Service Information on page xi*.
Failed to open port. Failed to connect. Failed to transmit. Failed to receive. Error during Receive of Command.	Error during receive of command.	Contact Motorola Enterprise Mobility support. See *Service Information on page xi*.
Invalid Device Address.	The device address info (parent) is invalid, missing, or formatted inaccurately.	Contact Motorola Enterprise Mobility support. See *Service Information on page xi*.
Command parsing state error. Missing argument for the command. Command internal type cast error. Missing operator. Unknown operator.	A command has been formatted inaccurately.	Contact Motorola Enterprise Mobility support. See *Service Information on page xi*.
The action must be confirmed.	The requested action must be confirmed by user before it is actually executed.	Select the confirmation option when issue this request.

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

Appendix A Technical Specifications

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 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
Mounting Dimensions (Mounting Holes)	2 holes required, center to center 4.192 inches
Weight	1.8 lbs (kg)
Base Material	Die cast aluminum, sheet metal and plastic.
LEDs	Multi-color LEDs: Power, Activity, Status and Applications
FX Environmental Specifications	
Operational Temperature	14° to +122° F/-10° to +50° C
Storage Temperature	-40° to +158° F/-40° to +70° C
Humidity	5 to 85% non-condensing
Vibration	Vibration Operational: 5.5 Grms, 0.02G2/Hz Random 20 Hz to 1000 Hz rolling off at -6 dB/octave to 2000 Hz for 1 hour per axis in all three axes.
Connectivity	
Communications	10/100 BaseT Ethernet (RJ45) w/ POE support USB Client (USB Type B)
General Purpose I/O	2 inputs, 2 outputs, optically isolated (Terminal Block)
Power	+24Vdc or POE (IEEE 802.3af)

Table A-1 *Technical Specifications (Continued)*

Item	FX		
Antenna Ports	FX 7400-4: 4 mono-static ports (Reverse Polarity TNC) FX 7400-2: 2 mono-static ports (Reverse Polarity TNC)		
Compliance Information			
Safety	cUL 60950-01, UL 2043, IEC 60950-1, EN 60950-1		
RF/EMI/EMC	FCC Part 15, RSS 210, EN 302 208, ICES-003 Class B, EN 301 489-1/3		
SAR/MPE	FCC 47CFR2:OET Bulletin 65; EN 50364		
Other	ROHS, WEEE		
Antenna Parameters	FX Series	US	EU
	Max Conducted RF Power	+ 30dBm	+29.2dBm
	Max Antenna Gain Allowed (including cable loss)	+ 6dBiL	+ 6dBiL
	Max Radiated Power Allowed	4W EIRP	2W ERP
	Maximum Beam Width	N/A	Per EN 302 208
Hardware/OS and Firmware Management			
Memory	Flash 64 MB; DRAM 64 MB		
Operating System	Microsoft Windows CE 5.0		
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, SSH, HTTP, FTP, Telnet, SNMP and NTP		
Air Protocols	ISO 18000-6C (EPC Class 1 Gen 2)		
Frequency (UHF Band)	902 MHz to 928 MHz, 865 MHz to 868 MHz		
Power Output	+15dBm to +30dBm		
IP addressing	Static and Dynamic		
Host Interface Protocol	LLRP		
API Support	.NET, C and JAVA		
Warranty			
The FX7400-4 and FX7400-2 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 Motorola hardware product warranty statement, go to: http://www.motorola.com/enterprisemobility/warranty			

Cable Pinouts

10/100bT Ethernet / POE Connector

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

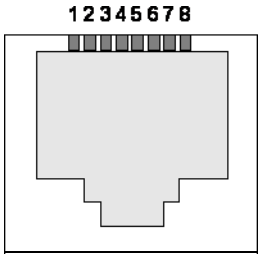

Figure A-1 *Ethernet Connections*

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	O	TX Data Positive Rail	Positive Vport, Negative Vport	
Pin 2	TX-N	O	TX Data Negative Rail	Positive Vport, Negative Vport	
Pin 3	RX-P	I	RX Data Positive Rail	Positive Vport, Negative Vport	
Pin 4	NC	-	No Connect		Positive Vport, Negative Vport
Pin 5	NC	-	No Connect		Positive Vport, Negative Vport
Pin 6	RX_N	I	RX Data Positive Rail	Positive Vport, Negative Vport	
Pin 7	NC	-	No Connect		Positive Vport, Negative Vport
Pin 8	NC	-	No Connect		Positive Vport, Negative Vport

USB Client Connector

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

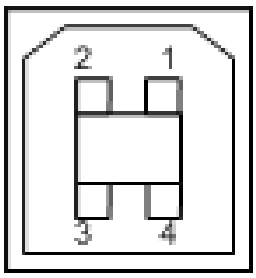

Figure A-2 *USB Client Connector*

Table A-3 *USB Client Port Connector Pinout*

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

GPIO Port Connections

These are plug terminal block types, allowing connecting and disconnecting individual wires independently. Separate connectors are used for inputs and outputs. See *Table A-4* for pin descriptions.

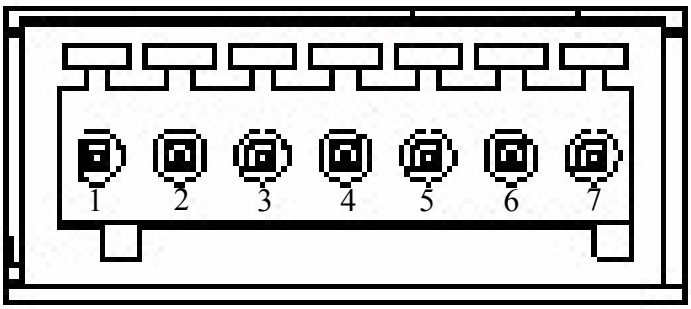

Figure A-3 *FX Series RFID Reader GPIO Connection*

Table A-4 *GPIO Pin Outs*

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

Third Party Software

The FX Series readers use third party open source and licensed software:

- **SSH**: Open SSH for Windows CE is part of the Microsoft open source project hosting web site Codeplex.com. For more details about the Open SSH for Windows CE visit http://www.codeplex.com/CESSH.
- **FTPS Server and Client**: Motorola customized the open source project IndiFTPD for Windows CE and ported it to FX Series readers. For more details about IndiFTPD projects visit http://sourceforge.net/projects/indiftpd/.
- **Openssl** : The OpenSSL Project is a collaborative effort to develop a robust, commercial-grade, full-featured, and Open Source toolkit implementing the Secure Sockets Layer (SSL v2/v3) and Transport Layer Security (TLS v1) protocols as well as a full-strength general purpose cryptography library. The project is managed by a worldwide community of volunteers that use the Internet to communicate, plan, and develop the OpenSSL toolkit and its related documentation. Open source URL is http://openssl.org.
- **FTPS Client**: Download from http://bsdftpd-ssl.sc.ru/download.html. License details are available in the attached COPYRIGHT file.
- **Polaris Network LLRP Tester**: Polaris Networks, Inc. non-open source tool. Purchased license for LLRP Protocol conformance testing.
- **LLRP Toolkit**: Download from http://sourceforge.net/projects/llrp-toolkit/. Open Source, Apache license v2. The license is available at http://www.apache.org/licenses/LICENSE-2.0.
- **Win32 pThreads**: Download from http://sourceware.org/pthreads-win32/. Open Source, GNU Lesser General Public License.
- **Code Synthesis XSD/e**: Download from http://www.codesynthesis.com/products/xsde/download.xhtml. Open Source, GNU General Public License 2. Visit http://www.codesynthesis.com/products/xsde/license.xhtml.
- **Yahoo User Interface (YUI)**: Download from http://developer.yahoo.com/yui/. Open source, BSD license. Visit http://developer.yahoo.com/yui/license.html.
- **Net-SNMP**: Download from http://www.net-snmp.org/. Open source, BSP like license (CMU/UCD license). See http://www.net-snmp.org/about/license.html.
- **LibXML2**: Parent site: http://xmlsoft.org, downloaded from ftp://xmlsoft.org/libxml2/. Open source, MIT License. Visit http://www.opensource.org/licenses/mit-license.html.
- **Intel R2000 firmware**: Delivered by Intel support. Refer to Intel R2000 SW License.pdf.
- **DPWSCore**: Parent site: https://forge.soa4d.org/projects/dpwscore/. Open source Lesser GNU Public License.
- **gSOAP**: GeniviaGSoapLicense.pdf and MotorolaPO-NP4702753.pdf. Site: http://www.cs.fsu.edu/~engelen/soap.html. Software development Site License.

Appendix B Firmware Upgrade Procedures

Introduction

This appendix provides the reader firmware upgrade procedure using the web-based **Administrative Console**. There are two methods to update reader firmware:

- *Update Method 1, Use a LAN on page B-3* - the preferred method when there are a number of readers connected to a LAN.
- *Update Method 2, Direct Connect Over the Ethernet Port on page B-5* - the preferred method when updating a single reader using an Ethernet crossover cable.

Each of the following types of firmware performs unique changes to the current settings and can be upgraded independently. Available firmware includes:

- Monitor Version
- OS Version
- Application Server Version
- MAC Radio Firmware Version
- Radio API Version

Prerequisites

The following items are required to perform the update:

- Reader with power supply
- Laptop (or other host computer)
- If using the LAN Update procedure, a Cat5 ethernet cable is required
- If using the Direct-Connect update procedure a Cat5 Crossover cable is required
- An ftp server on the host computer

- Current firmware file examples:
  - OSUpdFalcon.exe
  - response.txt
  - FlashUpdateUtility.dll
  - FalRData*XXX*.hex (**Data** partition, *XXX* is a filename variable)
  - FalRConfig*XXX*.hex (Reader Config, *XXX* is a filename variable)
  - FalPlat*XXX*.hex (**Platform** partition, *XXX* is a filename variable)
  - FalParTbl*XXX*.hex (Partition table, *XXX* is a filename variable)
  - FalOSUnrel*XXXXX*.hex (OS, *XXXXX* is a filename variable)
  - FalMon*XXXX*.hex (Monitor, *XXXX* is a filename variable)
  - FalData*XXX*.hex (**Data** partition, *XXX* is a filename variable)
  - FalConfArea*XXX*.hex (Reader Config, *XXX* is a filename variable)
  - FalBkupOS*XXXXX*.hex (OS, *XXXXX* is a filename variable)
  - FalApp*XXX*.hex (Application, *XXX* is a filename variable)

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

Refer to the release notes to determine which files were updated; not all of the files are updated in every release. There is no specific order necessary when installing these files.

Auto Recovery

The Auto Recovery feature allows the reader to recover flash images that are corrupt due to a power outage during software upgrade. If a firmware upgrade (over LAN) fails (e.g., due to a power outage), on the next reboot the reader retries the update from the same remote server. If reader cannot complete the update, a recovery web page appears when accessing the reader management interface via a web browser. To reattempt upgrade, enter the FTP server path and credentials.

NOTE The recovery console supports only the FTP mode update, and does not support secure FTP (FTP over TLS explicit) or CAB file update.

Update Phases

The firmware update takes place in two phases:

Phase 1 - The reader application retrieves the **Response.txt**, **osupdFX.exe**, and **FlashUpdateUtility.dll** 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.

A typical entry in the **Response.txt** is:

;*Platform* partition version 1.2.7

-t4 -FXc42PlatH127.hex -s2679149

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.

Update Method 1, Use a LAN

This is the preferred method, since readers are typically on a LAN and the update does not require existing connections to change.

1. Create a folder on a local ftp server and name it: **\FXUPDT\ReleaseXXX**.
2. Download the firmware files from http://www.support.symbol.com into this folder and unzip the files if they are zipped.
3. Ensure that the readers can be pinged from the host computer. If they cannot, consult with the network administrator.
4. On the reader to update, access the web based **Administrator Console**:
   a. Open a browser and type the IP address of the reader to update (format example: http://157.235.88.147). The **Reader Administrator Console** login screen appears. See *Connect to the Reader on page 4-3*.
   b. Enter the user name and password. If this is the first time accessing the console, a prompt appears for a user name and password update. The default settings are:

      Username: **admin**

      Password: **change**

      The **Administrator Console Main Menu** appears. See *Figure 4-14 on page 4-12*.
5. From the **Console Main Menu** select **Scan Control the Reader Scan Control**.
6. Click the **Enable/Disable Polling** button to set **Disable Polling**. The button reads **Enable Polling** when polling is disabled.
7. Select **Maintenance**. The **Reader Maintenance Console** appears. See *Figure 4-1 on page 4-2*. [refers to Maintenance chapter that was removed; remove step??]
8. Select **Version**. The **Version Control** screen appears with the current version information. See *Figure 4-14 on page 4-22*. [refers to Maintenance chapter that was removed; remove step??]
9. To upgrade the firmware:
   a. Ensure the ftp server is running on the host computer.
   b. Ensure the TFTP server is running on the host computer, and that the file path is the same as when logging on using the FTP server.
   c. On the **Version Control** screen, enter in the following information:

      For the ftp Server link, enter *ftp:///<ip address of host computer>/filepath (format example: ftp:///192.168.1.3// FX UPDT/ReleaseXXX)*. Be sure to enter an IP address; entering the host name does not work.

      Enter the ftp server user name.

      Enter the ftp server password.

NOTE If using the default host computer ftp server, the system user name and password may be required (consult the system administrator).

d. Click **Start Update** to start the update. The reader indicates that it is going to shutdown.

e. The green LED on the reader flashes during the update. The reader application software first downloads **osupFX.exe**, **FlashUpdateUtility.dll**, and **Response.txt** files, starts running **Osupdate**, and shuts down. **Osupdate** then downloads all the files specified in the **Response.txt** file into RAM, and if successful writes the files to Flash. If the ftp is not successful, no files are written to Flash.

f. The update can take up to 15 minutes. Do not remove power to the reader or reboot the reader during the update.

g. The reader reboots when the update completes.

h. If the reader is set up with a static IP address, it restores the static IP address and reboots again.

i. The reader may reboot a third time if the FPGA version has changed.

NOTE During the FPGA update, all the LEDs turn off for about 90 seconds.

If there is a power outage during the upgrade, when the power comes back on, the reader Monitor program retrieves all the files using the TFTP server and saves them to Flash.

10. Log onto the web console, access the **Version Control** screen, and verify the new upgrade version is running.

Update Method 2, Direct Connect Over the Ethernet Port

Use this method to update a reader that is not on a LAN.

1. Use the serial **Administrator Console** to disable DHCP on the reader, and configure it for a static IP address (192.168.1.3).
2. Configure the host computer to reside on the same subnet as the reader:
   a. Open Network Connections and locate the connection to use to connect to the reader.
   b. Open the **TCP/IP Connection Properties** window. Modify this to use a static IP address on the same subnet as the reader (192.168.1.5). Click **OK**.

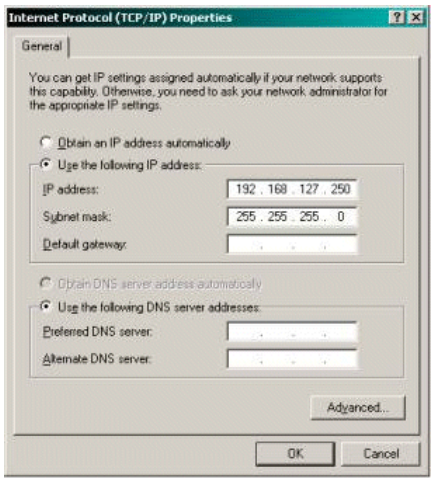

Figure B-1 *TCP/IP Connection Properties Screen*

3. Connect the Cat5 crossover cable from the host computer to the reader.
4. On the reader, access the web-based **Administrator Console**:
   a. Open a browser and type http://192.168.1.3 (or the IP address of the reader to upgrade, if it is not the default address above). The **Reader Administrator Console** login screen appears. See *Connect to the Reader on page 4-3*.
   b. Enter the user name and password. If this is the first time accessing the console, a prompt appears for a user name and password update. The default settings are:

      Username: **admin**

      Password: **change**

      The **Console Main Menu** appears. See *Figure 4-14 on page 4-12*.
5. From the **Console Main Menu** select **Scan Control**. The **Reader Scan Control** screen appears.
6. Click the **Enable/Disable Polling** button to set to **Disable Polling**. The button reads **Enable Polling** if polling is disabled.
7. Select **Maintenance**. The **Reader Maintenance Console** appears. See *Figure 4-1 on page 4-2*. [refers to Maintenance chapter that was removed; remove step??]
8. Select **Version.** The **Version Control** window displays the current version information. See *Figure 4-14 on page 4-22*. [refers to Maintenance chapter that was removed; remove step??]

9. Upgrade the firmware:

   NOTE Refer to the release notes to determine which files changed; Not all of the files are updated in every release. There is no specific order necessary when installing these files.

   a. Ensure that an ftp server is running on the host computer.

      Do not change any other default setting (the necessary defaults should already be in C:/FXUPDT/ReleaseXXX).

   b. On the **Version Control** screen, enter in the following information:

      For the ftp Server link, enter *ftp:///<ip address of host computer>/filepath (ftp:///192.168.1.5// FXUPDT/ReleaseXXX)*. Be sure to enter an IP address; entering the host name does not work.

      Enter the ftp server user name.

      Enter the ftp server password.

   NOTE If using the default host computer ftp server, the system user name and password may be required (consult the System Administrator).

   c. Click **Start Update**. See *Figure 4-14 on page 4-22*. The reader indicates that it is shutting down. [refers to Maintenance chapter that was removed; remove step??]

   d. The green LED on the reader flashes during the update. The reader application software first downloads **osupFX.exe**, **FlashUpdateUtility.dll**, and **Response.txt** files, starts running **Osupdate**, and shuts down. **Osupdate** then downloads all files specified in the **Response.txt** file into RAM, and if successful writes the files to Flash. If the ftp is not successful, no files are written to Flash.

   e. This update can take up to 15 minutes. Do not remove power to the reader or reboot the reader during the update.

   f. The reader reboots when the update completes.

10. Log onto the web console and access the **Version Control** window. Verify the new upgrade version is running.

Appendix C Java Upgrade Procedures

Introduction

The FX Series reader browser interface requires Java1.6 or later. To confirm the Java version in the Internet Explorer web browser, go to **Tools** > **Internet Options** > **Advanced** tab:

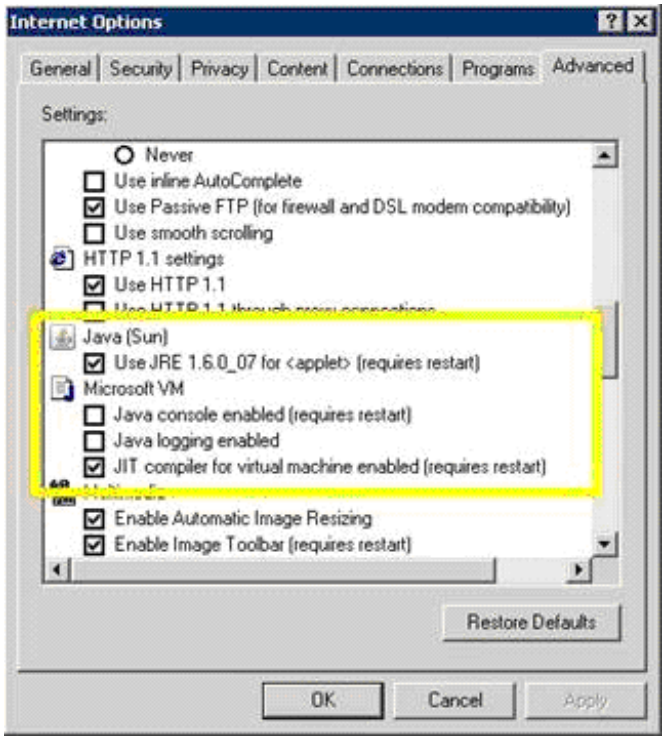

Figure C-1 *Java Version Window*

Install Java 1.6 or later if the virtual machine configuration entries are missing, or if an earlier version is installed. Download JVM from http://www.java.com/en/download/manual.jsp

Appendix D Static IP Configuration

Introduction

This appendix describes three methods of setting the static IP address on an FX7400 RFID Reader.

DHCP Network is Available - Set the Static IP Using the Web Console

1. Browse the device using the host name, e.g., FX7400CD3B1E.
2. Log onto the device.

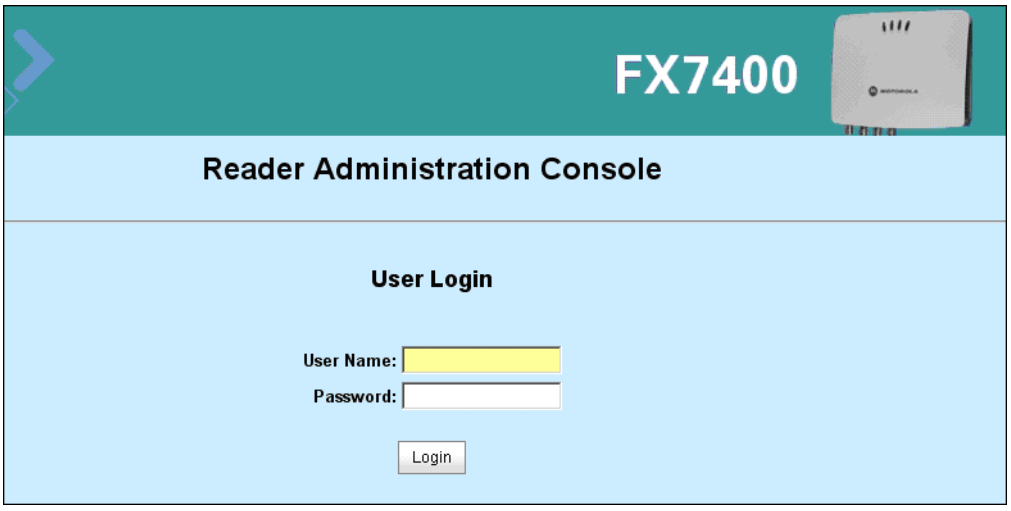

Figure D-1 *Reader Administration Console Login Window*

3. Click **Communication**, then click **Network**.

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

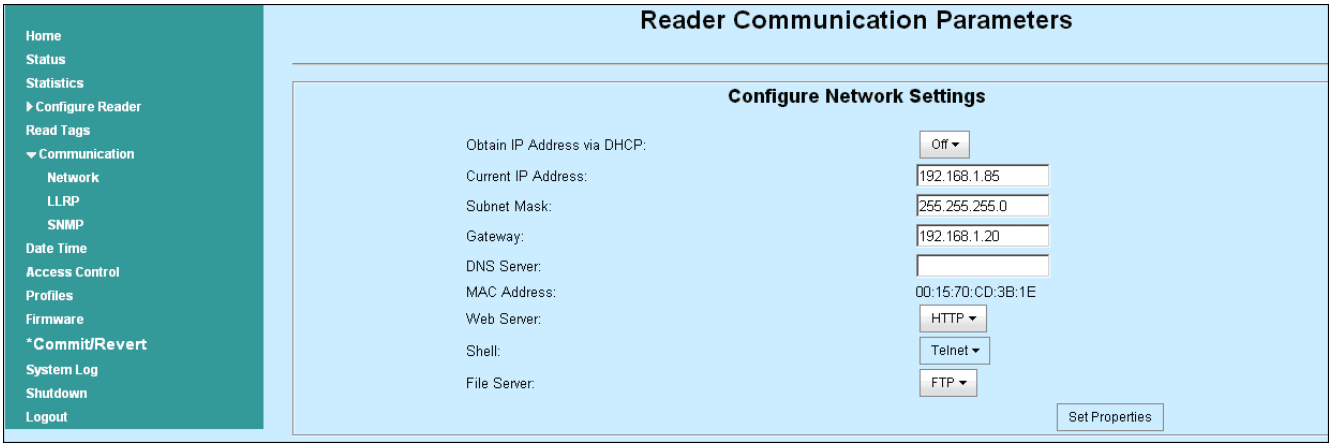

Figure D-2 *Reader Communication Parameters Window*

5. Click **Set Properties**. You can set a static IP that doesn't belong to this DHCP network.

6. Click **Commit/Revert**, then click the **Commit** button.

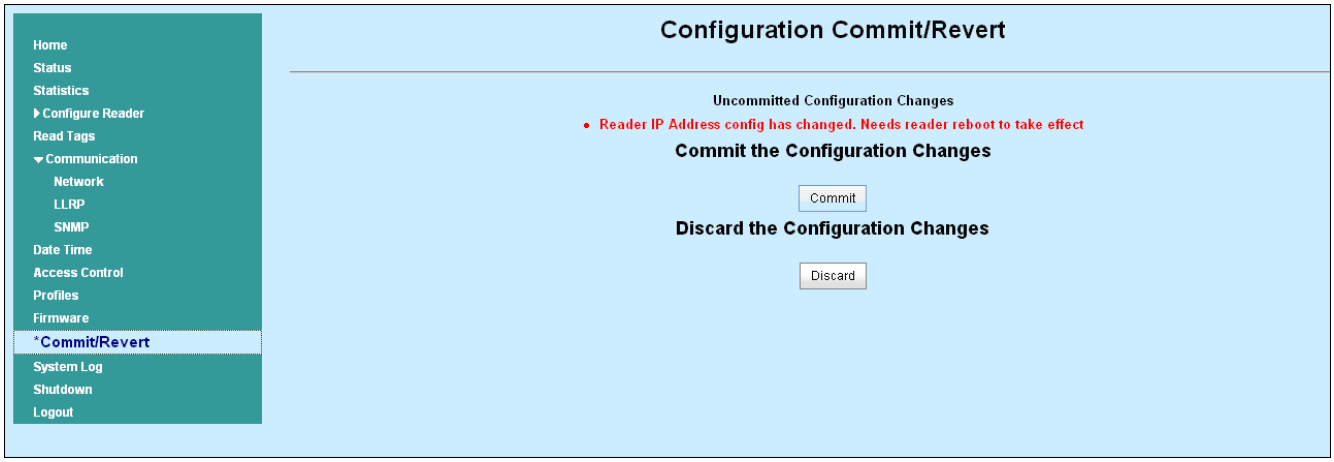

Figure D-3 *Commit/Revert Window*

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.

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 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**.

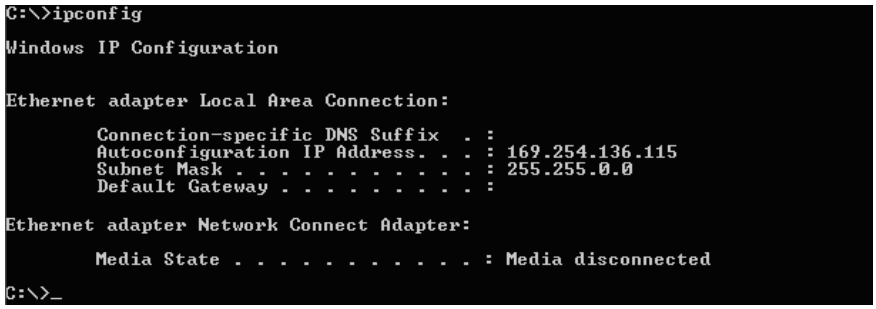

Figure D-4 *Obtain IP Address*

4. When possible, ping the hostname of the device.

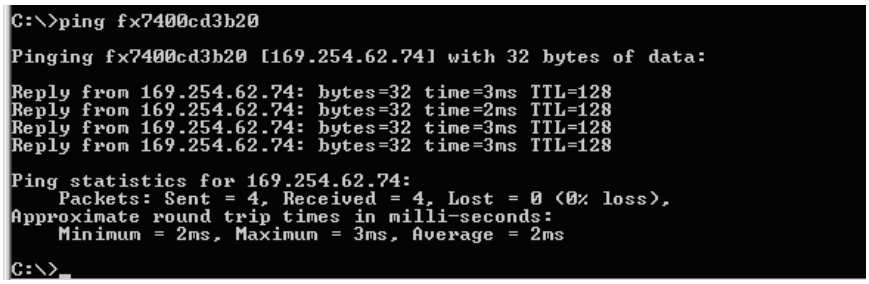

Figure D-5 *Ping the Hostname*

5. Browse the device with host name, e.g., FX7400CD3B1E.

6. Log onto the device.

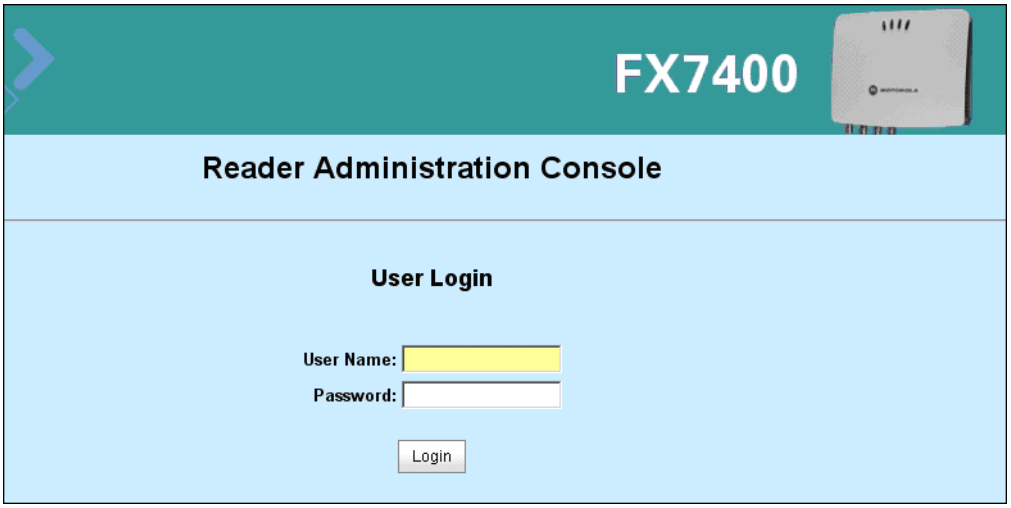

Figure D-6 *Reader Administration Console Login Window*

7. Click **Communication**, then click **Network**.

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

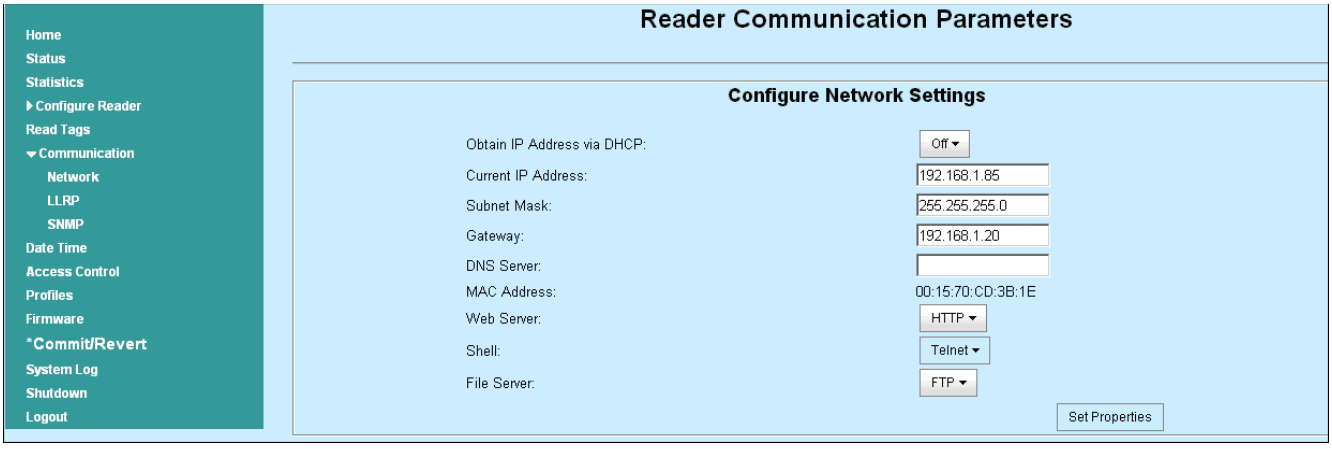

Figure D-7 *Reader Communication Parameters Window*

9. Click **Set Properties**.

10. Click **Commit/Revert**, then click the **Commit** button.

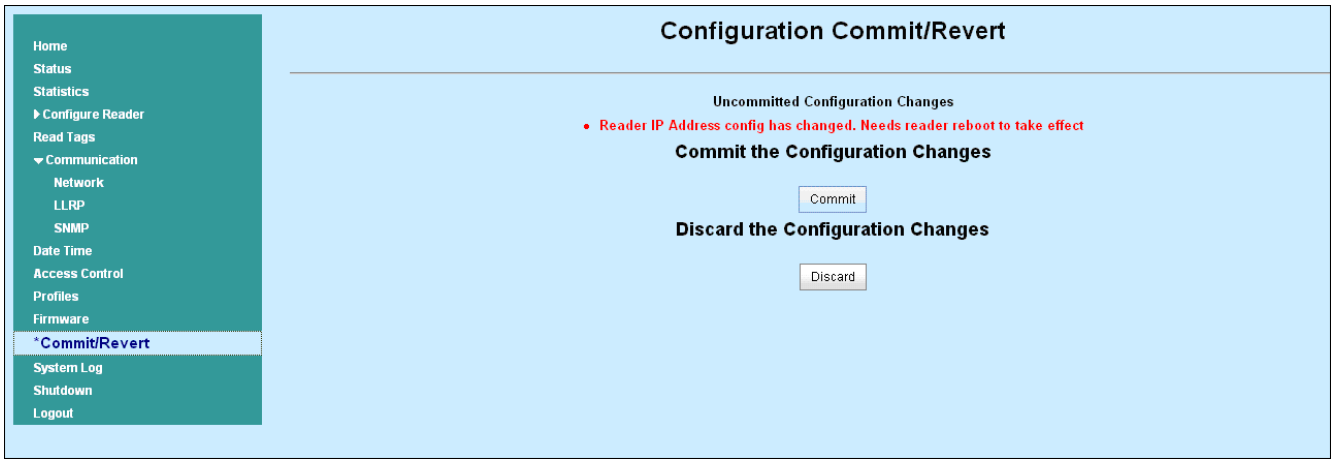

Figure D-8 *Commit/Revert Window*

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.

DHCP Network Not Available - Edit Configuration Files to Set the Static IP

Use this option to configure a static IP on the reader regardless of the host network settings:

1. Establish an ActiveSync connection over USB to the reader.
2. Browse to the **\ReaderConfig** directory on the reader. Copy **AdvReaderConfig.xml** from **\ReaderConfig** to a local folder.

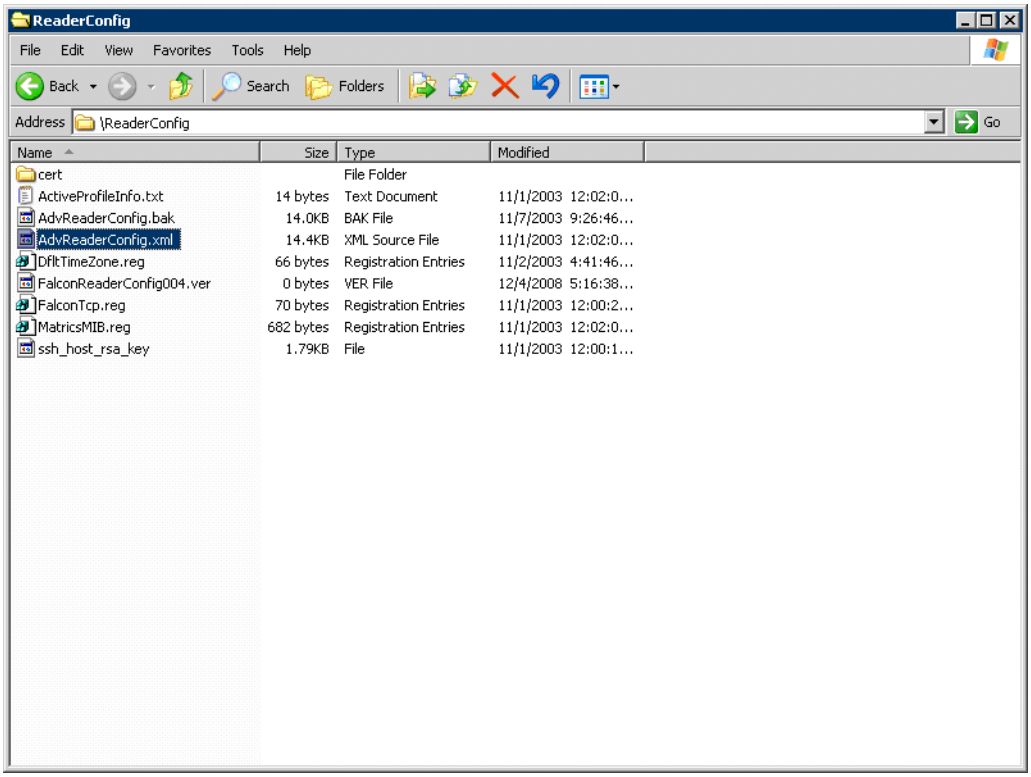

Figure D-9 *Copy AdvReaderConfig.xml*

3. Open **AdvReaderConfig.xml** in any text editor.

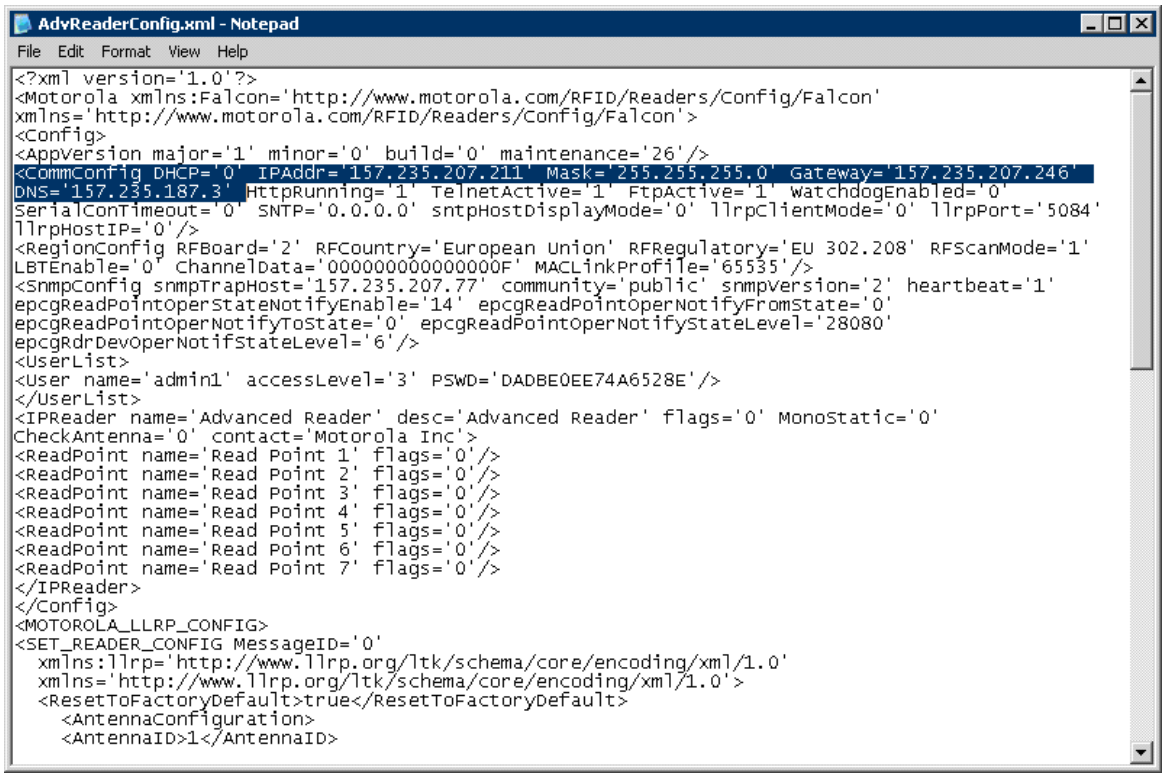

Figure D-10 *Copy AdvReaderConfig.xml*

4. Change **DHCP** to **0**, and set **IPAddr**, **Mask**, and optionally **Gateway** and **DNS** IP addresses to desired values.
5. Save the edited file locally.
6. Copy and replace the edited **AdvReaderConfig.xml file** in the **\ReaderConfig** directory.
7. Reset the reader twice as follows:
   a. Insert a paper clip into the reset hole for less than two seconds, or repower the unit. The Boot LED turns red, then remains amber during initialization. When the reader has initialized, the LED turns green.
   b. After the reader initializes and the LED turns green, reset the reader again as in Step a. When the Boot LED is green, reader is ready and accessible using the configured IP.

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Motorola, Inc.
One Motorola Plaza
Holtsville, New York 11742, USA
1-800-927-9626
http://www.symbol.com

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