CHAPTER 4 ADMINISTRATOR CONSOLE

Introduction

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

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

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

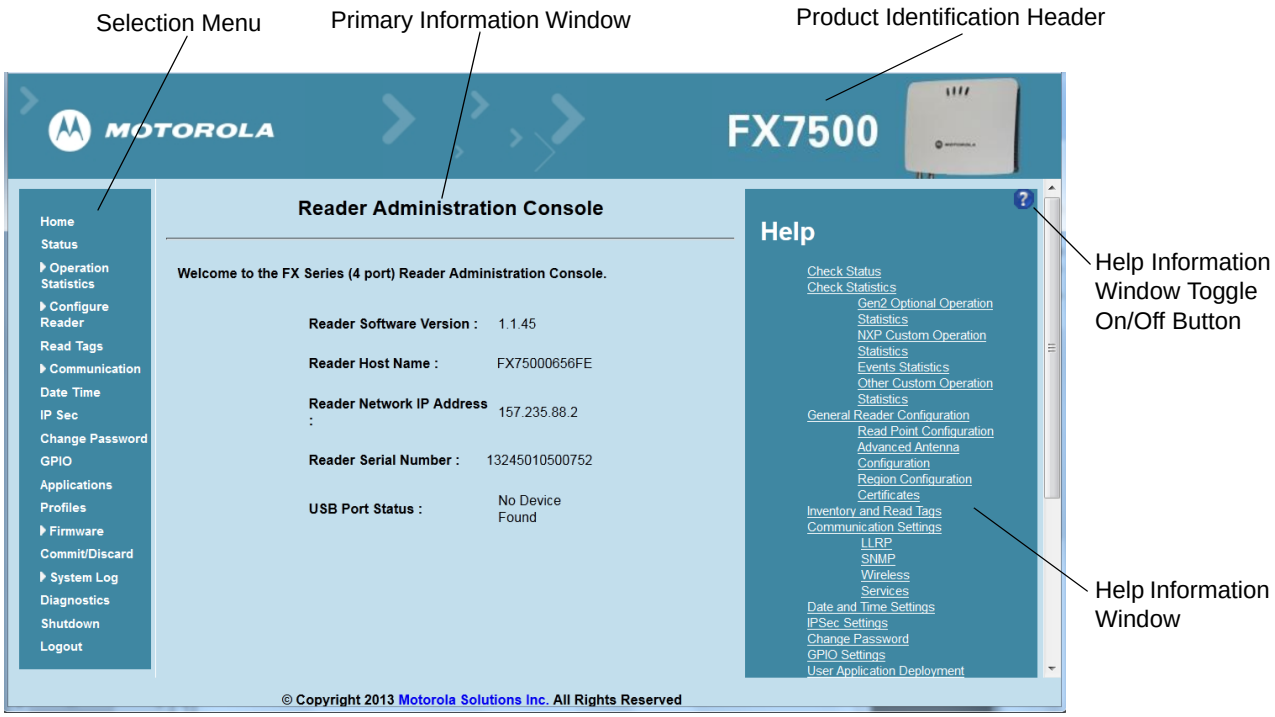

Figure 4-1 *Reader Administrator Console Main Menu*

Profiles

Use profiles for multiple reader deployments to save configuration time, as only a few APIs are needed to completely configure a reader. See *Reader Profiles on page 4-37*.

Resetting the Reader

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

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

Connecting to the Reader

NOTE This section describes procedures in a Windows environment.

To use the Administrator Console to manage the reader, first power up the reader and connect it to an accessible network. See *Powering the Reader on page 3-10* and *Ethernet Connection on page 3-5*. The green power LED indicates that the reader is ready. If the green power LED is not lit, reset the reader. See *Resetting the Reader on page 4-2*.

Connect to the reader in one of two ways:

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

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

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

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

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

Connecting via Host Name

To connect to the reader using the host name:

CAUTION Reader host name is not guaranteed to work at all times. Its recommended use is only in networks where the probability for IP collisions is low, such as a network in which a DNS server is configured to work together with DHCP to register host names. Host name usage is not recommended in a network where there is no strict control to prevent IP collisions, such as informal networks that use IP static configuration without strict control.

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

3. Proceed to *Administrator Console Login on page 4-6* to log in to the reader.

NOTE Connect the reader to a network that supports host name registration and lookup to ensure the network can access the reader using the host name. For instance, some networks can register host names through DHCP. When first connecting to the reader, it is recommended to keep DHCP enabled in both the PC and the reader, although it is not guaranteed that the host name will work all the time. Use the host name printed on the reader label, or construct it using the reader MAC address on the reader back label. The host name is a string with prefix FX7500, followed by the last three MAC address octets. For example, for a MAC address of 00:15:70:CD:3B:0D, use the prefix FX7500, followed by the last three MAC address octets (CD, 3B, and 0D), for the host name FX7500CD3B0D. Type http://FX7500CD3B0D in the browser address bar to access the reader.

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

Auto Discovery

The FX7500 can automatically belong to a network. The reader implements WS-Discovery conforming to RFID Reader Management Profile (RDMP) specification in ISO 24791-3. RDMP is based on an extension for Device Profile for Web Services (DPWS). The discovery mechanism is limited to subnets and does not work across subnets. The Power Session application supports this feature, and it lists the discovered reader using reader hostnames. Because this feature is based on WS-Discovery, the readers can also be discovered in Windows Vista and Windows 7 computers by clicking on the **Network** icon in a file browser.

Connecting via IP Address

To use the IP address to connect to the reader:

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

Using Zero-Configuration Networking when DHCP Server is Not Available

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

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

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

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

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

Obtaining the IP Address via Command Prompt

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

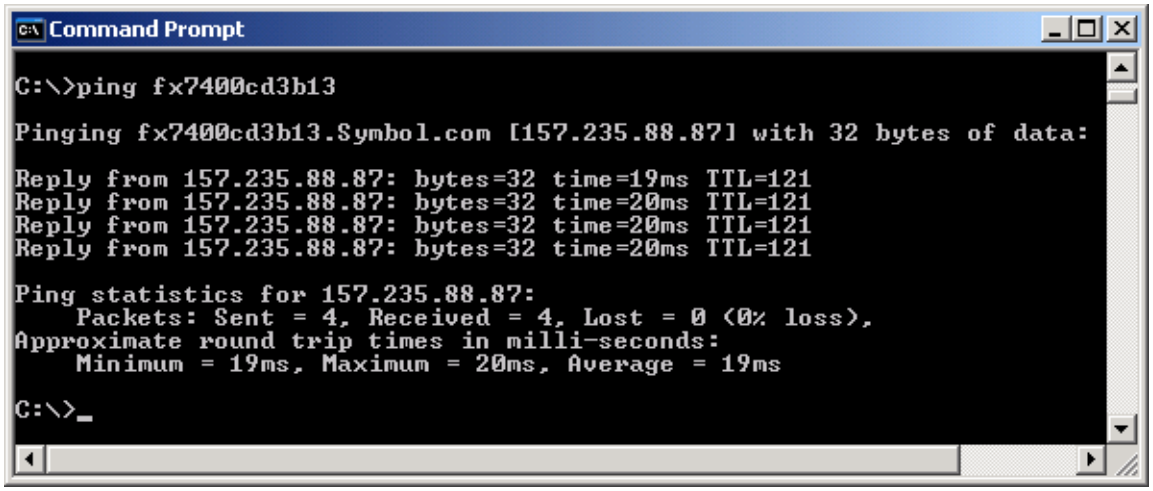

Figure 4-2 *IP Ping Window*

Administrator Console Login

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

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

First Time / Start-Up Login

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

Logging In with Default User ID and Password

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

Figure 4-3 *User Login Window*

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

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

Setting the Region

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

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

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

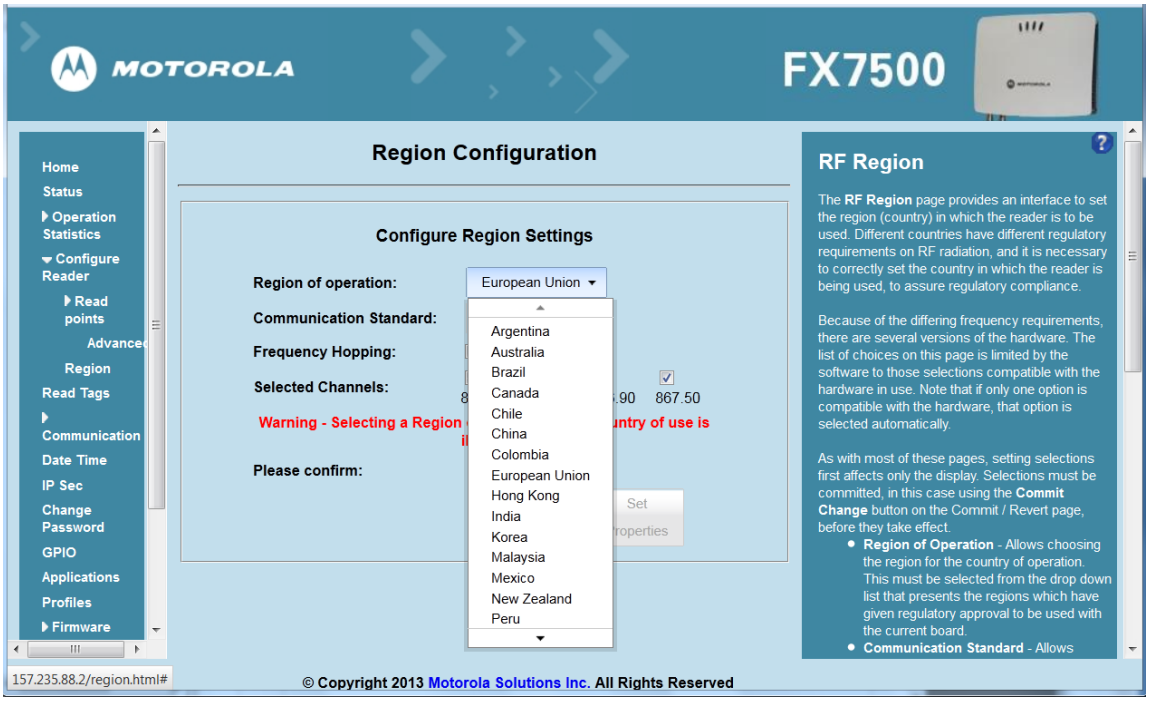

Figure 4-4 *Selecting the Region*

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

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

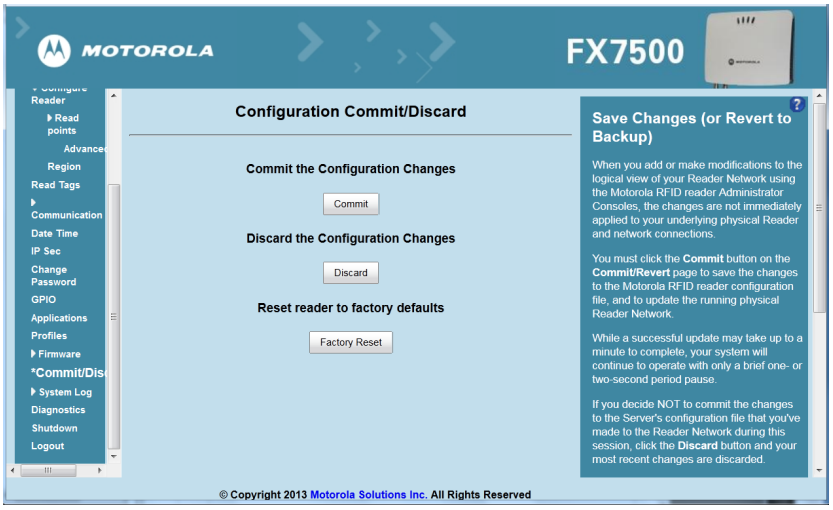

Figure 4-5 *Commit/Discard Window*

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

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

Reader Administrator Console

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

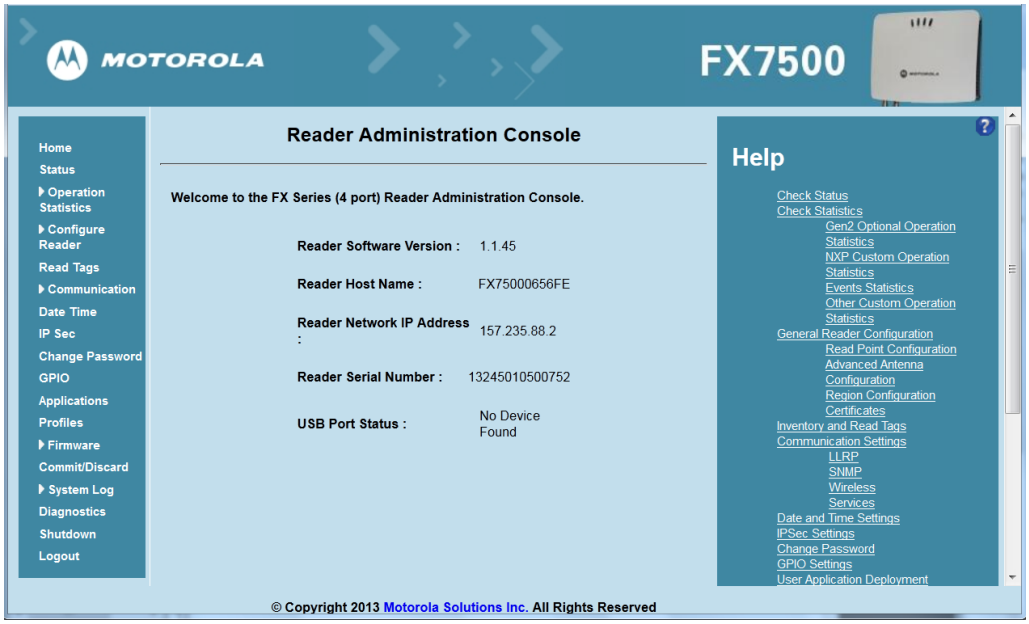

Figure 4-6 *Reader Administrator Console Main Window*

Administrator Console Option Selections

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

- **Status** - see *Status on page 4-10*
- **Operation Statistics** - see *Reader Statistics on page 4-11*
  - **Gen2 Optional** - see *Reader Gen2 Optional Operation Statistics on page 4-12*
  - **NXP**
  - **Events**
  - **Other Custom** - see *NXP Custom Command Operation Statistics on page 4-13*
- **Configure Reader** - see *Configure Reader on page 4-16*
  - **Read Points** - see *Read Points on page 4-17*
    - **Advanced** - see *Read Points - Advanced on page 4-19*
  - **Region** - see *Configure Region on page 4-20*
- **Read Tags** - see *Read Tags on page 4-21*
- **Communication** - see *Communication Settings on page 4-23*
  - **LLRP** - see *Configure LLRP Settings on page 4-27*
  - **SNMP** - see *SNMP Settings on page 4-28*
  - **Wireless** - see
  - **Services** - see
- **Date/Time** - see *System Time Management on page 4-31*
- **IP Sec** - see

- **Change Password** - see
- **GPIO** - see
- **Applications** - see
- **Profiles** - see *Reader Profiles on page 4-37*
- **Firmware** - see *Firmware Version/Update on page 4-39*
  - **Update** - see *Firmware Update on page 4-40*
- **Commit/Discard** - see *Commit/Discard on page 4-41*
- **System Log** - see *System Log on page 4-42*
  - **Configure** - see
- **Diagnostics** - see
- **Shutdown** - see *Shutdown on page 4-45*
- **Logout** - click **Logout** to immediately log out of the **Administrator Console.**

Status

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

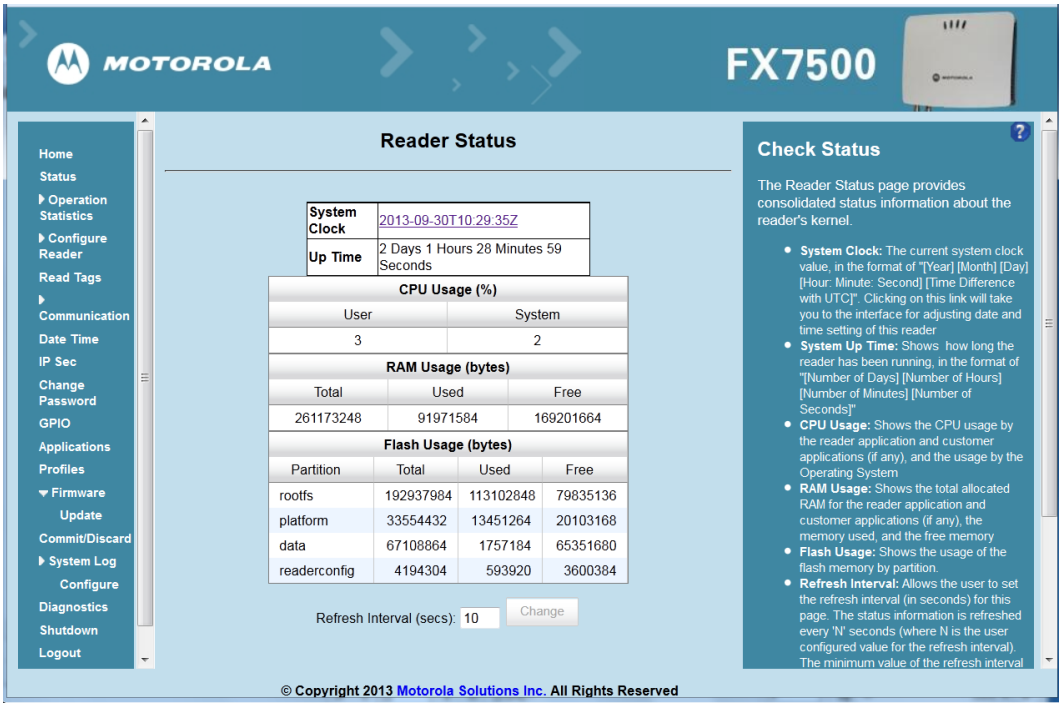

Figure 4-7 *Reader Status Window*

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

- **System Clock:** The current system clock value, in the format of [Year] [Month] [Day] [Hour: Minute: Second] [Time Difference with UTC]. Click the link to adjust the reader date and time settings.
- **Up Time** - Displays how long the reader has been running, in the format [Number of Days] [Number of Hours] [Number of Minutes] [Number of Seconds].

- **CPU Usage:** Displays the CPU usage of the reader application and customer applications (if any), and the operating system CPU usage.
- **RAM Usage:** Displays the total allocated RAM for the reader application and customer applications (if any), the memory used, and the free memory.
- **Flash Usage:** Displays the flash memory usage by partition.
- **Refresh Interval** - Sets the refresh interval (in seconds) for the window. The status information refreshes every **N** seconds (where **N** is the user configured value for the refresh interval). The minimum refresh interval value is 10 seconds; the maximum allowed is 86,400 seconds.

Reader Statistics

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

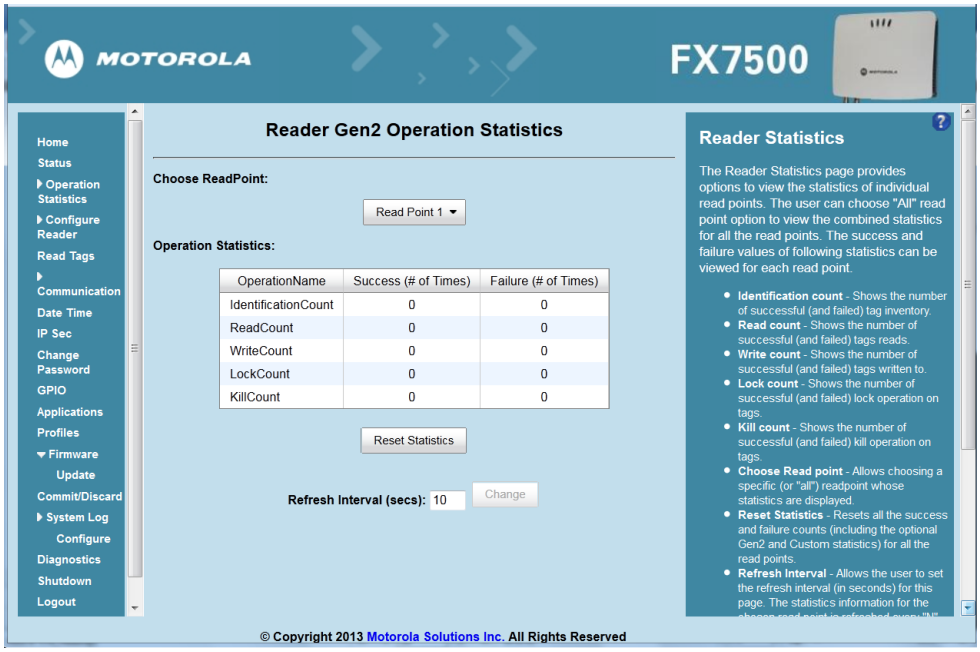

Figure 4-8 *Reader Operation Statistics Window*

- **Choose ReadPoint** - Select a specific read point or select **All** from the drop-down list to display the statistics.
- **IdentificationCount** - Displays the number of successful (and failed) tag inventories.
- **ReadCount** - Displays the number of successful (and failed) tag reads.
- **WriteCount** - Displays the number of successful (and failed) tag writes.
- **Lockcount** - Displays the number of successful (and failed) lock operations on tags.
- **KillCount** - Displays the number of successful (and failed) kill operations on tags.
- **Reset Statistics** - Resets all success and failure counts (including the optional Gen2 and Custom statistics) for all read points.

- **Refresh Interval** - Sets the refresh interval (in seconds) for this window. The statistics information for the chosen read point is refreshed every **N** seconds (where **N** is the set refresh interval). The minimum value is 10 seconds and the maximum value allowed is 86,400 seconds. Input a new value and click **Change** to set a new interval.

Reader Gen2 Optional Operation Statistics

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

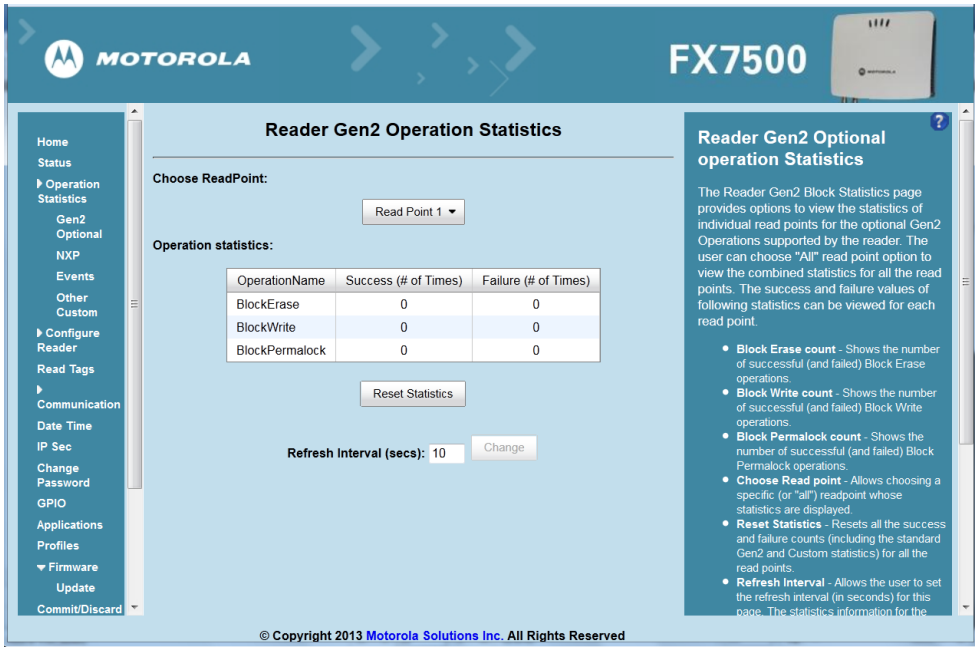

Figure 4-9 *Reader Gen2 Operation Statistics Window*

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

NXP Custom Command Operation Statistics

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

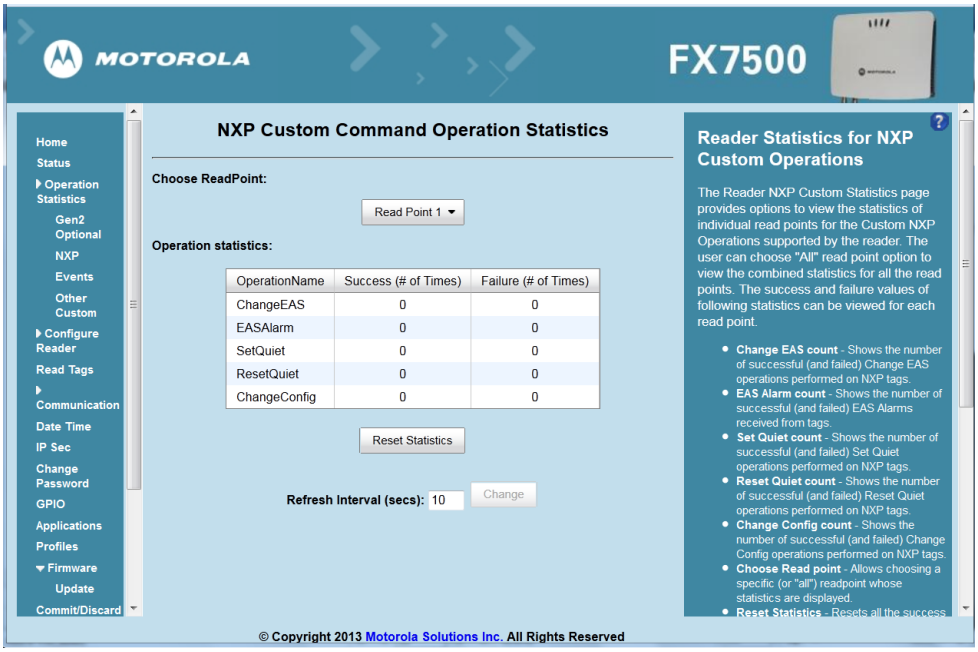

Figure 4-10 *NXP Custom Command Operation Statistics Window*

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

Event Statistics

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

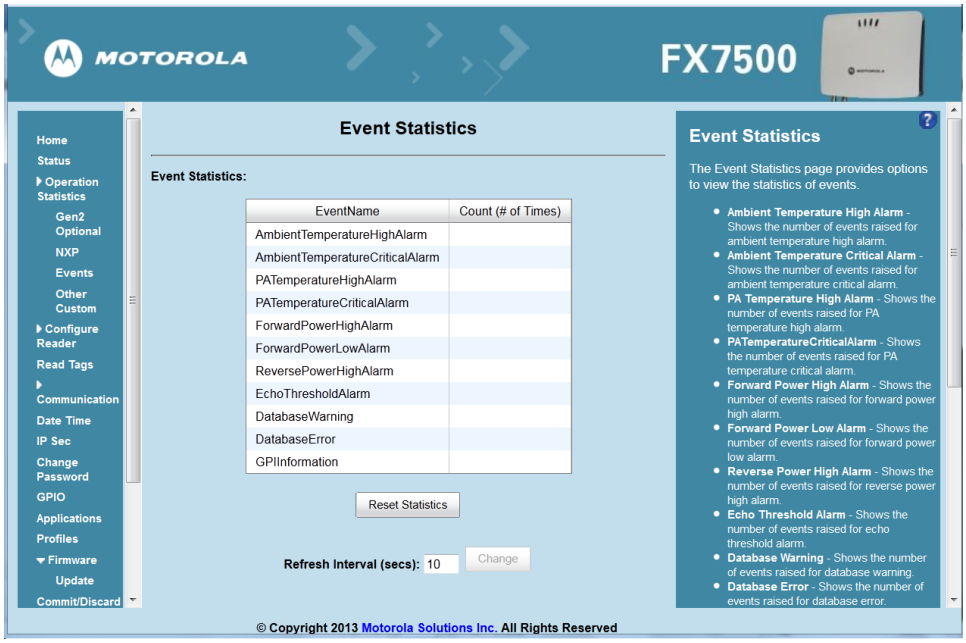

Figure 4-11 *Event Statistics Window*

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

Other Custom Command Operation Statistics

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

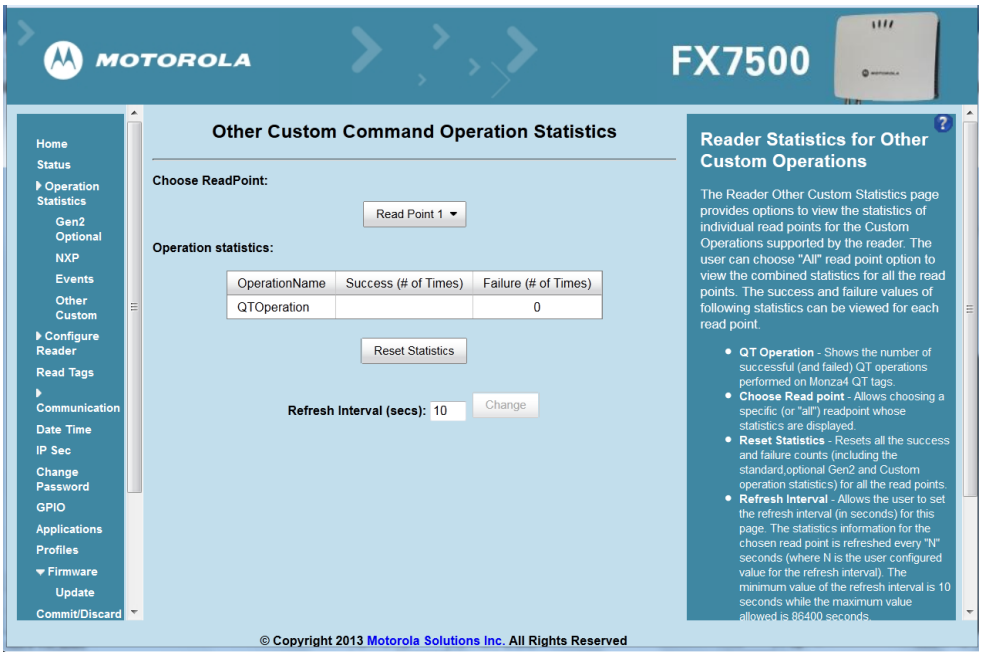

Figure 4-12 *NXP Custom Command Operation Statistics Window*

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

Configure Reader

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

Reader Parameters (General)

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

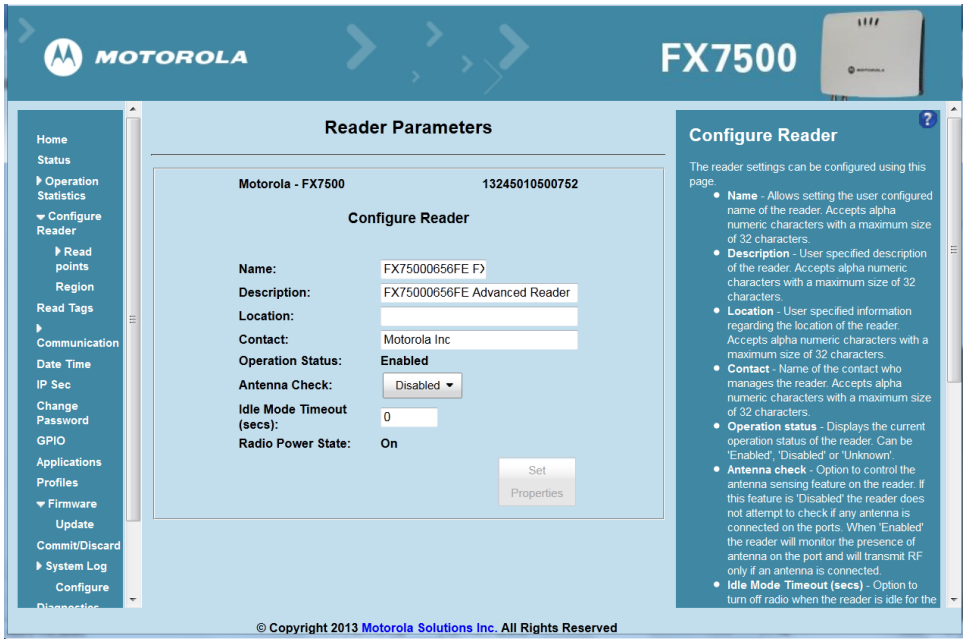

Figure 4-13 *Reader Parameters*

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

These settings only affect the display. Use *Commit/Discard on page 4-41* to save the changes.

Read Points

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

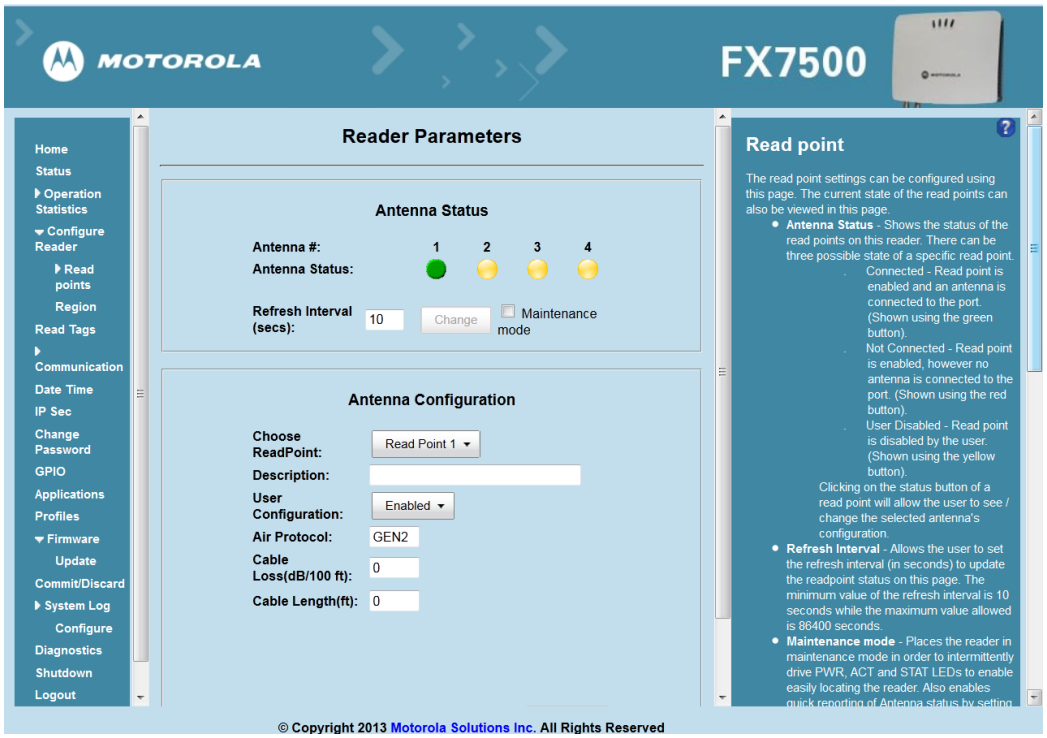

Figure 4-14 *Configure Read Points*

Antenna Status

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

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

Antenna Configuration

- **Choose Read Point** - Select a read point to display the configuration.
- **Description** - Enter a read point description of up to 32 alphanumeric characters.
- **User Configuration** - Enable or disable the read point. Disabling a read point blocks RF operation using the port/antenna.
- **Air Protocol** - Displays the air protocols the read point supports. The reader currently supports only EPC Class1 GEN2 air protocol.
- **Cable loss (dB/100 ft)** - Specifies the cable loss in terms of dB per 100 feet length for the antenna cable that is used to connect this read point port to the antenna. Refer to the specification of the antenna cable for this information. The default value is **0**. Setting this and the cable length to non-zero values allows the compensating for the RF signal loss in the cable due to attenuation by specifying an appropriate increase in the transmit power for this read point. The reader uses this and the cable length value to internally calculate the cable loss. The calculated cable loss is internally added to the power level configured on the read point.
- **Cable length (ft)** - Sets the cable length in feet of the physical cable that connects the read point port to the antenna.
- **Set Properties** - Select **Set Properties** to apply the changes. Select *Commit/Discard on page 4-41* to save the changes to the reader.

Read Points - Advanced

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

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

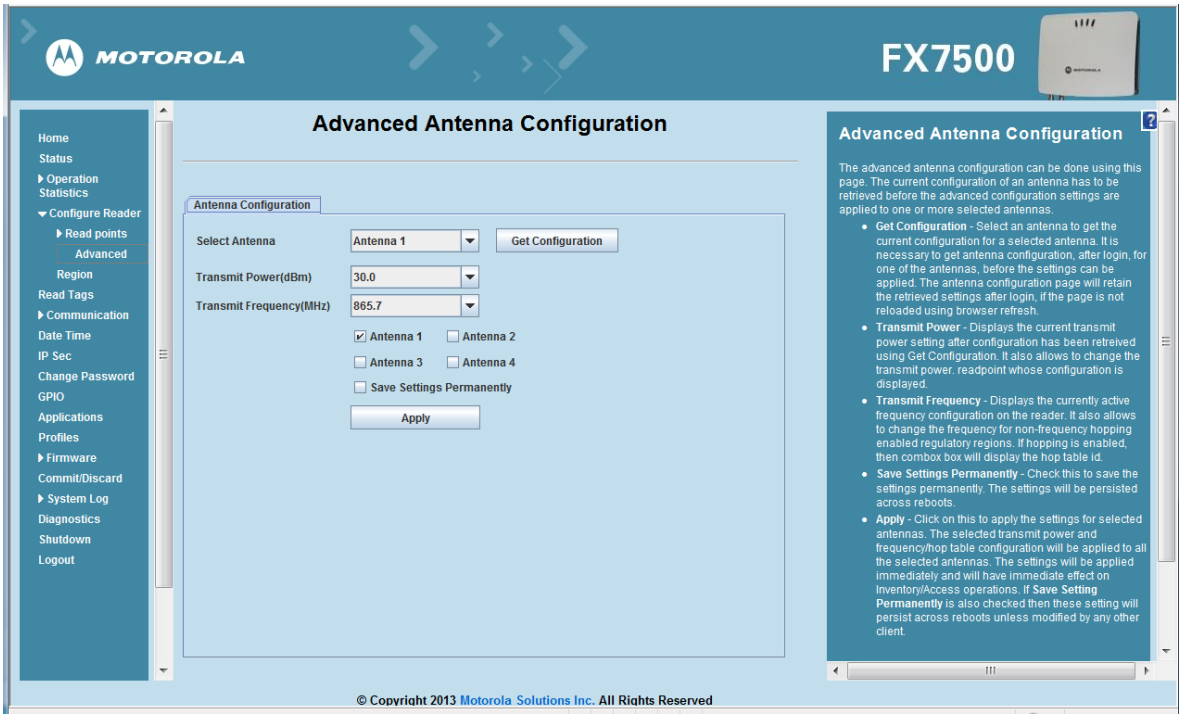

Figure 4-15 *Advanced Antenna Configuration*

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

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

Configure Region

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

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

Because of the differing frequency requirements, there are several versions of the hardware. The list of choices on this page is limited by the software to those selections compatible with the hardware in use. Note that if only one option is compatible with the hardware, that option is selected automatically.

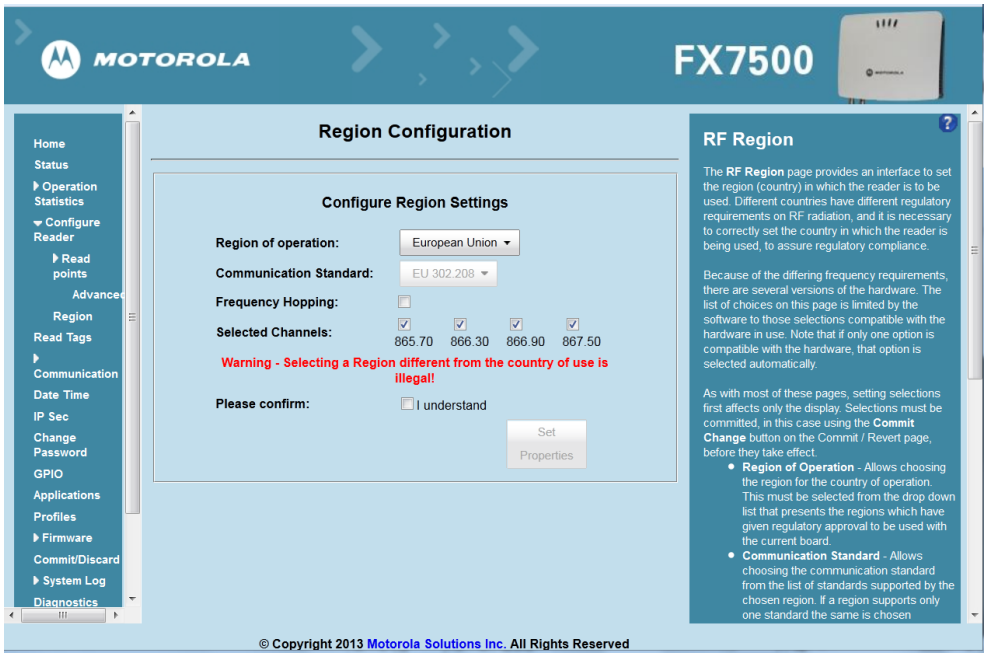

Figure 4-16 *Configure Region Settings Window*

- **Region of Operation** - Select the region for the country of operation from the drop-down list. This list includes regions which have regulatory approval to use with the current board.
- **Communication Standard** - Select the communication standard from the list of standards that the chosen region supports. If a region supports only one standard, it is automatically selected.
- **Frequency Hopping** - Check to select frequency hopping. This option appears only if the chosen region of operation supports this.
- **Selected Channels** - Select a subset of channels on which to operate (from the list of supported channels). This option appears only if the chosen region of operation supports this.
- **Please confirm** - Check the **I understand** check box to confirm your understanding that the choices are in compliance with local regulatory requirements.
- **Set Properties** - Click to apply the changes. Select *Commit/Discard on page 4-41* to save the changes to the reader.

Read Tags

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

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

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

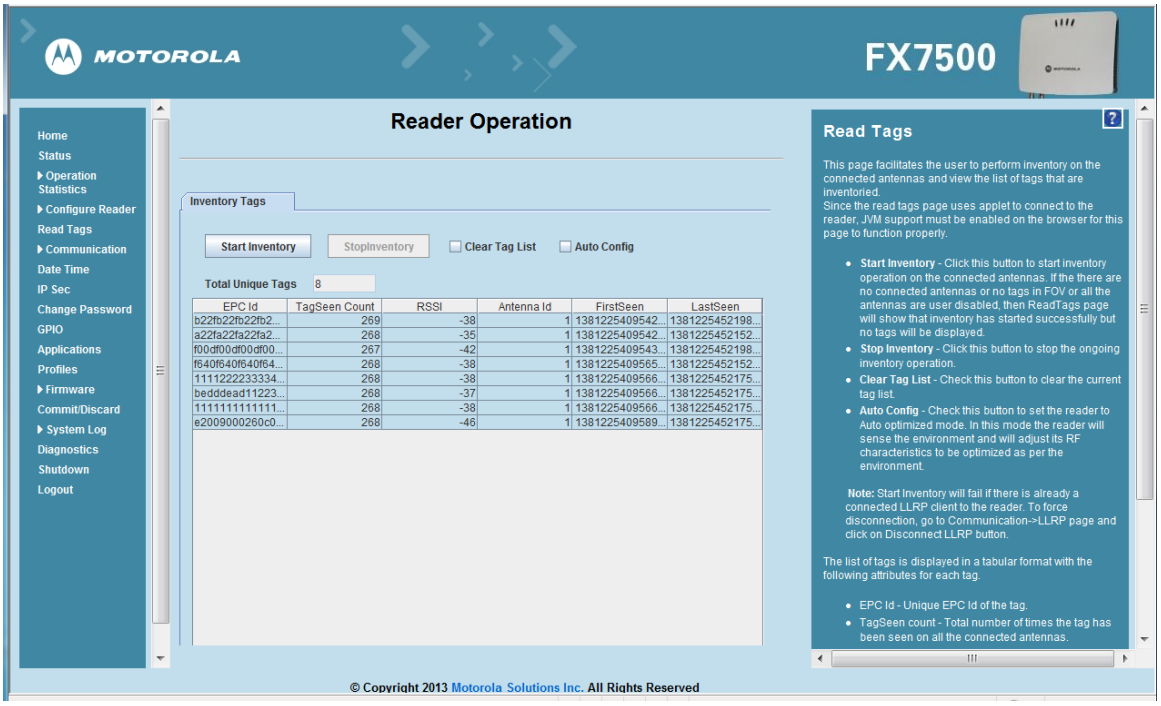

Figure 4-17 *Read Tags Window*

- **Start Inventory** - Click to starts inventory operation on the connected antennas. If the there are no connected antennas, no tags in the field of view, or all the antennas are user-disabled, the **Read Tags** window indicates that inventory successfully started but no tags display.
- **Stop Inventory** - Stops the ongoing inventory operation.
- **Clear Tag List** - Clears the current tag list.
- **Auto Config** - Check this to set the reader to auto-optimized mode. In this mode the reader senses the environment and adjusts its RF characteristics to be optimized as per the environment.
- **Total Unique Tags** - Indicates the number of unique tags read.

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

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

Communication Settings

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

Configure Network Settings - Ethernet Tab

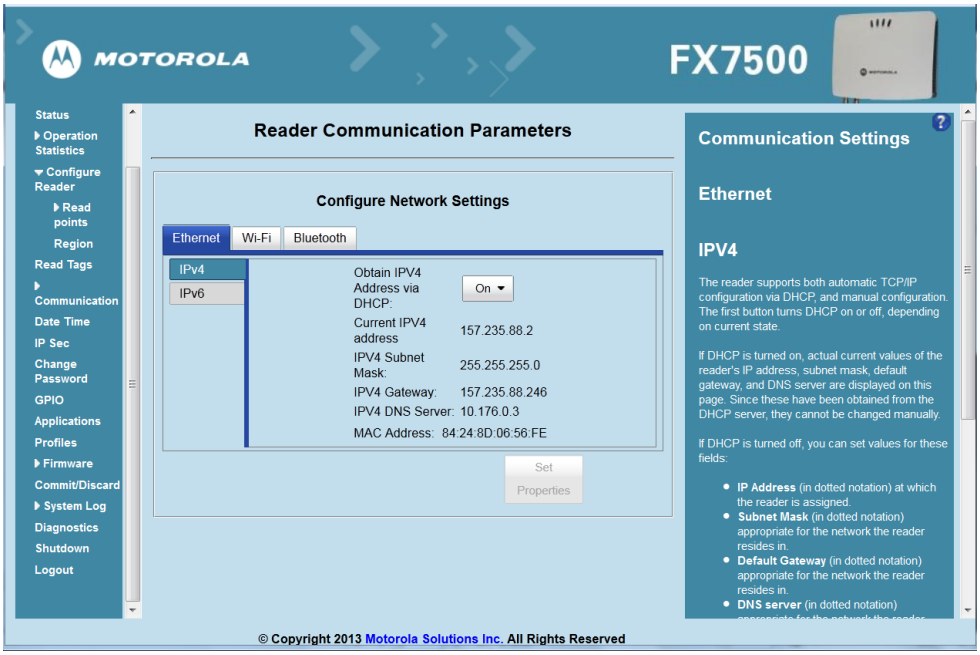

Figure 4-18 *Configure Network Settings - Ethernet Tab*

IPV4

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

  If DHCP is turned on, this window displays actual current values of the reader's IP address, subnet mask, default gateway, and DNS server. Because these are obtained from the DHCP server, they cannot be changed manually.

  If DHCP is turned off, you can set the following values for these fields.
- **Current IPV4 Address** - IP address (in dotted notation) at which the reader is assigned.
- **IPV4 Subnet Mask** - Subnet mask (in dotted notation) appropriate for the network in which the reader resides.
- **IPV4 Default Gateway** - Default gateway (in dotted notation) appropriate for the network in which the reader resides.
- **IPV4 DNS Server** - DNS server (in dotted notation) appropriate for the network in which the reader resides.
- **MAC Address** - The MAC address of the reader.

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

IPV6

- **Obtain IPV6 Address via DHCP** - The reader supports both automatic TCP/IPV6 configuration via DHCP and manual configuration. The DHCP button turns DHCP on and off.

  If DHCP is turned on, this window displays actual current values of the reader's IPV6 address, prefix length, default gateway, and DNS server. Because these are obtained from the DHCP server, they cannot be changed manually.

  If DHCP is turned off, you can set the following values for these fields.
- **Current IPV6 Address** - IP address (in dotted notation) at which the reader is assigned.
- **Prefix Length** - Prefix length appropriate for the network in which the reader resides.
- **IPV6 Default Gateway** - Default gateway (in dotted notation) appropriate for the network in which the reader resides.
- **IPV6 DNS Server** - DNS server (in dotted notation) appropriate for the network in which the reader resides.
- **MAC Address** - The MAC address of the reader.

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

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

Configure Network Settings - Wi-Fi Tab

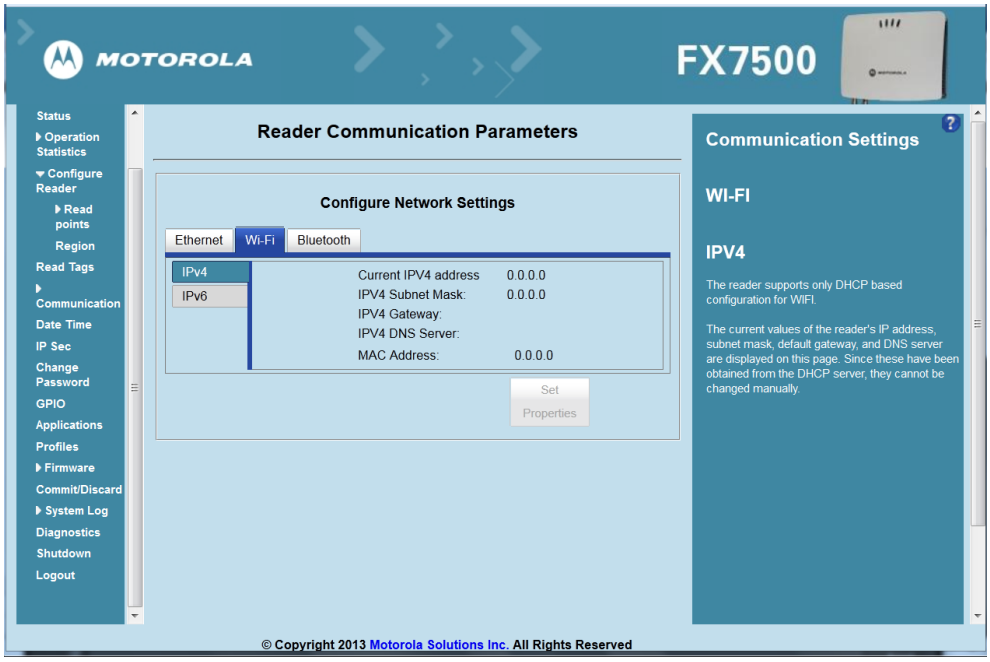

Figure 4-19 *Configure Network Settings - Wi-Fi Tab*

IPV4

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

IPV6

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

Configure Network Settings - Bluetooth Tab

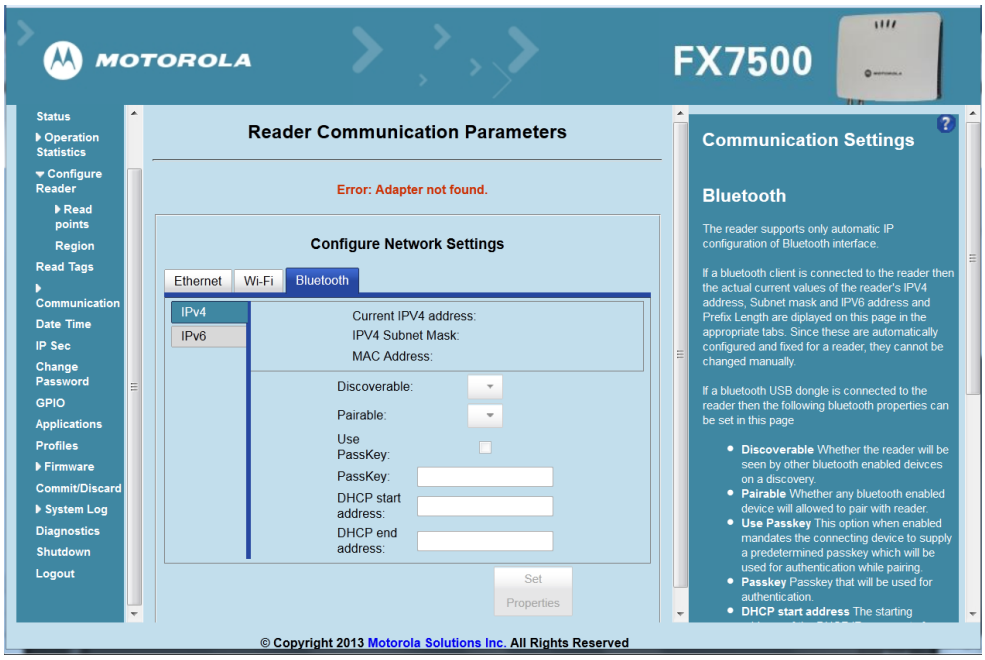

Figure 4-20 *Configure Network Settings - Bluetooth Tab*

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

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

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

- **Discoverable** - Select whether the reader is seen by other Bluetooth-enabled devices on discovery.
- **Pairable** - Select whether any Bluetooth-enabled device can pair with reader.
- **Use Passkey** - Enable this option to mandate the connecting device to supply a pre-determined passkey to use for authentication while pairing.
- **Passkey** - The passkey to use for authentication.
- **DHCP start address** - The starting address of the DHCP IP range out of which an IP is assigned to the connecting device.
- **DHCP end address** - The end address of the DHCP IP range out of which an IP is assigned to the connecting device.

NOTE The DHCP IP range specified using the DHCP start address and DHCP end address options also determine the IP of the Bluetooth interface of the reader. The first two octets of the IP address of the reader Bluetooth interface are taken from the IP range specified and the last two octets use the reader BD address.

Configure LLRP Settings

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

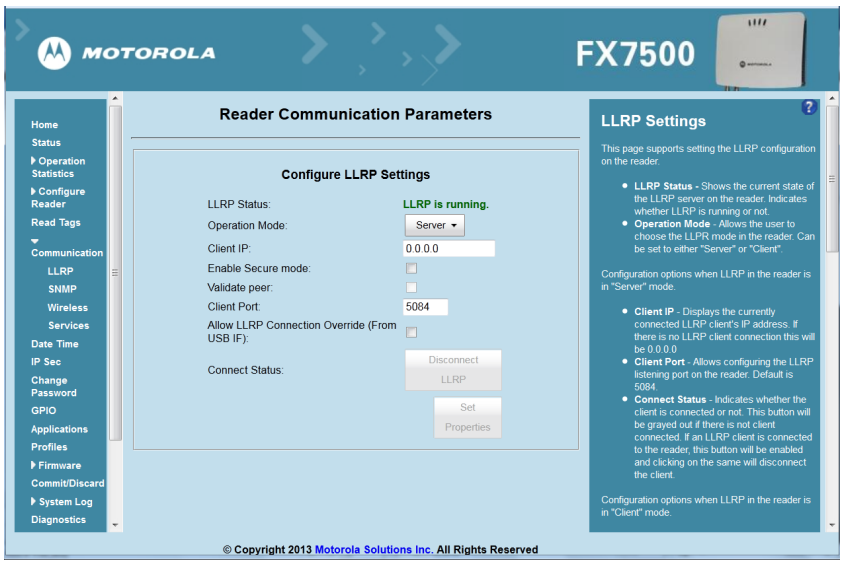

Figure 4-21 *Configure LLRP Settings Window*

This window offers the following fields:

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

LLRP configuration options when the reader is in **Server** mode:

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

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

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

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

LLRP configuration options when the reader is in **Secure** mode:

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

SNMP Settings

Select **SNMP** to view the **Configure SNMP Settings** window.

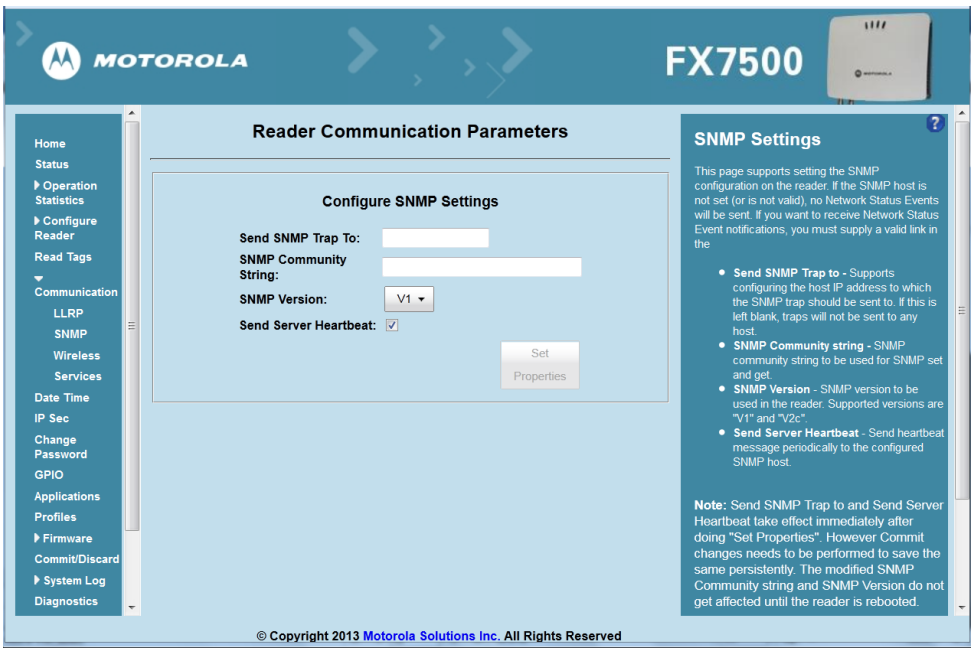

Figure 4-22 *Configure SNMP Settings Window*

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

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

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.

Wireless Settings

Select **Wireless** to view the **Reader Wireless Settings Parameters** window.

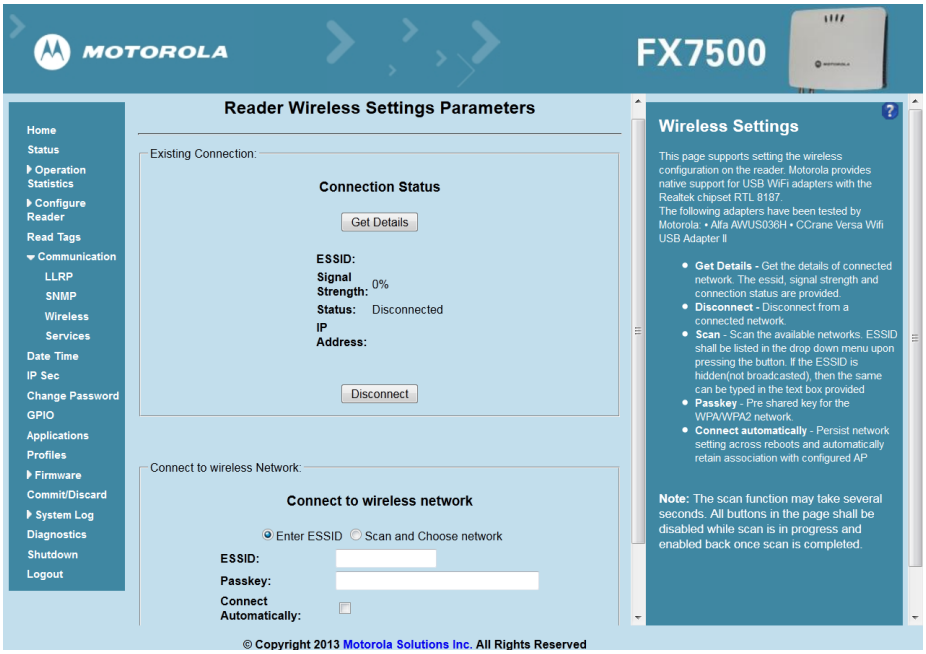

Figure 4-23 *Wireless Settings Window*

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

- Alfa AWUS036H
- CCrane Versa Wifi USB Adapter II

The Wireless Settings window offers the following options:

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

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

Network Services Settings

Select **Services** to view the **Configure Network Service Settings** window.

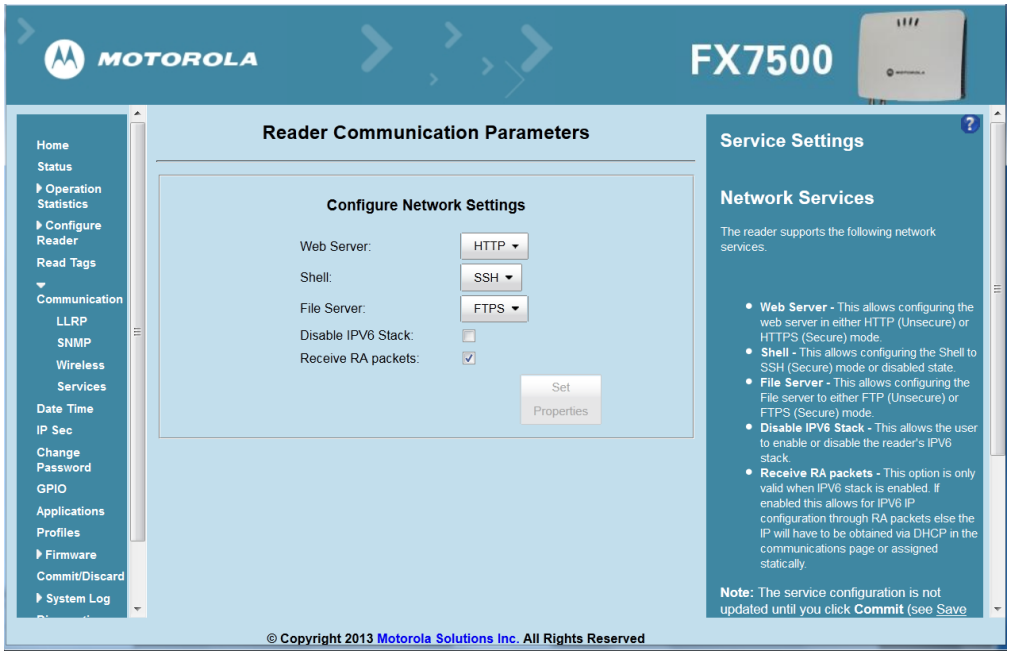

Figure 4-24 *Configure Network Service Settings Window*

The reader supports the following network services.

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

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

System Time Management

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

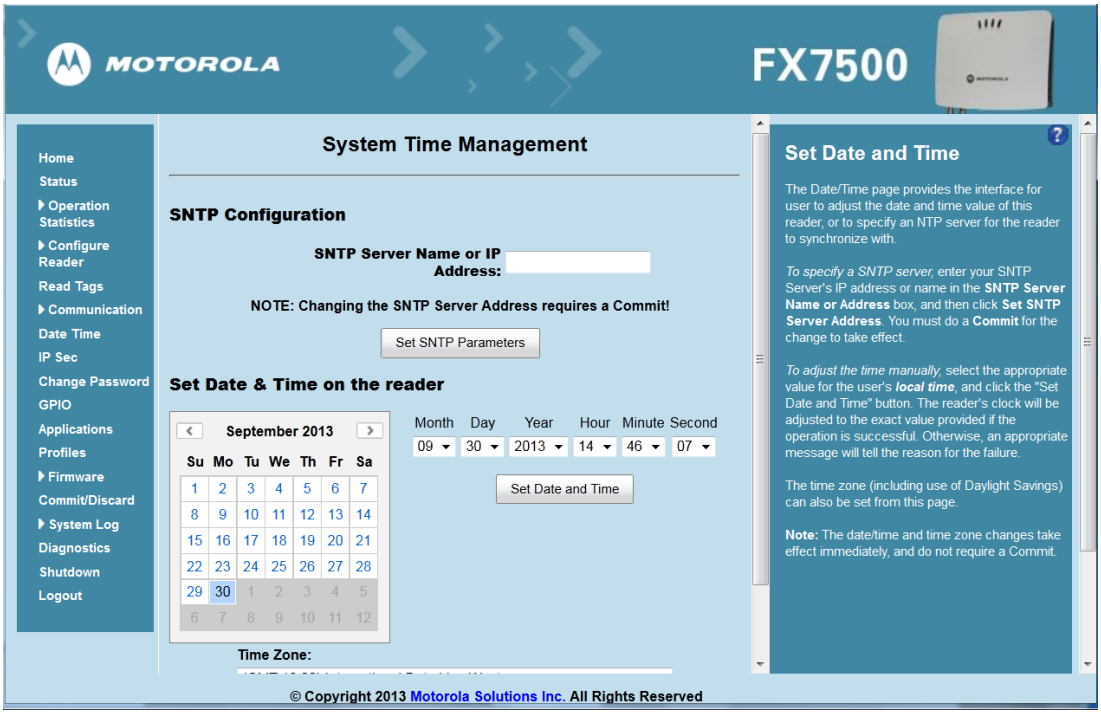

Figure 4-25 *System Time Management Window*

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

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

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

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

IPV6 IP Sec

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

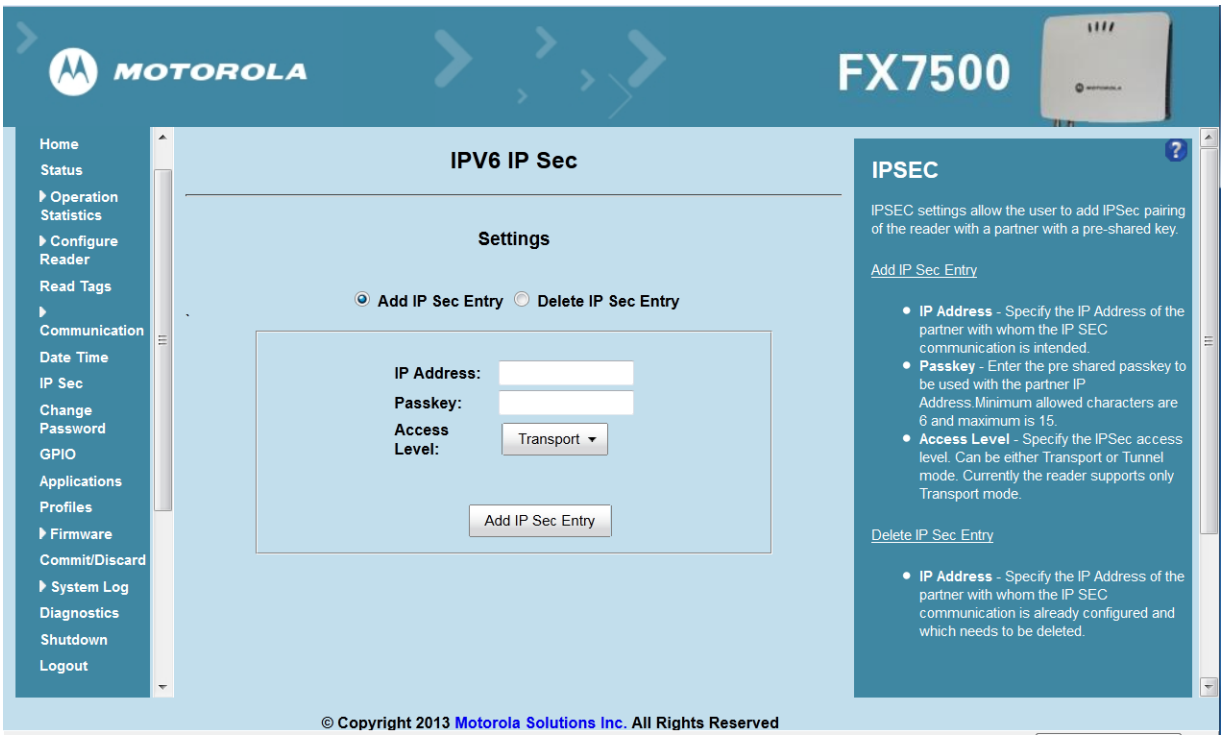

Figure 4-26 *IPV6 IP Sec Window*

To add an IP Sec entry:

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

To delete an IP Sec entry:

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

Change Password

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

FX7500 User Accounts

The FX7500 supports the different user accounts:

- **admin** - This user has web access but no shell access, with full privileges to make changes on the reader using the Administrator Console interface and to access to the reader using the FTP interface.
- **guest** - This user has web access but no shell access, with read-only privileges in the Administrator Console and can not make configuration changes. The **guest** user does not need a password to log in to the Administrator Console.
- **rfidadm** - This is the reader administrator, with shell access but no Administrator Console access. **rfidadm** has full access to the **/apps** directory and read-only access to most of the other directories, including the **/platform**, **/usr**, **/lib**, **/etc**, and **/bin** directories. The **rfidadm** user can use this account to install and uninstall RFID programs and upload user applications.

Select **Change Password** to view the **Change Password** window.

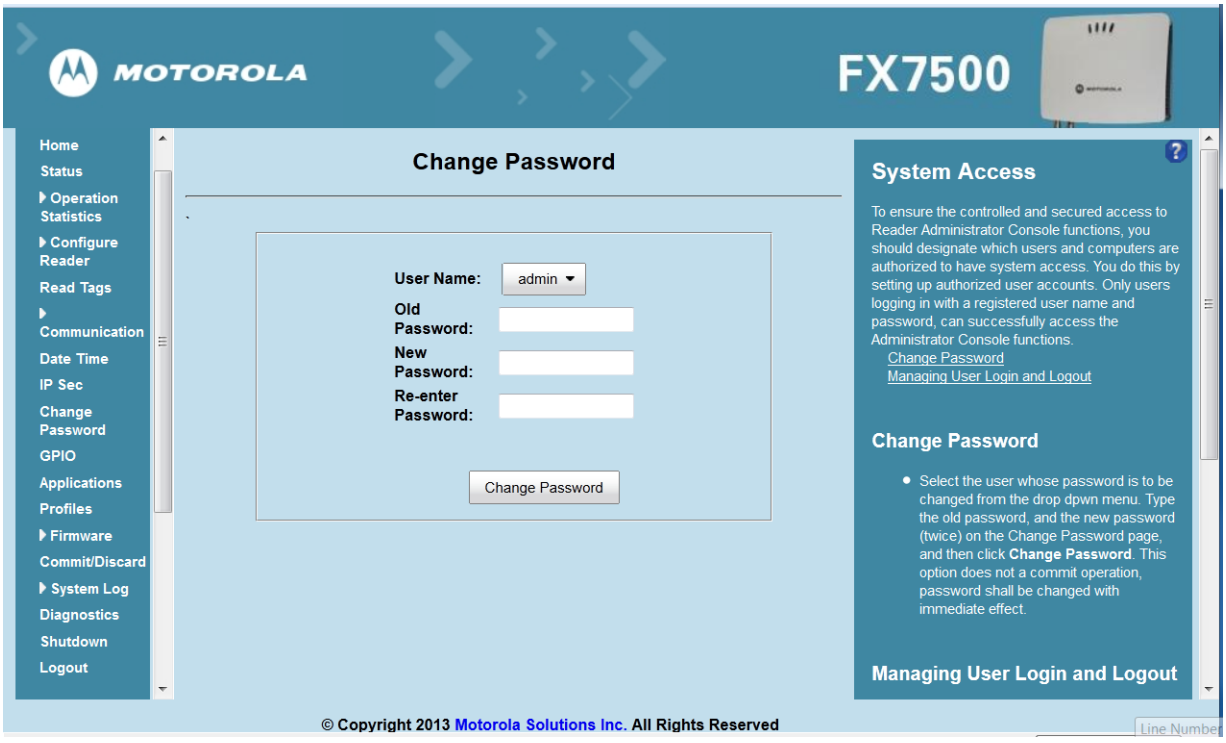

Figure 4-27 *Change Password Window*

To set a user password:

1. In the **User Name** drop-down list, select the user for whom to change the password.
2. In the **Old Password** field, enter the existing password for that user.
3. In the **New Password** field, enter the new password, and again in the **Re-Enter Password** field.

4. Click **Change Password**. The password changes immediately and does not require a Commit operation.

Managing User Login and Logout

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

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

GPIO

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

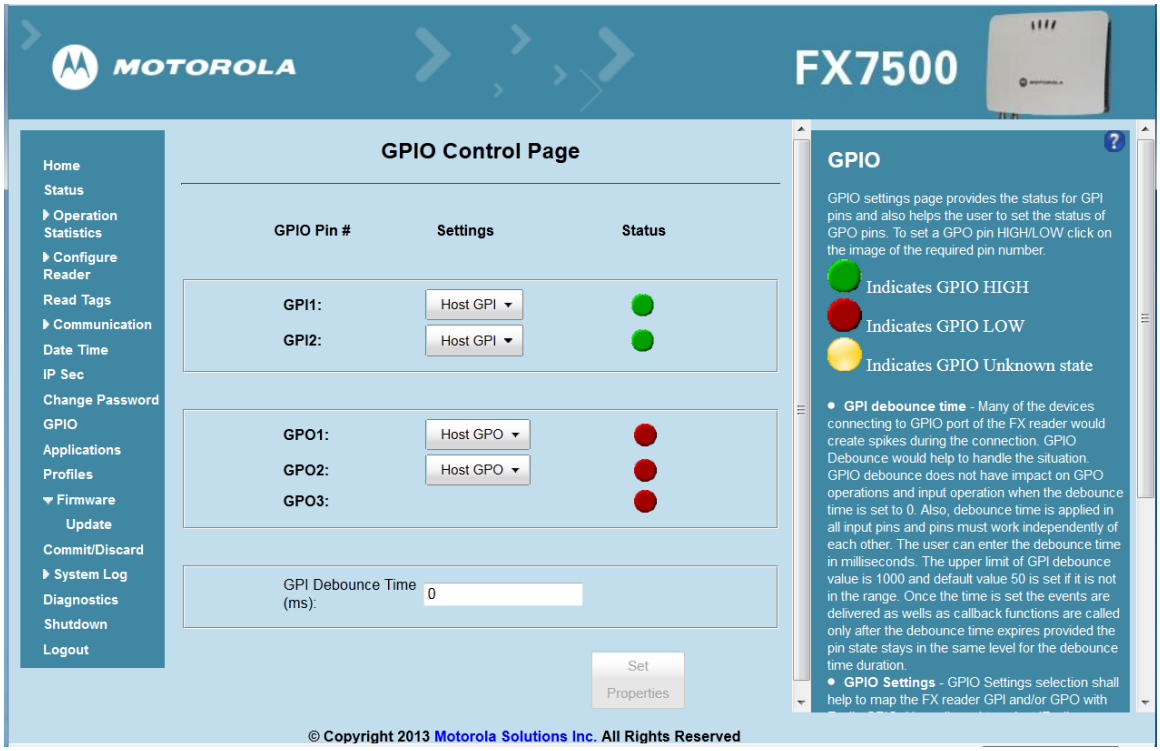

Figure 4-28 *GPIO Control Page*

- **Settings** - Map the reader GPI and/or GPO with the radio GPIO. Select either **Radio** or **Host** for **GPI*x*** or **GPO*x*** where *x* = 0 or 1. An attempt to violate this condition changes the selection to either **Host GPI*x*** or **Host GPO*x*** automatically. These settings are valid for FX7500 four port readers and are disabled if not supported.
- **Status** - To set a GPO pin high or low, click on the image next to the required pin number:
  - Green  indicates GPIO HIGH
  - Red  indicates GPIO LOW
  - Yellow  indicates GPIO unknown
- **GPI Debounce Time** - Enter a value of up to 1000 milliseconds to minimize spikes that can occur when a device connects to the GPIO port of the FX reader. The default is 50. Debounce time applies to all input pins, and pins must work independently of each other. Events and callback functions occur only after the debounce time expires, provided the pin state remains at the same level for the debounce time duration. GPIO debounce does not impact GPO and input operations when set to 0.
- **Set Properties** - Click this when all selections are made.

Applications

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

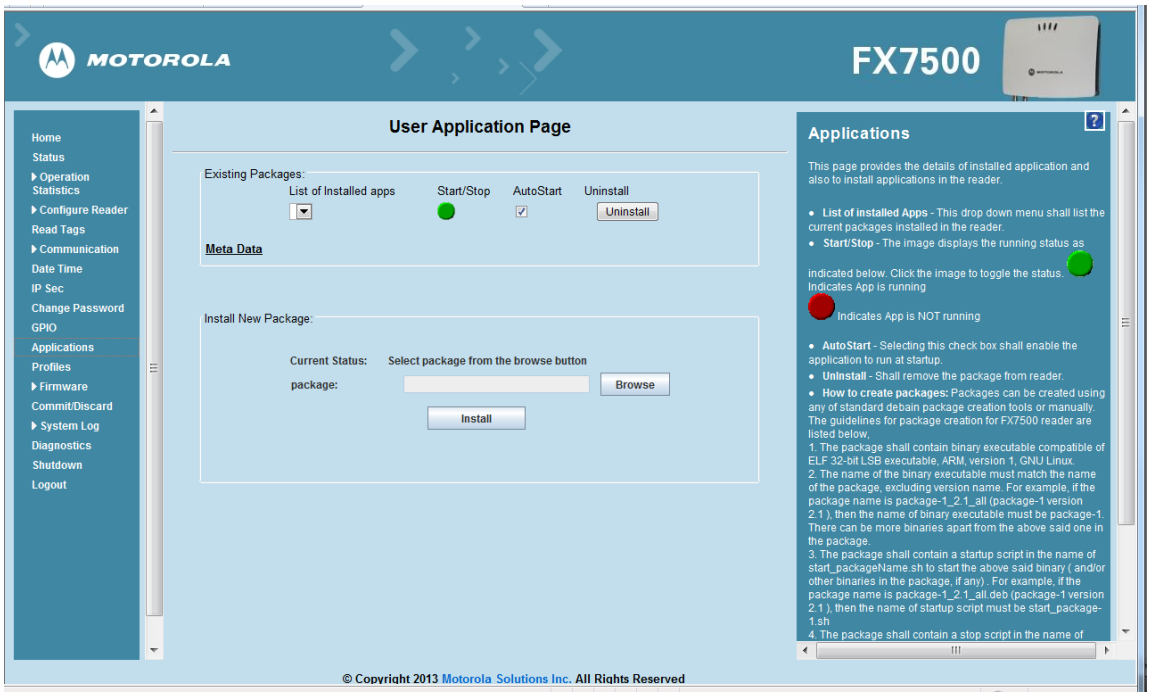

Figure 4-29 *User Application Page*

The **Existing Packages** section includes the following options:

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

To create packages for the FX7500 reader, use any of the standard Debian package creation tools, or create them manually.

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

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

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

Reader Profiles

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

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

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

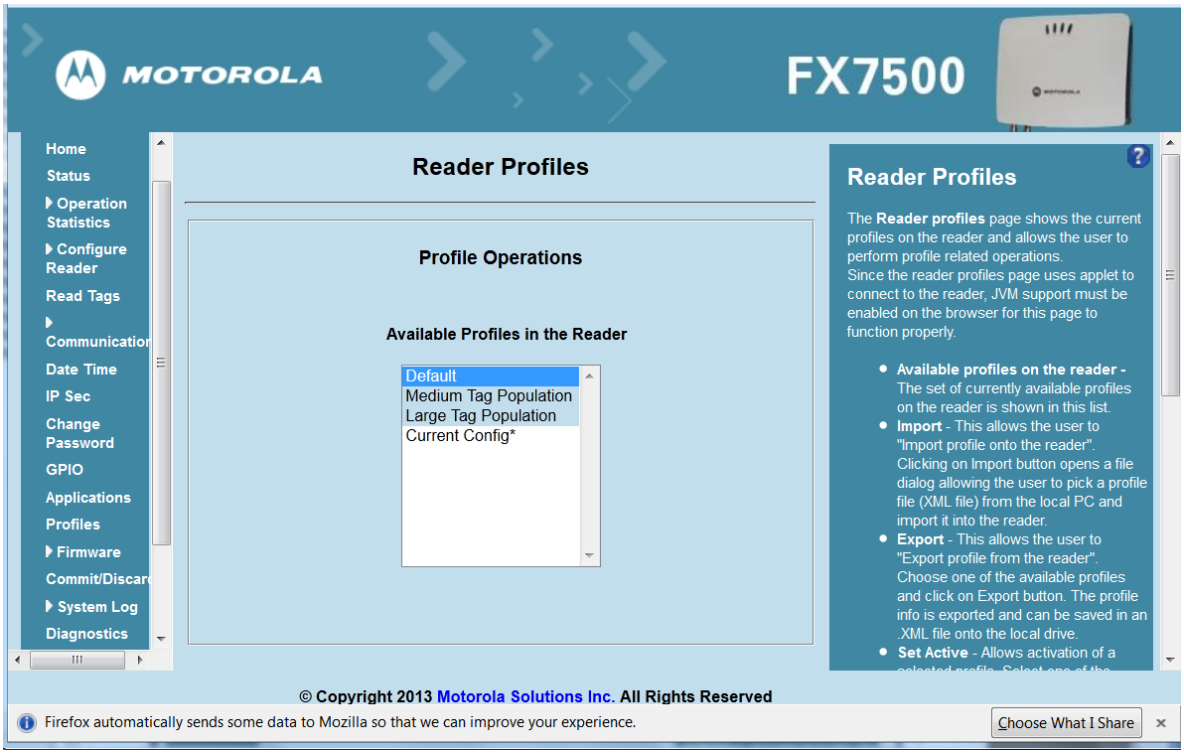

Figure 4-30 *Reader Profiles Window*

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 profile and click **Set Active** to load the profile content in the reader.

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

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

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

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

FIPS Support on FX7500

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

- HTTPS
- FTPS
- SSH
- LLRP Server
- IPSec
- SNMP

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

Firmware Version/Update

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

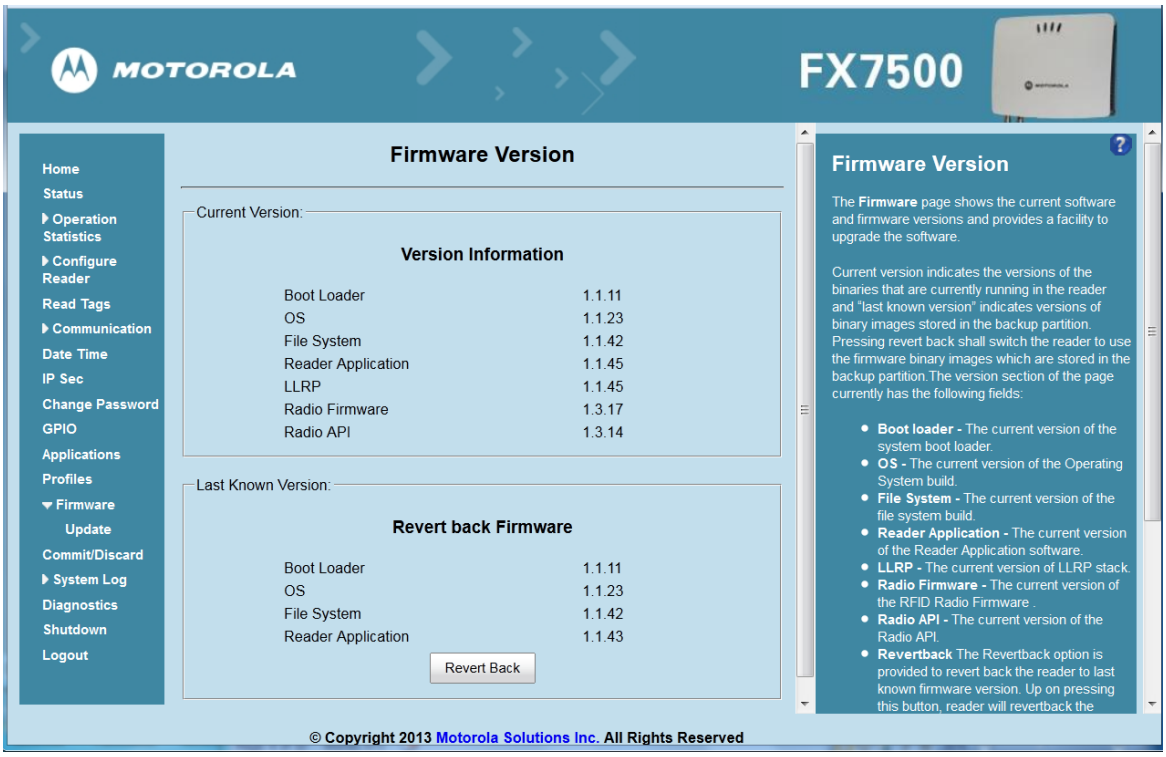

Figure 4-31 *Firmware Version*

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

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

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

Firmware Update

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

NOTE You must be logged in with Administrator privileges in order to access this window. See *Change Password on page 4-33*.

The reader supports three different methods of updating the firmware:

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

For instructions on updating the firmware, see *Appendix C, FTP Firmware Upgrade*.

Commit/Discard

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

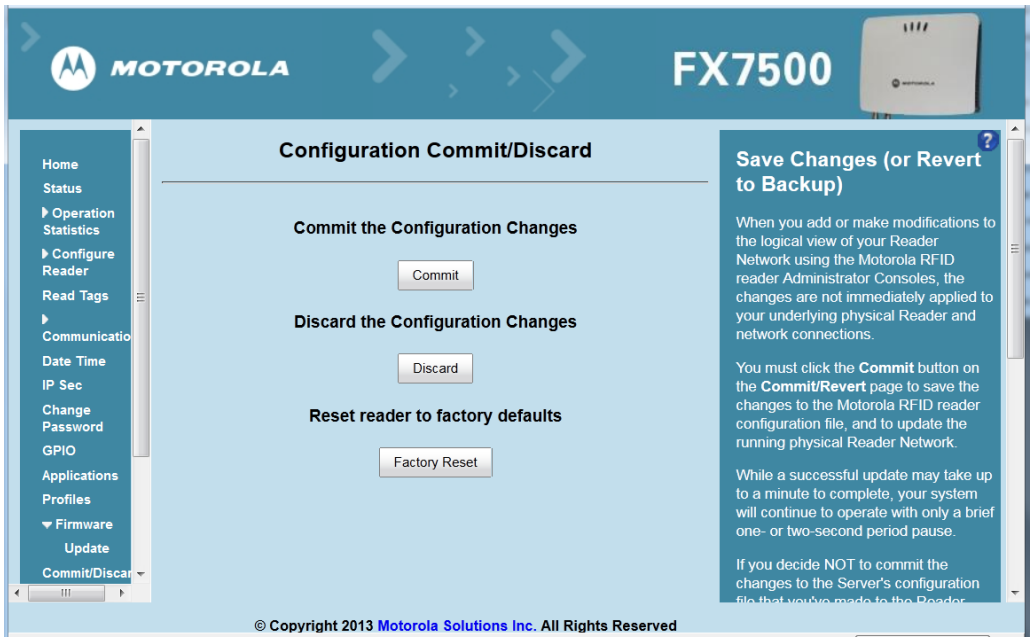

Figure 4-32 *Configuration Commit/Discard Window*

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

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

System Log

The **System Log** window lists reader log information.

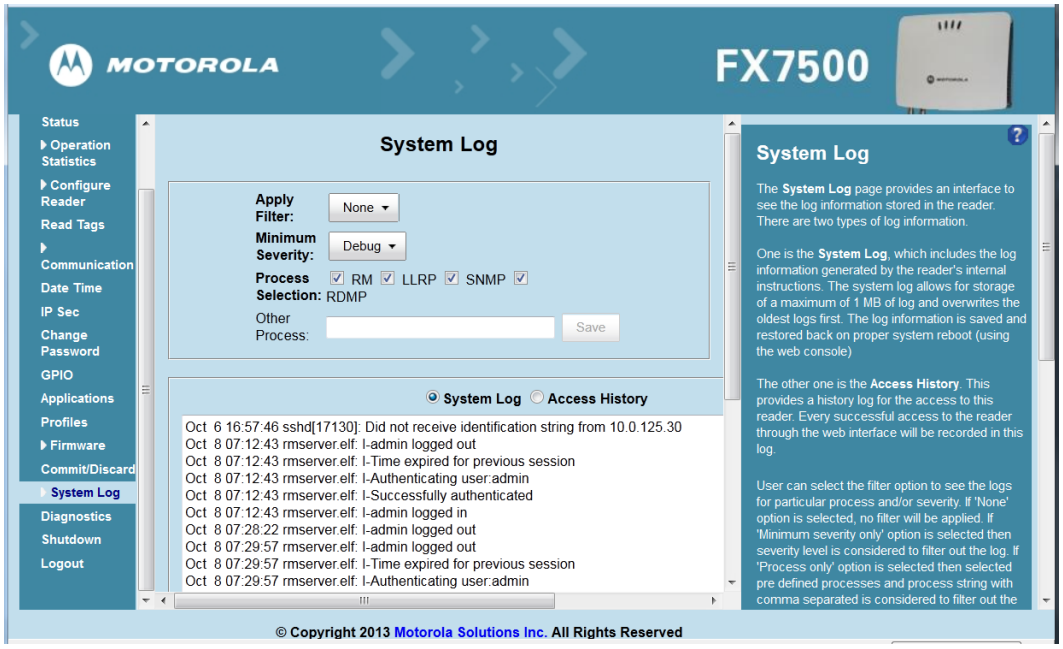

Figure 4-33 *System Log Window*

This window offers the following options:

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

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

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

Configure System Log

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

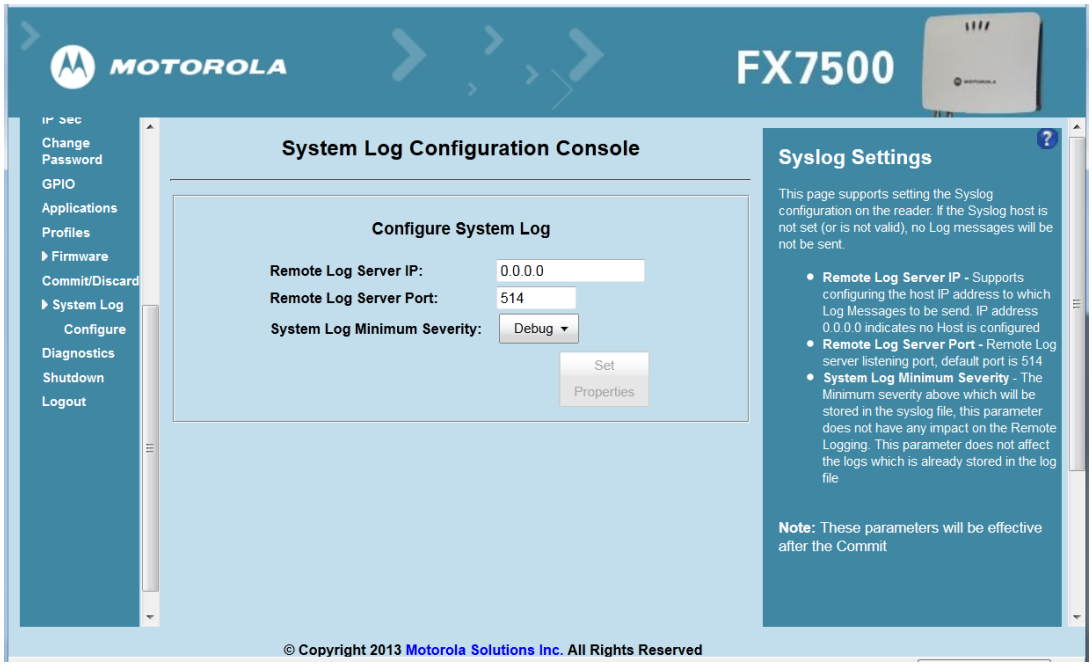

Figure 4-34 *Configure System Log Window*

This window offers the following options:

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

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

Reader Diagnostics

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

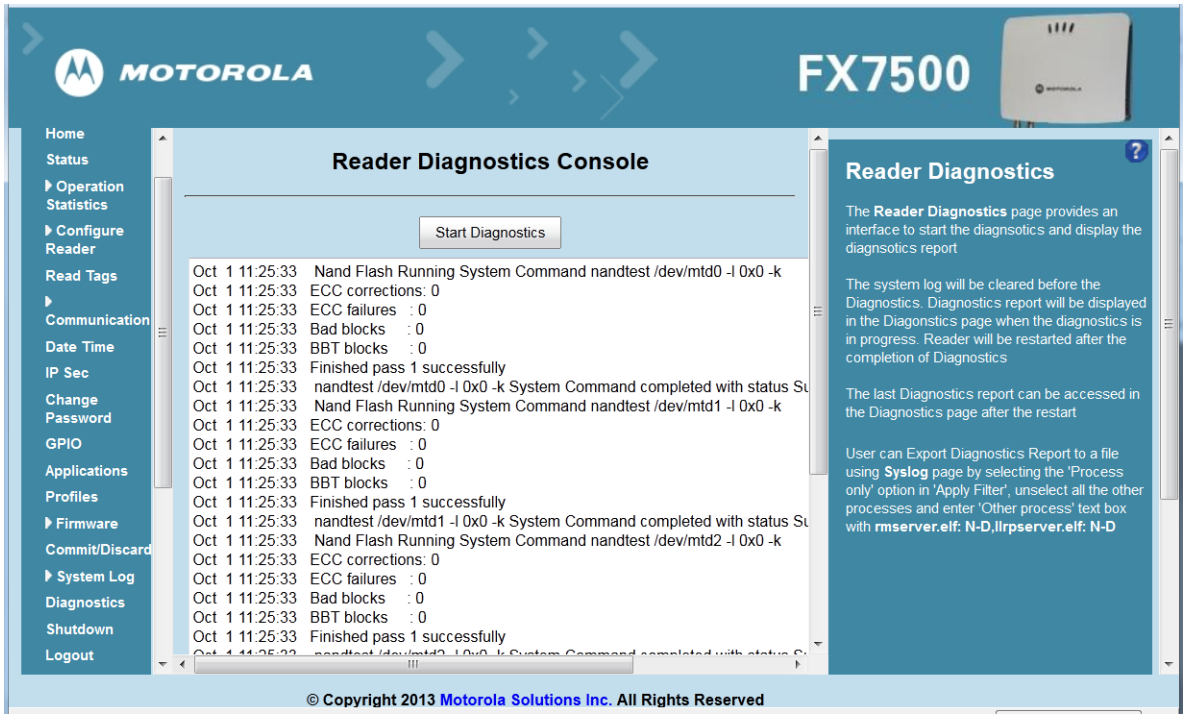

Figure 4-35 *Reader Diagnostics Window*

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

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

Shutdown

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

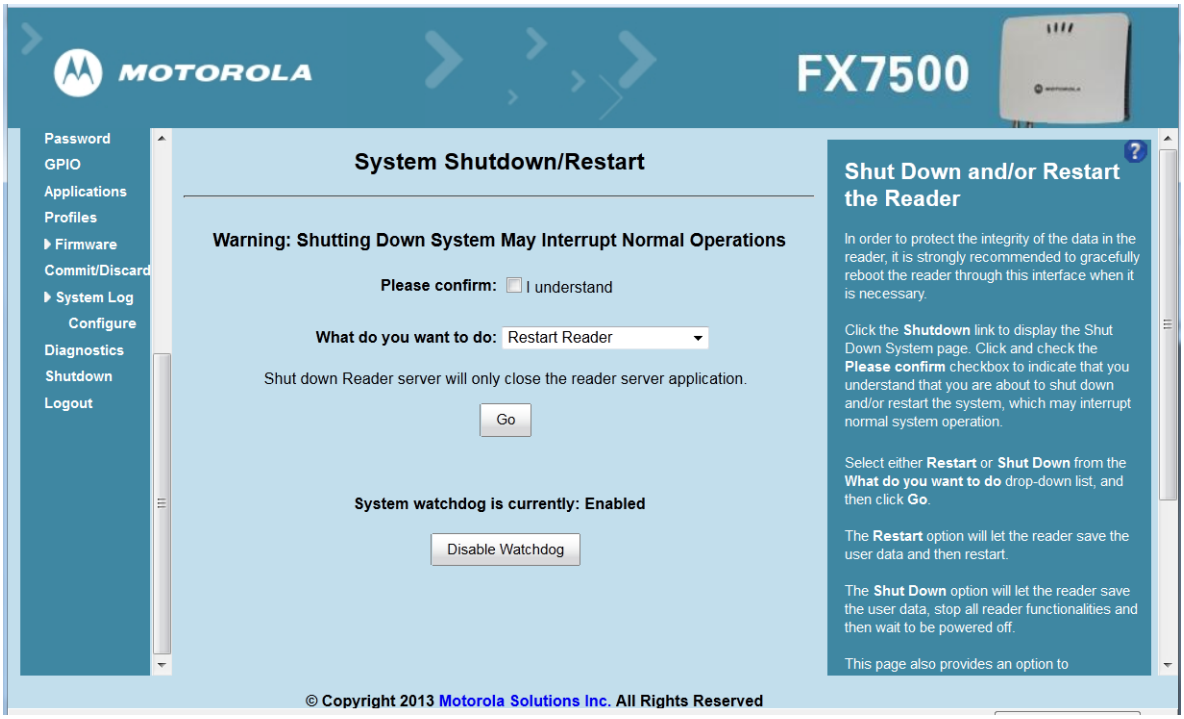

Figure 4-36 *System Shutdown/Restart Window*

To shut down or restart the reader:

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

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

CHAPTER 5 TROUBLESHOOTING

Table 5-1 provides FX7500 troubleshooting information.

Table 5-1 *Troubleshooting*

Problem/Error	Possible Causes	Possible Solutions
Reader error LED lights after the reader is in operation.	The CPU cannot communicate.	Refer to the system log for error messages.
Reader error LED stays lit on power up.	An error occurred during the power up sequence.	Refer to the system log for error messages.
Cannot 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 3-5*.
Reader is not reading tags.	The tag is out of its read range. Antennas are not connected. Tags are damaged. Tags are not EPCgen2. If reading with the reader's web page, Java JRE 1.6 or later is not installed.	Move the tag into read range. See *Read Tags on page 4-21*. Connect antennas. Confirm that tags are good. Confirm that tags are EPCgen2. Install Java JRE 1.6.
Cannot access the **Administrator Console**.	The IP address is unknown.	See *Communications Connections on page 3-5* to view the IP address, or use the host name to connect to the reader.

Table 5-1 *Troubleshooting (Continued)*

Problem/Error	Possible Causes	Possible Solutions
Certain real time applications are no longer functional.	The node address, IP address, or other reader configuration parameter(s) were changed using the **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**. The applications can use the **Force Login** option to log in even when the user closes the browser without logging out. **Force Login** option is supported for the administrative user.
Cannot log into **Administrator Console**.	The user forgot the password.	Press and hold the reset button for more than 8 seconds. This resets the reader configuration to factory defaults, including the password. This also removes the contents of the **apps** partition.
Unable to add SNTP server, reader returning error.	SNTP server is not reachable. SNTP server name is not resolvable via DNS server. DNS server is not reachable.	Ensure the SNTP server is accessible. Ensure the DNS server name is configured in TCP/IP configuration. Ensure the DNS server is accessible.
Operation failed.	A user operation did not complete, typically due to invalid input.	Validate all inputs and retry the operation. If it is not successful, see *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, see *Service Information on page xi*.
Session has Timed-out - Log in again.	The current session was inactive beyond the time-out period (15 minutes), so the system automatically logged out.	Log in again. As a security precaution to protect against unauthorized system access, always log out of the system when finished.
User name is not correct.	The user name does not match the current user registry (illegal characters, too long, too short, unknown, or duplicate.) User forgot the user ID.	Accurately retype the user name. See *Service Information on page xi*.

Table 5-1 *Troubleshooting (Continued)*

Problem/Error	Possible Causes	Possible Solutions
Not a legal IP address (1.0.0.0 - 255.255.255.255). Cannot reach the specified IP address. The SNMP Host Link is not valid.	The IP address entered is either formatted inaccurately or cannot be accessed (pinged).	Accurately retype the IP address, and make sure the host device is connected and online. If this is not successful, see *Service Information on page xi.*
Invalid network mask.	The network mask entered is not formatted correctly.	Confirm the correct network mask from the network administrator and enter it correctly.
Invalid SNMP version number.	The version number for SNMP protocol is not a supported version.	Use version number 1 for SNMP version 1, and 2 for SNMP version 2c.
Invalid description.	The description contained invalid characters (<,>,or').	Correct the description.
Invalid password.	The password does not match the current user registry (illegal characters, too long, or too short.) User forgot the password.	Accurately retype the password. 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 selecting an item from the list box before continuing.	Select an item from the list box, and then continue.
Last command is pending. Try again later.	The system did not finish 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 does not allow more than one administrator to log in at a time.	Wait until the other administrator logs out (or times out) before logging in.
Backup configuration file does not exist.	The system cannot revert to a backup configuration unless a backup file exists.	Commit the new configuration to create a backup file.
Failed to confirm the new password.	The system requires entering the password identically two times.	Accurately retype the password twice.
Network configuration change(s) have not been saved.	The user requested log out prior to committing/ discarding the changes made during the session.	Select one of the **Commit/Discard** options.

Table 5-1 *Troubleshooting (Continued)*

Problem/Error	Possible Causes	Possible Solutions
New password is the same as the old one.	The system requires entering a new password (different from the existing password) during the **Change Password** operation.	Enter a password that is different from the existing password.
Old password is not correct.	The system requires entering the existing password during the **Change Password** operation.	Accurately retype the existing password.
Unspecified error occurred - code: ####	A specific error message is missing for the given status code.	Note the code number, and contact Motorola Solutions 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 Solutions support. See *Service Information on page xi*
Request method was NULL. No query string was provided.	The system does not permit executing a proxy program from the command line rather than the web server.	No action required. The system is reporting that this action is not permitted.
Content length is unknown.	The system cannot accept an incorrectly formatted HTTP POST request (from an unsupported browser application).	Use a GET request instead, or update the software.
Couldn't read complete post message.	The system stopped a POST operation before completion.	Retry the operation, and allow it to complete.
Unhandled reply type.	The system generated an unexpected value.	Contact Motorola Solutions 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 Solutions support. See *Service Information on page xi*.
Invalid Device Address.	The device address information (parent) is invalid, missing, or formatted inaccurately.	Contact Motorola Solutions support. See *Service Information on page xi*.

Table 5-1 *Troubleshooting (Continued)*

Problem/Error	Possible Causes	Possible Solutions
Command parsing state error. Missing argument for the command. Command internal type cast error. Missing operator. Unknown operator.	A command was formatted inaccurately.	Contact Motorola Solutions support. See *Service Information on page xi*.
The action must be confirmed.	The user must confirm the requested action before it is executed.	Select the confirmation option when issuing this request.
Invalid network adapter when navigating to the Bluetooth configuration page.	The Bluetooth dongle is not plugged in or not supported.	Plug in a supported Bluetooth dongle and refresh the browser.
Wireless scan error.	Wireless dongle is not plugged in or not supported.	Plug in a supported wireless dongle and repeat the wireless scan.
OS update in progress.	Firmware update on the reader is ongoing. The current operation is not permitted.	Wait for the firmware update to complete and then retry the operation.
Cannot change password.	Cannot change password for guest.	Guest does not need a password to log in to the Administrator Console.

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

APPENDIX A TECHNICAL SPECIFICATIONS

FX7500 Kits

KT-FX75004US-01 4-Port US Reader Kit

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

KT-FX75002US-01 2-Port US Reader Kit

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

KT-FX75004WR-01 4-Port Global Reader Kit

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

KT-FX75002WR-01 2-Port Global Reader Kit

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

Technical Specifications

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

Table A-1 *Technical Specifications*

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

Table A-1 *Technical Specifications (Continued)*

Item	FX
Hardware/OS and Firmware Management	
Memory	Flash 512 MB; DRAM 256 MB
Operating System	Linux
Firmware Upgrade	Web-based and remote firmware upgrade capabilities
Management Protocols	RM 1.0.1 (with XML over HTTP/HTTPS and SNMP binding)
Network Services	DHCP, HTTPS, FTPS, SFPT, SCP, SSH, HTTP, FTP, SNMP and NTP
Network Stack	IPv4, IPv6
Security	Transport Layer Security Ver. 1.2, FIPS 140-2 Level 1
Air Protocols	EPCglobal UHF Class 1 Gen2, ISO 18000-6C
Frequency (UHF Band)	Global Reader: 902 MHz to 928 MHz (Maximum, supports countries that use a part of this band) 865 MHz to 868 MHz US (only) Reader: 902 MHz to 928 MHz
Transmit Power Output	10 dBm to +31.5 dBm (POE+, 12V ~ 48V External DC, Universal 24 VDC Power Supply; +10 dBm to +30.0 dBm (POE)
Max. Receive Sensitivity	-82 dBm
IP addressing	Static and Dynamic
Host Interface Protocol	LLRP v1.0.1
API Support	Host Applications – .NET, C and Java EMDK; Embedded Applications – C & Java SDK
Warranty	
The FX7500-4 and FX7500-2 are warranted against defects in workmanship and materials for a period of one year (12 months) from date of shipment, provided the product remains unmodified and is operated under normal and proper conditions. For the complete Motorola hardware product warranty statement, go to: http://www.motorolasolutions.com/warranty	
Recommended Services	
Support Services	Service from the Start Advance Exchange On-Site System Support Support
Advanced Services	RFID Design and Deployment Services

Cable Pinouts

10/100bT Ethernet / POE Connector

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

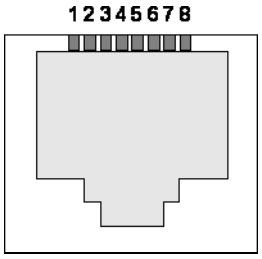

Figure A-1 *Ethernet Connections*

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

USB Client Connector

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

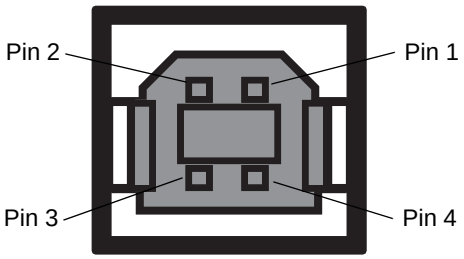

Figure A-2 *USB Client Connector*

Table A-3 *USB Client Port Connector Pinout*

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

USB Host Connector

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

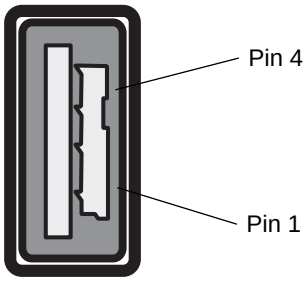

Figure A-3 *USB Host Connector (J22)*

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

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

GPIO Port Connections

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

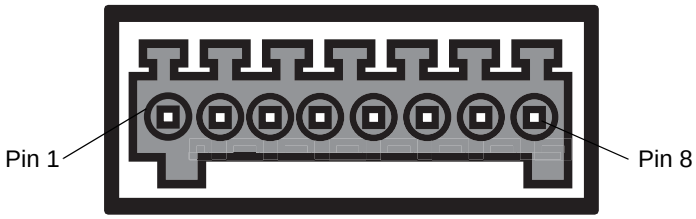

Figure A-4 *FX7500 RFID Reader GPIO Connection*

Table A-5 *GPIO Pin Outs*

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

APPENDIX B LLRP AND RM API EXTENSIONS

For information on Low Level Reader Protocol (LLRP) and Reader Management (RM) extensions for the FX7500 reader, refer to the *FX Series Reader Software Interface Control Guide.*