

Libra MAX-SS 5X00 Outdoor Subscriber Unit

User's Guide

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Product Version

This document revision applies to LIBRA MAX-SS 5X00 Outdoor WiMAX Subscriber Units 1.11xx and higher running firmware version 3.0 and higher.

Document Revision Level

Revision	Date	Description
A1	June 2008	Initial Release

Changes in this Revision

Not applicable (initial release).

Preface

Welcome to the EION LIBRA MAX-SS 5X00 Outdoor WiMAX Subscriber Unit User's Guide. The LIBRA MAX-SS 5X00 Outdoor WiMAX Subscriber Unit supports point-to-multipoint communication with an IEEE 802.16-2004-compliant WiMAX base station. This guide contains all the information you need to install and configure the LIBRA MAX-SS 5X00 Outdoor WiMAX Subscriber Unit.

Purpose and Audience

This guide is designed for anyone who installs, configures, deploys, or prepares a site for the Libra MAX-SS 5X00 Subscriber Unit. This guide is intended for the following audiences:

- Customers with a technical knowledge of and experience with networks and the Internet.
- Network administrators who install, configure, and manage EION LIBRA MAX-SS 5X00 WiMAX Subscriber Units.
- Network administrators who install, configure, and manage other EION or similar products, but are unfamiliar with the EION LIBRA MAX-SS 5X00 WiMAX Subscriber Unit.

Models and Configurations

The LIBRA MAX-SS 5X00 WiMAX Subscriber Unit is available in a variety of models and configurations. The following table lists some of the models available.

LIBRA MAX-SS 5X00 Models and Configurations

Model Number	Configuration and Description
Libra MAX-SS 5X00i16	5.8 GHz subscriber unit with integrated 16dBi antenna
Libra MAX-SS 5X00i20	5.8 GHz subscriber unit with integrated 20 dBi antenna
Libra MAX-SS 5X00i24	5.8 GHz subscriber unit with integrated 24 dBi antenna
Libra MAX-SS 5X00e	5.8 GHz subscriber unit with N-type connector



In this document, the term “LIBRA MAX-SS 5X00 ” is used to refer collectively to the family of LIBRA MAX-SS 5X00 Outdoor WiMAX Subscriber Unit products. If information in this document pertains to certain models, the particular model number will be used.

LIBRA MAX-SS 5X00 Features

The LIBRA MAX-SS 5X00 is designed for quick installation. The following list summarizes the key features of the LIBRA MAX-SS 5X00 .

- Complies with IEEE 802.16-2004 for communication with WiMAX base stations that support this standard.
- Supports multiple duplex modes and channel bandwidths.
- Power-over-Ethernet (PoE) capabilities allow data and power to be supplied to the unit using a single Ethernet cable.
- Includes an external or embedded antenna.
- External signal strength LEDs allow the antenna to be aligned for optimal received signal strength from the base station, without having to use a computer to log in to the unit.

Summary of Chapters

This guide contains the following chapters.

- **Chapter 1, Basic Installation** includes instructions for getting the LIBRA MAX-SS 5X00 WiMAX Subscriber Unit up and running as quickly as possible.
- **Chapter 2, Advanced Configuration** describes how to perform advanced configuration activities using the Web-based Configurator.
- **Chapter 3, Viewing Status Information** describes how to use the Configurator to view/change status information about LIBRA MAX-SS 5X00 .
- **Chapter 4, Configuring Administrative Settings** describes how to use the Configurator to view change the device name and location; enable or disable Web, SSH, and Telnet access to the LIBRA MAX-SS 5X00 ; enable or disable the LIBRA MAX-SS 5X00 status LEDs; and change the user name and password for logging in to the Configurator.
- **Appendix A, Factory Default Configuration Settings** lists the factory default configuration settings for the LIBRA MAX-SS 5X00 .
- **Appendix B, Upgrading Firmware** describes how to upgrade the LIBRA MAX-SS 5X00 firmware.

Release Notes








The Release Notes provided with your LIBRA MAX-SS 5X00 contain information that may not have been available when this User's Guide was written. We recommend you read the Release Notes before installing and configuring your LIBRA MAX-SS 5X00 .

Document Conventions

This document uses the following conventions to draw your attention to certain information.

Safety and Warnings

This document also uses the following symbols to draw your attention to certain information.

Icon	Meaning	Description
	Note	Notes emphasize or supplement important points of the main text.
	Tip	Tips provide helpful information, guidelines, or suggestions.
	Caution	Cautions indicate that failure to take a specified action could result in damage to the software or hardware.
	WARNING	Warnings indicate that failure to take a specified action could result in loss of communications or serious damage to hardware.
	DANGER	Danger warns users of possible injury or death if instructions are not followed.
	ELECTRIC SHOCK HAZARD	This symbol warns users of electric shock hazard. Failure to take appropriate precautions such as not opening or touching hazardous areas of the equipment could result in injury or death.
	Electrostatic Sensitive	The ESD symbol warns users that the equipment is sensitive to electrostatic discharge (ESD) and could be damaged if users do not take appropriate precautions such as using a grounded wrist strap when touching or handling the equipment.

Typographic Conventions

The following typographic conventions are used in this document.

Convention	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels.
<i>Italic</i>	Indicates a variable, which is a placeholder for actual text provided by the user or system.
screen font	Indicates text that is displayed on screen or entered by the user.

Contact Information

For more information about the LIBRA MAX-SS 5X00 or other products from EION Inc., please contact us using any of the following methods:

- **Web site:** Our Web site contains valuable information about our products. We encourage you to visit us at <http://www.eion.com>.
- **Sales:** Our Sales Department can be reached by phone or email:
 - Phone: +1 866 872-6936
 - Email: sales@EION.com
- **Fax calls:** Requests for information can be sent to our 24-hour fax number: +1 604 460 6005.
- **Technical support:** Technical support, the customer-satisfaction arm of EION Inc., is available by phone, live chat, email, and fax. For more information, see Appendix C.

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1

Basic Installation

This chapter provides instructions for getting your LIBRA MAX-SS 5X00 up and running as quickly as possible.

The topics covered in this chapter are:

- Section 1.1, Sample Configuration (page 2)
- Section 1.2, Unpacking (page 3)
- Section 1.3, User-Supplied Items (page 3)
- Section 1.4, Installing the LIBRA MAX-SS 5X00 (page 4)
- Section 1.6, Monitoring LIBRA MAX-SS 5X00 Status (page 14)

1.1 Sample Configuration

Figure 1-1 shows a configuration example where the LIBRA MAX-SS 5X00 is connected to the uplink (WAN) interface on an Ethernet router, hub, or switch. In this configuration, the LIBRA MAX-SS 5X00 communicates wirelessly with a base station using its WiMAX interface, while communicating at 10/100 Mbps with the attached Ethernet device. The LIBRA MAX-SS 5X00 also receives its power from the Ethernet connection, eliminating the need to run a power cable to the LIBRA MAX-SS 5X00. In this way, the Ethernet device serves as the bridge between the attached computers and the LIBRA MAX-SS 5X00.

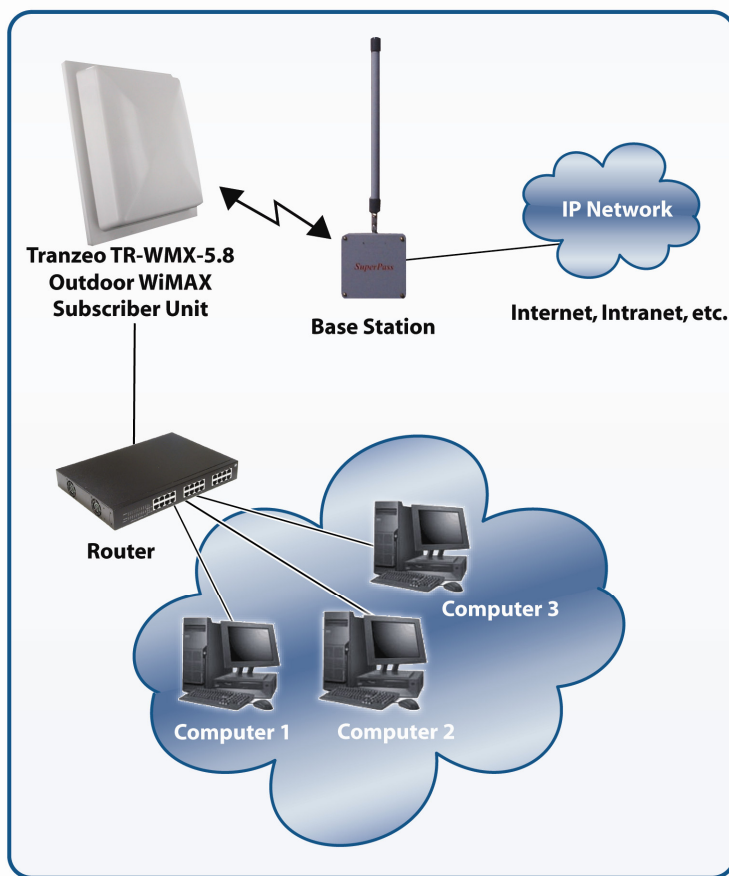


Figure 1-1. Example of a LIBRA MAX-SS 5X00 Configuration

1.2 Unpacking

After receiving your LIBRA MAX-SS 5X00 , perform the following steps to ensure that your contents arrived safely.

- Inspect the outer shipping container for damage during shipping. Report any sign of damage to the appropriate shipping carrier.
- Remove the contents from the shipping container.

One LIBRA MAX-SS 5X00 WiMAX Subscriber Unit

One Power over Ethernet (POE) adapter

An 18 VAC, 24 VAC, or other adapters

One L bracket, boot cover with gasket, and U bolt kit (outdoor unit only)

Inspect your contents thoroughly and compare them to the checked items on the inside of the shipping carton. If any item is missing or damaged, contact the shipping carrier.

1.3 User-Supplied Items

To complete your installation, please provide the following items:

- One 3/8 wrench
- One 3/4 wrench
- One RJ-45 crimper
- A Category 5 Ethernet LAN cable (straight-through or crossover) that is sufficiently long to bring the signal from the device to the POE adapter
- Two RJ-45 jacks
- One #6 grounding wire
- A personal computer (PC) with a Web browser
- An IEEE 802.16-2004-compliant WiMAX base station

1.4 Installing the LIBRA MAX-SS 5X00

The LIBRA MAX-SS 5X00 can be mounted either horizontally or vertically. Before you install the unit, determine whether the LIBRA MAX-SS 5X00 will be mounted horizontally or vertically.



The LIBRA MAX-SS 5X00 must be installed by a trained professional, value added reseller, or systems integrator who is familiar with RF cell planning issues and the regulatory limits defined by the FCC for RF exposure, specifically those limits outlined in sections 1.1307.

The following procedure describes how to install the LIBRA MAX-SS 5X00 Outdoor Subscriber Unit.

1. Mount the LIBRA MAX-SS 5X00 at the desired location.
2. Attach the boot cover, L bracket, and U bolt to the LIBRA MAX-SS 5X00, as shown in Figure 1-2.

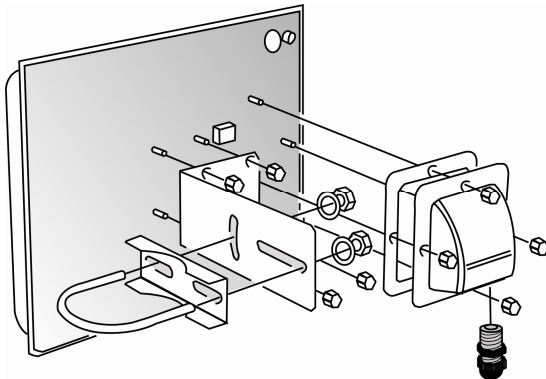


Figure 1-2. Attaching the Boot Cover to the LIBRA MAX-SS 5X00

3. To power the LIBRA MAX-SS 5X00 :
 - Connect one end of a Category 5 Ethernet LAN cable to the LIBRA MAX-SS 5X00 Ethernet port.
 - Connect the other end of the cable to the port labeled **CPE** on the supplied PoE adapter.
 - Connect the supplied AC adapter to the PoE adapter.
 - Plug the AC adapter into an electrical outlet. The LIBRA MAX-SS 5X00 performs its self-test for about 30 seconds. Then the LIBRA MAX-SS 5X00 LEDs show the status of the unit (see section 1.6.2).



Do not connect a device other than the LIBRA MAX-SS 5X00 to the CPE port.

Network equipment that does not support PoE can be damaged permanently by connecting to a PoE source. Most Ethernet interfaces on PCs, laptop/notebook computers, and other network equipment (such as Ethernet switches and routers) do not support PoE.

4. If your unit has an external antenna, turn off power to the LIBRA MAX-SS 5X00 , then attach the antenna to the LIBRA MAX-SS 5X00 antenna connector. Mount the antenna in a location that provides the best communication with the base station.



Be sure to turn off power to the LIBRA MAX-SS 5X00 before mounting the antenna.

5. Use the **Ground** terminal on the LIBRA MAX-SS 5X00 to ground the unit (for best practices, see section 1.4.1).



When used in Norway, Finland, or Sweden, this equipment must be installed in a Restricted Access Location.



This equipment is intended for installation by trained / competent service personnel only.

Figure 1-3 show an example of the LIBRA MAX-SS 5X00 installed.

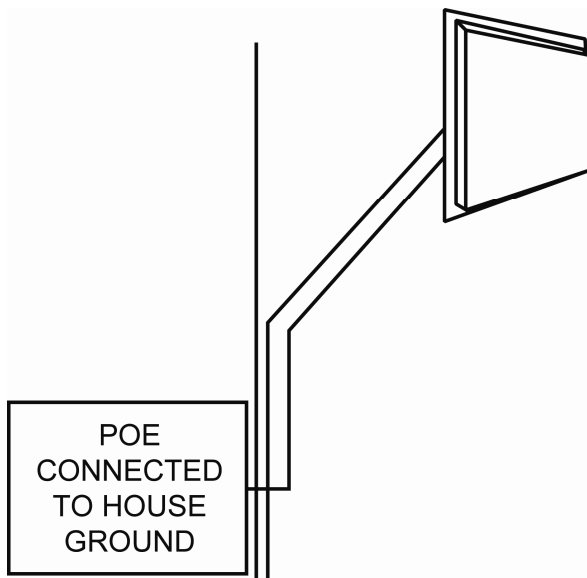


Figure 1-3. Sample LIBRA MAX-SS 5X00 Installation

1.4.1 Installation Best Practices

Observe the following best practices when installing the LIBRA MAX-SS 5X00 .

- The LIBRA MAX-SS 5X00 10/100 Ethernet port auto-senses the cable connected to it and adjusts automatically. The Ethernet connector is protected with a weatherproof housing. Pin assignments for this connector are shown in Table 1-1.
- Always try to run the Category 5 cable and LMR inside the mounting pole whenever possible. This helps to insulate the cable from any air surges.
- Keep all runs as straight as possible. Never put a full loop into the cables.
- The LIBRA MAX-SS 5X00 antenna's grounding system must be installed according to Article 810-15, 810-20, and 810-21 of the National Electric Code, ANSI/NFPA No. 70-1993 or applicable National or Local Wiring Codes / Rules. Test all grounds to ensure that they are using a proper Ground. If you use an electrical socket for Ground, use a socket tester, such as Radio Shack 22-1412. We recommend you obtain a copy of the National Electric Code Guide and follow its guidelines. If you are in doubt or have questions about the antenna grounding system, contact a local licensed electrician. Alternatively, you can drive your own rod and bond it to the house Ground; this way, you will know that at least one rod is correctly grounded in the system.
- Never attach a Grounding wire when the LIBRA MAX-SS 5X00 is powered. If the Ground is to be attached to an existing electrical circuit, turn off the circuit before attaching the wire.
- Never install radio equipment, such as the LIBRA MAX-SS 5X00 , during an electrical storm. In addition, to protect your system against damage from lightning, design the system so it does not attract lightning (it cannot repel lightning, either). National, state, and local codes are designed to protect life, limb, and property and must always be obeyed. When in doubt, consult local and national electrical codes or contact an electrician or professional trained in the design of grounding systems.

Table 1-1. Pin Assignments for the LIBRA MAX-SS 5X00 10/100 Ethernet Port

Pin	Signal	Standard Wire Color
1	Tx+	White/Orange
2	Tx-	Orange
3	Rx+	White/Green
4	PoE V+	Blue
5	PoE V+	White/Blue
6	Rx-	Green
7	Gnd	White/Brown
8	Gnd	Brown

1.5 Configuring the LIBRA MAX-SS 5X00

After installing the LIBRA MAX-SS 5X00 , use the procedures in the following sections to configure it using its Configurator.

1.5.1 Logging in to the Configurator

Your LIBRA MAX-SS 5X00 provides a Web-based Configurator for performing advanced configuration activities. After you install your LIBRA MAX-SS 5X00 , use the following procedure to launch the Configurator.

1. Use an Ethernet cable to connect the Ethernet port on the PoE to a network-interface card (NIC) in a PC or network hub.



The LIBRA MAX-SS 5X00 Ethernet port is equipped with an auto-sensing Ethernet port that allows both regular and cross-over cables to be used.

2. Start your Web browser and point it to one of the following default IP addresses: `http://192.168.101.151` or `http://192.168.0.1`. The Login page in Figure 1-4 appears, with your cursor in the **User name** field.



The default IP address is the same for all TR-WMX units. Therefore, do not simultaneously connect multiple unconfigured TR-WMX units to a common Local Area Network (LAN) and try to access them using the default IP address.



To connect to the Configurator, your PC's IP address must be on the same subnet (192.168.101.xxx, where xxx is a number from 1 to 253) as the LIBRA MAX-SS 5X00 , and the PC's netmask must be set to 255.255.255.0.

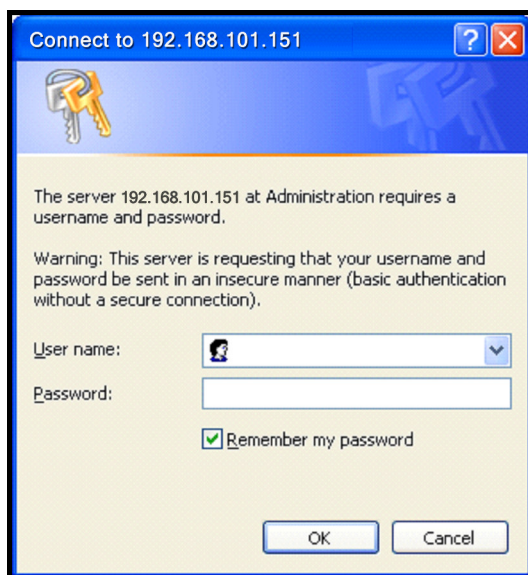


Figure 1-4. Login Page

3. Enter the default username **admin** and default case-sensitive password **default** in the appropriate fields.



For security, every typed password character appears as a bullet (•). For additional security, we recommend you change the default password (see section 4.4.4).

4. Click the **OK** button to log in. The Information Page appears (see Figure 1-5). This read-only page displays network, wireless, and device information about your installation. For more information about this page, see section 3.1.

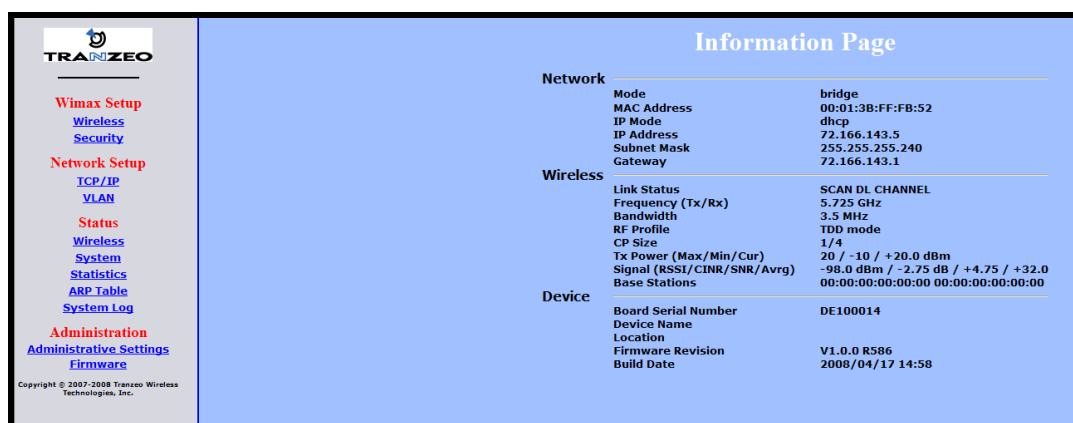


Figure 1-5. Example of an Information Page

1.5.2 Specifying Wireless Settings

After logging in to the Configurator, use the following procedure to set the LIBRA MAX-SS 5X00 wireless settings.



The default configuration settings for most parameters should work well for the majority of installations. Only those settings that should be confirmed or adjusted as part of the quick-start instructions are described in this section.

1. In the left pane, under **WiMAX Setup**, click **Wireless**. The Wireless Settings page appears (see Figure 1-6).
2. Set the three groups of parameters as indicated in Table 1-2 and Figure 1-6.
3. Click the **Apply** button. A page tells you that your configuration changes have been saved, but will not be applied until you reboot the LIBRA MAX-SS 5X00 .
4. Do not reboot the LIBRA MAX-SS 5X00 at this time. Instead, proceed to section 1.5.3 on page 12.

Figure 1-6. Wireless Settings Page

Table 1-2. Wireless Settings

Parameter	Choose This Setting
Group ⌘ Parameters in Figure 1-6	
Channel Bandwidth (MHz)	Select 3.5MHz (<i>default</i>) 5MHz, or 7MHz, whichever best suits your application's bandwidth needs and is allowed by your license. The base station must be set to the same bandwidth.
Secondary Management Connection Support	Confirm that the default setting (Secondary Management Support) is selected. If not, select it.
Initial Ranging Burst Inverting	Confirm that the default setting (Software Auto) is selected. If not, select it.
Adaptive Modulation (DBPC)	Confirm that the default setting (Auto using CINR thresholds) is selected. If not, select it.
Frequency (KHz)	Sets the frequency, in kHz. Range is 5725000 – 5925000 in increments of 500kHz. Default is 5725000 (5.72 GHz).
Initial Delay Correction Value	Confirm that the default setting (0) is selected. If not, select it.
Max TX Power (dBm)	<p>This value should match the LIBRA MAX-SS 5X00 antenna. Examples:</p> <ul style="list-style-type: none"> LIBRA MAX-SS 5X00 -14: specify a value that is 14db less than the max EIRP setting. If the max EIRP setting is 30dBm, for example, set Max Tx Power to 16dBm. LIBRA MAX-SS 5X00 -17: specify a value that is 17db less than the max EIRP setting. If the max EIRP setting is 30dBm, for example, set Max Tx Power to 13dBm. LIBRA MAX-SS 5X00 -20: specify a value that is 20db less than the max EIRP setting. If the max EIRP setting is 30dBm, for example, set Max Tx Power to 10dBm. <p>The Max Tx Power value cannot exceed 20dBm. Default setting is 20.</p> <p>Note: When setting the Max Tx Power value, do not exceed the max EIRP allowed by your license. When adding the values for Tx Antenna Gain and Max Tx Power, the sum of these values must equal or be less than the max EIRP that your license allows. The gain of the internal antenna is 17dB, requiring the Max Tx Power to be set to (max EIRP – 17).</p>
Min Tx Power (dBm)	Confirm that the default setting (-10) is selected. If not, select it.
Rx Antenna Gain (1/4dB step)	Confirm that the default setting (0) is selected. If not, select it.
Tx Antenna Gain (1/4dB step)	Confirm that the default setting (0) is selected. If not, select it.
Group • Parameters in Figure 1-6	
MAC Message Strict Checking	Confirm that the default setting (Disable) is selected. If not, select it.
Pack Enable for Primary CID	Confirm that the default setting (Enable) is selected. If not, select it.
Fragment Enable for Primary CID	Confirm that the default setting (Enable) is selected. If not, select it.

Parameter	Choose This Setting
Tx Overrun Fix	Confirm that the default setting (Disable) is selected. If not, select it.
QoS Admitted Bit	Confirm that the default setting (Disable) is selected. If not, select it.
QoS Tx Policy Checking	Confirm that the default setting (Disable) is selected. If not, select it.
Enable 0 Symbol HDD Patch	Confirm that the default setting (Disable) is selected. If not, select it.
Group ÷ Parameters in Figure 1-6	
BSID and Mask	Use the standard format for MAC addresses (six 2-digit hexadecimal numbers separated by colons) to enter the base station ID. Example: "12:34:56:78:9a:bc". You can enter up to 8 base station addresses, separating each by pressing the Enter key. To match all BSIDs, mask out the lower 3 bytes. "00:00:00:00:00:00 00:00:00:00:00:00".

1.5.3 Specifying Network Setup Settings

After specifying wireless settings, use the following procedure to specify the network setup settings.

1. In the left pane, under **Network Setup**, click **TCP/IP**. The TCP/IP Settings page appears (see Figure 1-7).
2. If the LIBRA MAX-SS 5X00 is set to unmanaged mode (**No Secondary Management**), set the parameters in Table 1-3 (these parameters are highlighted in orange in Figure 1-7). Otherwise, skip to step 3 below.



By default, the LIBRA MAX-SS 5X00 is set to use secondary managed mode. In this mode, the settings in Table 1-3 are set automatically and the fields are unavailable. If you switch to unmanaged mode (**No Secondary Management**), you can specify the settings in Table 1-3 manually. To change between the two modes, use **Secondary Management Connection Support** on the Wireless Settings page (see section 2.2.1).

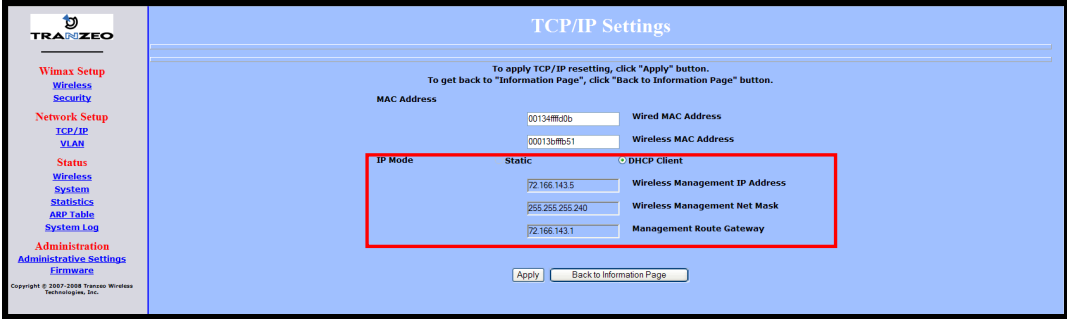



Figure 1-7. TCP IP Settings

Table 1-3. TCP/IP Settings


Parameter	Choose This Setting
Wireless Management IP Address	<p>Secondary managed mode: This value is set automatically and the field is unavailable.</p> <p>Unmanaged mode: Set this parameter to an unused value in the subnet to which the base station is connected.</p>
Wireless Management Net Mask	<p>Secondary managed mode: This value is set automatically and the field is unavailable.</p> <p>Unmanaged mode: Set this value to match that of the subnet to which the base station is connected.</p>
Management Route Gateway	<p>Secondary managed mode: This value is set automatically and the field is unavailable.</p> <p>Unmanaged mode: Set this value to be the router on the subnet to which the base station is connected.</p>

3. Click the **Apply** button. When the next page appears, click the **Reboot** button to reboot the LIBRA MAX-SS 5X00 and put your saved settings into effect.

 Rebooting disconnects the LIBRA MAX-SS 5X00 and any connections currently running. It may take 60 seconds before the LIBRA MAX-SS 5X00 is running and accessible again. The **Status** LED flashes while the unit reboots and goes ON when the unit completes the reboot process.



Congratulations! You have now completed the installation procedures for your LIBRA MAX-SS 5X00 node. Your LIBRA MAX-SS 5X00 unit is now ready for use.

 By default, security is disabled on the LIBRA MAX-SS 5X00. To enable security, see section 2.2.2.

1.6 Monitoring LIBRA MAX-SS 5X00 Status

There are two ways to monitor the status of your LIBRA MAX-SS 5X00 :

- Viewing status pages through the LIBRA MAX-SS 5X00 Configurator
- Watching the status LEDs on the rear panel of the LIBRA MAX-SS 5X00


1.6.1 Viewing Status Information

You can view LIBRA MAX-SS 5X00 status information by clicking the links under **Status** in the left pane of the Configurator. To display the system information, for example, click **System**. For more information, see Chapter 3.



The values shown in the status pages are not updated dynamically. To refresh the values shown, reload the Web page.

Status Links



Wimax Setup

[Wireless](#)

[Security](#)

Network Setup

[TCP/IP](#)

[VLAN](#)

Status

[Wireless](#)

[System](#)

[Statistics](#)

[ARP Table](#)

[System Log](#)

Administration

[Administrative Settings](#)

[Firmware](#)

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Information Page

Network	
Mode	bridge
MAC Address	00:01:3B:FF:FB:52
IP Mode	dhcp
IP Address	72.166.143.5
Subnet Mask	255.255.255.240
Gateway	72.166.143.1
Wireless	
Link Status	SCAN DL CHANNEL
Frequency (Tx/Rx)	5.725 GHz
Bandwidth	3.5 MHz
RF Profile	TDD mode
CP Size	1/4
Tx Power (Max/Min/Cur)	20 / -10 / +20.0 dBm
Signal (RSSI/CINR/SNR/Avrg)	-98.0 dBm / -2.75 dB / +4.75 / +32.0
Base Stations	00:00:00:00:00:00 00:00:00:00:00:00
Device	
Board Serial Number	DE100014
Device Name	
Location	
Firmware Revision	V1.0.0 R586
Build Date	2008/04/17 14:58

Figure 1-8. Status Links on the Configurator

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1.6.2 Status LEDs

The rear of the LIBRA MAX-SS 5X00 has 9 LEDs that show the unit's status. Table 1-4 describes the functions of the LEDs.



The LIBRA MAX-SS 5X00 status LEDs can be disabled from the Administrative Settings page (see section 4.4.3).

Table 1-4. LIBRA MAX-SS 5X00 LEDs

LED	Description
Radio	ON = connection with a base station has been established. OFF = connection with a base station has not been established.
LAN	ON = a connection to the Ethernet port has been established. Flash = connection is in use. OFF = a connection to the Ethernet port has not been established.
Status	ON = LIBRA MAX-SS 5X00 is fully operational. Blink = LIBRA MAX-SS 5X00 is booting or shutting down.
Signal	Indicates the received signal strength from a base station. 1 LED blinking = there is no link between the LIBRA MAX-SS 5X00 and the base station. 1 LED ON = $RSSI \leq -96\text{dBm}$ 2 LEDs ON = $-95\text{dBm} \leq RSSI < -86\text{ dBm}$ 3 LEDs ON = $-85\text{dBm} \leq RSSI < -76\text{ dBm}$ 4 LEDs ON = $-75\text{dBm} \leq RSSI < -61\text{ dBm}$ 5 LEDs ON = $RSSI \geq -60\text{ dBm}$
Power	ON = LIBRA MAX-SS 5X00 is receiving power. OFF = LIBRA MAX-SS 5X00 is not receiving power.

2

Advanced Configuration

This chapter describes how to perform advanced configuration activities using the LIBRA MAX-SS 5X00 Configurator.



This chapter is for expert users who understand networking concepts and terminology. You do not need to perform these activities to use your LIBRA MAX-SS 5X00 , nor should you undertake these procedures if you are a novice user. Performing the instructions in Chapter 1 is all that is required to start using your LIBRA MAX-SS 5X00 .

The topics covered in this chapter are:

- Section 2.1, Understanding the Pages in the Configurator (page 17)
- Section 2.2, Entering WiMAX Setup Settings (page 19)
- Section 2.3, Entering Network Setup Settings (page 24)

2.1 Understanding the Pages in the Configurator

The LIBRA MAX-SS 5X00 Configurator is a Web-based utility that provides an intuitive user interface for viewing and changing configuration and status settings.

The page header at the top of the page shows the name of the page. The navigation panel on the left side provides links you can click to display the pages in the Configurator. The links are organized into the following categories:

- **WiMAX Setup** - lets you access the pages for viewing and configuring the LIBRA MAX-SS 5X00 wireless and security settings. See section 2.2.
- **Network Setup** - lets you access the pages for viewing and configuring the LIBRA MAX-SS 5X00 TCP/IP and VLAN settings. See section 2.3.
- **Administration** - lets you view and configure administrative settings (see section 4) and upgrade the LIBRA MAX-SS 5X00 firmware (see Appendix B).

Pages with user-configurable settings have an **Apply** button at the bottom of the page. The same pages, and the Firmware page, have a **Back to Information Page** button.

- After you change configuration settings on a page, click **Apply** before going to another page; otherwise, your changes will be discarded. Clicking **Apply** saves in memory all changes made on the currently displayed page. When you click this button, another page appears with a **Reboot** button. You can either click the **Reboot** button to reboot the LIBRA MAX-SS 5X00 and have the new configuration settings take effect, or change settings on other pages and reboot after all of your configuration changes are complete.



Rebooting disconnects the LIBRA MAX-SS 5X00 and any connections currently running. It may take up to 60 seconds before the LIBRA MAX-SS 5X00 is running and accessible again. When you reboot the LIBRA MAX-SS 5X00, the **Status** LED flashes while the unit reboots and goes ON when the unit completes the reboot process.



Another way to reboot the unit is by using the **Reboot** button on the Administration Settings page (see section 4.3).

- The **Back to Information Page** lets you redisplay the Information Page. This page lets you view the LIBRA MAX-SS 5X00's current network, wireless, and device settings (see section 3.1). This page is the first page that appears when you log in to the Configurator.

The main panel is the viewing area on the page. When you select a link in the navigation panel, the fields of the page are displayed in the main panel. This is where you view and change the LIBRA MAX-SS 5X00 configuration settings.

The remaining sections describe the Configurator pages you can use to view and change the LIBRA MAX-SS 5X00 configuration and status. These sections assume you used the procedure in section 1.5.1 to log in to the Configurator.

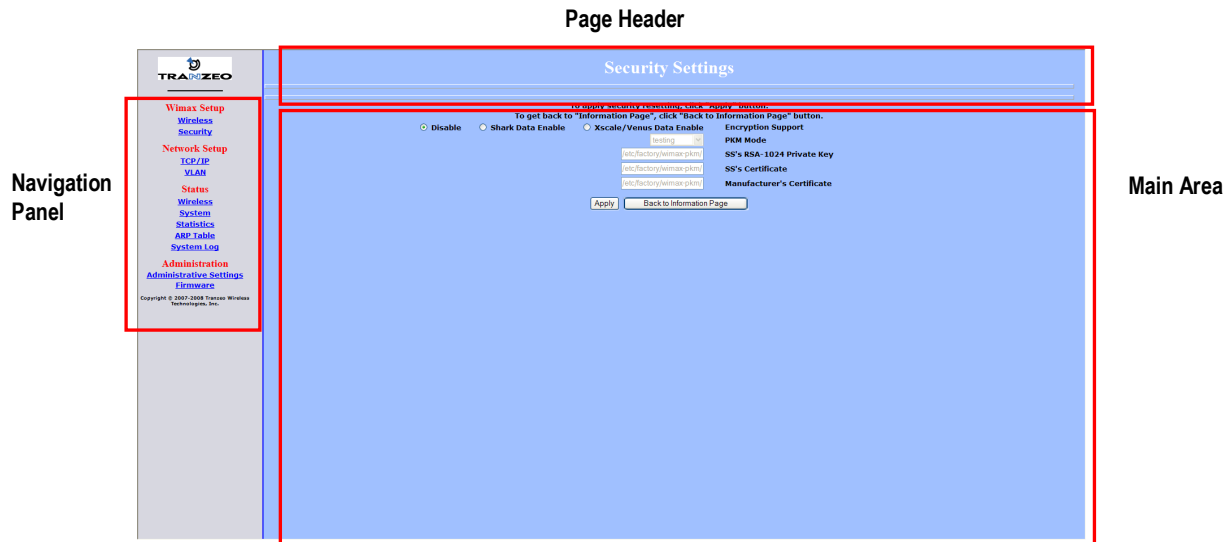


Figure 2-1. Areas on the Configurator Page

2.2 Entering WiMAX Setup Settings

The Configurator provides two menu selections for entering WiMAX setup settings:

- **Wireless** lets you set wireless settings for the LIBRA MAX-SS 5X00 . See section 2.2.1.
- **Security** lets you set security settings for the LIBRA MAX-SS 5X00 . See section 2.2.2.

If you change any of the settings on these pages, click the **Apply** button at the bottom of the page to reboot the LIBRA MAX-SS 5X00 and have your settings take effect.

2.2.1 Entering Wireless Settings

Clicking the **Wireless** link under **WiMAX Setup** in the left pane of the Configurator displays the Wireless Settings page. Use this page to select the wireless settings for the LIBRA MAX-SS 5X00 . Figure 2-2 shows this page, and Table 2-1 describes the fields and buttons on it.

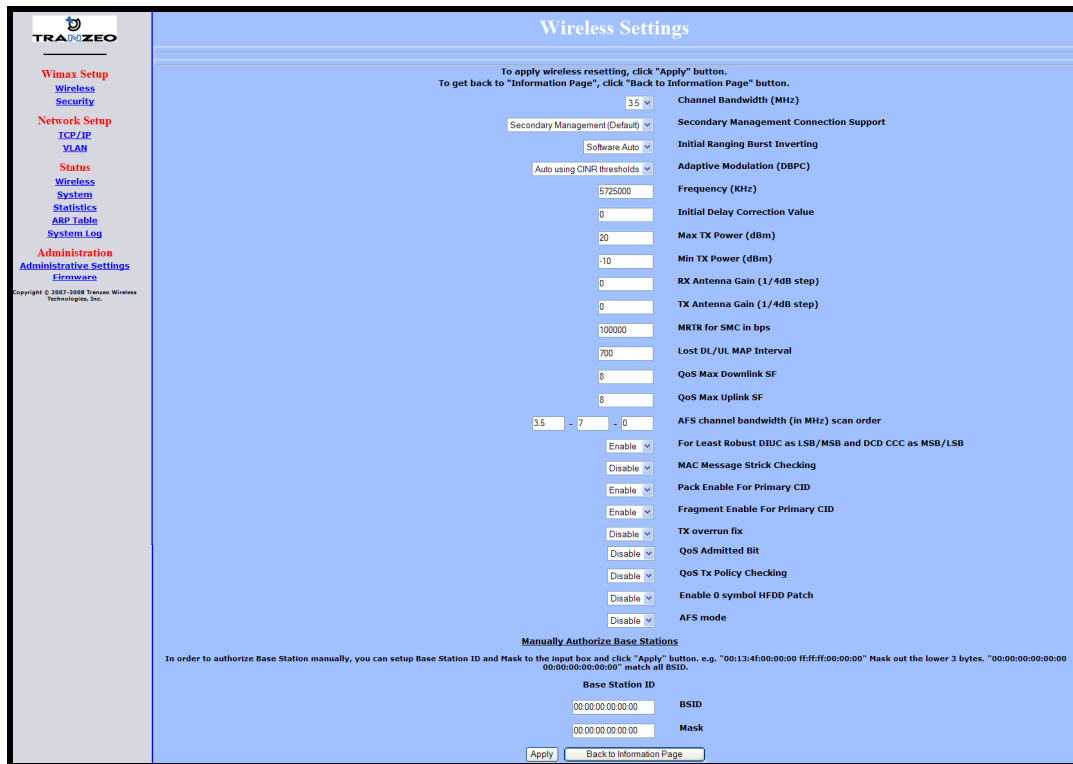


Figure 2-2. Wireless Settings Page

Table 2-1. Fields and Buttons in the Wireless Settings Page

Field	Description
Channel Bandwidth (MHz)	Select the value that best suits your application's bandwidth needs and is allowed by your license. Choices are: <ul style="list-style-type: none"> 3.5 MHz (<i>default</i>) 5 MHz 7 MHz
Secondary Management Connection Support	Determines whether the LIBRA MAX-SS 5X00 is configured for Static or DHCP Client mode. Choices are: <ul style="list-style-type: none"> No Secondary Management Support – unmanaged mode. This setting requires you to set the LIBRA MAX-SS 5X00 IP addresses manually. This setting makes the Management Net Mask, and Management Route Gateway fields available on the TCP/IP Settings page. Secondary Management (Default) – Secondary managed mode. Select this setting if the LIBRA MAX-SS 5X00 IP addresses will be set automatically by a DHCP server. This setting makes Management Net Mask, and Management Route Gateway fields on the TCP/IP Settings page unavailable. (<i>default</i>)
Initial Ranging Burst Inverting	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection of Software Auto.
Adaptive Modulation (DBPC)	Matches the downlink modulation used to the link conditions. Adaptive modulation, operates in conjunction with the downlink burst power control (DBPC) which adjusts the CPE transmit power to that requested by the base station. Fixed modulations can be selected or adaptive algorithms based on CINR or based on error rates can be used to determine when the downlink modulation is adjusted. Choices are: <ul style="list-style-type: none"> Disable DBPC Auto using CINR thresholds (<i>default</i>) Auto using BER thresholds Fixed to BPSK-1/2 Fixed to QPSK-1/2 Fixed to QPSK-3/4 Fixed to QAM16-1/2 Fixed to QAM16-3/4 Fixed to QAM64-2/3 Fixed to QAM64-3/4
Frequency (KHz)	Sets the frequency, in kHz. Range is 5725000 – 5925000 in increments of 500kHz. Default is 5725000 (5.72 GHz).
Initial Delay Correction Value	0 (<i>default</i>)
Max TX Power (dBm)	The maximum transmit power at which the unit can operate, specified in dBm. This value added to the Tx Antenna Gain cannot exceed the EIRP that the operator license allows. Range is -10 to 20dBm. Default is 20dBm.
Min Tx Power (dBm)	The minimum transmit power at which the unit can operate, specified in dBm. Range is -10 to 20dBm. Default is -10dBm.
Rx Antenna Gain (1/4dB step)	The gain of the Rx antenna, in dB. The gain of the internal antenna is 17dB. Default is 0dB.

Field	Description
Tx Antenna Gain (1/4dB step)	The gain of the Rx antenna, in dB. The gain of the internal antenna is 17dB. Default is 0dB.
MRTR for SMC in bps	Sets the minimum reserved traffic rate for the secondary management channel. Default is 100000.
Lost DL/UL MAP Interval	Sets the time in seconds that the CPE will maintain the link to the BS using the last DL or UL MAP received. Default is 700.
QoS Max Downlink SF	Sets the maximum number of downlink service flows the CPE will support. Default is 8. The maximum possible SF for downlink and uplink service flows, combined is 60.
QoS Max Uplink SF	Sets the maximum number of uplink service flows the CPE will support. Default is 8. The maximum possible SF for downlink and uplink service flows, combined is 60.
AFS channel bandwidth (in MHz) scan order	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
For Least Robust DIUC as LSB/MSB and DCD CCC as MSB/LSB	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
MAC Message Strict Checking	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
Pack Enable for Primary CID	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
Fragment Enable for Primary CID	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
Tx Overrun Fix	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
QoS Admitted Bit	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
QoS Tx Policy Checking	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
Enable 0 Symbol HDD Patch	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
AFS Mode	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
BSID and Mask	Use the standard format for MAC addresses (six 2-digit hexadecimal numbers separated by colons) to enter the base station ID. Example: "12:34:56:78:9a:bc". You can enter up to 8 base station addresses, separating each by pressing the Enter key. To match all BSIDs, mask out the lower 3 bytes. "00:00:00:00:00:00 00:00:00:00:00:00" .

2.2.2 Setting Security Settings

Clicking the **Security** link under **WiMAX Setup** in the left pane of the Configurator displays the Security Settings page. Use this page to select the security settings for the LIBRA MAX-SS 5X00 . The first selection on this page lets you select the encryption method to be used. Depending on your selection, the remaining fields on the page are either enabled or disabled. Figure 2-3 shows this page, and Table 2-2 describes the fields and buttons on it.

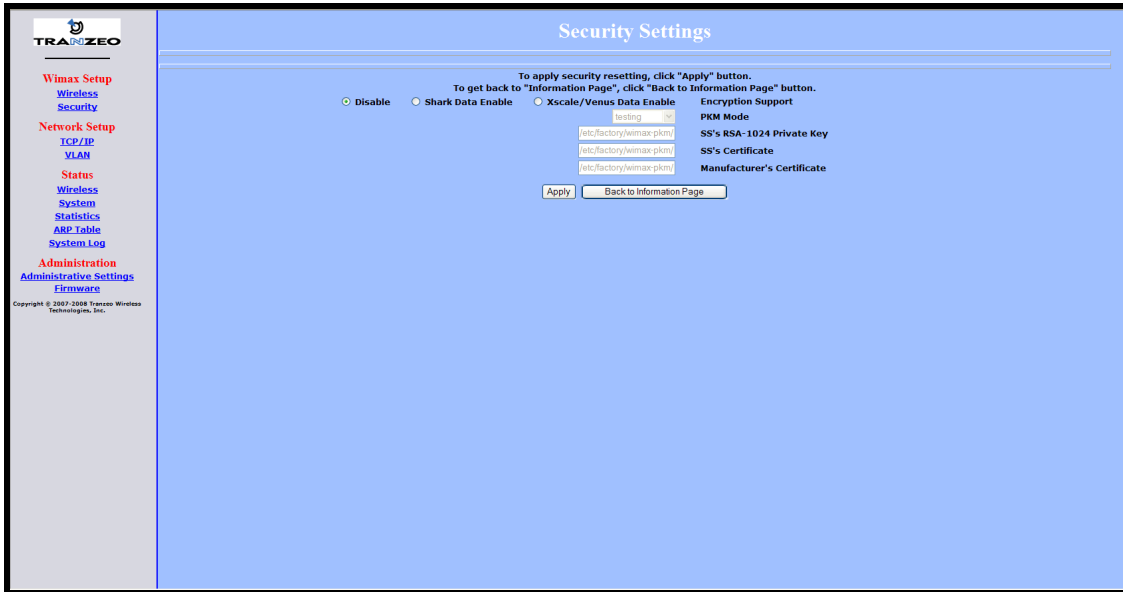


Figure 2-3. Security Settings Page

Table 2-2. Fields and Buttons in the Security Settings Page

Field	Description
Disable	Disables the LIBRA MAX-SS 5X00 security settings on this page. This is the default setting.
Shark Data Enable	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
Xscale/Venus Data Enable	This feature is provided for Engineering development use, and is an undocumented feature. Please do not change from the default selection.
PKM Mode	<p>Enable the privacy key management (PKM) protocol used to distribute and maintain private keys for traffic encryption. Choices are:</p> <ul style="list-style-type: none"> • Testing – select this setting if the LIBRA MAX-SS 5X00 will be used for testing/evaluation purposes. (<i>default</i>) • Operational – select this setting if the LIBRA MAX-SS 5X00 will be used for network operations.
SS's RSA-1024 Private Key	Specify the path where the RAS 1024 private key is located.
SS's Certificate	Specify the path where the subscriber station's certificate is located.
Manufacturer's Certificate	Specify the path where the manufacturer's certificate is located.

2.3 Entering Network Setup Settings

The Configurator provides two menu selections for entering network setup settings:

- **TCP/IP** lets you set the MAC address and IP mode for the LIBRA MAX-SS 5X00 . See section 2.3.1.
- **VLAN** lets you set the virtual LAN (VLAN) settings for the LIBRA MAX-SS 5X00 . See section 2.3.2.

If you change any of the settings on these pages, click the **Apply** button at the bottom of the page to reboot the LIBRA MAX-SS 5X00 and have your settings take effect.

2.3.1 Entering TCP/IP Settings

Clicking the **TCP/IP** link under **Network Setup** in the left pane of the Configurator displays the TCP/IP Settings page. Use this page to select the wireless settings for the LIBRA MAX-SS 5X00 . Figure 2-4 shows this page, and Table 2-3 describes the fields and buttons on it.



By default, the LIBRA MAX-SS 5X00 is set to secondary managed mode. In this mode, the IP Mode settings in Table 2-3 are set automatically and the fields are unavailable. If you switch to unmanaged mode (**No Secondary Management**), you can specify these settings manually. To change between the two modes, use **Secondary Management Connection Support** on the Wireless Settings page (see section 2.2.1).



If you change the unit's MAC address from those assigned when the unit was shipped and noted on the Subscriber Unit label, please ensure that the MAC of the Wireless MAC address is a lower number than the Wired MAC address.

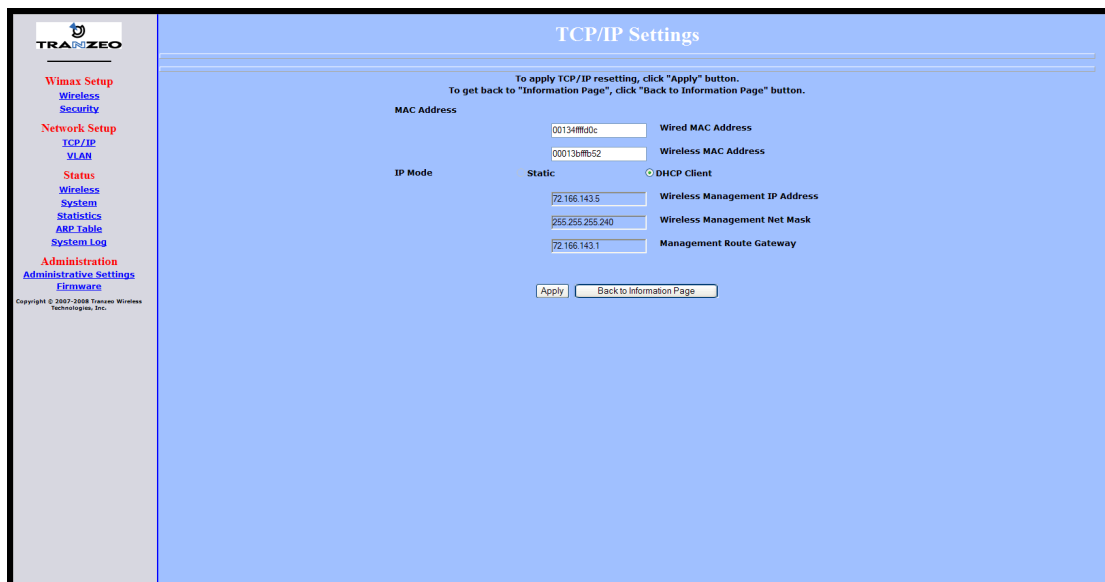


Figure 2-4. TCP/IP Settings Page

Table 2-3. Fields and Buttons in the TCP/IP Settings Page

Field	Description
MAC Address	
Wired MAC Address	The LIBRA MAX-SS 5X00 's wired MAC address.
Wireless MAC Address	The LIBRA MAX-SS 5X00 's wireless MAC address.
IP Mode	
Static	The LIBRA MAX-SS 5X00 IP address will be set manually and remain static.
DHCP Client	The LIBRA MAX-SS 5X00 IP address will be set automatically using DHCP.
Wireless Management IP Address	The wireless management IP address of the LIBRA MAX-SS 5X00 . <ul style="list-style-type: none"> Secondary managed mode: This value is set automatically and the field is unavailable. Unmanaged mode: Set this value to an unused IP address in the subnet to which the base station is connected.
Wireless Management Net Mask	The wireless management netmask of the LIBRA MAX-SS 5X00 . <ul style="list-style-type: none"> Secondary managed mode: This value is set automatically and the field is unavailable. Unmanaged mode: Set this value to match that of the subnet to which the base station is connected.
Management Route Gateway	The wireless management gateway of the LIBRA MAX-SS 5X00 . <ul style="list-style-type: none"> Secondary managed mode: This value is set automatically and the field is unavailable. Unmanaged mode: Set this value to be the router on the subnet to which the base station is connected.

2.3.2 VLAN Settings

A VLAN is an administrative grouping of network devices that is logically segmented, by functions, project teams, or applications rather than a physical or geographical basis. VLANs provide the segmentation services traditionally provided by routers in LAN configurations. For example, all workstations and servers used by a particular workgroup team can be connected to the same VLAN, regardless of their physical connections to the network. In this way, you can use VLANs to reconfigure the network through software rather than physically unplugging and moving devices or wires.

Clicking the **VLAN** link under **Network Setup** in the left pane of the Configurator displays the VLAN Settings page. Use this page to select the security settings for the LIBRA MAX-SS 5X00 . Figure 2-5 shows this page, and Table 2-4 describes the fields and buttons on it.

The VLAN Settings page is divided into four areas:

- The top area lets you enable and configure the management VLAN.
- The middle area lets you define rules for the management VLAN.
- Buttons below the rules area let you add, edit, delete, and update a management VLAN.
- The bottom of the page shows the VLAN rules that have been defined.

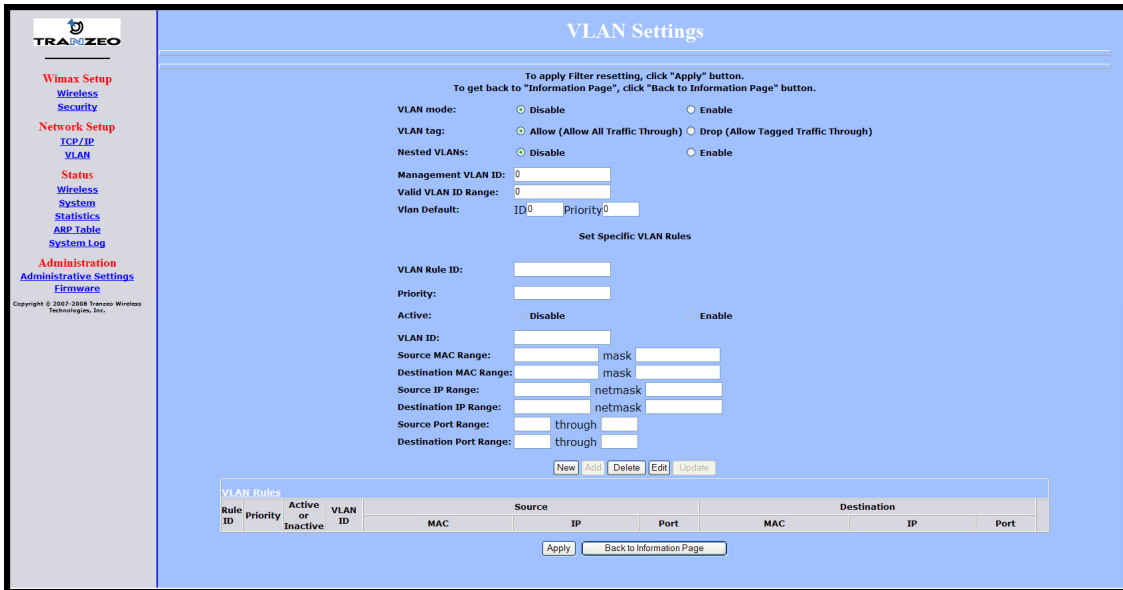


Figure 2-5. VLAN Settings Page

Table 2-4. Fields and Buttons in the VLAN Settings Page

Field	Description
VLAN Mode	Lets you enable or disable VLAN mode. Choices are: <ul style="list-style-type: none"> • Enable – enables VLAN mode, enabling the settings on this page. • Disable – disables VLAN mode, disabling the settings on this page. (<i>default</i>)
VLAN Tag	Tagging refers to the IEEE 802.1Q header that is inserted into the standard Ethernet header. Choices are: <ul style="list-style-type: none"> • Allow – a Tag Header is added to the frame after the destination and source MAC addresses. This information is preserved as the frame moves through the network.. (<i>default</i>) • Drop – a Tag Header is not added to the frame.
Nested VLANs	Nested VLANs (also known as VLAN double tagging) are used to overlay a private Layer 2 network over a public Layer 2 network. This provides simple access to an infrastructure of network service providers in networks. With a nested VLAN configuration, each customer is given a customer-ID, which is a unique identifier within the service provider infrastructure. Traffic from individual customers is tagged with the customer-ID and segregated from other customer's traffic. <ul style="list-style-type: none"> • Disable – disables nested VLANs. (<i>default</i>) • Enable – enables nested VLANs.
Management VLAN ID	The numeric identifier for the management VLAN. Default is 0.
Valid VLAN ID Range	To specify a range of VLAN IDs, enter the first and last numbers, separated by a dash (for example, 100-200). Default is 0.
VLAN Default	The default ID and priority of the VLAN. Defaults are 0 for ID and Priority.
Set Specific VLAN Rules	
VLAN Rule ID	You can create a VLAN identification matching rule that is based on a single VLAN ID or priority, a range of IDs or priorities, or any ID or priority.
Priority	Specify a single VLAN priority, a range of VLAN priorities, or a VLAN priority for any traffic flow. <ul style="list-style-type: none"> • To specify a single VLAN priority, enter a number between 0 and 7 (0 has the highest priority and 7 has the lowest priority). • To specify a range of VLAN priorities, enter the first and last numbers, separated by a dash (for example, 1-3). • To match any traffic flow that has a VLAN priority tag, type the word any.
Active	Select whether the rule is enabled or disabled. Choices are: <ul style="list-style-type: none"> • Disable – rule is not in effect. • Enable – rule is in effect.
VLAN ID	Enter the VLAN ID of the rule you want to edit or delete.
Source MAC Range	The range of source MAC addresses to which the rule applies and corresponding mask.
Destination MAC Range	The range of destination MAC addresses to which the rule applies and corresponding mask.

Set Specific VLAN Rules (continued)	
Field	Description
Source IP Range	The range of source IP addresses to which the rule applies and corresponding mask.
Destination IP Range	The range of destination IP addresses to which the rule applies and corresponding mask.
Source Port Range	The range of source ports to which the rule applies and corresponding mask.
Destination Port Range	The range of destination ports to which the rule applies and corresponding mask.
Button	Description
New	Click this button to set up a new rule for the management VLAN. After clicking this button, complete the Set Specific VLAN Rules section on this page and click Add. The new rule appears under VLAN Rules at the bottom of this page.
Add	After setting up a new rule, click this button to add the rule to the VLAN Rules list at the bottom of the page.
Delete	Lets you delete a rule. In the VLAN Rule ID field, enter the ID for the rule you want to delete. Then click Delete to delete the rule. Note: No precautionary message appears before deleting a rule, so be sure you do not need the rule before you delete it.
Edit	Lets you modify a rule. In the VLAN Rule ID field, enter the ID for the rule you want to edit. Then click Edit, change the settings, and click Update.
Update	Click this button after editing a rule.

3

Viewing Status Information

The Configurator provides a **Status** section that lets you display status pages for monitoring the LIBRA MAX-SS 5X00 . This section describes how to use these pages to monitor the LIBRA MAX-SS 5X00 .

The topics covered in this chapter are:

- Section 3.1, Information Page (page 30)
- Section 3.2, Wireless Information Page (page 32)
- Section 3.2, Wireless Information Page (page 32)
- Section 3.3, System Information Page (page 34)
- Section 3.4, Statistics Information Page (page 36)
- Section 3.5, ARP Information Page (page 38)
- Section 3.6, System Log (page 39)

3.1 Information Page

The Information Page is the first page that appears when you log in to the Configurator. You can also display this page from another page in the Configurator by clicking the **Back to Information Page** button at the bottom of the pages in the **WiMAX Setup**, **Network Setup**, and **Administration** sections.

The Information Page is a read-only page that displays network, wireless, and device information. Figure 3-1 shows this page and Table 3-1 describes the fields on it.

The screenshot shows the 'Information Page' in the TRINIZEO Configurator. The sidebar on the left contains the following navigation links: **Wimax Setup**, **Wireless**, **Security**, **Network Setup**, **TCP/IP**, **VLAN**, **Status**, **Wireless**, **System**, **Statistics**, **ARP Table**, **System Log**, **Administration**, **Administrative Settings**, and **Firmware**. The main content area is titled 'Information Page' and contains three sections:

Network	
Mode	bridge
MAC Address	00:01:3B:FF:FB:52
IP Mode	dhcp
IP Address	72.166.143.5
Subnet Mask	255.255.255.240
Gateway	72.166.143.1

Wireless	
Link Status	SCAN DL CHANNEL
Frequency (Tx/Rx)	5.725 GHz
Bandwidth	3.5 MHz
RF Profile	TDD mode
CP Size	1/4
Tx Power (Max/Min/Cur)	20 / -10 / +20.0 dBm
Signal (RSSI/CINR/SNR/Avg)	-98.0 dBm / -3.0 dB / -3.0 / +31.50
Base Stations	00:00:00:00:00:00 00:00:00:00:00:00

Device	
Board Serial Number	DE100014
Device Name	
Location	
Firmware Revision	V1.0.0.R506
Build Date	2008/04/17 14:58

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Figure 3-1. Information Page

Table 3-1. Information Page

Field	Description
Network	
Mode	LIBRA MAX-SS 5X00 operating mode (for example, bridge, router, etc.).
MAC Address	LIBRA MAX-SS 5X00 Media Access Control (MAC) address, as defined on the TCP/IP Settings page (see section 2.3.1).
IP Mode	IP mode of the LIBRA MAX-SS 5X00 , as defined on the TCP/IP Settings page (see section 2.3.1).
IP Address	IP address of the LIBRA MAX-SS 5X00 .
Subnet Mask	Subnet mask of the LIBRA MAX-SS 5X00 .
Gateway	Gateway mask of the LIBRA MAX-SS 5X00 .
Wireless	
Link Status	Shows whether the LIBRA MAX-SS 5X00 is connected to the base station.
Frequency (Tx/Rx)	LIBRA MAX-SS 5X00 transmit and receive frequencies, as defined on the Wireless Settings page (see section 2.2.1).
Bandwidth	Bandwidth used by the LIBRA MAX-SS 5X00 .
RF Profile	LIBRA MAX-SS 5X00 duplex method, as defined on the Wireless Settings page (see section 3.2).
CP Size	LIBRA MAX-SS 5X00 cyclic prefix size, as define on the Wireless Settings page (see section 3.2).
Tx Power (Max/Min/Cur)	LIBRA MAX-SS 5X00 maximum, minimum, and current transmit power levels, in dBm. The maximum and minimum settings are defined on the Wireless Settings page (see section 3.2).
Signal (RSSI/CINR/SNR/Avg)	<p>RSSI, CINR, SNR, and average signal strength, in dBm.</p> <ul style="list-style-type: none"> • RSSI - the higher the value, the higher the transmit rate (up to the maximum). Conversely, the lower the RSSI, the lower the transmission speed until 0 is reached (no connectivity). • CINR - the higher the value, the more throughput a link can maintain. • SNR - the lower the value means the desired signal is nearly indistinguishable from the unwanted noise. • Avg - the average of the RSSI, CINR, and SNR values.
Base Stations	MAC address with which the LIBRA MAX-SS 5X00 is communicating, as defined on the Wireless Settings page (see section 3.2).
Device	
Board Serial Number	Serial number of the LIBRA MAX-SS 5X00 printed circuit board.
Device Name	Name of the LIBRA MAX-SS 5X00 unit, as defined on the Administrative Settings page (see section 4.4.1). Default is TR-WMX.
Location	Location of the LIBRA MAX-SS 5X00 , as defined on the Administrative Settings page (see Chapter 4).
Firmware Revision	Revision number of the firmware used by the LIBRA MAX-SS 5X00 .
Build Date	Build date of the firmware used by the LIBRA MAX-SS 5X00 .

3.2 Wireless Information Page

The Wireless Information page shows information about the LIBRA MAX-SS 5X00 's wireless operation. The user-configurable information on this page can be set using the Wireless Settings page (see section 2.2.1). Figure 3-2 shows this page and Table 3-2 describes the fields on it.

Wireless Information Page	
Channel Bandwidth Status (MHz)	3.5
Frequency (KHz)	5725000
RF Profile	TDD mode
CP Size	1/4
DBPC Support (Downlink Burst Profile Change)	Enable
Modulation	Automatic Mode
Link Manager State	SCAN DL CHANNEL
Link State	link down
RSSI (Received Signal Strength Indicator)	-98.0 dBm
CINR (Carrier to Interference and Noise Ratio)	-2.75 dB
Current TX Power	+20.0 dBm
RF Mode	licensed
Initial Ranging Burst Inverting	Software Automatic
Initial Delay Correction Value	0
TX Power Range Max	20
TX Power Range Min	-10
TX Antenna Gain	0
RX Antenna Gain	0
AFS mode	Disable
MRTT for SMC in bps	100000
Lost DL/UL MAP Interval ([1600, 1800] milliseconds)	700
RNG-RSP Byte Order	Least Robust DIUC as MSB and DCD CCC as LSB

Figure 3-2. Wireless Information Page

Table 3-2. Wireless Information Page

Field	Description
Channel Bandwidth Status (MHz)	Bandwidth, in MHz, of the LIBRA MAX-SS 5X00 , as defined on the Wireless Settings page (see section 2.2.1).
Frequency (KHz)	Frequency, in kHz, of the LIBRA MAX-SS 5X00 , as defined on the Wireless Settings page (see section 2.2.1).
RF Profile	RF profile of the LIBRA MAX-SS 5X00 , as defined on the Wireless Settings page (see section 2.2.1).
CP Size	Cycle prefix size, as defined on the Wireless Settings page (see section 2.2.1).
Modulation	Modulation used by the LIBRA MAX-SS 5X00 .
Link Manager State	Shows where in the network connection process the CPE is. For example if the CPE is scanning for a BS downlink message, receiving a DHCP address assignment, or if the CPE to BS link is operational.
Link State	Shows whether the LIBRA MAX-SS 5X00 link is up or down.
RSSI (Received Signal Strength Indicator)	Strength of the Received Signal Strength Indicator, in dBm, received by your LIBRA MAX-SS 5X00 . The higher the value, the higher the transmit rate (up to the maximum). Conversely, the lower the RSSI, the lower the transmission speed until 0 is reached (no connectivity).
CINR (Carrier to Interference and Noise Ratio)	Carrier to Interference and Noise Ratio, in dB, for your LIBRA MAX-SS 5X00 . The higher the value, the more throughput a link can maintain.
Current TX Power	Current transmit power, in dBm, for your LIBRA MAX-SS 5X00 .
RF Mode	Current radio-frequency mode (licensed or unlicensed) for your LIBRA MAX-SS 5X00 .
Initial Ranging Burst Inverting	This feature is provided for Engineering development use, and is an undocumented feature.
Initial Delay Correction Value	This feature is provided for Engineering development use, and is an undocumented feature.
TX Power Range Max	The maximum transmit power range of the LIBRA MAX-SS 5X00 , as defined on the Wireless Settings page (see section 2.2.1).
TX Power Range Min	The minimum transmit power range of the LIBRA MAX-SS 5X00 , as defined on the Wireless Settings page (see section 2.2.1).
TX Antenna Gain	The maximum transmit antenna gain of the LIBRA MAX-SS 5X00 , as defined on the Wireless Settings page (see section 2.2.1).
RX Antenna Gain	The minimum transmit antenna gain of the LIBRA MAX-SS 5X00 , as defined on the Wireless Settings page (see section 2.2.1).
AFS Mode	This feature is provided for Engineering development use, and is an undocumented feature.
MRTR for SMC in bps	The minimum reserved traffic rate for the secondary management channel.
Lost DL/UL MAP Interval ([600 , 1800] milliseconds)	The time in seconds that the CPE will maintain the link to the BS using the last DL or UL MAP received.
RNG-RSP Byte Order	This feature is provided for Engineering development use, and is an undocumented feature.

3.3 System Information Page

The System Information page shows information about the LIBRA MAX-SS 5X00 's wireless configuration settings and operation. Figure 3-3 shows this page and Table 3-3 describes the fields on it.

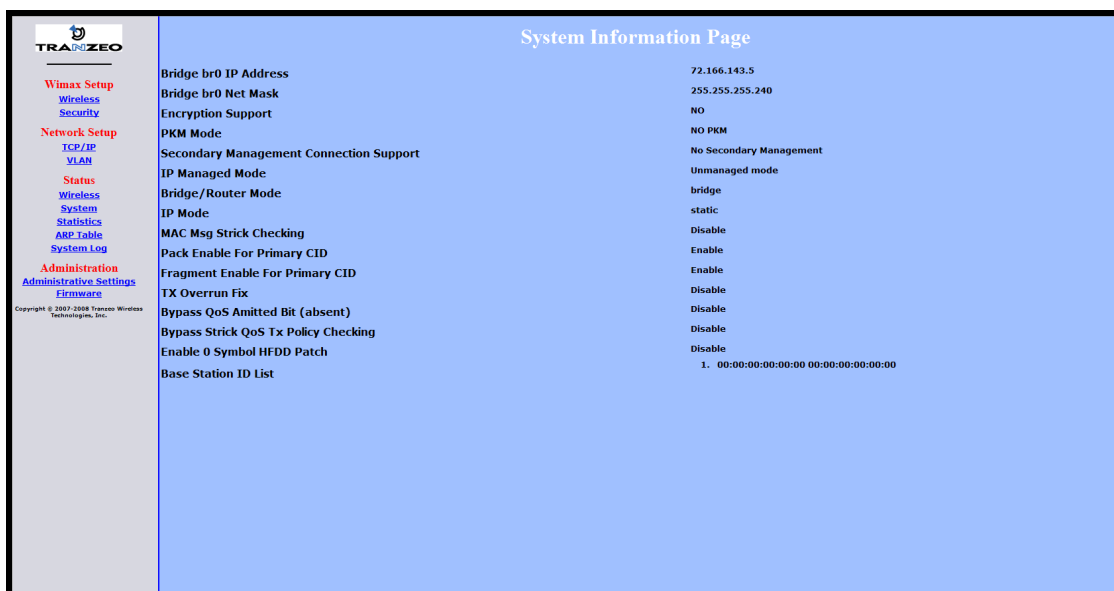


Figure 3-3. System Information Page

Table 3-3. System Information Page

Field	Description
Bridge br0 IP Address	Wired IP address of the LIBRA MAX-SS 5X00 , as defined on the TCP/IP Settings page (see section 2.3.1).
Bridge br0 Net Mask	Wired netmask of the LIBRA MAX-SS 5X00 , as defined on the TCP/IP Settings page (see section 2.3.1).
Encryption Support	Shows whether encryption is enabled or disabled on the LIBRA MAX-SS 5X00 , as defined on the Security Settings page (see section 2.2.2).
PKM Mode	Shows whether private key management is enabled or disabled on the LIBRA MAX-SS 5X00 , as defined on the Security Settings page (see section 2.2.2).
Secondary Management Connection Support	Shows whether the secondary management support has been enabled.
IP Managed Mode	Shows whether an IP address has been assigned to the CPE using DHCP operating over the IEEE 802.16 secondary management channel.
Bridge/Router Mode	Shows whether the LIBRA MAX-SS 5X00 is configured for bridge or router mode, as defined on the TCP/IP Settings page (see section 2.3.1).
IP Mode	Shows whether IP mode is set to static or DHCP setting, as defined on the TCP/IP Settings page (see section 2.3.1).
MAC Msg Strict Checking	Shows whether MAC Message Strict Checking is enabled or disabled, as defined on the Wireless Settings page (see section 2.2.1).
Pack Enable For Primary CID	Shows whether Pack Enable for Primary CID is enabled or disabled, as defined on the Wireless Settings page (see section 2.2.1).
Fragment Enable For Primary CID	Shows whether Fragment Enable For Primary CID is enabled or disabled, as defined on the Wireless Settings page (see section 2.2.1).
TX Overrun Fix	Shows whether TX Overrun Fix is enabled or disabled, as defined on the Wireless Settings page (see section 2.2.1).
Bypass QoS Admitted Bit (Absent)	Shows whether Bypass QoS Admitted Bit (Absent) is enabled or disabled.
Bypass Strict QoS Tx Policy Checking	Shows whether Bypass Strict QoS Tx Policy Checking is enabled or disabled.
Enable 0 Symbol HFDD Patch	Shows whether Enable 0 Symbol HFDD Patch is enabled or disabled, as defined on the Wireless Settings page (see section 2.2.1).
Base Station ID List	Shows the base station ID list, as defined on the Wireless Settings page (see section 2.2.1).

3.4 Statistics Information Page

The Statistics Information page shows statistics of the wired and wireless packets sent and received by the LIBRA MAX-SS 5X00 . Figure 3-4 shows this page and Table 3-4 describes the fields on it.

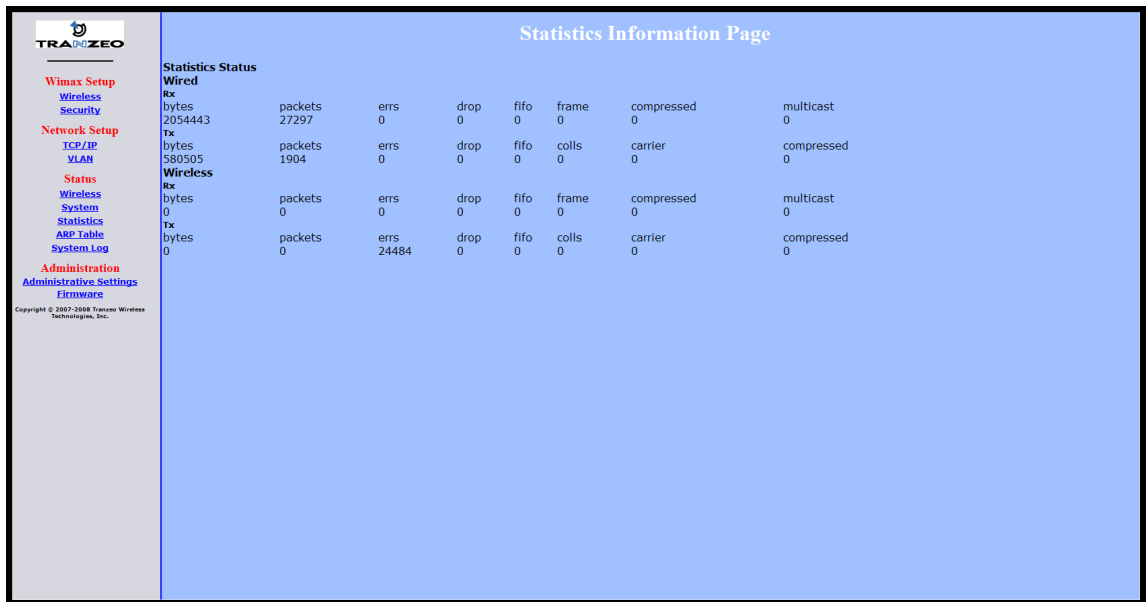


Figure 3-4. Statistics Information Page

Table 3-4. Statistics Information Page

Field	Description
Wired	<p>Received (Rx) and transmitted (Tx) statistics for the LIBRA MAX-SS 5X00 's wired interface.</p> <ul style="list-style-type: none"> • Bytes – number of bytes transmitted (Tx) or received (Rx) by the LIBRA MAX-SS 5X00 on the wired network. • Packets – number of packets transmitted (Tx) or received (Rx) the LIBRA MAX-SS 5X00 on the wired network. • Errs – number of transmit/receive errors detected by the LIBRA MAX-SS 5X00 on the wired network. • Drop – number of dropped transmitted (Tx) or received (Rx) packets detected by the LIBRA MAX-SS 5X00 on the wired network. • Fifo – number of transmitted (Tx) or received (Rx) packets first in/first out between the LIBRA MAX-SS 5X00 and the wired network. • Frame – number of frames transmitted (Tx) or received (Rx) by the LIBRA MAX-SS 5X00 on the wired network. • Colls – number of collisions(shown for Tx only). • Carrier - status of the link pulse (i.e., if it is connected). • Compressed – number of compressed frames transmitted (Tx) or received (Rx) by the LIBRA MAX-SS 5X00 on the wired network • Multicast – number of multicast frames transmitted (Tx) or received (Rx) by the LIBRA MAX-SS 5X00 on the wired network
Wireless	<p>Received (Rx) and transmitted (Tx) statistics for the LIBRA MAX-SS 5X00 's wireless interface.</p> <ul style="list-style-type: none"> • Bytes – number of bytes transmitted (Tx) or received (Rx) by the LIBRA MAX-SS 5X00 on the wireless network. • Packets – number of packets transmitted (Tx) or received (Rx) the LIBRA MAX-SS 5X00 on the wireless network. • Errs – number of transmit/receive errors detected by the LIBRA MAX-SS 5X00 on the wireless network. • Drop – number of dropped transmitted (Tx) or received (Rx) packets detected by the LIBRA MAX-SS 5X00 on the wireless network. • Fifo – number of transmitted (Tx) or received (Rx) packets first in/first out between the LIBRA MAX-SS 5X00 and the wireless network. • Frame – number of frames transmitted (Tx) or received (Rx) by the LIBRA MAX-SS 5X00 on the wireless network. • Colls – number of collisions(shown for Tx only). • Carrier - status of the link pulse (i.e., if it is connected). • Compressed – number of compressed frames transmitted (Tx) or received (Rx) by the LIBRA MAX-SS 5X00 on the wireless network • Multicast – number of multicast frames transmitted (Tx) or received (Rx) by the LIBRA MAX-SS 5X00 on the wireless network

3.5 ARP Information Page

The LIBRA MAX-SS 5X00 has an Address Resolution Protocol (ARP) table that automatically maps the LIBRA MAX-SS 5X00 IP address to the MAC address of a switch. The ARP Information page shows the LIBRA MAX-SS 5X00 IP address and the corresponding MAC address of the switch. For example, the page in Figure 3-5 shows that the LIBRA MAX-SS 5X00's IP address is 72.166.143.1, which corresponds to the MAC address 00:A0:C8:2B:2A:4A.



Figure 3-5. ARP Information Page

3.6 System Log

The LIBRA MAX-SS 5X00 has separate logs that contain information about the unit's wireless and router operations. Using the System Information page, you can view the information in these logs.

- The **Wireless Log** area shows wireless information recorded in the wireless log.
- The **Router Log** area shows router information recorded in the router log.

Both areas have a **Refresh** button that can be used to update the information displayed in the respective areas on this page.

Figure 3-6 shows this page.

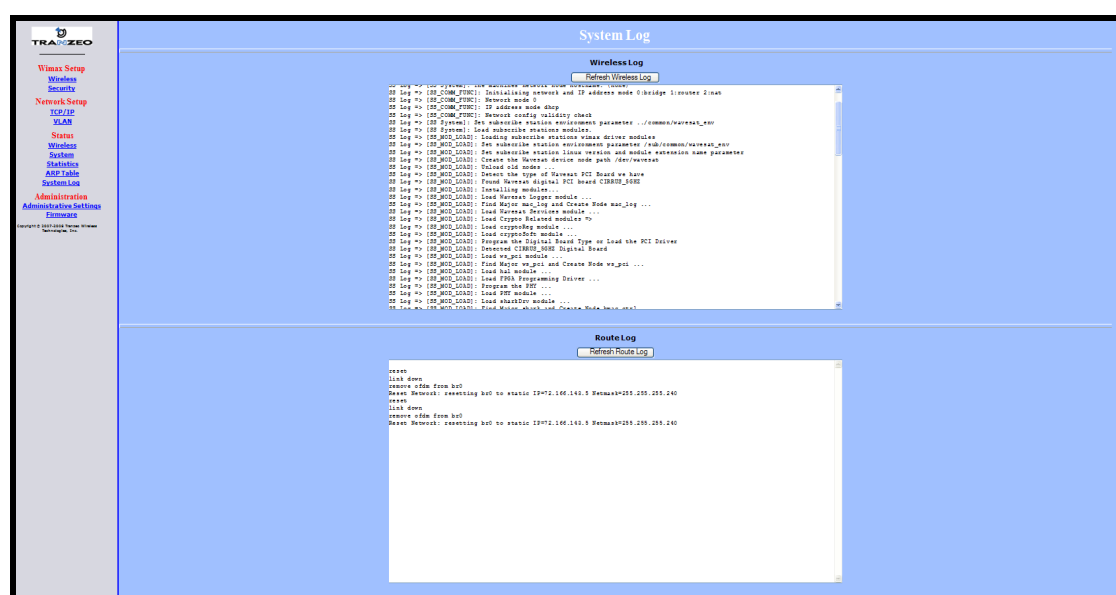


Figure 3-6. System Log Page

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4

Configuring Administrative Settings

The Configurator has an **Administration** link that lets you perform a variety of administrative tasks, such as:

- Restoring the LIBRA MAX-SS 5X00 to its factory defaults
- Rebooting the LIBRA MAX-SS 5X00 without returning the unit to its factory default settings.
- Changing the device name and location.
- Enabling or disabling Web, SSH, and Telnet access.
- Enabling or disabling the LIBRA MAX-SS 5X00 status LEDs.
- Changing the user name and password required to log in to the Configurator.

The topics covered in this chapter are:

- Section 4.1, Displaying the Administrative Settings Page (page 42)
- Section 4.2, Returning to Factory Default (page 42)
- Section 4.3, Rebooting the LIBRA MAX-SS 5X00 Unit (page 43)
- Section 4.4, Changing Device Configuration Settings (page 43)

4.1 Displaying the Administrative Settings Page

All administrative tasks are performed from the Administrative Settings page. To display the Administrative Settings page, click the **Administrative Settings** link under **Administration** in the navigation panel of the Configurator. Figure 4-1 shows the Administrative Settings page.

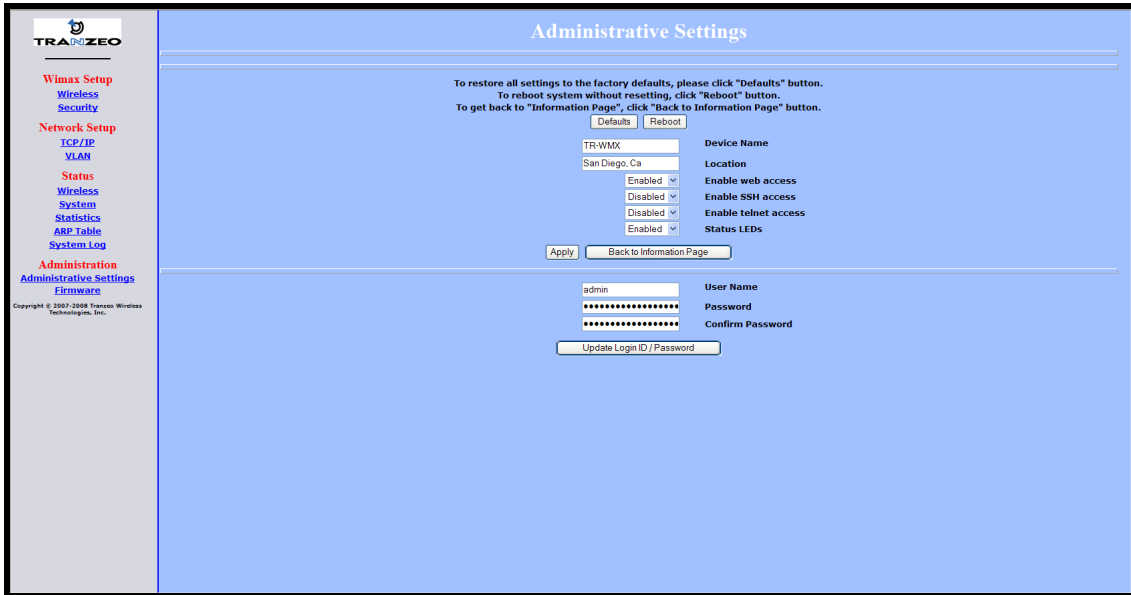


Figure 4-1. Administrative Settings Page

4.2 Returning to Factory Default Settings

Using the **Defaults** button on the Administrative Settings page, you can return the LIBRA MAX-SS 5X00 to the settings that were in effect when you powered it up for the first time. When you click this button, a precautionary message tells you that proceeding will remove any custom settings you set and return all parameters to their factory default settings. You can then click **OK** to continue or **Cancel** to cancel the operation.



For a complete list of the LIBRA MAX-SS 5X00's default settings, see Appendix A.

4.3 Rebooting the LIBRA MAX-SS 5X00 Unit

The **Reboot** button on the Administrative Settings page provides one way to reboot the LIBRA MAX-SS 5X00 (the other way is using the **Apply** and **Reboot** button described in section 2.1). If you change any LIBRA MAX-SS 5X00 configuration settings, you must use one of these methods to reboot the LIBRA MAX-SS 5X00 and put the settings into effect.

When you click this button, a precautionary message tells you that proceeding will reboot the LIBRA MAX-SS 5X00 . You can then click **OK** to continue or **Cancel** to cancel the operation.



Rebooting disconnects the LIBRA MAX-SS 5X00 and any connections currently running. It may take up to 60 seconds before the LIBRA MAX-SS 5X00 is running and accessible again. When you reboot the LIBRA MAX-SS 5X00 , the **Status** LED flashes while the unit reboots and goes ON when the unit completes the reboot process.

4.4 Changing Device Configuration Settings

Using the Administrative Settings page, you can:

- Change the LIBRA MAX-SS 5X00 device name and location
- Enable or disable Web, SSH, and Telnet access
- Enable or disable the LIBRA MAX-SS 5X00 LEDs

4.4.1 Changing the Device Name and Location

The LIBRA MAX-SS 5X00 device name is the name used to identify the device. The device name appears on the Information Page (see section 3.1). If your installation has a number of devices, you will probably want to assign a unique device name to each LIBRA MAX-SS 5X00 .

To change the device name:

1. On the Administrative Settings page, delete the current name shown in the **Device Name** field and enter a new name.
2. To change the location, delete the current location shown in the **Location** field and enter a new location.
3. Click the **Apply** button to save your changes. When the next page appears, either:
 - Click the **Reboot** button to reboot the LIBRA MAX-SS 5X00 and apply the settings.
 - Change settings on other pages, then reboot the LIBRA MAX-SS 5X00 to apply all the new settings.

4.4.2 Enabling or Disabling Web, SSH, and Telnet Access

Using the Administrative Settings page, you can enable or disable Web access, SSH access, and Telnet access to the LIBRA MAX-SS 5X00 .

- If you disable Web access, you will not be able to access the LIBRA MAX-SS 5X00 using a browser.
- If you disable SSH access, you will not be able to access the LIBRA MAX-SS 5X00 via an SSH session.
- If you disable Telnet access, you will not be able to access the LIBRA MAX-SS 5X00 using a Telnet session.

To enable or disable Web, SSH, and Telnet access to the LIBRA MAX-SS 5X00 , use the following procedure.

1. To enable or disable Web access to the LIBRA MAX-SS 5X00 , click the down arrow next to **Enable Web Access** and select **Enable** or **Disable** from the drop-down list.
2. To enable or disable SSH access to the LIBRA MAX-SS 5X00 , click the down arrow next to **Enable SSH Access** and select **Enable** or **Disable** from the drop-down list.
3. To enable or disable Telnet access to the LIBRA MAX-SS 5X00 , click the down arrow next to **Enable telnet Access** and select **Enable** or **Disable** from the drop-down list.
4. Click the **Apply** button to save your changes. Then either:
 - Click the **Reboot** button on the next page that appears to apply the settings and reboot the LIBRA MAX-SS 5X00 at this time.
 - Change any other configuration settings you want to modify. When finished, apply all the new and reboot the LIBRA MAX-SS 5X00 .

4.4.3 Enabling or Disabling the Status LEDs

Using the Administrative Settings page, you can enable or disable the 10 status LEDs on the rear panel of the LIBRA MAX-SS 5X00 . By default, the LEDs are configured to be ON. This means they show the status of the LIBRA MAX-SS 5X00 as described in Table 1-4 on page 15. If the LIBRA MAX-SS 5X00 will be installed in a location where the LEDs cannot be observed, you can disable them and rely on the status screens described in Chapter 3 to assess the status of the LIBRA MAX-SS 5X00 .

To enable or disable the status LEDs on the LIBRA MAX-SS 5X00 , use the following procedure.

1. Click the down arrow next to **Status LEDs** and select **Enable** or **Disable** from the drop-down list.
2. Click the **Apply** button to save your changes. Then either:
 - Click the **Reboot** button on the next page that appears to apply the settings and reboot the LIBRA MAX-SS 5X00 at this time.

- Change any other configuration settings you want to modify. When finished, apply all the new and reboot the LIBRA MAX-SS 5X00 .

4.4.4 Changing Log In Settings

Using the Administrative Settings page, you can change the user name and password used to log in to the Configurator. For security purposes, we recommend you change the default password.

1. To change the user name, click in the **User Name** field, delete the name shown, and enter a new user name.
2. To change the log in password, click in the **Password** field, delete the entry, and enter a new password.
3. Click in the **Confirm Password** field, delete the entry, and enter the same password you typed in step 2.



For security, every typed password character appears as a bullet (•).

5. Click the **Apply** button to save your changes. When the next page appears, either:
 - Click the **Reboot** button to reboot the LIBRA MAX-SS 5X00 and apply the settings.
 - Change settings on other pages, then reboot the LIBRA MAX-SS 5X00 to apply all the new settings.

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A

Factory Default Configuration Settings

This appendix lists the factory default configuration settings that are in effect when you unpack the LIBRA MAX-SS 5X00 or reset it to factory default settings.

A.1 Default Wireless Settings

Setting	Default	Setting	Default
Channel Bandwidth (MHz)	3.5	QoS Max Downlink SF	8
Secondary Management Connection Support	Secondary Management (Default)		
Initial Ranging Burst Inverting	Software Auto	AFS channel bandwidth (in MHz) scan order	35-7-0
Adaptive Modulation (DBPC)	Auto using CINR thresholds	For Least Robust DIUC as LSB/MSB and DCD CCC as MSB/LSB	Enable
Frequency (KHz)	5725000	MAC Message Strict Checking	Disable
Initial Delay Correction Value	0	Pack Enable For Primary CID	Enable
Max TX Power (dBm)	20	Fragment Enable For Primary CID	Enable
Min TX Power (dBm)	-10	TX overrun fix	Disable
RX Antenna Gain (1/4dB step)	0	QoS Admitted Bit	Disable
TX Antenna Gain (1/4dB step)	0	QoS Tx Policy Checking	Disable
MRTR for SMC in bps	100000	Enable 0 symbol HFDD Patch	Disable
Lost DL/UL MAP Interval	700	AFS mode	Disable

A.2 Default Security Settings

Setting	Default
Encryption Support	Disable

A.3 Default TCP/IP Settings

Setting	Default
IP Mode	
DHCP Client	Enabled

A.4 Default VLAN Settings

Setting	Default
VLAN Mode	Disable
VLAN Tag	Allow (Allow All Traffic Through)
Nested VLANs	Disable
Management VLAN ID	0
Valid VLAN ID Range	0
Vlan Default	ID = 0, Priority = 0

A.5 Default Administrative Settings

Setting	Default
Device Name	TR-WMX
Location	San Diego, Ca
Enable Web Access	Enabled
Enable SSH Access	Disabled
Enable Telnet Access	Disabled
Status LEDs	Enabled
User Name	Admin
Password	Default
Confirm Password	default

B

Upgrading Firmware

From time to time, EION, Inc. makes new firmware available for the LIBRA MAX-SS 5X00 . The firmware may add new features to the LIBRA MAX-SS 5X00 and/or fix problems.

This appendix describes how to upgrade the firmware for the LIBRA MAX-SS 5X00 .

1. Log in to the Configurator (see section 1.5.1).
2. In the left pane, under **Administration**, click **Firmware**. The Firmware page appears (see Figure B-1). The **Current** section shows information about the current firmware installed. The **Upgrade** section is where you specify the new firmware you want to install. :f

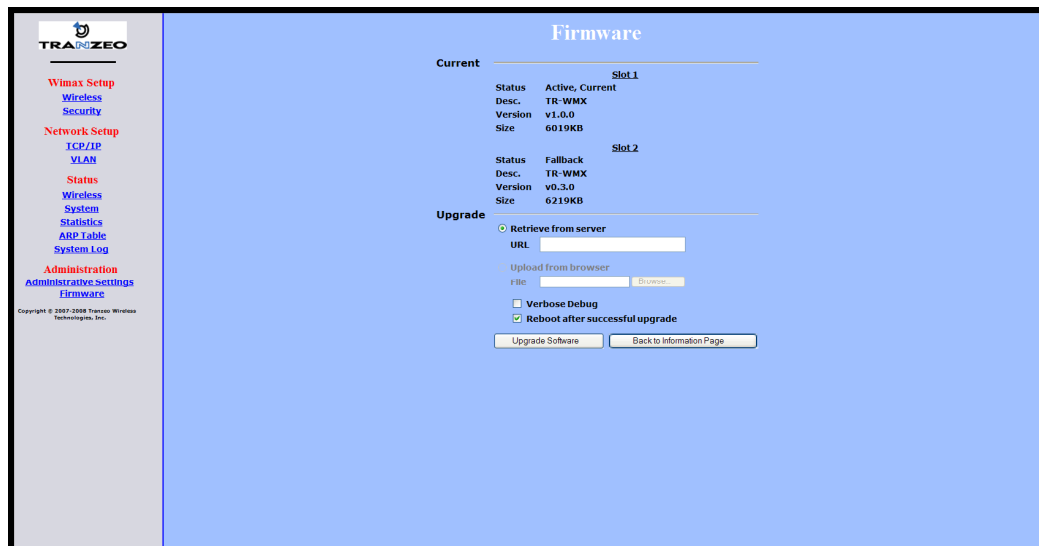


Figure B-1. Firmware Page

3. To view the output of what is happening throughout the firmware upgrade process, check **Verbose Debug**.
4. To reboot the LIBRA MAX-SS 5X00 after its firmware has been upgraded, check **Reboot after successful upgrade**.
5. Under **Upgrade**, select **retrieve from server** (if it is not already selected).
6. In the **URL** field, enter the Uniform Resource Locator (URL) of the FTP server where the new firmware file is located.
7. Log in to the server and download the firmware file.
8. After the firmware file has been downloaded, upload it to the LIBRA MAX-SS 5X00 using your browser. Under **Upload from browser**, click the **Browse**, select the firmware file, and click **OK**.

9. Click **Upgrade Software** to start the upgrade procedure. If you checked **Reboot after successful upgrade**, the LIBRA MAX-SS 5X00 reboots automatically following the firmware upgrade; otherwise, you must manually reboot the LIBRA MAX-SS 5X00 to have the new firmware upgrade take effect.

C

Technical Support

Technical support is available through the Internet and by phone, live chat, email, and fax.

C.1 Web Portal

The EION Support Web site <http://support.eion.com> is the main portal to help you maximize your experience with your EION product. The site provides valuable support contact information, including support files and guides and the latest support news. We encourage you to check this site frequently, even if you do not have support issues.

C.2 Telephone Support

In-house telephone support is available during the hours and at the telephone numbers shown in Table C-1. Voice mail is available during non-telephone hours.

Table C-1. Telephone Support Hours and Numbers

Location	Telephone Hours	Telephone Number
Americas	1:00 AM to 5:00 PM PST	+1 888 460 6366 (Toll free USA and Canada)
Europe, Africa, Middle East	9:00 AM to 1:00 AM GMT	+353-61-775-702
Americas outside the USA and Canada		+1 604 460 6366
Australia, Asia		+1 604 460 6366

C.3 Live Chat

Live chat offers one-to-one chat support with a EION support representative allows you to receive real-time answers to your questions. Live chat is available during the hours and numbers shown in Table C-2.

Table C-2. Live Chat Support Hours

Location	Live Chat Hours
Americas	1:00 AM to 5:00 PM PST
Europe, Africa, Middle East	9:00 AM to 1:00 AM GMT

C.4 Email

Technical support can be reached by email at support@eion.com. RMA requests should be addressed to rma@eion.com.

C.5 Fax

Faxes can be sent to our 24-hour fax number at +1 604 460 6005.

Glossary

ARP	Address Resolution Protocol, a network layer protocol used to convert an IP address into a physical (DLC) address, such as an Ethernet address. A host wishing to obtain a physical address broadcasts an ARP request onto the TCP/IP network. The host on the network that has the IP address in the request replies with its physical hardware address.
CINR	Carrier to Interference and Noise Ratio, a measure of quality for wireless signals.
CPE	Customer Premises Equipment, communications equipment that resides on the customer's premises and is owned or leased by the customer.
Gateway	A node on a network that serves as an entrance to another network.
IEEE	Institute of Electrical and Electronics Engineers (pronounced I-triple-E), an organization that develops standards for the computer, networking, and electronics industries.
MAC Address	Media Access Control address, a hardware address that uniquely identifies each node of a network.
PKM	Privacy key management, a protocol used to authenticate nodes on the network, and distribute and maintain private keys used for traffic encryption.
PoE	Power over Ethernet, a solution where electrical current is run to networking hardware over an Ethernet Category 5 or higher data cable. No additional AC power cord is needed, minimizing the amount of cables needed and the hassle of installing extra outlets.
RSA	Rivest, Shamir, and Adelman, a public-key encryption technology that requires an extraordinary amount of computer processing power and time to break. The RSA algorithm has become the de facto standard for industrial-strength encryption, especially for data sent over the Internet.
RSSI	Received Signal Strength Indicator, a circuit or signal that indicates the strength of an incoming signal into a receiver, such as your LIBRA MAX-SS 5X00 .
SNR	Signal-to-Noise Ratio, the ratio of the amplitude of a desired analog or digital data signal to the amplitude of noise in a transmission channel at a specific point in time.

Glossary

SSH	Secure Shell, a program to log into another computer over a network to execute commands in a remote machine, and to move files from one machine to another. SSH provides strong authentication and secure communications over insecure channels, protecting a network from attacks such as IP spoofing, IP source routing, and DNS spoofing.
Subnet mask	A mask used to determine the subnet to which an IP address belongs.
Subscriber station	A fixed station used by a subscriber for communication within a central office station.
Telnet	A terminal emulation program for TCP/IP networks that runs on your computer and connects your PC to a device (such as your LIBRA MAX-SS 5X00 unit). You can then enter commands through the Telnet program and they will be executed at the LIBRA MAX-SS 5X00 unit.
URL	Uniform Resource Locator, the global address of documents and other resources on the World Wide Web. www.eion.com is an example of a URL.
VLAN	Virtual Local Area Network, a network of computers that behave as if they are connected to the same wire even though they may actually be physically located on different segments of a LAN. With VLANs, a computer can physically move to another location while remaining on the same VLAN, without any hardware reconfiguration.

Compliance Information

This device has been designed to operate with the antennas having a maximum gain of 32 dB. Antennas not included in this list or having a gain greater than 32 dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

5 GHz Antennas

- TR-5.8-32DB-ANT - 32 dBi Dish Antenna
- TR-GD58-26 - 26 dBi Grid Antenna

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: –Reorient or relocate the receiving antenna.

–Increase the separation between the equipment and receiver.

–Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

–Consult the dealer or an experienced radio/TV technician for help.

The maximum antenna gain permitted (for devices in the band 5725-5825 MHz) to comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate, as stated in section A9.2(3) of RSS-210 June 2007.

In addition, users should also be cautioned to take note that high-power radars are allocated as primary users (meaning they have priority) of the bands 5250-5350 MHz and 5650-5850 MHz and these radars could cause interference and/or damage to LE-LAN devices.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

This device must be installed so that there is a minimum of **139** cm between the antenna and any person.

Professional Installation Required

This product must be professionally installed and configured in accordance with local regulations and safety codes.

Geographical Restrictions

This product is intended to be used in the following countries:

Compliance Information

- North America
- South America
- Australia
- Africa

The following restrictions apply to the use of this product:

- This device may not be used in a geographical location that requires the use of Dynamic Frequency Selection unless approved by the local authorities.
- The user of this product must ensure that it complies with the EIRP limits specified by local regulations.

Declaration of Conformity

“Hereby, EION, declares that this TR-WMX-58 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.”



To obtain a copy of the Declaration of Conformity, contact EION at the following:
<http://www.eion.com/conformity.php>.

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