



EXTRICOM WLAN SYSTEM

USER GUIDE

- EXSW-800
- EXSW-1200
- EXSW-2400
- EXRP-20
- EXRP-40
- EXRE-10



DRAFT



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Important Notice:

Read this user manual and safety instructions before installing and operating the Extricom WLAN system.

Disclaimer

Extricom makes no representations or warranties, whether express or implied, that the Extricom wireless local area network (WLAN) system or any component thereof shall meet the purchaser's operating requirements or that system operation will be uninterrupted or errorfree. All WLANs, including the Extricom WLAN system, can potentially be affected by outside sources of interference such as other broadcasting devices, radiation, device immunity level, and other external sources of interference.



Declaration of Conformity

Manufacturer's Name: Extricom Ltd.

Declares under our sole responsibility that the products:

Product Names: Extricom EXSW-800 & EXSW-1200 & EXSW-2400 & EXRE -10

Conform(s) to the following standard(s) or other normative document(s):

EMC: FCC Part 15 Class B
EN 300386
VCCI V-3/2001.04
ANATEL Resolution 237

Safety: EN 60950-1
UL 60950-1
IEC 60950-1
ANATEL Resolution 238

Environmental: EU Directive 2002/95/EC of January 27, 2003, on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)

Manufacturer's Name: Extricom Ltd.

Declares under our sole responsibility that the product:

Product Name: Extricom EXRP-20 & EXRP-40

Conforms to the following standard(s) or other normative document(s):

EMC: FCC Part 15 Class B
EN 301489
VCCI V-3/2001.04.

Radio: FCC Part 15 C
FCC Part 15 E
EN 300328
EN 301893
Japan Type Certificate: Article 2, clause 1
ANTEL Resolution 365

Safety: EN 60950-1
UL 60950-1
IEC 60950-1

Environmental: EU Directive 2002/95/EC of January 27, 2003, on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:



- *The device may not cause harmful interference*
- *This device must accept any interference received, including interference that may cause undesired operation.*

This equipment has been approved for mobile applications where the equipment should be used at distances greater than 20cm from the human body (with the exception of hands, wrists, feet and ankles). Operation at distances less than 20 cm is strictly prohibited.



Changes or modification to device not expressly approved by Extricom LTD is strictly prohibited and could avoid the user's authority to operate the equipment.

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About This Guide

This guide provides detailed instructions for installing, configuring, and troubleshooting the Extricom EXSW-800/1200/2400 WLAN switches and Extricom EXRP-20/40UltraThin™ Access Point (AP) .

Audience

This guide is intended for enterprise IT managers and system installers who are familiar with installing and configuring networks.

Conventions



This is a note. It provides additional information to users.



This is a caution. A caution warns of possible damage to the equipment if a procedure is not followed correctly.



A warning alerts you to important operating instructions.

Safety Precautions

Follow the instructions in the guide to ensure proper installation and operation of the switch and APs.



The use of wireless devices is limited to the constraints imposed by local laws.

- Operate the switch and APs in an indoor environment.
- Disconnect the switch and APs from power sources before servicing.

- The switch and AP enclosure must not be opened by anyone other than an authorized service representative.
- To comply with FCC RF exposure compliance requirements, maintain a minimal separation distance of at least 20 cm/8 inches between the AP and all persons.
- The switch contains an internal battery.



- *Always replace the battery with the same type to avoid the risk of explosion.*
- *Dispose of used battery according to the instructions provided with the new battery.*

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Introduction to the Extricom Wireless LAN System

A Wireless Local Area Network (WLAN) based on the IEEE 802.11 standard enables laptops, PDAs, phones, and other “Wi-Fi” equipped devices to wirelessly connect to the enterprise network.

However, large scale deployments of traditional cell-based WLANs, in which each access point (AP) operates on a different channel than that of adjacent APs, have been hindered by issues such as poor coverage, low capacity, high-latency mobility, and expensive interference analysis or site survey and maintenance costs.

Extricom’s WLAN, on the other hand, is a completely new solution. Referred to as the Interference-Free™ architecture, it eliminates the coverage and capacity trade-offs of traditional cell-based WLAN architecture. In addition, the need for cell planning and interference analysis, a highly expensive aspect of owning a WLAN, is also eliminated. Finally, Extricom’s innovative approach does away with most WLAN maintenance tasks. Extricom’s WLAN System is specifically designed to provide increased network capacity, seamless mobility, high level of security, and easy installation and configuration.

Overview of the Extricom WLAN System

The Extricom WLAN consists of a wireless switch (EXSW-800/1200/2400) connected to a set of UltraThin™ APs (EXRP-20/40). The Extricom WLAN system eliminates the concept of cell-planning and replaces it with the “channel blanket” topology. In this topology, each Wi-Fi radio channel is used on every access point to create continuous “blankets” of coverage. By using multi-radio APs, the Extricom system is able to create multiple overlapping channel blankets from the same physical set of devices, as illustrated in Figure 1.

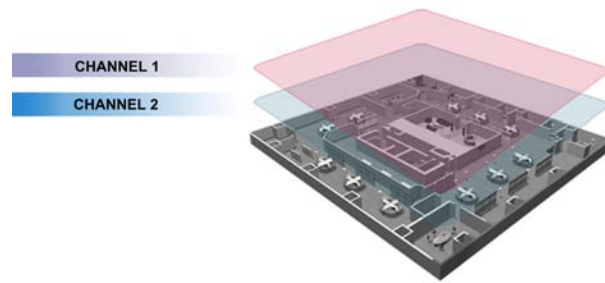


Figure 1. Two Channel Blanket Coverage

The Extricom solution is based on a fully centralized WLAN architecture, in which the switch makes all of the decisions for packet delivery on the wireless network. In this configuration, the access points (APs) simply function as radios, with no software, storage capability, or IP address. Even the basics of connecting are different: clients associate directly with the switch, not with the AP. The AP acts as an “RF conduit” to rapidly funnel traffic between the clients and the switch. The Extricom architecture has essentially centralized the 802.11 logic in the switch, while distributing the wireless electronics in the APs.

Centralization of the Wi-Fi environment enables enterprises to deploy 802.11a/b/g channels at *every* AP, creating multiple overlapping “channel blankets” that leverage each of the radios in the multi-radio UltraThin AP. Each channel’s bandwidth is delivered across the blanket’s service area (i.e. the combined coverage of all APs connected to the switch), with interference-free operation and consistent capacity throughout.

As the client moves throughout the blanket, different APs will be in the best position to serve the client at different times. The switch always uses the uplink and downlink path that is optimal to serve the client. While this is going on “behind the scenes,” the client never experiences an AP-to-AP handoff (i.e. de-association and re-association), resulting in seamless mobility.

Within each channel blanket, the switch avoids co-channel interference by permitting *multiple* APs to simultaneously transmit on the same channel only if they won’t interfere with each other. This is the essence of the TrueReuse™ functionality.

Features and Benefits

Extricom’s WLAN system solution offers the following features:

- **Ease of deployment - No cell planning**
Extricom’s architecture requires no cell planning and experiences no constraints due to RF interference or channelization. Consequently, Extricom APs can be deployed wherever needed, in any density or even varying density, to meet the desired end-client service level (stipulated in terms of connection rate). The traditional site survey is therefore reduced to just physical equipment installation planning.

- **Multi-Layer WLAN**
Using multiple radio Access Points, a single set of APs enables deployment of multiple high-data-rate channel blankets with overlapping coverage, resulting in multiplied aggregate capacity. Separate channel blankets also offer the unique ability to guarantee Quality of Service by physically segregating different user types, traffic, and roles onto different channels.
- **Same band operation**
The Extricom WLAN system enables two WLAN channels, in the same band (e.g. Channel 1 and 6 in 2.4 GHz), to be simultaneously used within the same AP, to form overlapping channel blankets using the same physical set of APs.
- **TrueReuse bandwidth**
TrueReuse technology multiplies the bandwidth of a standard 802.11 channel by dynamically optimizing the reuse of each frequency. Within a channel blanket, up to three APs are permitted to simultaneously transmit on the same channel, when the TrueReuse algorithm determines that they can do this without causing each other co-channel interference.
- **Zero-latency mobility**
In an Extricom WLAN, wireless device remains on the same channel everywhere within the channel blanket. Inter-AP handoffs delays or packet loss do not occur as the client moves across the range of different APs.
- **WiFi collaboration**
Extricom's patented WiFi Collaboration technology in which all APs are able to receive on the same channel, provides uplink path diversity for client transmissions, making the system highly resistant to RF instabilities and outside interference.
- **Dense AP deployment**
In an Extricom WLAN, APs can be deployed in any density convenient to the enterprise, to achieve both blanket coverage and a guaranteed communications rate to all users. In fact, while cell-based solutions shy away from dense deployments because of their inherent RF obstacles, Extricom's system performance actually increases with AP density.
- **Wire-line quality VoWLAN**
Extricom's Interference-Free architecture is perfectly suited for VoWLAN providing zero-latency mobility, voice and data separation, reduced power consumption, and high RF resiliency, all together resulting in superior voice performance.
- **IEEE 802.11i support**
Extricom's products support WEP-64, WEP-128, WPA-TKIP, WPA2-AES (CCMP) encryption. The authentication modes supported include: RADIUS (802.1x) and WPA Pre-Shared Key (PSK).
- **Power save**
Full power conservation management is enabled for associated mobile devices over unicast, multicast, and broadcast frames. For multicast and broadcast frames, the DTIM (Delivery Traffic Indicator Message) period is configurable.
- **Centralized configuration**
New switches are added to the network via a single Web interface either manually by the user, or automatically using an Extricom protocol.

- **System redundancy**
Extricom enables full redundancy by connecting two switches in parallel to different APs over the same area. The switchover parameters are user-configurable, and the Active to Standby switchover is seamless to the user.
- **SNMP traps**
The Extricom system supports SNMP traps, enabling the user to determine the status of the system, including the status of APs and Redundancy statuses.
- **Rogue AP Detection**
The Extricom system supports Rogue AP detection and reporting without the need for additional hardware. By using one radio in each of the multi-radio APs, the Extricom Rogue AP solution delivers the benefits of a dedicated security sensor network, without the costs of such a physical overlay.
- **Multiple RADIUS & RADIUS Redundancy**
The Extricom system supports multiple RADIUS servers, enabling the user to set redundancy between these RADIUS servers.
- **Network Time Protocol (NTP)**
The Extricom system supports synchronization of the system clock over the network, thereby ensuring accurate local time keeping with reference to radio and atomic clocks located on the Intranet and/or Internet.
- **Fast Handoff (Opportunistic Key Caching)**
The Extricom system speeds up the handoff of 802.11i WLAN stations between Extricom switches by use of Extricom's inter switch protocol. This technique enables the client to avoid repetitive 802.1x authentications, thereby enabling faster transition between Access Points connected to different switches with minimal session interruption.

Summary

The Extricom WLAN eliminates the cost and complexity of cell planning and site surveys for interference analysis. The Multi-Layered blankets provide high-capacity, zero latency (seamless) mobility, high level of security and ease of deployment wireless network.

Overview of the Extricom Switches

The Extricom EXSW-800 the EXSW-1200 and the EXSW-2400 switches provide central control and configuration of the WLAN. The switches implement the Interference-Free architecture in the Extricom WLAN. The WLAN switches are connected to EXRP-20 or the EXRP-40 access points to form Extricom WALN network.

The EXSW-800 switch can connect up to 8 EXRP-20 APs each with two 802.11a/b/g radios, to provide two channel blankets.

The EXSW-1200 and the EXSW-2400 can connect to the EXRP-20 or the EXRP-40 APs, the EXSW-1200 can connect to 12 while the EXSW-2400 switch can connect up to 24 APs. Each with two or four 802.11a/b/g radios, to provide two or four channel blankets.



Figure 2. Extricom EXSW-2400 Switch



Figure 3 Extricom EXSW-1200 Switch



The Extricom EXSW-1200 is derived from the EXSW-2400, it is based on the same Hardware and Software , however , it supports 12 instead of 24 WLAN ports



Figure 4. Extricom EXSW-800 Switch

Configuring a switch and its associated set of APs is as simple as configuring a single traditional AP, greatly reducing the effort required to deploy and maintain the WLAN.

The minimal configuration required for the switch is done via a dedicated secured Web interface.

Overview of the Extricom Access Point

Extricom's EXRP-20 and EXRP-40 UltraThin APs are high-bandwidth devices, containing standard 802.11 radio devices. The EXRP-20 contain two radio devices while the EXRP-40 contain four radio devices

Since the APs have no software, they require no configuration. This makes them fully interchangeable, enabling truly plug-and-play installation. If stolen, the APs do not pose a security risk, since all encryption is performed in the switch.

With all intelligence residing in the WLAN switch, APs may be placed as close together as necessary to provide high-quality, high-speed connectivity from all locations within the enterprise.

APs are connected to the Extricom WLAN Switch via standard Cat5e/6 cables. Since the APs are powered by the standard 802.3af Power over Ethernet (PoE), only a single Cat5e/6 cable connection is required to support two simultaneous radios.



Figure 5. Extricom EXRP-20 AP



Current software version on the WLAN switch only support two channel blankets, as such when the EXRP-40 is connected, only two radio devices on this access point will operate. Future versions will support full configuration

Extricom APs only function when they are directly connected to Extricom switches.

Overview of the Extricom Repeater

The EXRE-10 Power Over Ethernet (PoE) Range Extender is a unique product that doubles the standard range of PoE, from the baseline 100 meters to a full 200 meters. It can be used both as a standalone to extend the reach of PoE installations that are limited power source UL approved, and as a complement to Extricom's award-winning Interference-Free™ Wireless LAN (WLAN) System. When used in WLAN implementations, the EXRE-10 enables Extricom UltraThin™ Access Points to be connected using standard Cat5e/6 cable up to 200 meters from the Extricom WLAN Switch.

Continuing Extricom's tradition of deployment simplicity, the EXRE-10 PoE Range Extender sits in-line on the Ethernet cable and does not require an external power feed. The Range Extender receives its power from the original PoE injector in the switch or from a PoE injector/power supply, while it simultaneously injects PoE to the extended cable



Figure 6 Extricom EXRE-10 PoE Range Extender

A Typical Extricom Wireless Network Topology

Extricom's switch is connected to the wired LAN, and the APs spread throughout the enterprise. *Figure 7* displays a typical Extricom enterprise topology, consisting of an Extricom switch and eight APs.

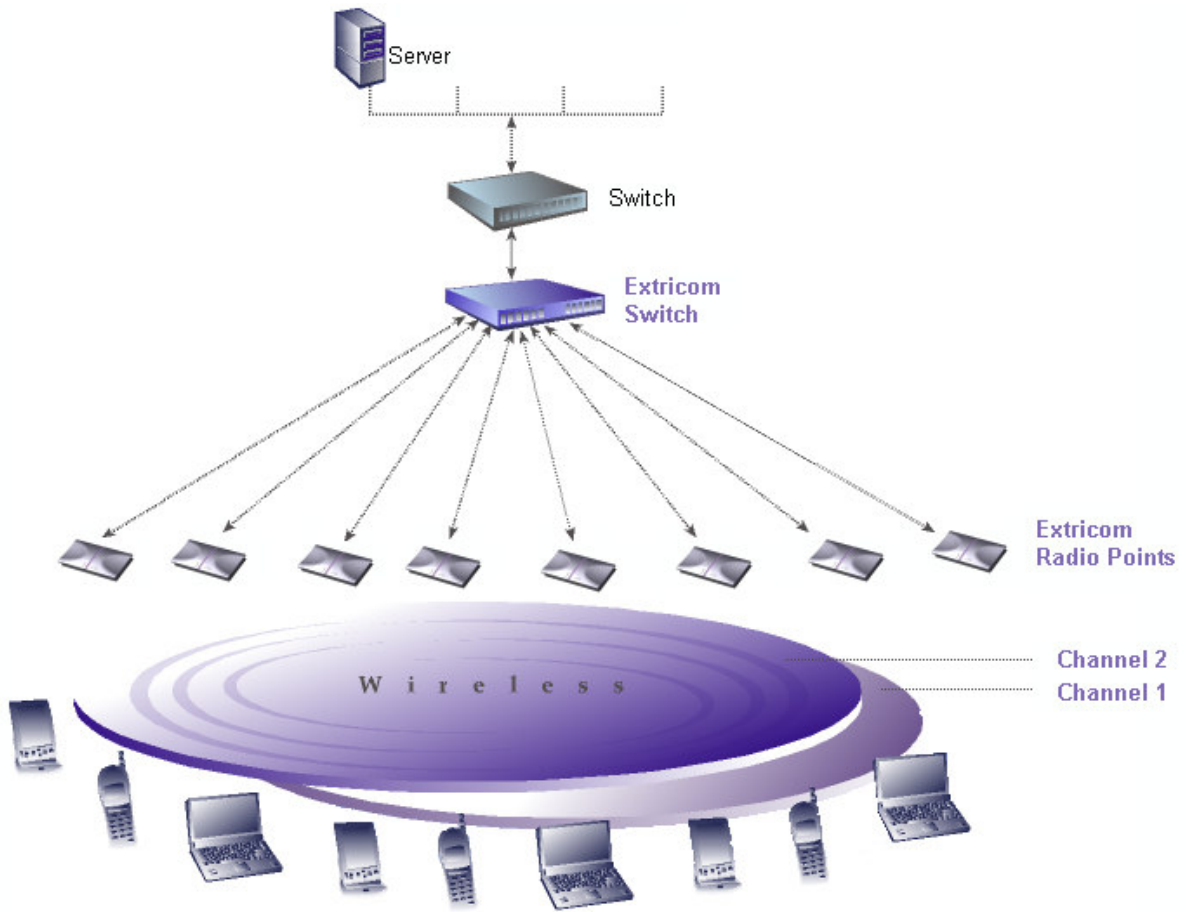


Figure 7. Typical Extricom Typology

Extricom uses standard WLAN protocols (IEEE 802.11). As a result, any 802.11a/b/g standard wireless device can work seamlessly with the Extricom system.

Installing the Extricom WLAN System

This chapter provides instructions for unpacking and installing the Extricom WLAN system.

Unpacking the Extricom WLAN System

The Extricom WLAN system is shipped with the following:

- One Extricom switch.
- CD which contains The Extricom WLAN System User Guide and Release Notes.
- APs (the number of APs is based on customer order and provided in separate boxes) are shipped as part of the overall order.

Additional Equipment Needed

The following additional equipment is required for installing the Extricom WLAN system:

- One CAT-5e/6 cable for each AP.
- One CAT-5e/6 cable for connecting the WLAN switch uplink to the LAN switch.
- Two stainless steel pan head 8x1-1/4" self-tapping Phillips screws for mounting each AP (optional).
- One power cable - For connecting power to the switch, use an AC power supply cord that has a standard plug and a C-13 connector that conforms to the following minimal requirements:
 - Approx. AWG: 16
 - Strand 31/32
 - Power Rating: 10 A



Use of a poorly grounded or ungrounded power cable may damage the switch.

Determining the Location of the Extricom Access Points

Before installing the switch and access points, plan the placement of the APs. Before permanently mounting the APs, it is recommended to test the network (using a laptop client) to identify potential coverage holes. If such a problem exists, relocate an AP or add additional APs to resolve the coverage hole.

The APs should be placed in a stable, secure location, such as on top of a closet or bookshelf, or mounted on a wall.

The switch should be placed near the distribution point of the LAN line. This is usually in the communications closet of your enterprise.

The Extricom EXSW-800 / 1200 / 2400 Switch

The Extricom EXSW-800 switch has 10 connectors and 4 LED types on the front panel (refer to *Figure 6*).

The Extricom EXSW-2400 switch has 27 connectors and 4 LED types on the front panel (refer to *Figure 9*).

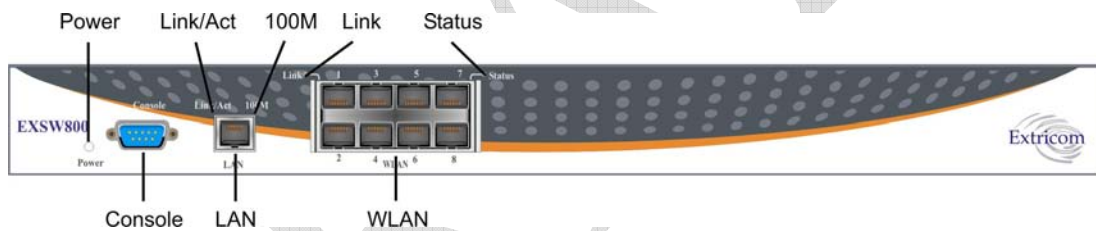


Figure 8. Extricom EXSW-800 Switch

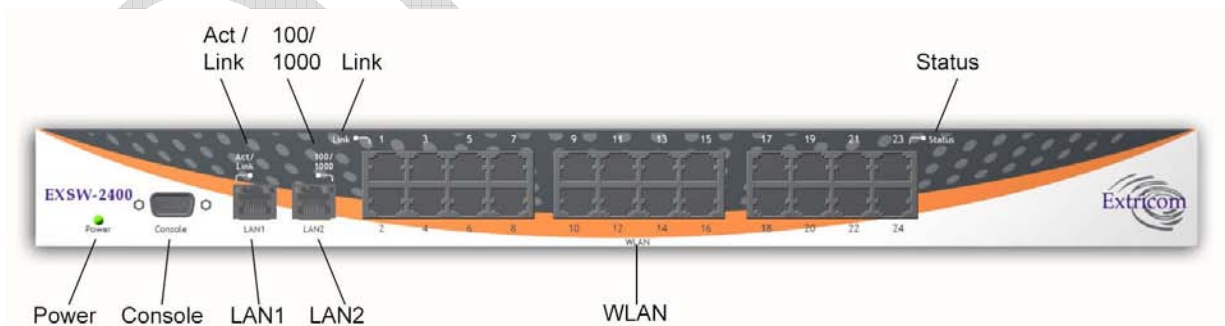


Figure 9. Extricom EXSW-2400 Switch

Table 1 describes the front panel and connectors of Extricom EXSW-800/2400 switches.

Table 1. Extricom EXSW-800/1200/2400 Switch Connectors




Connectors	Description
Console	Serial connector – only to be used by, or as instructed by Extricom personnel for troubleshooting, support, or maintenance. Can be accessed using a Null modem cable.
EXSW-800 LAN EXSW-1200/2400 LAN1, LAN2	RJ-45 connectors – used to connect the switch to the wired LANs. On EXSW-1200/2400 these connectors provide redundancy and load sharing between them.  LAN2 is not currently active pending future development.
WLAN	RJ-45 connectors – used to connect Extricom APs to the switch.  Do not connect any device other than Extricom APs to the WLAN ports. These ports provide 802.3AF PoE compatible power. Maximum current: 270 mA, 48 volts.

Table 2 describes the front panel LEDs of Extricom EXSW-800/1200/2400 switches.

Table 2. Extrinsic EXSW-800/1200/2400 Switch LEDs

LEDs	Color	Description
Power	Green	On/off
LAN, LAN1, LAN2		
Link/Act	Green	<ul style="list-style-type: none"> On indicates connection to the LAN network Blinking indicates activity in the LAN network connection Off indicates no connection to the LAN network
EXSW-800 100M	Orange	<ul style="list-style-type: none"> On – 100Mbps full duplex Off – 10Mbps
EXSW-1200/2400 100/1000	Orange	<ul style="list-style-type: none"> On – 100Mbps full duplex Blinking – 1000Mbps full duplex  1000Mbps is not currently active pending future development.
WLAN		
Link	Green	<ul style="list-style-type: none"> On indicates connection to the WLAN AP Blinking indicates activity over the connection to the WLAN AP Off indicates no connection to the WLAN AP

The Extricom Access Points

Extricom APs have two connectors located on the side of the device and four LEDs located on the top of the device.



Figure 10. Extricom AP

Table 3 describes the Extricom Access Point connectors.

Table 3. Extricom AP Connectors


Connectors	Description
Power	<p> External power is not required for most applications. Power is supplied through the Ethernet (PoE).</p> <p>In case of an external power requirement by the application, use UL Listed LPS (Limited Power Source) or NEC Class II adapter. Rating – Input: 90-240VAC 0.8A max. Output: 48VDC 0.56A max.</p> <p><i>Due to regulatory requirements and pending certification process for the power supply connector - external power supply should not be used.</i></p>
WLAN	<p>RJ-45 connector – used to connect the Extricom AP to the Extricom switch. Power is provided by the Extricom switch to the AP when directly connected to it.</p>

Table 4. Extricom EXRP-20 AP LEDs

LEDs	Color	Description
Radio 1	Green	1 st Radio is active
	Red	1 st Radio is malfunctioning
	Off	1 st Radio is off
Radio 2	Green	2 nd Radio is active
	Red	2 nd Radio is malfunctioning
	Off	2 nd Radio is off
LAN	Green (flashing)	Connection to Extricom switch is active
	Off	Not active
Power	Green	On/Off

Table 5 Extricom EXRP-40 AP LEDs

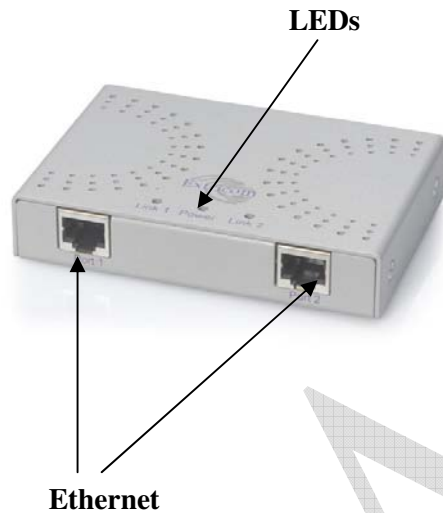
LEDs	Color	Description
Radio 1	Green	1 st Radio is active
	Red	1 st Radio is malfunctioning
	Off	1 st Radio is off
Radio 2	Green	2 nd Radio is active
	Red	2 nd Radio is malfunctioning
	Off	3 rd Radio is off
Radio 3	Green	3 rd Radio is active
	Red	3 rd Radio is malfunctioning
	Off	3 rd Radio is off
Radio 4	Green	4 th Radio is active
	Red	4 th Radio is malfunctioning
	Off	4 th Radio is off



Radio 3 and 4 are not supported in this release

The Extricom Repeater

The Extricom EXRE-10 PoE Range Extender has two 10/100 Base Ethernet interface with 803.3af Power over Ethernet support.



LEDs	Color	Description
LAN-1	Green (flashing)	Connection to Extricom switch is active
	Off	Not active
LAN-2	Green (flashing)	Connection to AP is active
	Off	Not active
Power	Green	On/Off

Connecting the Switch and Access Points

Extricom's switch is connected to the wired LAN and the APs that are located throughout the enterprise.

To connect the switch and access points:

1. Using a CAT-5e/6 100/1000Mbps cable, connect the switch RJ-45 LAN connector (located on the front panel of the switch, (refer to *Figure 9*) to the LAN switch.
2. Using a CAT-5e/6 cable, connect each AP (refer to *Figure 9*) to one of the switch's RJ-45 WLAN connectors
3. Connect the power cable to the power connector located on the rear panel of the switch, and plug the other end of the power cable into a power source.
4. Verify that the Power LEDs on both the switch and connected APs are green.



Additional APs can be connected/disconnected while the switch is active.

Mounting the Access Points (Optional)

Extricom APs can be mounted on the wall. To mount the APs, you will need two stainless steel pan head 8x1-1/4" self-tapping Phillips screws.

To mount the Access Points:

1. Place the installation template (refer to *Access Point Mounting Template* on page 65) on the wall where you want to mount the AP.
2. Mark the "Point for Drilling" locations on the wall.
3. Screw the two stainless steel pan head 8x1-1/4" self-tapping Phillips screws into the wall leaving enough of the screws protruding to enable you to hook the AP over the screw.
4. Align the holes on the back of the Access Point with the screws and slip the AP into place.



Position the Access Point so that the connectors are on the bottom left corner of the AP.

Configuring the Extricom WLAN System

After connecting the switch and AP, configure the Extricom WLAN system through Extricom's web configuration GUI using a terminal or PC connected to the same LAN as the switch.

To access the Extricom web configuration pages:

1. In your Web browser, enter the following: `https://<IP address of the switch>`
where `<IP address of the switch>` is the IP address of the switch provided with your purchase (for example, the URL should be <https://1.2.3.4> if the IP address of the switch is 1.2.3.4).



If you did not receive a switch IP address with the switch, the factory default value for the switch IP address is 192.168.1.254.



If you are using the default IP settings, do not place a router between the user PC and the switch.

The *Login* page appears.



Figure 11. Login Page

2. Enter your user name and password (as provided by your system installer) and click **OK**. The *Summary* page appears.



If you did not receive a user name and password with your switch, use the following factory default user name and password:

user name: *admin*

password: *Switch1*

The user name and password are case-sensitive.

Using the Extricom Web Configuration Pages

The Extricom Web configuration pages have three main areas:

- The navigation tree.
- The menu bar.
- The work area.

The screenshot displays the Extricom Web Configuration interface. On the left is a vertical navigation tree with a yellow 'Navigation Tree' label. The top features a dark blue menu bar with 'Extricom Web Configuration' and navigation arrows. The main content area is divided into sections: 'Summary' (with a yellow 'Menu Bar' label), 'LAN Configuration', 'WLAN Configuration', and 'Other SSIDs'. The 'WLAN Configuration' section includes a table for Radio 1 and Radio 2 settings.

	Radio 1	Radio 2
Wlan mode:	802.11g	802.11a
Channel:	1	36
SSIDs (vlan):	Octopus_G	Octopus_A
True Reuse:	disabled	disabled

Figure 12. Typical Web Configuration Page

The *navigation tree* provides access to the following Extricom Web configuration pages:

- *LAN Configuration* – used for configuring LAN parameters.
- *WLAN Configuration* – used for configuring WLAN parameters.
- *SSID & Security* – used for configuring SSID and security parameters and/or passwords and external RADIUS servers and their timeouts for redundancy.
- *Advanced Features*– used for configuring redundancy, SNMP and Rogue AP detection parameters.
- *Centralized Configuration* – used for configuration and control of remote switches from a Master switch
- *Access Points* – used for powering and activating/deactivating connected APs.
- *Utilities* – used for viewing the system configuration file, or to restore system default settings, upgrade the switch firmware, set the time and date manually or automatically, and reboot the switch.
- *Password Management* – used for changing system passwords
- *Reports & Events* – used for viewing system events and performance reports.
- *Summary* – provides a comprehensive summary of the system configuration.
- *About* – provides basic information about the Extricom WLAN system firmware versions.



Alternatively, you can access the:

- *Summary* page by clicking **Summary** in the menu bar.
- *About* page by clicking **About** in the menu bar.

The *work area* displays the configuration pages selected in the navigation tree. Use this area to configure the Extricom parameters.

After changing the values of the configuration parameters on a web configuration page, you must click **Update** to save the new configuration. An update status message appears at the top and bottom of the page informing you if the update was successful (refer to *Figure 13*). If the update was not successful, a description of the problem is displayed (refer to *Figure 14*).


 **Updated Successfully**

Figure 13. Successful Update Message

 **Error: Select At Least 1 Basic Rate**

Figure 14. Unsuccessful Update Message



The new configuration only takes effect after rebooting the switch (refer to *Rebooting the Extricom Switch* on page 46).

Configuring the LAN Parameters

In the *LAN Configuration* page, you can configure the following:

- The LAN IP address and network mask, as well as a backup address and mask.
- The LAN interface VLAN tag IDs.
- The default gateway.
- The address of the System Log and how often (if at all) the log is written to.
- The address of the Monitor Log and how often (if at all) the log is written to.

To configure the LAN parameters:

1. Click **LAN Configuration** in the navigation tree. The *LAN Configuration* page appears (refer to *Figure 15*).

The screenshot displays the Extricom Web Configuration interface for LAN Configuration. The top navigation bar includes 'Summary' and 'About'. The left sidebar lists various configuration options, with 'LAN Configuration' highlighted. The main content area is titled 'LAN Configuration' and contains the following fields:

IP Address:	<input type="text" value="192.168.1.233"/>	Network Mask:	<input type="text" value="255.255.255.0"/>
VLAN (0-4095):	<input type="text"/>		
2nd IP Address:	<input type="text" value="192.168.2.233"/>	2nd Network Mask:	<input type="text" value="255.255.255.0"/>
2nd VLAN (0-4095):	<input type="text"/>		
Default Gateway:	<input type="text" value="192.168.1.1"/>	(192.168.1.1 - 192.168.1.254) (192.168.2.1 - 192.168.2.254)	
Switch Name:	<input type="text"/>		

Below the configuration fields is the 'Statistics & Events' section:





- Syslog On
Syslog Address:
Syslog Interval (sec):
- Monitor On
Monitor Address:
Monitor Interval (sec):


An 'Update' button is located at the bottom right of the configuration area. The footer contains 'Contact us | www.extricom.com' and '©2006 Extricom'.

Figure 15. LAN Configuration Page


2. Configure the LAN parameters. Refer to *Table 6* for a description of the LAN parameters.

Table 6. LAN Configuration Parameters

Field	Description
IP Address	Enter the main IP address of the Extricom Switch.
Network Mask	Enter the network mask address.
VLAN	VLAN tag ID for VLAN access to the switch
2 nd IP Address	Enter the backup IP address of the Extricom Switch.
2 nd Network Mask	Enter the backup network mask address.
2 nd VLAN	2 nd VLAN tag ID for VLAN access to the switch.
Default Gateway	Enter the default gateway address.
<div style="border: 1px solid black; padding: 5px; display: inline-block;">  The default gateway must be on the same subnet as 1st or 2nd IP address. </div>	
Switch name	A textual descriptor of the switch. Up to 32 characters.
Monitor On	The Monitor Log is only relevant for a dedicated network status monitoring tool that is not provided with the switch. By default, this option should not be checked.
<div style="border: 1px solid black; padding: 5px; display: inline-block;">  Check this option only if you are using the Extricom dedicated network monitoring tool, otherwise unnecessary data packets are sent through the Ethernet. </div>	
Monitor Address	Enter the address of the Monitor Log if using the Extricom dedicated network monitoring tool.
Monitor Interval (sec)	Specify how often information is sent to the Monitor Log. If using the dedicated network status monitoring tool, 1 second is the recommended interval.
<div style="border: 1px solid black; padding: 5px; display: inline-block;">  Configure this parameter only if using the dedicated network monitoring tool. </div>	
Syslog On	Check the <i>Syslog On</i> option to record system information in the System Log.
<div style="border: 1px solid black; padding: 5px; display: inline-block;">  In most common operational scenarios, this option should be unchecked (unless used for troubleshooting). </div>	
Syslog Address	Enter the IP address of the computer to send the System Log.

Field	Description
Syslog Interval (sec)	Specify how often information is sent to the System Log. 3600 seconds is the recommend default interval.
	 If you detect a problem, you can decrease the <i>Syslog Interval</i> to receive updates more frequently.


3. Click **Update** to save the configuration.


 The new configuration only takes effect after rebooting or reconfiguring the switch (refer to *Rebooting the Extricom Switch* on page 51).

Configuring the WLAN Parameters

In the *WLAN Configuration* page, one can configure the following WLAN parameters for each Radio (Radio 1 or Radio 2):

- Channel options.
- Data rates.
- SSIDs.


 There are up to 16 different SSIDs per channel.


 Refer to *Configuring SSIDs* on page 30 for an explanation of the relationships between radios, channels, SSIDs, and VLANs.

To configure WLAN parameters:

1. Click **WLAN Configuration** in the navigation tree. The *WLAN Configuration* page appears (refer to *Figure 16*).
2. Select the “Country / Regulatory Domain” which meets your locale from the list.
3. Click the Radio tab for which you want to configure the WLAN parameters.
4. Configure the WLAN parameters. Refer to table 6 for a description of the WLAN parameters.



- LAN Configuration
- WLAN Configuration
- SSID & Security
- Advanced Features
- Centralized Configuration
- Access Points
- Utilities
- Password Management
- Reports & Events
- Summary
- About

Regulatory Domain

Country / Regulatory Domain: United States

WLAN Configuration

Radio 1 | Radio 2

Channel Options

Enable:

WLAN Mode: 802.11g

Channel: 1

Maximum Retries: 5 1-15 retries

Allow Rate Adaptation:

Rates Configuration

6 Mbps:	<input checked="" type="radio"/> Basic	<input type="radio"/> Optional	<input type="radio"/> Disabled
9 Mbps:	<input type="radio"/> Basic	<input checked="" type="radio"/> Optional	<input type="radio"/> Disabled
12 Mbps:	<input checked="" type="radio"/> Basic	<input type="radio"/> Optional	<input type="radio"/> Disabled
18 Mbps:	<input type="radio"/> Basic	<input checked="" type="radio"/> Optional	<input type="radio"/> Disabled
24 Mbps:	<input checked="" type="radio"/> Basic	<input type="radio"/> Optional	<input type="radio"/> Disabled
36 Mbps:	<input type="radio"/> Basic	<input checked="" type="radio"/> Optional	<input type="radio"/> Disabled
48 Mbps:	<input type="radio"/> Basic	<input type="radio"/> Optional	<input checked="" type="radio"/> Disabled
54 Mbps:	<input type="radio"/> Basic	<input type="radio"/> Optional	<input checked="" type="radio"/> Disabled

Setup SSIDs

Assigned SSIDs: Octopus_G Remove from Channel

Other SSIDs: Octopus_A Add to Channel

New SSID:


Rename SSIDs: [Rename SSIDs](#)



All SSIDs: Octopus_G
Octopus_A Delete Permanently


[Edit SSID & Security Setting](#)

Figure 16. WLAN Configuration Page


Table 7. WLAN Configuration Parameters

Field	Description
Channel Options	
Enable	Check this box if you want to enable the radio.
WLAN Mode	<p>Select the WLAN mode. Possible options are:</p> <ul style="list-style-type: none"> • 802.11a • 802.11b • 802.11g for pure mode • 802.11b/g for mixed mode <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Since the Extricom solution can support two simultaneous channels in the same frequency band, selecting the WLAN mode enables the Extricom solution to offer <i>same band</i> capability. This means that both radios can be set to:</p> <ol style="list-style-type: none"> 1. 802.11a & 802.11a 2. 802.11b & 802.11b 3. 802.11b & 802.11g 4. 802.11g & 802.11g 5. 802.11b/g & 802.11b/g <p>And any other combination.</p> </div>
Channel	Select the channel. The options available are based on the country and WLAN mode.
Maximum Retries	Select the number of times to try to resend a packet if the transmission of the packet fails.
Allow Rate Adaptation	<p>Check this box if you want to enable rate adaptation.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p> All enabled rates participate in the rate adaptation..</p> </div>


Field	Description
Rates Configuration	<p>For each of the data rates listed, select whether the rate is <i>Basic</i>, <i>Optional</i>, or <i>Disabled</i>.</p> <p>When configuring the data rates, you should consider the data rate capabilities of the wireless devices in your enterprise.</p> <ul style="list-style-type: none"> • <i>Basic</i> – The <i>Basic</i> data rates are usually the data rates that the vast majority of your wireless devices can support. Only wireless devices that support all the <i>Basic</i> data rates will be connected to the WLAN system. Therefore, it is recommended that you configure a minimal number of <i>Basic</i> data rates that the vast majority or all your wireless devices can support. When working in Mixed Mode, there should be at least one <i>Basic</i> data rate from the 802.11b rates. • <i>Optional</i> – If you configure a data rate as <i>Optional</i>, the network will provide that data rate to wireless devices that can support it. • <i>Disabled</i> – <i>Disabled</i> data rates are not available to wireless devices. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  <p>Since the Extricom WLAN system allows for dense deployment of APs it is recommended where applicable, to disable low data rates. Not doing so could possibly lead to an “edge user” effect, in which a client reduces aggregate network throughput by moving to the edge of the coverage area.</p> </div>
Short Preamble:	This option becomes available only when selecting 802.11b as the WLAN mode. In this case, mark the checkbox to allow a short preamble.
Setup SSIDs	
Assigned SSIDs	Displays the list of SSIDs assigned to the channel.
Remove from Channel	To remove an SSID from the channel, select an SSID and check the <i>Remove from Channel</i> option. The SSID is removed from the <i>Assigned SSIDs</i> list, and appears on the <i>Unassigned SSIDs</i> list after clicking Update .
	<div style="border: 1px solid black; padding: 5px;">  <p>In the Extricom WLAN system, a single channel can support up to 16 different SSIDs.</p> </div>

Field	Description
Unassigned SSIDs	Displays the list of SSIDs not assigned to the channel.
Add to Channel	To add an unassigned SSID to the channel, select an SSID from the <i>Unassigned SSIDs</i> list and check the <i>Add to Channel</i> option. The selected SSID is removed from the <i>Unassigned SSIDs</i> list and added to the <i>Assigned SSIDs</i> list after clicking Update .
New SSID	To create a new SSID and assign it to the selected channel, enter a unique SSID name and check the <i>Create and Assign</i> option. The new SSID is added to the <i>Assigned SSIDs</i> list after clicking Update . <div style="border: 1px solid black; padding: 2px; margin-top: 5px;">  The character Space may be used in SSID name. </div>
Create and Assign	Check to assign the new SSID. The new SSID is added to the <i>Assigned SSIDs</i> list after clicking Update .
All SSIDs	Displays a list of all SSIDs configured for the switch.
Delete Permanently	To delete an SSID from the switch, select an SSID from the <i>All SSIDs</i> list and check the <i>Delete Permanently</i> option. The SSID is removed from any list on which it appears after clicking Update .

- Click **Update** to save the configuration.

 The new configuration only takes affect after rebooting or reconfiguring the Extricom Switch (refer to *Rebooting the Extricom Switch* on page 51).

- To configure WLAN parameters for another radio, click the tab for that radio, configure the WLAN parameters, and click **Update** to save the configuration.
- To configure SSID and security settings, click **Edit SSID & Security Setting**. Refer to *Configuring SSIDs* on page 30, and *Configuring Security Definitions* on page 35.

 To configure SSID and security settings, you can also click **SSID & Security** in the navigation tree.

Configuring SSIDs

An *SSID* (Service Set Identifier) is the name of the network. Wireless devices must connect to a specific SSID which determines the pre-defined set of privileges, settings, and limitations (such as security definitions, access privileges, VLAN assignments, etc.) of the network. Each channel can support multiple SSIDs, thus creating “virtual” networks on the same channel.

The following is the data structure used by the Extricom system:

- Each radio is assigned one channel.
- Each channel can support up to 16 different SSIDs.
- Each SSID can be associated with a VLAN tag.
- The same SSID name cannot be repeated for different channels.

Table 8 shows this data structure with an example of possible channel, SSID and VLAN tag assignments.

Table 8. Data Structure Example

Access Point	Channel	SSID	VLAN tag
First Radio	1	Network1	1
		Network2	2
	
	
		Network15	15
		Network16	16
Second Radio	6	Network17	17
		Network18	18
	
	
		Network31	31
		Network32	32

In the *SSID & Security* page, *SSID Options* section, the following SSID parameters can be configured to:

- Allow Default SSID.
- Display SSID in Beacon.
- Allow Store & Forward.
- Allow Inter-Ess Store & Forward
- Enable Multicast
- ARP Caching
- Assign a VLAN to the SSID.
- Set a disassociation timeout.
- Set DTIM period.

To configure the SSID parameters:

1. Click **SSID & Security** in the navigation tree. The *SSID & Security* page appears (refer to *Figure 17*).

The screenshot displays the 'SSID & Security' configuration page in the Extricom Web Configuration interface. The left navigation pane shows 'SSID & Security' as the active section. The main content area is divided into several sections:


- SSID:** A dropdown menu is set to 'Octopus_G', with a 'Rename SSIDs' link. A note states: 'All configuration in this page applies to the chosen SSID'.
- SSID Options:** A series of radio buttons for enabling or disabling features:
 - Allow Default SSID: Enable Disable
 - Display SSID in Beacon: Enable Disable
 - Allow Store & Forward: Enable Disable
 - Allow Inter-Ess Forward: Enable Disable
 - Enable Multicast: Enable Disable
 - ARP Caching: Enable Disable
- Encryption & Authentication:**
 - 'Choose Method' dropdown is open, showing options: None, WEP64, WEP128, WEP64 & 802.1x Authentication, WEP128 & 802.1x Authentication, WPA/WPA2 TKIP/AES & Pre-Shared Key Authentication, and WPA/WPA2 TKIP/AES & 802.1x Authentication.
 - Checkboxes for 'WPA2 Only' and 'AES Only' are present.
 - 'Transmission Key' section has four keys (Key 1-4) with input fields and 'ASCII' dropdowns. Key 1 is pre-filled with '(WEP128)'. The 'I/HEX length' is set to 'WEP64) 13/26'.
 - 'WPA' section has a 'WPA-PSK' input field and an 'ASCII' dropdown. A note says: 'Key will be converted to HEX. ASCII/HEX length: 8-63/64 Input Format:'.
 - 'WPA/RADIUS' section has a 'Rekey Interval' set to '3600' seconds.
 - 'RADIUS' section has four server configurations, each with 'Address', 'Port' (set to 1812), and 'Password' fields, and a 'Server Timeout' set to 30 seconds.



At the bottom of the page, there is an 'Update' button and footer information: 'Contact us | www.extricom.com' and '©2006 Extricom'.


Figure 17. SSID & Security Page

2. Configure the SSID parameters. Refer to *Table 9* for a description of the SSID parameters.

Table 9. SSID Parameters

Field	Description
SSID	
Choose SSID	Select an SSID from the <i>Choose SSID</i> dropdown list. To add/remove SSIDs from this list, click <i>WLAN Configuration</i> (refer to table 6).
SSID Options	
Allow Default SSID	If this option is <i>enabled</i> , a wireless device will be allowed to connect even without requesting a specific SSID (i.e., “default” or “any” SSID) to the Extricom WLAN. If this option is <i>disabled</i> , then a wireless device needs to connect to a specific SSID in the Extricom WLAN.
Display SSID in Beacon	This option provides an additional (though limited) level of security. The AP sends out a beacon with information about the network. If this option is enabled, the SSID appears in the beacon. If disabled, the SSID does not appear in the beacon.
Allow Store & Forward	If this option is <i>enabled</i> , two wireless devices connected to the Extricom WLAN with the same SSID can communicate and transfer data to each other without going through a router. Traffic between wireless devices will not be forwarded to the LAN switch. If this option is <i>disabled</i> , all traffic goes through the LAN switch. Wireless devices will not be able to communicate without going through a router. This could be used by IT managers to apply security settings or various policies in the LAN network.
 Disabling <i>Allow Store & Forward</i> disables the <i>Allow Inter Store & Forward</i> option.	

Field	Description
Allow Inter Store & Forward	<p>If this option is <i>enabled</i>, two wireless devices connected to the Extricom WLAN with different SSIDs will be able to communicate with each other without going through a router. Traffic between wireless devices will not be forwarded to the LAN switch.</p> <div style="border: 1px solid black; padding: 5px;">  This option must be enabled on both SSIDs. In order for wireless devices, associated to different SSIDs, to be able to communicate with each other, the SSIDs must be defined on the same VLAN (or no VLAN at all). </div> <p>If this option is <i>disabled</i>, all traffic goes through the LAN switch. This could be used by IT managers to apply security settings or various policies in the LAN network.</p>
Enable Multicast	<p>This option, when enabled, provides support of multicast and broadcast packets for the selected SSID. Multicast and/or broadcast packets shall be transmitted from all APs.</p>
ARP Caching	<p>This option, when enabled, provides an immediate response to ARP requests directed towards WLAN stations associated with the selected SSID. The Switch answers on behalf of the WLAN stations.</p>
VLAN	<p>Enter a VLAN tag to assign to the SSID. Assigning a VLAN to an SSID enables you to control a wireless devices' privileges through the existing wired network definitions.</p>
Disassociation Timeout	<p>Enter the amount of time (in seconds) a wireless device can remain inactive (no data sent to or from the wireless device) before automatically disconnecting from the network.</p>
DTIM Period	<p>The period of time after which broadcast and multicast packets are transmitted to mobile clients in the Active Power Management mode.</p> <p>Select the DTIM period for the selected SSID. This is relevant for clients that want to utilize the power management capability. The possible values are 1-5. The default is 3.</p> <div style="border: 1px solid black; padding: 5px;">  A high DTIM value may cause these clients to loose connection with the network. </div>

 The remaining parameters in the *SSID & Security* page are described in *Configuring Security Definitions* on page 30).

3. Click **Update** to save the configuration.



The new configuration only takes affect after rebooting the switch (refer to *Rebooting the Extricom Switch* on page 46).

Configuring Security Definitions

In the *SSID & Security* page *Encryption & Authentication* section (refer to *Figure 17*), the following security definitions can be configured:

- Type of encryption.
- Type of authentication.



With some configurations, you can use encryption without authentication. However, for a higher level of security, it is recommended to use both encryption and authentication.





Extricom system eases the configuration of the SSID security parameters by providing a list of available combinations of Encryption and Authentication protocols


Security definitions are configured for each SSID individually.

To configure the security definitions:

1. Click **SSID & Security** in the navigation tree. The *SSID & Security* page appears (refer to *Figure 17*).
2. Select the SSID from the *Choose SSID* dropdown list for which you want to configure the security definitions.
3. Configure the security definitions for the selected SSID. Refer to *Table 10* for a description of the Security parameters.

Table 10. Security Definition Parameters

Field	Description
Encryption & Authentication	
Choose method	<p>Define the method of encryption and authentication.</p> <p>A combination of encryption and authentication methods may be selected from the options detailed in the drop-down list.</p> <p>Encryption cipher</p> <p>There are three types of encryption ciphers available:</p> <ul style="list-style-type: none"> • <i>WEP64</i> – Wired Equivalent Privacy (802.11 encryption protocol). This is a very basic encryption level. (AKA WEP40) • <i>WEP128</i> – This encryption is similar to WEP64, but the WEP keys are longer. (AKA WEP104) • <i>TKIP</i> – Temporal Key Integrity Protocol. This is a more secure and more advanced method of encryption as a part of the WPA standard. • <i>AES (CCMP)</i> – Advanced Encryption Standard.(Cipher Block Chaining Message Authentication Code Protocol) is currently the most advanced and secured method of WiFi encryption and is part of 802.11i (WPA2) standard. <p>Authentication method</p> <p>Authentication is used to identify if a wireless device is authorized to connect to the WLAN, and verifies the wireless device’s identity. Authentication methods (such as specific EAP methods available in the <i>WPA/WPA2 (RADIUS)</i> option) also verify that the association process is secured. Authentication utilizing <i>WPA/WPA2 (RADIUS)</i> can also support encryption key changes.</p> <p>The following methods are available:</p> <ul style="list-style-type: none"> • <i>802.1x</i> – if the cipher is WEP or WEP104 • <i>WPA/WPA2-PSK</i> or <i>WPA/WPA2 (RADIUS)</i> – if the cipher is TKIP or AES • <i>Supported protocols: EAP, TLS, TTLS, PEAP, LEAP and MD5</i> <div data-bbox="597 1417 1377 1524" style="border: 1px solid black; padding: 5px;">  <p>When choosing the encryption cipher and authentication methods, one should take into account wireless devices’ capabilities.</p> </div> <div data-bbox="597 1600 1377 1774" style="border: 1px solid black; padding: 5px;">  <p>The Extricom system supports “WPA2 Mixed Mode”. This mode permits the coexistence of WPA and WPA2 clients on the same SSID. WPA2 mixed mode allows “Old” WLAN clients with “New” WLAN clients on the same SSID during transition period.</p> </div> <p>Any security combination (Encryption and Authentication) can be selected by the user as a combination of the list and the check boxes.</p>

Field	Description									
<i>WEP Keys</i>	The <i>WEP Keys</i> area is only enabled if the cipher selected in the Choose Method field is WEP or WEP104. In the WEP Keys area, you define the WEP Key that is used for encrypting or decrypting. You can define all four WEP keys. For each key you define, select the input format (ASCII or HEX) and enter the key according to the following table:									
	<table border="1"> <thead> <tr> <th>Cipher</th> <th>ASCII</th> <th>HEX</th> </tr> </thead> <tbody> <tr> <td>WEP64 (or WEP64+802.1x)</td> <td>5 characters</td> <td>10 digits</td> </tr> <tr> <td>WEP128 (or WEP128+802.1x)</td> <td>13 characters</td> <td>26 digits</td> </tr> </tbody> </table>	Cipher	ASCII	HEX	WEP64 (or WEP64+802.1x)	5 characters	10 digits	WEP128 (or WEP128+802.1x)	13 characters	26 digits
Cipher	ASCII	HEX								
WEP64 (or WEP64+802.1x)	5 characters	10 digits								
WEP128 (or WEP128+802.1x)	13 characters	26 digits								
Transmission Key	Select the WEP64/WEP128 key to be used for transmitting the data from the AP.									
<i>WPA</i>	The WPA area is only enabled if the cipher selected in the Choose Method field is WPA/WPA2 TKIP/AES.									
WPA-PSK	If WPA/WPA2 with Pre-Shared key authentication is used, the WPA-PSK field is enabled. In this case, select one of the following input formats, and enter the corresponding key listed: <ul style="list-style-type: none"> • For ASCII, enter 8-63 characters. • For HEX, enter 64 digits. 									
<i>WPA/RADIUS</i>										
Re-key Interval	Enter the amount of time (in seconds) that elapses before the Group Key is changed.									
<i>RADIUS</i>	Define the RADIUS servers parameters if: <ul style="list-style-type: none"> • The cipher is WEP64/WEP128, and the 802.1x authentication method is selected. • The cipher is TKIP/AES, and the WPA/WPA2 (RADIUS) authentication method is selected. 									
Server Address	Enter the address of the RADIUS server.									
	 Use Server # 1 if only one server is used. Use consecutive servers if several servers are used.									
Server Port	Enter the RADIUS server port.									
Server Password	Enter the RADIUS server password.									
Server Timeout	Enter the time which the Extricom switch waits for the RADIUS server response.									

Encryption and Authentication methods.

The “Choose Method” drop down list in “Encryption & Authentication” displays the following items for user selection:

- None
- WEP64 (Open)
- WEP128 (Open)
- WEP64 & 802.1x Authentication
- WEP128 & 802.1x Authentication
- WPA/WPA2 TKIP/AES & Pre Shared Key Authentication
- WPA/WPA2 TKIP/AES & 802.1x Authentication

When the “WPA2 Only” is checked, only Clients with WPA2 support are allowed access to the WLAN.

When the “AES Only” is checked, only Clients with AES support are allowed access to the WLAN.

Cisco LEAP protocol (not CMIC & CKIP) is supported under “*WEP_{xxx} & 802.1x Authentication*”.

Multiple RADIUS and RADIUS redundancy

RADIUS is a common authentication protocol utilized by the 802.1x security standard (often used in wireless networks). Although RADIUS was not initially intended to be a wireless security authentication method, it improves the WEP encryption key standard, in conjunction with other security methods such as EAP-PEAP.

In an enterprise environment several RADIUS servers may be used for backup and also for serving different geographical locations. Up to four different RADIUS servers can be defined for each SSID. RADIUS redundancy is based on the assumption that the user database is identical in all RADIUS servers and that users are listed in all servers with the same credentials.

Switch over from one RADIUS server to another takes place after consecutive failures of the server. The order of priorities is 1 to 4.

4. Click **Update** to save the configuration.



The new configuration only takes affect after rebooting or reconfiguring the switch (refer to *Rebooting the Extricom Switch* on page 51).

Advanced Configuration of the Extricom WLAN Architecture

The advanced configuration page of Extricom WLAN includes two tabs:

- Advanced
- Rogue

Advanced Tab

The **Advanced** tab includes the capability to configure the following:

- Redundancy parameters.
- SNMP parameters.

In redundancy mode, two identical switches (H/W and configuration) are installed with the same number of connected APs.

One of the switches is configured as the Main switch, while the second is in Stand-by mode, and can switch over as soon as the switch-over conditions are met.

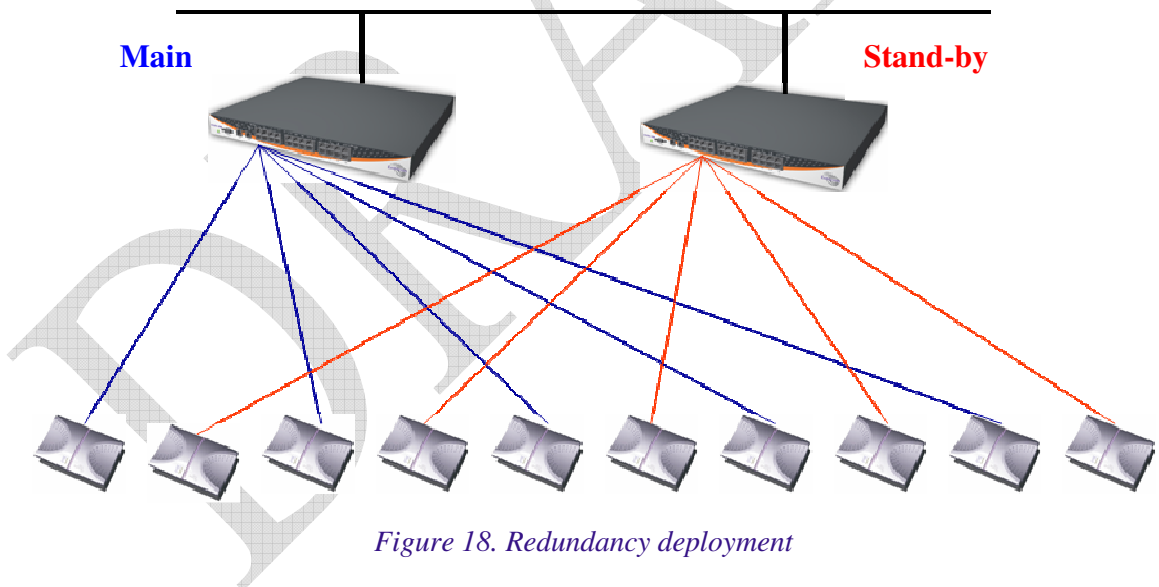


Figure 18. Redundancy deployment

To configure the Advanced Features parameters:

1. Click **Advanced Features** in the navigation tree. The *Advanced* configuration page appears (refer to *Figure 19*).
2. Select **Advanced** tab for configuring redundancy and/or SNMP parameters
3. Configure the redundancy, and SNMP parameters. Refer to *Table 11* for a description of the Advanced Features configuration information.

4. Select **Rogue** tab for configuring Rogue AP detection and parameters (refer to *Figure 20*).
5. Configure Rogue AP parameters. Refer to table 11 for a description of the Rogue AP configuration information

Figure 21 Advanced Features

Table 12. Advanced Configuration Tab

Field	Description
Redundancy Status	Enables designating pairs of switches, one as active and one as standby.
Monitored IP	The IP address of the other switch.
Reference IP	The IP address of a reference network element. This is used to test connectivity to the LAN.
Keep Alive Interval	The interval in mSec between the Keep Alive packets.
Keep Alive Check Threshold	The number of lost keep-alive packets before switching to the stand-by switch.

Field	Description
SNMP	
Enable Traps	Check this option to enable SNMP traps.
Community name	Enter the community name.
Manager IP	Enter the manager's IP address.

At present, the following Traps are sent from the Extricom switch to the device on the LAN running the SNMP manager.

1. **Client <Client MAC> has associated to <SSID>** - This trap is sent after successful association with the client MAC address and the SSID the client associated to.
2. **Client <Client MAC> has disassociated from <SSID>. Reason: <Reason>** - This trap is sent after client disassociation/disconnection from an SSID. The reason code is an 802.11 reason code.
3. **Key error! Client: <Client MAC> - SSID: <SSID> - Cipher suite: <Cipher>** - This trap is sent in case of any key error during four-way handshake (MIC error) or as a result of any key error when receiving data from client..
4. **New Rogue Detected <BSSID><Port><Radio><Channel><RSSI>** - This trap is sent when a new Rogue AP is detected. The trap includes the AP's BSSID, the switch port which detected the Rogue AP, the channel of the Rogue AP and the Rogue AP signal level (RSSI).
5. **Rogue Updated <BSSID><Port><Radio><Channel><RSSI>** - This trap is sent when an existing previously detected Rogue AP is re-detected with change in one of its parameters. The trap includes the AP's BSSID, the switch port which detected the Rogue AP, the channel of the Rogue AP and the Rogue AP signal level (RSSI).
6. **Rogue Removed <BSSID><Port><Radio><Channel><RSSI>** - This trap is sent when a new Rogue AP is detected. The trap includes the AP's BSSID, the switch port which detected the Rogue AP, the channel of the Rogue AP and the Rogue AP signal level (RSSI).
7. **RADIUS Timeout <ESSID><# of timeouts>** - This trap is sent when the RADIUS timeout had elapsed and includes the ESSID and the number of timeouts that occurred.
8. **RADIUS Redundancy Selection Changed <ESSID><# of RADIUS>to<# of RADIUS>** - This trap is sent when the RADIUS selection has been changed from one server to another, and includes the ESSID, the number of the previous server and the number of the new server.
9. **No RADIUS <ESSID>** - This trap is sent when the last RADIUS server failed and includes the ESSID.
10. **Configured and connected APs of channel [<channel number>]** - This trap provides a summary of all APs and their status. This trap is typically sent after an event of AP removal or connection from/to the switch.
11. **AP <ap number in hex base> has been connected** - This trap is typically sent after an event of connecting an AP to the switch.
12. **AP <ap number in hex base> has been disconnected** - This trap is typically sent after an event of disconnecting an AP from the switch.
13. **Reference Host is up** – This trap is sent when the Reference host is up and active. Sent by the Main switch.
14. **Reference Host is down** - This trap is sent when the Reference host is down. Sent by the Main Switch.
15. **Standby Switch is up** - This trap is sent when the Standby Switch is up & active.
16. **Standby Switch is down** - This trap is sent when the Standby Switch is down.
17. **Inactive - Reference Host is down** - This trap is sent when the Reference host is down, and hence the Main switch becomes inactive.

18. **Inactive Standby Switch** - Main Switch is up - This trap is sent when the Main Switch becomes active again and hence the Standby Switch becomes inactive (Switch over).
19. **Main Switch is active again** - This trap is sent when the Main Switch changes status from inactive to active and regains the Main switch status.
20. **Failure detected in Main Switch** - Switching Over. - This trap is sent when the Main Switch is about to go down and the Standby Switch is becoming Active.

Rogue Tab


A “Rogue” AP is an AP which is connected to an organization’s wired LAN without proper authorization. Such an AP represents a security hazard since the organization cannot control that AP’s over-the-air security measures.

Rogue APs pose threats to the enterprise. These threats vary and may include any of the following:

- WEP keys cracking.
- Password hijacking.
- IP and MAC spoofing.
- Channel jamming.

To configure Rogue AP detection parameters refer to *Table 13: Rogue AP Tab* and *Figure 22*

Table 13: Rogue AP Tab

Field	Description
Enable	Enables Rogue AP detection function
	 When Rogue AP detection is enabled the 2 nd radio is not used for service.
Allowed BSSIDs	
	Displays a list of authorized APs (White List)
Remove	Removes checked BSSIDs from the white list.
Edit	Provides capability of editing the white list
Add BSSID	
Add	Adds the BSSID in the text box to the white list. BSSIDs may be added from events log.



- LAN Configuration
- WLAN Configuration
- SSID & Security
- Advanced Features
- Centralized Configuration
- Access Points
- Utilities
- Password Management
- Reports & Events
- Summary
- About

✔ Updated Successfully

Rogue

Advanced **Rogue**

Enable

Update

Allowed BSSIDs

- 00:0a:e4:32:08:28
- 00:0a:e4:32:08:29
- 00:0a:e4:32:08:ea
- 00:0a:e4:32:08:12

Edit

Remove

Add BSSID

Add

✔ Updated Successfully

Figure 22: Rogue AP configuration.

Centralized Configuration Settings

Centralized Configuration allows managing a group of identical Extricom switches (*slaves*) from one single *master* switch. The user should decide which switch will act as *master*. Extricom Switches have a built-in mechanism to discover the presence of other switches. In addition, the user is given the ability to manually configure the entries in the table of switches.

Configuration changes on the *master* switch are propagated to the *slave* switches via a secured mechanism. For this authentication scheme to work, the *slave switches* need to obtain a copy of the *master's* public key prior to the centralized configuration. This is done in the initial phase of the switch's configuration by first retrieving the *master's* public key and then uploading it to the designated *slave switches*.

The screenshot shows the Extricom Web Configuration interface. At the top left is the Extricom logo. The header contains 'Summary' and 'About' links, and the main title 'Extricom Web Configuration'. A navigation menu on the left lists various configuration options, with 'Centralized Configuration' selected. The main content area features a green 'Updated Successfully' message. Below this, the 'Centralized Configuration' section includes 'SSH Key Management' with options for 'Master Switch', 'Generate New SSH Keys', and 'Retrieve Public SSH Key', each with an 'Update' button. The 'Switches Table' section contains a table with columns for Status, Name, IP Address, and Action. A single entry is shown with a green checkmark, the name 'SWITCH', IP address '192.168.1.233', and an 'Action' dropdown set to 'none'. Below the table is a 'Create a New Table Entry' form with fields for 'Name' and 'IP Address', and an 'Update' button. A second green 'Updated Successfully' message is displayed at the bottom of the main content area. The footer includes 'Contact us | www.extricom.com' and '©2006 Extricom'.

Figure 23. Central Configuration Page

To configure Centralized Configuration parameters:

Initial Setup

1. Configure the LAN settings on the *master* switch
2. Generate an SSH key pair on the *master* switch. This is done by clicking on the **Update** button next to the generate New SSH Keys.
3. Retrieve the SSH public key from the *master* switch and save it in a file on your PC.
4. Manually configure each of the *slave* switches' LAN settings, and continue by uploading the previously saved master's public key on every *slave* you wish to manage. This allows the *slave* switch to be configured only by the *master* switch which generated the public key.

Centralized Configuration

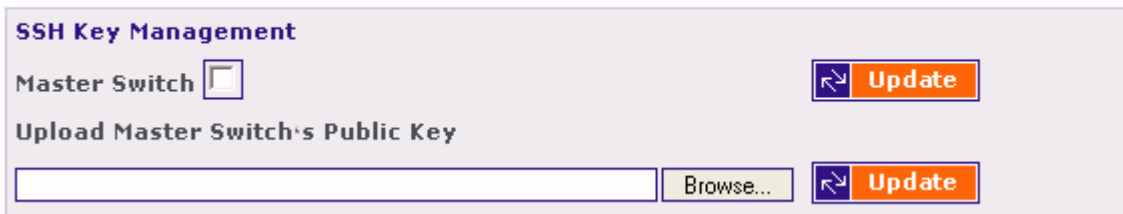


Figure 24. Central Configuration Page

Slave Switch Configuration

1. On the *master* switch, open the Centralized Configuration web page and click on the **Update** button in the Switches Table section. This will retrieve and generate the *slave* switches' information and all the relevant dialog boxes will be filled with data.
2. *Slave* switches can be added to the switches table by creating a new entry. Simply enter the new switch name and its IP address, and continue by clicking on the **Update** button.
3. Configure a slave switch, i.e. Copy the configuration file of the master with appropriate changes to the slave.



Figure 25. Action options

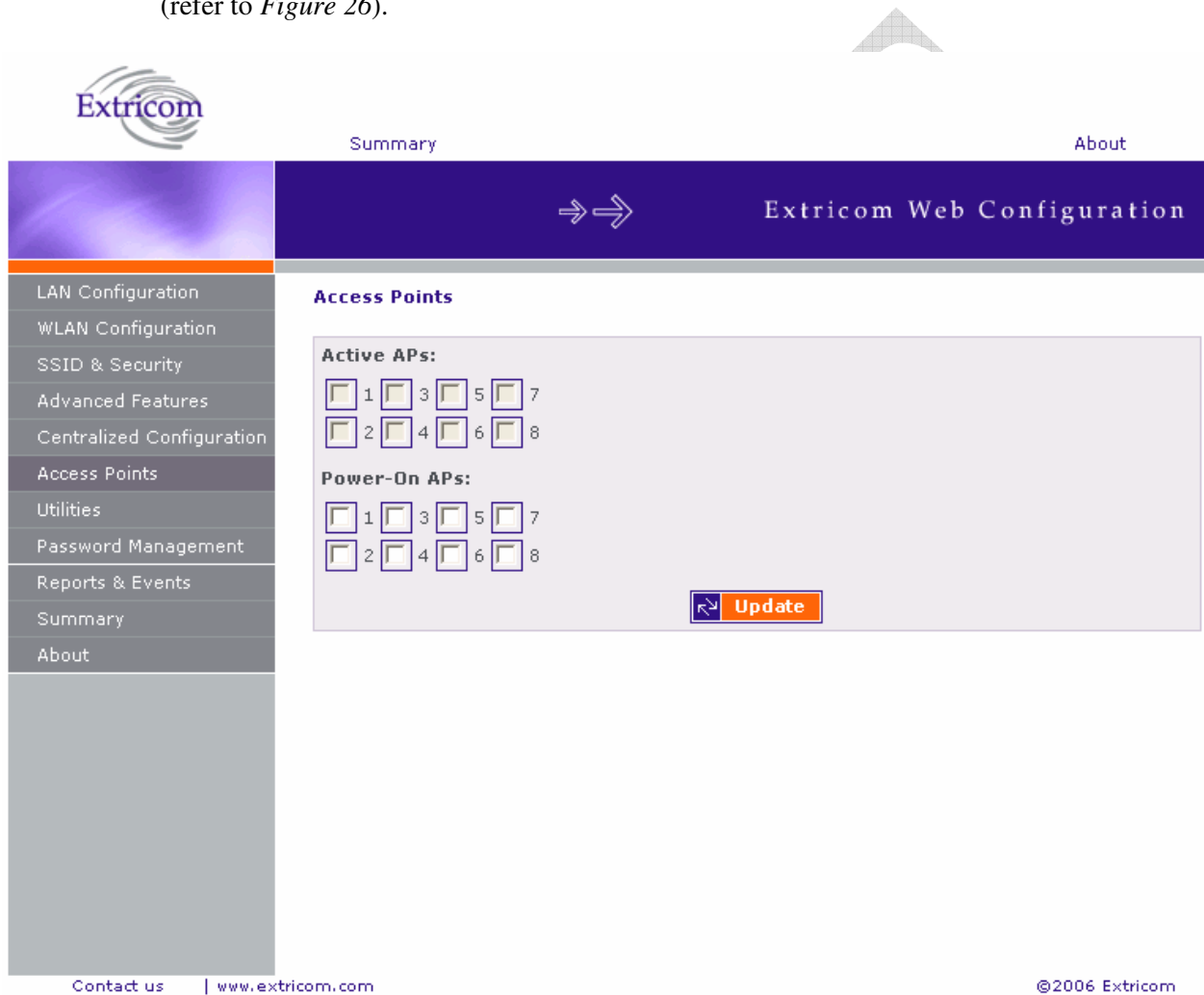
4. Reboot the *slave* switches.

Access Points Powering

The only configuration required for APs in the Extricom WLAN architecture is activation or deactivation of specified AP ports..

To access the Access Points page:

- Click on the **Access Points** in the navigation tree. The APs configuration page appears (refer to *Figure 26*).



The screenshot shows the Extricom Web Configuration interface. At the top, there is a navigation bar with 'Summary' and 'About' links. Below this is a dark blue header with the Extricom logo and the text 'Extricom Web Configuration'. A left-hand navigation menu lists various configuration options, with 'Access Points' highlighted. The main content area is titled 'Access Points' and contains two sections: 'Active APs' and 'Power-On APs'. Each section has a grid of checkboxes for ports 1 through 8. An 'Update' button is located at the bottom right of the main content area. The footer contains 'Contact us | www.extricom.com' and '©2006 Extricom'.

Figure 26. APs Configuration Page

To configure APs:

- Configure the APs and click **Update**. Refer to *Table 14* for a description of the APs configuration information.

Table 14. AP Configuration Page

Field	Description
Active APs	Checked boxes indicate ports with attached and configured APs. If a port is “powered” but not “active”, the AP is malfunctioning. This field is read-only.
Powered APs	Checked boxes indicate ports with attached and powered-on APs. Un-checking a box will turn off the power on the AP. The box must be re-checked to enable the port.



You do not need to reboot the switch for changes in AP configuration to take effect. (The Access Points page of the EXSW-2400 displays 24 check boxes.)

Configuration of the Extricom WLAN Architecture Utilities

The utilities page includes two tabs and serves the following function:

- Viewing the System Configuration File.
- Uploading a new Configuration File (replace existing).
- Upgrading the Extricom Firmware.
- Reconfiguring the Extricom system
- Rebooting the Extricom switch.
- Setting the Time and Date (separate tab).

To access the Utilities configuration pages:

- Click **Utilities** in the navigation tree. The *Utilities* configuration page appears (refer to *Figure 27*).



Figure 27. Utilities Configuration Page

Viewing the System Configuration File

The system configuration file contains all of the parameters that are configurable through the configuration utility.

To view the system configuration:

1. In the *Configuration* section of the *Utilities* configuration page, click *Configuration file*. The system configuration file appears in your Web browser.
2. Review the configuration in the XML file.



To return to the Extricom web configuration pages, click **Back** in your Web browser.

Configuration File Backup

You can create a backup file of the current configuration to upload in the future. This is an optional procedure.

To back up a configuration file:

1. In the *Show Configuration* section of the *Utilities* page, right-click *Configuration file* and select *Save Target As*. The *File Download* dialog box opens, and then the *Save As* dialog box opens.
2. Select the location in which to save the configuration file and click **Save**. The configuration file will be saved to the selected location.

Uploading a New Configuration File

A previously saved configuration file can be uploaded (e.g., a file saved for backup purposes).

To upload a new configuration file:

1. Backup the current XML configuration.
2. In the *Upload Configuration* section of the *Utilities* configuration page, click **Browse** and browse to the location of the configuration file that you want to upload. The file's path appears in the Upload Configuration field.
3. Click **Update** to update the configuration.
4. Click **Reboot** at the bottom of the page to reboot the switch.



Make sure that you are uploading a valid configuration file.

Restoring System Defaults

Restores the switch to its default configuration.

To restore system defaults:

- In the *Utilities* page, *Configuration* section *Restore Defaults*, click **Update**. The switch's defaults are restored.

Upgrading the Extricom Firmware

Extricom firmware can be easily upgraded using *Upgrade Firmware*.

To upgrade the Extricom firmware:

1. Download the upgrade to your computer from the CD supplied with your purchase.
or
Obtain an upgrade file from the Extricom's website, <http://www.extricom.com>. Click the Partners link on the menu bar at the top of the Extricom home page and log in using your username and password.
2. Create a backup of the XML file that contains the current configuration.
3. In the *Upgrade Firmware* section of the *Utilities* configuration page, click **Browse** and browse to the location of the upgraded firmware. The file's path appears in the Upgrade Firmware field.

4. Click **Update** to upgrade the firmware.
5. Reboot the switch (refer to *Rebooting the Extricom Switch* on page 46).



The firmware upgrade file is GNU zipped (gzip). Some Internet browsers are configured to automatically unzip files when downloading. Verify that this option is disabled so that the upgrade file remains zipped after downloading.

Rebooting the Extricom Switch

You must reboot the switch to activate any changes you make to the switch configuration.

To reboot the Extricom switch:

1. In the *Reboot Switch* section of the *Utilities* configuration page, click **Reboot**.
2. A new screen opens, prompting you “Are you sure you want to reboot?”.
3. Click **Reboot** to reboot.

Reconfigure Switch - Smart Configuration

Not every change in the Extricom switch’s configuration requires system reboot. Some parameters can be changed and will take effect immediately. This button checks whether a full reboot is required. In case reboot is not required, the update will take effect immediately.

Setting the Time and Date

Extricom system supports two ways of setting Date and Time (refer to *Figure 28*)

To manually set the time and date on your Extricom Switch:

1. In the *Set Time & Date* tab of the *Utilities* configuration page, select **Manually**.
2. Enter the time and date in the format hh:mm:ss dd-mm-yy.
3. Click **Update** to save the configuration.

To set the time and date on your Extricom Switch using NTP protocol:

1. In the *Set Time & Date* section of the *Utilities* configuration page, enter the time and date in the format hh:mm:ss dd-mm-yy.
2. Click **Update** to save the configuration.



- LAN Configuration
- WLAN Configuration
- SSID & Security
- Advanced Features
- Centralized Configuration
- Access Points
- Utilities
- Password Management
- Reports & Events
- Summary
- About

Set Time & date

Utilities | Time & Date

Current Time (24h): Wed Jan 17 16:08:16 UTC 2007

GMT: (GMT) Greenwich Mean Time : Dublin, Edinburgh, Lisbon, London

Manually: hr min sec AM day month year

NTP Client

Update from NTP now: Update

Interval (1-168): hours

NTP Server: **Known Servers:** time.nist.gov

Manual:

2nd NTP Server: **Known Servers:** time.nist.gov

Manual:

Update

Figure 29. Setting Date and Time

Setting Passwords in the Extricom Switch

Passwords are set according to user levels. Refer to *Table 15* for a description of the user access levels and their default passwords.

Table 15. Default Passwords

User Access Level	Privileges	Default Password
admin	Accessing the Web configuration.	Switch1



The 'operator' and 'root' passwords are used when accessing the switch for maintenance and service purposes. Changing these passwords should be performed only by an Engineer authorized by Extricom.



For security purposes, it is important that all the passwords (including operator and root passwords) be changed from the default values when the switch is first installed, as well as periodically updated.



Record all passwords and store them in a safe location.

To set and change a password for the Extricom switch:

1. Click Password Management in the navigation tree to open the Password Management page.
2. Enter the user access level whose password you want to change.
3. Enter the current password.
4. Enter the new password.
5. Re-type the new password.

Viewing Reports and Events Log

The *Reports & Events* page provides performance reports and list of events.

To view Reports & Events:

1. Click **Reports & Events** in the navigation tree.
2. Select **Reports** tab to view True Reuse performance. The screen is updated every second.
3. Select **Events** tab to view events. Hit refresh in order to see new events.

Viewing a Summary of the Updated Configuration

The *Summary* page provides a summary of the current configuration.

To view a summary of the updated configuration:

4. Click **Summary** in the navigation tree.
or
Click **Summary** in the menu bar.
The *Summary* page appears (refer to *Figure 30*).

The screenshot shows the Extricom Web Configuration interface. At the top, there is a navigation bar with 'Summary' and 'About' links. Below this is a dark blue header with the Extricom logo and 'Extricom Web Configuration'. A left-hand navigation tree lists various configuration options, with 'Summary' highlighted. The main content area displays the following information:

- Date:** Tue Feb 13 11:52:39 UTC 2007
- Uptime:** 12 min
- LAN Configuration**
 - IP Address:** 192.168.8.233
 - Network Mask:** 255.255.255.0
 - MAC address:** 00:13:a6:00:0a:e0
 - Default Gateway:** 192.168.1.1
 - Domain:** ODM1
 - SNMP Server:**
 - Serial Number:** 052010114
 - Syslog Server:**
- WLAN Configuration**
 - Country / Regulatory Domain:** United States

	Radio 1	Radio 2
Wlan mode:	802.11g	802.11a
Channel:	1	36
SSIDs (vlan):	Octopus_G	Octopus_A
True Reuse:	disabled	disabled
- Other SSIDs:**
- Access Points (1-8)**
 - Active Access Points:**
 - Power-On Access Points:**

At the bottom of the page, there is a footer with 'Contact us | www.extricom.com' on the left and '©2006 Extricom' on the right.

Figure 30. Summary Page

Refer to *Table 16* for a description of the summary information.

Table 16. Summary Page

Field	Description	
Date	Displays the date and time the summary was created.	
Uptime	Displays the amount of time the switch has been active.	
LAN Configuration		
IP Address	Displays the IP address of the switch.	
MAC address	Displays the base MAC address of the switch near the MAC address.	
Regulatory Domain	Displays the regulatory domain name currently in use by the switch.	
Network Mask	Displays the network mask.	
Default Gateway	Displays the default gateway IP address.	
SNMP Server	Displays the IP address of the SNMP server	
Syslog Server	Displays the IP address of the syslog server.	
WLAN Configuration		
	<i>Radio 1</i>	<i>Radio 2</i>
Wlan mode	Displays the WLAN mode for Radio 1 (802.11a, 802.11b, or 802.11g).	Displays the WLAN mode for Radio 2 (802.11a, 802.11b, or 802.11g).
Channel	Displays the channel for Radio 1.	Displays the channel for Radio 2.
SSIDs (vlan)	Displays the SSIDs and their related VLANs, defined and assigned to Radio 1.	Displays the SSIDs and their related VLANs, defined and assigned to Radio 2.
True Reuse	Displays TrueReuse status	
Other SSIDs	Displays other SSIDs that are defined but are not assigned to a specific Radio.	
Access Points (1-8/24)		
Active Access Points	List of the active APs.	
Power-On Access Points	List of APs powered via Power over Ethernet.	

Viewing Extricom Information

Information about firmware versions currently installed in the Extricom Wireless LAN system can be viewed in the *About* page.

To view Extricom information:

- Click **About** in the navigation tree.
or
Click **About** in the menu bar.
The *About* page appears.

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Troubleshooting

Table 17 lists possible problems you may encounter with your WLAN and provides possible solutions. If after attempting the solutions you are still experiencing difficulties, contact Extricom customer support.


Table 17. Troubleshooting

Problem	Solution
The AP Power LED is not lit.	<ul style="list-style-type: none"> • Verify that the AP Ethernet cable is connected to the switch and to the AP. The APs get PoE from the switch. • Verify that the AP is not turned off in the <i>Access Points Web</i> configuration page (refer to <i>page 57</i>).
A wireless device can't associate a specific SSID	<ul style="list-style-type: none"> • Verify that the wireless device supports the same 802.11 standard as configured for the SSID (802.11/a/b/g). • Verify that the wireless device is set to connect to the specific SSID. • Verify that the wireless device supports the security standard used by the SSID, e.g., WEP. • Verify that the security settings are configured to use the same authentication method. • If the Radius Server is used, verify that the wireless device is registered and has the necessary authorization.
Cannot connect to the Extricom web configuration pages	<ul style="list-style-type: none"> • Verify that the switch is connected to the LAN. • Verify that the correct IP address is used.
Low data rates	<ul style="list-style-type: none"> • Verify that the switch was not mistakenly configured to use low data rates. • Verify that there is no additional cause of interference (e.g., an additional WLAN network in the same proximity using the same frequencies as the Extricom WLAN, or that there are no cordless phones using the same frequencies, or microwave oven interference).

Problem	Solution
Wireless devices disconnect in a specific location	<ul style="list-style-type: none">• Verify that there is no additional cause of interference (e.g., an additional WLAN network in the same proximity using the same frequencies as the Extricom WLAN, or that there are no cordless phones using the same frequencies, or microwave oven interference).• Add an additional AP to cover the area. Plug another AP into the switch, or relocate an existing Access Point.
Cannot access the switch's Web configuration GUI	<ul style="list-style-type: none">• Verify that the workstation on which the Web browser is running is connected to the same LAN as the switch.• Verify that the URL entered for the switch begins with <code>https</code>.

Specifications

Extricom Switch Specifications

Standards	
WLAN	IEEE 802.11a, 5GHz IEEE 802.11b, 2.4GHz (short/long preamble support) IEEE 802.11g, 2.4GHz (pure mode) IEEE 802.11b/g, 2.4GHz (mixed mode)
Ethernet	IEEE 802.3x, full/half duplex IEEE 802.1q, VLAN tagging
Interfaces	
APs	<ul style="list-style-type: none"> EXSW-2400 – 24x 100BaseT Ethernet with IEEE 802.3af PoE (out of band) EXSW-1200 – 12x 100BaseT Ethernet with IEEE 802.3af PoE (out of band) EXSW-800 – 8x 100BaseT Ethernet with IEEE 802.3af PoE (out of band)
Wired LAN	<ul style="list-style-type: none"> EXSW-1200/2400 – 2x 1000/100BaseT Ethernet <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">  LAN2 and 1000Mbps are not currently active pending future development. </div> <ul style="list-style-type: none"> EXSW-800 – 1x 100/10BaseT Ethernet
Wireless Performance	
Channels	Up to 2 simultaneous WLAN channels
Capacity	Up to 108Mbps Aggregate WLAN connection-rate (2 channel blankets, each with 54 Mbps)
Inter-AP handoff	0 ms intra-switch
Management	
User Interface	Secure Web-based Graphical User Interface (GUI)
SNMP	Traps, using SNMP Version 2c
Logging	Remote and local SYSLOG

Upgrades	Firmware upgrade through Web from anywhere in the LAN.
Security	
Encryption	WEP-64 WEP-128 WPA-TKIP/AES (CCMP) WPA2-TKIP/AES (CCMP)
Authentication	802.1x (RADIUS) WPA/WPA2 pre-shared key MAC Address-based ACL EAP, TLS, TTLS, LEAP, PEAP, MD5
SSID & VLAN	
SSID	16 SSIDs per channel
VLANs	4095 Ethernet VLANs SSID to VLAN mapping
Regulations Approval	
Safety	UL 60950-1 EN 60950-1 IEC 60950-1 ANATEL Resolution 237
EMC	FCC Part 15 Class B EN 300386 Part B VCCI Technical Requirements, V-3/2001.04 ANATEL Resolution 238
Physical Properties	
Installation options	Rackmount (19" 1U) Desktop
LEDs	Power LAN Activity WLAN Port Activity
Power	<i>PoE (IEEE 802.3af): 15W</i> <i>PoE to WLAN ports: 15W for each port</i>
Environmental	
Operational	<i>Temperature: 0°C to 45°C (32°F to 122°F)</i> <i>Humidity: 0% to 90%, non-condensing</i>
Storage	<i>Temperature: - 20°C to +70°C (-49°F to 185°F)</i> <i>Humidity: 0% to 90%, non-condensing</i>

Extricom Access Point Specifications

WLAN Standards

IEEE 802.11a, 5GHz
IEEE 802.11b, 2.4GHz (short/long preamble support)
IEEE 802.11g, 2.4GHz (pure mode)
IEEE 802.11b/g, 2.4GHz (mixed mode)

Spectrum

Number of simultaneous channels	Up to two (four in EXRP-40)
802.11a	5.15-5.25 GHz 5.25-5.35 GHz 5.505-5.725 GHz 5.725-5.850 GHz <i>Available channels limited by local regulation</i>
802.11b	2.400-2.497 GHz <i>Available channels limited by local regulation</i>
802.11g	2.400-2.483 GHz <i>Available channels limited by local regulation</i>

Transmission Power

802.11a	<i>Max: 17 dBm (limited by local regulation)</i>
802.11b	<i>Max: 17 dBm</i>
802.11g	<i>Max: 15 dBm</i>

Supported Rates

802.11a	6, 9, 12, 18, 24, 36, 48 and 54 Mbps
802.11g	6, 9, 12, 18, 24, 36, 48 and 54 Mbps
802.11b	1, 2, 5.5, and 11 Mbps

Receive Sensitivity

802.11a:	6 Mbps: -88 dBm
	9 Mbps: -87 dBm
	12 Mbps: -86 dBm
	18 Mbps: -84 dBm
	24 Mbps: -81 dBm
	36 Mbps: -77 dBm
	48 Mbps: -73 dBm
	54 Mbps: -69 dBm

802.11b/g	1 Mbps: -91 dBm
	2 Mbps: -88 dBm
	5.5 Mbps: -87 dBm
	11 Mbps: -85 dBm
	6 Mbps: -89 dBm
	9 Mbps: -88 dBm
	12 Mbps: -87 dBm
	18 Mbps: -85 dBm
	24 Mbps: -82 dBm
	36 Mbps: -79 dBm
	48 Mbps: -74 dBm
	54 Mbps: -71 dBm

Typical Range (single AP)

802.11a	18 Mbps: 45.7 m (150 ft.)
	6 Mbps: 64 m (210 ft.)

802.11b/g	11 Mbps: 48.8 m (160 ft.)
	5.5 Mbps: 73.2 m (240 ft.)
	2 Mbps: 103.6 m (340 ft.)
	1 Mbps: 152.4 m (500 ft.)
	18 Mbps: 45.7 m (150 ft.)
	6 Mbps: 61 m (200 ft.)

Regulations Approval

Safety	UL 60950
	EN 60950
	IEC 60950

EMC	FCC Part 15 sub part B EN 301 EN 300328 EN 300440 ENV 301893 EN 300386 Part B VCCI V-2/2001.04
Access (including modular approval)	FCC Part 15 C FCC Part 15 E EN 300 328 EN 301 893 EN 300 489 Japan Type Certificate: Article 2, clause 1, Items 19, 19-2, 19-3, 19-13
Physical Properties	
Dimensions (W x H x D)	195mm x 150mm x 50mm (7.67" x 5.9" x 2")
Weight	400gr (0.8 lb.)
Installation options	Horizontal (desktop) Vertical (wall mount)
LEDs	Power LAN Activity 2 x WLAN Activity (2 colors)
Power	<i>PoE (IEEE 802.3af): 15W</i> <i>Power Supply (optional): 48VDC @ 400mA</i>
Environmental	
Operational	<i>Temperature: 0°C to 45°C (32°F to 122°F)</i> <i>Humidity: 0% to 90%, non-condensing</i>
Storage	<i>Temperature: - 20°C to +70°C (-49°F to 185°F)</i> <i>Humidity: 0% to 90%, non-condensing</i>

Extricom PoE Range extender specificathion

Regulations Approval

EMC	FCC Part 15 Sub Part B EN 300386 VCC TECH Reg V-3/2001-04
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Physical Properties

Dimensions (W x H x D)	100*20*75mm 4.4 * 0.8 * 3"
Weight	200gr (0.5 lb.)
Installation options	Horizontal (desktop) Vertical (wall mount)
LEDs	Power 2xLAN Activity
Power	1.5 watts

Environmental

Operational	<i>Temperature:</i> 0°C to 45°C (32°F to 122°F) <i>Humidity:</i> 0% to 90%, non-condensing
Storage	<i>Temperature:</i> - 20°C to +70°C (-49°F to 185°F) <i>Humidity:</i> 0% to 90%, non-condensing

Access Point Mounting Template

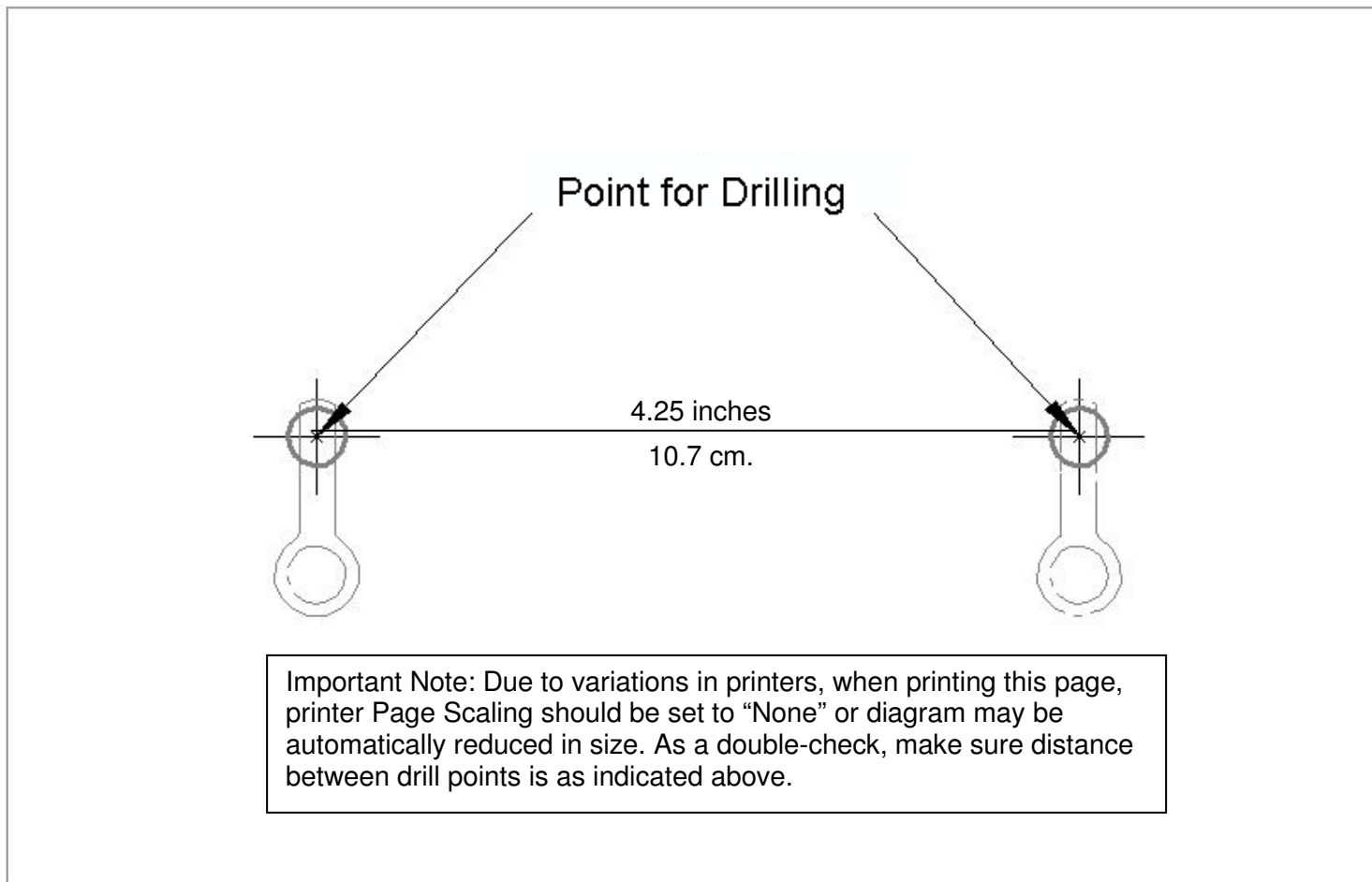


Figure 31. Access Point Mounting Template

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