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A **BELDEN** BRAND

Configuration User Manual

Industrial Wireless LAN Gateway

BAT-C2

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libwebsockets v2.4.2

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Version 2.1, February 1999

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paho.mqtt.embedded-c v1.0.0

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zeromq v4.0.4, dnsmasq v2.79, bash v4.3.30, readline v6.3, m4 v1.4.17, libglib2 v2.38.2, and tar v1.28

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Version 3, 29 June 2007

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wide-dhcpv6-20080615

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cjson v58

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curl v7.44.0

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flex v2.5.39

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bzip2 v1.0.6

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Julian Seward, jseward@bzip.org
bzip2/libbzip2 version 1.0.6 of 6 September 2010

zlib v1.2.8

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Iperf v2.0.5

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Iperf performance test

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expat v2.1.0

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libpcre v8.38

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1: Using This Guide

Purpose and Audience

This document provides information needed to configure, use, and update the Industrial Wireless LAN Gateway BAT-C2. It is intended for software developers and system integrators who are embedding this product into their designs.

Summary of Chapters

The remaining chapters in this guide include:

Chapter	Description
2: Introduction	Description of main features of the product and the protocols it supports. Includes technical specifications.
3: Configuration Using Web Manager	Instructions for accessing Web Manager and using it to configure settings for the BAT-C2.
4: Network Settings	Instructions to view and configure access point, bridge, wired network, wireless network, protocol stack Wi-Fi protected setup, WLAN Scan, QuickConnect, and WLAN Profiles settings.
5: Filesystem	Instructions to access and configure filesystem status.
6: Diagnostics	Instructions to view and configure DNS, hardware, IP socket, log, memory, ping, processes, routes, threads, and traceroute information.
7: Administration	Instructions to view and configure clock, HTTP, SSL, syslog, system, user management, xml, and quick setup information.
A: Further Support	Instructions for contacting Hirschmann Technical Support.

Additional Documentation

Document	Description
<i>Installation User Manual</i>	The "Installation User Manual" contains a device description, safety instructions, a description of the display, and the other information that you need to install the device. Documentation mentioned in the "Installation User Manual" that is not supplied with your device in print can be found as PDF download on the Internet at the Hirschmann product pages (www.hirschmann.com).

Safety Instructions



WARNING

UNCONTROLLED MACHINE ACTIONS

To avoid uncontrolled machine actions caused by data loss, configure all the data transmission devices individually.

Before you start any machine which is controlled via data transmission, be sure to complete the configuration of all the data transmission devices.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

2: Introduction

The device allows a cost-effective and energy-saving WLAN installation for applications with limited installation space.

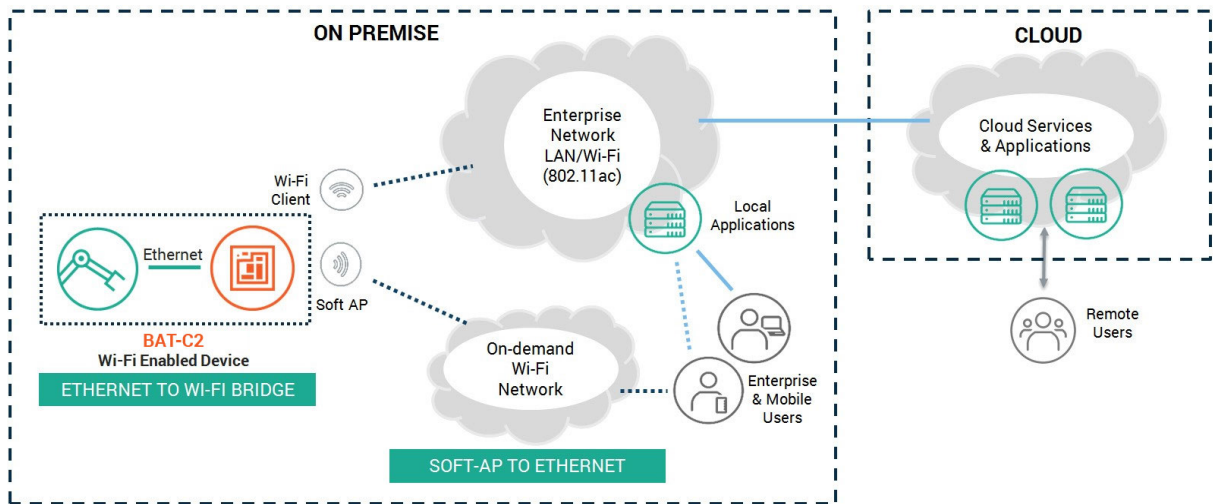


Figure 2-1 BAT-C2 Usage Mode for Ethernet to Wi-Fi

Due to its robust design and compact dimensions, the device is suitable for use in a variety of stationary and mobile WLAN applications in industrial environments. Areas of application are, for example, warehouse logistics or production logistics.

Main device features:

- ◆ WLAN module complying with IEEE 802.11a/b/g/n/ac
- ◆ Support of the following frequency ranges: 2.4 GHz and 5 GHz
- ◆ Convenient device management via Web browser
- ◆ Encryption functions
- ◆ Smart roaming for uninterrupted connections during transmission from one radio cell to another
- ◆ Proven M12 connection technology for industrial applications
- ◆ Device complies with degree of protection IP65
- ◆ Numerous mounting options
- ◆ Device works without a fan

The device is designed for the special requirements of industrial automation. The device meets the relevant industry standards, provides very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility.

The Hirschmann network components help you ensure continuous communication across all levels of the company.

Key Features

- ◆ First industrial rated 802.11ac Wi-Fi module (2.4 GHz and 5 GHz)
- ◆ Up to 433 Mbps (1x1 802.11ac) and up to 150 Mbps (802.11n) peak data rates
- ◆ High performance embedded Ethernet to Wi-Fi bridge and router modes
- ◆ Direct mobile to BAT-C2 service interface via SoftAP Wi-Fi Direct
- ◆ Concurrent SoftAP and client (STA), SoftAP only, client (STA) only modes
- ◆ Frequency and band selection options in AP and client modes
- ◆ Enterprise Wi-Fi security - WPA2-Enterprise, EAP-TLS, EAP-TTLS, EAP-PEAP, EAP-FAST, EAP-MD5, and EAP-MSCHAPv2
- ◆ Integrated enterprise security and management features
- ◆ 10/100 Mbps Ethernet MAC/PHY (external magnetics and RJ45 required)
- ◆ Network Connectivity - Ethernet, Wi-Fi
- ◆ Antenna diversity
- ◆ Operating temperature range: -40°C to +70°C

Protocol Support

The BAT-C2 contains a full-featured IP networking and wireless software stack:

- ◆ DHCP Client, DHCP Server, DHCPv6 Client
- ◆ LCAP (77FE), SSLv3/TLSv1, HTTP(S)
- ◆ IPv4/IPv6, TCP, UDP, ICMP, ARP, Auto-IP, DNS, SNMP v1/v2/v3
- ◆ WPA/WPA2 Personal, WPA2 Enterprise (EAP-TLS, EAP-TTLS, EAP-PEAPv0/v1, EAP-FAST, EAP-MD5, and EAP-MSCHAPv2)

Troubleshooting Capabilities

The BAT-C2 offers a comprehensive diagnostic tool set that lets you troubleshoot problems quickly and easily. Diagnostic tools available in the Web Manager allow you to:

- ◆ View critical hardware, memory, buffer pool, IP socket information and routing table
- ◆ Perform ping and traceroute operations
- ◆ Conduct forward or reverse DNS lookup operations
- ◆ View all processes currently running on the BAT-C2 including CPU utilization
- ◆ View system log messages

Configuration Methods

After installation, the BAT-C2 requires configuration. For the unit to operate correctly on a network, it must have a unique IP address on the network. There are four basic methods for logging into the BAT-C2 and assigning IP addresses and other configurable settings:

- ◆ **Web Manager:** View and configure all settings easily through a web browser using the Hirschmann Web Manager. See [Chapter 3: Configuration Using Web Manager](#).
- ◆ **XML:** The BAT-C2 supports XML-based configuration and setup records that make BAT-C2 configuration transparent to users and administrators. XML is easily editable with a standard text or XML editor.

Hardware Address

The hardware address is also referred to as the Ethernet address, physical address, or MAC address. The first three bytes of the Ethernet address are fixed. The fourth, fifth, and sixth bytes are unique numbers assigned to each unit.

Sample ways hardware address may be represented:

- ◆ EC-E5-55-14-1B-18
- ◆ EC:E5:55:14:1B:18

IP Address

Every BAT-C2 connected to an IP network must have a unique IPv4 address. This address references the specific unit.

Port Numbers

- ◆ Every TCP connection and every UDP datagram is defined by a destination and source IP address, and a destination and source port number. The following is a list of the default server port numbers running on the BAT-C2:
- ◆ TCP Port 443:HTTPS (Web Manager Configuration)

3: Configuration Using Web Manager

This chapter describes how to configure the BAT-C2 using Web Manager, the Hirschmann browser-based configuration tool. The gateway's configuration is stored in non-volatile memory and is retained across gateway reset and during loss of power to the gateway. All changes take effect immediately, unless otherwise noted. This chapter contains the following sections:

- ◆ [Accessing Web Manager](#)
- ◆ [Web Manager Components](#)
- ◆ [Navigating Web Manager](#)

Accessing Web Manager

Web Manager is normally accessed through a standard web browser. For further instructions, see the "Installation User Manual" available as PDF download on the Internet at the Hirschmann product pages (www.hirschmann.com).

To access Web Manager through a web browser:

1. Open a standard web browser. Hirschmann supports the latest versions of Internet Explorer®, Firefox®, Safari®, or Chrome™ web browsers.
2. Enter the IP address or host name of the BAT-C2 in the address bar. The factory-default IP address on ETH is 192.168.1.1/24.
3. Enter your username and password. The factory-default username is "**admin**" and the factory-default password is "**private**". The Status web page (see) displays current configuration and status details for the gateway and network settings.

Web Manager Components

The layout of a typical Web Manager page is below.

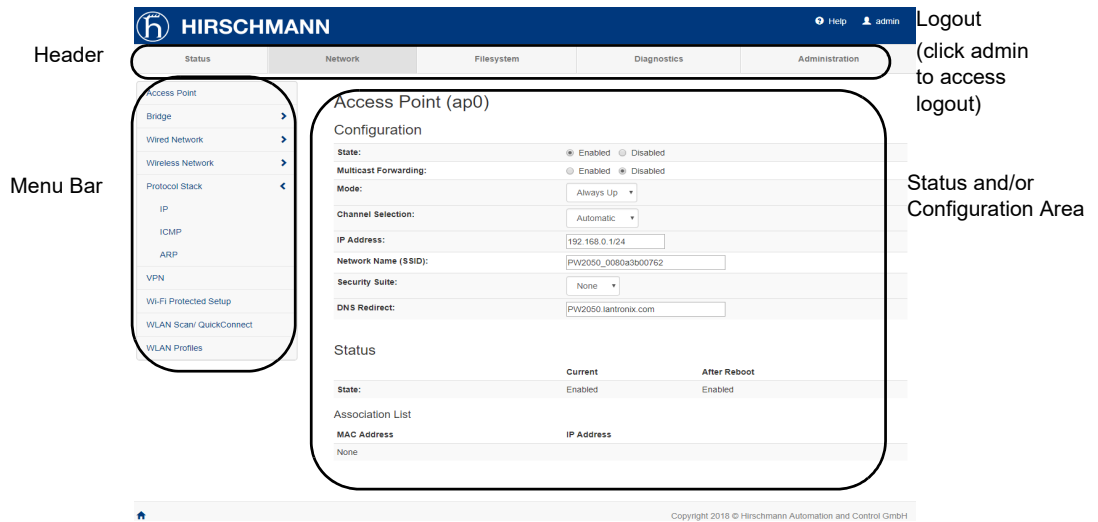


Figure 3-1 Components of the Web Manager Page

Web Manager pages have these sections:

- ◆ The **Status**, **Network**, **Filesystem**, **Diagnostics** and **Administration** tabs located in the **header** at the top of the page provide direct access to each Web Manager page of the same name. All the functionality is accessible through Web Manager and is divided between these tab/pages.
- ◆ Each Web Manager page accessed through the header tabs reveal a page-specific **menu bar** on the left side organizing available sections for that page.
 - ◆ The menu bar accessed via the **Network** and **Administration** tabs contain selections that can further expand to reveal additional subsections. A right-pointing blue arrow indicates a particular selection can be expanded to reveal subsections.
 - ◆ Expand or collapse an expandable menu bar section by clicking on it.
- ◆ The main body area of the page contains either view-only **Status info** or **Configuration options** according to the tab, menu bar selection or subsection selected.
- ◆ When a parameter is changed on a page, a **Submit** button will appear at the bottom of the page. Click on this button to save the change.
- ◆ A **Logout** link is available at the upper right corner of every Setup and Admin page. In Chrome or Safari, it is necessary to close out of the browser to completely log out.

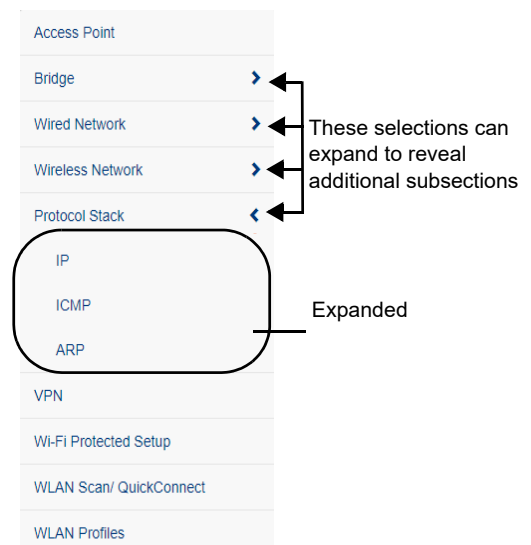


Figure 3-2 Expandable Menu Bar Selections

Status Page

The Status page appears upon logging into Web Manager and when you click the **Status** tab. The upper left vertical menu bar allows you to jump to a specific section on the Status page. Click a particular item in the menu bar to jump to that particular section.

The screenshot shows the Hirschmann web manager interface. At the top is a blue header with the Hirschmann logo and the name 'HIRSCHMANN'. To the right of the header are links for 'Help' and 'admin'. Below the header is a navigation bar with five tabs: 'Status' (selected), 'Network', 'Filesystem', 'Diagnostics', and 'Administration'. On the left side, there is a vertical menu with three items: 'Device' (selected), 'Network', and 'VPN'. The main content area is divided into three sections: 'Device', 'Alarms', and 'Network'. The 'Device' section contains a table of product information. The 'Alarms' section shows a single alert. The 'Network' section shows network settings.

Product Information	
Product Type:	Hirschmann BAT-C2 (BAT-C2)
Secure Boot:	Disabled
Firmware Version:	08.02.01.03R07
Radio Firmware Version:	1.141.79f6.37.42.11
Build Date:	Jan 7 16:44:49 PST 2019
Serial Number:	[REDACTED]
Uptime:	0 days 00:09:57
Current Date/Time:	Thu Jan 10 20:56:39 UTC 2019
Permanent Config:	Saved
Region:	United States
Access Point:	Enabled
WiFi Direct GO Mode:	Disabled

Alerts	
Alarm (wan0 link state change)	
Duration:	0 days 00:09:33

Network Settings	
Primary DNS:	[REDACTED]
Secondary DNS:	[REDACTED]

Figure 3-3 Status Page (Part 1 of 2)

Interface eth0	
Link:	Auto 10/100 Mbps Auto Half/Full (100 Mbps Full)
MAC Address:	
Hostname:	
MTU:	1500
IP Address:	
Network Mask:	
Default Gateway:	
Domain:	
IPv6 Link-local Address:	
IPv6 Domain:	
Interface wlan0	
Link:	Disconnected
MAC Address:	
Hostname:	
MTU:	1500
IP Address:	
Network Mask:	
Default Gateway:	
Domain:	
IPv6 Link-local Address:	
IPv6 Domain:	
Interface ap0	
State:	Enabled
Network Name (SSID):	
Security Suite:	None
IP Address:	
VPN	
Status:	Disabled
IP Address:	<None>

Figure 3-4 Status Page (Part 2 of 2)

Navigating Web Manager

The table below provides a shortcut to the various software features available for viewing and configuration through Web Manager.

Web Manager Page	Description	Page
Status	Shows product information, network, line, and tunneling settings.	86
Access Point	Allows you to configure an access point and shows the current operational state of existing access points.	89
Action	Allows you to view and configure the actions for a specific alarm or report.	121
Applications	View and configure application running scripts.	122
Bridge	Allows you to configure a bridge and shows the current operational state of the bridge.	91
Clock	Allows you to view and configure the current date, time and time zone as it displays in web manager.	124
Diagnostics	Lets you perform various diagnostic procedures.	116
DNS	Displays the current status of the DNS subsystem.	116
Filesystem	Shows file system statistics and lets you browse the file system to view a file, create a file or directory, upload files using HTTP, copy a file, or move a file.	115

Table 3-5 Web Manager Pages

Web Manager Page	Description	Page
Gateway	Shows statistics and lets you change the current configuration for the gateway.	125
GRE	Allows you to view and configure GRE settings.	131
Hardware	Shows hardware status and configuration options.	117
HTTP	Shows Hyper Text Transfer Protocol (HTTP) statistics and lets you change the current configuration and authentication settings.	132
IP Sockets	Shows IP socket status and lets you change hardware configuration.	117
Log	Shows and allows changes with logs.	117
Memory	Shows memory status and lets you change hardware configuration.	118
Network	Shows status and lets you configure the network interface.	89
Ping	Shows how to ping a network host with a DNS hostname or IP address.	118
Processes	Shows the processes currently running on the system.	118
Protocol Stack	Lets you perform lower level network stack-specific activities.	105
Quick Setup	Shows the quick setup configuration options for the BAT-C2.	147
Relay Contact	Allows you to enable or disable the Relay Contact.	124
Routes	Shows the current system routing table.	119
SNMP	Shows SNMP status and configuration options.	134
SSL	Lets you upload an existing certificate or create a new self-signed certificate.	135
Syslog	Lets you specify the severity of events to log and the server and ports to which the syslog should be sent.	139
System	Lets you reboot BAT-C2, restore factory defaults, upload new firmware, and change the BAT-C2 long and short names.	140
Threads	Shows thread ID numbers, names and CPU usage.	119
Traceroute	Allows you to perform a traceroute to a network host.	119
User Management	Displays the configuration of users.	142
VPN	Lets you view and configure VPN settings.	107
WLAN Profiles	Lets you view, edit, delete and create a WLAN profile on a BAT-C2.	111
WLAN Scan/ QuickConnect	Shows a scan of wireless networks within range of the BAT-C2 and lets you connect to them.	110
XML	Lets you export XML configuration and status records, and import XML configuration records.	144

Table 3-5 Web Manager Pages (continued)

4: Network Settings

Network settings for the BAT-C2 can be viewed and modified under the Network tab in the Web Manager user interface. Network settings include:

- ◆ [Access Point](#)
- ◆ [Bridge](#)
- ◆ [Wired \(eth0\) Network](#)
- ◆ [Wireless \(wlan0\) Network](#)
- ◆ [Protocol Stack](#)
- ◆ [VPN](#)
- ◆ [Wi-Fi Protected Setup](#)
- ◆ [WLAN Scan/QuickConnect](#)
- ◆ [WLAN Profiles](#)

Access Point

Configure software-enabled access point interface (SoftAP) on this page. Access point status information displays at the bottom half of the page.

Access Point Field	Description
State	Select to enable or disable the access point. If enabled, the DHCP server will assign IP addresses to the access point clients. Disabled by default.
Multicast Forwarding	Select to enable or disable forwarding of multicast packets.
Mode	Select the desired mode from the drop-down menu: <ul style="list-style-type: none">◆ Always Up: the SoftAP interface will always be up, allowing clients to connect at any time. Default selection.◆ Triggered: in response to an external trigger event, the SoftAP interface will come up for a user-configurable amount of time (the 'First Client Connect Timeout' and the 'Last Client Disconnect Timeout') and allow clients to connect.
First Client Connect Timeout	Enter the number of seconds for the First Client Connect Timeout. Upon receiving an external trigger event the SoftAP interface will stay up this amount of time waiting for a client to connect. If, at the end of the First Client Connect Timeout no clients have connected, the SoftAP interface will immediately go back down. If, during the First Client Connect Timeout at least one client has attached, the SoftAP interface will remain up until the last client has disconnected. After the last client has disconnected, the SoftAP interface will remain up for a user-configurable amount of time (the 'Last Client Disconnect Timeout',) giving clients an opportunity to reconnect. <i>Note: This field appears when Triggered mode is selected.</i>

Table 4-1 Access Point Settings

Access Point Field	Description
Last Client Disconnect Timeout	Enter the number of seconds for the Last Client Disconnect Timeout. After the last client has disconnected the SoftAP interface will stay up this amount of time, giving clients an opportunity to reconnect. If, at the end of the Last Client Disconnect Timeout no clients have reconnected, the SoftAP interface will immediately go down. If, during the Last Client Disconnect Timeout at least one client has attached, the SoftAP interface will remain up until the last client has disconnected. <i>Note: This field appears when Triggered mode is selected.</i>
SoftAP Trigger	Click the Trigger button to provide an external trigger event to bring the SoftAP interface up. <i>Note: This button and the timeout settings appear when the Triggered mode is selected.</i>
Channel Selection	Select the desired channel from the drop-down menu through which the SoftAP will operate: <ul style="list-style-type: none"> ◆ Automatic: Allow the radio to select the channel for the SoftAP. ◆ Configured: Specify the channel on which the SoftAP should operate. <i>Note: The Configured setting will only control the channel on which the SoftAP operates as long as the station (STA) interface is not connected to an access point. Once the STA interface has established an association with an access point, the SoftAP will move to the STA interface's channel (determined by the access point.) The channel selected by the user will be validated by the UI against a list of channels supported by the radio. To prevent inconsistent channel/band combinations the UI will coordinate the 'SoftAP channel' and 'WLAN Band' settings.</i>
Channel	Enter the Channel number to be configured. <i>Note: This field appears when a Configured channel selection is selected.</i>
IP Address	Enter the IP address of the SoftAP interface.
Network Name (SSID)	Specify the network name/SSID of the access point. The SSID update will take effect after the BAT-C2 is rebooted.
Security Suite	Select a security suite to be used with the access point.
Passphrase	Enter a passphrase if WPA or WPA2 security suite is selected above. <i>Note: This field appears when WPA or WPA2 security suite is selected.</i>
Show Password (check box)	Check to make the passphrase entered to the left visible. <i>Note: This field appears when WPA or WPA2 security suite is selected.</i>
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.
DNS Redirect	Enter the name to the IP address of the Access Point. DNS names are case insensitive.

Table 4-1 Access Point Settings (continued)

To View or Configure Access Point Settings

Using Web Manager

- ◆ To view access point statistics and configuration options, on the **Network** page, click **Access Point**.

Using XML

- ◆ Include in your file: `<configgroup name="access point">`

Bridge

The BAT-C2 bridges traffic between an Ethernet and WLAN interface. For example, br0 is a bridge between eth0 and wlan0. When a bridge is enabled, the *Wired (eth0) Network* configuration is used for configuring direct connections into the BAT-C2 over the primary interface; the *Wireless (wlan0) Network* configuration is ignored. Both the Ethernet and WLAN link configurations are used the same as when the bridge is disabled.

Bridging MAC Address specifies the MAC address of bridgeable traffic between the Ethernet and WLAN interfaces. When bridging is active, this MAC Address will be used as the MAC address of the WLAN interface. Packets received on the Ethernet interface from this address will be bridged to the WLAN interface (except traffic directed at the Primary Interface). If this field is not configured, then the BAT-C2 waits for the first packet to arrive on the Ethernet interface and uses the source address as the bridging address.

Bridging IP Address specifies the IP address of the bridged client.

When bridging is active, this IP Address will be used to create a static route between this BAT-C2 and the bridged client.

This route is required for connecting to the bridged client from BAT-C2s connected via the access point network and from this BAT-C2.

If Auto Detect IP Address is enabled, then the BAT-C2 will attempt to learn the IP Address by using the source or destination IP address of packets arriving on the Ethernet interface.

Notice: *Enabling Auto Detect IP Address may affect the performance of running processes during the learning phase.*

During initialization, the bridging subsystem enables and controls both eth0 and wlan0 networks. These are important aspects to keep in mind:

- ◆ If the eth0 physical link is inactive, wlan0 is the primary interface.
- ◆ If the eth0 physical link is active, eth0 is the primary interface.

When the eth0 link is active, the wlan0 link is established. Additionally, the bridging MAC address is acquired using preconfiguration or auto-detection, and bridging enters the Active state. If either link goes down, bridging reverts to the Inactive state.

When in the Active state, all packets that arrive on the wlan0 interface are bridged out (through) the eth0 interface. Similarly, all packets that arrive on the eth0 interface are bridged out (through) the wlan0 interface. However, exceptions to this behavior include:

- ◆ Ethernet packets directed specifically to the Ethernet (eth0) MAC address are terminated internally and are not bridged to WLAN.
- ◆ An ARP request for the primary interface IP address is terminated internally and is not bridged to the WLAN.

Ethernet packets that do not originate from the bridging MAC Address are discarded.

Bridge Status and Configuration

View-only status information on the Bridge1 (br0) Status page displays whether bridging is currently enabled, active, and the following (if any): Ethernet link, WLAN link, primary interface, bridging MAC, Ethernet MAC, WLAN MAC, bridging IP address, and bridging IPv6 address. Ethernet to WLAN and WLAN to Ethernet statistics are provided for unicast, nonunicast, discards and octets. The minimum unicast and multicast data throughput from eth0 to wlan0 and from wlan0 to eth0 is 35 megabits per second.

See [Table 4-2](#) for the bridge settings that can be modified on the Bridge1 (br0) Configuration page.

Bridge Fields	Description
State	<p>Select to enable or disable bridging. When a bridge is Enabled, the Ethernet Network Interface Configuration is used for configuring direct connections into the BAT-C2 over the primary Interface. The WLAN Network Interface Configuration is ignored. Both the Ethernet and WLAN Link Configurations are used the same as when the bridge is disabled. In Bridge Statistics:</p> <ul style="list-style-type: none"> ◆ Enable State shows whether the bridge is currently enabled. If the state is changed, it will not be reflected here until the next reboot. ◆ Active State shows the current state of the bridge. The bridge may be Active or Inactive, depending on the state of the bridge and the physical links. <p>Enabled by default.</p>
Bridging Mode	<p>Select either Host, Network, or Static Network.</p> <ul style="list-style-type: none"> ◆ In Host mode, a single device is connected via Ethernet. Default. ◆ In Network mode, multiple devices can be connected via Ethernet through a switch. DHCP server with DHCP relay must be enabled. ◆ In Static Network mode, multiple devices with static IP addresses can be connected via Ethernet through a switch. If the DHCP server with DHCP relay is also enabled, the BAT-C2 will act as a DHCP relay agent.
Transparent Mode	<p>Select to enable or disable transparent mode. This can only be enabled if Bridging Mode is Host.</p> <ul style="list-style-type: none"> ◆ If Enabled, the BAT-C2 bridge can no longer be accessed via web manager from a PC and is invisible to the network. The connected device and the BAT-C2 will share a MAC address. Default. <p>If Disabled, the BAT-C2 bridge will be accessible to a PC on the network via Web Manager.</p>
Network Access for Gateway	<p>Select to enable or disable network access for the gateway. This can only be enabled if Transparent Mode is Enabled.</p> <ul style="list-style-type: none"> ◆ If Enabled, the BAT-C2 will share the Ethernet IP address of the bridged client in addition to the MAC address. WLAN Network Interface Configuration must match the bridged client Ethernet configuration. Local ports must be configured to distinguish network traffic destined for the BAT-C2. Any port configured on the BAT-C2 must be different from those in use by services on the bridged client. Default. ◆ If Disabled, the BAT-C2 will not be accessible over the network.
Ethernet Interface	<p>Select interface from drop-down menu:</p> <ul style="list-style-type: none"> ◆ eth0

Table 4-2 Bridge Settings

Bridge Fields	Description
Bridging MAC Address	Enter the bridging MAC address which specifies the MAC address of bridgeable traffic between the Ethernet and WLAN interfaces. When bridging is active, this MAC Address will be used as the MAC address of the WLAN interface. Packets received on the Ethernet interface from this address will be bridged to the WLAN interface (except traffic directed at the primary interface). If this field is not configured, then the BAT-C2 waits for the first packet to arrive on the Ethernet interface and uses the source address as the bridging address.
Bridging IP Address	Enter the bridging IP address which specifies the IP address of the bridged client. When bridging is active, this IP address will be used to create a static route between this BAT-C2 and the bridged client. This route is required for connecting to the bridged client from BAT-C2s connected via the access point network and from this BAT-C2.
Auto Detect IPv4 Address	Select to enable or disable auto detection of IPv4 addresses. If enabled, the BAT-C2 will attempt to learn the IP addresses by using the source or destination IP address of packets arriving on the Ethernet interface. Enabled by default. Notice: Running processes may be impacted while the BAT-C2 monitors Ethernet traffic to determine the wired host IP address.
Bridging IPv6 Address	Enter the bridging IPv6 address.
Initial Scan Interval	Indicate time interval, in seconds, the BAT-C2 will attempt to learn the IP address initially.
Scan Interval	Indicate how often the BAT-C2 will attempt to learn if the IP address has changed. Notice: Running processes may be impacted while the BAT-C2 monitors Ethernet traffic to determine the wired host IP address.
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 4-2 Bridge Settings (continued)

To View or Configure Bridge Settings

Using Web Manager

- ◆ To view the Bridge status, on the **Network** page, click **Bridge > Statistics**.
- ◆ To configure Bridge settings, on the **Network** page, click **Bridge > Configuration** in the links.

Using XML

- ◆ Include in your file: `<configgroup name="bridge" instance="br0">`

Wired (eth0) Network

Network interface settings apply to both the wired Ethernet (eth0) and wireless WLAN (wlan0) interfaces, but are configured independently for each interface. The wired network pages are described in this section.

Wired (eth0) Interface Status and Configuration

Table 4-3 displays the wired interface status and configuration information. The view-only status information is available on the Wired (eth0) Network Interface Status page. This same information is configurable on the Wired (eth0) Network Interface Configuration page.

Field/Button	Description
State	Select to enable or disable the interface
Hostname	<p>Enter the hostname for the interface. It must begin with a letter or number, continue with a sequence of letters, numbers, or hyphens, and end with a letter or number.</p> <p>This setting will take effect immediately, but will not register the hostname with a DNS server until the next reboot.</p>
Priority	Priority ranges from 0-10. The IP stack will give the interface with the lowest numerical value highest priority and the highest numerical values lowest priority when sending data. This setting only applies when the BAT-C2 is not in bridging mode and both interfaces are connected to the same IP subnet.
MTU	When DHCP is enabled, the MTU size is (usually) provided with the IP address. When not provided by the DHCP server, or using a static configuration, this value is used. The MTU size can be from 576 to 1500 bytes, the default being 1500 bytes.
IPv4 State	Select to enable or disable. Enabled by default.
DHCP Client	<p>Select to turn On or Off. At boot up, after the physical link is up, the BAT-C2 will attempt to obtain IPv4 settings from a DHCP server and will periodically renew these settings with the server.</p> <p>Note: Overrides the BOOTP client, the configured IPv4 address/mask, gateway, hostname, and domain. Changing this value requires you to reboot the BAT-C2. Within Web Manager, click Renew to renew the DHCP lease.</p>
IP Address	<p>Enter the static IPv4 address to use for the interface. You may enter it alone or in CIDR format.</p> <p>Note: This setting will be used if Static IP is active (both DHCP and BOOTP are Disabled). Per factory-default, the BAT-C2 uses the static IP address 192.168.1.1, with a network mask of 255.255.255.0. Changing this value requires you to reboot the BAT-C2. When DHCP or BOOTP is enabled, the BAT-C2 tries to obtain an IPv4 address from a DHCP or BOOTP server.</p>
Default Gateway	<p>Enter the IPv4 address of the router for this network.</p> <p>Note: This setting will be used if Static IP is active (both DHCP and BOOTP are Disabled).</p>
Domain	<p>Enter the domain name suffix for the interface.</p> <p>Note: This setting will be used when either static IP or auto IP is active, or if DHCP/BOOTP is active and no domain suffix was acquired from the server.</p>
DHCP Client ID	Enter the ID if the DHCP server requires a DHCP client ID option. The DHCP server's lease table shows IP addresses and MAC addresses for BAT-C2s. The lease table shows the client ID, in hexadecimal notation, instead of the BAT-C2 MAC address.
Primary DNS	<p>Enter the IP address of the primary domain name server (DNS.)</p> <p>Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no DNS server was acquired from the server.</p>

Table 4-3 Wired (eth0) Network Interface

Field/Button	Description
Secondary DNS	Enter the IP address of the secondary domain name server. <i>Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no DNS server was acquired from the server.</i>
IPv6 State	Select to enable or disable. Enabled by default.
IPv6 DHCP Client	Select to turn On or Off . At bootup, after the physical link is up, the BAT-C2 will attempt to obtain IPv6 settings from a DHCPv6 server and will periodically renew these settings with the server. <ul style="list-style-type: none"> ◆ On: enables the BAT-C2 server to obtain IPv6 setting from a DHCPv6 server upon bootup. ◆ Off: enables the BAT-C2 server to obtain IPv4 settings from a DHCP server upon bootup. Disabled by default. <i>Note: Overrides the configured IP address/mask, gateway, hostname, and domain. Changing this value requires you to reboot the BAT-C2. Within Web Manager, click Renew to renew the DHCPV6 lease.</i>
IPv6 Auto Configuration	Select to turn On or Off IPv6 auto configuration. Off by default.
IPv6 IP Address	Enter the static IPv6 address to use for the interface. <i>Note: This setting is used if Static IPv6 is active (DHCPv6 is Disabled). Changing this value requires a reboot. When DHCPv6 is enabled, the BAT-C2 tries to obtain an IPv6 address from a DHCPv6 server. If it cannot, then BAT-C2 generates and uses a Link local IPv6 address.</i>
IPv6 Default Gateway	Enter the default IPv6 default gateway.
IPv6 Domain	Enter the domain name suffix for the interface. <i>Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no Domain Suffix was acquired from the server.</i>
IPv6 Primary DNS	Enter the IP address of the primary domain name server. <i>Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no DNS server was acquired from the server.</i>
IPv6 Secondary DNS	Enter the IP address of the secondary domain name server. <i>Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no DNS server was acquired from the server.</i>
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 4-3 Wired (eth0) Network Interface (continued)

To Configure Network Interface Settings

Using Web Manager

- ◆ To view Ethernet (eth0) Interface statistics, on the **Network** page, select **Wired Network > Interface**.
- ◆ To configure Ethernet (eth0) interface settings, on the **Network** page, select **Wired Network > Interface > Configuration**.

Using XML

- ◆ Include in your file: `<configgroup name= "interface" instance="eth0">`

Wired (eth0) Link Status and Configuration

Table 4-4 displays the wired link status and configuration information. The view-only status information is available on the Wired (eth0) Network Ethernet Link page. This same information is configurable on the Wired (eth0) Network Ethernet Link Configuration page.

Field/Button	Description
Speed	Select the Ethernet link speed. (Default is Auto .) <ul style="list-style-type: none"> ◆ Auto = Auto-negotiation of Link Speed (default) ◆ 10 Mbps = Force 10 Mbps ◆ 100 Mbps = Force 100 Mbps
Duplex	Select the Ethernet link duplex mode. (Default is Auto .) <ul style="list-style-type: none"> ◆ Auto = Auto-negotiation of Link Duplex (default) ◆ Half = Force Half Duplex ◆ Full = Force Full Duplex
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 4-4 Link (eth0) Configuration

Notes:

- ◆ When speed is **Auto**, duplex must be **Auto** or **Half**.
- ◆ When speed is not **Auto**, duplex must be **Half** or **Full**.
- ◆ Fixed-speed **Full** duplex produces errors when connected to **Auto**, due to duplex mismatch.

To Configure Network Link Settings

Using Web Manager

- ◆ To view Ethernet (eth0) link statistics, on the **Network** page, select **Wired Network > Link**.
- ◆ To configure Ethernet (eth0) link settings, on the **Network** page, select **Wired Network > Link > Configuration**.

Using XML

- ◆ Include in your file: `<configgroup name= "interface" instance="eth0">`

Wired (eth0) QoS Statistics and Configuration

QoS (Quality of Service) can be enabled and configured for both the Wireless (wlan0) Network and wired Network (eth0). If enabled, the router will control the flow of outbound traffic according to the user-defined filters. In other words, QoS improves performance by allowing the user to prioritize applications. Filters can be defined to prioritize traffic based on the source or destination network, source or destination port, or the source MAC address. Up to 32 user-defined filters can be added. The following are predefined priority classes:

- ◆ Network Control and Internetwork Control are typically used for network control packets such as ICMP and have the highest priorities.
- ◆ Move: Bandwidth allocation is at minimum 5% each to Network control.
- ◆ Voice: Bandwidth allocation is at minimum 30%.
- ◆ Video: Bandwidth allocation is at minimum 20%.
- ◆ Critical Applications: Bandwidth allocation is at minimum 15%.

- ◆ Excellent Effort: Bandwidth allocation is at minimum 10%.
- ◆ Best Effort: Bandwidth allocation is at minimum 10%.
- ◆ Background: Bandwidth allocation is at minimum 5% and has the lowest priority.

[Table 4-5 Wired \(eth0\) Network QoS Settings](#) shows the network QoS settings that can be configured including adding new filters.

Wired (eth0) Network Settings	Description
State	Click to enable or disable state.
Import filters	Click to enable or disable import filters to import configurations from other interfaces. This is helpful when more than one interface is enabled and traffic route is determined based on interface priority.
Uplink Speed	Enter the maximum uplink speed. Set 0 to set speed to default. <i>Note: Default is set to 90% of the maximum link speed.</i>
Submit (button)	Click the Submit button to enter the QoS settings. The Submit button appears when new settings are entered.
Delete	Click the checkbox to the left of any existing QoS filter to be deleted and click the Submit button.
Filter type	Select the filter type from the drop-down window: <ul style="list-style-type: none"> ◆ Network ◆ Port
Network	Enter the Network to prioritize traffic from a BAT-C2 on your LAN or to a BAT-C2 on WAN. These are entered as host name or in CIDR notation including the network prefix. For example, to prioritize traffic from a single IP address enter xxx.xxx.xxxx.xxx/32. <i>Note: This field appears when the Network filter type is selected above.</i>
Ports	Enter the Port to prioritize traffic from and to a specific port or port range. The port range is entered as start-end. <i>Note: This field appears when the Port filter type is selected above.</i>
Priority	Select the priority of the filter from the drop-down menu: <ul style="list-style-type: none"> ◆ Network Control ◆ Internetwork Control ◆ Voice ◆ Video ◆ Critical Applications ◆ Excellent Effort ◆ Best Effort ◆ Background
Submit (button)	Click the Submit button to enter new filter settings.

Table 4-5 Wired (eth0) Network QoS Settings

To View and Configure Wired Network QoS Settings

Using Web Manager

- ◆ To view Ethernet (eth0) QoS statistics, click **Network** on the menu and select **Wired Network > QoS**.
- ◆ To modify Ethernet (eth0) QoS information, click **Network** on the menu and select **Wired Network > QoS > Configuration**.

Using XML

- ◆ Include in your file: `<configgroup name="ethernet" instance="eth0">`

Wired (eth0) Network Failover

The BAT-C2 gateway provides WAN network failover, in the form of a "dead remote host reachability" mechanism (essentially a ping against a known host). If the remote host is determined to be not reachable, the BAT-C2 will failover to the Wi-Fi interface. If the remote host is determined to be reachable, the BAT-C2 will failback to the Ethernet interface.

Wired Network (Failover) Settings	Description
State	Click to enable or disable state.
Failover Interface	Always select wlan0 in the BAT-C2 gateway.
Hostname	Enter the remote host to specify the DNS Hostname or IP Address of a remote host where connectivity should always be present.
Method	Select ICMP or TCP based ping.
Timeout	Indicate the Timeout interval, in seconds, to wait for ping response from remote host.
Interval	Indicate the Interval in which to test reachability. The Failover detection will ping this host every Interval seconds to determine whether there is still a network path to it.
Failover Threshold	Indicate the allowed number of failed pings – after which the BAT-C2 will failover to the wlan0 interface.
Failback Threshold	Indicate the number of successful pings – after which the BAT-C2 will failback to the Ethernet interface.
Test (button)	Click the Test button to test if failover hostname is reachable.

Table 4-6 Wired (eth0) Network Failover Settings

To View and Configure Wired Network Failover Settings

Using Web Manager

- ◆ To view Ethernet Failover statistics, click **Network** on the menu and select **Wired Network > Failover**.
- ◆ To modify Ethernet Failover settings, click **Network** on the menu and select **Wired Network > Failover > Configuration**. Using XML
- ◆ Include in your file: `<configgroup name="network failover" instance="eth0">`

Wireless (wlan0) Network

The wireless network pages are used to configure and view the status of the wireless (wlan0) interface and link on the BAT-C2. To see the effect of these items after a reboot, view the Status page.

The following items require a reboot to take effect:

- ◆ Network State
- ◆ DHCP Client On/Off

- ◆ Network Priority
- ◆ Network IP Address
- ◆ Network DHCP Client ID

If DHCP is turned on, any configured IP Address, Network Mask, Gateway, Hostname, or Domain will be ignored. DHCP will auto-discover and eclipse those configuration items.

When DHCP fails to discover an IP Address, a new address will automatically be generated using AutoIP. This address will be within the 169.254.x.x space.

Wireless (wlan0) Network Interface

[Table 4-7](#) displays the wireless interface status and configuration information. The view-only status information is available on the Wireless (wlan0) Network Interface Status page. This same information is configurable on the Wireless (wlan0) Network Interface Configuration page.

Field/Button	Description
State	Select to enable or disable the interface. Disabled by default.
Hostname	Enter the hostname for the interface. It must begin with a letter or number, continue with a sequence of letters, numbers, or hyphens, and end with a letter or number. This setting will take effect immediately, but will not register the hostname with a DNS server until the next reboot.
Priority	Priority ranges from 0-10. The IP stack will give the interface with the lowest numerical value highest priority and the highest numerical values lowest priority when sending data. This setting only applies when the BAT-C2 is not in bridging mode and both interfaces are connected to the same IP subnet.
MTU	When DHCP is enabled, the MTU size is (usually) provided with the IP address. When not provided by the DHCP server, or using a static configuration, this value is used. The MTU size can be from 576 to 1500 bytes, the default being 1500 bytes.
IPv4 State	Select to enable or disable.
DHCP Client	Select to turn On or Off . At boot up, after the physical link is up, the BAT-C2 will attempt to obtain IPv4 settings from a DHCP server and will periodically renew these settings with the server. Note: Overrides BOOTP, the configured IPv4 address/mask, gateway, hostname, and domain. Changing this value requires you to reboot the BAT-C2. Within Web Manager, click Renew to renew the DHCP lease.
IP Address	Enter the static IPv4 address to use for the interface. You may enter it alone, in CIDR format, or with an explicit mask: <ul style="list-style-type: none"> ◆ 192.168.1.1 (default mask) ◆ 192.168.1.1/24 (CIDR) ◆ 192.168.1.1 255.255.255.0 (explicit mask) Note: This setting will be used if Static IP is active (both DHCP and BOOTP are Disabled). Changing this value requires you to reboot the BAT-C2. When DHCP or BOOTP is enabled, the BAT-C2 tries to obtain an IPv4 address from a DHCP or BOOTP server. If it cannot, the BAT-C2 generates and uses an Auto IP address in the range of 169.254.xxx.xxx, with a network mask of 255.255.0.0.
Default Gateway	Enter the IPv4 address of the router for this network. Note: This setting will be used if Static IP is active (both DHCP and BOOTP are Disabled).

Table 4-7 Wireless (wlan0) Interface Configuration

Field/Button	Description
Domain	Enter the domain name suffix for the interface. Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no Domain Suffix was acquired from the server.
DHCP Client ID	Enter the ID if the DHCP server requires a DHCP Client ID option. The DHCP server's lease table shows IP addresses and MAC addresses for BAT-C2s. The lease table shows the client ID, in hexadecimal notation, instead of the BAT-C2 MAC address.
Primary DNS	Enter the IP address of the primary domain name server Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no DNS server was acquired from the server.
Secondary DNS	Enter the IP address of the secondary domain name server. Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no DNS server was acquired from the server.
IPv6 State	Select to enable or disable.
IPv6 DHCP Client	Select to turn On or Off . At bootup, after the physical link is up, the BAT-C2 will attempt to obtain IPv6 settings from a DHCPv6 server and will periodically renew these settings with the server. <ul style="list-style-type: none"> ◆ On: enables the BAT-C2 server to obtain IPv6 setting from a DHCPv6 server upon bootup. ◆ Off: enables the BAT-C2 server to obtain IPv4 settings from a DHCP server upon bootup. Note: Overrides the configured IP address/mask, gateway, hostname, and domain. Changing this value requires you to reboot the BAT-C2. Within Web Manager, click Renew to renew the DHCPV6 lease.
IPv6 Auto Configuration	Select to turn On or Off IPv6 auto configuration.
IPv6 IP Address	Enter the static IPv6 address to use for the interface. IPv6 DNS entries can also be entered here. Note: This setting is used if Static IPv6 is active (DHCPv6 is Disabled). Changing this value requires a reboot. When DHCPv6 is enabled, the BAT-C2 tries to obtain an IPv6 address from a DHCPv6 server. If it cannot, then BAT-C2 generates and uses a Link local IPv6 address.
IPv6 Default Gateway	Enter the default IPv6 default gateway. IPv6 DNS entries can also be entered here.
IPv6 Domain	Enter the domain name suffix for the interface. Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no Domain Suffix was acquired from the server.
IPv6 Primary DNS	Enter the IP address of the primary Domain Name Server. Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no DNS server was acquired from the server.
IPv6 Secondary DNS	Enter the IP address of the secondary Domain Name Server. Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no DNS server was acquired from the server.

Table 4-7 Wireless (wlan0) Interface Configuration (continued)

To Configure Wireless Network Interface Settings

Using Web Manager

- ◆ To view the wireless (wlan0) network interface status, on the **Network** page, then select **Wireless Network > Interface**.
- ◆ To configure wireless (wlan0) network interface settings, on the **Network** page, select **Wireless Network > Interface > Configuration**.

Using XML

- ◆ Include in your file: `<configgroup name= "interface" instance="wlan0">`

Wireless (wlan0) Network Link

Configuration details are stored in one or more WLAN profiles. See [WLAN Profiles \(on page 111\)](#) to view and configure WLAN profiles. You can select and prioritize up to four preconfigured WLAN profiles for automatic connection to wireless networks. Dynamic profiles, created via quick connect/WPS, have a higher priority over a static profile. Listed dynamic and static profiles can be prioritized with 1 being highest priority through 4 being lowest priority.

[Table 4-8](#) displays the wireless link status and configuration information. The view-only status information is available on the Wireless (wlan0) Network WLAN Link Status page. This same information is configurable on the Wireless (wlan0) Network WLAN Link Configuration page.

Field/Button	Description
Choice 1 Profile Choice 2 Profile Choice 3 Profile Choice 4 Profile	Enter up to four (4) WLAN Profiles (on page 111) for automatic connection to wireless networks in order of priority, with Choice 1 Profile being highest priority through Choice 4 Profile being lowest priority. If a profile in the choice list is deleted, that profile is skipped in the connection attempt.
Antenna Diversity	Enable antenna diversity or select a specific antenna for use: <ul style="list-style-type: none"> ◆ Enabled ◆ Antenna 1 ◆ Antenna 2
Band	Select the band from the drop-down menu. This will be the band on which the radio will operate. This global band setting will control both wlan0 and SoftAP interfaces and override any frequency settings on the SoftAP interface. <ul style="list-style-type: none"> ◆ Auto ◆ 2.5 Ghz Only ◆ 5 Ghz Only <p>Notes:</p> <ul style="list-style-type: none"> ◆ <i>To prevent inconsistent channel/band combinations, the user interface will coordinate the 'SoftAP Channel' and 'WLAN Band' settings.</i> ◆ <i>Wi-Fi Direct requires that the 2.4 GHz band be available. The UI will prevent the selection of '5GHz Only' when Wi-Fi Direct GO Mode is enabled.</i>

Table 4-8 Wireless (wlan0) Link Configuration

Field/Button	Description
Scanning Latency	<p>Select the desired Scanning Latency:</p> <ul style="list-style-type: none"> ◆ Standard performs a complete unbroken scan of a list of channels. Scanning Channel List accepts list of channels. ◆ Enhanced Throughput breaks the scanning into small blocks of channels, reducing the impact on network throughput and improving the availability of the Access Point (AP0) interface (if enabled). <p>Notice: <i>Selecting Enhanced Throughput may greatly increase the time required to establish a connection on the wlan0 interface. The scanning channel list is unavailable when Enhanced Throughput is selected.</i></p> <p>Note: <i>The Scanning Channel List setting only accepts 20 MHz channels (5 GHz band.) If the external access point to which the BAT-C2 STA interface is connecting supports 'wide' channels (40 MHz or above), it is possible that the BAT-C2 may appear to connect on a channel not in the Scanning Channel List. For example, if the external AP is configured for channel 36 with 40 MHz support enabled the BAT-C2 may indicate a connection on channel 38. It has also been observed with some routers (configured with 40 MHz channel support) that the BAT-C2 may establish a connection with either of the bonded 20 MHz channels (whether or not it is included in the 'Scanning Channel List'.) For example, if the router is configured to operate on channel 40 (with 40 MHz support enabled) the BAT-C2 may establish a connection on channel 36.</i></p>
Scanning Channel List	Enter the Scanning Channel List in the field. This field accepts comma separated integers as a list of channels. An empty list is considered as default and all radio supported channels are considered.
Debugging Level	Set the verbosity level for printing WLAN Link messages to the TLOG (Default is Info).
Wi-Fi Direct GO Mode	Select to enable or disable. If enabled, WPS issues the credentials when the client BAT-C2 indicates that it wishes to connect with our BAT-C2. No password is required. Go to Wi-Fi Protected Setup (on page 109) to setup WPS.

Table 4-8 Wireless (wlan0) Link Configuration (continued)

Smart Roam

Wireless network (wlan0) smart roaming can be enabled and configured on the BAT-C2.

Radio Settings	Description
Roaming	Enable or disable Roaming. Disabled by default.
Level	<p>Choose a radio preset:</p> <ul style="list-style-type: none"> ◆ Low (default) ◆ Medium ◆ High <p>Upon changing any Smart Roam value, the Level is changed to Custom.</p>
Scan Interval	Scan interval in seconds. The scan interval is the time between scans looking for a roaming candidate.
RSSI Delta For 2.4 GHz	RSSI 2.4 GHz delta value in dBm. A device with an RSSI delta higher than the current access point is a roaming candidate.
RSSI Delta For 5 GHz	RSSI 5 GHz delta value in dBm. A device with an RSSI delta higher than the current access point is a roaming candidate.
Scan Threshold For 2.4 GHz	The 2.4 GHz RSSI threshold. When the signal drops below the scan threshold, the radio attempts to roam.

Table 4-9 Smart Roam Settings

Radio Settings	Description
Scan Threshold For 5 GHz	The 5 GHz RSSI threshold. When the signal drops below the scan threshold, the radio attempts to roam.

Table 4-9 Smart Roam Settings (continued)

To Configure Network Link Settings

Using Web Manager

- ◆ To view wireless (wlan0) link statistics, on the **Network** page, select **Wireless Network > Link**.
- ◆ To configure wireless (wlan0) link settings, on the **Network** page, select **Wireless Network > Link > Configuration**.
- ◆ To configure Smart Roam settings, on the **Network** page, select **Wireless Network > Link > Smart Roam**

Using XML

- ◆ Include in your file: `<configgroup name= "interface" instance="wlan0">`

Wireless (wlan0) Network QoS

QoS (Quality of Service) can be enabled and configured for both Wired (eth0) Network and Wireless (wlan0) Network. If enabled, the router will control the flow of outbound traffic according to the user-defined filters. In other words, QoS improves performance by allowing the user to prioritize applications. Filters can be defined to prioritize traffic based on the source or destination network, source or destination port, or the source MAC address. Up to 32 user-defined filters can be added. The following are predefined priority classes:

- ◆ Network Control and Internetwork Control are typically used for network control packets such as ICMP and have the highest priorities.
- ◆ Bandwidth allocation is at minimum 5% each.
- ◆ Voice: Bandwidth allocation is at minimum 30%.
- ◆ Video: Bandwidth allocation is at minimum 20%.
- ◆ Critical Applications: Bandwidth at allocation is minimum 15%.
- ◆ Excellent Effort: Bandwidth allocation is at minimum 10%.
- ◆ Best Effort: Bandwidth allocation is at minimum 10%.
- ◆ Background: Bandwidth allocation is at minimum 5% and has the lowest priority. [Table 4-10](#) shows the network QoS settings that can be configured including adding new filters.

Wireless Network (QoS) Settings	Description
State	Click to enable or disable state.
Import filters	Click to enable or disable import filters to import configurations from other interfaces.
Uplink Speed	Enter the maximum uplink speed in kbps. Set 0 to set speed to default.

Table 4-10 Wireless (wlan0) Network QoS Settings

Adding or Deleting Wireless Network (QoS) Settings	Description
Delete	Click the checkbox to the left of any existing QoS filter to be deleted and click the Submit button.
Filter type	Select the filter type from the drop-down window: <ul style="list-style-type: none"> ◆ Mac Address ◆ Network ◆ Port
MAC Address	Enter the MAC address to prioritize traffic from a particular BAT-C2 without an IP address on your LAN. <i>Note: This field appears when the MAC Address filter type is selected above.</i>
Network	Enter the Network to prioritize traffic from a BAT-C2 on your LAN or to a BAT-C2 on WAN. These are entered as hostname or in CIDR notation including the network prefix. For example, to prioritize traffic from a single IP address enter xxx.xxx.xxxx.xxx/32. <i>Note: This field appears when the Network filter type is selected above.</i>
Ports	Enter the Port, if the Port filter type is selected. <i>Note: This field appears when the Port filter type is selected above.</i>
Priority	Select the priority of the filter from the drop-down menu: <ul style="list-style-type: none"> ◆ Network Control ◆ Internetwork Control ◆ Voice ◆ Video ◆ Critical Applications ◆ Excellent Effort ◆ Best Effort ◆ Background
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 4-11 Adding or Deleting Wireless (wlan0) Network QoS Settings

To View or Configure Wireless Network QoS Settings

Using Web Manager

- ◆ To view Wireless (wlan0) QoS statistics, click Network on the menu and select **Wireless Network > QoS**.
- ◆ To modify Wireless (wlan0) QoS information, click Network on the menu and select **Wireless Network > QoS > Configuration**.

Using XML

- ◆ Include in your file: `<configgroup name="wlan" instance="wlan0">`

Wireless (wlan0) Network Failover

The BAT-C2 provides wlan0 failover, in the form of a "dead remote host reachability" mechanism (essentially a ping against a known host). If the remote host is determined to be not reachable, the BAT-C2 will failover to the Ethernet interface. If the remote host is determined to be reachable, the BAT-C2 will failback to the Wi-Fi interface.

Settings	Description
State	Click to enable or disable state.
Failover Interface	Always select eth0 in the BAT-C2 gateway.
Hostname	Enter the remote host to specify the DNS Hostname or IP Address of a remote host where connectivity should always be present.
Method	Select ICMP or TCP based ping.
Timeout	Indicate the interval to wait for ping response from remote host.
Interval	Indicate the interval in which to test reachability
Failover Threshold	Indicate the allowed number of failed pings - after which the BAT-C2 will failover to the wlan0 interface.
Failback Threshold	Indicate the number of successful pings - after which the BAT-C2 will failback to the Ethernet interface.

Table 4-12 Wireless (wlan0) Network Failover

To View or Configure Wireless Network Failover Settings

Using Web Manager

- ◆ To view wireless network Failover statistics, click **Network** on the menu and select **Wireless Network > Failover**.
- ◆ To modify wireless network Failover settings, click **Network** on the menu and select **Wireless Network > Failover > Configuration**.

Using XML

- ◆ Include in your file: `<configgroup name="network failover" instance="wlan0">`

Protocol Stack

There are various low level network stack specific items that are available for configuration. This includes settings related to IP, ICMP, and ARP, which are described in the sections below.

IP Settings

This page contains lower level IP Network Stack specific configuration items.

Protocol Stack IP Settings	Description
IP Time to Live	Enter the number of hops to be transmitted before the packet is discarded. This value typically fills the time to live in the IP header. SNMP refers to this value as "ipDefaultTTL".
Multicast Time to Live	This value fills the Time To Live in any multicast IP header. Normally this value will be one so the packet will be blocked at the first router. It is the number of hops allowed before a multicast packet is discarded. Enter the value to be greater than one to intentionally propagate multicast packets to additional routers.
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 4-13 IP Protocol Stack Settings

To Configure IP Protocol Stack Settings

Using Web Manager

- ◆ To configure IP protocol settings, on the **Network** page, click **Protocol Stack > IP**.

Using XML

- ◆ Include in your file: `<configgroup name="ip">`

ICMP Settings

This page contains lower level ICMP Network Stack specific configuration items.

Protocol Stack ICMP Settings	Description
State	Select to enable or disable processing of ICMP messages. This includes both incoming and outgoing messages.
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 4-14 ICMP Protocol Stack Settings

To Configure ICMP Protocol Stack Settings

Using Web Manager

- ◆ To configure ICMP protocol settings, on the **Network** page, click **Protocol Stack > ICMP**.

Using XML

- ◆ Include in your file: `<configgroup name="icmp">`

ARP Settings

This page contains lower level Address Resolution Protocol (ARP) network stack specific configuration items. The ARP cache can be manipulated manually by adding new entries and deleting existing ones. Added entries are static and for test purposes only.

Protocol Stack ARP Settings	Description
IP Address	Enter the IP address to add the ARP cache.
MAC Address	Enter the MAC address to add to the ARP cache.
Interface	Select the type of interface if adding to the ARP cache: <ul style="list-style-type: none"> ◆ wlan0 ◆ eth0 ◆ ap0
Add (button)	Click this button to add a new entry (after entering the IP address, MAC address and Interface info for the new entry above).
Clear	Click the Clear link above all listed addresses to remove all the addresses.
Remove	Click the Remove link beside a specific address to remove it.

Table 4-15 ARP Protocol Stack Settings

To Configure ARP Network Stack Settings

Using Web Manager

- ◆ To configure ARP protocol settings, on the **Network** page, click **Protocol Stack > ARP**.

Using XML

- ◆ Include in your file: `<configgroup name="arp" >`

VPN

Access VPN statistics and configuration options on this page.

VPN Setting	Description
Statistics	
Show details	Click this link to view the VPN log.
Configuration	
Name	Enter the name of this VPN connection.
State	Select to enable or disable the VPN connection.
Connection Type	Select connection type in the drop-down menu: <ul style="list-style-type: none"> ◆ Host to Host - VPN tunnel for Local and Remote subnets are fixed. ◆ Host to Subnet - VPN tunnel for Remote subnet area is dynamic and Local subnet is fixed.
IKEv2	Select the IKE version 2 settings to be used. The acceptable values are: <ul style="list-style-type: none"> ◆ Permit: (the default) signifying no IKEv2 should be transmitted, but will be accepted if the other ends initiates to us with IKEv2. ◆ Never: signifying no IKEv2 negotiation should be transmitted or accepted. ◆ Propose: signifying that the BAT-C2 will permit IKEv2, and also use it as the default to initiate. ◆ Insist: signifying that the BAT-C2 will only accept and receive IKEv2 and IKEv1 negotiations will be rejected.
Authentication Mode	Select the authentication mode of IPSec VPN. <ul style="list-style-type: none"> ◆ PSK (Pre-shared Key) is used when there is a single key common to both ends of the VPN. ◆ RSA uses RSA digital signatures. ◆ XAUTH provides an additional level of authentication by allowing the IPSec gateway to request extended authentication from remote users, thus forcing remote users to respond with their credentials before being allowed access to the VPN.
Mode Configuration	Select to enable or disable extended authentication operation and the settings provided to the client during the configuration exchange.
Type	Select Tunnel or Transport type from the drop-down menu. Tunnel Mode is used for protecting traffic between different networks, when traffic must pass through an intermediate, untrusted network. Transport Mode is used for end-to-end communications (for example, for communications between a client and a server).

Table 4-16 VPN

VPN Setting	Description
Interface	Select the interface to use to connect to VPN Gateway. <ul style="list-style-type: none"> ◆ any ◆ eth0 ◆ wlan0
Remote Network	
Endpoint	Enter the remote VPN Gateway's IP Address.
Subnet	Enter the subnet behind the VPN Gateway.
ID	Enter the identifier expected to receive from the remote host during Phase 1 negotiation.
Router/Next Hop	Enter the next-hop gateway IP address for the VPN Gateway.
Local Network	
Subnet	Enter the subnet the local BAT-C2s have access to or can be accessed from the VPN connection.
ID	Enter the identifier sent to the remote host during Phase 1 negotiation.
Router/Next Hop	Enter the next-hop gateway IP address for this connection to the public network.
Key Management	
Perfect Forward Secrecy (PFS)	Select to enable or disable the Perfect Forward Secrecy. Enabling this feature will require IKE to generate a new set of keys in Phase 2 rather than using the same key generated in Phase 1.
Pre-shared Key (PSK)	Enter the Pre-Shared Key used in the IPSec setting between the Local and VPN Gateway.
ISAKMP Phase 1 (IKE)	
Aggressive Mode	Select to enable or disable Aggressive Mode. In Aggressive mode, IKE tries to combine as much information into fewer packets while maintaining security. Aggressive mode is slightly faster but less secure.
NAT Traversal	Select to enable or disable NAT Traversal. If there is an external NAT BAT-C2 between VPN tunnels, the user must enable NAT Traversal.
Encryption	Select the encryption algorithm in key exchange from the drop-down menu.
Authentication	Select the hash algorithm in key exchange from the drop-down menu.
DH Group	Select the Diffie-Hellman (DH) groups (the Key Exchange group between the Remote and VPN Gateways) from the drop-down menu.
IKE Lifetime	Enter the number of hours for the IKE SA lifetime.
ISAKMP Phase 2 (ESP)	
Encryption	Select the encryption algorithm in data exchange from the drop-down menu.
Authentication	Select the hash algorithm in data exchange from the drop-down menu.
DH Group	Select the Diffie-Hellman (DH) groups (the Key Exchange group between the Remote and VPN Gateways) for Phase 2 from the drop-down menu.
SA Lifetime	Enter the number of hours for the SA lifetime in Phase 2.

Table 4-16 VPN (continued)

VPN Setting	Description
Unreachable Host Detection	
Host	Enter the unreachable detection host monitoring the connectivity with the host on the remote network.
Ping Interval	Enter the Ping Interval to monitor connectivity with a host on the remote network.
Max Tries	Enter the number of Max Tries for pinging the host before the VPN tunnel is restarted.
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 4-16 VPN (continued)

Configuring VPN Settings

You may edit or view VPN settings.

Using Web Manager

- ◆ To view or configure VPN settings on the **Network** page, click **VPN**.

Using XML

- ◆ Include in your file: `<configgroup name="vpn" instance="1">`

Wi-Fi Protected Setup

Using Wi-Fi® protected setup (WPS), you have the option of connecting the BAT-C2 to a router or access point in a single operation instead of manually creating a profile with a network name (SSID), setting up wireless security parameters and updating the choice list. You may setup WPS through pin or push button functionality through Web Manager.

Note: *Not all access points support Wi-Fi protected setup pin or Wi-Fi protected setup push button.*

WPS buttons	Description
WPS (PIN)	Click the WPS (PIN) button in Web Manager to setup WPS by pin and click OK in the confirmation popup which appears. A randomly generated pin will appear on the screen. Enter this pin at the access point and point your browser to the correct IP address.
WPS (PBC)	Click the WPS (PBC) button in Web Manager to setup WPS by push button, click OK in the confirmation popup which appears, and the credentials are passed to the BAT-C2 automatically. Then point your browser to the correct IP address. Note: <i>Make sure the WPS PBC is triggered on the Access Point to utilize this option.</i>

Table 4-17 Wi-Fi Protected Setup

To Initiate WPS

Using Web Manager

- ◆ To initiate WPS, on the **Network** page, click **Wi-Fi Protected Setup**.

Using XML

- ◆ Not applicable.

To Show WPS Status

Using XML

- ◆ Not applicable.

WLAN Scan/QuickConnect

Going to this page initiates a scan of wireless networks within range of the BAT-C2 and allows users to add a WLAN profile after testing it. There is an option to automatically update the scan results every 60 seconds, which is disabled by default. The scan results contain the following prepopulated information about each wireless BAT-C2: service set identifier (SSID), basic service set identifier (BSSID), channel number (CH), received signal strength indication (RSSI), and Security Suite. You may also run a filtered scan of network names by the first few letters within the name.

Click on any network name for QuickConnect configuration.

WLAN Quick Connect Settings	Description
Network Name (search field)	Enter the first few letters of a network name in the search field before pressing the Scan button (next field description below).
Scan "<network SSID>"	Click Scan to search for all network names containing the first few letters entered in the Network Name search field. Performs a scan for BAT-C2s within range of the BAT-C2. To limit the scan to BAT-C2s that are configured with the specified SSID, include the network SSID. To perform a scan for all BAT-C2s, omit the network SSID. The command syntax requires the opening and closing quotation marks. If you omit the SSID, include the quotation marks, for example, scan "".
Refresh scan results every 60 seconds (check box)	To automatically update the list every 60 seconds, select the checkbox. To stop automatically updating the list, clear the checkbox.
Show entries (drop-down menu)	Select the number of entries to show on the page at a time.
Search (field)	Enter characters within the name of an SSID in the Search field to limit scan results to SSIDs with characters typed.
SSID	To display a network configuration profile, click the service set identifier (SSID) of a specific network.
BSSID	The basic service set identifier (BSSID) is a unique 48-bit address that identifies the access point that creates the wireless network.
CH (Channel)	The channel number and frequency (MHz) of a network.

Table 4-18 WLAN Scan/Quick Connect Results

WLAN Quick Connect Settings (continued)	Description
RSSI	A real-time value that indicates the signal strength of the network. Green indicates the strongest, yellow indicates average, and red indicates the weakest signal strength. The received signal strength indication (RSSI) that is reported in scan results is a single sample. To review the signal strength average over time, use the status command. The average is based on the connected AP.
Security Suite	The security suite of a network. For example: WEP, WPA, WPA2, WPS. Although WPS is reported with the security flags, it does not indicate a security setting. WPS indicates that an AP supports WPS.
Previous 1 2 3 4 5 6 Next	Click to navigate among multiple pages of WLAN link scan results.

Table 4-18 WLAN Scan/Quick Connect Results (continued)

To View WLAN Link Scan and Status Information

Using Web Manager

- ◆ To view the WLAN Link Scan and Status information, on the **Network** page, click **WLAN Scan/Quick Connect**.

Using XML

- ◆ Include in your file: `<statusgroup name="wlan scan">`

WLAN Profiles

A WLAN profile defines all of the settings needed to establish a wireless connection. This is true when in infrastructure mode for an access point. A maximum of eight profiles can exist on the BAT-C2 at a time. All enabled profiles are active.

The BAT-C2 supports dynamic profiles and prioritization of the profiles. Dynamic Profiles are created using WPS or Quick Connect. Profiles are assigned numbers based on priority. For example, dynamic profiles list in reverse order of creation, followed by choice-list profiles, then any remaining profiles.

Create a new profile by entering a name in the text box, then click the Submit button which will appear. The new profile is initially saved with default parameter values.

Note: *WLAN Profiles created by Quick Connect, Quick Setup, or WPS are called dynamic profiles and have a higher priority than user created profiles.*

The profiles on the WLAN Profiles page are listed in order of priority.

WLAN Profile Settings	Description
Enabled (check box)	Check the checkbox to the right of the WLAN profile listed right to enable the specific profile. Unchecking the enabled checkbox disables the WLAN profile.
Delete (check box)	Check the checkbox to the right of the WLAN profile listed right and click the Submit button which appears, to delete the specific profile.

Table 4-19 WLAN Profiles

WLAN Profile Settings	Description
Name (link to WLAN profile)	Click an existing WLAN profile listed under the Name column to reveal the configuration options as shown in Table 4-20 Individual WLAN Profile Settings . Modify configuration options as desired.
Name (“Add a new profile” field)	Enter the name of a new profile and click Submit to add it. The profile appears in the WLAN Profiles list.

Table 4-19 WLAN Profiles (continued)

Configuring WLAN Profile Settings

You can edit, create, or delete a WLAN profile.

Using Web Manager

- ◆ To edit, create or delete a WLAN profile, on the **Network** page, click **WLAN Profiles**.

Using XML

- ◆ Include in your file:

```
<configgroup name="wlan profile" instance="profile_name">
```

WLAN Profile Settings	Description
Network Name (SSID)	Enter or modify the network name.
State	Click to enable or disable. Enabled by default.
Suite	Select a security suite configuration: <ul style="list-style-type: none"> ◆ None Select None to not select a security suite. ◆ WEP WEP security is available in Infrastructure mode. WEP is a simple and efficient security mode, encrypting the data using the RC4 algorithm. However, WEP has become more vulnerable due to advances in hacking technology. State-of-the-art equipment can find WEP keys in 5 minutes. For stronger security, use WPA, or the stronger WPA2, with AES (CCMP). ◆ WPA2/WPA Mixed Mode
Authentication	<p>If WEP security suite is selected, select one of these authentication options which appear:</p> <ul style="list-style-type: none"> ◆ Shared: Encryption keys of both parties are compared as a form of authentication. If mismatches occur, no connection establishes. ◆ Open: A connection establishes without first checking for matching encryption keys. If keys do not match, however, data becomes garbled and prevents connectivity on the IP level. <p>If WPA or WPA2/IEEE 802.11i security suite is selected, select one of these authentication options which appear:</p> <ul style="list-style-type: none"> ◆ PSK: In pre-shared keying, the same key must be configured both on the BAT-C2 side and on the access point side. ◆ IEEE 802.1X: This authentication method communicates with a RADIUS authentication server that is part of the network. The RADIUS server matches the credentials sent by the BAT-C2 with an internal database. If IEEE 802.1X is selected under authentication type, select the protocol to use to authenticate the WLAN client.

Table 4-20 Individual WLAN Profile Settings

WLAN Profile Settings	Description
PMF	Select one of the following options regarding protected management frames (PMF): <ul style="list-style-type: none"> ◆ Disabled (default) ◆ Optional ◆ Required <p>Note: This option is available when the WPA2/WPA mixed mode suite and the IEEE 802.1x authentication settings are selected.</p>
Key Type	Select a key Hex or Passphrase key type after indicating the security suite type.
Key Size	If the WEP security suite is selected, then select 40 bits or 104 bits key size in this field which becomes available.
Passphrase	If Passphrase key type is selected, enter an alphanumeric phrase up to 63 characters in length in this field which becomes available. Spaces and special characters are allowed. Check Show Password to show the passphrase entered.
TX Key Index	If WEP security suite and Hex key type have been selected, then select the TX key index from the drop-down menu, which becomes available. <ul style="list-style-type: none"> ◆ For interoperability with some products that generate four identical keys from a passphrase, this index must be one. ◆ For Keys 1-4, enter one or more encryption keys in hexadecimal format. Enter 10 hexadecimal digits (0-9, a-f) for WEP40 and 26 for WEP104. For security reasons, the configured keys are not shown.
IEEE 802.1X	If IEEE 802.1X authentication is selected, choose a particular type: <ul style="list-style-type: none"> ◆ LEAP: Type a User Name and Password, then select an Encryption. ◆ EAP-TLS: Type a User Name. ◆ EAP-TTLS ◆ PEAP: For PEAP Option, select a security protocol. ◆ FAST: If selected, select the Fast Option and Fast Provisioning options.
FAST Option	Select the FAST option from the drop-down menu: <ul style="list-style-type: none"> ◆ MD5 (default) ◆ MSCHAPV2 ◆ GTC <p>Note: This option is available when the WPA2/WPA mixed mode suite and the IEEE 802.1x authentication settings are selected.</p>
FAST Provisioning	Select the FAST provisioning option from the drop-down menu: <ul style="list-style-type: none"> ◆ Unauthenticated ◆ Authenticated (default) ◆ Both <p>Note: This option is available when the WPA2/WPA mixed mode suite, the FAST IEEE 802.1x authentication, and the MSCHAPV2 FAST option are selected.</p>

Table 4-20 Individual WLAN Profile Settings (continued)

WLAN Profile Settings	Description
EAP-TTLS Option	<p>Select a security protocol:</p> <ul style="list-style-type: none"> ◆ EAP-MSCHAPV2 ◆ MSCHAPV2 ◆ MSCHAP ◆ CHAP ◆ PAP ◆ EAP-MD5 <p>Note: This option is available when the WPA2/WPA mixed mode suite, the IEEE 802.1x authentication, and EAP-TTLS settings are selected.</p>
PEAP Option	<p>Select EAP-MSCHAPV2, EAP-MD5 or EAP-TLS.</p> <p>Note: This option is available when the WPA2/WPA mixed mode suite, the IEEE 802.1x authentication, and PEAP settings are selected.</p>
Validate Certificate	<p>If EAP-TLS is selected, validate the certificate installed on the BAT-C2 by selecting Enabled in the Validate Certificate field which appears. Validates the certificate installed on the BAT-C2 with the one received from the RADIUS server.</p>
Credentials	<p>After EAP-TLS is selected and the Validate Certificate is enabled, either:</p> <ul style="list-style-type: none"> ◆ Select the credential, if listed in the drop-down menu, to validate. ◆ Type the name of the credential if the credential is not listed in the drop-down menu.
Username	Enter a username.
Password	Enter a password if the LEAP, EAP-TTLS and PEAP option is chosen. Check the Show Password check box to make the password viewable as you enter it in the Password field.
Inner Credentials	<p>Provide inner credentials with enterprise authentication when PEAP EAP/TLS is selected. Inner credentials specify the client certificate required for the TLS inner authentication.</p> <p>Note: This option is available when the WPA2/WPA Mixed Mode suite, the IEEE 802.1x authentication, PEAP and PEAP EAP-TLS settings are selected.</p>
Advanced Configuration (Link)	Click the Advanced Configuration to reveal additional configuration settings.
TX Power Maximum	Enter the TX Power Maximum in dBm.
Power Management	Select to enable or disable.
Apply (button)	Click this button after making configuration selections above to apply but not submit/save your choices.
Test Connection (button)	Click this button to test the connection according to the configuration selections made above but not submit/save your choices.
Submit (button)	Click this button to submit and save your configuration choices.

Table 4-20 Individual WLAN Profile Settings (continued)

5: Filesystem

The Filesystem page provides statistics and current usage information for the flash filesystem. From here you may format the entire filesystem.

- ◆ Directories can be created, deleted, moved, and renamed. A directory must be empty before it can be deleted.
- ◆ Files can be created, deleted, moved, renamed, uploaded via HTTP, and transferred to and from a TFTP server. Newly created files will be empty.

File Transfer and Modification

Files can be transferred to and from the BAT-C2 via the TFTP protocol. This can be useful for saving and restoring XML configuration files. Files can also be uploaded via HTTP.

File Transfer Settings	Description
Create	Type in a File or Directory name and click the Create button. The newly created File or Directory will appear above.
Upload File	Click Choose File to select the file to be uploaded via HTTP. Click Upload to upload the chosen file.
Copy File	Enter the Source and Destination name for file to be copied and click the Copy button.
Move	Enter the Source and Destination name for file to be moved and click the Move button.

Table 5-1 File Transfer Settings

To View, Transfer, or Modify Filesystem Files

Using Web Manager

- ◆ To view current filesystem browser statistics or to format the filesystem, click **Filesystem** in the menu and select **Statistics**.

Note: *Formatting the filesystem will cause existing files on the filesystem to be deleted.*

- ◆ To create a new file or directory, upload an existing file, copy or move a file, click **Filesystem** in the menu and select **Browse**.

Using XML

- ◆ Include in your file: `<configgroup name="filesystem">`

6: Diagnostics

Diagnostic settings for the BAT-C2 can be viewed and modified under the Diagnostics tab in the Web Manager user interface. This chapter describes the following diagnostic settings:

- ◆ [DNS](#)
- ◆ [Hardware](#)
- ◆ [IP Sockets](#)
- ◆ [Log](#)
- ◆ [Memory](#)
- ◆ [Ping](#)
- ◆ [Processes](#)
- ◆ [Routes](#)
- ◆ [Threads](#)
- ◆ [Traceroute](#)

DNS

The primary and secondary DNS addresses come from the active interface. DHCP or BOOTP can override the static addresses from the network interface configurations.

To look up either the DNS host name or the IP address for an address, type the address or host name in the field, then click **Lookup**.

This section describes the active run-time settings for the domain name system (DNS) protocol. The primary and secondary DNS addresses come from the active interface. The static addresses from the Network Interface configuration settings may be overridden by DHCP.

Field/Button	Description
Lookup	Perform one of the following and click the Lookup button: <ul style="list-style-type: none">◆ Enter an IP address, and perform a reverse Lookup to locate the host name for that IP address.◆ Enter a host name, and perform a forward Lookup to locate the corresponding IP address.

Table 6-1 DNS Settings

Accessing the DNS Settings

Using Web Manager

- ◆ To view the current DNS name or IP address, on the **Diagnostics** page, click **DNS**.
- ◆ To configure the DNS Settings, on the **Diagnostics** page, enter the name of a DNS host and click **Lookup**.

Note: If DNS information is not supplied by DHCP, configure Ethernet (eth0) internet settings according to instructions at [Wired \(eth0\) Network \(on page 93\)](#) and configure Wireless (wlan0) Network interface settings according to instructions at [Wireless \(wlan0\) Network \(on page 98\)](#).

Using XML

- ◆ Include in your file: `<configgroup name="interface" instance="wlan0">`

Hardware

View the CPU type, CPU speed, RAM size and flash size of the hardware on this Web Manager page.

To View Hardware Information

Using Web Manager

- ◆ To view hardware information, on the **Diagnostics** page, click **Hardware**.

Using XML

- ◆ Include in your file: `<statusgroup name="hardware">`

IP Sockets

You can view the list of listening and connected IP sockets. This page also shows the reserved ports and associated services on this device.

To View the List of IP Sockets

Using Web Manager

- ◆ To view IP Sockets, on the **Diagnostics** page, click **IP Sockets**.

Using XML

- ◆ Include in your file: `<statusgroup name="ip sockets">`

Log

Enable or disable the diagnostic log on this Web Manager page. Log output is created via IP packets on WLAN and LAN.

Diagnostics	Log Description
Output	Select a diagnostic log output type: <ul style="list-style-type: none"> ◆ Disable - Turn off the logging feature (default). ◆ Filesystem - Output to <code>/log.txt</code>. ◆ Max Length - Limit the size in Kilobytes that <code>/log.txt</code> will be allowed to grow to. If this size is exceeded, the file will be reinitialized using the 100 most recent messages.

Table 6-2 Log Settings

To Configure the Diagnostic Log Output

Using Web Manager

- ◆ To configure the Diagnostic Log output, on the **Diagnostics** page, click **Log**.

Using XML

- ◆ Include in your file: `<configgroup name="diagnostics">`

Memory

The memory information includes the total and available memory in kilobytes.

To View Memory Usage

Using Web Manager

- ◆ To view memory information, on the **Diagnostics** page, click **Memory**.

Using XML

- ◆ Include in your file: `<statusgroup name="memory">`

Ping

You can use Ping to test connectivity to a remote host.

IP Socket	Description
Host	Enter the IP address or host name for the BAT-C2 that you want to ping.
Count	Enter the number of ping packets that the BAT-C2 attempts to send to the Host. The default number of packets is 3.
Timeout	Enter the time in seconds that the BAT-C2 waits for a response from the Host before it times out. The default time is 5 seconds.
Ping (button)	Click this button to submit a Ping according to the Host, Count and Timeout indicated above.

Table 6-3 Ping Configuration

To Ping a Remote Host

Using Web Manager

- ◆ To view memory information, on the **Diagnostics** page, click **Ping**.

Processes

The BAT-C2 shows all the processes currently running on the system. It shows the process ID (PID), parent process ID (PPID), user, CPU percentage, percentage of total CPU cycles, and process command line information.

To View Process Information

Using Web Manager

- ◆ To view process information, on the **Diagnostics** page, click **Processes**.

Using XML

- ◆ Include in your file: `<statusgroup name="processes">`

Routes

Routing allows one system to find the network path to another system, from a gateway to a destination.

Using Web Manager

- ◆ To view the current networking routes, on the **Diagnostics** page, click **Routes**.

Threads

The threads information shows details of threads in the ltrx_evo task which can be useful for technical experts in debugging.

To View Thread Information

Using Web Manager

- ◆ To view thread information, on the **Diagnostics** page, click **Threads**.

Using XML

- ◆ Include in your file: `<statusgroup name="processes">`

Traceroute

You can use traceroute to trace a packet from the BAT-C2 to an Internet host. A traceroute shows how many hops the packet requires to reach the host and how long each hop takes. This information can be helpful to diagnose delays for a web page that loads slowly.

Traceroute Fields	Description
Host	Enter the IP address or DNS host name of the destination BAT-C2.
Protocol	Select the protocol that you want to use for the traceroute: <ul style="list-style-type: none"> ◆ TCP ◆ ICMP ◆ UDP
Traceroute (button)	Click the Traceroute button to enter the settings.

Table 6-4 Traceroute Settings

To Perform a Traceroute

Using Web Manager

- ◆ To view traceroute information, on the **Diagnostics** page, click **Traceroute**.

7: Administration

Administrative features for the BAT-C2 are organized beneath the Administration tab in the Web Manager user interface. This chapter describes the following administrative settings:

- ◆ [Actions](#)
- ◆ [Applications](#)
- ◆ [Clock](#)
- ◆ [Relay Contact](#)
- ◆ [Gateway](#)
- ◆ [GRE](#)
- ◆ [HTTP](#)
- ◆ [SNMP](#)
- ◆ [SSL](#)
- ◆ [Syslog](#)
- ◆ [System](#)
- ◆ [User Management](#)
- ◆ [XML](#)
- ◆ [Quick Setup](#)

Actions

Configure actions to be taken either continuously or when an alarm is turned on or off. Use Delay to defer alarm processing. Alarm actions will not be executed if the cause is corrected within this time.

contains the configuration options for all alarms and reports.

Action Settings	Description
Delay	Enter the Delay time in seconds to defer alarm processing. Alarm actions will not be executed if the cause is corrected within this time. Default is 5 seconds.
SNMP Trap	Use SNMP Trap to send SNMP trap to configured trap destinations. First click the + symbol to the right of SNMP Trap to expand action settings. SNMP Trap State can be Enabled or Disabled . The contents of Alarm Message are included when an alarm SNMP trap is sent. If the alarm stays on longer than the Reminder Interval , another alarm SNMP Trap is sent. The contents of Normal Message are included when a normal SNMP trap is sent. If the alarm stays off longer than the Reminder Interval, another normal SNMP Trap is sent.

Table 7-1 Action Settings

To Configure Action Settings

Using Web Manager

- ◆ To view Action status, on the **Administration** page, click **Action > Status** on the menu.
- ◆ To modify Action information, on the **Administration** page, click **Action > Configuration** on the menu and select a specific action from the drop-down menu.

Using XML

- ◆ Include in your file: `<configgroup name = "action" instance = "eth0 link state change">`
- ◆ Include in your file: `<configgroup name = "action" instance = "wlan0 link state change">`
- ◆ Include in your file:
`<configgroup name = "action" instance = "on scheduled reboot">`

Python

Python™ is a dynamic, object-oriented programming language that can be used for developing a wide range of software applications. The BAT-C2 includes the installation of Python interpreter, making it easy to load and run custom Python scripts on your device.

The version of Python programming language installed on the BAT-C2 comes with "batteries included" by having the Python language's standard library. In addition, the developer can take advantage of thousands of available third party packages to speed up development.

IDE

Python scripts can be written with any text editor. If using Windows for development, Notepad++ is a powerful choice as this text editor includes traditional IDE features such as syntax highlighting and automatic indentation (<http://notepad-plus-plus.org/>). Notepad++ also includes the ability to customize through plugins. Some interesting plugins for the development of Python scripts for the BAT-C2 platform include the following:

- ◆ **PyNPP:** <https://github.com/mpcabd/PyNPP>
This plugin allows the user to use keystrokes to launch the open Python script in the local Python interpreter for debugging and testing.

Applications

The BAT-C2 supports the ability to install and uninstall user-defined Python scripts and packages and will include the following:

bin	python	
lib	libpython{version}.so	
	<ltrx python sdk>	
	libpython{version}	"python precompiled scripts "python shared libraries

Table 7-2 contains the setting options for configuring, installing, uninstalling and running external applications via Python scripts.

Notice: *Python scripts could allow inadvertent resource usage or access. Use care when installing and running scripts.*

Script Settings	Description
Reserved Start Port	Enter the Reserved Start Port. The range is between 1024 and 65535.
Reserved Ports	Enter a Reserved Port. The range is between 2 and 32.
Script (Number)	Click the Run button to manually execute the script. Note: <i>The script is run with configuration saved to the Flash.</i>
Enabled (checkbox)	Check the Enabled checkbox within a particular script to enable it. Uncheck the checkbox to disable the script.
Run on startup (checkbox)	Check the Run on startup checkbox within a particular script to have it run upon the start up of the BAT-C2. Uncheck the checkbox to disable automatically running the unit upon startup.
Run on shutdown (checkbox)	Check the Run on shutdown checkbox within a particular script to have it run on shutdown of the BAT-C2. Uncheck the checkbox to disable automatically running the script upon shutdown. Note: <i>Shutdown scripts which do not complete within 15 seconds (30 seconds for scheduled reboots) will be terminated and BAT-C2 will be rebooted.</i>
Script	Enter the path of the script to run.
Parameter	Enter the script parameters (if any).
Output	Enter output log file (if desired) for the script to redirect output of script to file. If the name of output log contains "%t", it will translate it into time stamp (e.g., script1_%t.log => script1_2007-01-02_19-06-57.log)
Uninstall (button)	Click the Uninstall button in a Python package to uninstall it.
Remove All (button)	Click the Remove All button to uninstall all Python packages.
Filename (field)	Enter the package file name pathway in the file system and click the Install button to install it.

Table 7-2 Script Settings

To Configure Application Settings

Using Web Manager

- ◆ To configure application scripts, on the **Administration** page, click **Applications** on the menu.

Using XML

- ◆ Include in your file: `<configgroup name = "applications">`

Clock

You can view current clock settings at the bottom of the screen, and also either manually update or synchronize the clock with an SNTP server. If you select SNTP, you can choose automatic time zone detection.

Clock Fields	Description
Method	Select Manual or SNTP from the drop-down window.
Date	If Manual method is selected, enter the date using the Year , Month and Day drop down menus that become available.
Time	If Manual method is selected, enter the time using the Hour , Minute (Min) and Second (Sec) drop down menus that become available.
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new Manual settings are entered.
NTP Server	If SNTP method is selected, the clock will keep time synchronized with the NTP Server by default. Enter an alternative NTP server if you wish to use an address other than the default.
Time Zone	Select the desired Time Zone from the drop-down menu based on geographic location. The time zones listed are in Universal Time Coordinated (UTC), formerly known as Greenwich Mean Time (GMT). Syslog and other applications may use UTC. The UTC Offset of the form HHMM (H = hour, M = minute) is applied to the UTC time to get the local time. The BAT-C2 will make seasonal time changes required for Daylight Savings Time.

Table 7-3 Clock Settings

To Specify a Clock-Setting Method

Using Web Manager

- ◆ To view or configure basic Clock settings, on the **Administration** page, click **Clock**.

Using XML

- ◆ Include in your file: `<configgroup name="clock">`

Relay Contact

Relay Contact is used to turn on a remote device. This page allows you to enable or disable the Relay Contact and see the current status.

Relay Contact Settings	Description
State	Select to enable or disable the Relay Contact. Enabled by default.

Table 7-4 Relay Contact Settings

To View and Configure Relay Contact

Using Web Manager

- ◆ To view or configure Relay Contact, on the Administration page, click Relay Contact.

Using XML

- ◆ Include in your file: `<configgroup name="relay contact">`

Gateway

The BAT-C2 can be configured as a wireless router with DHCP server functionality.

Status

This page displays the current configuration and statistics information for the gateway.

- ◆ To view gateway status: on the **Administration** page, click **Gateway > Status**.

WAN

When operating as a gateway or router, BAT-C2 offers multiple options for selecting the WAN interface to use in these modes. See [Table 7-5](#) for WAN Configuration options.

Gateway Settings	Description
Operating Mode	Select the type of operating mode: <ul style="list-style-type: none"> ◆ Disabled: prevents the BAT-C2 to be used as a gateway; use normally (default). ◆ Gateway: allows the BAT-C2 to be used as a router with NAT. ◆ Router: allows the BAT-C2 to be used as a router without NAT.
Firewall	Select to enable or disable firewall: <ul style="list-style-type: none"> ◆ Enabled: enables the gateway firewall. ◆ Disabled: disable the gateway firewall (default).
MAC Address filter	Select to enable or disable the MAC address filter. Disabled by default.
Interface	Specify the interface with which the gateway will connect to the WAN: <ul style="list-style-type: none"> ◆ wlan0: connect to WAN via WLAN (default) ◆ eth0: connect to WAN via Ethernet <p>Note: When WAN interface is wlan0, the LAN interface is eth0. When WAN interface is eth0, the LAN interface is Access Point.</p>
IP Address	Assign a static IP address to the gateway.
IPv6 Address	Assign a static IPv6 address to the gateway.
Primary DNS	Enter the IP address of the primary Domain Name Server. <p>Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no DNS server was acquired from the server.</p>
Secondary DNS	Enter the IP address of the secondary Domain Name Server. <p>Note: This setting will be used when either Static IP or Auto IP is active, or if DHCP/BOOTP is active and no DNS server was acquired from the server.</p>

Table 7-5 WAN Configuration

WAN MAC Address Filters

Accept or drop traffic on the WAN interface that was chosen in WAN configuration from specified MAC addresses using the settings below.

Adding or Deleting New MAC Address Filter Settings	Description
Delete	Click the checkbox to the left of any existing MAC address filter to be deleted (if any) and click the Submit button.
MAC Address	Enter a new MAC address to add a new filter.
Action	Select to Accept or Drop above indicated MAC Address field. Default is Accept .
Add (button)	Click the Add button to enter new MAC Address filter settings.

Table 7-6 Adding a New MAC Address Filter

To Configure Gateway WAN Settings

Using Web Manager

- ◆ To view gateway status information, on the **Administration** page, click **Gateway > Status**.
- ◆ To modify gateway WAN information, on the **Administration** page, click **Gateway > Configuration > WAN**.

Using XML

- ◆ Include in your file: `<configgroup name="gateway"> <configitem name="wan">`

Port Forwarding

Port forwarding allows remote computers (for example, computers on the Internet) to connect to a specific computer or service within a private local-area network (LAN). Port Forwarding rules apply to inbound traffic and will not work if the BAT-C2 is not reachable or traffic to certain ports is blocked before it reaches the gateway.

If traffic is going through firewalls, all referenced ports on the gateway and LAN devices must be accessible.

Port Forwarding Rule	Description
Enabled	Enables the port forwarding rule.
Delete	Deletes the port forwarding rule.
Name	User friendly name for the rule. Click on the [Edit] icon to make changes.
Ingress IP Address: Port Range	Port or Port range for the rule.
Protocol	Protocols for the rule: TCP , UDP , or Both .
IP Address: Target Port	Target for the port forwarding rule.

Table 7-7 Port Forwarding Rules List

Adding New Port Forwarding Rule Settings	Description
Name	Enter a User Friendly name for the rule (optional).

Table 7-8 Adding a New Port Forwarding Rule

Adding New Port Forwarding Rule Settings	Description
Ingress IP Address	Enter the destination address of the packets. This option can only be used with single ports and not with port range. Optional.
Start Port	Enter the starting port number.
End Port	Enter the end port number (optional). If start port and end port are same it assumes a single port. If start port and end port are not the same – it is a port range.
Protocol	Select the protocol for the rule. TCP , UDP , or Both .
IP Address	Enter the target for the port forwarding rule.
Target Port	Indicate the target port. This is the port which the packets are to be forwarded. This options can only be used with single ports and not with port range. If this value is not specified, the packets are forwarded to same port or pot range. Optional field.

Table 7-8 Adding a New Port Forwarding Rule (continued)

To Configure Gateway Port Forwarding Settings

Using Web Manager

- ◆ To modify gateway port forwarding information, on the **Administration** page, click **Gateway > Configuration > Port Forwarding**.

Using XML

- ◆ Not applicable.

Static Routes

Allows the user to add routes to the BAT-C2 routing table.

Static Route Settings	Description
Enabled	Enables the static route.
Delete	Deletes the static route.
Name	User friendly name for the route. Click on the [Edit] icon to make changes.
Route	Network or Host for the route.
Applied	If the route was successfully applied. Routing table updates require a reboot and route needs to be valid as per other BAT-C2 configurables.

Table 7-9 Static Route Settings

Routing Table Access	Description
Routing Table (Header/Link)	<p>Click this header/link to reveal the current system IPv4 and IPv6 routing tables. Please note that some fields may differ from static route definitions.</p> <p>The following information displays in the IPv4 routing table:</p> <ul style="list-style-type: none"> ◆ Network ◆ Gateway ◆ Mask ◆ Flags ◆ Metric ◆ Interface <p>The following information displays for the IPv6 routing table:</p> <ul style="list-style-type: none"> ◆ Network ◆ NextHop ◆ Flags ◆ Metric ◆ Interface

Table 7-10 Routing Table

Adding New Static Route Settings	Description
Name	User friendly name for the route.
Network	Network or Host for the route.
Gateway	Gateway for the route.
Interface	Interface for the route: <ul style="list-style-type: none"> ◆ wlan0 (default) ◆ eth0
Metric	Priority for the route. Lower metric means higher priority.

Table 7-11 Adding a New Static Route

To Configure Gateway Static Route Settings

Using Web Manager

- ◆ To modify gateway static route information, on the **Administration** page, click **Gateway > Configuration > Static Routes**.

Using XML

- ◆ Include in your file: `<configgroup name="gateway"> <configitem name="static routes" instance="<number>">`

DHCP Server

Allows the user to configure the BAT-C2 as a DHCP server.

Alter the DHCP settings below and click **Submit** (or **Cancel** to cancel changes).

DHCP Settings	Description
Configuration	
Lease time	Duration for which lease is initially assigned. Clients must renew after this duration.
DHCP Settings	

Table 7-12 DHCP Settings

DHCP Settings	Description
State	Enable or Disable the DHCP server for the DHCP settings. <ul style="list-style-type: none"> ◆ Enabled: DHCP server is enabled ◆ Disabled: DHCP server is disabled (default).
DHCP Relay	Enable for the gateway to operate as a DHCP relay agent between the DHCP server on the network and connected Ethernet devices. <ul style="list-style-type: none"> ◆ Enabled: DHCP Relay is enabled. ◆ Disabled: DHCP Relay is disabled.
Start IP Address	Start IP Address of address pool.
End IP Address	End IP Address of address pool.
DHCP v6Settings	
State	Enable or Disable the DHCP server for the DHCPv6 settings. <ul style="list-style-type: none"> ◆ Enabled: DHCP server is enabled ◆ Disabled: DHCP server is disabled (default).
Start IPv6 Address	Start IPv6 Address of address pool
End IPv6 Address	End IPv6 Address of address pool

Table 7-12 DHCP Settings (continued)

Static Lease Listings

On this page, the BAT-C2 also provides the ability to pre-assign specific IP addresses to connected devices using static leases. This would ensure that the connected device (identified by the MAC address) always gets the same IP address even while using DHCP.

Previously added static leases will appear under **Static Leases** where they can be deleted.

Static Lease List Settings	Description
Delete	Click checkbox beside existing static lease MAC Address/IP Address to delete, if available and if desired.
MAC Address	Displays the MAC Address of existing static leases are listed here.
IP Address	Displays the static IP Address of existing static leases are listed here.
IPv6 Address	Displays the static IPv6 Address of existing static leases are listed here.

Table 7-13 (Existing) Static Leases

To add a new static lease, complete the fields and click the **Add** button. Newly added static leases will appear under Static Leases (see [Table 7-13](#)).

Add a Static Lease Settings	Description
MAC Address	Enter the MAC Address of the static lease to be added.
IP Address	Enter static IP address of the static lease to be added.
IPv6 Address	Enter static IPv6 address of the static lease to be added.
Add (button)	Click the Add button when the new static lease fields have been entered.

Table 7-14 Adding a Static Lease

To Configure Gateway DHCP Server Settings

Using Web Manager

- ◆ To modify gateway DHCP server or static lease information, on the **Administration** page, click **Gateway > Configuration > DHCP Server**.

Using XML

- ◆ Include in your file: `<configgroup name = "dhcp server">`

Routing Protocols

The BAT-C2 allows the configuration of routing protocols. Routing protocols specify how routers communicate with each other, disseminating information that enables the selection of routes between any two nodes on a computer network. Routing algorithms determine the specific choice of route. Each router has a prior knowledge of networks directly attached to it. A routing protocol shares this information among immediate neighbors first, then through the network. This way, routers gain knowledge of the topology of the network. The BAT-C2 supports RIP and OSPF protocols.

Routing Settings	Description
RIP	
State	Select to enable or disable the RIP state. Disabled by default.
Version	Select how the RIP is to be configured. It can accept Version 1 , Version 2 , or Version 1 and 2 (default) .
Update Interval	Indicate the number of seconds for the Update Interval . Send unsolicited Response message every <Update Interval> seconds containing the complete routing table to all neighboring RIP routers. Default interval is 30 seconds.
Timeout Interval	Indicate the number of seconds for the Timeout Interval . Upon expiration of the Timeout Interval , the routes are no longer valid, however, they are retained in the routing table for a short time so that neighbors can be notified that the route has been dropped. Default interval is 180 seconds.
GC Interval	Indicate the number of seconds for the GC Interval . Upon expiration of the GC Interval , the routes are finally removed from the routing table. Default interval is 120 seconds.
OSPF	
State	Select to Enable or Disable the OSPF state. Disabled by default.
Hello Interval	Indicate the number of seconds for the Hello Interval . Hello packet will be sent every <Hello Interval> seconds. Default interval is 10 seconds.
Dead Interval	Indicate the number of seconds for the Dead Interval . Sets the time period for which hello packets must not have been seen before neighbors declare the router down. Default interval is 40 seconds.
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 7-15 Routing Protocol Settings

To Configure Gateway Routing Protocol Settings

Using Web Manager

- ◆ To modify gateway protocol settings, on the **Administration** page, click **Gateway > Configuration > Routing Protocol**.

Using XML

- ◆ Include in your file: `<configgroup name = "routing protocols">`

Virtual IP

The BAT-C2 allows the configuration of Virtual IP addresses. Virtual IP is a means to map an externally visible IP address to LAN-side IP addresses. BAT-C2 will support creating up to three virtual IP address mappings by creating loop back interfaces and publishing this information via the routing protocols.

Existing Virtual IPs	Description
Enabled (checkbox)	Uncheck the Enabled checkbox adjacent to a virtual IP address (if any listed) to disable it. Keep the checkbox checked to keep the virtual IP address enabled. A virtual IP address is enabled by default.
Delete (checkbox)	Check the Delete checkbox adjacent to a virtual IP address (if any listed) to be deleted, clicking the Submit button.
Name	Displays the name of the virtual IP address.
IP Address	Displays the virtual IP address to which the LAN IP address is to be mapped.
LAN IP Address	Displays the LAN IP address to which the virtual IP address is to be mapped.

Table 7-16 Existing Virtual IP Listings

Virtual IP Settings	Description
Name	Enter a name of the virtual IP address.
IP Address	Enter the virtual IP address to which the LAN IP address is to be mapped.
LAN IP Address	Enter the LAN IP address to which the virtual IP address is to be mapped.
Add (button)	Click the Add button to add a new virtual IP. Newly added static leases will appear under Static Leases (see Table 7-13 (Existing) Static Leases).

Table 7-17 Adding a Virtual IP

To Configure Gateway Virtual IP

Using Web Manager

- ◆ To modify gateway DHCP server information, on the **Administration** page, click **Gateway > Configuration > Virtual IP**.

Using XML

- ◆ Include in your file: `<configgroup name = "virtual ip">`

GRE

Generic Routing Encapsulation (GRE) tunneling is available on the BAT-C2, providing more capabilities than IP-in-IP tunneling. For example, it supports transporting multicast traffic and IPv6 through a GRE tunnel.

GRE Settings	Description
Name	Enter the user-defined name of the GRE tunnel.
State	Select to enable and disable GRE tunnel. Disabled by default.
IP Address	Assign a IP address/mask for the GRE tunnel.

Table 7-18 GRE Settings

GRE Settings	Description
MTU	Enter the number of bytes indicating the largest physical packet size that the network can transmit. Default MTU is 1500 bytes.
Local Network	Select the local network to use the GRE tunnel. Select vpn 1 to use the VPN network. Select any to use any available interface to remote host. Default is any .
Remote Host	Enter the remote IP address to use for the GRE tunnel.
Remote Network	Enter the remote network to use for the GRE tunnel.
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 7-18 GRE Settings (continued)

To Configure GRE Settings

Using Web Manager

- ◆ To view or configure GRE settings for a specific tunnel, on the **Administration** page, click **GRE**.

Using XML

- ◆ Include in your file: `<configgroup name="gre">`

HTTP

Hypertext Transfer Protocol (HTTP) is a request-response standard protocol between clients and servers. HTTP defines how messages are formatted and transmitted. It also defines the actions Web servers and browsers take in response to different commands. HTTP Authentication enables the requirement of user names and passwords for access to the BAT-C2.

Interface Status, Configuration and Authentication

View-only status information on the HTTP Statistics page displays various HTTP server statistics including information on Rx bytes, Tx bytes, error message types, status unknown, work queue full, socket error, memory error and logs.

See [Table 7-19](#) for the HTTP settings that can be modified on the HTTP Configuration page. See [Table 7-20](#) for the HTTP settings that can be authenticated on the HTTP Authentication page.

HTTP Settings	Description
State	Select to enable or disable the HTTP server. Enabled by default.
Port	Enter the port for the HTTP server to use. The default is 80 .
HTTPS State	Select to enable or disable. Enabled by default.
Secure Port	Enter the port for the HTTPS server to use. The default is 443 . The HTTP server only listens on the HTTPS Port when an SSL certificate is configured. HTTP requests to port 80 will be redirected to port 443.

Table 7-19 HTTP Configuration

HTTP Settings	Description
Secure Protocols	<p>Select to enable or disable the following protocols:</p> <ul style="list-style-type: none"> ◆ SSL3 = Secure Sockets Layer version 3. Disabled by default. ◆ TLS1.0 = Transport Layer Security version 1.0. TLS 1.0 is the successor of SSL3 as defined by the IETF. Enabled by default. ◆ TLS1.1 = Transport Layer Security version 1.1. Enabled by default. ◆ TLS1.2 = Transport Layer Security version. Enabled by default. <p>Note: A server certificate and associated private key need to be installed in the SSL configuration section to use HTTPS.</p>
Secure Credentials	Specify the name of the set of RSA and/or DSA certificates and keys to be used for the secure connection.
Max Timeout	Enter the maximum time for the HTTP server to wait when receiving a request. This prevents Denial-of-Service (DoS) attacks. The default is 10 seconds.
Max Bytes	<p>Enter the maximum number of bytes the HTTP server accepts when receiving a request. The default is 40 KB (this prevents DoS attacks).</p> <p>Note: You may need to increase this number in some cases where the browser is sending data aggressively within TCP Windows size limit, when file(including firmware upgrade) is uploaded from webpage.</p>
Logging State	<p>Select to enable or disable HTTP server logging:</p> <ul style="list-style-type: none"> ◆ Enabled (default) ◆ Disabled
Max Log Entries	Set the maximum number of HTTP server log entries. Only the last Max Log Entries are cached and viewable. The default is 50 entries.
Log Format	<p>Set the log format string for the HTTP server. Follow these Log Format rules:</p> <ul style="list-style-type: none"> ◆ %a - remote IP address (could be a proxy) ◆ %b - bytes sent excluding headers ◆ %B - bytes sent excluding headers (0 = '-') ◆ %h - remote host (same as '%a') ◆ %{h}i - header contents from request (h = header string) ◆ %m - request method ◆ %p - ephemeral local port value used for request ◆ %q - query string (prepend with '?' or empty '-') ◆ %t - timestamp HH:MM:SS (same as Apache '%(%H:%M:%S)t' or '%(%T)t') ◆ %u - remote user (could be bogus for 401 status) ◆ %U - URL path info ◆ %r - first line of request (same as '%m %U%q <version>') ◆ %s - return status
Authentication Timeout	The timeout period applies if the selected authentication type is either Digest or SSL/Digest . After this period of inactivity, the client must authenticate again. The default is 30 minutes.
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 7-19 HTTP Configuration (continued)

To View or Configure HTTP

Using Web Manager

- ◆ To view HTTP statistics, on the **Administration** page, click **HTTP > Statistics**
- ◆ To configure HTTP, on the **Administration** page, click **HTTP > Configuration**.

Using XML

- ◆ Include in your file: `<configgroup name="http server">`

The HTTP Server can be configured with many different authentication directives. The authentication is hierarchical in that any URI can be given an authentication directive in order to override a parent URI authentication directive.

HTTP Authentication Settings	Description
URI	Enter the URI. The URI must begin with / to refer to the filesystem.
Authentication Type	<p>Select an HTTP authentication type. The different types offer various levels of security, from the least to most secure:</p> <ul style="list-style-type: none"> ◆ None: no authentication necessary ◆ Basic: encodes passwords using Base64 ◆ Digest: encodes passwords using MD5 <p>When changing the parameters of Digest authentication, it is often best to close and reopen the browser to ensure that it does not attempt to use cached authentication information.</p> <p>There is no real reason to create an authentication directive using None unless you want to override a parent directive that uses some other Authentication Type.</p> <p>Click Submit when URI and Authentication Type is entered to submit it.</p>
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.
Delete	Click to delete the existing configuration.

Table 7-20 HTTP Authentication

To Configure HTTP Authentication

Using Web Manager

- ◆ To configure HTTP authentication, on the **Administration** page, click **HTTP > Authentication**.

Using XML

- ◆ Include in your file: `<configgroup name="http authentication uri">`

SNMP

Simple Network Management Protocol (SNMP) settings may be viewed and configured in this section.

SNMP Settings	Description
SNMP Agent	
State	Select to enable or disable the SNMP agent state. Disabled by default.
Port	Set the port of the SNMP agent. Default is 161 .
Version	Select the SNMP version used by the SNMP agent. Default is SNMPv3 .

Table 7-21 SNMP Settings

SNMP Settings	Description
Read Community	Specify the read community used by the agent (defaults to public community). The password for the read community is: <ul style="list-style-type: none"> ◆ For SNMPv2c: <code>public</code> ◆ For SNMPv3: <code>publicpublic</code> For the SNMPv3 read community, the username is <code>user</code> .
Write Community	Specify the write community used by the agent (defaults to private community). The password for the write community is: <ul style="list-style-type: none"> ◆ For SNMPv2c: <code>private</code> ◆ For SNMPv3: <code>privateprivate</code> For the SNMPv3 write community, the username is <code>admin</code> .
System MIB	
System Contact	Specify the system contact.
System Name	Update the system name, as necessary. The default system name is "BAT-C2".
System Description	Update the system description, as necessary. The default system information includes the manufacturer name, model name, version and the serial number of the BAT-C2.
System Location	Specify a system location for the SNMP setting.
MIB	
Hirschmann MIB File	Click the Hirschmann MIB file name to save and download it. This is the base MIB file. Load or compile this file first.
MIB File	Click the MIB file name to save and download it. This is the product specific MIB file. Load or compile this after the Hirschmann MIB File.

Table 7-21 SNMP Settings (continued)

To Configure SNMP Settings

Using Web Manager

- ◆ To configure SNMP, on the **Administration** page, click **SNMP** in the menu.

Using XML

- ◆ Include in your file: `<configgroup name="snmp">`

SSL

Secure Sockets Layer (SSL) is a protocol that creates an encrypted connection between devices. It also provides authentication and message integrity services. SSL is used widely for secure communication to a Web server, and also for wireless authentication.

SSL certificates identify the BAT-C2 to peers and are used with some methods of wireless authentication. Provide a name at upload time to identify certificates on the BAT-C2. You can upload Certificate and Private key combinations, obtained from an external Certificate Authority (CA), to the BAT-C2. The BAT-C2 can also generate self-signed certificates with associated private keys.

If a user-created HTTPS server certificate is not available when the device is booted, then a new certificate will be generated.

Credentials

The BAT-C2 can generate self-signed certificates and their associated keys for both RSA and DSA certificate formats. When you generate certificates, assign them a credential name to help identify them on the BAT-C2. Once you create your credentials, then configure them with the desired certificates.

To Create a New Credential

Using Web Manager

1. In Web Manager, click the **Administration** tab in the header.
2. Click **SSL > Credentials**.
3. Type the name for your credential in the **Create new credential** field.
4. Click **Submit**. The new SSL credential appears in the list.

Using XML

- ◆ Include in your file: `<configgroup name="ssl">`

To Delete a Credential

Using Web Manager

1. In the Web Manager, click the **Administration** tab.
2. Click **SSL > Credentials**.
3. Click **X** beside the existing credential you wish to delete.
4. To confirm the delete, click **OK** (or **Cancel** to cancel the deletion).

Using XML

- ◆ Include in your file: `<configgroup name="ssl">`

Upload Certificate Settings	Description
Authority	Click the Choose File button to browse to the SSL certificate to be uploaded. RSA or DSA certificates are allowed.
New Certificate Type	Select the certificate type to upload: <ul style="list-style-type: none"> ◆ PEM (default) ◆ PKCS7 ◆ PKCS12
Password	Enter the password for the new certificate. This field is only usable when the New Certificate Type is PKCS12.
New Private Key	Click the Choose File button to browse to the authentication key to be uploaded. RSA or DSA certificates are allowed.
New Key Type	Select the certificate type to upload: <ul style="list-style-type: none"> ◆ PEM (default) ◆ Encrypted PEM ◆ PKCS12
Password	Enter the password for the new authentication key. This field is only usable when the New Key Type is Encrypted PEM or PKCS12.

Table 7-22 SSL Credential - Upload Certificate

Upload Certificate Settings	Description
Submit (button)	Click the Submit button to enter the settings. The Submit button appears when new settings are entered.

Table 7-22 SSL Credential - Upload Certificate (continued)

Field	Description
Country (2 Letter Code)	Enter the 2 letter code for the country where the organization is located. This is a two-letter ISO code (e.g., "US" for the United States).
State/Province	Enter the state or province where the organization is located.
Locality (City)	Enter the city where the organization is located.
Organization	Enter the organization name to which the BAT-C2 belongs.
Organization Unit	Enter the organization unit which specifies the department or organization to which the BAT-C2 belongs.
Common Name	Enter a network name for the BAT-C2 when installed in the user's network (usually the fully qualified domain name). It is identical to the name that is used to access the BAT-C2 with a web browser without the prefix <code>http://</code> . In case the name given here and the actual network name differ, the browser will pop up a security warning when the BAT-C2 is accessed using HTTPS.
Key length	Select the key length.

Table 7-23 SSL Credential - Create New Self-Signed Certificate

To Configure an SSL Credential to Use an Uploaded Certificate

1. In the Web Manager, click the **Administration** tab.
2. Click **SSL > Credentials**.
3. Under the **View or Edit** heading, click the credential that you want to modify to access the information page for that credential.
4. To upload a **New Certificate** to assign to the credential, click **Browse...** beside **New Certificate**, locate the valid certificate, then double-click the file to select it.
5. Identify the **New Certificate Type** selected.
 - ◆ If you select SSL authority, RSA, or DSA certificates, select **PEM** or **PKCS7**.
 - ◆ If the Web Manager determines that the certificate is an Authority Certificate type, the New Certificate Type field updates to **PKCS12** automatically. For PKCS12 certificates, enter a password.

Note: *Ensure that the certificate is formatted properly with a valid open and close tag. Also ensure that the Private Key is associated to the selected certificate and that it is formatted properly with a valid open and close tag.*

6. To locate the associated valid **New Private Key** for this certificate, click **Browse...** to browse to and select the file.
7. Select the **New Key Type** from the drop-down menu.
8. Click **Submit**.

To Configure an SSL Credential to Use a Self-Signed Certificate

1. In the Web Manager, click the **Administration** tab.
2. Click **SSL**.
3. Click **Credentials**.
4. Under **View or Edit**, click the credential you wish to modify to access the information page for that credential.
5. Enter the details for a new self-signed certificate for this credential. See [Table 7-23](#).
6. Click **Submit**. The process to create a self-signed certificate can take up to 30 seconds, depending on the length of the key.

Trusted Authorities

One or more authority certificates are used to verify the identity of a peer. Authority certificates are used with some wireless authentication methods. These certificates do not require a private key.

Trusted Authorities Settings	Description
Authority	Click the Browse... button to browse to an existing SSL authority certificate. RSA or DSA certificates are allowed. The format of the authority certificate can be PEM or PKCS7. PEM files must start with "-----BEGIN CERTIFICATE-----" and end with "-----END CERTIFICATE-----". Some certificate authorities add comments before and/or after these lines. Those comments must be deleted before upload.
New Certificate Type	Select the certificate type through the drop-down window. Default is PEM. This field may automatically update, depending upon extension of the certificate entered.
Delete All	To delete all existing certificate authorities as listed, click the Delete ALL button. <i>Note: This button appears when there is at least one uploaded certificate authority.</i>
Delete	To delete an existing certificate authority, click the Delete button beside the specific authority listed under Current Certificate Authorities . <i>Note: This button appears when there is at least one uploaded certificate authority.</i>

Table 7-24 SSL Trusted Authority

To Upload an Authority Certificate

You can upload SSL authority, RSA, or DSA certificates.

To upload a trusted authority certificate:

1. In the Web Manager, click the **Administration** tab.
2. Click **SSL > Trusted Authorities**.
3. Click **Choose File** to browse to and select an authority certificate.
4. Select the **New Certificate Type** from the drop-down window:
 - ◆ If you select SSL authority, RSA, or DSA certificates, select **PEM** or **PKCS7**.
 - ◆ If the Web Manager determines that the certificate is an authority certificate type, the field updates to **PKCS12** automatically. For PKCS12 certificates, type a **Password**.

Notes:

- ◆ Ensure that the certificate is formatted properly with a valid open and close tag.
- ◆ Ensure that the Private Key is associated to the selected certificate and that it is formatted properly with a valid open and close tag.
- ◆ If the New Certificate field is set to **None**, the certificate is not supported.

5. Click **Submit**.

CSR (Certificate Signing Request)

The BAT-C2 uses the Secure Socket Layer (SSL) protocol for any encrypted network traffic between itself and a connected client. During the connection establishment the BAT-C2 has to expose its identity to a client using a cryptographic certificate. Upon leaving the factory this certificate and the underlying secret key is the same for all BAT-C2s and will not match the network configuration where it is installed. The certificate's underlying secret key is also used for securing the SSL handshake. It is possible to generate and install a new base64 encoded x.509 certificate that is unique for a particular BAT-C2. The BAT-C2 is able to generate a new cryptographic key and the associated Certificate Signing Request (CSR) that needs to be certified by a certification authority (CA).

To create and install an SSL certificate, perform the following steps.

1. On the **Administration** page, click **SSL > CSR (Certificate Signing Request)**. The Certificate Signing Request page displays.
2. Modify the following fields:

Field	Description
Country (2 Letter code)	Enter the two-letter ISO code (e.g., US for the United States) for the country where the organization is located.
State/Province	Enter the state or province where the organization is located.
Locality (City)	Enter the city where the organization is located.
Organization	Enter the organization name to which the BAT-C2 belongs.
Organization Unit	Enter the department within the organization to which the BAT-C2 belongs.
Common Name	Enter the network name of the BAT-C2 once it is installed in the user's network (usually the fully qualified domain name). It is identical to the name that is used to access the BAT-C2 with a web browser without the prefix http://. In case the name given here and the actual network name differ, the browser will pop up a security warning when the BAT-C2 is accessed using HTTPS.
Key length	Select the key length: 2048 or 4096 .

Table 7-25 SSL CSR (Certificate Signing Request)

3. Click **Submit** to initiate the Certificate Signing Request generation. After a few moments, the CSR file created will appear.
4. Click the CSR file to download it if desired.

Syslog

The system log (Syslog) provides information that shows the current configuration and statistics of the Syslog. You can configure the Syslog host and set the severity level for events to log.

Note: The system log is saved to local storage but is not retained through reboots. To allow the administrator to save the complete system log, save the system log to a server that supports remote logging services. For details, refer to RFC 3164. The default port is 514.

To Configure Syslog Settings

Using Web Manager

1. In the Web Manager, click the **Administration** tab.
2. Click **Syslog**.
3. To enable Syslog, for **State**, select **Enabled**.
4. For **Host**, type the IP address of the remote server that stores the logs.
5. For **Remote Port**, enter the port number for the remote host that supports logging services. The default port number is 514.
6. For Local Port, enter the local port number.
7. For **Severity Log Level**, click the arrow to select the minimum level message type that you want the system to log.
8. Click **Submit**.

Using XML

- ◆ Include in your file: `<configgroup name="syslog">`

System

The BAT-C2 settings allow for reboot, restoring factory defaults, uploading new firmware and updating a system's short and long name.

Note: Anytime you reboot the unit, this operation will take some time to complete. Please wait a minimum of 10-20 seconds after rebooting the unit before attempting to make any subsequent connections.

System Settings	Description
State	Select to enable or disable the reboot schedule. Disabled by default. Notice: <i>The BAT-C2 will automatically reboot as scheduled. Please note that any configuration changes not saved to flash memory will be lost. WEB sessions and network traffic will be interrupted. To avoid frequent reboots, BAT-C2 will not be rebooted if it was started or configured less than 30 minutes from the current date/time.</i>
Schedule	Select the reboot schedule interval: Daily or Interval (default is Daily).
Time (24 hour)	Set the time to reboot by selecting the Hour and Min (Minute) in the drop-down menus. Note: <i>This configuration option appears when the Daily schedule is selected.</i>

Table 7-26 System Settings

System Settings	Description
Interval	<p>Enter the interval number in the field. Then select the type of interval from the drop-down menu:</p> <ul style="list-style-type: none"> ◆ Hours ◆ Days (default) ◆ Weeks ◆ Months <p>Note: This configuration option appears when the Interval schedule is selected.</p>
Submit (button)	Click the Submit button after settings are made in the above Reboot Schedule fields.
Reboot Device	<p>Click the Reboot button to reboot the BAT-C2. When the device is rebooted, your browser should be refreshed and redirected to the main status page after 30 seconds.</p> <p>Note: The redirect will not work as expected if the IP Address of the BAT-C2 changes after reboot.</p>
Restore Factory Defaults	Click the Factory Defaults button to restore the BAT-C2 to original factory settings. All configuration will be lost. The BAT-C2 automatically reboots upon setting back to the defaults. After setting the configuration back to the factory defaults, the gateway will automatically be rebooted. Factory defaults may also be restored by pressing and holding the Reset button on the BAT-C2 and holding it down for six seconds.
Upload New Firmware	<p>Click Choose File to browse to and select the firmware file. Secure Boot ensures that only authorized software is allowed to run on the BAT-C2. Secure Boot requires that the firmware is signed by Hirschmann. To check if Secure Boot is enabled, click Status in the header and check the status of Secure Boot under Device. Uploading new firmware writes the new firmware file to firmware.rom on the BAT-C2. After browsing to the desired file, click Upload. The BAT-C2 automatically reboots upon the installation of new firmware. The BAT-C2 will only accept signed software binaries with authorized signatures.</p> <p>Notice: Do not attempt to power off or reset the gateway while uploading new firmware. Once the upload has completed and the new firmware has been verified and flashed to memory, the BAT-C2 will automatically be rebooted.</p>
Name	Enter a Short Name for the system name. A maximum of 32 characters are allowed. Enter a Long Name for the system name. A maximum of 64 characters are allowed. Click the Submit button after name changes have been made.

Table 7-26 System Settings (continued)

To access System settings:

Using Web Manager

- ◆ To access System settings with options to set up a reboot schedule, reboot, restore factory defaults, upload new firmware, reboot the standalone firmware installer, update the system name (long or short names) or to view the current configuration, on the **Administration** page, click **System**.

Using XML

- ◆ Include in your file: `<configgroup name="xml import control">`
- ◆ Include in your file: `<configgroup name="reboot schedule">`
- ◆ Include in your file: `<configgroup name="device">`

User Management

This page displays the configuration of users. The Admin Password is used for initial login access from the HTTP.

The Admin user can modify their username and/or password here. There are two preconfigured users that can be used for initial login access from the HTTP.

Administrator Settings	Description
Username	View and modify the current account's Username as desired. The default Username for read/write access is <code>admin</code> . The default Username for read access only is <code>user</code> .
Password	Modify the current account's Password as desired. The default Password for read/write access is <code>private</code> . The default password for read access only is <code>public</code> .
Submit	Click Submit to submit changes Username and/or Password . The Submit button appears when either or both Username and Password are modified.

Table 7-27 Administrator Settings

Users created by the original Admin user will be listed here for editing and deletion.

Current Users	Description
Delete	Click the check box besides a specific user to be deleted and click the Submit button which appears (or click Cancel to cancel the deletion). Click OK in the confirmation window which appears to delete indicated user.
Name	Name of User. Click a specific user name to edit the user information (Username , Password , and Role) on the Edit User page.
Role	The Role assigned to the user.

Table 7-28 Current Users List

Create new user login, password and roles here. Admin-created users can be deleted or altered in the Current Users list ([Table 7-28](#)). Up to 8 user accounts can be created to access the BAT-C2.

New User Settings	Description
Username	Enter the Username of the new user. Must be between 4 and 15 characters.
Password	Enter the Password of the new user. Must be between 4 and 15 characters.
Role	Click the Role field to select a role for this user: <ul style="list-style-type: none"> ◆ Administrator ◆ Technician ◆ User
Add	Click Add to submit the new user. Click OK in the confirmation window which appears to add the user.

Table 7-29 New User Settings

The system-defined default roles that come with the BAT-C2 along with any Admin-created user roles are listed here. Admin-created custom roles can be deleted or altered.

Current Role	Description
Delete	Click the check box beside a specific custom role to be deleted and click the Submit button which appears (or click Cancel to cancel the deletion). Click OK in the confirmation window which appears to delete indicated user.
Name	Name of Role. Click a specific custom role to edit the role information (Role , Configuration Groups , and Actions) on the Edit Role page. Administrator , Technician and User roles are system-defined and cannot be deleted or altered.
Configuration Groups	Displays the Configuration Groups accessible by the role. Configuration Group access can be modified for custom-created roles.
Actions	Displays the Actions accessible by the role. Actions can be modified for custom-created roles.

Table 7-30 Current Roles List

Create a custom role here. Admin-created custom roles can be deleted or altered in the Current Roles list ([Table 7-30](#)). Up to 8 custom roles can be created.

New Role Settings	Description
Name	Enter the name of a new role to be created.
Actions	Check the Actions that the new role will have access to, if any: <ul style="list-style-type: none"> ◆ Device Reboot ◆ Factory Reset ◆ Firmware Upgrade
Configuration Groups	Check which Configuration Groups, if any, the new role will be able to configure.: <ul style="list-style-type: none"> ◆ access point ◆ action ◆ application ◆ arp ◆ bridge ◆ clock ◆ device ◆ dhcp server ◆ diagnostics ◆ ethernet ◆ filesystem ◆ gateway ◆ gre ◆ host ◆ http authentication ◆ uri ◆ http server ◆ icmp ◆ input filters ◆ interface ◆ ip ◆ network failover ◆ qos ◆ reboot schedule ◆ routing protocols ◆ snmp ◆ ssl ◆ syslog ◆ user management ◆ virtual ip ◆ vpn ◆ wlan profile ◆ wlan
Add	Click Add to submit the new role. Click OK in the confirmation window which appears to add the role.

Table 7-31 New Role Settings

To Configure User Management

Using Web Manager

- ◆ To configure user settings, on the **Administration** page, click **User Administration**.

Using XML

- ◆ Include in your file: `<configgroup name="user management">`

XML

This page is used to clone the current system configuration. The generated file can be imported at a later time to restore the configuration.

Notice: *The 'User Management', 'WLAN Profile', 'HTTP Authentication', and SSL groups must be imported with secrets manually filled in (e.g., passwords and private key) before import.*

The exported file can be modified and imported to update the configuration on this BAT-C2 or another.

The clone file can be exported to the browser window. XML records can also be exported to browser window or to a download link on the BAT-C2.

Notice that by default, all Groups to Export are checked except some pertaining to the network configuration; this is so that if you later 'paste' the entire clone configuration, it will not break your network connectivity. You may check or uncheck any group to include or omit that group from export.

Selection of Lines to Export filters instances to be exported are in the line and terminal groups.

To Export Configuration

By default, all settings groups are checked.

Using Web Manager

1. In the Web Manager, click the **Administration** tab.
2. Click **XML > Export Configuration**.
3. Select where to send exported status information:
 - ◆ **Export to browser** sends the information into a separate web window which appears.
 - ◆ **Export to local file** sends information into a new locally saved file. A file name must be specified in field provided if this option is selected.
4. Select **Download (from link)** to download this content as a file, or click **Export to browser** to open a web browser with this content.
5. To include descriptive comments in the XML file, check **Comments**.
6. For **Lines to Export**, check the lines and/or the network that you want to export to the XML configuration file.
 - ◆ Clicking the **Clear All** button will uncheck all checkboxes.
 - ◆ Clicking the **Select All** button will check all checkboxes.
7. Click the desired **Groups to Export**. Several checkboxes are available.
 - ◆ Clicking the **Clear All** button will uncheck all checkboxes.
 - ◆ Clicking the **Select All but Networking** button will check all checkboxes except `Interface:etho`, `Bridge:br0` and `Interface:wlan0`.

Note: Ensure that the group list is comma delimited and encased in double-quotes. To view the list of available groups, type **xcr list**.

8. Click **Export**.

Note: Though keys are not exported with XML objects and variables, there is a placeholder value included in the XML variable that would need to be populated with the correct key value when using an exported configuration for an import operation.

Using XML

- ◆ Include in your file: `<configgroup name="xml import control">`

To Export Status

You can export the current status in XML format. By default, all groups are exported, or you can select a subset of groups to export.

Using Web Manager

1. In the Web Manager, click the **Administration** tab.
2. Click **XML**.
3. Click **Export Status**.
4. Select where to send exported status information:
 - ◆ **Export to browser** sends the information into a separate web window which appears.
 - ◆ **Export to local file** sends information into a new locally saved file. A file name must be specified in field provided if this option is selected.
5. For **Lines to Export**, check the lines and/or the network that you want to export to the XML configuration file.
 - ◆ Clicking the **Clear All** button will uncheck all checkboxes.
 - ◆ Clicking the **Select All** button will check all checkboxes.
6. Click the desired **Groups to Export**. Several checkboxes are available.
 - ◆ Clicking the **Clear All** button will uncheck all checkboxes.
 - ◆ Clicking the **Select All** button will check all checkboxes.

Notes:

- ◆ Ensure that the group list is comma delimited and encased in double-quotes.
- ◆ To view the list of available groups, type **xcr list**.

7. Click **Export**.

Using XML

- ◆ Include in your file: `<configgroup name="xml ">`

To Import Configuration

To import system XML configuration file that you saved previously, use Import Configuration.

Using Web Manager

1. In the Web Manager, click the **Administration** tab.

2. Click **XML**.
3. Click **Import Configuration**.
4. Select where to import configuration information:
 - ◆ **Configuration from External file** picks up all the settings from the external file. For this option, click **Browse...** to locate and select the XML configuration file that you wish to import. The name of the file will appear in the Web Manager screen. Click **Import**.
 - ◆ **Configuration from Filesystem** picks up settings from the selected Groups, Lines and Instances. Make selections in the form which appears (see [Table 7-32](#)) and click **Import**.
 - ◆ **Line(s) from single line Settings on the Filesystem** copies lines settings from an the input file containing only one Line instance to all of the selected Lines. Make selections in the form which appears (see [Table 7-33](#)) and click **Import**.

Using XML

- ◆ Include in your file: `<configgroup name="xml import control">`

Setting	Description
Filename	Enter the name of the file on the BAT-C2 (local to its filesystem) that contains XCR data.
Lines to Import	Select filter instances to be imported in the line, serial, tunnel and terminal groups. This affects both Whole Groups to Import and Text List selections. Click Clear All to clear all checkmarks and Select All to check all checkmarks.
Whole Groups to Import	Select the configuration groups to import from the XML configuration record. This option imports all instances of each selected group. Click Clear All to clear all checkmarks and Select All but Networking to check all checkmarks except Networking.
Text List	Enter the string to import specific instances of a group. The textual format of this string is: <code><g>:<i>;<g>:<i>;...</code> Each group name <code><g></code> is followed by a colon and the instance value <code><i></code> and each <code><g>:<i></code> value is separated by a semi-colon. If a group has no instance then only the group name <code><g></code> should be specified.
Import (button)	Click the Import button when the Configuration from Filesystem fields are completed above.

Table 7-32 Configuration from Filesystem

Setting	Description
Filename	Enter the name of the file on the BAT-C2 (local to its filesystem) that contains XCR data.
Whole Groups to Import	Select the configuration groups to import from the XML configuration record. This option imports all instances of each selected group. Click Clear All to clear all checkmarks and Select All but Networking to check all checkmarks except Networking.
Import (button)	Click the Import button when the Line(s) from single line Settings on the Filesystem fields are completed above.

Table 7-33 Line(s) from Single Line Settings on the Filesystem

Quick Setup

Quick Setup provides a place to configure all basic settings in one place. You may access Quick Setup through the Administration menu or whenever you reset your system to factory defaults.

Note: The “Installation User Manual” provides for instructions on accessing Web Manager via SoftAP. The “Installation User Manual” can be found as PDF download on the Internet at the Hirschmann product pages (www.hirschmann.com).

Setting	Description
State	Select to enable or disable the state
Transparent Mode	Select to enable or disable the transparent mode.
Network Access for Gateway	Select to enable or disable network access for the gateway.
Ethernet Interface	Select the desired interface.
Bridging MAC Address	Enter the bridging MAC address
Bridging IP Address	Enable Auto Detect IPv4 Address or disable it to enter the bridging IP address. Check the appropriate radio button to enable or disable. If enabled, the BAT-C2 will attempt to learn the IP Address by using the source or destination IP address of packets arriving on the Ethernet interface. This may affect the performance of running processes during the learning phase.
Bridging IP Address	Select to enable or disable auto-detection of the IPv4 address.
Bridging IPv6 Address	Enter the bridging IPv6 address
Initial Scan Interval	Enter the Initial Scan Interval in seconds.
Scan Interval	Enter the Scan Interval in seconds.

Table 7-34 Bridge 1 (br0) Configuration

Setting	Description
WPS (PBC)	Click this button for push button connect.
WPS (PIN)	Click this button for pin hole connect.

Table 7-35 Wi-Fi Protected Setup

Setting	Description
Network Name (SSID)	View existing network name/SSID, if any.
State	Select to enable or disable the state.
IPv4 State	Select to enable or disable the state.
DHCP Client	Select to turn on or off.
IPv6 State	Select to enable or disable the state.
IPv6 DHCP Client	Select to turn on or off.
IPv6 Auto Configuration	Select to turn on or off.

Table 7-36 Current Configuration

Setting	Description
Refresh scan results every 60 seconds	Check this checkbox and click Scan to scan available networks every 60 seconds. Scroll through list of available networks listed, as desired.

Table 7-37 Available Networks

Setting	Description
Show entries (drop-down menu)	Select the number of entries to show on the page at a time.
Search (field)	Enter characters within the name of an SSID in the Search field to limit scan results to SSIDs with characters typed.

Table 7-37 Available Networks (continued)

To Utilize Quick Setup

Using Web Manager

1. In the Web Manager, click the **Administration** tab.
2. Click **Quick Setup**.
3. Click **OK** in the verification window which appears.
4. Login to your BAT-C2, if prompted.
5. Update the Quick Setup information below:
6. Click **Clear** at any time to clear all fields of choices made (if any). The **Clear** button will only appear when changes have been made to fields above.
7. Click **Manual Setup** to return to the Status page where you may make changes directly in the configuration pages accessible through the **Network**, **Diagnostic** and **Administration** tabs.
8. Click **Submit** to submit configuration choices on the Quick Setup page.

A: Further Support

Maintenance

Hirschmann is continually working on improving and developing their software. Check regularly whether there is an updated version of the software that provides you with additional benefits. You find information and software downloads on the Hirschmann product pages on the Internet (<http://www.hirschmann.com>).

Technical Questions

For technical questions, please contact any Hirschmann dealer in your area or Hirschmann directly.

You find the addresses of our partners on the Internet at <http://www.hirschmann.com>.

A list of local telephone numbers and email addresses for technical support directly from Hirschmann is available at <https://hirschmann-support.belden.com>.

This site also includes a free of charge knowledge base and a software download section.

Hirschmann Competence Center

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- ◆ Consulting incorporates comprehensive technical advice, from system evaluation through network planning to project planning.
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