



AirborneAP™ APXG-Q5420

User Manual

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1.0 Conventions

The following section outlines the conventions used within the document. Where convention is deviated from, the deviation takes precedence and should be followed. If you have any question related to the conventions used or clarification of indicated deviation please contact B&B Electronics Sales or Wireless Support.

1.1 Terminology

APXG-Q5420 is used in the opening section to describe the device detailed in this document. After this section the term **module** or **device** will be used to describe the device.

1.2 Notes

A note contains information that requires special attention. The following convention will be used. The area next to the indicator will identify the specific information and make any references necessary.



The area next to the indicator will identify the specific information and make any references necessary.

1.3 Caution

A caution contains information that, if not followed, may cause damage to the product or injury to the user. The shaded area next to the indicator will identify the specific information and make any references necessary.



The area next to the indicator will identify the specific information and make any references necessary.

1.4 File Format

These documents are provided as Portable Document Format (PDF) files. To read them, you need Adobe Acrobat Reader 4.0.5 or higher. For your convenience, Adobe Acrobat Reader is provided on the software CD. Should you not have the CD, you can download the latest version of Adobe Acrobat Reader at the Adobe Web site: www.adobe.com

2.0 Product Description

B&B Electronics' APXG-Q5420 industrial grade access point enables a piece of M2M equipment to become the center of a self-sufficient Wi-Fi network. This makes it easy to access equipment data as well as resources from other Wi-Fi enabled devices, like laptops, tablets and handhelds. The other devices can be powered by Android, iOS or Windows. The APXG-Q5420 includes a 10/100 Ethernet port that supports both bridge and router modes, and two serial ports that are compatible with RS232/422/485 devices. Users may make multiple connections to the same machine, and all ports may be used simultaneously in any serial data configuration. This allows the APXG-Q5420 to provide more port configuration options than any competing device in the industry.

The APXG-Q5420 also includes a wide range power supply input (5-36 VDC) with terminal block and barrel jack connections. It is packaged in a rugged metal enclosure.

B&B Electronics is the industry leader in industrial grade 802.11b/g wireless serial-to-Ethernet converters, access points, Ethernet bridges and Ethernet adapters. The APXG-Q5420 is the newest member of B&B Electronics' Quatech/Airborne™ series, a family of fully integrated 802.11b/g wireless LAN bridge, serial device server, and access point products designed to provide wireless LAN and Internet connectivity in industrial, scientific, medical and automotive applications. The highly integrated hardware and software enables plug-and-play capability and significantly reduces the complexity of wireless system deployment and network connectivity.

All Quatech/Airborne™ 802.11 b/g access point products include Airborne Management Center software for web browser-based configuration and administration. The Airborne Management Center makes it easy to install and configure Airborne devices. The same interface is employed across the entire product line. If you've used one Airborne device, you know how to use them all.

3.0 Features

- 802.11b/g Wi-Fi Radio with 32-bit ARM9 CPU (256Mb SDRAM, 64Mb Flash)
- Fully functional M2M Access Point and Wireless Router.
- Software selectable as AirborneAP™ or AirborneDirect™ client device server.
- Integrated Airborne Device Server and Wireless Adapter technology.
- Supports WEP, WPA, WPA2 and 802.1x Supplicant¹, with Certificates.
- The AirborneAP™ M2M Access Point supports integrated:
 - 802.11b/g radio
 - TCP/IP stack, UDP, telnet, FTP server
 - Ethernet bridge mode (Access Point)
 - Ethernet router mode (Wireless Router)
 - Dual Serial ports (RS232/422/485)
 - Data bridging and buffering
 - Command Line Interface
 - Web interface
 - WEP/WPA/WPA2-PSKSecurity
 - DHCP Server (For wireless clients)
 - Firewall and Port Forwarding (Ethernet Router Mode)
 - Transmit RF power control
 - FTP Server
- Supports antenna diversity (transmit and receive).
- Operating Temperature(-20°C to 85°C)
- Storage temp (-55°C to 150°C)
- Industry standard wired connections:
 - D-9 Serial connectors (RS232/422/485)
 - RJ-45 (10/100 Ethernet)
- Multiple host interfaces supported:
 - Dual Serial (RS232/422/485) – up to 921K BAUD
 - 10/100 Ethernet
- Dual RP-SMA antenna connectors.
- Integrated standard and wide range (J1455) Power Supply (5-36VDC)
- Power connector options include 2.1mm Barrel Jack, Terminal Block
- Integrated Site Survey mode.
- Advanced Low power modes.
- Rugged mounting options.
- Worldwide Regulatory Support (FCC, IC, CE)

4.0 Device Types

This manual covers the AirborneAP™ M2M Access Point/Wireless Router/Client. Information on the variations and functionality available in the AirborneDirect™ device family can be found in the ABDG Family User Manual. If you are not certain which type you have or would like clarification on the available options please contact B&B Sales or Technical Support.

The AirborneAP™ supports the following host interfaces:

4.1 Serial

This device supports dual serial ports and provides serial to 802.11 bridging. The following serial interface types are available:

- RS-232
- RS-422
- RS-485

Default configuration is RS-232. Conversion to RS-422/485 is software selectable. Changing the serial port configuration is covered later in the manual.

4.2 Ethernet

The Ethernet adapter provides a wireless interface to an existing Ethernet port (RJ-45). The connection to the Ethernet port of the host is made via the RJ-45 socket.

The device supports a 10/100 Ethernet interface with auto configuration. Manual control of the interface is possible through the web or CLI interface.

4.3 Flexport™

This AirborneAP™ allows for simultaneous connection of Serial and Ethernet ports in any combination. You may maintain network-based connections to both the Ethernet and Serial ports without compromising functionality or performance.

Each interface can be configured and operated independently of the others. Connection to the serial port can be made via both the wireless and Ethernet ports. In this mode the device is capable of supporting redundant network connectivity for high reliability applications.

4.4 Industrial Packaging

Developed to support the demands of the industrial and automotive environments, the packaging supports the full industrial operating temperature range and the complete set of functional capabilities of the Airborne Access Point, Airborne Device Server and Wireless Adapter technology.

Figure 1 - Industrial AirborneAP™ Device



The device includes a metal enclosure and a wide range power supply capable of exceeding the SAE J1455 power supply requirements.

The industrial packaging is ideal for the following application types:

- CNC/DNC equipment.
- Vehicle diagnostics.
- Telematics.
- Remote monitoring and management.
- Industrial control.

5.0 Pinout and Connectors

The following defines the pinouts for the wired interfaces.

5.1 Serial Ports

The AirborneAP™ unit supports two serial ports. The Port pinout can change depending upon the interface configuration chosen. Table 1 shows the pinout for the interface selected.

Figure 2- DE-9 (DB-9) Connector Pin-out

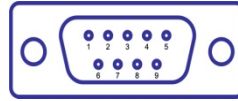


Table 1-Serial Port Pin Definition

Pin	RS232 (DTE)	RS232 w/Power on pin 9 ²	RS422	RS485
1	No Connect	No Connect	No Connect	No Connect
2	RxD	RxD	RxD+	Connect to pin 3 ³
3	TxD	TxD	TxD+	TxD+/RxD+
4	No Connect	No Connect	No Connect	No Connect
5	GND	GND	GND	GND
6	No Connect	No Connect	RxD-	Connect to pin 9 ³
7	RTS	RTS	No Connect	No Connect
8	CTS	CTS	No Connect	No Connect
9	No Connect	5VDC (Input)	TxD-	TxD-/RxD-



1. For 2-wire operation, the user must externally connect pin 3 to pin 2 and pin 6 to pin 9.

The Port 1 and Port 2 interfaces support the following configurations:

- BAUD: 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200, 230400, 460800, 921600
- Flow Control: None, Hardware (CTS/RTS), Software (XON/XOFF)
- Port 1 Default settings: 9600, 8, N, 1, No Flow Control.
- Port 2 Default settings: 9600, 8, N, 1, No Flow Control.

5.2 Ethernet Port

The AirborneAP™10/100Mbps interface supports auto negotiation. The interface also supports both half and full duplex for 10Mbps and 100Mbps. Table 2 shows the interface pinout.

Figure 3 - Ethernet Jack Pinout

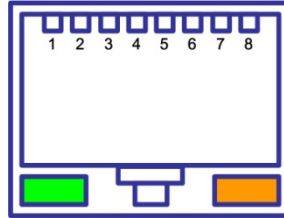


Table 2 - Ethernet Connector Pinout

Pin	RJ45 Socket
1	TxD+
2	TxD-
3	RxD+
4	NC
5	NC
6	RxD-
7	NC
8	NC
Green LED	Valid TCP/IP connection made with Airborne Adapter: Off No TCP/IP connection On Valid TCP/IP Connection
Yellow LED	Power-on Self Test (POST): Off Not powered or has failed POST On Passed POST

5.3 Connector Definition

The AirborneAP™ device has five connectors. Table 3 provides definitions for the connectors.

Table 3 - Connector Description

Type	Description
Serial	DE-9 Connector Male
Ethernet	RJ45 Socket
Antenna	RP-SMA
Power	2.1mm Barrel Jack
Power	2 Position Terminal Block

5.4 Default Switch (Factory Reset)

The AirborneAP™ device will let you reset the configuration back to OEM defaults and start over again. This is useful when a device has been incorrectly configured. An incorrect configuration can make it impossible to communicate on any of the available ports. That would prevent access to the configuration interfaces and block your ability to correct the configuration.

Performing a Factory RESET will return the device to the original OEM defaults. If no OEM configuration is installed the device will return to the B&B factory defaults. That will restore your ability to communicate with the device.

The following Table 4 describes the sequence for resetting the AirborneAP™ device to the OEM defaults

Table 4 - Reset Procedure

1	Disconnect or turn off the power supply.
2	Press and hold in the Default (factory reset) button. This may require the use of a small, narrow object. Do not use anything sharp, as that may damage the unit.
3	While the Default button is pressed and held in, re-apply power to the unit.
4	Continue to hold in the Default button for 5-6 seconds after power has been applied.
5	Release the Default button.
6	The device will restart with the installed OEM defaults. If no OEM configuration exists the device will return to B&B Electronics factory defaults. See section 11.6 on use of OEM factory configurations.

The AirborneAP™ Default button is on the Ethernet/Power end of the box, next to the 2.1mm barrel connector (See section 8.0)

5.5 Indicator LEDs

The indicator LEDs provide feedback on the state of the device when it is configured as an AP/WR. If the device is configured for any other operation please refer to the appropriate device manual. The LEDs are a useful tool during installation and troubleshooting.

Table 5 - LED Indicators

LED	Color	Airborne Device State
POWER	○	Adapter is not powered.
	●	(Blue) Adapter is powered.
POST	○	Adapter is not powered.
	●	(Red) Adapter failed Power On Self Test (POST) and is not configured for wireless communication.
	●	(Orange) Adapter passed POST but is not configured for wireless network communication. The radio is not enabled.
LINK	○	Adapter is not powered.
	●	(Green) Adapter has successfully associated with an Access Point.
COMM	○	<ul style="list-style-type: none"> If Power LED and COMM LED are both Off the Adapter is not powered. If Power LED is On but the COMM LED is Off, it means that no TCP session from the WLAN or Ethernet interface has been established.
	●	(Red) The device is powered and there is no Ethernet device connected to the Ethernet port.
	●	(Orange) A TCP connection to the adapter has been established from the Wireless or Ethernet interfaces but no traffic has been detected.

6.0 Electrical & RF Specification

Table 6- Absolute Maximum Values¹

Parameter	Min	Max	Unit
Maximum Supply Voltage	5.0	36	VDC
Power Dissipation		3.00	W
Operating Temperature Range	-20	85	°C
Storage Temperature	-55	150	°C

Note: 1. Values are absolute ratings, exceeding these values may cause permanent damage to the device.

Table 7 - RF Characteristics – 802.11b/g

Symbol	Parameter	Rate (Mb/s)	Min	Average dBm / mW		Peak dBm / mW		Units
P _{OUTB}	Transmit Power Output 802.11b	11, 5.5, 2, 1	13.0	15.0	31.6			dBm
P _{OUTG}	Transmit Power Output 802.11g	6, 9, 12, 18, 24, 36, 48, 54	13.0	15.0	31.6			dBm
P _{RSENB}	Receive Sensitivity 802.11b	11		-89				dBm
		1		-93				
P _{RSENG}	Receive Sensitivity 802.11g	54		-72				dBm
		36		-79				
		18		-85				
		6		-90				
F _{RANGEBG}	Frequency Range		2412			2484		MHz



The transmit power is automatically controlled by the device for minimum power consumption.

The transmit power at the antenna connector is 15dBm±2dBm.

Table 8 - Supported Data Rates by Band

Band	Supported Data Rates (Mb/s)
802.11b	11, 5.5, 2, 1
802.11g	54, 48, 36, 24, 18, 12, 9, 6

Table 9 - Operating Channels

Band	Region	Freq Range (GHz)	No. of Channels	Channels
802.11b	US/Canada	2.401 - 2.473	11	1 – 11
	Europe	2.401 - 2.483	13	1 – 13
	France	2.401 - 2.483	13	1 – 13
	Japan	2.401 - 2.495	14	1 – 14
802.11g	US/Canada	2.401 - 2.473	11	1 – 11
	Europe	2.401 - 2.483	13	1 – 13
	France	2.446 - 2.483	13	1 – 13
	Japan	2.401 - 2.483	13	1 – 13



1. Only channels 1, 6 and 11 are non-overlapping.

6.1 AC Electrical Characteristics – Transmitter

Transmit power is automatically managed by the device for minimum power consumption. The transmit power at the RF connector is $+15\text{dBm} \pm 2 \text{ dBm}$ for 802.11b/g Modes (all rates).

6.2 Performance/Range

The following table illustrates the typical data rates, performance and range the device can provide using an omni-directional antenna.

Table 10 - Radio Typical Performance Range

Data Rate	Typical Outdoor Distance (Unity gain antenna)	Typical Outdoor Distance (2dBi antenna gain on each end for B/G mode)
1.0 Mb/s	240m	380m
11.0 Mb/s	135m	215m
6Mb/s 802.11g	135m	215m
6Mb/s 802.11a	49m	155m
54Mb/s 802.11g	12m	19m
54Mb/s 802.11a	4.5m	14m

Ranges are affected by receiver sensitivity; transmit power, free-space path loss, antenna gain, and link margin. Actual range will vary from those stated. Non-line-of-site applications will result in lower typical values than those shown above.

The Data Rate is the supported connection rate for the wireless link. The actual data throughput for the link will be less than the stated data rates.

7.0 Antenna

The unit supports antenna connection through two (2) RP-SMA connectors, located on the sides of the enclosure.

Any antenna used with the system must be designed for operation within the 2.4GHz ISM band and specifically support the 2.412GHz to 2.482GHz for 802.11b/g operation. They are required to have a VSWR of 2:1 maximum referenced to a 50Ω system impedance.

7.1 Antenna Selection

The Airborne radio supports a number of antenna options. The correct antenna option will be determined by a number of factors, including consideration of the application, mechanical construction and desired performance. Since the number of possible combinations is endless we will review some of the more common solutions in this section. If your application is not covered during this discussion please contact Technical Support for more specific answers.

Due to FCC/IC regulatory restrictions only antenna covered by the approvals listed on the device may be used with the device. Please contact Technical Support for a full list of approved antenna.

7.2 Antenna Location

Antenna location can determine the success or failure of the Wi-Fi implementation.

There are several factors that need to be considered when choosing the location:

- Distance of Antenna from radio
- Location of host system
 - Proximity to RF blocking or absorbing materials
 - Proximity to potential noise or interference
 - Position relative to infrastructure (Access Points or Laptops)
- Orientation of host system relative to infrastructure
 - Is it known
 - Is it static

To minimize the impact of these factors, take the following steps during the development process:

- Minimize the distance between the radio and the antenna. As the length of the connecting cable increases, so does the negative impact on Transmit Power and Receive Sensitivity.
- Avoid situations where metal surfaces come into contact with the antenna, or are close to the location of the antenna.
- Avoid locations where RF noise or overlapping ISM bands may be present. This would include microwave ovens and wireless telephone systems in the 2.4GHz and 5.0GHz frequency range.
- Elevate the antenna as much as you can.

- Locate the antenna where there is a minimum of obstruction between the antenna and the location of the Access Points. Access Points are typically located in the ceiling or high on walls.
- Keep the main antenna's polarization vertical, or in-line with the antenna of the Access Points. 802.11 systems utilize vertical polarization and aligning both transmit and receive antenna maximizes the link quality.

No connection will ever be perfect. Experiment with the various possibilities until you get the best connection permitted by the circumstances.

7.3 Performance

Performance will vary according to the application and the circumstances. In most cases your primary concern will be the link quality, which is a function of the bandwidth available between two devices. In general, as the link rate drops the radio's Transmit Power, Receive Sensitivity and link quality improve.

Measurement of link quality can be made in several ways. Bit Error Rate (BER), Signal to Noise (SNR) ratio and Signal Strength are all very useful. The link quality is used by the radio to determine the link rate. When the link quality for a given link rate falls below a predefined limit, the radio will drop to the next lowest link rate and try to communicate using that one.

The reverse is also true. If the radio observes good link quality at one rate it will try to move up to the next rate to see if communication can be maintained at the higher rate.

So consider your application's actual bandwidth requirements and tailor your link rate to optimize the link quality. For example, the link quality at 6Mb/s is likely to be better than it would be for 54Mb/s. If the application only needs 2Mb/s of data throughput, the 6Mb/s rate would provide a better link quality.

Aside from the radio performance, there are a number of other things that contribute to the link quality. These include the items discussed earlier and choices made when looking at the overall antenna gain. The antenna gain contributes to the Equivalent Isotropically Radiated Power (EIRP) of the system. This is part of Link Margin, an overall measurement of link quality.

Link Margin provides a measurement of all the parts of the RF path that impact the communications between two systems. The basic equation looks like this:

$$\text{EIRP (dB)} = \text{TxP} + \text{TxA} - \text{TxC}$$

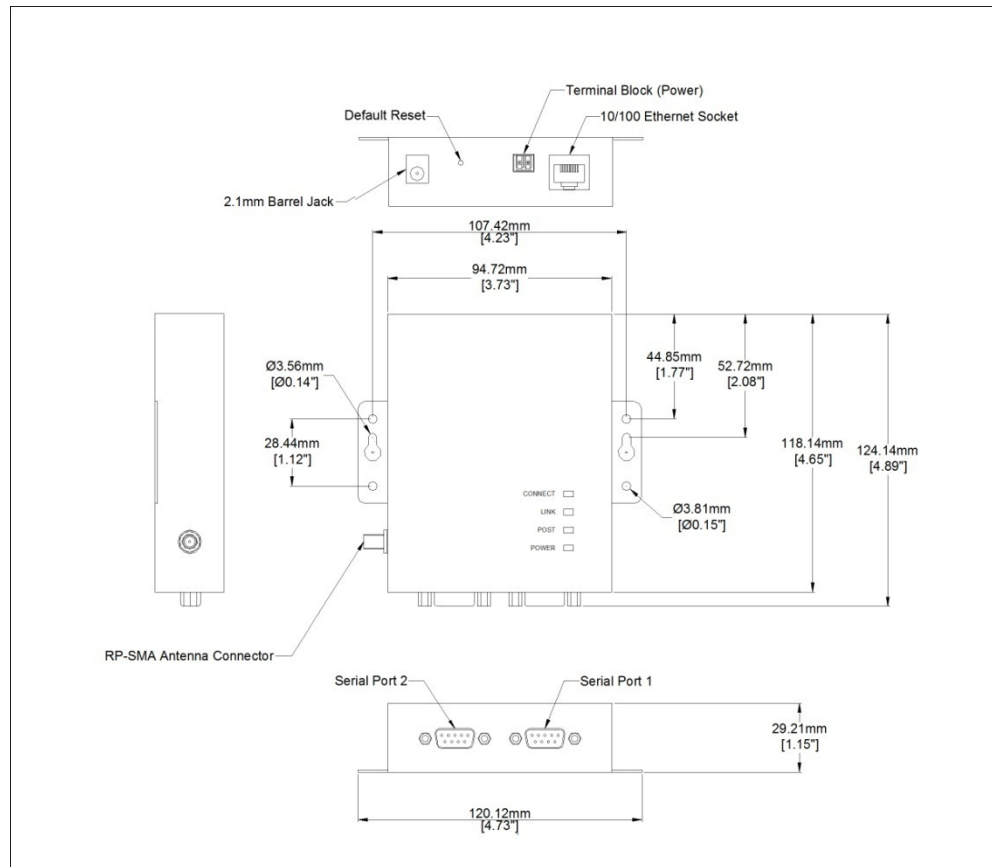
$$\text{Link Margin (dB)} = \text{EIRP} - \text{FPL} + (\text{RxS} + \text{RxA} - \text{RxC})$$

Where:

- TxP = Transmitter output power (dBm)
- TxA = Transmitter antenna gain (dBi)
- TxC = Transmitter to Antenna coax cable loss (dB)
- FPL = Free Path Loss (dB)
- RxS = Receiver receive sensitivity (dBm)
- RxA = Receiver antenna gain (dBi)
- RxC = Receiver to Antenna coax cable loss (dB)

To learn more about Link Margin, visit B&B Electronics' online technical library.

8.0 Mechanical Outline – Industrial Class



- Antenna Connector: **RP-SMA (Reverse Polarity – SMA)**
Requires 2.4GHz ISM band antenna, 50 input impedance, RP-SMA connector
- Serial Connector: **DB-9M (Male)**
Requires DB-9F (Female)
- Ethernet Connector: **RJ-45 Socket**
Requires RJ-45 plug, 10/100 Ethernet interface
- Power Connector: **2.1mm Barrel Jack**
Requires 2.1mm ID, 5.5mm OD, +5VDC center pin.
- Power Connector: **Terminal Block (2 connector)**
Requires 16-30 AWG gauge wire.

9.0 Getting Started

9.1 Unpack the AirborneAP™ Device

Unpack the AirborneAP™ Device and compare the package contents with the items listed on the front of the included Quick Start Guide. If any item is missing or damaged, contact B&B immediately.

Contact details can be found at www.bb-elec.com.

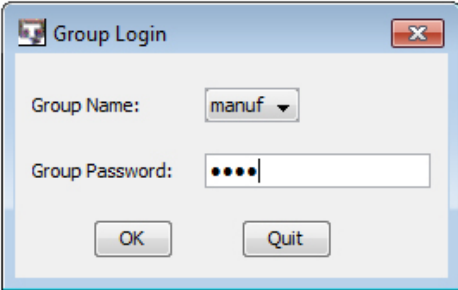
Be sure you have the following:

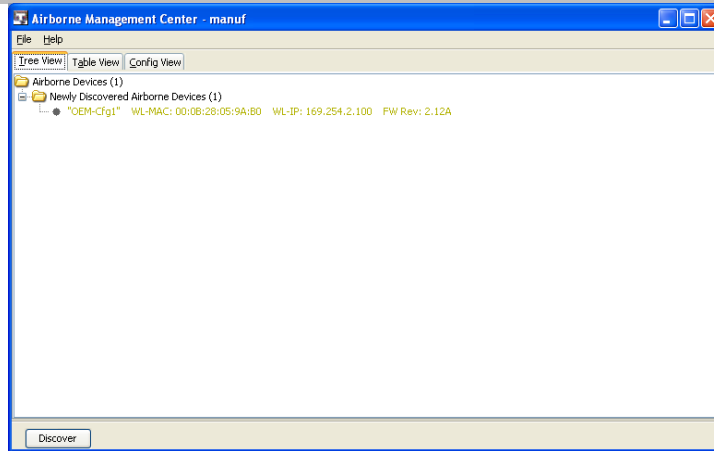
- Wireless Access Point
- CD with Airborne Command Center Software and User Manual
- (2) Antennas.

10.0 Setup (APXG-Q5420)

The instructions in Table 11 provide a step-by-step guide for configuration of the AirborneAP™ M2M Access Point/Wireless Router (APXG-Q5420).

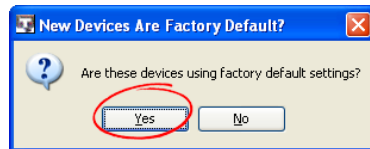
Table 11- APXG Accessing the Web Interface

1	Place the AirborneAP™ CD in the CD/DVD drive of the laptop or desktop you will be using to configure the AirborneAP™ device. Follow the on screen directions for installation.
2	Use a piece of Cat5 cable to connect the Ethernet port on the APXG to a network that supports DHCP, or directly to the Ethernet port on your laptop or desktop. Note: When connected directly to a computer Ethernet port, disable all other installed Ethernet adapters, wireless or wired, during configuration process.
3	Apply power to the APXG-Q5420. The unit will boot and display the following LED patterns: COMM: ● RED LINK : ● OFF POST: ● ORANGE POWER: ● BLUE
4	Run the Airborne Management Center (AMC) application. This was installed during the CD installation and a menu item will be found in the Airborne folder located in the programs directory of your system. The application will display the following dialog: <div style="text-align: center;">  </div> Select Group Name: manuf and enter Group Password: dpac
5	The AMC will load and discover the attached device.

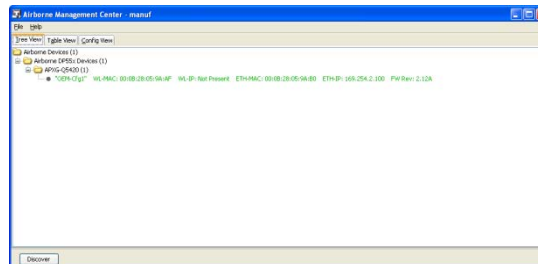


Note: You may be required to wait up to 180 seconds before the APXG is discovered and displayed. This is due to the use of the AutoIP fallback function when connected directly to the APXG.

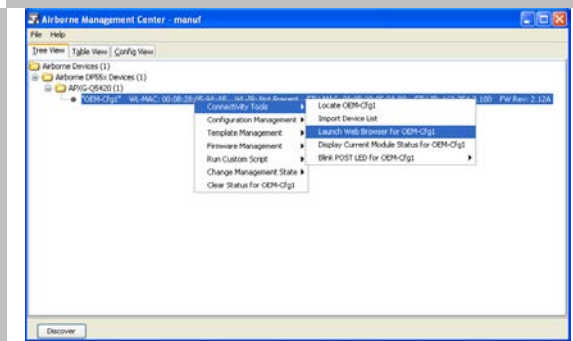
Manage Your Device



6



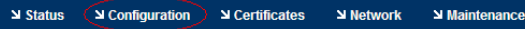
Right Click the device's name. Under "Connectivity Tools" choose "launch web browser for OEM-Cfg1." This will open the device's browser-based management window.



Username= "dpac"
Password = "dpac"



If this is not the first time you have accessed the web interface it will default to the Module Status page. If is the first time, the web browser will default to the Express setup page. To access the Express Setup Page, select the Configuration tab the top of the page (dark blue bar).



Then select the Express Setup link in the left hand column (light blue column) You are now ready to configure your device.



Note that none of your changes will take effect until you click the "Commit" button at the bottom of the page and then reboot the device.

If your device is connected and configured correctly you will see the following LED status.

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 COMM: ● **RED**
 LINK : ● **GREEN**
 POST: ● **GREEN**
 POWER: ● **BLUE**

9 Access Point in Router Mode

(Connected wireless devices are set up on their own network)

Discovery OEM Device Name = (Users option)
 Radio Startup Mode = On
 WLAN Connection Type = Access Point
 SSID = (Users option)
 WLAN Security Type = (Users option)
 Ethernet Role = Router
 WLAN Channel: = (Users option)
 Wireless DHCP Server Enabled = Enable
 WLAN DHCP: (Client) = (Not used)
 Ethernet DHCP(for networks with DHCP servers) = Enabled
 WLAN Static IP address = 192.168.10.100 (first IP ad dress assigned by WLAN DHCP server.)
 WLAN Subnet Mask = 255.255.255.0
 WLAN Gateway Address = 192.168.10.1

Express Setup	Current Values
Discovery OEM Device Name:	OEM-Cfg1
Radio Startup Mode:	On
WLAN Parameters	
WLAN Connection Type:	Access Point
SSID:	AirborneAP
WLAN Security Type:	WEP 128
WEP Key 1:	
Ethernet Parameters	
Ethernet Role:	Router
Access Point Parameters	
WLAN Channel:	1
Wireless DHCP Server Enabled:	Enable
IP Address Parameters	
WLAN DHCP:	Disabled
Ethernet DHCP:	Enabled
WLAN Static IP Address:	192.168.10.100
WLAN Subnet Mask:	255.255.255.0
WLAN Gateway Address:	192.168.10.1

Commit Cancel Defaults

Access Point in Bridge Mode

(Connected wireless devices are connected to corporate network)

Discovery OEM Device Name = (Users option)
 Radio Startup Mode = On
 WLAN Connection Type = Access Point
 SSID = (Users option)
 WLAN Security Type = (Users option)
 Ethernet Role = Bridge
 WLAN Channel = (Users option)
 Wireless DHCP Server Enabled = (Not used)
 WLAN DHCP: (Client) = (Not used)
 Ethernet DHCP (for networks with DHCP servers) = (Users option)
 WLAN Static IP address = 192.168.10.100 (Not used in Bridge Mode)
 WLAN Subnet Mask = 255.255.255.0 (Not used in Bridge Mode)
 WLAN Gateway Address = 192.168.10.1 (Not used in Bridge Mode)

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Express Setup	Current Values
Discovery OEM Device Name:	OEM-Cfg1
Radio Startup Mode:	On
WLAN Parameters	
WLAN Connection Type:	Access Point
SSID:	AirborneAP
WLAN Security Type:	WEP 128
WEP Key 1:	
Ethernet Parameters	
Ethernet Role:	Bridge
Access Point Parameters	
WLAN Channel:	1
Wireless DHCP Server Enabled:	Enable
IP Address Parameters	
WLAN DHCP:	Disabled
Ethernet DHCP:	Enabled
WLAN Static IP Address:	192.168.10.100
WLAN Subnet Mask:	255.255.255.0
WLAN Gateway Address:	192.168.10.1
Port Settings	
Web Server Port:	80
Telnet Port:	23
Internal FTP Server Listen Port:	21
Secure Shell Server (SSH) Port:	22

Commit Cancel Defaults

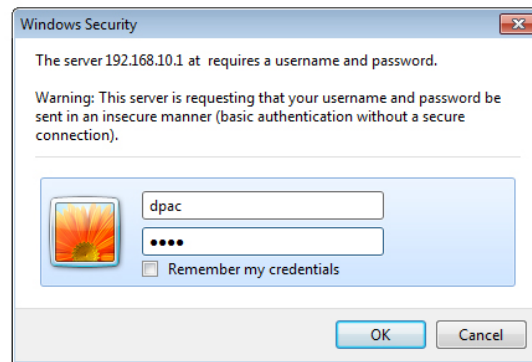
11.0 Using the Web Interface

AirborneDirect™ Device Servers and Wireless Adapters include a web interface that provides access to module status, parameter modification and certificate and configuration file management. To use the web interface follow the steps outlined in section “*Error! Reference source not found*” to establish the IP address of the module. After you know the IP address you can open a web browser and enter the IP address of the module in the URL window.

The web interface currently supports Internet Explorer v6.0 thru 8.0, Firefox v3.x, Opera v9.6+ and Chrome v4.0+.

When the authentication request is returned enter username “dpac” and password “dpac”.

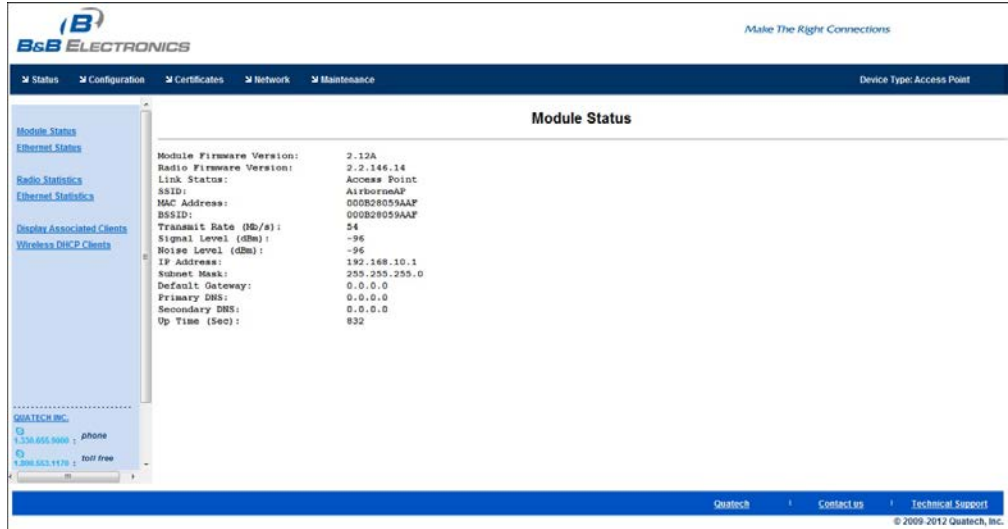
Figure 4 - Website Login



Username: dpac
Password: dpac

After successfully authenticating with the module, you will be logged into the web server. If this is the first time you have accessed the device the Express Setup page will be displayed. See section 12.0 for configuration of the device using this page. If you have previously configured the device the default home page will be displayed (See Figure 5). From here you can update device settings if required. A quick overview of the web interface follows.

Figure 5 - Default Home Page



11.1 Navigation Bar

Figure 6- Website Navigation Bar



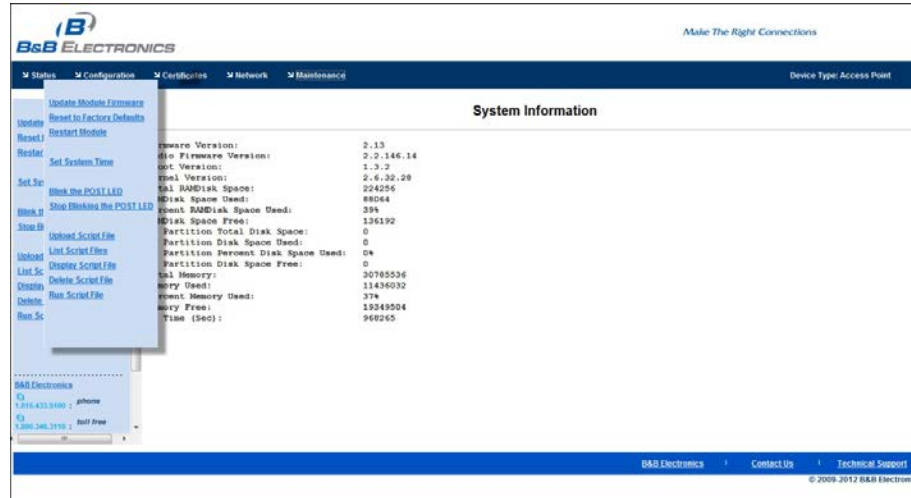
Table 12 - Navigation Bar Items

Title	Description
Status	Provides status and performance characteristics for the network interfaces available. Includes radio statistics and Ethernet statistics.
Configuration	Allows viewing and configuration of all the interface settings including wireless LAN, network connectivity, security, FTP client, serial port and web server. Includes the interface for delivery of OEM and user configuration files, as well as management and viewing of current configurations.
Certificates	This menu item provides the interface for certificate delivery and management. Included in this section are the abilities to view resident certificates, upload and delete certificates.
Network	With this section it is possible to locate other Airborne Device Server modules on the current network. It is also possible to scan for available Access Points.
Maintenance	This section allows the updating of the modules firmware. You can also revert the device settings to OEM defaults and restart the module remotely. The module locate function is also enabled in this section.

11.2 Feature Links

Each Navigation Bar link gives you access to a set of Features/Fields. These are different for each Navigation option and change for different device selections. The Feature Links are located in the left hand panel of the web page. (See Figure 7.)

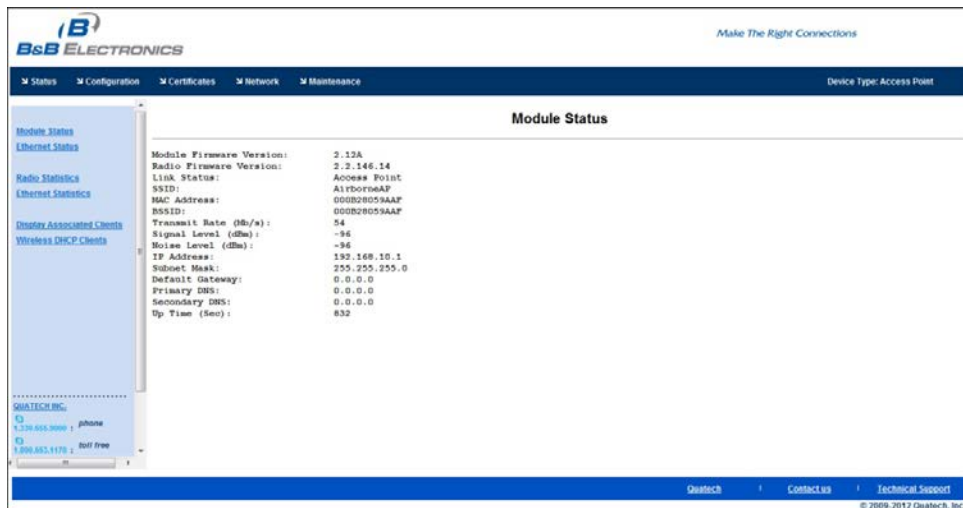
Figure 7- Feature Links



11.3 Navigating the Website

A standard web page looks like Figure 8. The navigation bar runs along the top of the page. Page-specific feature links are listed in the left hand pane of the page. The specific parameters are shown in the main display panel.

Figure 8 - Airborne Web Page



To select any of the items, move your cursor over the item and press the left-hand mouse button. The items in the Navigation bar and the Feature Links are hyperlinks and will cause the mouse cursor to change from an arrow pointer to a finger pointer when placed over them.

To find out what a specific field does, click on the question mark next to the field. A help balloon will appear. It will provide details on the function of the field and its valid range of values.

11.4 Updating a Field

To update a field, select the field by pressing the Left Hand mouse button. Then either type in the appropriate content or select it from the pull down menu.

Once you have finished modifying parameters, scroll to the bottom of the page and press the **Commit** button. The page will then indicate that the changes have been completed successfully. It will offer you the choice of returning to the configuration page by pressing the **Reload** button or restarting the module by pressing the **Reboot** button. Changes to the parameters will not be applied until a module restart (reboot) has been completed.

Before the **Commit** button has been pressed, all modified fields can be returned to their original state by pressing the **Cancel** button.



Note that the changes to the parameters will not be applied until a module restart (reboot) has been completed.

11.5 Uploading Certificates

Adding certificates to the Airborne Device Server module is very easy when using the web interface.

Figure 9 - Upload Certificate Web Page

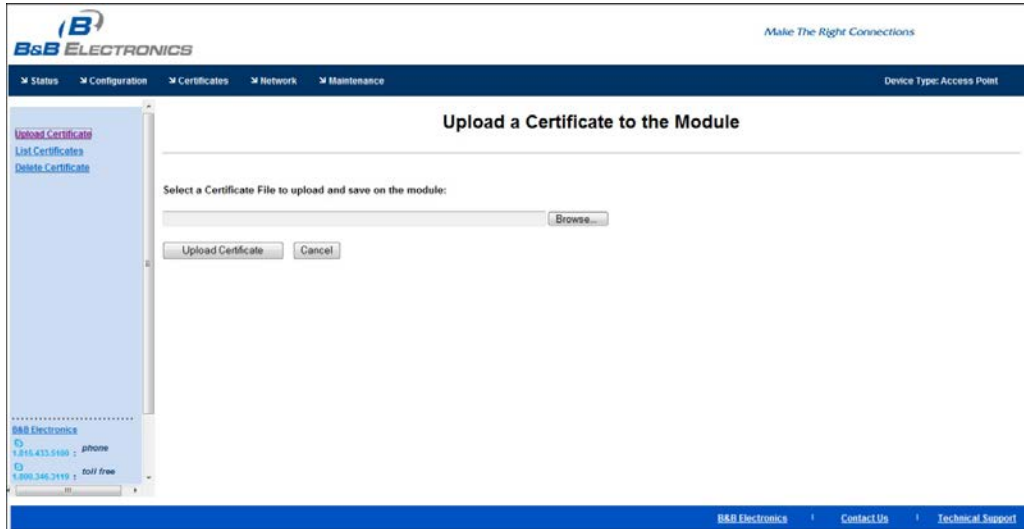


Table 13 - Uploading Certificates

Step	Description
<i>Navigation Bar</i> Select Certificates	You will see a list of certificates currently resident on the module when you enter the Certificate File List window.
<i>Feature Link</i> Select Upload Certificates	You will see a field for entering the location of the certificate you want to upload.
Press Browse... Button	This will open a dialog box in which you can locate the certificate you wish to upload to the module. Select the Certificate file and press Open . This will return you to the Certificate Upload window. The file you have chosen will now be listed next to the Browse... button.
Press Upload Certificate	You will see a notice that the certificate has been successfully uploaded to the module.
Press List Certificates Files	This will show the current certificates resident on the module and will include the file you have just uploaded.

11.6 Upload Configuration Files

The Airborne Device Server module supports both OEM and User configuration files for provisioning the module. Delivery of these configuration files can be performed through the web interface. A full description of these files can be found in the Airborne CLI manual.

To upload configuration files follow the steps in Table 14.

Figure 10 - Upload Configuration Web Page

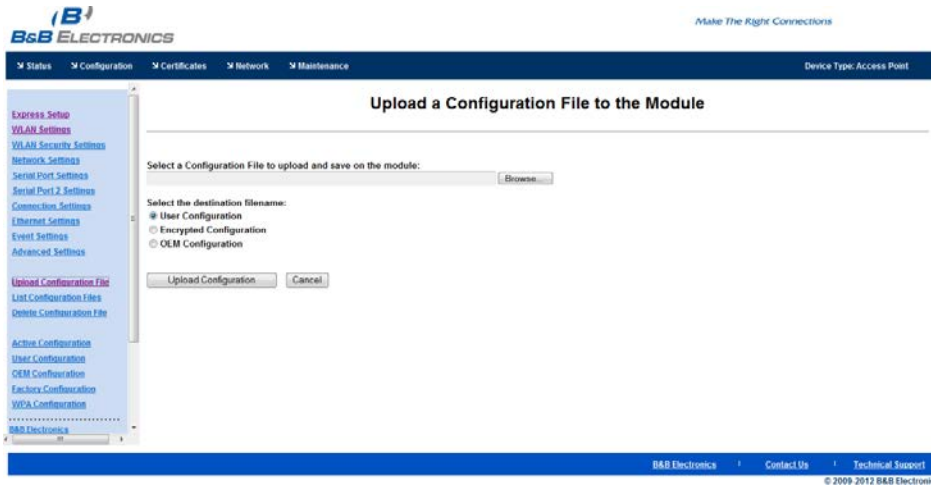


Table 14 - Uploading Configurations

Step	Description
<p><i>Navigation Bar</i></p> <p>Select Configuration</p>	You will see major WLAN parameters displayed.
<p><i>Feature Link</i></p> <p>Select Upload Configuration File</p>	The page will present you with a field for entering the location of the configuration you want to upload, along with a choice of OEM, User or Encrypted Configuration.
<p>Press Browse... Button</p>	<p>This will open a dialog box in which you can locate the certificate you wish to upload to the module. Select the configuration file and press Open.</p> <p>This will return you to the Configuration Upload window. The file you have chosen will appear in the field next to the Browse... button.</p>
<p>Select User or OEM Configuration</p>	This defines the configuration you are installing. OEM Configurations will survive a factory reset, User will not.
<p>Press Upload Configuration</p>	You will see a notice that the configuration has been successfully uploaded to the module.
<p>Press List Configuration Files</p>	This will display the current configuration files resident on the module and will include the file you have just uploaded.

*

Uploading a configuration file will overwrite any configuration file already stored on the module. This will cause a change in configuration when a module restart is performed.

IMPORTANT: Confirm that the OEM or USER settings in the configuration files will allow the user to communicate with the module after the upload and a restart has been completed.

11.7 Updating Firmware

The module's firmware may be updated using the web interface. Please refer to Table 15 for the procedure to do this.

Updating the firmware will not alter any existing configuration files or certificates loaded on the module.

You can obtain the version of firmware you wish to install from the B&B Electronics website or B&B Electronics technical support. The firmware will be a binary image file (.img) and will indicate the version of the firmware in the file name.

Once you have obtained the firmware, save the firmware file to a location on the system that you are using to control the module, or at a location that is accessible to that system. Use the Firmware Update page to locate and upload the new firmware.

Figure 11 - Firmware Update Page

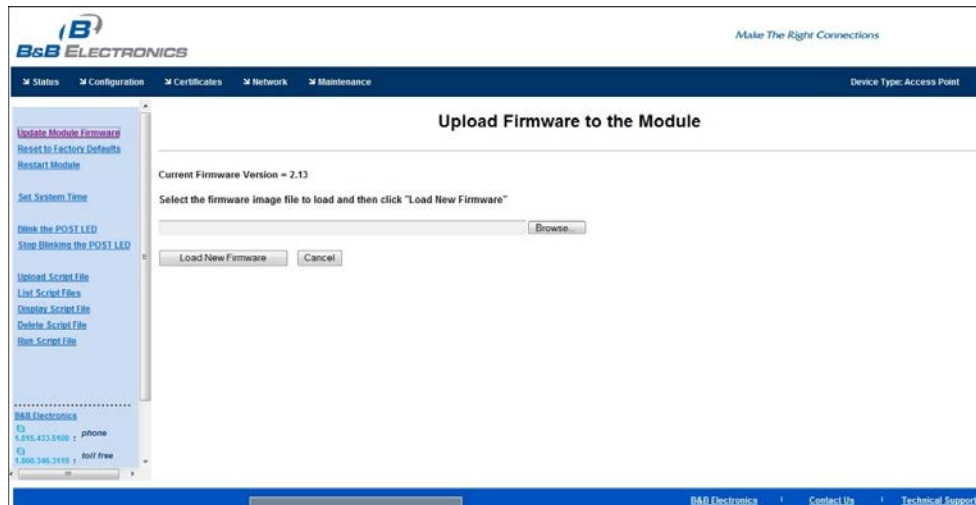
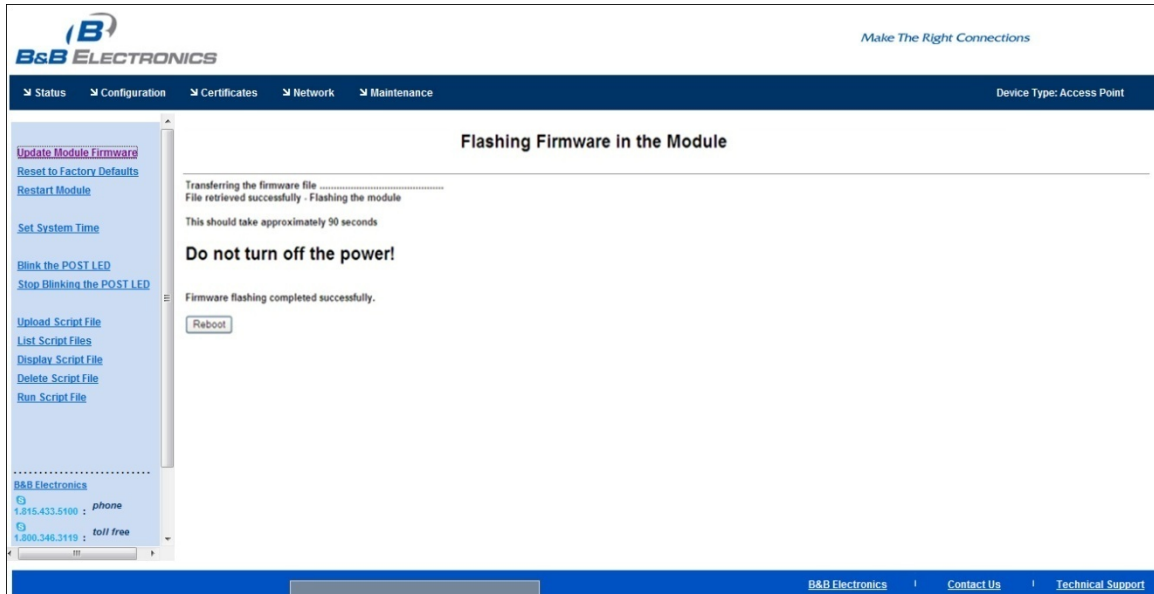


Figure 12 - Firmware Update in Progress



When the firmware has been successfully flashed, “Firmware flashing completed successfully” will appear on screen. Select the Restart button. You may confirm the change on the Module Status page.

Table 15 - Updating Firmware

Step	Description
<p><i>Navigation Bar</i> Select Maintenance</p>	This will open a window showing the current module status.
<p><i>Feature Link</i> Select Update Module Firmware</p>	The page will present you with a field to enter the location of the module firmware you want to upload. The current firmware version number is displayed at the top of the page.
Press Browse... Button	This will open a dialog box to help you locate the firmware image that you wish to upload to the module. Select the firmware image file and press Open . This will return you to the Upload Firmware window. The location and file name of the firmware image you wish to upload will now appear in the field next to the Browse... button.
Press Load New Firmware	You will then see a notice that the firmware upload has begun (Figure 12). When the upload has been completed successfully and the firmware has been updated, a window indicating this will appear (Figure 13).
Press Reboot	This will restart the module and the new firmware will be loaded.



DO NOT REMOVE POWER FROM THE MODULE DURING THE FIRMWARE UPDATE.

This may cause the device to become non-operational. If this happens please contact Quatech Technical Support.

12.0 Express Setup Configuration Page

When the device’s web interface is accessed for the first time an Express Setup page will be shown. This page is designed to allow a quick device setup by presenting the most popular device configuration options in a single location. For more advanced configurations the full set of options are available in the feature links(left-hand column).

The Express Setup web page will display the necessary fields based upon the selections made during configuration. The Express Setup page looks like (Figure 14):

Figure 13 - Express Setup Page

Express Setup	Current Values
Discovery OEM Device Name:	OEM-Cfg1
Radio Startup Mode:	On
WLAN Parameters	
WLAN Connection Type:	Access Point
SSID:	AirborneAP
WLAN Security Type:	WEP 128
WEP Key 1:	
Ethernet Parameters	
Ethernet Role:	Bridge
Access Point Parameters	
WLAN Channel:	1
Wireless DHCP Server Enabled:	Enable
IP Address Parameters	
WLAN DHCP:	Disabled
Ethernet DHCP:	Enabled
WLAN Static IP Address:	192.168.10.100
WLAN Subnet Mask:	255.255.255.0
WLAN Gateway Address:	192.168.10.1
Port Settings	
Web Server Port:	80
Telnet Port:	23
Internal FTP Server Listen Port:	21
Secure Shell Server (SSH) Port:	22
<input type="button" value="Commit"/> <input type="button" value="Cancel"/> <input type="button" value="Defaults"/>	

To configure the device for operation each field must be configured correctly. The following steps should be taken to configure the device (Note: Default settings may hide certain fields that are not part of default configuration):

Table 16 - Express Page Setup

Step	Description
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of WLAN Parameters.
<i>Feature Link</i> Select Express Setup	This step is optional. If this is the first time the device has been configured this page will automatically be displayed.

Step	Description
Select Discovery OEM Device Name	<p>This parameter allows you to name the device uniquely or group it into a functional set. When device discovery is used this name identifies the found device.</p> <p>If you wanted to uniquely identify the device you could mark it with a label like Dev1, for example, and then enter Dev1 in this field. When the device is found it will identify itself as Dev1.</p> <p>Alternately you could indicate the type of equipment the device is attached to, like a Haas TL-2 (CNC Turning Center), by giving the unit a name like Haas_TL_2. When discovered you can then identify the device you are accessing.</p> <p>Enter the text string if you wish to change the default value. This field is optional.</p>
Select Radio Startup Mode	Select On from the drop down menu for the radio to operate.
Select WLAN Connection Type	Default mode is Access Point. To use the device as a wireless router (default mode) or as an Infrastructure Access Point (member of an existing wireless network) the connection type should be Access Point .
Select SSID	Enter the name of the wireless network you wish to setup. This field is case sensitive and may include spaces.
Select Wireless LAN Security Type	<p>Select the security type you wish to use with your wireless network.</p> <p>Depending upon the option you choose you may have to enter additional information. Once you have selected the security type the required inputs will be displayed. All displayed fields must be completed.</p> <p>If an option is displayed, but grayed out, that option is unavailable in Access Point mode.</p>
Select Ethernet Role	<p>The default setting is Wireless Router. In this mode devices on the wired port are assigned static IP addresses or there must be a DHCP server on the network. A firewall and port forwarding are available to allow/restrict access between the WLAN and Ethernet networks.</p> <p>Change this to Bridge if your application has Ethernet devices on the wired port. All devices can be on the same subnet and wireless clients will have access to resources on the wired port.</p>
Select WLAN Channel	<p>This is the channel the Access Point will use to communicate with clients. It is recommended that you use only one Access Point per channel.</p> <p>The default is 1.</p>
Select Wireless DHCP Server Enabled	<p>When Enabled this will provide IP addresses to clients that are using a DHCP client for IP address assignment. (Router mode)</p> <p>When the Ethernet port is in Bridge mode, the DHCP server will provide IP addresses for Ethernet clients also.</p>
Select WLAN DHCP	This parameter is ignored in AP mode.
Select Ethernet DHCP	<p>The function of this field depends upon the Ethernet mode setting.</p> <p>If Ethernet mode is Client; enabling this will cause the Ethernet interface to obtain an IP address from a DHCP on the network attached to the Ethernet port.</p> <p>If Ethernet Mode or Bridge is Router; This parameter is ignored.</p>

Step	Description
Select WLAN Static IP	<p>The function of this field depends upon whether or not the DHCP Server is enabled on the WLAN interface.</p> <p>If the DHCP Server is disabled, this field defines the static IP address for the wireless interface.</p> <p>If the DHCP Server is enabled, this field defines the first IP address leased by the DHCP server. Addresses are incremented as new clients are leased addresses.</p> <p>Default: 192.168.10.100</p>
Select WLAN Subnet Mask	<p>The function of this field depends upon whether or not the DHCP Server is enabled on the WLAN interface.</p> <p>If the DHCP Server is disabled, this field defines the subnet mask used by the wireless interface.</p> <p>If the DHCP Server is enabled, this field defines the subnet mask provided by the DHCP server.</p> <p>Default: 255.255.255.0</p>
Select WLAN Gateway Address	<p>The function of this field depends upon whether or not the DHCP Server is enabled on the WLAN interface.</p> <p>If the DHCP Server is disabled, this field defines the gateway IP address used by the wireless interface.</p> <p>If the DHCP Server is enabled, this field defines the gateway IP address provided by the DHCP server.</p> <p>If the DHCP Server is enabled, this field defines the IP address of the WLAN interface of the APXG.</p> <p>Default: 192.168.10.1</p>
Select Ethernet Static IP	<p>The function of this field depends upon whether or not the Ethernet Mode setting.</p> <p>If Ethernet Mode is Client, this field defines the IP address to be used if DHCP is not being used or if DHCP fails.</p> <p>If Ethernet Mode is Bridge or Router, this field defines the static IP address to be used by the Ethernet interface.</p> <p>When the Ethernet Mode is Bridge it is recommended that this field be set to an IP address within the same subnet as the WLAN Static IP address.</p> <p>Default: 192.168.2.100</p>
Select Ethernet Subnet Mask	<p>This field defines the subnet to be used with the Ethernet Static IP address.</p> <p>Default: 255.255.255.0</p>
Select Ethernet Gateway Address	<p>This field defines the Gateway IP address to be used by the Ethernet port.</p> <p>Default: 0.0.0.0</p>
(Optional) Select Web Server Port	<p>Only displayed when Ethernet Mode is set to Bridge.</p> <p>Defines the port number used by the device for HTTP access (web interface).</p> <p>It is recommended that this be changed from the default 80.</p>
(Optional) Select Telnet Port	<p>Only displayed when Ethernet Mode is set to Bridge.</p> <p>Defines the port number used by the device for Telnet & TCP/IP access (CLI interface).</p>
(Optional) Select Internal FTP Server Listen Port	<p>Only displayed when Ethernet Mode is set to Bridge.</p> <p>Defines the port number used by the device to listen for FTP access.</p>
(Optional) Select Secure Shell Server (SSH) Port	<p>Only displayed when Ethernet Mode is set to Bridge.</p> <p>Defines the port number used by the device to listen for SSH access.</p>

Step	Description
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Express Settings page. Select this if you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device is rebooted it will attempt to authenticate to the configured network. As long as the network is in range the wireless interface will connect. If the network is using DHCP an IP address will be assigned to the WLAN interface and IP connectivity is possible over the WLAN network. If the network is using static IP addresses it will be necessary to configure the network interface. See the next step.

The web interface supports advanced configuration of the device through the additional pages. The following sections provide guidance on how to use these pages for specific configurations.

13.0 Configuring the Wireless Interface

For configurations other than Access Point please refer to the AirborneDirect™ User Manual.

14.0 Configuring the Security Settings

Almost all 802.11 networks use some sort of security to protect the network from unauthorized use. There are many types of security options available. The following section will cover configurations for the most popular options.

14.1 Configuring for WEP Security

Although an old protocol, WEP is still used by many networks. The Airborne device supports many variations of WEP. However, we will only cover the most popular in the following table.

Table 17 - Configuring for WEP Security

Step	Description
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of WLAN Parameters.
<i>Feature Link</i> Select WLAN Security Settings	The wireless interface must be configured before configuring the security for the network. A page showing the range of security options and fields is displayed.
Select Wireless LAN Security	Select WEP64 or WEP128 from the drop down list. The options identify the length of the key that will be used with the security protocol. If WEP64 is selected the key length is 10 digits. If WEP128 is selected the key length is 26 digits.
Select Authentication Type	Select Auto from the drop down list. This field should not need to be changed. Only modify it if you have been specifically told to do so by the network administrator.
Select Default WEP Key	Select the default key you wish to use with the AP. There must be a valid key in the selected key number field.
Select WEP Key 1 - 4	Select the key field that matches the one selected in Default WEP Key field. If WEP64 is selected the key length is 10 digits. If WEP128 is selected the key length is 26 digits. More than one key field can be completed.
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the WLAN Settings page. Select this if you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device has rebooted WEP security will be applied to the network. Any client using the network will need to be configured to match the installed settings.

14.2 Configuring for WPA-PSK Security

This security type is a very popular type and is easy to configure. Most often used in small office and home environments.

Table 18 - Configuring for WPA Security

Step	Description
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of WLAN Parameters.
<i>Feature Link</i> Select WLAN Security Settings	The wireless interface must be configured before configuring the security for the network. A page showing the range of security options and fields is displayed.
Select Wireless LAN Security	Select WPA-PSK from the drop down list.
Select WPA Protocol Version	Select Auto from the drop down list. This field should not need to be changed. Only modify it if you have been specifically told to do so by the network administrator.
Select WPA/WPA2 Pre Shared Key (PSK)	Enter the PreShared Key (PSK) you wish to use on the network. It must be a minimum of eight characters long. The PSK cannot include spaces.
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the WLAN Settings page. Select this if you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device has rebooted WPA-PSK security will be applied to the network. Any client using the network will need to be configured to match the installed settings.

14.3 Configuring for WPA2-PSK Security

This security type is a very popular type and is easy to configure. This provides the highest level of security available for the APXG in Access Point mode.

Table 19 - Configuring for WPA2 Security

Step	Description
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of WLAN Parameters.
<i>Feature Link</i> Select WLAN Security Settings	The wireless interface must be configured before configuring the security for the network. A page showing the range of security options and fields is displayed.
Select Wireless LAN Security	Select WPA2-PSK from the drop down list.
Select WPA/WPA2 Pre Shared Key (PSK)	Enter the PreShared Key (PSK) you wish to use with the network. The PSK cannot include spaces.
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the WLAN Settings page. Select this if you have further configuration options to change.

Step	Description
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device has rebooted WPA2-PSK security will be applied to the network. Any client using the network will need to be configured to match the installed settings.

15.0 Configuring the Serial Device Server

The APXG-Q5240 can be used as a Serial Device Server even when in Access Point mode. The following section will cover the full configuration of a Serial Device.

The following section explains how to manually configure the unit to accept TCP/IP connections and automatically setup a data tunnel with one of the serial ports. The configuration is independent of the source of the request, as the tunnel ports are available to both the WLAN and Ethernet interfaces.

Airborne devices support conditional tunnel binding based upon rules included in the configuration. The major options will be included.

15.1 Configuring Serial Port for Access on Telnet Port

A data tunnel can be made using the device's telnet port as the network connection port. This does require authenticating with the device and manually initiating the tunnel connection. Configuring the device to support this approach is covered in the following table.

Table 20—Configure Data Tunnel on Telnet Port

Step	Description
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of WLAN Parameters.
<i>Feature Link</i> Select Connection Settings	The wireless interface and security must be configured before configuring the Ethernet settings. A page is displayed that shows the configuration options for TCP/IP and UDP connections to the device. You may configure Telnet, HTTP and SSH ports on this page.
Select Telnet Port	Enter the port number you wish to use for a telnet (TCP/IP) connection to the device. The default 23 should only be changed if your application requires access to port 23 for another purpose.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the Connection Settings page.
<i>Feature Link</i> Select Serial Port 1 Settings/Serial Port 2 Settings	The wireless interface and security must be configured before configuring the Ethernet settings. Displays a page showing the serial port configuration. You may set the default mode of operation for the serial interfaces on this page
Select Serial CLI Default Mode	Select Listen from the drop down menu.
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Serial Port Settings page. Select this if you have further configuration options to change.

Step	Description
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device has rebooted it will attempt to authenticate to the configured network. As long as the network is in range the wireless interface will connect. Once authenticated to the network it is possible for a TCP/IP connection to be made on the Telnet port.

To establish a data tunnel and gain access to the serial data from the WLAN or Ethernet interface follow the steps in Table 21.

Table 21 - Data Tunnel using Telnet Port

Step	Description
Open TCP socket to device	Using the WLAN IP Address and configured telnet port number.
Authenticate with device	<code>authdpacdpac</code> Any user level above L5 can authenticate with the unit. Device responds <code>OK</code>
Open data tunnel to serial port	<code>pass-x</code> Where <code>x</code> can be <code>p1</code> , <code>p2</code> or <code>any</code> . <code>p1orp2</code> binds to the indicated serial port, as long as the serial port is in listen mode and does not already have a data tunnel open. <code>Any</code> binds to the first serial port which is in listen mode and does not already have a data tunnel open.

15.2 Configuring Serial Port 1 for Access on Tunnel Port

A data tunnel can be made using the device's tunnel port as the network connection port. This does not require authenticating with the device and automatically initiates the tunnel connection. Configuring the device to support this approach is covered in the following table.

Table 22 – Configure Data Tunnel on Serial Port 1 Tunnel Port (TCP)

Step	Description
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of WLAN Parameters.
<i>Feature Link</i> Select Connection Settings	The wireless interface and security must be configured before configuring the Ethernet settings. A page appears showing the configuration options for TCP/IP and UDP connections to the device. Configuration of Telnet, HTTP and SSH ports can be done on this page.
Select Tunnel Enabled	Select Enabled .

Step	Description
Select Tunnel Port	Enter the port to be used for the tunnel. Default is 8023 . This should only be changed if a port is already defined for the application server or it is already being used by another service.
Select Tunnel Mode	Select TCP from drop down menu.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the Connection Settings page.
<i>Feature Link</i> Select Serial Port Settings	The wireless interface and security must be configured before configuring the Ethernet settings. Displays a page showing the serial port configuration. You will set the default mode of operation for the serial interface here.
Select Serial CLI Default Mode	Select Listen from the drop down menu.
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Serial Port Settings page. Select this if you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device has rebooted it will attempt to authenticate to the configured network. As long as the network is in range the wireless interface will connect. After authenticated is completed you will be able to make a TCP/IP connection on the Telnet port.

To establish a data tunnel and gain access to the serial data from the WLAN or Ethernet interface follow the steps in Table 23.

Table 23 - Data Tunnel using Tunnel Port on Serial Port 1

Step	Description
Open TCP socket to device	Using the WLAN IP Address and configured tunnel port number for Serial Port 1 (Default 8023).

15.3 Configuring Serial Port 2 for Access on Tunnel Port

A data tunnel can be made using the device's tunnel port as the network connection port. This does not require authenticating with the device and automatically initiates the tunnel connection. Configuring the device to support this approach is covered in the following table.

Table 24 – Configure Data Tunnel on Serial Port 2 Tunnel Port (TCP)

Step	Description
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of WLAN Parameters.

Step	Description
<i>Feature Link</i> Select Connection Settings	The wireless interface and security must be configured before configuring the Ethernet settings. A page showing the configuration options for TCP/IP and UDP connections to the device. Configuration of Telnet, HTTP and SSH ports is possible through this page.
Select Tunnel Enabled – Serial Port 2	Select Enabled .
Select Tunnel Port – Serial Port 2	Enter the port to be used for the tunnel. Default is 8024 , this should only be changed if a port is already defined for the application server or it is already being used by another service.
Select Tunnel Mode – Serial Port 2	Select TCP from drop down menu.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the Connection Settings page.
<i>Feature Link</i> Select Serial Port 2 Settings	The wireless interface and security must be configured before configuring the Ethernet settings. Displays a page showing the serial port configuration, setting the default mode of operation for the serial interface is done in this page.
Select Serial CLI Default Mode	Select Listen from the drop down menu.
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Serial Port 2 Settings page. Select this if you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device has rebooted it will attempt to authenticate to the configured network. As long as the network is in range the wireless interface will connect. Once authenticated the network it is possible for a TCP/IP connection to be made on the Telnet port.

To establish a data tunnel and gain access to the serial data from the WLAN or Ethernet interface follow the steps in Table 25.

Table 25 - Data Tunnel using Tunnel Port on Serial Port 2

Step	Description
Open TCP socket to device	Using the WLAN IP Address and configured tunnel port number for Serial Port 2 (Default 8024).

15.4 Configuring Serial Port 1 as TCP Client

In this mode the device will attempt to initiate a TCP connection to a network based server and establish a data tunnel with Serial Port 1 on a successful network connection.

Table 26 - Configure Serial Port 1 as TCP Client

Step	Description
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of WLAN Parameters.
<i>Feature Link</i> Select Connection Settings	The wireless interface and security must be configured before configuring the Ethernet settings. You will see a page showing the configuration options for TCP/IP and UDP connections to the device. You may configure Telnet, HTTP and SSH ports on this page.
Select TCP Port	Enter the port on which the target server is listening for TCP connections.
Select TCP Timeout	Enter the inactivity timeout in seconds, after which the device will close the open data tunnel on Serial Port 1. The default 0 disables the timeout.
Select TCP Retry Time	Enter the period(in seconds)that the device should use to retry establishing the TCP connection to the target server.
Select Primary TCP Target Server IP Address	Enter the IP address of the primary target server. The address must be in the format: XXX.XXX.XXX.XXX
<i>Optional</i> Select Secondary TCP Target Server IP Address	Enter the IP address of the secondary target server. The address must be in the format: XXX.XXX.XXX.XXX This address will be used if the initial attempts to connect to the primary server fail. This field is optional.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the Connection Settings page.
<i>Feature Link</i> Select Serial Port 1 Settings	The wireless interface and security must be configured before configuring the Ethernet settings. You will see a page showing the serial port configuration. You may set the default mode of operation for the serial interface on this page.
Select Serial CLI Default Mode	Select Pass from the drop down menu.
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Serial Port 1 Settings page. Select this if you wish to change additional configuration options.

Step	Description
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device has rebooted it will attempt to authenticate to the configured network. As long as the network is in range the wireless interface will connect. Once authenticated to the network the device will attempt to make a TCP connection with primary target server, using the configured port number.

15.5 Configuring Serial Port 2 as TCP Client

In this mode the device will attempt to initiate a TCP connection to a network based server and establish a data tunnel with Serial Port 2 on a successful network connection.

Table 27 - Configure Serial Port 2 as TCP Client

Step	Description
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of WLAN Parameters.
<i>Feature Link</i> Select Connection Settings	The wireless interface and security must be configured before configuring the Ethernet settings. You will see a page showing the configuration options for TCP/IP and UDP connections to the device. You may configure Telnet, HTTP and SSH ports on this page.
Select TCP Port – Serial Port 2	Enter the port on which the target server is listening for TCP connections.
Select TCP Timeout – Serial Port 2	Enter the inactivity timeout in seconds, after which the device will close the open data tunnel on Serial Port 1. The default 0 disables the timeout.
Select TCP Retry Time – Serial Port 2	Enter the period (in seconds) the device should use to retry establishing the TCP connection to the target server.
Select Primary TCP Target Server IP Address – Serial Port 2	Enter the IP address of the primary target server. The address must be in the format: XXX.XXX.XXX.XXX
<i>Optional</i> Select Secondary TCP Target Server IP Address – Serial Port 2	Enter the IP address of the secondary target server. The address must be in the format: XXX.XXX.XXX.XXX This address will be used if the initial attempts to connect to the primary server fail. This field is optional.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the Connection Settings page.

Step	Description
<i>Feature Link</i> Select Serial Port 2 Settings	The wireless interface and security must be configured before configuring the Ethernet settings. You will see a page showing the serial port configuration. You may set the default mode of operation for the serial interface on this page.
Select Serial CLI Default Mode	Select Pass from the drop down menu.
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Serial Port 2 Settings page. Select this if you wish to change additional configuration options.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device has rebooted it will attempt to authenticate to the configured network. As long as the network is in range the wireless interface will connect. Once authenticated to the network the device will attempt to make a TCP connection with primary target server, using the configured port number.

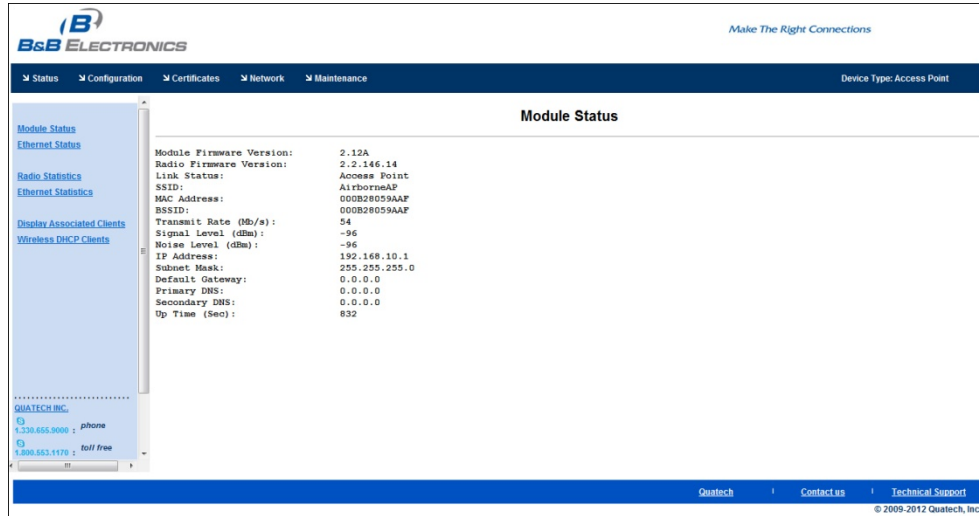
16.0 Web Page Overview

The following section highlights the contents of each web page and provides a reference to the associated CLI command. For further explanation of each of the fields please refer to the referenced command in the table (See Airborne Enterprise Command Line Reference Manual).

Module Status

URL /Status/Module Status

Description When authenticated to the Airborne device, this page provides important information about the device's firmware version, wireless connection status and wireless interface network configuration.



Field	CLI Command
Displayed Page	wl-info

Ethernet Status

URL /Status/Ethernet Status

Description Provides important information about the device's firmware version, Ethernet connection status and Ethernet interface network configuration.

The screenshot shows the B&B Electronics web interface. The top navigation bar includes links for Status, Configuration, Certificates, Network, and Maintenance. The main content area is titled "Ethernet Status" and displays the following information:

```

Module Firmware Version: 2.13
Link Status: Connected
Ethernet MAC Address: 000829059A7E
Link Speed: 100Mb/s
Duplex: Full
IP Address: 10.1.2.222
Subnet Mask: 255.255.255.0
Default Gateway: 0.0.0.0
Primary DNS: 0.0.0.0
Secondary DNS: 0.0.0.0
Up Time (Sec): 970255
  
```

At the bottom of the interface, there are links for B&B Electronics, Contact Us, and Technical Support.

Field	CLI Command
Displayed Page	eth-info

Radio Statistics

URL /Status/Radio Statistics

Description Provides information about the packet transmit and receive performance of the wireless interface.

Radio Statistics

Rx Packets:	1648007
Rx Bytes:	42861729
Rx Errors:	0
Rx Dropped:	0
Rx Overruns:	0
Tx Packets:	1257368
Tx Bytes:	4353932
Tx Errors:	0
Tx Dropped:	0
Tx Overruns:	0

Field	CLI Command
Displayed Page	stats<blank> or radio

Ethernet Statistics

URL /Status/Ethernet Statistics

Description Provides information about the packet transmit and receive performance of the Ethernet interface.

Ethernet Statistics

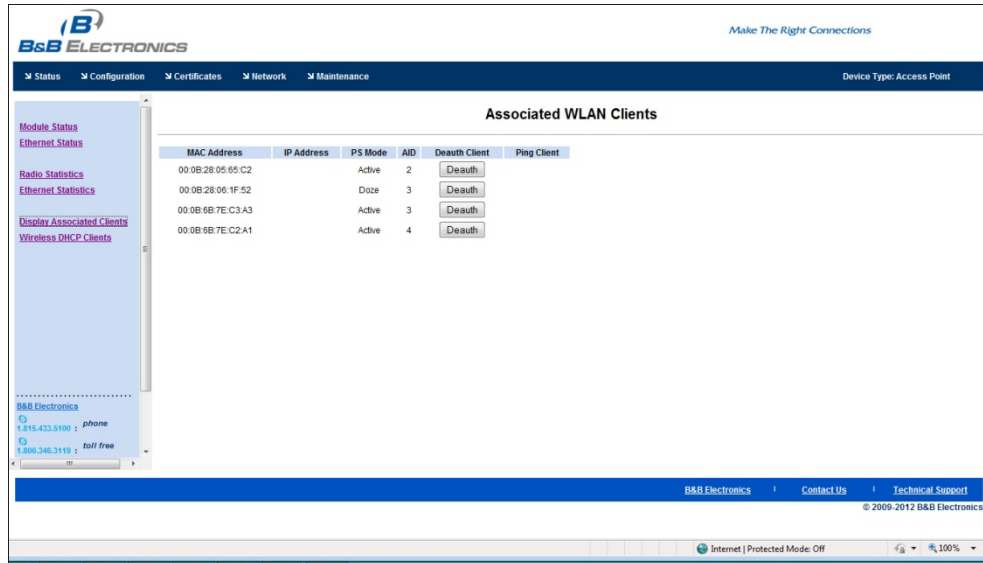
Rx Packets:	19357160
Rx Bytes:	3358282914
Rx Errors:	0
Rx Dropped:	0
Rx Overruns:	0
Tx Packets:	5878
Tx Bytes:	3540019
Tx Errors:	0
Tx Dropped:	0
Tx Overruns:	0

Field	CLI Command
Displayed Page	statsethernet

Display Associated Clients

URL /Status/Display Associated Clients

Description Displays associated clients.

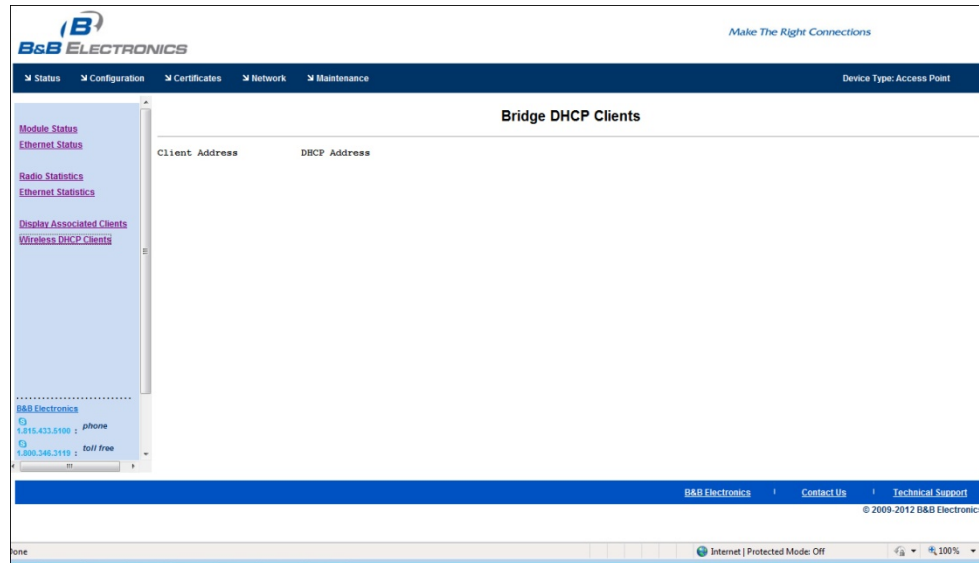


Field	CLI Command
Displayed Page	eth-clients

Wireless DHCP Clients

URL /Status/Wireless DHCP Clients

Description Displays wireless DHCP clients.



Field	CLI Command
Displayed Page	eth-dhcp-clients

Express Setup

URL /Configuration/Express Setup

Description Provides a simplified configuration option set in a single page. This will be the default home page when configuring the device for the first time, or after a factory reset has been performed.

The screenshot shows the B&B Electronics Express Setup configuration page. The page is titled "Express Setup" and "Current Values". The configuration options are as follows:

Field	Current Value
Discovery OEM Device Name	OEM-Cfg1
Radio Startup Mode	On
WLAN Parameters	
WLAN Connection Type	Access Point
SSID	Airborne
WLAN Security Type	Disabled
Ethernet Parameters	
Ethernet Role	Bridge
Access Point Parameters	
WLAN Channel	1
Wireless DHCP Server Enabled	Enable
IP Address Parameters	
WLAN DHCP	Disabled
Ethernet DHCP	Disabled
WLAN Static IP Address	192.168.10.100
WLAN Subnet Mask	255.255.255.0
WLAN Gateway Address	192.168.10.1
Ethernet Static IP Address	10.1.2.222
Ethernet Subnet Mask	255.255.255.0

Field	CLI Command
Discovery OEM Device Name	name-oem
Radio Startup Mode	radio-on, radio-off
Wireless LAN Connection Type	wl-type
SSID	wl-ssid
Wireless LAN Security Type	wl-security
WEP Key 1	wl-key-1
WPA/WPA2Pre Shared Key (PSK)	pw-wpa-psk
Ethernet Role	eth-role
WLAN Channel	wl-chan
Wireless DHCP Server Enabled	wl-dhcp-server
WLAN DHCP	wl-dhcp
Ethernet DHCP	eth-dhcp
WLAN Static IP Address	wl-ip
WLAN Subnet Mask	wl-subnet
WLAN Gateway Address	wl-gateway
Ethernet Static IP Address	eth-ip
Ethernet Subnet Mask	eth-subnet
Ethernet gateway Address	eth-gateway
Web Server Port	wl-http-port
Telnet Port	wl-telnet-port
Internal FTP Server Listen Port	ftp-server-listen-port
Secure Shell Server (SSH) Port	wl-ssh-port

WLAN Settings

URL /Configuration/WLAN Settings

Description Configures the wireless interface settings, including network name and type.

The screenshot shows the B&B Electronics web interface for configuring WLAN settings. The page title is "WLAN Settings" and the device type is "Access Point". The configuration is organized into two columns: "WLAN Parameters" and "Current Values".

WLAN Parameters	Current Values
Radio Startup Mode:	On
WLAN Connection Type:	Access Point
SSID:	Airborne
WLAN Channel:	1
WLAN TX Power (dBm):	15 dBm
WLAN Beacon Interval:	100
WLAN DTIM Interval:	2
Hide SSID in Beacon:	Disabled
Access Control Policy:	Disable
AP-Mode Data Rates:	G
Wireless DHCP Server Enabled:	Enable
WLAN Region:	United States

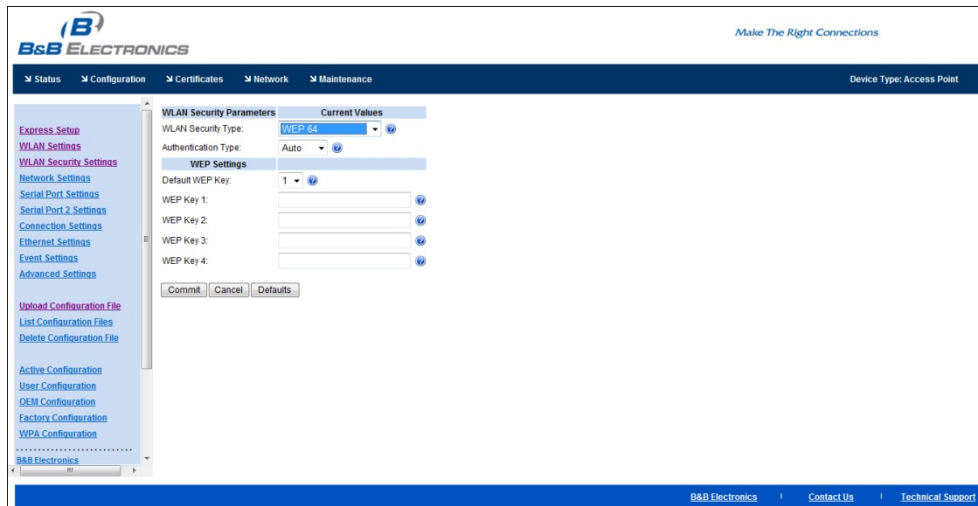
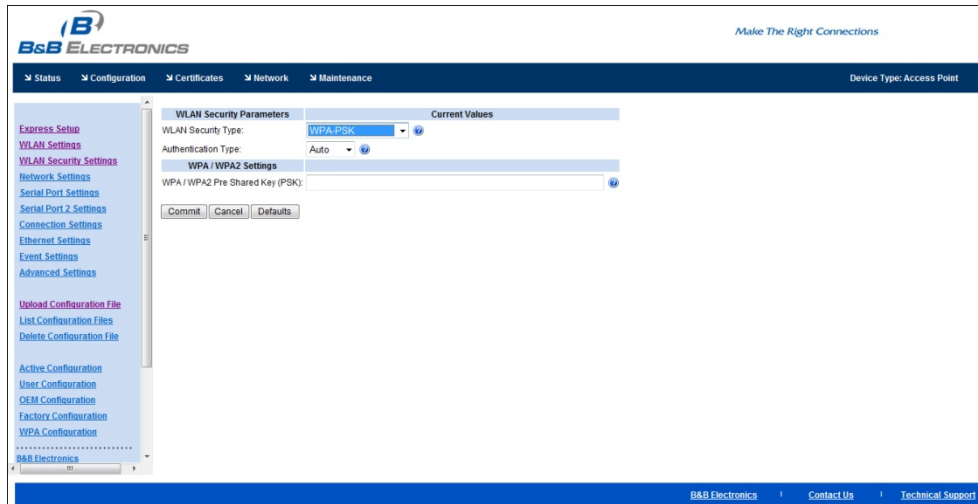
Buttons: Commit, Cancel, Defaults

Field	CLI Command
Radio Startup Mode	radio-on, radio-off
Wireless LAN Connection Type	wl-type
SSID	wl-ssid
Wireless LAN Channel	wl-chan
WLAN TX Power (dBm)	wl-tx-power
WLAN Beacon Interval	wl-beacon-int
WLAN DTIM Interval	wl-dtim-int
Hide SSID in Beacon	wl-hide-ssid
Access Control Policy	wl-acl-policy
Access Control Policy MAC Addresses	wl-acl-mac
AP-Mode Default Data Rates	wl-mode
Wireless DHCP Server Enabled	wl-dhcp-server
Wireless LAN Region	wl-region

WLAN Security Settings

URL /Configuration/WLAN Security Settings

Description Configures the security settings for the target network.



Field	CLI Command
Wireless LAN Security Type	wl-security
Authentication Type	wl-auth
Default WEP Key	wl-def-key
WEP Key 1 - 4	wl-key-1, wl-key-2, wl-key-3, wl-key-4
WPA/WPA2 Pre Shared Key (PSK)	pw-wpa-psk

Network Settings

URL /Configuration/Network Settings

Description Configures the wireless and Ethernet interface network settings including DHCP, static IP and Fallback configurations.

The screenshot shows the B&B Electronics web interface for Network Settings. The interface is divided into several sections:

- Navigation Menu (Left):** Includes links for Express Setup, WLAN Settings, WLAN Security Settings, Network Settings (selected), Serial Port Settings, Serial Port 2 Settings, Connection Settings, Ethernet Settings, Event Settings, Advanced Settings, Upload Configuration File, List Configuration Files, Delete Configuration File, Active Configuration, User Configuration, OEM Configuration, Factory Configuration, WPA Configuration, and B&B Electronics.
- Network Parameters (Top):** Shows 'Current Values' for various settings.
- WLAN Specific Settings:**
 - WLAN DHCP: Disabled
 - WLAN DHCP Client Name: Airborne059A7D
 - WLAN Static IP Address: 192.168.10.100
 - WLAN Subnet Mask: 255.255.255.0
 - WLAN Gateway IP Address: 192.168.10.1
- Ethernet Specific Settings:**
 - Ethernet DHCP: Disabled
 - Ethernet DHCP Client Name: Airborne059A7E
 - Ethernet Static IP Address: 10.1.2.222
 - Ethernet Subnet Mask: 255.255.255.0
 - Ethernet Gateway IP Address: 192.168.2.1
- Common Settings:**
 - DNS Server1 IP Address: 0.0.0.0
 - DNS Server2 IP Address: 0.0.0.0
 - WINS Server1 IP Address: 0.0.0.0
 - WINS Server2 IP Address: 0.0.0.0

Buttons for 'Commit', 'Cancel', and 'Defaults' are located at the bottom of the configuration area.

Field	CLI Command
WLAN DHCP	wl-dhcp
WLAN DHCP Client Name	wl-dhcp-client
WLAN Static IP Address	wl-ip
WLAN Subnet Mask	wl-subnet
WLAN Gateway IP Address	wl-gateway
Ethernet DHCP	eth-dhcp
Ethernet DHCP Client Name	eth-dhcp-client
Ethernet Static IP Address	eth-ip
Ethernet Subnet Mask	eth-subnet
Ethernet Gateway IP Address	eth-gateway
DNS Server1/2 IP Address	dns-server1, dns-server2
WINS Server 1/2 IP Address	wins-server1, wins-server2

Serial Port Settings

URL /Configuration/Serial Port Settings

Description Configures the serial port settings on the primary serial port.

The screenshot shows the B&B Electronics web interface for configuring serial port settings. The page title is "Serial Port Parameters" and it includes a "Current Values" column. The settings are as follows:

Field	Current Value
Serial CLI Default Mode	CLI
Serial Port Bit Rate	9600
Parity	None
Data Bits	8
Stop Bits	1
Flow Control	None
Input Buffer Flush Size	1460
Serial Escape Mode	On
Network CLI Escape Mode	On
Escape String	7E7E6473
Serial Interface Type	RS-232

Field	CLI Command
Serial CLI Default Mode	serial-default, serial-default-p1
Serial Port Bit Rate	bit-rate, bit-rate-p1
Parity	parity, parity-p1
Data Bits	data-bits, data-bits-p1
Stop Bits	stop-bit, stop-bit-p1
Flow Control	flow, flow-p1
Serial Assert	serial-assert, serial-assert-p1
Input Buffer Flush Size	input-size, input-size-p1
Serial Escape Mode	esc-mode-serial, esc-mode-serial-p1
Network CLI Escape Mode	esc-mode-lan, esc-mode-lan-p1
Escape String	esc-str, esc-str-p1
Serial Interface Type	intf-type

Serial Port 2 Settings

URL /Configuration/Serial Port 2 Settings

Description Configures the serial port settings on the secondary serial port.

The screenshot shows the B&B Electronics web interface for configuring Serial Port 2. The page title is "Serial Port Parameters" and it shows "Current Values" for various settings. The settings are as follows:

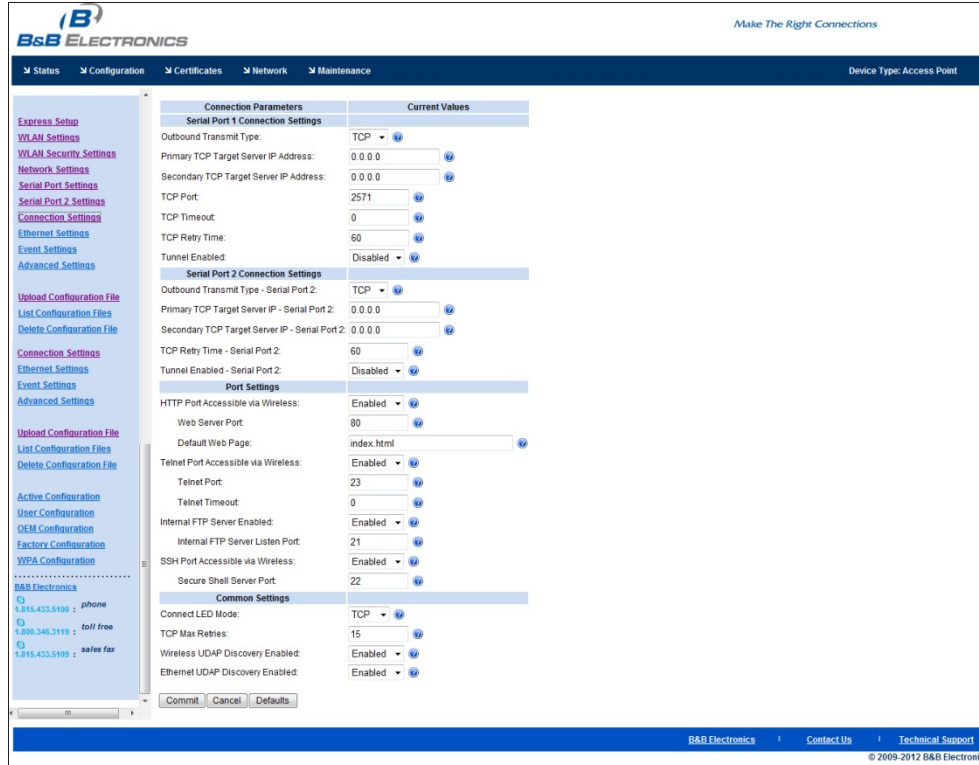
Field	Current Value
Serial CLI Default Mode	CLI
Serial Port Bit Rate	9600
Parity	None
Data Bits	8
Stop Bits	1
Flow Control	None
Input Buffer Flush Size	1460
Serial Escape Mode	On
Network CLI Escape Mode	On
Escape String	7E7E7E6473
Serial Interface Type	RS-232

Field	CLI Command
Serial CLI Default Mode	serial-default-p2
Serial Port Bit Rate	bit-rate-p2
Parity	parity-p2
Data Bits	data-bits-p2
Stop Bits	stop-bit-p2
Flow Control	flow-p2
Serial Assert	serial-assert-p2
Input Buffer Flush Size	input-size-p2
Serial Escape Mode	esc-mode-serial-p2
Wireless LAN CLI Escape Mode	esc-mode-lan-p2
Escape String	esc-str-p2
Serial Interface Type	intf-type

Connection Settings

URL /Configuration/Connection Settings

Description Configures the data tunnel and network port settings for both serial ports. Includes management of port access and service availability.



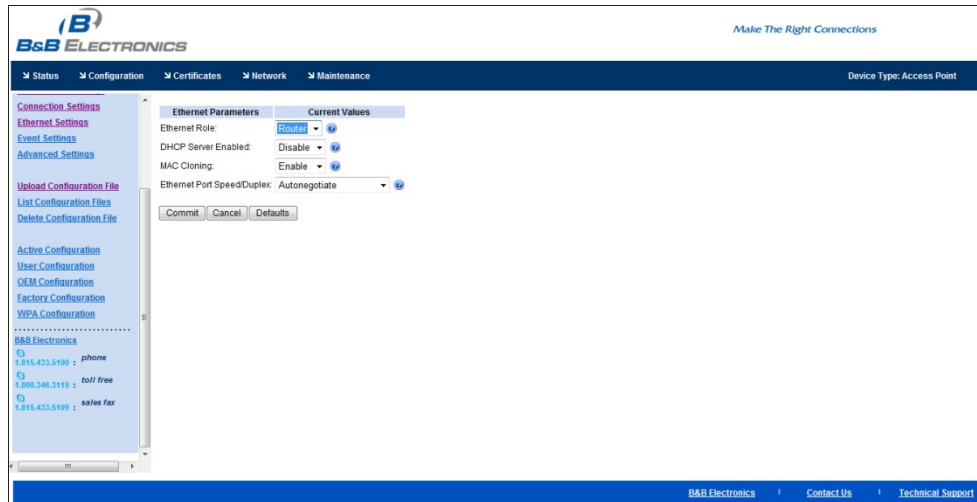
Field	CLI Command
Outbound Transmit Type	wl-xmit-type, wl-xmit-type-p1
Primary TCP Target Server IP Address	wl-tcp-ip, wl-tcp-ip-p1
Secondary TCP Target Server IP Address	wl-tcp-ip2, wl-tcp-ip2-p1
TCP Port	wl-tcp-port, wl-tcp-port-p1
TCP Timeout	wl-tcp-timeout, wl-tcp-timeout-p1
TCP Retry Time	wl-retry-time, wl-retry-time-p1
Tunnel Enabled	wl-tunnel, wl-tunnel-p1
UDP Target Server IP Address	wl-udp-ip, wl-udp-ip-p1
UDP Port	wl-udp-port, wl-udp-port-p1
UDP Receive Port	wl-udp-rxport, wl-udp-rxport-p1
UDP Transmit Mode	wl-udp-xmit, wl-udp-xmit-p1
Outbound Transmit Type – Serial Port 2	wl-xmit-type-p2
Primary TCP Target Server IP Address – Serial Port 2	wl-tcp-ip-p2
Secondary TCP Target Server IP Address – Serial Port 2	wl-tcp-ip2-p2
TCP Port – Serial Port 2	wl-tcp-port-p2
TCP Timeout – Serial Port 2	wl-tcp-timeout-p2

TCP Retry Time – Serial Port 2	wl-retry-time-p2
Tunnel Enabled – Serial Port 2	wl-tunnel-p2
UDP Target Server IP Address – Serial Port 2	wl-udp-ip-p2
UDP Port – Serial Port 2	wl-udp-port-p2
UDP Receive Port – Serial Port 2	wl-udp-rxport-p2
UDP Transmit Mode – Serial Port 2	wl-udp-xmit-p2
HTTP Port Accessible via Wireless	http-port
Web Server Port	wl-http-port
Default Web Page	<index.html>
Telnet Port Accessible via Wireless	telnet-port
Telnet Port	wl-telnet-port
Telnet Timeout	wl-telnet-timeout
Internal FTP Server Port	ftp-server-port
Internal FTP Server Listen Port	ftp-server-listen-port
SSH Port Accessible via Wireless	ssh-port
Secure Shell Server Port	wl-ssh-port
Connect LED Mode	wl-con-led
TCP Max Retries	tcp-retries
Wireless UDAP Discovery Enabled	wl-udap
Ethernet UDAP Discovery Enabled	eth-udap

Ethernet Settings

URL /Configuration/Ethernet Settings

Description Configures the Ethernet interface for AirborneDirect™ Ethernet devices.



Field	CLI Command
Ethernet Role	eth-role
DHCP Server Enabled	eth-dhcp-server
MAC Cloning	wl-mac-clone
Ethernet Port Speed/Duplex	eth-mode

Event Settings

URL /Configuration/Event Settings

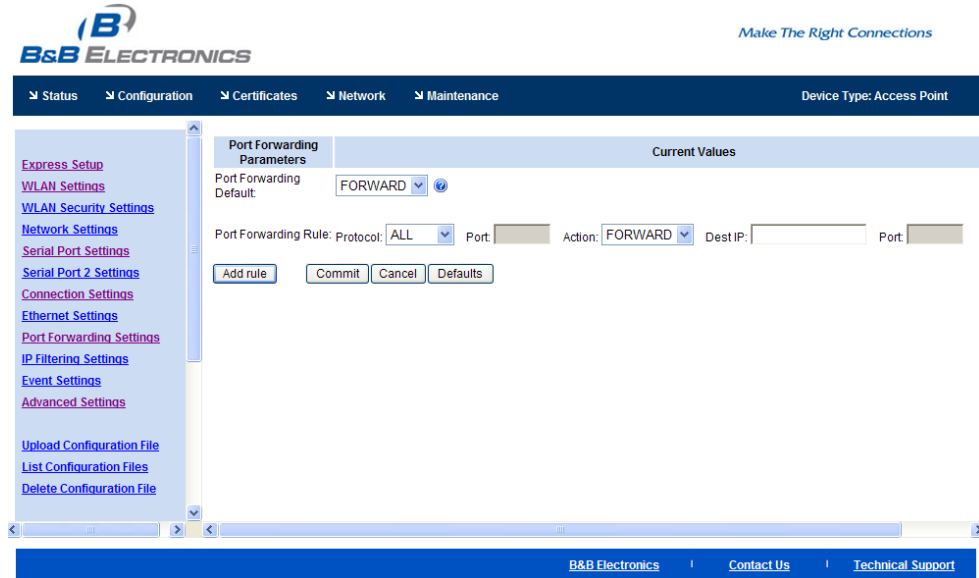
Description Event Settings

Field	CLI Command
TBD	

Port Forwarding Settings

URL /Configuration/Port Forwarding Settings

Description Configures port forwarding.



Field	CLI Command
Port Forwarding Default	wl-route-default
Port Forwarding Rule	wl-route

IP Filtering Settings

URL /Configuration/IP Filtering Settings

Description Configures IP filtering.


The screenshot shows the B&B Electronics web interface for IP Filtering Settings. The page title is "IP Filtering Parameters" and it displays "Current Values". The "IP Filtering Default" is set to "ACCEPT". Below this, there is a form for "IP Filtering Rule" with fields for Protocol (set to "ALL"), IP, Port, and Action (set to "ACCEPT"). There are buttons for "Add rule", "Commit", "Cancel", and "Defaults". The footer contains "B&B Electronics | Contact Us | Technical Support".

Field	CLI Command
IP Filtering Default	eth-route-default
IP Filtering Rule	eth-route

Advanced Settings

URL /Configuration/Advanced Settings

Description Configures the advanced configuration settings for the unit, including authentication usernames and passwords, configuration of SSH, power save setup, GPIO, indicator LED and FTP settings.


Make The Right Connections

▼ Status ▼ Configuration ▼ Certificates ▼ Network ▼ Maintenance Device Type: Access Point

[Express Setup](#)

[WLAN Settings](#)

[WLAN Security Settings](#)

[Network Settings](#)

[Serial Port Settings](#)

[Serial Port 2 Settings](#)

[Connection Settings](#)

[Ethernet Settings](#)

[Event Settings](#)

[Advanced Settings](#)

[Upload Configuration File](#)

[List Configuration Files](#)

[Delete Configuration File](#)

[Active Configuration](#)

[User Configuration](#)

[OEM Configuration](#)

[Factory Configuration](#)

[WPA Configuration](#)

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☎ 1.800.346.3119 : toll free

☎ 1.815.433.5109 : sales fax

Advanced Parameters	Current Values
Version / User Management	
OEM Defined Version String:	oemverstr <input type="button" value="v"/>
Discovery Manufacturer Device Name:	DPAC-Airborne-AccessPoint <input type="button" value="v"/>
Discovery OEM Device Name:	Production_E-V_Programmer <input type="button" value="v"/>
Discovery Device Name:	Device <input type="button" value="v"/>
Administrator Password:	<input type="text"/> <input type="button" value="v"/>
Manufacturing User Name:	dpac <input type="button" value="v"/>
Manufacturing Password:	<input type="text"/> <input type="button" value="v"/>
OEM User Name:	oem <input type="button" value="v"/>
OEM Password:	<input type="text"/> <input type="button" value="v"/>
CFG User Name:	cfg <input type="button" value="v"/>
CFG Password:	<input type="text"/> <input type="button" value="v"/>
Regular User Name:	user <input type="button" value="v"/>
Regular User Password:	<input type="text"/> <input type="button" value="v"/>
Encrypt Wireless Keys:	Disabled <input type="button" value="v"/>
Protect the OEM Configuration:	Disabled <input type="button" value="v"/>
SSH Settings	
SSH Default User Name:	<input type="text"/> <input type="button" value="v"/>
SSH Default Password:	<input type="text"/> <input type="button" value="v"/>
SSH Keysize (evenly divisible by 8):	1024 <input type="button" value="v"/>
Power Save Settings	
Module Power Save Mode:	Active <input type="button" value="v"/>
Serial Port 1 Inactivity Timer:	0 <input type="button" value="v"/>
Serial Port 2 Inactivity Timer:	0 <input type="button" value="v"/>
Radio Startup Mode:	On <input type="button" value="v"/>
FTP Settings	
FTP Server IP Address or Name:	<input type="text"/> <input type="button" value="v"/>
FTP User Name:	<input type="text"/> <input type="button" value="v"/>
FTP Password:	<input type="text"/> <input type="button" value="v"/>
FTP Server Path:	<input type="text"/> <input type="button" value="v"/>
FTP File Name:	<input type="text"/> <input type="button" value="v"/>
System Time Settings	
Timezone Name:	EST <input type="button" value="v"/>
Timezone Offset:	-5:00 <input type="button" value="v"/>
Daylight Saving Time Adjustment:	Enabled <input type="button" value="v"/>
Daylight Saving Time Name:	EDT <input type="button" value="v"/>
Daylight Saving Time Offset:	-4:00 <input type="button" value="v"/>
Daylight Saving Time Starting Week:	Second <input type="button" value="v"/>
Daylight Saving Time Starting Day:	Sunday <input type="button" value="v"/>
Daylight Saving Time Starting Month:	March <input type="button" value="v"/>
Daylight Saving Time Ending Week:	First <input type="button" value="v"/>
Daylight Saving Time Ending Day:	Sunday <input type="button" value="v"/>
Daylight Saving Time Ending Month:	November <input type="button" value="v"/>
NTP Server IP Address or Name:	pool.ntp.org <input type="button" value="v"/>
NTP Sync at Startup:	Disabled <input type="button" value="v"/>
NTP Refresh Interval:	0 <input type="button" value="v"/>
WLAN Specific Settings	
Antenna Mode:	Antenna 2 Only <input type="button" value="v"/>
Speedlink Roaming:	Enabled <input type="button" value="v"/>
Beacons Missed Before Roaming:	6 <input type="button" value="v"/>
Association Retry Count:	3 <input type="button" value="v"/>
Association Backoff Time (msec):	10000 <input type="button" value="v"/>
ARP Staleout Time:	120 <input type="button" value="v"/>
ARP Reachable Time:	120 <input type="button" value="v"/>
Use Directed Probes:	Disabled <input type="button" value="v"/>
Lost Association Link Timeout:	1 <input type="button" value="v"/>
Startup Options	
Startup Message Mode:	Disabled <input type="button" value="v"/>
Startup Message Text:	Ready <input type="button" value="v"/>
DHCP Vendor Class ID Strings	
WLAN DHCP Vendor Class ID String:	<input type="text"/> <input type="button" value="v"/>
Ethernet DHCP Vendor Class ID String:	<input type="text"/> <input type="button" value="v"/>
LED / GPIO Settings	
IO Port F Bit Direction:	0xFF <input type="button" value="v"/>
IO Port F Internal Pullup Resistor:	0xFF <input type="button" value="v"/>
IO Port G Bit Direction:	0xFF <input type="button" value="v"/>
IO Port G Internal Pullup Resistor:	0xFF <input type="button" value="v"/>
Enable LED Signal Strength Meter:	Disabled <input type="button" value="v"/>
Enable POST LED:	Enabled <input type="button" value="v"/>
Enable RF_LINK LED:	Enabled <input type="button" value="v"/>
Enable WLAN_CFG LED:	Enabled <input type="button" value="v"/>
Enable CONN LED:	Enabled <input type="button" value="v"/>
Other Advanced Settings	
Enable Echo for Telnet Sessions:	Enabled <input type="button" value="v"/>
UDP Server Ping:	Disabled <input type="button" value="v"/>

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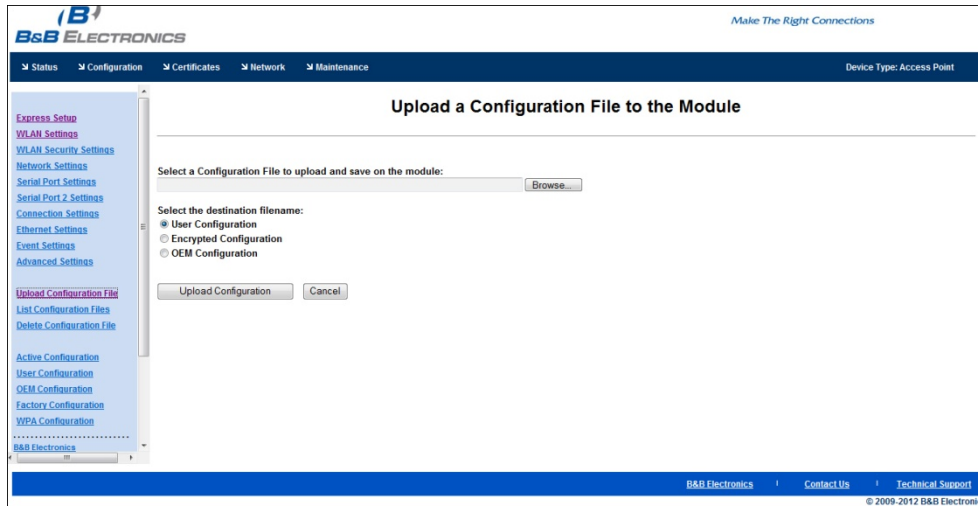
Field	CLI Command
OEM Defined Version String	oemstr
Device Manufacture Discovery Name	name-manuf
Device OEM Discovery Name	name-oem
Discovery Device Name	name-device
Administrator Password	pw-root
Manufacturing User Name	pw-manuf
Manufacturing Password	user-manuf
OEM User Name	pw-oem
OEM Password	user-oem
CFG User Name	pw-cfg
CFG Password	user-cfg
Regular User Name	pw
Regular User Password	user
Encrypt Wireless Keys	cfg-encrypt
Protect the OEM Configuration	cfg-oem-protect
SSH Default User Name	ssh-default-user
SSH Default Password	ssh-default-password
SSH Key Size (evenly divisible by 8)	ssh-keysize
Module Power Save Mode	pm-mode
Serial Port 1 Inactivity Timeout	wl-tcp-timeout
Serial Port 2 Inactivity Timeout	wl-tcp-timeout-p2
Radio Startup Mode	radio-startup
FTP Server IP Address or Name	ftp-server-ip-address
FTP User Name	ftp-user
FTP Password	ftp-password
FTP Server Path	ftp-server-path
FTP File Name	ftp-server-filename
Timezone Name	timezone-name
Timezone Offset	timezone-offset
Daylight Savings Adjustment	daylight-saving-time
Daylight Savings Time Name	daylight-saving-name
Daylight Savings Time Offset	daylight-saving-offset
Daylight Savings Time Starting Week	daylight-saving-startweek
Daylight Savings Time Starting Day	daylight-saving-startday
Daylight Savings Time Starting Month	daylight-saving-startmonth
Daylight Savings Time Ending Week	daylight-saving-stopweek
Daylight Savings Time Ending Day	daylight-saving-stopday
Daylight Savings Time Ending Month	daylight-saving-stopmonth
NTP Server IP Address or Name	ntp-server-address
NTP Sync at Startup	ntp-startup-sync
NTP Refresh Interval	ntp-refresh-interval
Antenna Mode	wl-ant
Speedlink Roaming	speedlink
Beacons Missed Before Roaming	wl-beacons-missed

Association Retry Count	wl-assoc-retries
Association Backoff Time (ms)	wl-assoc-backoff
ARP Staleout Time	arp-staleout-time
ARP Reachable Time	arp-reachable-time
Use Directed Probes	wl-specific-scan
Lost Association Link Timeout	wl-link-timeout
Startup Message Mode	startup-msg
Startup Message Text	startup-text
WLAN DHCP Vendor Class ID String	wl-dhcp-vendorid
Ethernet DHCP Vendor Class ID String	eth-dhcp-vendorid
I/O Port F Bit Direction	io-dir-f
I/O Port F Bit Internal Pullup Resistor	io-pullup-f
I/O Port G Bit Direction	io-dir-g
I/O Port G Bit Internal Pullup Resistor	io-pullup-g
Enable LED Signal Strength Meter	led-mode
Enable POST LED	post-led
Enable RF_LINK LED	rf-link-led
Enable WLN_CFG LED	wln-cfg-led
Enable CONN LED	conn-led
Enable Echo for Telnet Sessions	telnet-echo
UDP Server Ping	udp-ping

Upload Configuration File

URL /Configuration/Upload Configuration File

Description Allows user, OEM or encrypted configuration files to be uploaded to the device.



Field	CLI Command
Upload Configuration [button]	put-cfg
User Config	put-cfg user_config.txt
Encrypted Configuration	put-cfguser_enc_config.uue
OEM Configuration	put-cfg oem_config.txt

List Configuration File

URL /Configuration/List Configuration File

Description Displays a list of the configuration files saved to the device.

The screenshot shows the B&B Electronics web interface. The top navigation bar includes links for Status, Configuration, Certificates, Network, and Maintenance. The main content area is titled "Configuration File Listing" and displays the following information:

File Name	Size
limezone.sh	42 bytes
user_config.txt	381 bytes
2 Files	423 bytes
137216 bytes free	

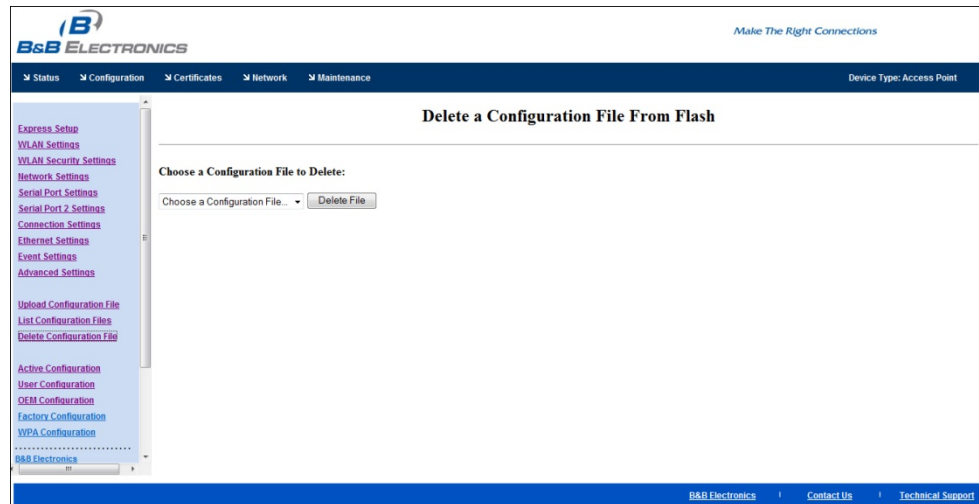
The left sidebar contains various configuration options such as Express Setup, WLAN Settings, Network Settings, and Active Configuration. The footer includes links for B&B Electronics, Contact Us, and Technical Support.

Field	CLI Command
Displayed Page	list-cfg

Delete Configuration File

URL /Configuration/Delete Configuration File

Description Lets you delete previously saved configuration files.



Field	CLI Command
Delete File [Button]	del-cfg

Active Configuration

URL /Configuration/Active Configuration

Description Displays the current configuration settings.

The screenshot shows the B&B Electronics web interface. The top navigation bar includes links for Status, Configuration, Certificates, Network, and Maintenance. The main content area is titled "Active Configuration" and displays the following configuration details:

```

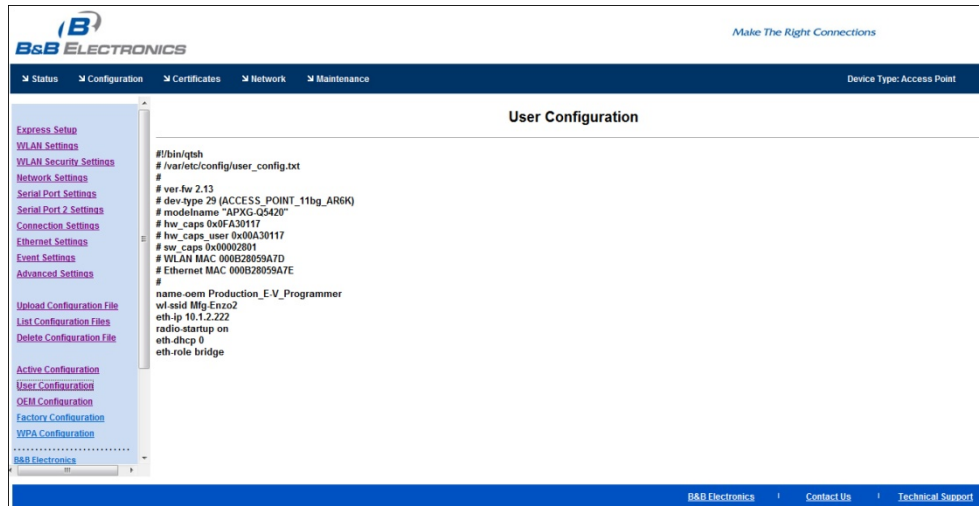
#bin/gtsh
# /var/tmp/active_config.txt
#
# ver-fw 2.13
# dev-type 29 (ACCESS_POINT_11bg_AR6K)
# modelname "APXG-Q5420"
# hw_caps 0x0FA30117
# hw_caps_user 0x0A30117
# sw_caps 0x00002801
# WLAN MAC 000B28059A7D
# Ethernet MAC 000B28059A7E
#
# ver-fw 2.13
# ver oemverstr
# user-leap dpac
# name-manuf DPAC.Airborne.AccessPoint
# name-oem Production_E-V_Programmer
# name-device Device
# pin-mode active
# esc-stx 7E7E7E6473
# esc-mode-serial on
# esc-mode-lan on
# serial-default cti
# intf-type rs232
# bit-rate 9600
# data-bits 8
# parity n
# flow n
  
```

Field	CLI Command
Displayed Page	ofig-dump active

User Configuration

URL /Configuration/User Configuration

Description Displays the contents of the user_config.txt configuration file.



Field	CLI Command
Displayed Page	ofg-dump user

OEM Configuration

URL /Configuration/OEM Configuration

Description Displays the contents of the oem_config.txt configuration file.

The screenshot shows the B&B Electronics web interface. The top navigation bar includes 'Status', 'Configuration', 'Certificates', 'Network', and 'Maintenance'. The 'Device Type: Access Point' is indicated on the right. The left sidebar contains a list of configuration options, with 'OEM Configuration' highlighted. The main content area displays the title 'OEM Configuration' and an error message: 'Error 0xf809: File not found.' The footer contains links for 'B&B Electronics', 'Contact Us', and 'Technical Support'.

Field	CLI Command
Displayed Page	cfg-dump oem

Factory Configuration

URL /Configuration/Factory Configuration

Description Displays the factory configuration settings. These are the default settings delivered from the B&B Electronics factory.

```

Factory Configuration
-----
#/bin/qsh
# /etc/factory_config_io.txt
ver oemverstr
user-manuf dpac
user-oem oem
user-cfg cfg
user user
user-leap dpac
name-manuf DPAC-Airborne-IndustrialE
name-oem OEM.Cfg1
name-device Device
pm-mode active
esc-str 7E7E7E6473
esc-mode-serial on
esc-mode-lan on
serial-default cli
intf-type rs232
bit-rate 9600
data-bits 8
parity n
flow n
input-size 0x05B4
serial-assert xon
stop-bit 1
io-dir-f 0xFF
io-dir-g 0xFF
io-pullup-f 0xFF
io-pullup-g 0xFF
wl-http-port 0x0050
wl-to-host-port 0x0017

```

Field	CLI Command
Displayed Page	cfg-dump factory

WPA Configuration

URL /Configuration/WPA Configuration

Description Displays the current security configuration settings being used by the device.

The screenshot shows the WPA Configuration page in the B&B Electronics web interface. The page title is "WPA Configuration". The main content area displays the configuration file path and the contents of the /var/tmp/wpa_supplicant.conf file. The configuration file contents are as follows:

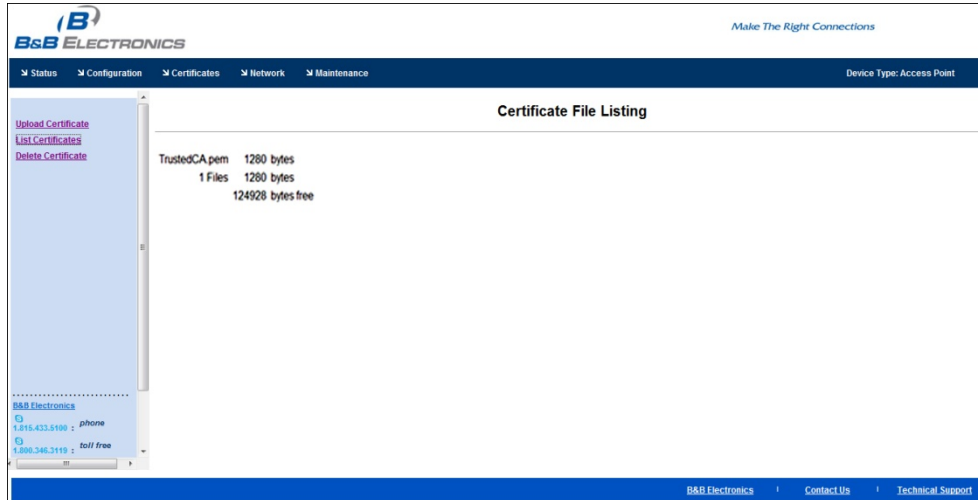
```
#
# /var/tmp/wpa_supplicant.conf
#
ctrl_interface=/var/run/wpa_supplicant
eapol_version=1
ap_scan=1
fast_reauth=1
assoc_retries=3
assoc_backoff=10
network={
  ssid="Cisco1100WPA"
  scan_ssid=1
  mode=0
  key_mgmt=WPA.PSK
  proto=WPA
  pairwise=TKIP
  group=TKIP
}
```

Field	CLI Command
Displayed Page	cfg-dump wpa

List Certificates

URL /Certificates/List Certificates

Description Displays a list of the certificates saved to the device. This is the home page for the Certificates link.

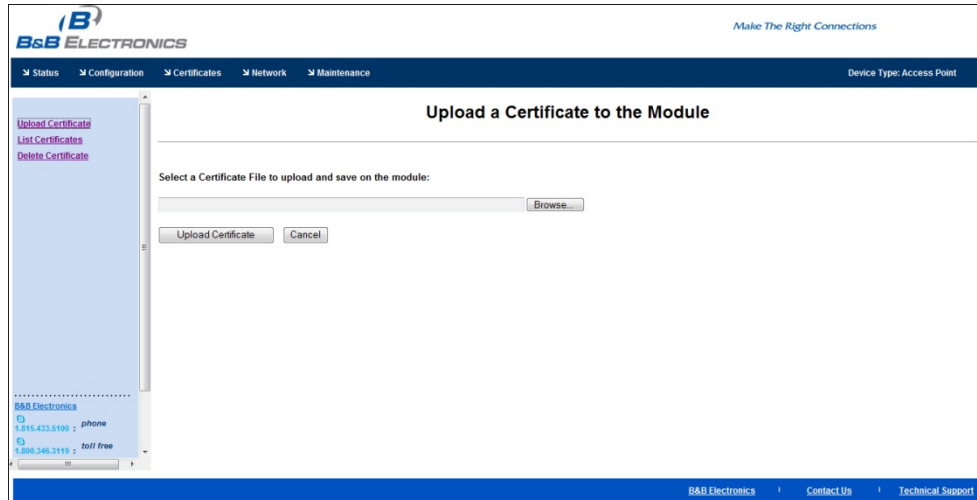


Field	CLI Command
Displayed Page	list-cert

Upload Certificate

URL /Certificates/Upload Certificate

Description Lets you upload certificates and private keys to the device.

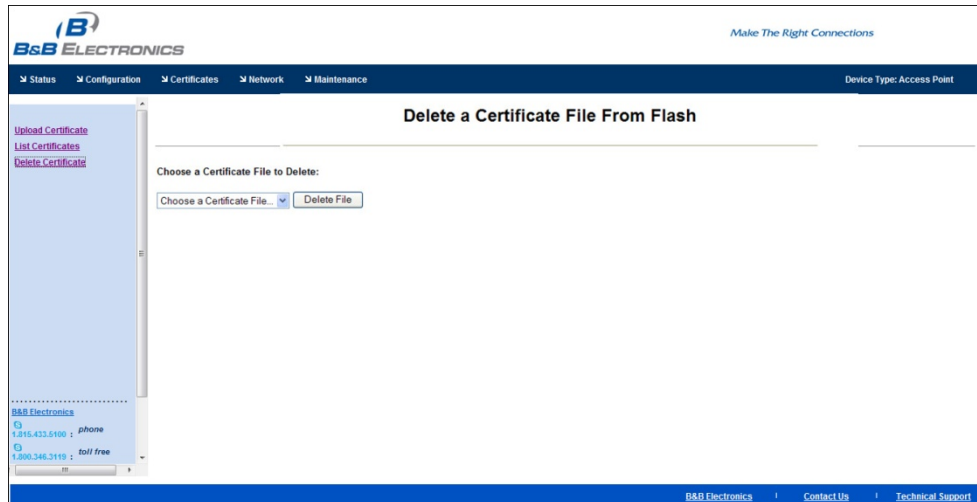


Field	CLI Command
Upload Certificate [Button]	put-cert

Delete Certificate

URL /Certificates/Delete Certificate

Description Allows you to delete certificates stored on the device.



Field	CLI Command
Delete Certificate [Button]	del-cert

Network (Home Page)

URL /Network

Description Home page for the network-related pages.

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▼ Status ▼ Configuration ▼ Certificates ▼ Network ▼ Maintenance Device Type: Access Point

Module Status

Discover Airborne Modules
Scan for Access Points

```

Module Firmware Version: 2.13
Radio Firmware Version: 2.2.146.14
Link Status: Access Point
SSID: Mfg-Rmz02
MAC Address: 000B28059A7D
BSSID: 000B28059A7D
Transmit Rate (Mb/s): 54
Signal Level (dBm): -96
Noise Level (dBm): -96
IP Address: 10.1.2.222
Subnet Mask: 255.255.255.0
Default Gateway: 0.0.0.0
Primary DNS: 0.0.0.0
Secondary DNS: 0.0.0.0
Up Time (Sec): 974564

```

B&B Electronics
☎ 1.815.433.5100 : phone
☎ 1.800.346.3110 : toll free

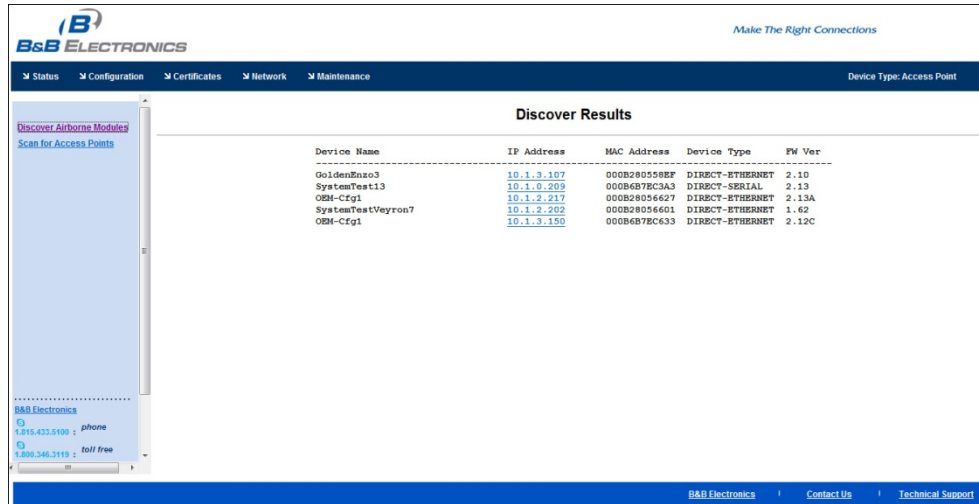
B&B Electronics | Contact Us | Technical Support

Field	CLI Command
Displayed Page	wl-info

Discover Airborne Modules

URL /Network/Discover Airborne Modules

Description Displays a list of Airborne devices that are visible to the device on the current network, with IP address, device type and wireless or Ethernet MAC address.



Field	CLI Command
Displayed Page	discover

Scan for Access Points

URL /Network/Scan for Access Points

Description Displays a list of wireless networks within range of the device

The screenshot shows the B&B Electronics web interface. The main content area is titled "Scan Results" and displays the output of a wireless scan. The scan results are as follows:

```
wlan0 Scan completed :
Cell 01 - Address: 00:13:1A:16:AC:10
        SSID:"Cisco1100NPA"
        Mode:Managed
        Frequency:2.412 GHz (Channel 11)
        Quality:D/10 Signal level=-44 dBm Noise level=-89 dBm
        Encryption key:on
        Bit Rates:1 Mb/s; 2 Mb/s; 5.5 Mb/s; 6 Mb/s; 9 Mb/s
                11 Mb/s; 12 Mb/s; 18 Mb/s; 24 Mb/s; 36 Mb/s
                48 Mb/s; 54 Mb/s
        Extra:wpa_ie=dd180050f20101000050f20201000050f20201000050f2022800
        Extra:wmm_ie=dd180050f2020101810003a4000027a4000042435e062322f00
        Extra:extra_ie

Cell 02 - Address: 00:30:44:02:E1:1C
        SSID:""
        Mode:Managed
        Frequency:2.462 GHz (Channel 11)
        Quality:D/10 Signal level=-48 dBm Noise level=-89 dBm
        Encryption key:on
        Bit Rates:1 Mb/s; 2 Mb/s; 5.5 Mb/s; 11 Mb/s; 6 Mb/s
                9 Mb/s; 12 Mb/s; 18 Mb/s; 24 Mb/s; 36 Mb/s
                48 Mb/s; 54 Mb/s
        Extra:rsn_ie=010100000fac02020000fac02000fac040100000fac020000
        Extra:wpa_ie=dd1a0050f20101000050f20202000050f2020050f20401000050f202
        Extra:wmm_ie=dd180050f2020101000003a4000027a4000042435e062322f00
        Extra:

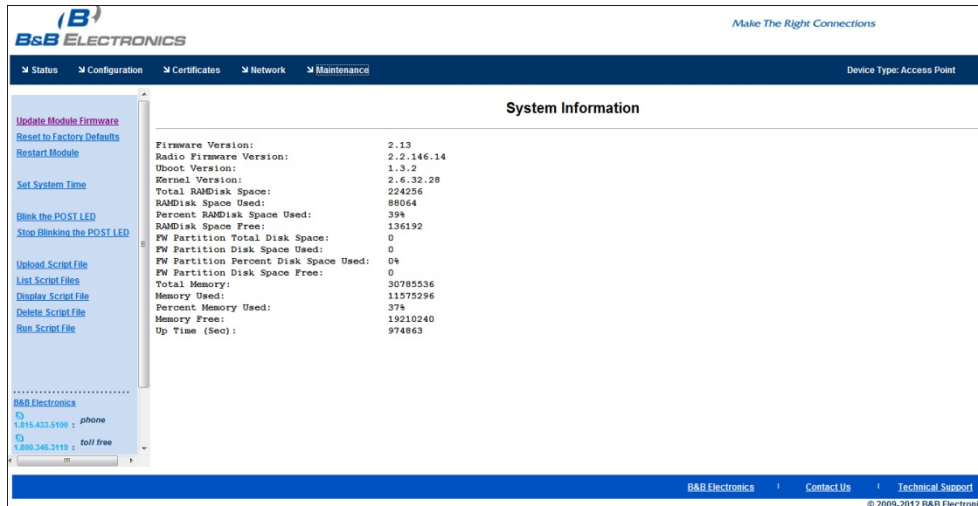
Cell 03 - Address: 00:20:A6:58:CD:A1
        SSID:""
        Mode:Managed
        Frequency:2.427 GHz (Channel 4)
```

Field	CLI Command
Displayed Page	wl-scan

Maintenance (Home Page)

URL /Maintenance

Description Home page for the maintenance-related pages.

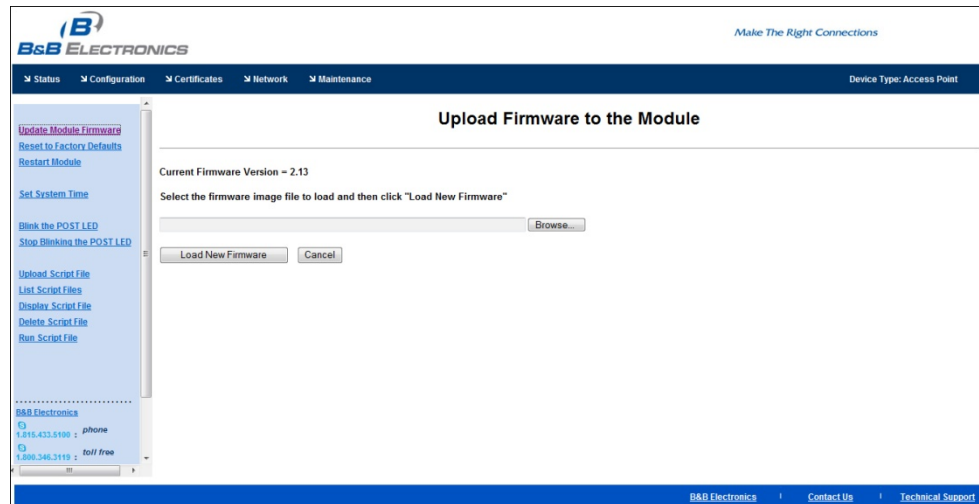


Field	CLI Command
Displayed Page	sys-info

Update Module Firmware

URL /Maintenance/Update Module Firmware

Description Enables you to update module firmware.

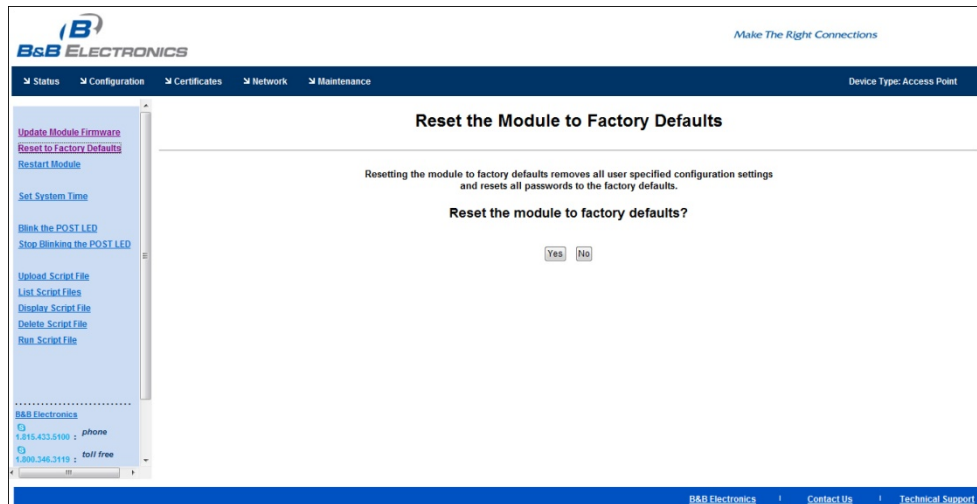


Field	CLI Command
Load New Firmware [Button]	update

Reset Factory Defaults

URL /Maintenance/Reset Factory Defaults

Description Returns device to factory defaults. If oem_config.txt is present this will take precedence over the factory configuration.

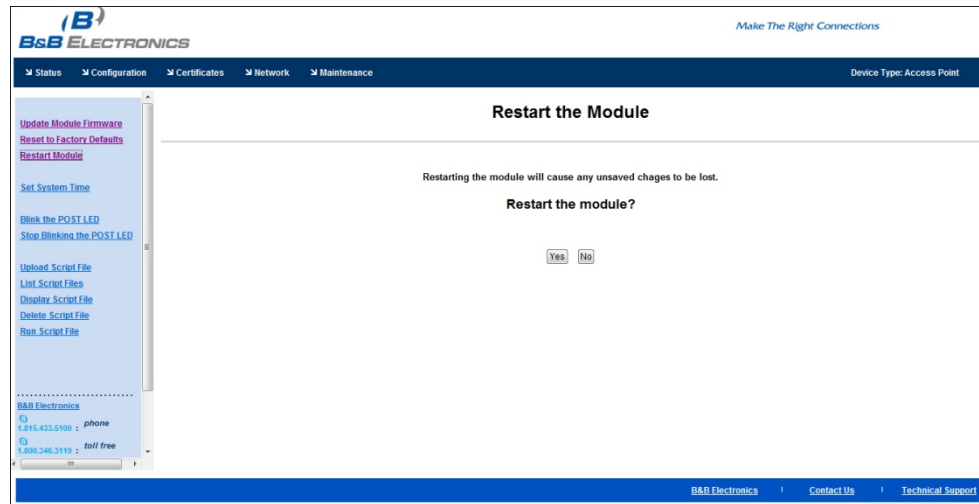


Field	CLI Command
Yes [Button]	reset

Restart Module

URL /Maintenance/Restart Module

Description Restarts device.

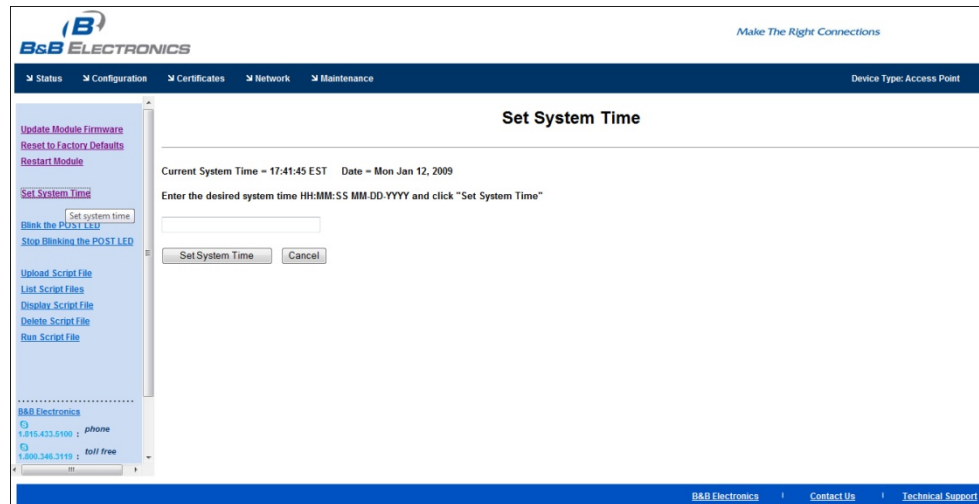


Field	CLI Command
Yes [Button]	restart

Set System Time

URL /Maintenance/Set System Time

Description Sets system time.

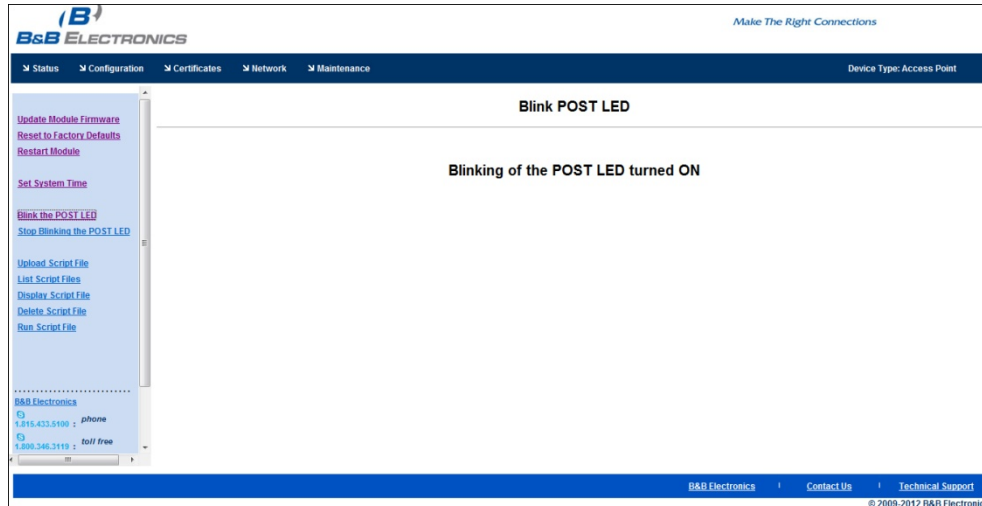


Field	CLI Command
Set System Time	sys-time

Blink the POST LED

URL /Maintenance/Blink the POST LED

Description Makes the POST LED blink. This lets you identify the specific device with which you are communicating.

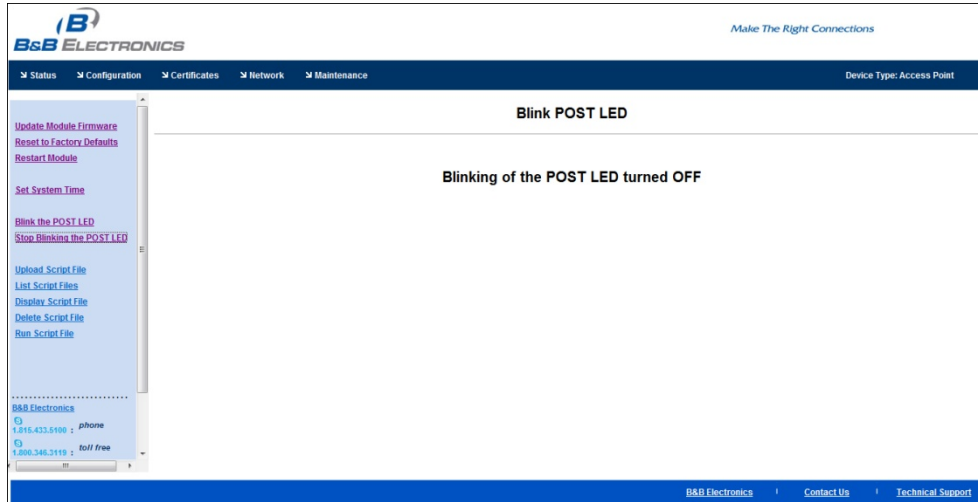


Field	CLI Command
Displayed Page	blink-post-led on

Stop Blinking the POST LED

URL /Maintenance/Stop Blinking the POST LED

Description Stops the POST LED blinking.

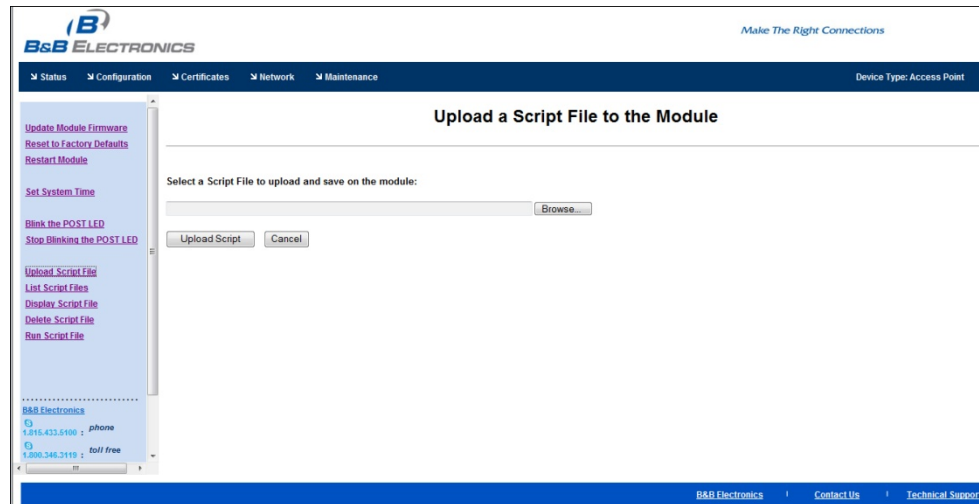


Field	CLI Command
Displayed Page	blink-post-led off

Upload Script Files

URL /Maintenance/Upload Script Files

Description Upload Script Files.

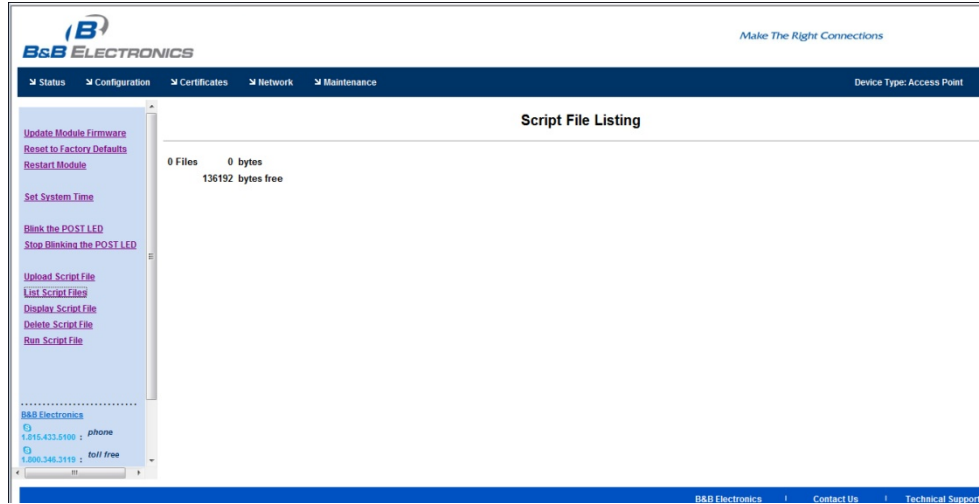


Field	CLI Command

List Script Files

URL /Maintenance/List Script Files

Description Lists script files.

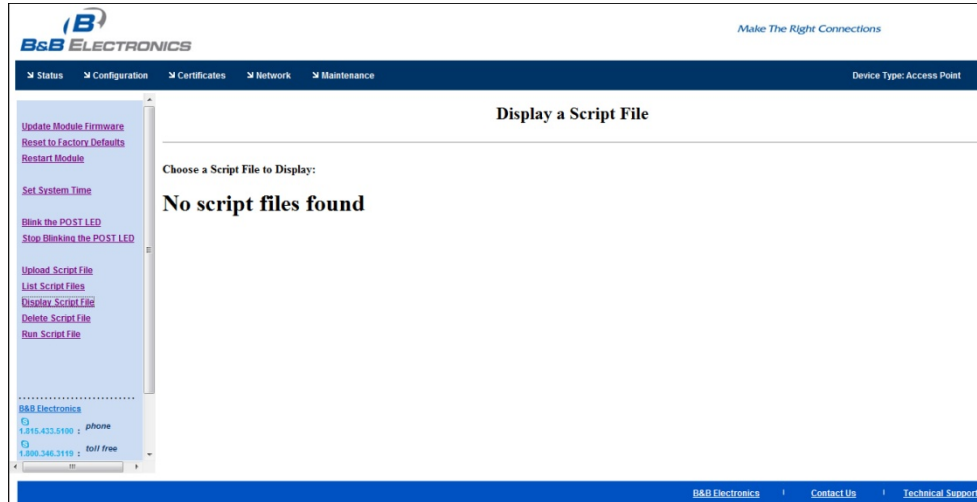


Field	CLI Command
TBD	

Display Script Files

URL /Maintenance/Display Script Files

Description Displays script files.

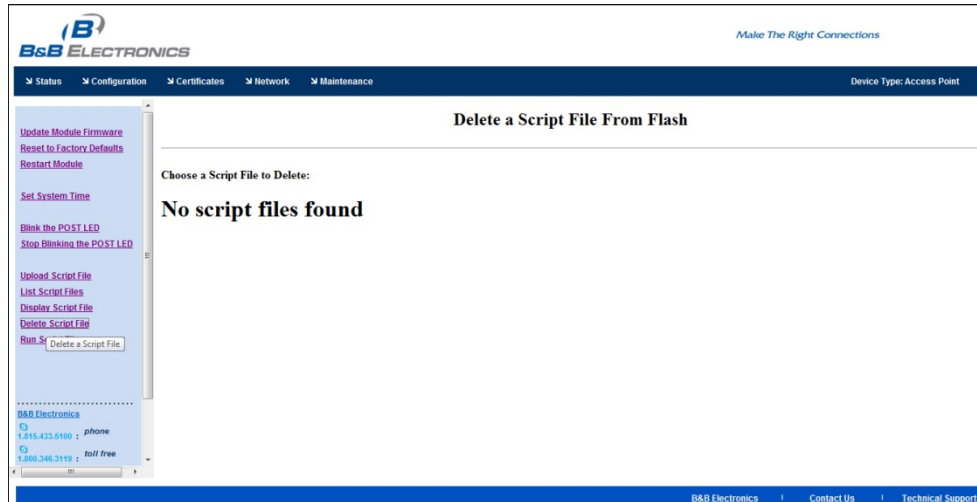


Field	CLI Command
TBD	

Delete Script File

URL /Maintenance/Delete Script File

Description Deletes a script file.

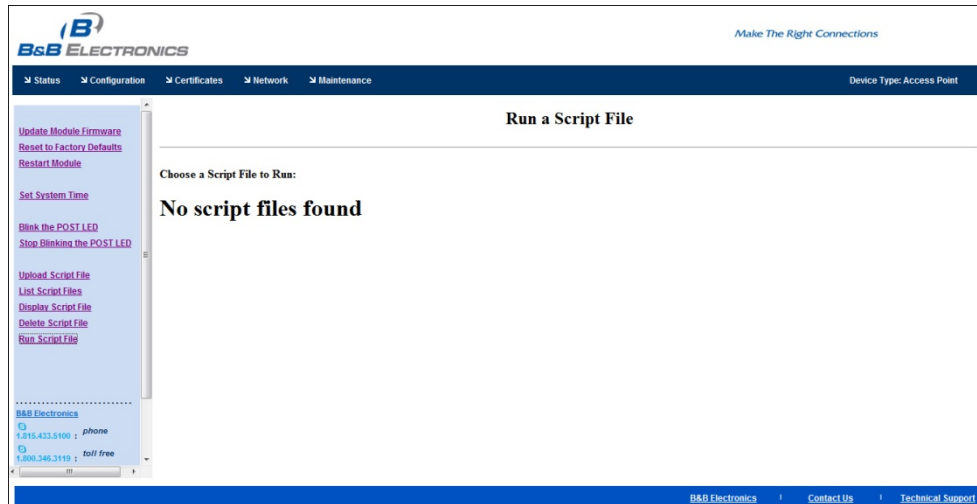


Field	CLI Command
Displayed Page	TBD

Run Script File

URL /Maintenance/Run Script File

Description Runs a script file.



Field	CLI Command
Displayed Page	TBD

17.0 Certification & Regulatory Approvals

The unit complies with the following agency approvals:

Table 28 - Regulatory Approvals

Country	Standard	Status
North America (US & Canada)	FCC Part 15 Sec. 15.107, 15.109, 15.207, 15.209, 15.247 Modular Approval	Complete
Europe	CISPR 16-1 :1993 ETSI EN 300 328 Part 1 V1.2.2 (2000-07) ETSI EN 300 328 Part 2 V1.1.1 (2000-07)	Complete
Japan	ARIB STD-T71 v1.0, 14 (Dec 2000) ARIB RCR STD-T33 (June 19, 1997) ARIB STD-T66 v2.0 (March 28, 2002)	Pending

17.1 FCC Statement

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for assistance.

17.2 FCC RF Exposure Statement

To satisfy RF exposure requirements, this device and its antenna must operate with a separation distance of a least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

17.3 Information for Canadian Users (IC Notice)

This device has been designed to operate with an antenna having a maximum gain of 5dBi for 802.11b/g band. An antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

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

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

17.4 FCC/IC Modular Approval

This document describes the Airborne WLN FCC modular approval and the guidelines for use as outlined in FCC Public Notice (DA-00-1407A1).

The APXG-Q5420 is covered by the following modular grants:

Table 2829 - Modular Approval Grant Numbers

Country	Standard	Grant
North America (US)	FCC Part 15 Sec. 15.107, 15.109, 15.207, 15.209, 15.247 Modular Approval	F4AWLNG551
Canada	RSS 210 Modular Approval	3913A-WLNG551

By providing FCC modular approval on the Airborne WLN modules, the customers are relieved of any need to perform FCC part 15 subpart C Intentional Radiator testing and certification, except where they wish to use an antenna that is not already certified.

B&B Electronics supports a group of pre-approved antennas; use of one of these antennas eliminates the need to do any further subpart C testing or certification. If an antenna is not on the list, it is a simple process to add it to the pre-approved list without having to complete a full set of emissions testing. Please contact B&B Electronics Technical support for details of our qualification processes.

Please note that as part of the FCC requirements for the use of the modular approval, the installation of any antenna must require a professional installer. This is to prevent any non-authorized antenna being used with the radio. There are ways to support this requirement but the most popular is to utilize a non-standard antenna connector, this designation includes the reverse polarity versions of the most popular RF antenna types (SMA, TNC, etc.). For more details please contact B&B Electronics.

The following documents are associated with this applications note:

- FCC Part 15 – Radio Frequency Devices
- FCC Public Notice – DA-00-1407A1 (June 26th, 2000)

B&B Electronics recommends that during the integration of the radio, into the customers system, that any design guidelines be followed. Please contact B&B Electronics Technical Support if you have any concerns regarding the hardware integration.

Contact B&B Electronics Technical support for a copy of the FCC and IC grant certificates, the test reports and updated approved antenna list.

17.5 Regulatory Test Mode Support

The Airborne Device Server includes support for all FCC, IC and ETSI test modes required to perform regulatory compliance testing on the module, please contact B&B Electronics Technical Support for details on enabling and using these modes.

18.0 Physical & Environmental Approvals

The device has passed the following primary physical and environmental tests. The test methods referenced are defined in SAE J1455 Aug1994.

Table 30 - Mechanical Approvals

Test	Reference	Conditions
Temperature Range (Operational)	Table 1B, Type 2b	-20°C to +85°C
Temperature Range (Non-Operational)		-40°C to +125°C
Humidity	Sect 4.2.3	0-95%RH @ 38°C condensing Fig 4a – 8 hours active humidity cycle
Altitude	Sect 4.8	Operational: 0-12,000ft (62 KPa absolute pressure) Non-operational: 0-40,000ft (18.6 KPa absolute pressure)
Vibration	Sect 4.9	Operational: 2.4 Grms, 10-1K Hz, 1hr per axis Non-operational: 5.2 Grms, 10-1K Hz, 1hr per axis
Shock	Sect 4.10	Operational: 20Gs MAX, 11ms half-sine pulse
Product Drop	Sect 4.10.3.1	1m onto concrete, any face or corner, 1 drop
Packaging Drop	Sect 4.10.2.1	32 inches onto concrete on each face and corner. Packaged in 'for transit' configuration.

Test reports are available from B&B Electronics Technical Support, please contact directly for the latest documentation.

19.0 Change Log

The following table indicates all changes made to this document:

Version	Date	Section	Change Description	Author
V 1.0	7/09/2012	-	Initial Release	ACR