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AirborneDirect™ User Manual

AirborneDirect™ DP500/IN5000/HD500 Family User Manual

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Qatech, Inc. Headquarters

QUATECH® Inc..
5675 Hudson Industrial Parkway
Hudson, OH 44236
USA

Telephone: 330.655.9000
Toll Free (USA): 800.553.1170
Fax: 330.655.9010
Technical Support: 800.553.1170 / support@quatech.com

Web Site: www.quatech.com

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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 Quatech Sales or Wireless Support.

1.1 Terminology

Airborne Enterprise Device Server and AirborneDirect Enterprise Device Server is used in the opening section to describe the devices detailed in this document, after this section the term **module** will be used to describe the devices.

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 Radio Evaluation Kit CD. Should you not have the CD, for the latest version of Adobe Acrobat Reader, go to the Adobe Web site (www.adobe.com).

2.0 Product Description

This guide describes the AirborneDirect™ device servers and wireless adapters from Quatech, Inc. AirborneDirect™ is a fully integrated, 802.11 wireless Local Area Network (LAN) connectivity device designed to provide wireless LAN and Internet connectivity in industrial, scientific, medical, and transportation applications where an existing communications interface already exists. The AirborneDirect family of products supports Serial (RS232/422/485), Ethernet and a combination these interfaces in a range of packaging options.

The AirborneDirect™ product family provides true plug-and-play wireless connectivity. By delivering convenient, easy-to-deploy wireless network connectivity, the device servers and adapters significantly reduce the complexities of wireless system deployment and network implementation. At the same time, users can move equipment without the cost and time associated with wired network drops and environment restrictions. This provides flexibility for seasonal demands, line and staffing changes, and more.

The AirborneDirect™ Serial Bridges and device servers provide a simple connection between the 802.11 wireless LAN and three leading serial interfaces: RS-232, RS-422, and RS-485. The Bridge acts transparently between any device using these interfaces and a wireless LAN. Using the Quatech virtual communications port Windows device driver OEMs can communicate with their devices from any workstation on the same network as if the workstation and devices were directly attached through a serial port.

The AirborneDirect™ Ethernet Adapter provides a link between the 802.11 wireless LAN and any Ethernet-ready device with an RJ-45 connector. It acts transparently between the device and a wireless LAN. By integrating AirborneDirect™ into existing and legacy platforms, OEMs can significantly enhance their products by delivering increased value and functionality to their entire customer base.

The Airborne family includes the ability to simultaneously use the serial-to-wireless and Ethernet-to-wireless connectivity in the same unit. This capability provides for multiple connections to the same machine or consolidation of multiple wireless units into a single device.

The AirborneDirect™ products open the world of remote device monitoring and management, as well as wide-area data collection, to any device, machine, or plant that has an external serial or Ethernet connection and a network infrastructure. The development kit provides quick and easy access to the Bridge's configuration and functions, while providing OEMs with a platform to develop their branded solutions. The Bridge also provides the capability to perform firmware upgrades that allow new features to be added quickly and easily, protecting your investment.

The Enterprise family includes the most advanced security support available for the device class in the industry, including WPA, WPA2 and full Enterprise support. The devices can be used with the most advanced WLAN networks being deployed today. The Airborne products are based upon the industry leading Airborne device server and wireless adapter technology from Quatech, providing a fully compatible and familiar device interface across the all product ranges. If you've used one you have used them all.

3.0 Features

- 802.11b/g WiFi Radio with 32bit ARM9 CPU (128Mb SDRAM, 64Mb Flash)
- Integrated Airborne Device Server and Wireless Adapter technology.
- Supports WEP, WPA, WPA2 and 802.1x Supplicant, with Certificates.
- The wireless device server includes integrated:
 - 802.11b/g radio driver
 - TCP/IP stack, UDP, telnet, FTP server
 - Data bridging and buffering
 - Command Line Interface
 - Web interface
 - WPA Supplicant
 - 802.11 Radio Driver
 - DHCP Server (Ethernet Interface)
 - Firewall and Port Forwarding (Ethernet)
 - FTP Server
- Supports flexible antenna selection.
- Operating Temperature (-40°C to 85°C)
- Storage temp (-50°C to 125°C)
- Industry standard wired connections:
 - D-9 Serial connectors (RS232/422/485)
 - RJ-45 (10/100 Ethernet)
- Multiple host interfaces supported:
 - Single and Dual Serial (RS232/422/485) – up to 921K BAUD
 - 10/100 Ethernet
- Integrated standard and wide range (J1455) Power Supply (5-36VDC)
- Power connector options include 2.1mm Barrel Jack, Terminal Block and custom connectors.
- Integrated Site Survey mode.
- Advanced Low power modes.
- Rugged mounting options.
- Virtual COM port driver (WinXP, Vista, Win7)
- Worldwide Regulatory Support (FCC, IC, CE)

4.0 Device Types

This manual covers all variations available in the AirborneDirect™ device family. The following section identifies the different types both functional and classification. In most cases the functional types are available in the listed classifications. If you are not certain which type you have or would like clarify the available options please contact Quatech Sales or Technical support.

4.1 Serial

This device supports a single or dual serial port and provides serial to 802.11 bridging. The serial devices can support one or more of the following serial interface types:

- RS232
- RS422
- RS485

Default configuration on all models is RS232, conversion to RS422/485 requires software configuration and in some models jumper setting changes. These are covered in the following sections.

This device allows the connection of a serial port to an 802.11 network.

4.2 Ethernet

The Ethernet adapter provides a wireless interface to an existing Ethernet port (RJ-45). Depending upon the model of device the connection to the Ethernet port of the host is made via a RJ-45 socket or pigtail with a RJ-45 plug.

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 Serial + Ethernet

This device allows for simultaneous connection of Serial and Ethernet ports. Providing the same functionality on each port that is available on the individual devices, it is possible to maintain network based connections to both the Ethernet and Serial ports without compromise of 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 supporting redundant network connectivity for high reliability applications.

4.4 Enterprise Class

The enterprise class product provides the best cost vs. performance in the AirborneDirect™ product family. The packaging is compact and designed to fit with non-industrial applications and markets. The product class supports the full industrial operating temperature range and the complete set of functional capabilities of the Airborne™ Device Server and Wireless Adapter technology.

Figure 1 - Enterprise AirborneDirect™ Device



The Enterprise class product range includes devices that support a single serial port and an Ethernet device.

The enterprise class product is ideal for the following application types:

- Medical equipment.
- Point-of-Sale devices.
- CNC/DNC equipment.
- Time clocks.
- Scales.
- Data collection devices.
- Vehicle diagnostics.

The Enterprise Class products require a 5VDC power supply.

4.5 Industrial Class

Developed to support the demands of the industrial and automotive environments, the features of the Industrial Class products offer a more flexible and rugged alternative to the enterprise class devices. The product class supports the full industrial operating temperature range and the complete set of functional capabilities of the Airborne Device Server and Wireless Adapter technology.

Figure 2 - Industrial AirborneDirect™ Device



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

The enterprise class product is ideal for the following application types:

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

The Industrial class of products includes Ethernet only, Serial only and the dual (Serial+Ethernet) capability.

4.6 Heavy Duty Class

These are the highest performing and most rugged Serial Device Server and Ethernet adapter products in the market. The Heavy Duty product class supports the highest level of ruggedization available allowing use in the most hazardous and demanding environments. The product class supports the full industrial operating temperature range and the complete set of functional capabilities of the Airborne Device Server and Wireless Adapter technology.

Figure 3 - Heavy Duty AirborneDirect™ Device



The product family uses the Deutsch EEC-325X4B enclosure with sealed and vented variations and a wide range power supply, capable of exceeding the SAE J1455 power supply requirements.

The Heavy Duty products are ideal for the following applications:

- Mining equipment telematics.
- Military vehicle diagnostics.
- Avionics.
- Construction heavy equipment diagnostics.

The HD class of products includes Ethernet only, Serial only and the dual (Serial+Ethernet) capability, through a custom Deutsch connector (DTM06-128A).

5.0 Block Diagram

The following outlines the block diagram for the devices:

Figure 4 - ABDG-SE/ET-DP5XX Block Diagram

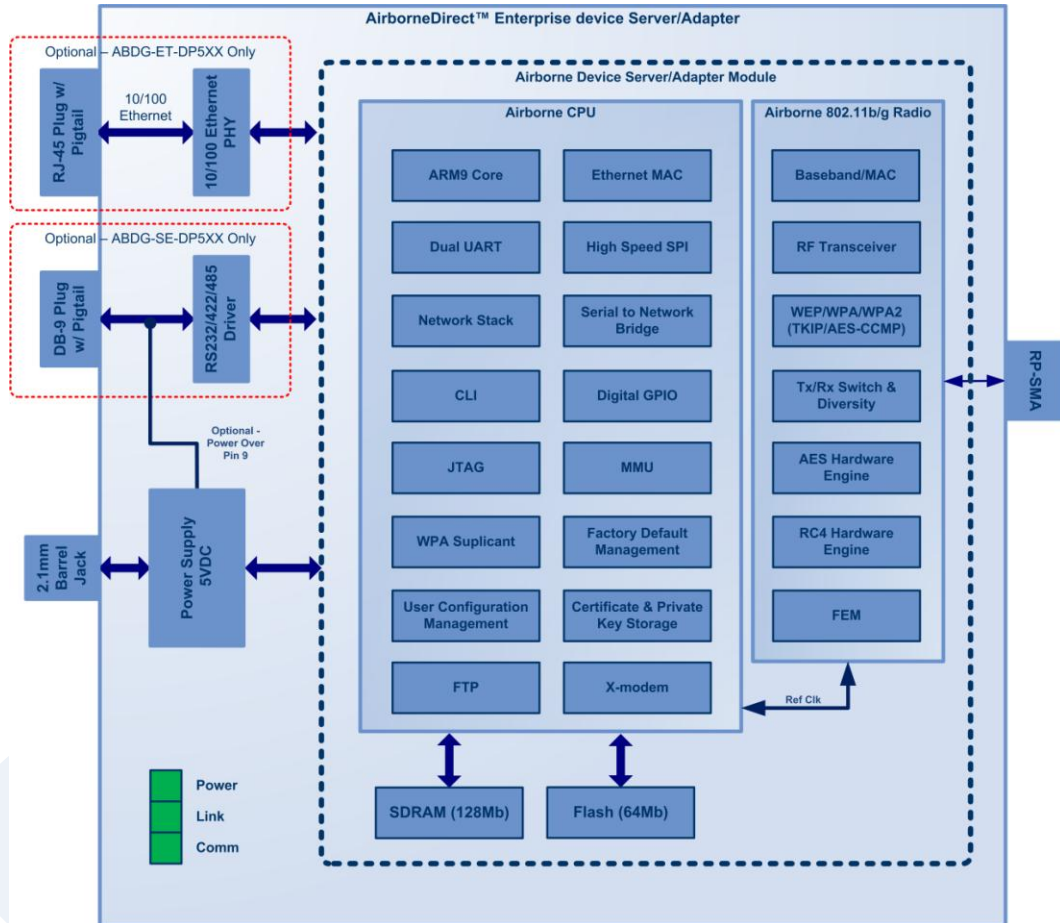
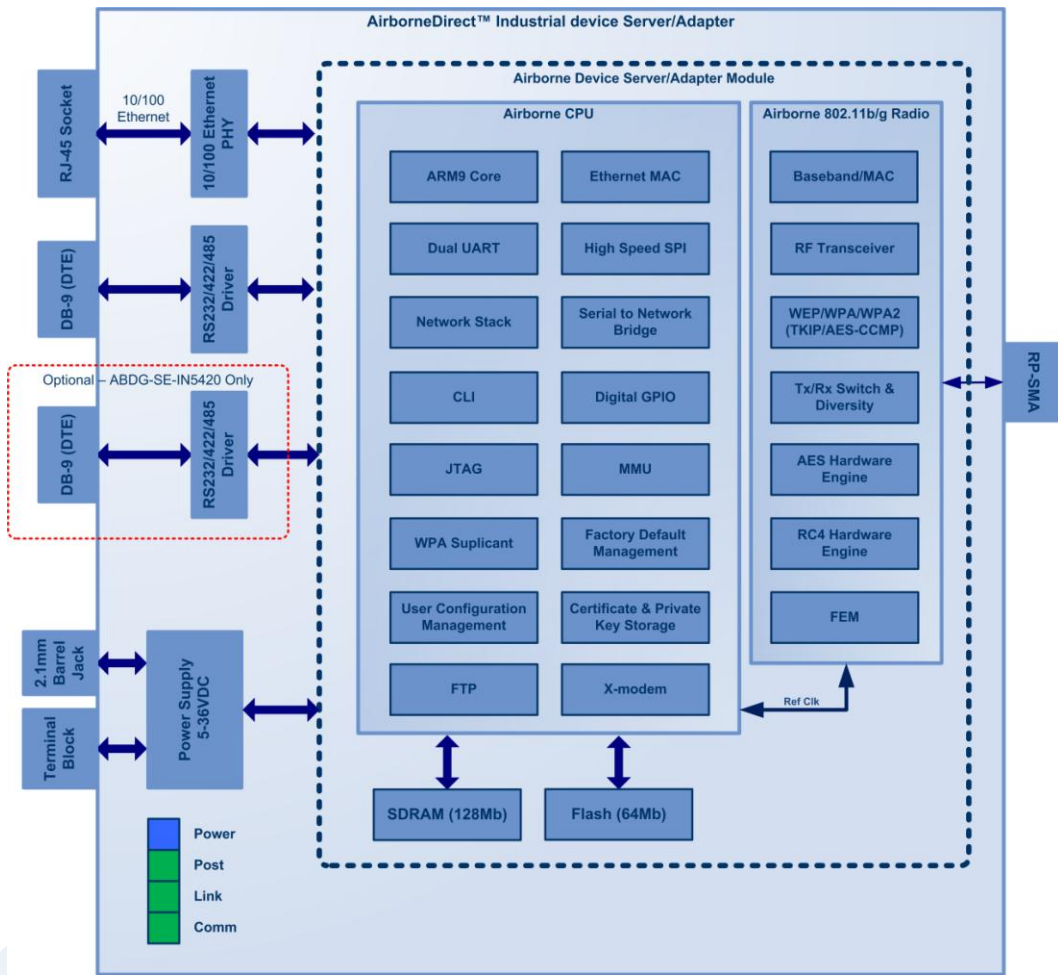


Figure 5 - ABDG-ET/SE-IN5XXX Block Diagram



6.0 Pin out and Connectors

Pin definition is dependent upon the device type selected. The following defines the pin outs for the individual interfaces.

6.1 Serial Ports

The AirborneDirect™ units support either a single or dual serial port configuration. The Port pin out can change depending upon the interface configuration chosen, Table 1 shows the pin out for the interface selected.

Figure 6 - DE-9 (DB-9) Connector Pin-out

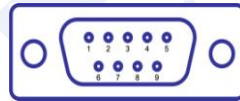


Table 1 – Serial Port Pin Definition

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.
2. Power on pin 9 only available on Enterprise devices (ABDG-SE-DP501).
3. Only required on Industrial products (ABDG-SE-IN54XX)

Table 2 shows the availability of the serial ports and available interface types by product class.

Table 2 - Serial Ports by Product Class

Device Class	Port 1	Port 2
Enterprise	RS232 RS422 (4-wire) RS485 (2-wire)	N/A
Industrial	RS232 RS422 (4-wire) RS485(2-wire)	N/A
	RS232 RS422 (4-wire) RS485(2-wire)	RS232 RS422 (4-wire)

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.

6.2 Ethernet Port

The AirborneDirect™ Ethernet devices support a single interface. This is a 10/100Mbps interface that supports auto negotiation and cross-over cabling. The interface also supports both half and full duplex for 10Mbps and 100Mbps. Table XX shows the interface pin out.

Figure 7 - Ethernet Jack Pin Out

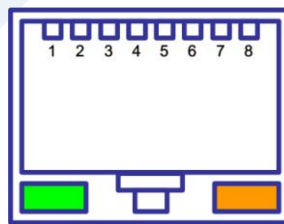


Table 3 - Ethernet Connector Pin Out

Pin	RJ45 Socket (Industrial)	RJ45 Plug (Enterprise)
1	TxD+	RxD+
2	TxD-	RxD-
3	RxD+	TxD+
4	NC	NC
5	NC	NC
6	RxD-	TxD-
7	NC	NC

Pin	RJ45 Socket (Industrial)	RJ45 Plug (Enterprise)
8	NC	NC
Green LED	Valid TCP/IP connection made with Airborne Adapter: Off No TCP/IP connection On Valid TCP/IP Connection	N/A
Yellow LED	Power-on Self Test (POST): Off Not powered or has failed POST On Passed POST	N/A

6.3 Connector Definition

There are a total of five connectors used by the AirborneDirect™ family. Which connectors are available on your product depend upon the model you purchased. The definition for the connectors is common to all product classes. Table 4 provides definitions for the connectors.

Table 4 - Connector Description

Type	Description	Product Class
Serial	DE-9 Connector Male	Enterprise, Industrial
Ethernet	RJ45 Plug	Enterprise
Ethernet	RJ45 Socket	Industrial
Antenna	RP-SMA	Enterprise, Industrial
Power	2.1mm Barrel Jack	Enterprise, Industrial
Power	2 Position Terminal Block	Industrial

6.4 OEM Reset Switch (Factory Reset)

All AirborneDirect™ devices support the ability to reset the configuration back to OEM defaults. This is useful when a device has been incorrectly configured and has lost the ability to communicate on any of the available ports, preventing access to one of the configuration interfaces and blocking your ability to recover the device by correcting the configuration.

The following Table 5 describes the sequence for OEM resetting the AirborneDirect™ devices. All devices use the same process however the location of the OEM reset switch varies between the product families.

Table 5 - OEM Reset Procedure

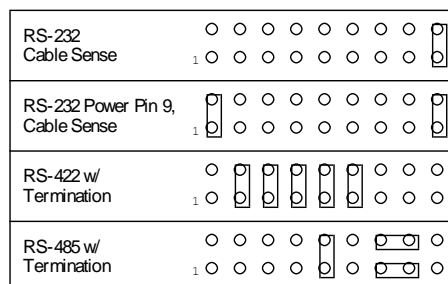
1	Disconnect or turn off the power supply.
2	Press the OEM reset (factory reset) button. This may require the use of a small narrow object, it is important that this object is not sharp as it may cause damage to the unit.
3	While holding the OEM button pressed reapply power to the unit.
4	Hold the OEM reset button for 5-6 seconds after power has been applied.
5	Release the OEM reset button.
6	The device will restart with the installed OEM defaults. If no OEM Configuration is applied the device will return to Quatech factory defaults. See section 15.6 on use of OEM factory configurations.

The location of the OEM reset button for the Enterprise devices is on the back of the enclosure, underneath the label near the pigtail. The Industrial devices OEM reset button is on the Ethernet/Power end of the box next to the 2.1mm barrel connector (See section 10.0)

6.5 Enterprise Serial Interface Jumpers

The Enterprise Serial device server supports RS232/422/485 interface drivers, as well as power over pin 9. Selection of these options is made through both the web interface and hardware jumpers. Figure 8 shows the interface selection jumpers for the different interface types.

Figure 8- Interface Selection Jumpers



The jumper selections must be made while the device is unpowered and before being used in the final application.



The interface type selected by the interface jumpers in Figure 8 must match the selected configuration for the **Configuration | Serial Port Settings | Serial Interface Type** setting in the web interface.

6.6 Indicator LED's

The devices provide indicator LED's to provide feedback on the state of the device. These are a useful tool during installation and troubleshooting.

Table 6 - Enterprise LED Indicators

LED	Color	Airborne Device State
POWER		Adapter is not powered.
		Adapter failed Power On Self Test (POST) and is not configured for wireless communication.
		Adapter passed POST but is not configured for wireless network communication.
		Adapter passed post and is configured for wireless communication.
LINK		Adapter is not powered.
		(Periodic Blinking) Adapter is searching for a valid network (Access Point) that matches device's configuration.
		Adapter has successfully associated with an Access Point.
COMM		If Power LED is also Off then Adapter is not powered. If Power LED is On then either: <ul style="list-style-type: none"> A physical connection detected on Serial/Ethernet cable. No TCP session from wireless interface has been established.
		No physical Serial/Ethernet connection has been detected.
		(Blinking – OFF/Red) A physical Serial/Ethernet connection has been detected and there is traffic across the interface. No TCP connection to the adapter has been established on the wireless interface.
		A TCP connection to the adapter from the wireless interface has been established but no physical connection on the Serial/Ethernet interface has been detected.
		(Blinking – Green/Orange) A physical Serial/Ethernet connection has been detected and there is Serial/Ethernet traffic across the interface. A TCP connection to the adapter has been established (On WLAN or Ethernet interface).
		A physical Serial/Ethernet connection has been detected. A TCP connection to the adapter has been established from the WLAN or Ethernet interface but no traffic has been detected.

Table 7 - Industrial LED Indicators

LED	Color	Airborne Device State
POWER	○	Adapter is not powered.
	●	Adapter is powered.
POST	○	Adapter is not powered.
	●	Adapter failed Power On Self Test (POST) and is not configured for wireless communication.
	●	Adapter passed POST but is not configured for wireless network communication.
LINK	○	Adapter is not powered.
	☀	(Periodic Blinking) Adapter is searching for a valid network (Access Point) that matches device's configuration.
	●	Adapter has successfully associated with an Access Point.
COMM	○	If Power LED is also Off then Adapter is not powered. If Power LED is On then: <ul style="list-style-type: none"> No TCP session from WLAN or Ethernet interface has been established.
	●	A TCP connection to the adapter has been established from the Wireless or Ethernet interfaces but no traffic has been detected.

7.0 Electrical & RF Specification

Table 8- Absolute Maximum Values¹

Parameter	Min	Max	Unit
Maximum Supply Voltage - Enterprise	4.5	5.5	VDC
Maximum Supply Voltage - Industrial	5.0	36	VDC
Power Dissipation		3.00	W
Operating Temperature Range	-40	85	°C
Storage Temperature	-50	125	°C

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

Table 9 - 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 10 - 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 11 - 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.

7.1 AC Electrical Characteristics – Transmitter

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

7.2 Performance/Range

The following table illustrates the typical data rates, performance and range the device is capable of providing using an omni-directional antenna.

Table 12 - 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 typical values less than 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.

8.0 Antenna

The unit supports antenna connection through a single Hirose U.FL connector, located on the top surface of the radio next to the RF shielding.

Any antenna used with the system must be designed for operation within the 2.4GHz ISM band and specifically must 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.

8.1 Antenna Selection

The Airborne radio supports a number of antenna options, all of which require connection to the U.FL connectors on the radio. Ultimately the antenna option selected 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.

The available antenna connections include:

- Host board mounted antenna
- Host Chassis mounted antenna
- Embedded antenna

In addition to the above options, location and performance need to be considered. The following sections discuss these items.

8.2 Host Board Mounted Antenna

Host board mounted requires that an antenna connection is physically mounted to the host system board. It also requires that the host board include a U.FL connector (two (2) if diversity is being used) to allow a U.FL to U.FL coaxial lead to connect from the radio to the host board. It will then require 50Ω matched PCB traces to be routed from the U.FL connector to the antenna mount.

There are several sources for the U.FL to U.FL coaxial cable these include Hirose, Sunridge and IPEX. Please contact Quatech for further part numbers and supply assistance.

This approach can simplify assembly but does require that the host system configuration can accommodate an antenna location that is determined by the host PCB. There are also limitations on the ability to seal the enclosure when using this approach.

This approach also restricts the selection of available antenna. When using this approach, antennas that screw or press fit to the PCB mount connector must be used. There are many options for the antenna connector type, however if you

wish to utilize the FCC/IC modular approval the connector choice must comply with FCC regulations. These state that a non-standard connector, e.g. RP-TNC/RP-SMA, is required. TNC/SMA connectors are not allowed.

8.3 Host Chassis Mounted Antenna

Host Chassis mounted antennas require no work on the host PCB. They utilize an antenna type called 'flying lead'. There are two types of flying leads; one which provides a bulkhead mounted antenna connector and one which provides a bulk head mounted antenna. The type you choose will be determined by the application.

A flying lead system connects a U.FL coaxial lead to the radio's U.FL connector. The other end of the coax is attached to either a bulkhead mounted antenna connector or directly to an antenna that has an integrated bulkhead mount.

In either of the two cases, the use of this approach significantly reduces the antenna system development effort and provides for greater flexibility in the available antenna types and placement in the host system chassis.

When using the flying lead antenna (integrated bulk head mounting), there are no connector choice restrictions for use with the FCC/IC modular certification. However if the flying lead connector is used, the same restrictions as identified for the Host Mounted Antenna apply.

There are many suppliers of flying lead antenna and connectors. Quatech's Airborne Antenna product line offers a range of antenna solutions.

8.4 Embedded Antenna

Use of Embedded antenna can be the most interesting approach for M2M, industrial and medical applications. Their small form factor and absence of any external mounting provides a very compelling argument for their use. There is a downside to this antenna type and it comes with performance. Antenna performance for all of the embedded options will, in most cases, be less that that achievable with external antenna. This does not make them unusable; it will impact choice of antenna type and requires more focus on placement.

The three main embedded antenna types are PCB embedded, chip (PCB mounted) and flying lead; each has its advantages and disadvantages (See Table 13).

Table 13 - Embedded Antenna Options

Antenna Type	Features			
	Cost	Size	Availability	Performance
PCB Embedded	Lowest	Largest	Custom	Poor
Chip	Low	Small	Standard	Poor
Flying Lead	Low	Small	Standard	Fair

PCB Embedded – This approach embeds an antenna design into the host PCB. This approach is very common with add-in WiFi cards (CF, PCMCIA, SDIO, etc.) as it requires no external connections and is the cheapest production approach. The lower production cost requires significant development cost and lack of performance and flexibility.

Chip – The integration of a chip antenna is simple and requires a relatively small footprint on the host system, however, it does suffer from the same limitations of flexibility and performance seen with the PCB embedded approach. There are relatively large numbers of suppliers of this type of antenna; there is also a range of configuration and performance options.

Flying Lead – This approach is similar to the flying lead solution for external antennas. The difference is that the form factors are smaller and provide a range of chassis and board mounting options, all for internal use. This approach suffers less from the performance and flexibility limitations of the other approaches, since the location of the antenna is not determined by the host PCB design. The assembly of a system using this approach maybe slightly more complex since the antenna is not necessarily mounted on the host PCBA.

8.5 Antenna Location

The importance of this design choice cannot be over stressed. It can in fact be the determining factor between success and failure of the WiFi implementation.

There are several factors that need to be considered when determining 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 the factors above the following things need to be considered during the development process:

- Minimize the distance between the radio and the location of the antenna. The coaxial cable between the two impacts the Transmit Power and Receive Sensitivity negatively. Quatech recommends using 1.32-1.37mm outer diameter U.FL coaxial cables.
- Minimize the locations where metal surfaces come into contact or are close to the location of the antenna.
- Avoid locations where RF noise, close to or over lapping the ISM bands, may occur. This would include microwave ovens and wireless telephone systems in the 2.4GHz and 5.0GHz frequency range.
- Mount the antenna as high on the equipment as possible.

- Locate the antenna where there is a minimum of obstruction between the antenna and the location of the Access Points. Typically Access Points are 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.

Even addressing all of the above factors does not guarantee a perfect connection, however with experimentation an understanding of the best combination will allow a preferred combination to be identified.

8.6 Performance

Performance is difficult to define as the appropriate metric changes with each application or may indeed be a combination of parameters and application requirements. The underlying characteristic that, in most cases, needs to be observed is the link quality. This can be defined as the bandwidth available over which communication between the two devices can be performed. The lower the link quality the less likely the devices can communicate.

Measurement of link quality can be made in several ways: Bit Error Rate (BER), Signal to Noise (SNR) ratio, Signal Strength, and may also include the addition of distortion. The link quality is used by the radio to determine the link rate. Generally as the link quality for a given link rate drops below a predefined limit, the radio will drop to the next lowest link rate and try to communicate using it.

The reciprocal 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 sustained using it. It is important to note that for a given position the link quality improves as the link rate is reduced. This is because as the link rate drops the radios Transmit power and Receive sensitivity improve.

From this it can be seen that looking at the link rate is an indirect way of assessing the quality of the link between the device and an Access Point. You should strive to make the communication quality as good as possible in order to support the best link rate. However be careful not to *over specify* the link rate. Consider your application's bandwidth requirements and tailor your link rate to optimize the link quality. For example, the link quality for a location at 6Mb/s is 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 an overall measurement of the link quality called link margin.

Link Margin provides a measure of all the parts of the RF path that impact the ability of two systems to communicate. The basic equation looks like this:

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

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

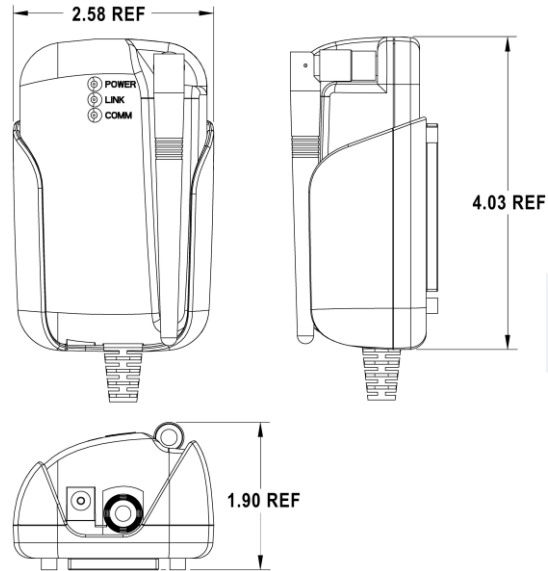
Where:

- 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)

This is a complex subject and requires more information than is presented here, Quatech recommends at reviewing the subject and evaluating any system at a basic level.

It is then possible, with a combination of the above items and an understanding of the application demands, to achieve a link quality optimized for the application and host design. It is important to note that this is established with a combination of hardware selection, design choices and configuration of the radio.

9.0 Mechanical Outline – Enterprise 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-9 (Female)

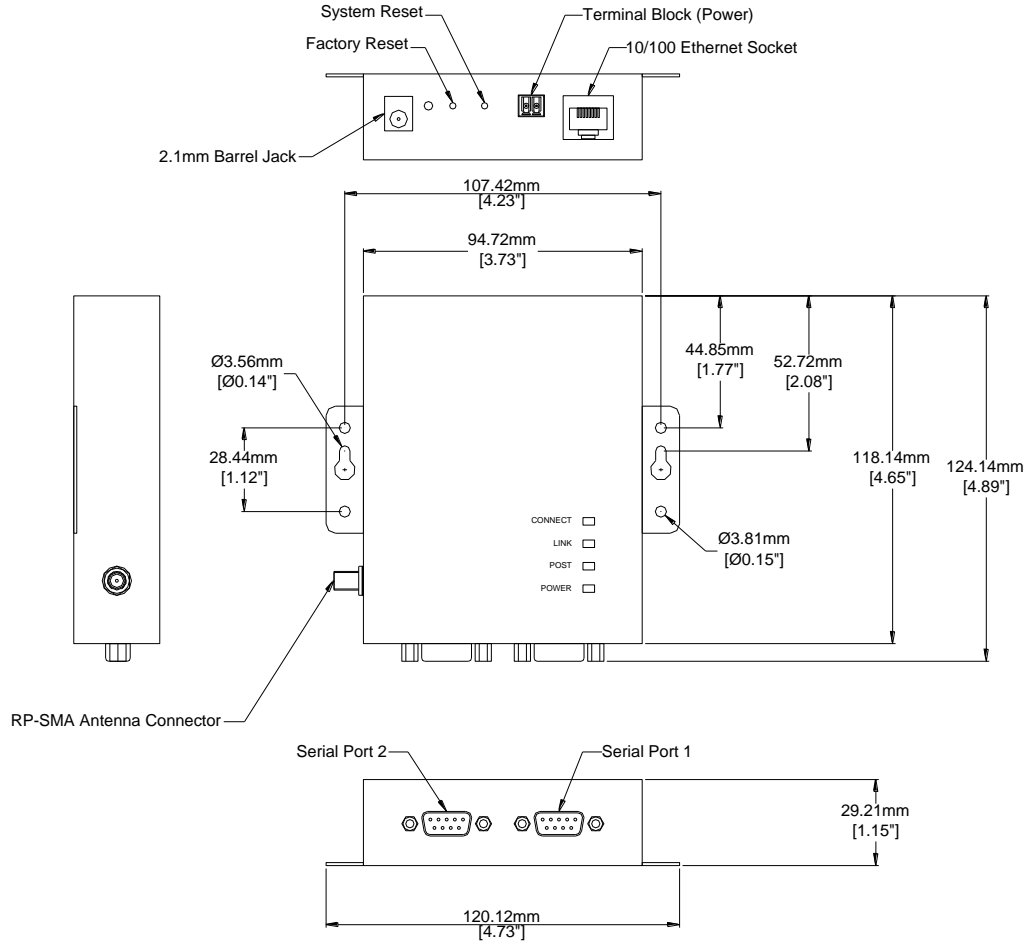
Ethernet Connector: **RJ-45 Plug**

Requires RJ-45 socket, 10/100 Ethernet interface

Power Connector: **2.1mm Barrel Jack**

Requires 2.1mm ID, 5.5mm OD, +5VDC center pin.

10.0 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.

11.0 Getting Started

11.1 Unpack the AirborneDirect™ Device

Unpack the AirborneDirect™ 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 Quatech immediately.

Contact details can be found at www.quatech.com/support.

11.2 Connect AirborneDirect™ to host

Connect the Airborne Direct unit to a system capable of configuring it. The preferred initial connection depends upon the class and type of product:

Serial – Enterprise: Connect to a serial port on the host or through a serial to USB adapter.

Serial – Industrial: Connect the RJ-45 socket to a RJ-45 socket using a CAT 5 Ethernet cable.

Ethernet – Enterprise: Connect to an RJ-45 socket on the host.

Ethernet – Industrial: Connect the RJ-45 socket to a RJ-45 socket using a CAT 5 Ethernet cable.

11.3 Attach Antenna and Power-up the AirborneDirect™

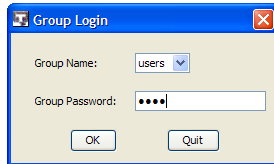
Attach the supplied antenna to the RP-SMA connector on the AirborneDirect™ unit. Connect the supplied AC adapter to the power connector. If using your own power supply make sure the correct power connector type and polarity are being used, verify the appropriate voltage to be applied by checking **Error! Reference source not found.** for the correct product class. Confirm that the device is receiving power by verifying that the POST LED is lit when the supply is applied.

12.0 Configuring Device – Industrial Serial (ABDG-SE-IN5XXX)

The following describes initial connection to an AirborneDirect™ Serial Device Server (ABDG-SE-IN5XXX). If you have an Ethernet device (ABGD-ET-DP5XX/IN5010), please go to section 14.0. If you have purchased a SE-DP5XX device please go to section 13.0 for the set-up instructions.

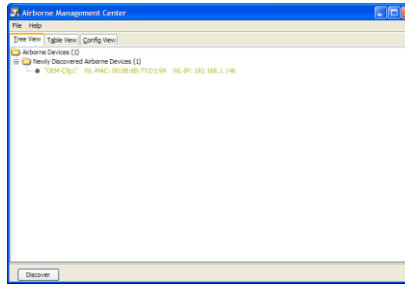
The instructions in Table 14 provide step-by-step instructions for configuration of the ABDG-SE-IN5XXX product family.

Table 14 - SE-IN5XXX Accessing the Web Interface

1	Open the AirborneDirect™ packaging and locate the Install CD.
2	Place the CD in the CD/DVD drive of the laptop or desktop you will be using to configure the AirborneDirect™ device. Follow the on screen directions for installation of the appropriate device software and documentation.
3	Connect the Ethernet cable on ABDG to an Ethernet port on the laptop or desktop system.
4	Apply power to the ABDG-SE-IN5XXX.
5	<p>The unit will boot and display one of the following LED patterns:</p> <p>ABDG-SE-IN5XXX</p> <p>COMM: ● Off</p> <p>LINK : ● Off</p> <p>POST: ● Orange</p> <p>POWER: ● Blue</p>
6	<p>Run the Airborne Management System 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.</p> <p>When the application opens the following dialog will be displayed:</p> <div style="text-align: center;">  </div> <p>Select Group Name: manuf and enter Group Password: dpac</p>

7

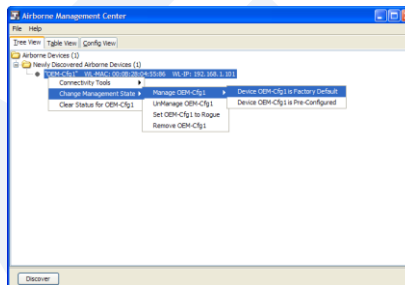
The AMC will load and discover the attached device.



8

Right Click the Unmanaged Device then:

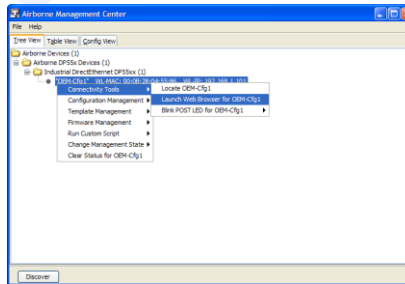
1. Select **Change Management State**
2. Select **Manage OEM-Cfg1**
3. Select **Device OEM-Cfg1 is Factory Default**



9

The devices status will move to managed and the device will be displayed under the device type/group it belongs too. Right click the device and then:

1. Select **Connectivity Tools**
2. Select **Launch Web Browser for OEM-Cfg1**



10

Opening web page shows adapter status.

Links to the available configuration options are identified in the left hand menu. The top menu bar provides access to different operations that can be performed by the AirborneDirect™ device. See section 15.0 for a full description of how to use the web interface.

11

Using Express Setup:

If this is the first time you have configured the device the Express Setup page will be displayed, please refer to section 16.0 to continue set-up of the device.

If this is not the first time please move to section to update the configuration

12	When the Reboot button is pressed the unit will restart and install new settings. This may take 15-20 seconds. Please refresh the web interface after the boot cycle has completed.															
13	When configured correctly the LED pattern should match the following: <table border="0"><thead><tr><th data-bbox="462 369 618 390">ABDG-SE-IN5XXX</th><th data-bbox="667 369 829 390"><i>No TCP Connection</i></th><th data-bbox="1013 369 1149 390"><i>TCP Connection</i></th></tr></thead><tbody><tr><td data-bbox="462 394 532 415">COMM:</td><td data-bbox="667 394 716 415">● Off</td><td data-bbox="1013 394 1084 415">● Green</td></tr><tr><td data-bbox="462 420 516 441">LINK :</td><td data-bbox="667 420 743 441">● Green</td><td data-bbox="1013 420 1084 441">● Green</td></tr><tr><td data-bbox="462 445 516 466">POST:</td><td data-bbox="667 445 743 466">● Green</td><td data-bbox="1013 445 1084 466">● Green</td></tr><tr><td data-bbox="462 470 537 491">POWER:</td><td data-bbox="667 470 732 491">● Blue</td><td data-bbox="1013 470 1073 491">● Blue</td></tr></tbody></table>	ABDG-SE-IN5XXX	<i>No TCP Connection</i>	<i>TCP Connection</i>	COMM:	● Off	● Green	LINK :	● Green	● Green	POST:	● Green	● Green	POWER:	● Blue	● Blue
ABDG-SE-IN5XXX	<i>No TCP Connection</i>	<i>TCP Connection</i>														
COMM:	● Off	● Green														
LINK :	● Green	● Green														
POST:	● Green	● Green														
POWER:	● Blue	● Blue														
14	To use the adapter on the wireless network, address all traffic to the IP address of the wireless interface of the ABDG-SE- IN5XXX. This address is listed in the home page of the web interface.															

13.0 Configuring Device – Enterprise Serial (ABDG-SE-DP5XX)

The ABDG-SE-DP5XX family does not have an Ethernet port for initial configuration so initial configuration can be performed through the serial port. To do this it is necessary to connect using the serial connector.

13.1 Connect a Host Computer

Connect the serial pigtail connector to the serial port on a host computer.



It may be necessary to use a gender changed that includes a Null Modem adapter.

13.2 Interacting with the AirborneDirect™ device

On the Host computer, use a terminal emulation program to interact with the device issuing Quatech Command Line Interface (CLI) commands. CLI commands let you request status or change parameter settings. Press the Enter key (<CR>) after each command line you type. After the module starts, type the following CLI command to log in (you must log in before CLI commands can be recognized):

Table 15 - UART Authentication

CLI Command	Description
Send Break Sequence	The serial port starts up in a listen mode waiting for a request for a data tunnel. To access the CLI mode in which set-up can take place the break sequence must be sent. The default break sequence for the device is $\tilde{\text{y}}\sim\text{ABD}$ The sequence must be sent with no trailing characters. If received correctly the device will respond OK.
auth dpac dpac <CR>	The module responds with OK, indicating that it executed the command successfully. (If you did not receive OK, check the settings in your terminal emulation program).



You will have to break into CLI mode and log into the module after any reset or restart.

13.3 Determine and Store the Access Point SSID

On the Host computer, use the terminal emulation program to type the following CLI commands in the order shown:

Table 16 - UART SSID & Authentication

CLI Command	Description
<code>wl-scan<CR></code>	The module scans for APs and returns information on each one it discovers. Note the SSID value that is returned, as you will need to enter it when configuring the device in the next steps.
<code>wl-ssid [SSID]<CR></code>	Associates the module with the network name [SSID] you specify. [SSID] is the value returned by the <code>wl-scan</code> command.
<code>commit<CR></code>	Stores the information to flash memory.
<code>restart</code>	Restarts the device and installs the new settings.

If your access point has security enabled, you will also need to use the CLI to enter those parameters (See the Enterprise CLI Reference Guide for details). That setup is outside the scope of this user guide, which assumes that the AP being tested with has no security.

After issuing the commands, the unit will restart and apply the network settings. Once restarted the LINK LED will stop blinking and go solid. If DHCP is enabled on the network the POWER and LINK LED's will turn solid green.

13.4 Determine the Device's IP address

On the Host computer, use the terminal emulation program to type the following CLI commands:

Table 17 - UART Determine Module's IP Address

CLI Command	Description
Send Break Sequence	The serial port starts up in a listen mode waiting for a request for a data tunnel. To access the CLI mode in which set-up can take place the break sequence must be sent. The default break sequence for the device is <code>~ABD</code> The sequence must be sent with no trailing characters. If received correctly the device will respond <code>OK</code> .
<code>auth dpac dpac <CR></code>	Authenticate with the device server.
<code>wl-ip<CR></code>	The module returns the IP address assigned to it by the DHCP server.

13.5 Accessing the Device Using the Web Interface

See section 15.0.

13.6 Accessing the Device Using Telnet

On the Remote computer, use a terminal emulation program to start a Telnet session. To connect to the device using TCP/IP, use the IP address obtained in section 13.4 to connect on port 23.

The terminal emulator will attempt to connect to the IP address; if successful you will now be able to use the WLAN interface for configuration of the device through either CLI or web.

For more information on the full CLI command set please refer to the Airborne Enterprise Command Line Reference Manual.

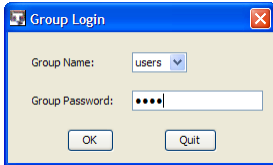


The above process can be achieved by any of the available Terminal Emulation programs. Please follow the specific applications requirements to make the TCP/IP connection and authenticate with the module.

14.0 Configuring Device – Enterprise/Industrial Ethernet

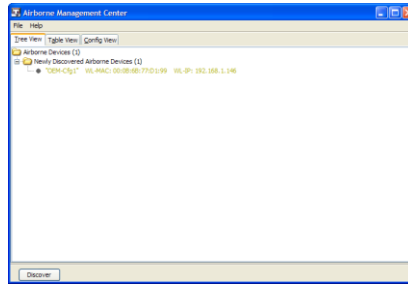
The following instructions describe how access the AirborneDirect™ Ethernet device and web interface for initial configuration of the unit.

Table 18 - ET-DP5XX/IN5XXX Accessing the Web Interface

1	Open the AirborneDirect™ packaging and locate the Install CD.																											
2	Place the CD in the CD/DVD drive of the laptop or desktop you will be using to configure the AirborneDirect™ device. Follow the on screen directions for installation of the appropriate device software and documentation.																											
3	Connect the Ethernet cable on ABDG to an Ethernet port on the laptop or desktop system.																											
4	Apply power to the ABDG-ET-DP5XX/IN5XXX.																											
5	<p>The unit will boot and display one of the following LED patterns:</p> <table border="0"> <tr> <td style="vertical-align: top;">ABDG-ET-DP5XX</td> <td style="vertical-align: top;"><i>Associated (Open Network)</i></td> <td style="vertical-align: top;"><i>Not Associated</i></td> </tr> <tr> <td>POWER:</td> <td>● Green</td> <td>● Green</td> </tr> <tr> <td>LINK :</td> <td>● Green</td> <td>● Red (Periodic Blinking)</td> </tr> <tr> <td>COMM:</td> <td>● Red</td> <td>● Red</td> </tr> <tr> <td>ABDG-ET-IN5XXX</td> <td></td> <td></td> </tr> <tr> <td>COMM:</td> <td>● Off</td> <td></td> </tr> <tr> <td>LINK :</td> <td>● Off</td> <td></td> </tr> <tr> <td>POST:</td> <td>● Orange</td> <td></td> </tr> <tr> <td>POWER:</td> <td>● Blue</td> <td></td> </tr> </table>	ABDG-ET-DP5XX	<i>Associated (Open Network)</i>	<i>Not Associated</i>	POWER:	● Green	● Green	LINK :	● Green	● Red (Periodic Blinking)	COMM:	● Red	● Red	ABDG-ET-IN5XXX			COMM:	● Off		LINK :	● Off		POST:	● Orange		POWER:	● Blue	
ABDG-ET-DP5XX	<i>Associated (Open Network)</i>	<i>Not Associated</i>																										
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LINK :	● Green	● Red (Periodic Blinking)																										
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COMM:	● Off																											
LINK :	● Off																											
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POWER:	● Blue																											
6	<p>Run the Airborne Management System 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.</p> <p>When the application opens the following dialog will be displayed:</p> <div style="text-align: center;">  </div> <p>Select Group Name: manuf and enter Group Password: dpac</p>																											

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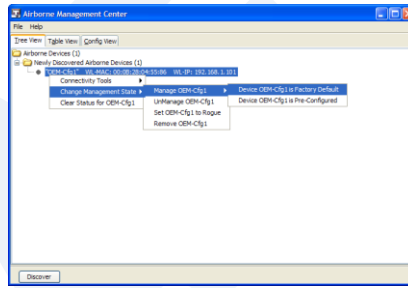
The AMC will load and discover the attached device.



8

Right Click the Unmanaged Device then:

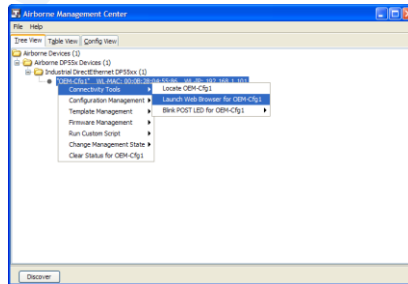
4. Select **Change Management State**
5. Select **Manage OEM-Cfg1**
6. Select **Device OEM-Cfg1 is Factory Default**



9

The devices status will move to managed and the device will be displayed under the device type/group it belongs too. Right click the device and then:

3. Select **Connectivity Tools**
4. Select **Launch Web Browser for OEM-Cfg1**



10

Opening web page shows adapter status.

Links to the available configuration options are identified in the left hand menu. The top menu bar provides access to different operations that can be performed by the AirborneDirect™ device. See section 15.0 for a full description of how to use the web interface.

11

Using Express Setup:

If this is the first time you have configured the device the Express Setup page will be displayed, please refer to section 16.0 to continue set-up of the device.

If this is not the first time please move to section to update the configuration

12

When the **Reboot** button is pressed the unit will restart and install new settings. This may take 15-20 seconds. Please refresh the web interface after the boot cycle has completed.

13

When configured correctly the LED pattern should match the following:

ABDG-ET-DP5XX

POWER: ● Green
LINK : ● Green
COMM: ● Red

ABDG-ET-IN5XX

	<i>No TCP Connection</i>	<i>TCP Connection</i>
COMM:	● Off	● Green
LINK :	● Green	● Green
POST:	● Green	● Green
POWER:	● Blue	● Blue

14

To use the adapter on the wireless network, address all traffic to the IP address of the wireless interface of the ABDG-ET- DP5XX/IN5XX. This address is listed in the home page of the web interface.

15.0 Using the Web Interface

The 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 14.0 to establish the IP address of the module. Once the IP address is known 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:

Figure 9 - Website Login

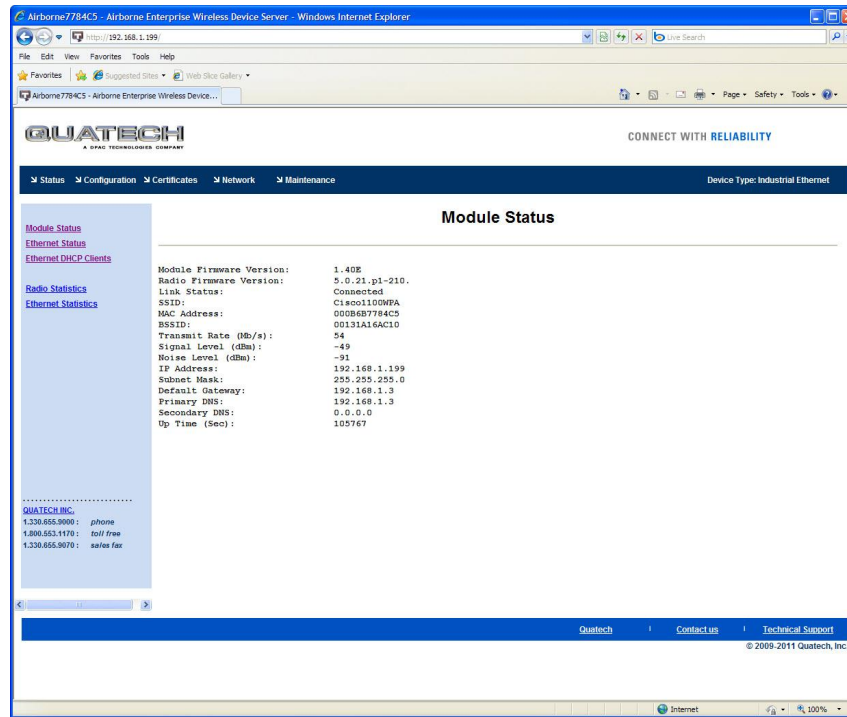


Username: dpac

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 16.0 for configuration of the device using this page. If you have previously configured the device the default home page will be displayed (See Figure 10), from here you can update device settings if required. A quick overview of the web interface follows.

Figure 10 - Default Home Page



15.1 Navigation Bar

Figure 11 - Website Navigation Bar



Table 19 - Navigation Bar Items

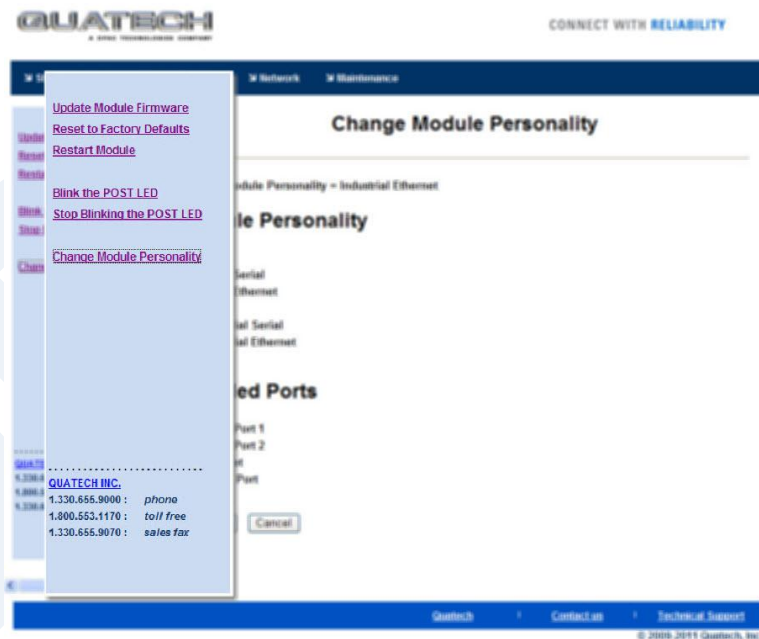
Title	Description
Status	Provides status and performance characteristics for the network interfaces available. Includes connection status, radio and Ethernet statistics.
Configuration	Allows viewing and configuration of all the interface settings including wireless LAN, network connectivity, security, 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.

Title	Description
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.

15.2 Feature Links

Each Navigation Bar link has a set of Features/Fields it allows access to. 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 12).

Figure 12- Feature Links



15.3 Navigating the Website

A standard web page looks like Figure 13. The navigation bar runs along the top of the page, page specific feature links are list in the left hand pane of the page and the specific parameters are shown in the main display panel.

Figure 13 - Airborne Web Page

The screenshot displays the Quatech web interface for configuring WLAN parameters. The top navigation bar includes links for Status, Configuration, Certificates, Network, and Maintenance. The 'Network' section is selected, and the 'WLAN Parameters' configuration page is shown. The page features a left-hand navigation menu with links for WLAN Settings, WLAN Security Settings, Network Settings, Serial Port Settings, Connection Settings, Ethernet Settings, and Advanced Settings. The main configuration area is titled 'WLAN Parameters' and includes a 'Current Values' table. The parameters are as follows:

WLAN Parameters	Current Values
Wireless LAN Connection Type:	Infrastructure
Wireless LAN Channel:	1
SSID:	Any_SSID
Maximum Wireless Data Rate:	Auto
Use Fixed Data Rate:	Disabled
Wireless LAN Region:	United States

At the bottom of the configuration area, there are 'Commit' and 'Cancel' buttons. The footer of the page includes the Quatech logo, 'Contact us', 'Technical Support', and the copyright notice '© 2009 Quatech, Inc.'.

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 move the cursor over the field and hover for approximately a second. A help balloon will appear and will provide details on the function of the field and its valid range of values.

15.4 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 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 the changes have been completed successfully, you can then return to the configuration page by pressing the **Reload** button or restart the module by pressing the **Reboot** button.



Note that the 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.

15.5 Uploading Certificates

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

Figure 14 - upload Certificate Web page

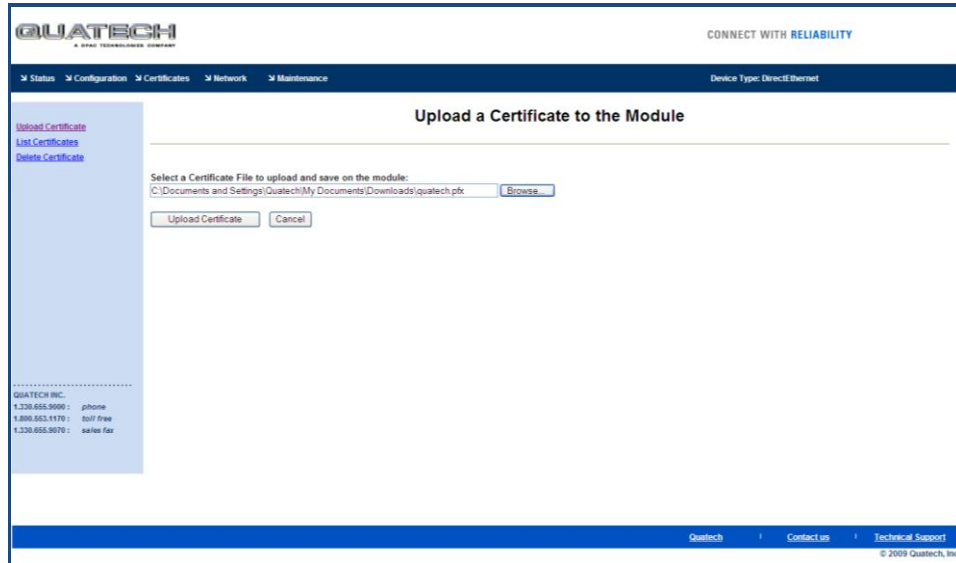


Table 20 - Uploading Certificates

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 window open with field to enter 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 and will have entered the location and file name of the certificate you wish to upload in the field next to the Browse... button.
Press Upload Certificate	You will then 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 just uploaded.

15.6 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 21.

Figure 15 - Upload Configuration Web Page

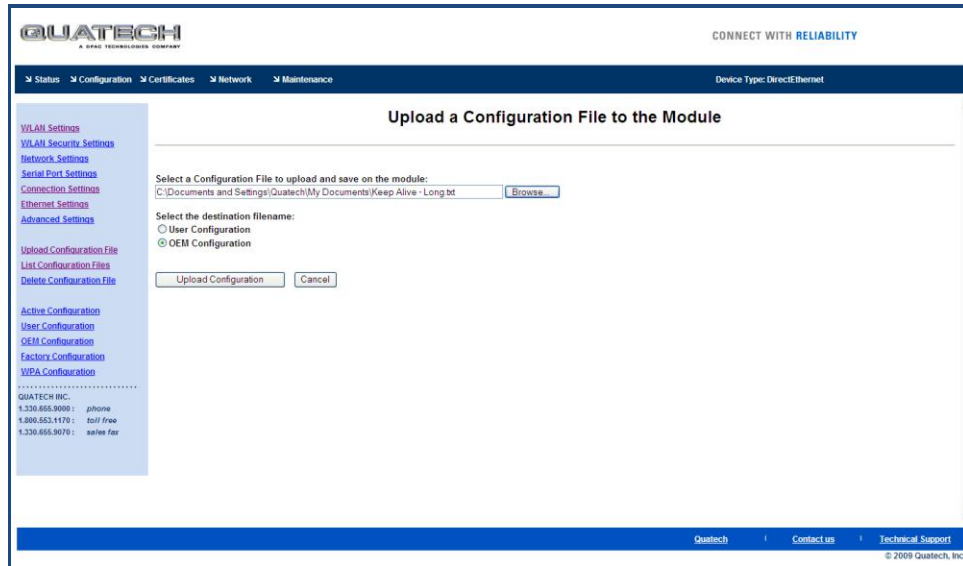



Table 21 - Uploading Configurations

Step	Description
Navigation Bar Select Configuration	You will see major WLAN parameters displayed.
Feature Link Select Upload Configuration File	You will see a window open with field to enter the location of the configuration you want to upload, along with a choice of OEM or User Configuration.
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 configuration file and press Open . This will return you to the Configuration Upload window and will have entered the location and file name of the certificate you wish to upload in the field next to the Browse... button.
Select User or OEM Configuration	This defines the configuration you are installing. OEM Configurations will survive a factory reset, User will not.
Press Upload Configuration	You will then see a notice that the configuration has been successfully uploaded to the module.
Press List Configuration Files	This will show the current configuration files resident on the module and will include the file 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.

15.7 Updating Firmware

The module's firmware may be updated using the web interface. Please refer to Table 22 for the procedure to do this.

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

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

Once you have obtained the firmware, save the firmware image to a location on the system you are browsing the module from, or a location accessible to the system you are browsing the module from.

Figure 16 - Firmware Update Page

The screenshot shows the Quatech web interface for updating firmware. The page title is "Upload Firmware to the Module". The current firmware version is 1.10. A file selection field shows the path "C:\Documents and Settings\Quatech\Desktop\Veyron110.img". There are "Load New Firmware" and "Cancel" buttons. The Quatech logo and navigation menu are visible at the top. Contact information for Quatech Inc. is listed at the bottom left.

QUATECH
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CONNECT WITH RELIABILITY

➤ Status ➤ Configuration ➤ Certificates ➤ Network ➤ Maintenance Device Type: DirectEthernet

Update Module Firmware
Reset to Factory Defaults
Restart Module

Blink the POST LED
Stop Blinking the POST LED

Current Firmware Version = 1.10

Select the firmware image file to load and then click "Load New Firmware"

C:\Documents and Settings\Quatech\Desktop\Veyron110.img Browse

Load New Firmware Cancel

QUATECH INC.
1.330.655.9000 : phone
1.800.653.1178 : toll free
1.330.655.9079 : sales fax

Quatech | Contact Us | Technical Support
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Figure 17 - Firmware Update in Progress

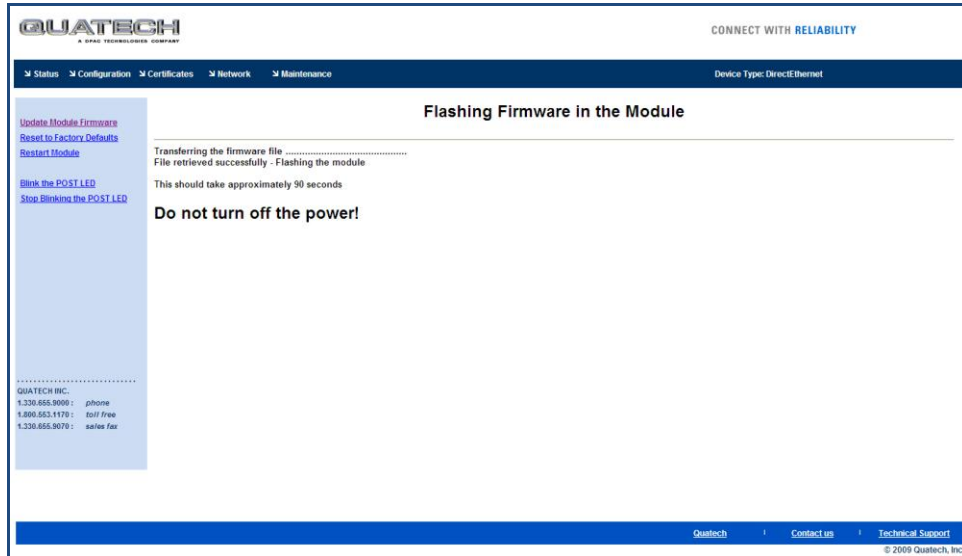


Figure 18 - Firmware Update Complete

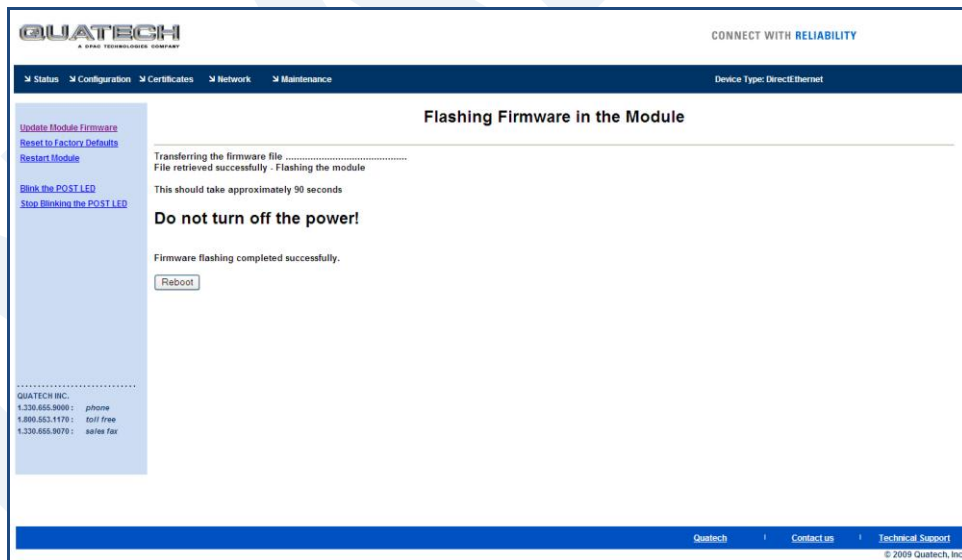


Table 22 - Updating Firmware

Step	Description
<i>Navigation Bar</i> Select Maintenance	This will open a window showing the current module status.
<i>Feature Link</i> Select Update Module Firmware	You will see a window open with 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.

Step	Description
Press Browse... Button	<p>This will open a dialog box in which you can locate the firmware image you wish to upload to the module. Select the firmware image file and press Open.</p> <p>This will return you to the Upload Firmware window and will have entered the location and file name of the firmware image you wish to upload in the field next to the Browse... button.</p>
Press Load New Firmware	<p>You will then see a notice that the firmware upload has begun (Figure 17).</p> <p>When the upload has been completed successfully and the firmware updated window indicating this will be shown (Figure 18).</p>
Press Reboot	<p>This will restart the module and the new firmware will be loaded.</p>



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.

16.0 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 set-up 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 19):

Figure 19 - Express Setup Page

To configure the device for operation each field must be configured correctly. The following steps should be taken to configure the device (Note: not all fields will be visible):

Table 23 - 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 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 e.g. Dev1, 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 e.g. 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 is 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 Wireless LAN Connection Type	<p>If you are using Access Points make sure this is set to Infrastructure from the drop down menu.</p> <p>If you want to use AdHoc set this accordingly. Additional settings may be required to fully configure for AdHoc mode, these are covered if section 17.2.</p>
Select SSID	Enter the name of the wireless network you wish to access. This field is case sensitive.
Select Wireless LAN Security Type	<p>Select the security type the wireless network you wish to access is using.</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 the security type is not in the available selections more are available in the <i>WLAN Security Settings</i> page. If you choose to use this page make sure you commit the change before selecting the <i>WLAN Security Settings</i> page.</p>
Select WLAN DHCP	<p>If your WLAN network uses DHCP to assign IP addresses to the wireless clients, select Enabled from the drop down menu.</p> <p>If you are using static IP addresses select disabled from the drop down menu. WLAN Static IP and WLAN Subnet Mask will need to be entered.</p>
Select Ethernet DHCP	<p>If the Ethernet network connected to the Ethernet port uses DHCP to assign IP addresses to the wired clients, you should select Enabled from the drop down menu.</p> <p>If you are using static IP addresses you should select Disabled from the drop down menu. Ethernet Static IP and Ethernet Subnet Mask will need to be entered.</p> <p>Important: This field is only used if the Ethernet interface is set as a client (default for Serial devices). If set as a router the field is ignored. See section 21.0 for a full description of configuring the unit as an Ethernet router.</p>
Select WLAN Static IP	<p>This field defines the static IP address for the wireless interface.</p> <p>This address is only used if the WLAN DHCP is disabled or DHCP failed.</p> <p>Default: 192.168.10.1</p>
Select WLAN Subnet Mask	<p>This field defines the subnet mask used by the wireless interface.</p> <p>This mask is only used if the WLAN DHCP is disabled or DHCP failed.</p> <p>Default: 255.255.255.0</p>

Step	Description
Select Ethernet Static IP	This field defines the static IP address for the Ethernet interface. When configured as a serial device server (Ethernet interface is in client mode) this address is only used if the Ethernet DHCP is disabled or DHCP failed. Default: 192.168.2.100
Select Ethernet Subnet Mask	This field defines the subnet mask used by the Ethernet interface. When configured as a serial device server (Ethernet interface is in client mode) this mask is only used if the Ethernet DHCP is disabled or DHCP failed. Default: 255.255.255.0
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Express Settings page. Select this is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as 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 then 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 available. The following sections provide guidance on how to use these pages for specific configurations.

17.0 Configuring the Wireless Interface

The following section will outline how to configure the wireless interface for both infrastructure and AdHoc networks.

17.1 Configuring for Infrastructure Networks

Infrastructure networks use Access Point and/or Wireless Routers to provide wireless access to a network. Each wireless network is identified by a name referred to as the SSID (**S**ervice **S**et **I**Dentifier). To configure the device with the necessary parameters to operate with an Infrastructure network use the following steps.

Table 24 - Configuring Wireless Interface - Infrastructure

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 Settings	This step is optional. The default home page for the Configuration link in the Navigation Bar is WLAN Settings .
Select Radio Startup Mode	Select On from the drop down list.
Select Wireless LAN Connection Type	Select the Infrastructure form the drop down list.
Select SSID	Enter the name of the wireless network you want the device to use. This cannot include spaces.
Select Wireless LAN Region	Select the most appropriate region for the deployment location of the device.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the WLAN Settings page.
<i>Feature Link</i> Select WLAN Security Settings	The wireless interface is now configured however most wireless networks use security to protect the network and users from unauthorized use. Selecting WLAN Security Settings will allow us to configure the devices security settings for the network. This is covered in section 18.0.

17.2 Configuring for AdHoc Networks

AdHoc networks use peer-to-peer connection to create a local wireless network. These can be useful when no infrastructure (AP) is available. Each wireless network is identified by a name referred to as the ESSID (Extended Service Set Identifier). To configure the device with the necessary parameters to operate with an AdHoc use the following steps.

Table 25 - Configuring Wireless Interface - AdHoc

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 Settings	This step is optional. The default home page for the Configuration link in the Navigation Bar is WLAN Settings .
Select Radio Startup Mode	Select On from the drop down list.
Select Wireless LAN Connection Type	Select the AdHoc form the drop down list.
Select Wireless LAN Channel	This determines the 802.11 channel that the device will use when it establishes a connection with another device in the AdHoc network. Select a channel that is clear, i.e. one which has no other 802.11 network using it. It is not necessary for all devices in a single AdHoc network to have the same channel number selected.
Select SSID	Enter the name of the wireless network you want the device to use. This cannot include spaces.
Select Wireless LAN Region	Select the most appropriate region for the deployment location of the device.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the WLAN Settings page.
<i>Feature Link</i> Select WLAN Security Settings	The wireless interface is now configured however most wireless networks use security to protect the network and users from unauthorized use. Selecting WLAN Security Settings will allow us to configure the devices security settings for the network. This is covered in section XX.
<i>Feature Link</i> Select Network Settings	The wireless interface is now configured however most AdHoc networks do not have a DHCP server available to provide IP address to the devices in the network. It therefore necessary to assign a static IP address to the wireless interface. Selecting Network Settings will allow us to configure the device with a static IP address. This is covered in section 19.0.

18.0 Configuring the Security Settings

Almost all 802.11 networks will 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 how to configure the device for the most popular options. If your security configuration is not covered, further details can be found in the Airborne Enterprise CLI Reference Manual.

18.1 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. If the basic 64 or 128 bit WEP configuration does not work please refer to the Airborne Enterprise CLI Reference Manual for the other options available.

Table 26 - 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 if you have been specifically told to by the network administrator.
Select Default WEP Key	Select the key number that matches the selection used by the AP's in the wireless network. This must match for authentication to be successful. 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. Enter the key exactly as it is entered into the AP. 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 is you have further configuration options to change.

Step	Description
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as 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 then 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.
<i>Feature Link</i> Select Network Settings	The wireless interface is now configured however if the WLAN network does not have a DHCP server available to provide IP address to the device, it necessary to assign a static IP address to the wireless interface. Selecting Network Settings will allow us to configure the device with a static IP address. This is covered in section 19.0.

18.2 Configuring for WPA-PSK Security

This security type is a very popular type and is easy to configure. Most often used in SOHO and home environments, some enterprise networks do use it.

Table 27 - 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 if you have been specifically told to by the network administrator.
Select WPA/WPA2 Pre Shared Key (PSK)	Enter the PreShared Key used by the AP. The PSK is case sensitive and must be entered exactly as it is in the AP. 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 is you have further configuration options to change.

Step	Description
<p><i>Optional</i> Press Restart [Button]</p>	<p>Restarts the device. After the device as rebooted it will attempt to authenticate to the configured network. As long as the network is in range the wireless interface will connect.</p> <p>If the network is using DHCP then an IP address will be assigned to the WLAN interface and IP connectivity is possible over the WLAN network.</p> <p>If the network is using static IP addresses it will be necessary to configure the network interface, see the next step.</p>
<p><i>Feature Link</i> Select Network Settings</p>	<p>The wireless interface is now configured however if the WLAN network does not have a DHCP server available to provide IP address to the device, it necessary to assign a static IP address to the wireless interface.</p> <p>Selecting Network Settings will allow us to configure the device with a static IP address. This is covered in section 19.0.</p>

18.3 Configuring for WPA2-PSK Security

This security type is a very popular type and is easy to configure. Most often used in SOHO and home environments, WPA2-PSK is starting to be widely used by enterprise networks.

Table 28 - Configuring for WPA2 Security

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

Step	Description
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as 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 then 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.
<i>Feature Link</i> Select Network Settings	The wireless interface is now configured however if the WLAN network does not have a DHCP server available to provide IP address to the device, it necessary to assign a static IP address to the wireless interface. Selecting Network Settings will allow us to configure the device with a static IP address. This is covered in section 19.0.

18.4 Configuring for PEAP Security

This security type is a very popular type for enterprise networks. Actual use of the security protocol requires the network is using a RADIUS server for device authentication, depending upon the security policies of the network this protocol supports authentication with and without a CA certificate.

The Airborne device supports PEAPv0 using both WPA (TKIP) and WPA2 (AES-CCMP) encryption. The device will automatically use the most appropriate encryption type to obtain authentication to the WLAN.

Table 29 - Configuring for PEAP 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 PEAP from the drop down list.
Select EAP Identity	Enter the RADIUS server account name provided by the network administrator. If a Windows domain server is being used for authentication the server domain must be included in the EAP Ident field
Select EAP Password	Enter the RADIUS server account password for the EAP Ident .
Select EAP Phase 1 String	Enter <code>peaplabel=0</code>
Select EAP Phase 1 String	Enter <code>auth=MSCHAPV2</code>

Step	Description
Select CA Certificate Filename	<p>Enter the name of the Certificate Authority (CA) certificate stored on the device.</p> <p>Storing Certificates on the device is cover in section 15.5.</p> <p>If the network security does not require the use of a CA certificate this field should be left blank.</p>
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the WLAN Settings page. Select this is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	<p>Restarts the device. After the device as rebooted it will attempt to authenticate to the configured network. As long as the network is in range the wireless interface will connect.</p> <p>If the network is using DHCP then an IP address will be assigned to the WLAN interface and IP connectivity is possible over the WLAN network.</p> <p>If the network is using static IP addresses it will be necessary to configure the network interface, see the next step.</p>
<i>Feature Link</i> Select Network Settings	<p>The wireless interface is now configured however if the WLAN network does not have a DHCP server available to provide IP address to the device, it necessary to assign a static IP address to the wireless interface.</p> <p>Selecting Network Settings will allow us to configure the device with a static IP address. This is covered in section 19.0.</p>

19.0 Configuring Network Settings

Once the device is authenticated to a wireless network communication is possible, however before TCP/IP connectivity can be achieved the device must obtain a valid IP address on the WLAN and/or Ethernet interface.

The Airborne device supports both DHCP and Static IP addressing for both the WLAN and Ethernet interfaces. The following sections cover the correct configuration for both DHCP and Static IP addressing on the interfaces.

When the Ethernet interface is in client mode DHCP can be used on either the WLAN or Ethernet interface but not on both interfaces at the same time.

The Ethernet interface configuration only applies when the interface is in client mode and is being used by a serial device server. The configuration of the Ethernet interface when being used with the Ethernet adapter (ABDG-ET) products is covered in section 21.0.



The Ethernet configuration sections do not apply to devices that do not have an available Ethernet port; these include but are not limited to the ABDG-SE-DP5XX product families.

19.1 Configuring DHCP on WLAN Interface

DHCP enabled on the WLAN interface is the default configuration for the Ethernet devices. For serial devices the default is DHCP disabled on the WLAN interface. It requires that there is a DHCP server on the WLAN network the device has authenticated to and that the necessary network policies will allow the server to lease an address to the Airborne™ device.

Table 30 - Configuring DHCP - WLAN

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 Network Settings	The wireless interface and security must be configured before configuring the network settings. A page showing the range of network options and fields, for both the WLAN and Ethernet interfaces, is displayed.
Select WLAN DHCP	Select Enabled from the dropdown menu.
<i>Optional</i> Select WLAN DHCP Name	Provides a method of uniquely identifying the device in the DHCP lease table on the DHCP server. The default name is AirborneXXXXXX , where XXXXXX matches the last 6 octets of the WLAN interface MAC address.
Press Commit [Button]	Saves changes to the device.

Step	Description
<i>Optional</i> Press Reload [Button]	Reloads the Network Settings page. Select this is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as 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 should lease an IP address to the WLAN interface and IP connectivity is possible over the WLAN network.

19.2 Configuring DHCP on Ethernet Interface

DHCP enabled on the Ethernet interface is the default configuration for the serial devices. The Ethernet interface must be in client mode for this setting to be used.

The Airborne Device does not support the ability to enable DHCP on the WLAN and Ethernet interfaces simultaneously (when in client mode). Only one may have DHCP enabled at a time. The other interface must be configured to use a static IP address.

Table 31 - Configuring DHCP - Ethernet

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 Ethernet Settings	The wireless interface and security must be configured before configuring the Ethernet settings. A page showing the range of Ethernet options and fields, setting the mode of operation for the Ethernet interface is done in this page.
Select Ethernet Role	Select Client from the drop down menu.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the Ethernet Settings page.
<i>Feature Link</i> Select Network Settings	The wireless interface and security must be configured before configuring the network settings. A page showing the range of network options and fields, for both the WLAN and Ethernet interfaces, is displayed.
Select Ethernet DHCP	Select Enabled from the drop down menu.
<i>Optional</i> Select WLAN DHCP Name	Provides a method of uniquely identifying the device in the DHCP lease table on the DHCP server. The default name is AirborneXXXXXX , where XXXXXX matches the last 6 hexadecimal digits of the Ethernet interface MAC address.

Step	Description
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Network 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. Once authenticated the network should lease an IP address to the WLAN interface and IP connectivity is possible over the WLAN network.

19.3 Configuring a Static IP Address on WLAN Interface

Static IP addresses on the WLAN interface is the default configuration for serial devices. It is important to verify the address being entered is unique to the device when on the network.

Table 32 - Configuring Static IP - WLAN

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 Network Settings	The wireless interface and security must be configured before configuring the network settings. A page showing the range of network options and fields, for both the WLAN and Ethernet interfaces, is displayed.
Select WLAN DHCP	Select Disable from the drop down menu.
Select WLAN Static IP Address	Enter the assigned static IP address. The address must be in the format: XXX.XXX.XXX.XXX
Select Subnet Mask	Enter the subnet mask for the network. The mask must be in the format: XXX.XXX.XXX.XXX
Select Gateway IP Address	Enter the assigned Gateway IP address. The address must be in the format: XXX.XXX.XXX.XXX
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Network 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 is 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 will use the assigned static IP address on the WLAN interface making IP connectivity possible over the WLAN network.

19.4 Configuring a Static IP Address on Ethernet Interface

This is not the default configuration for the Ethernet interface. It is important to verify the address being entered is unique to the device when on the network.

The Airborne Device does not support the ability to enable DHCP on the WLAN and Ethernet interfaces simultaneously (when in client mode). Only one may have DHCP enabled at a time, the other interface must be configured to use a static IP address.

Table 33 - Configuring Static IP - Ethernet

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 Ethernet Settings	The wireless interface and security must be configured before configuring the Ethernet settings. A page showing the range of Ethernet options and fields, setting the mode of operation for the Ethernet interface is done in this page.
Select Ethernet Role	Select Client from the drop down menu.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the Ethernet Settings page.
<i>Feature Link</i> Select Network Settings	The wireless interface and security must be configured before configuring the network settings. A page showing the range of network options and fields, for both the WLAN and Ethernet interfaces, is displayed.
Select Ethernet DHCP	Select Disable from the drop down menu.
Select Ethernet Static IP Address	Enter the assigned static IP address. The address must be in the format: XXX.XXX.XXX.XXX
Select Ethernet Subnet Mask	Enter the subnet mask for the network. The mask must be in the format: XXX.XXX.XXX.XXX

Step	Description
Select Ethernet Gateway IP Address	Enter the assigned Gateway IP address. The address must be in the format: XXX.XXX.XXX.XXX
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Network Settings page. Select this is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as 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 will use the assigned static IP address on the Ethernet interface making IP connectivity possible over the Ethernet network.

20.0 Configuring Serial Device Server

The ABDG-SE-DP5XX/IN5XXX devices are shipped preconfigured for use as Serial Device Servers. All that is required is configuration of the WLAN parameters and security protocols; however the following section will cover the full configuration of a Serial Device Server to aid in the installation and deployment of the units.

If the Windows Virtual COM port driver is being used with the device, configure only the WLAN network parameters and security protocols through the web interface. All other parameters will be controlled by the VCOM driver. Installation and configuration of the VCOM driver is covered in section 21.0.

The following section shows how to manually configure the unit to accept TCP/IP connections and automatically set-up 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.

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

20.1 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 to establishing a data tunnel is covered in the following table.

Table 34 – 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 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 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.

Step	Description
<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, 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 X Settings page. Select this is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as 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 35.

Table 35 - 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>auth dpac dpac</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 x can be <code>p1</code> , <code>p2</code> or <code>any</code> . <code>p1</code> or <code>p2</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.

20.2 Configuring Serial Port 1 for Access on Tunnel Port

A data tunnel can be made using the devices 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 to establishing a data tunnel is covered in the following table.

Table 36 – 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 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	Select Enabled .
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, 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 Settings page. Select this is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as 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 37.

Table 37 - 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).

20.3 Configuring Serial Port 2 for Access on Tunnel Port

A data tunnel can be made using the devices 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 to establishing a data tunnel is covered in the following table.

Table 38 – 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.
<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 is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as 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 39.

Table 39 - 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).

20.4 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 40 - 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. 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 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) 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.

Step	Description
<i>Feature Link</i> Select Serial Port 1 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 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 is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as 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 the device will attempt to make a TCP connection with primary target server, using the configured port number.

20.5 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 41 - 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. 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 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.

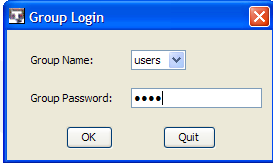
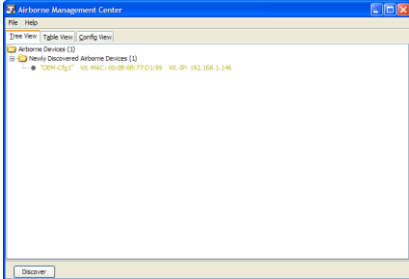
Step	Description
Select Primary TCP Target Server IP Address – Serial Port 2	Enter the IP address of the primary target server. The address must be in the format: XXX.XXX.XXX.XXX
<i>Optional</i> Select Secondary TCP Target Server IP Address – Serial Port 2	Enter the IP address of the secondary target 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.
<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 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 is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as 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 the device will attempt to make a TCP connection with primary target server, using the configured port number.

21.0 Installing and Using the Airborne VirtualCOM Driver

Quatech supplies with its serial devices a virtual COM port device driver for the Microsoft Windows operating system. This driver acts as a Virtual COM port for applications requiring the use of a COM port for data communication. The driver redirects serial data to a TCP/IP connection between the host computer and target Airborne™ device.

Installation of the VCOM driver is done using the Airborne Management Center™ (AMC). The following Table 42 identifies the steps to complete the process of installing the VCOM driver for a specific device. Once installed the host system will have additional COM ports through which the system may communicate with the device attached to the serial port on the Airborne™ device.

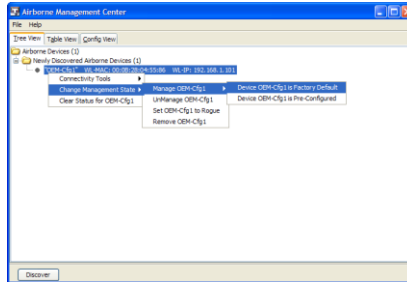
Table 42 - Install VCOM

1	<p>Run the Airborne Management System 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.</p> <p>When the application opens the following dialog will be displayed:</p>  <p>Select Group Name: manuf and enter Group Password: dpac</p>
2	<p>The AMC will load and discover the attached devices. Managed devices will show up under the device type heading they belong to. To install a VCOM driver the device MUST have a serial port.</p> <p>The device must be managed to install the VCOM driver. If the device you wish to install the VCOM with is already managed skip to step 4.</p> 

3

Right Click the Unmanaged Device then:

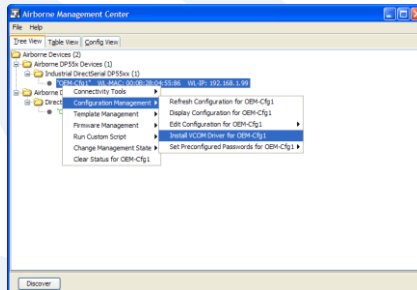
1. Select **Change Management State**
2. Select **Manage OEM-Cfg1**
3. Select **Device OEM-Cfg1 is Factory Default**



4

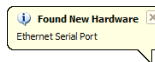
The status of the device will move to managed and it will be displayed under the device type/group it belongs too. To install the VCOM driver, right click the target device:

1. Select **Configuration Management**
2. Select **Install VCOM Driver for OEM-Cfg1**



5

The VCOM driver will then be installed. When completed the following message will be seen in the lower right-hand corner.

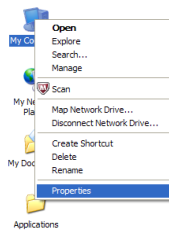


6

The installed VCOM ports are now available for use.

7

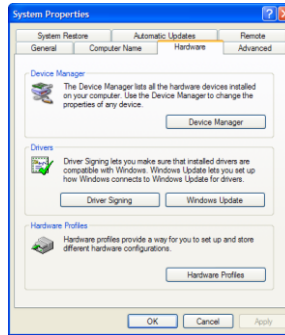
To identify the VCOM ports right click **My Computer**.
Select **Properties**.



8

Select the **Hardware** tab.

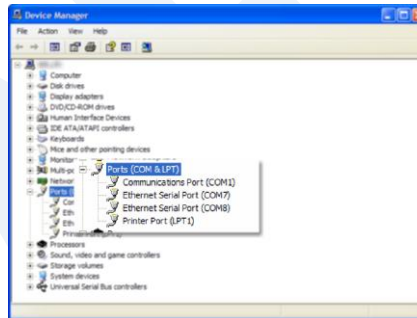
Select the **Device Manager** button.



9

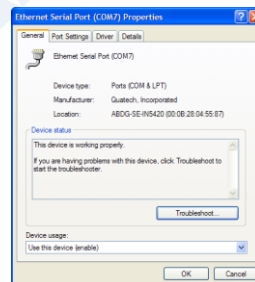
Select the **Ports (COM & LPT)** group and the list of available COM ports will be shown. The VCOM ports will be identified as **Ethernet Serial Port (COMx)**, where **x** will be an integer. This **COMx** reference identifies the VCOM to be used.

Note that if your unit is a dual serial port device, two VCOM ports will have been created.



10

To identify which VCOM port is assigned to which device right click the **Ethernet Serial Port** and select **Properties**.



The **Location** label identifies the MAC address of the associated Airborne device.



Do not change the WLAN IP address settings for the Airborne device which is using the VCOM driver. Changing the IP address of the device will cause the VCOM driver not to function. It will need to be reinstalled if this occurs.

22.0 Replacing a Serial Cable

The serial device servers can be configured to act as a cable replacement using either an AdHoc or Infrastructure network. In this application you will need two (2) Quatech Serial device servers. Once configured the two devices will automatically connect and make a virtual serial connection between the two serial ports across the 802.11 network.

To establish the cable replacement one device will be the master and one the slave. It does not matter which end of the serial connection is which. The master initiates the network connection and the slave waits for the master to connect. The following Table 43 and Table 44 identify the required configurations for the Master and Slave. The configuration is for a single serial port, the same configuration can be used with those devices that support two serial connections.

The configurations in Table 43 and Table 44 use an AdHoc network. An infrastructure network can be used as long as static IP configuration is used for the slave device.

Table 43 - Cable Replacement - Slave Configuration

Step	Description
<i>Configure the device to use an AdHoc network</i>	See section 17.2 After the Commit at the end of the configuration press the Reload Button.
<i>Configure the device to use a static IP address on the WLAN interface</i>	See section 19.3 After the Commit at the end of the configuration press the Reload Button.
<i>Configure the device to listen for a connection on the tunnel port</i>	See section 20.2 After the Commit at the end of the configuration press the Reload Button.
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of Interface and Network Parameters.
<i>Feature Link</i> Select Serial Port 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 Serial Port Bit Rate	Select the appropriate bit rate to match the serial port the device will be connected to.
Select Parity	Select the parity setting to match the serial port the device will be connected to, from the drop down list.
Select Data Bits	Select the number of data bits to match the serial port the device will be connected to, from the drop down list.
Select Stop Bits	Select the number of stop bits to match the serial port the device will be connected to, from the drop down list.
Select Flow Control	Select the flow control option to match the serial port the device will be connected to, from the drop down list.
<i>Optional</i> Select Serial Assert	Select the option to match the serial port the device will be connected to, from the drop down list. This is only required if software flow control has been selected.
Press Commit [Button]	Saves changes to the device.

Step	Description
Press Reload [Button]	Reloads the WLAN Settings page.
<i>Optional</i> Press Reload [Button]	Reloads the Serial Port Settings page. Select this is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as rebooted it will create an AdHoc network with the name you gave the SSID. As long as the network is in range the wireless interface will connect.

Table 44 - Cable Replacement - Master Configuration

Step	Description
<i>Configure the device to use an AdHoc network</i>	See section 17.2 After the Commit at the end of the configuration press the Reload Button.
<i>Configure the device to use a static IP address on the WLAN interface</i>	See section 19.3 After the Commit at the end of the configuration press the Reload Button.
<i>Configure the device to listen for a connection on the tunnel port</i>	See section 20.2 After the Commit at the end of the configuration press the Reload Button.
<i>Navigation Bar</i> Select Configuration	You will see a group of fields under the banner of Interface and Network Parameters.
<i>Feature Link</i> Select Serial Port Settings	The serial port must be configured to work with the target device. This is a page showing the configuration options for the serial port.
Select Serial Port Bit Rate	Select the appropriate bit rate to match the serial port the device will be connected to.
Select Parity	Select the parity setting to match the serial port the device will be connected to, from the drop down list.
Select Data Bits	Select the number of data bits to match the serial port the device will be connected to, from the drop down list.
Select Stop Bits	Select the number of stop bits to match the serial port the device will be connected to, from the drop down list.
Select Flow Control	Select the flow control option to match the serial port the device will be connected to, from the drop down list.
<i>Optional</i> Select Serial Assert	Select the option to match the serial port the device will be connected to, from the drop down list. This is only required if software flow control has been selected.
Select Serial CLI Default Mode	Select Pass from the drop down menu.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the WLAN Settings page.

Step	Description
<i>Feature Link</i> Select Connection Settings	The target device configuration must be configured to make sure the master device connects to the correct slave. A page showing the configuration options for TCP/IP and UDP connections to and from the device. Configuration of Telnet, HTTP and SSH ports is possible through this page.
Select TCP Port	This is the target port for the TCP connection on the slave device. This should be set to the listen port assigned during the configuration of the slave. The default for the listen port is 8023 .
Select TCP Timeout	This parameter allows the device to close the TCP socket to the slave should the connection be lost. The default of 0 disables the timeout. The timeout setting should be based upon the period of time a connection would not be used. It should at least exceed the worst case of the data period.
Select Primary TCP Target Server IP Address	Enter the static IP address that was given to the slave device during configuration.
Select Outbound Transmit Type	This is the outbound transmission protocol. Set this to TCP from the drop down list.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the WLAN Settings page.
<i>Optional</i> Press Reload [Button]	Reloads the Serial Port Settings page. Select this is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as rebooted it will create an AdHoc network with the name you gave the SSID. As long as the network is in range the wireless interface will connect.

23.0 Configuring Ethernet Adapter

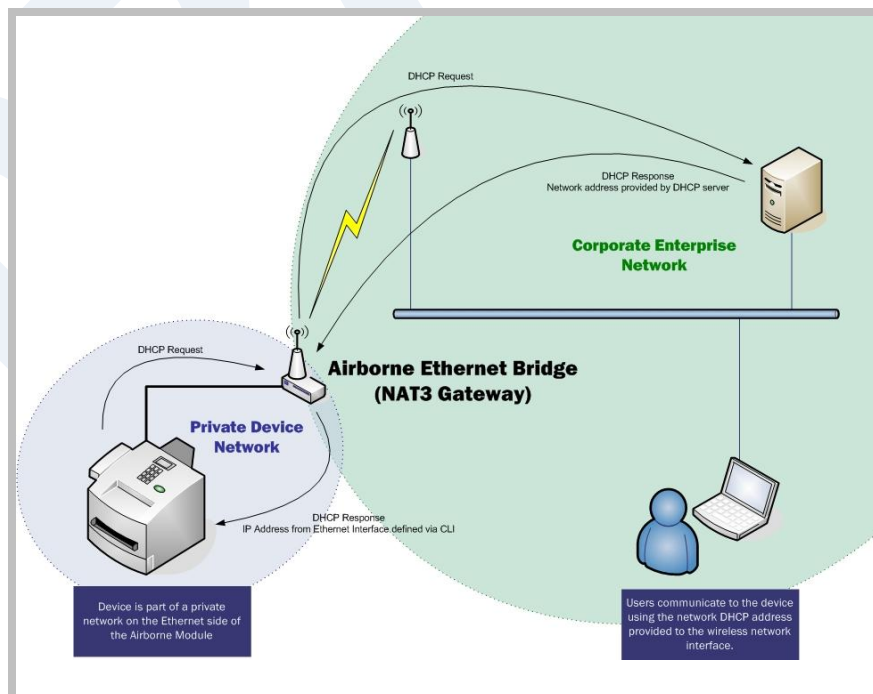
The ABDG-ET-DP5XX/IN5XXX devices are shipped preconfigured for use as an Ethernet adapter. All that is required is configuration of the WLAN parameters and security protocols; however the following section will cover the full configuration of an Ethernet Device to aid in the installation and deployment of the units.

The Airborne Ethernet adapter is a fully functional NAT Level 3 router, supporting a public IP address for the WLAN interface and a private network for the attached devices on the Ethernet interface.

Network Address Translation (NAT) is the process of modifying network address information in datagram packet headers while in transit across a traffic routing device for the purpose of remapping a given address space into another. In the case of a NAT Level 3 device, the modification of the packet headers provides for a translation between a single public IP address (that of the WLAN interface) and the IP address of the devices on the private network (Ethernet interface).

The Airborne Adapter WLAN interface is considered the public address and will be the point of contact on the target network (see Figure 20). This interface supports all the wireless and network authentication requirements including support for WPA2-Enterprise. It can acquire an IP address through both DHCP or user configured static IP. Configuration, association and authentication are handled entirely by the Airborne Bridge and require no interaction from the wired host on the private network.

Figure 20 - Ethernet Bridge Functionality



The Private network is the wired interface provided by the bridge. This interface includes a DHCP server and supports dynamic and static IP address assignment. This means any Ethernet client supporting DHCP can be connected to the wired interface without any configuration changes. The private network host can communicate with the Airborne Adapter using the bridge's Ethernet IP address on the private network.

The Airborne Ethernet Adapter supports NAT Level 3 and as such provides the following advantages over the more traditional bridge functionality:

- A single network IP address on the public network. This simplifies management of the devices on the network.
- A single point of authentication. The Airborne device handles authentication for the public network, this means a single point of contact for all security interaction, simplifying deployment for the network.
- Zero security footprint on the private network host.
- Support for DHCP and static IP on the private network. This capability allows the host to be shipped without any configuration changes.
- Port forwarding. Allows you to decide if web page, telnet or FTP access should be forwarded to the private network or handled by the Airborne Bridge.
- Plug-n-Play. In most cases all that is required for full functionality is configuration of the wireless interface for the target network. This can be done before deployment to minimize deployment time and complexity.

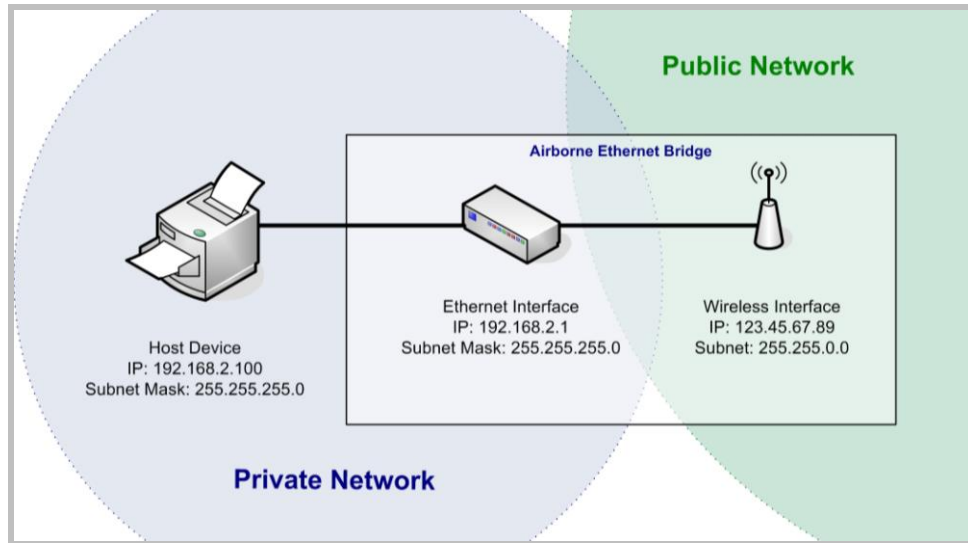
23.1 Public Network Interface

The public network interface is the Airborne Adapter WLAN port. This interface must be configured to associate and authenticate with the target network. Configuration of this interface is covered in section 17.0.

The public address becomes the target address for all accesses to the host device connected to the private network. In the example shown in Figure 21, any device on the public network wanting to communicate with the Host device (IP: 192.168.2.100), would use the IP address 123.45.67.89, the Airborne Ethernet Adapter will forward all traffic to the private address 192.168.2.100.

The network infrastructure will show the MAC and IP address of the Airborne Adapter WLAN interface as the network presence, as a consequence of this all traffic will be identified as being from or to this address.

Figure 21 - Airborne Ethernet Bridge IP Configuration



The public network interface supports the Airborne™ discovery protocol and will respond to discovery requests issued on the public network.

23.2 Private Network Interface

The private network interface is on the Ethernet port of the Airborne Adapter. The interface supports multiple Ethernet clients with either a static or DHCP sourced IP addresses. The configuration of this interface is covered in Table 45 and Table 46.

Table 45 - Ethernet Adapter interface Configuration - DHCP

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 Ethernet Settings	The wireless interface and security must be configured before configuring the Ethernet settings. A page showing the range of Ethernet options and fields, setting the mode of operation for the Ethernet interface is done in this page.
Select DHCP Server Enabled	Select Enable from drop down menu.
Select Ethernet Role	Select Router from the drop down menu.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the Ethernet Settings page.

Step	Description
<i>Feature Link</i> Select Network Settings	The wireless interface and security must be configured before configuring the network settings. A page showing the range of network options and fields, for both the WLAN and Ethernet interfaces, is displayed.
Select Ethernet Static IP Address	Enter a valid IP address. This address will be the first IP address leased. If more than one is leased they will increment from this address. The subnet of the address must be different than the WLAN interface subnet. The address must be in the format: XXX.XXX.XXX.XXX This is also the default address all incoming traffic on the WLAN interface is routed to.
Select Ethernet Subnet Mask	Enter the subnet mask for the private network. The mask must be in the format: XXX.XXX.XXX.XXX
Select Ethernet Gateway IP Address	Enter a valid Gateway IP address. This is the Static IP address of the Ethernet interface on the private network. This must be in the same subnet as the Ethernet Static IP Address . The address must be in the format: XXX.XXX.XXX.XXX
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Network Settings page. Select this is you have further configuration options to change.
<i>Optional</i> Press Restart [Button]	Restarts the device. After the device as rebooted it will attempt to authenticate to the configured network. As long as the network is in range the wireless interface will connect. The Ethernet interface will have leased IP addresses to the Ethernet clients and the Ethernet interface would have taken the Ethernet Gateway IP Address . Access to the public network from the private network is now possible.

Unless your public network is using the default 192.168.2.XX subnet you should not change the Ethernet parameters.


Table 46 - Ethernet Adapter interface Configuration - Static IP

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 Ethernet Settings	The wireless interface and security must be configured before configuring the Ethernet settings. A page showing the range of Ethernet options and fields, setting the mode of operation for the Ethernet interface is done in this page.
Select DHCP Server Enabled	Select Disable from drop down menu.
Select Ethernet Role	Select Router from the drop down menu.
Press Commit [Button]	Saves changes to the device.
Press Reload [Button]	Reloads the Ethernet Settings page.
<i>Feature Link</i> Select Network Settings	The wireless interface and security must be configured before configuring the network settings. A page showing the range of network options and fields, for both the WLAN and Ethernet interfaces, is displayed.
Select Ethernet Static IP Address	Enter the static IP address of the Ethernet client attached to the devices Ethernet port. The subnet of the address must be different than the WLAN interface subnet. The address must be in the format: XXX.XXX.XXX.XXX This is also the default address all incoming traffic on the WLAN interface is routed to.
Select Ethernet Subnet Mask	Enter the subnet mask for the private network that matches the subnet mask on the Ethernet client. The mask must be in the format: XXX.XXX.XXX.XXX
Select Ethernet Gateway IP Address	Enter a valid Gateway IP address. This is the Static IP address of the Ethernet interface on the private network. This must be in the same subnet as the Ethernet Static IP Address , but a different address. The address must be in the format: XXX.XXX.XXX.XXX This address should be entered into the Gateway parameter for the Ethernet clients on the private network.
Press Commit [Button]	Saves changes to the device.
<i>Optional</i> Press Reload [Button]	Reloads the Network Settings page. Select this is you have further configuration options to change.

Step	Description
<p><i>Optional</i> Press Restart [Button]</p>	<p>Restarts the device. After the device as rebooted it will attempt to authenticate to the configured network. As long as the network is in range the wireless interface will connect.</p> <p>Access to the public network from the private network is now possible.</p>

The private network supports the Airborne™ discovery protocol (UDAP) and will respond to discovery requests.



The subnet for the private network IP addresses (Ethernet Client and Gateway) and public IP address (WLAN), obtained by the module via the wireless interface, **MUST NOT** be the same.

Failure to observe this requirement will result in unpredictable behavior of the adapter.

When attempting to make an out-bound connection to a device on the public network, the public network IP address of the device should be used e.g. In Figure 21 the client with address 192.168.2.100 wants to connect to an FTP server, with the address of 123.45.67.99, on the public network to perform a firmware download. The FTP address that would be used in the **Configuration/Advanced Settings** FTP Server Address or Name would be 123.45.67.99. Note that this is not within the subnet of the Ethernet client, however the NAT router will do the necessary address translations and packet header manipulations to ensure the out-bound and in-bound connections are maintained.

Any traffic between the Airborne Ethernet Adapter's Ethernet interface and Ethernet client, on the private network, will not be broadcast on the public network unless it is directed at the public network.

For most users there will be no modification of the private network settings needed and if the target Ethernet client uses DHCP to obtain an IP address, no change in configuration will be required either.

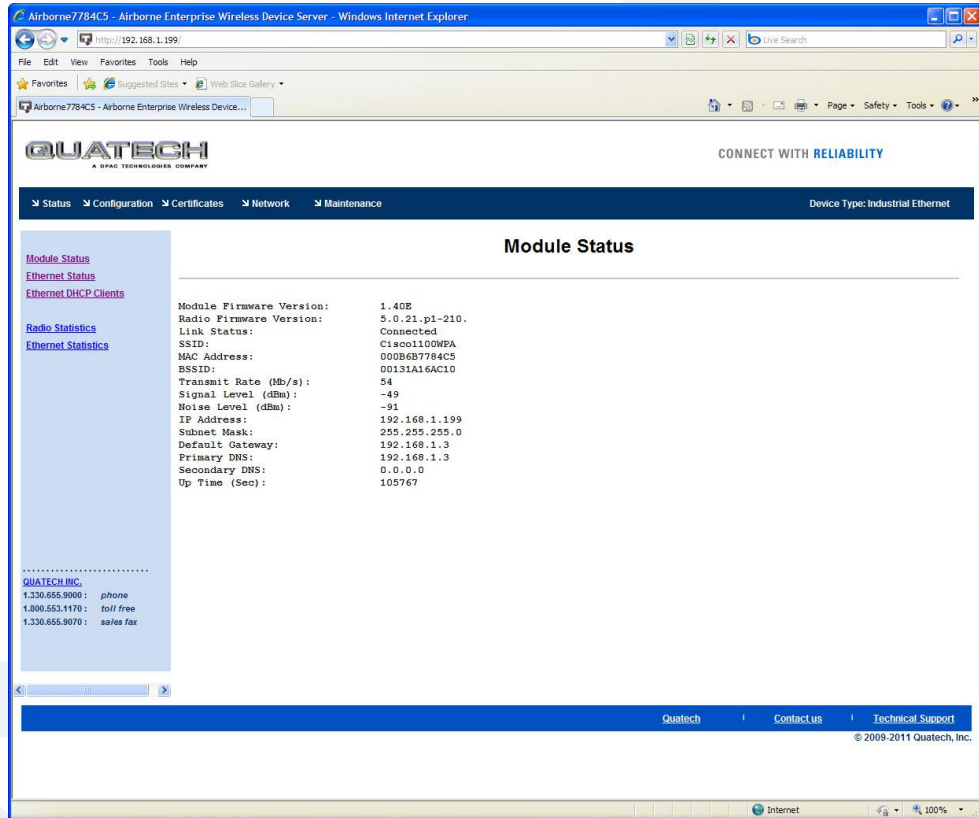
24.0 Web Page Overview

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 The home page 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.

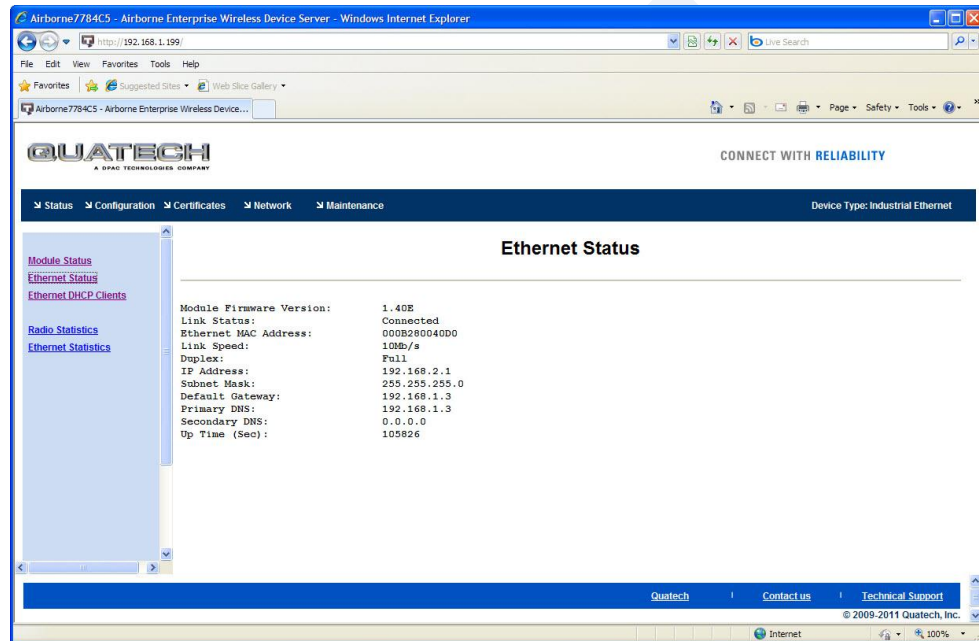


Field	CLI Command
Displayed Page	wl-info

Ethernet Status

URL /Status/Ethernet Status

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

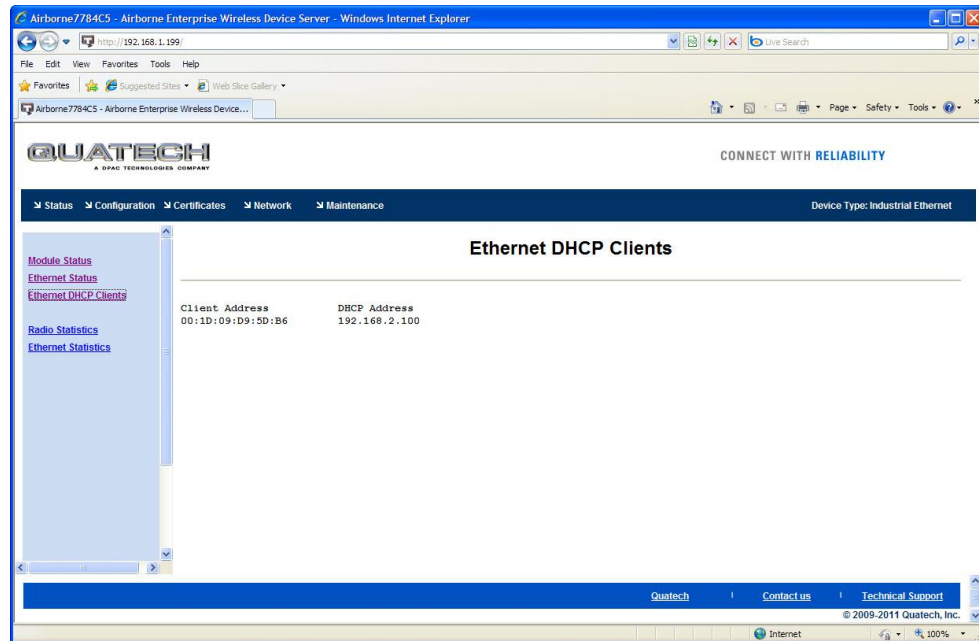


Field	CLI Command
Displayed Page	eth-info

Ethernet DHCP Clients

URL /Status/Ethernet DHCP Clients

Description Displays the IP address issued by the DHCP server to specific MAC addresses.



Field	CLI Command
Displayed Page	eth-dhcp-clients

Radio Statistics

URL /Status/Radio Statistics

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

The screenshot shows a web browser window displaying the Quatech web interface. The page title is "Radio Statistics". The interface includes a navigation menu with options like Status, Configuration, Certificates, Network, and Maintenance. The main content area shows the following statistics:

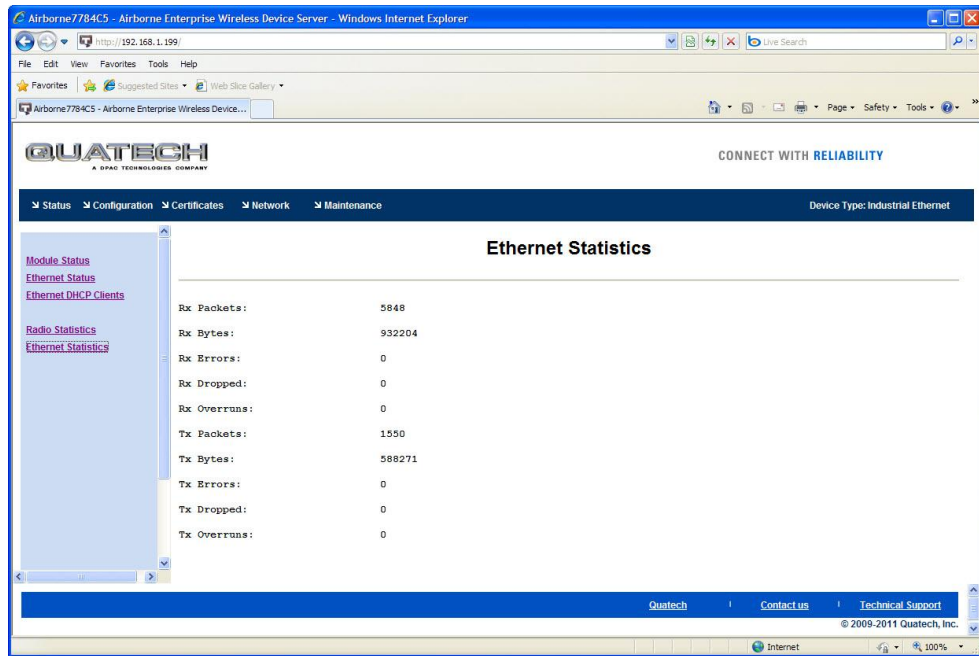
Metric	Value
Rx Packets:	22518
Rx Bytes:	2981054
Rx Errors:	0
Rx Dropped:	0
Rx Overruns:	0
Tx Packets:	1881
Tx Bytes:	303406
Tx Errors:	0
Tx Dropped:	0
Tx Overruns:	0

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.



Field	CLI Command
Displayed Page	stats ethernet

Express Setup

URL /Configuration/Express Setup

Description A page that provides a simplified configuration option set in a single page. Is the default home page when configuring the device for the first time or after a factory reset has been performed.

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[WLAN Security Settings](#)
[Network Settings](#)
[Serial Port Settings](#)
[Serial Port 2 Settings](#)
[Connection Settings](#)
[Ethernet Settings](#)
[Wireless Routing Settings](#)
[Ethernet Routing Settings](#)
[Advanced Settings](#)
[Upload Configuration File](#)
[List Configuration Files](#)
[Delete Configuration File](#)
[Active Configuration](#)
[User Configuration](#)
[OEM Configuration](#)
[Factory Configuration](#)
[WPA Configuration](#)

Express Setup | **Current Values**

Discovery OEM Device Name:

Radio Startup Mode:

WLAN Parameters

Wireless LAN Connection Type:

SSID:

Wireless LAN Security Type:

WPA / WPA2 Pre Shared Key (PSK):

IP Address Parameters

WLAN DHCP:

Ethernet DHCP:

Ethernet Static IP Address:

Ethernet Subnet Mask:

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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
LEAP User Name	user-leap
LEAP Password	pw-leap
PEAP Identity	eap-ident
PEAP Password	eap-password
WLAN DHCP	wl-dhcp
Ethernet DHCP	eth-dhcp
WLAN Static IP Address	wl-ip

WLAN Subnet Mask	wl-subnet
Ethernet Static IP Address	eth-ip
Ethernet Subnet Mask	eth-subnet

DRAFT

WLAN Settings

URL /Configuration/WLAN Settings

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

WLAN Parameters	Current Values
Radio Startup Mode:	On
Wireless LAN Connection Type:	Infrastructure
Wireless LAN Channel:	1
SSID:	Cisco1100WPA
Maximum Wireless Data Rate:	Auto
Use Fixed Data Rate:	Disabled
Wireless LAN Region:	United States

Commit Cancel Defaults

Field	CLI Command
Radio Startup Mode	radio-on, radio-off
Wireless LAN Connection Type	wl-type
Wireless LAN Channel	wl-chan
SSID	wl-ssid
Maximum Wireless Data Rate	wl-rate
Use Fixed Data Rate	wl-fixed-rate
Wireless LAN Region	wl-region

WLAN Security Settings

URL /Configuration/WLAN Security Settings

Description Configures the security settings for the target network.

WLAN Security Parameters	Current Values
Wireless LAN Security Type:	WPA-PSK
Authentication Type:	Auto
LEAP Settings	
LEAP User Name:	dpac
LEAP Password:	
WEP Settings	
Default WEP Key:	1
WEP Key 1:	
WEP Key 2:	
WEP Key 3:	
WEP Key 4:	
WPA / WPA2 / EAP Settings	
WPA Protocol Version:	Auto
WPA / WPA2 Pre Shared Key (PSK):	
EAP Identity:	
EAP Password:	
EAP Anonymous Identity:	
EAP Phase 1 String:	
EAP Phase 2 String:	
EAP Subject Match String:	
EAP Subject Match 2 String:	
EAP Alternate Subject Match String:	
EAP Alternate Subject Match 2 String:	
CA Certificate File Name:	
CA Certificate 2 File Name:	
Client Certificate File Name:	
Client Certificate 2 File Name:	
Private Key File Name:	
Private Key File Password:	
Private Key 2 File Name:	
Private Key File 2 Password:	
DH Parameter File Name:	
DH Parameter 2 File Name:	
EAP-FAST Settings	
EAP-FAST Provisioning Type:	Authenticated
Maximum Number of EAP-FAST Servers:	10
<input type="button" value="Commit"/> <input type="button" value="Cancel"/> <input type="button" value="Defaults"/>	

Field	CLI Command
Wireless LAN Security Type	wl-security
Authentication Type	wl-auth
LEAP User Name	user-leap
LEAP Password	pw-leap
Default WEP Key	wl-def-key
WEP Key 1 - 4	wl-key-1, wl-key-2, wl-key-3, wl-key-4
WPA Protocol Version	wl-wpa-format
WPA/WPA2 Pre Shared Key (PSK)	pw-wpa-psk

EAP Identity	eap-ident
EAP Password	eap-password
EAP Anonymous Identity	eap-anon-ident
EAP Phase String 1	eap-phase1
EAP Phase String 2	eap-phase2
EAP Subject Match String	subject-match
EAP Subject Match 2 String	subject-match2
EAP Alternate Subject Match String	alt-subject-match
EAP Alternate Subject Match 2 String	alt-subject-match2
CA Certificate File Name	ca-cert-filename
CA Certificate 2 File Name	ca-cert2-filename
Client Certificate File Name	client-cert-filename
Client Certificate 2 File Name	client-cert2-filename
Private Key File Name	priv-key-filename
Private Key File Password	priv-key-password
Private Key 2 File Name	priv-key2-filename
Private Key File 2 Password	priv-key2-password
DH Parameter File Name	dh-parm-filename
DH Parameter 2 File Name	dh-parm2-filename
EAP-FAST Provisioning Type	eap-fast-provisioning
Maximum Number of EAP-FAST Servers	eap-fast-max-pac-list

Network Settings

URL /Configuration/Network Settings

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

Network Parameters	Current Values
Common Settings	
DNS Server1 IP Address:	<input type="text" value="0.0.0.0"/>
DNS Server2 IP Address:	<input type="text" value="0.0.0.0"/>
WINS Server1 IP Address:	<input type="text" value="0.0.0.0"/>
WINS Server2 IP Address:	<input type="text" value="0.0.0.0"/>
WLAN Specific Settings	
WLAN DHCP:	Enabled <input type="button" value="v"/>
WLAN DHCP Client Name:	<input type="text" value="Airborne7784C5"/>
WLAN DHCP Request Retransmission Mode:	Exponential Interval <input type="button" value="v"/>
WLAN DHCP Request Retransmission Interval:	<input type="text" value="15"/>
WLAN DHCP Acquire Limit:	<input type="text" value="90"/>
WLAN Static IP Address:	<input type="text" value="192.168.10.1"/>
WLAN Subnet Mask:	<input type="text" value="255.255.255.0"/>
WLAN Gateway IP Address:	<input type="text" value="192.168.10.1"/>
WLAN DHCP Fallback:	Enabled <input type="button" value="v"/>
WLAN Fallback to Last DHCP IP Address:	Disabled <input type="button" value="v"/>
Save Last WLAN DHCP IP Address as Fallback IP Address:	Disabled <input type="button" value="v"/>
WLAN Fallback IP Address:	<input type="text" value="192.168.10.1"/>
WLAN Fallback Gateway IP Address:	<input type="text" value="0.0.0.0"/>
WLAN Fallback Subnet Mask:	<input type="text" value="255.255.255.0"/>
Ethernet Specific Settings	
Ethernet DHCP:	Disabled <input type="button" value="v"/>
Ethernet DHCP Client Name:	<input type="text" value="Airborne0040D0"/>
Ethernet DHCP Acquire Limit:	<input type="text" value="90"/>
Ethernet Static IP Address:	<input type="text" value="192.168.2.100"/>
Ethernet Subnet Mask:	<input type="text" value="255.255.255.0"/>
Ethernet Gateway IP Address:	<input type="text" value="192.168.2.1"/>
Ethernet DHCP Fallback:	Disabled <input type="button" value="v"/>
Ethernet Fallback to Last DHCP IP Address:	Disabled <input type="button" value="v"/>
Save Last Ethernet DHCP IP Address as Fallback IP Address:	Disabled <input type="button" value="v"/>
Ethernet Fallback IP Address:	<input type="text" value="192.168.10.2"/>
Ethernet Fallback Gateway IP Address:	<input type="text" value="0.0.0.0"/>
Ethernet Fallback Subnet Mask:	<input type="text" value="255.255.255.0"/>

Field	CLI Command
DNS Server1/2 IP Address	dns-server1, dns-server2
WINS Server1/2 IP Address	wins-server1, wins-server2
WLAN DHCP	wl-dhcp
WLAN DHCP Client Name	wl-dhcp-client
WLAN DHCP Request Retransmission Mode	wl-dhcp-mode
WLAN DHCP Request Retransmission Interval	wl-dhcp-interval
WLAN DHCP Acquire Limit	wl-dhcp-acqlimit
WLAN Static IP Address	wl-ip

WLAN Subnet Mask	wl-subnet
WLAN Gateway IP Address	wl-gateway
WLAN DHCP Fallback	wl-dhcp-fb
WLAN Fallback to Last DHCP IP Address	wl-dhcp-fbauto
Save Last WLAN DHCP IP Address as Fallback IP Address	wl-dhcp-fbper
WLAN Fallback IP Address	wl-dhcp-fbip
WLAN Fallback Gateway IP Address	wl-dhcp-fbgateway
WLAN Fallback Subnet Mask	wl-dhcp-fbsubnet
Ethernet DHCP	eth-dhcp
Ethernet DHCP Client Name	eth-dhcp-client
Ethernet DHCP Request Retransmission Mode	eth-dhcp-mode
Ethernet DHCP Request Retransmission Interval	eth-dhcp-interval
Ethernet DHCP Acquire Limit	eth-dhcp-acqlimit
Ethernet Static IP Address	eth-ip
Ethernet Subnet Mask	eth-subnet
Ethernet Gateway IP Address	eth-gateway
Ethernet DHCP Fallback	eth-dhcp-fb
Ethernet Fallback to Last DHCP IP Address	eth-dhcp-fbauto
Save Last Ethernet DHCP IP Address as Fallback IP Address	eth-dhcp-fbper
Ethernet Fallback IP Address	eth-dhcp-fbip
Ethernet Fallback Gateway IP Address	eth-dhcp-fbgateway
Ethernet Fallback Subnet Mask	eth-dhcp-fbsubnet

Serial Port Settings

URL /Configuration/Serial Port Settings

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

Serial Port Parameters	Current Values
Serial Port Bit Rate:	9600
Parity:	None
Data Bits:	8
Stop Bits:	1
Flow Control:	None
Serial Assert:	XON
Input Buffer Flush Size:	1460
Serial Escape Mode:	On
Escape String:	7E7E6473
Serial CLI Default Mode:	CLI
Serial Interface Type:	RS-232
Wireless LAN CLI Escape Mode:	On

Commit Cancel Defaults

Field	CLI Command
Serial Port Bit Rate	bit-rate, parity-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
Escape String	esc-str, esc-str-p1
Serial CLI Default Mode	serial-default, serial-default-p1
Serial Interface Type	intf-type
Wireless LAN CLI Escape Mode	esc-mode-lan, esc-mode-lan-p1

Serial Port 2 Settings

URL /Configuration/Serial Port 2 Settings

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

Serial Port 2 Parameters	Current Values
Serial Port Bit Rate:	9600
Parity:	None
Data Bits:	8
Stop Bits:	1
Flow Control:	None
Serial Assert:	XON
Input Buffer Flush Size:	1460
Serial Escape Mode:	On
Escape String:	7E7E7E6473
Serial CLI Default Mode:	CLI
Wireless LAN CLI Escape Mode:	On

Commit Cancel Defaults

Field	CLI Command
Serial Port Bit Rate	parity-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
Escape String	esc-str-p2
Serial CLI Default Mode	serial-default-p2
Wireless LAN CLI Escape Mode	esc-mode-lan-p2

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.

Connection Parameters	Current Values
Common Settings	
Connect LED Mode:	TCP
Wireless UDAP Discovery Enabled:	Enabled
Ethernet UDAP Discovery Enabled:	Enabled
Serial Port 1 Connection Settings	
Tunnel Enabled:	Disabled
Tunnel Port:	8023
Tunnel Mode:	TCP
TCP Port:	2571
TCP Timeout:	0
TCP Retry Time:	60
Primary TCP Target Server IP Address:	0.0.0.0
Secondary TCP Target Server IP Address:	0.0.0.0
UDP Port:	8023
UDP Receive Port:	8023
UDP Target Server IP Address:	0.0.0.0
UDP Transmit Mode:	Disable
Outbound Transmit Type:	TCP
Serial Port 2 Connection Settings	
Tunnel Enabled - Serial Port 2:	Disabled
Tunnel Port - Serial Port 2:	8024
Tunnel Mode - Serial Port 2:	TCP
TCP Port - Serial Port 2:	2571
TCP Timeout - Serial Port 2:	0
TCP Retry Time - Serial Port 2:	60
Primary TCP Target Server IP - Serial Port 2:	0.0.0.0
Secondary TCP Target Server IP - Serial Port 2:	0.0.0.0
UDP Port - Serial Port 2:	8024
UDP Receive Port - Serial Port 2:	8024
UDP Target Server IP - Serial Port 2:	0.0.0.0
UDP Transmit Mode - Serial Port 2:	Disable
Outbound Transmit Type - Serial Port 2:	TCP
Port Settings	
HTTP Port Accessable via Wireless:	Enabled
Telnet Port Accessable via Wireless:	Enabled
SSH Port Accessable via Wireless:	Enabled
Web Server Port:	80
Default Web Page:	index.html
Telnet Port:	23
Telnet Timeout:	0
Secure Shell Server Port:	22

Commit Cancel Defaults

Field	CLI Command
Connect LED Mode	wl-con-led
Wireless UDAP Discovery Enabled	wl-udap
Ethernet UDAP Discovery Enabled	eth-udap
Tunnel Enabled	wl-tunnel, wl-tunnel-p1
Tunnel Port	wl-tunnel-port, wl-tunnel-port-p1

Tunnel Mode	wl-tunnel-mode, wl-tunnel-mode-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
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
UDP Port	wl-udp-port, wl-udp-port-p1
UDP Receive Port	wl-udp-rxport, wl-udp-rxport-p1
UDP Target Server IP Address	wl-udp-ip, wl-udp-ip-p1
UDP Transmit Mode	wl-udp-xmit, wl-udp-xmit-p1
Outbound Transmit Type	wl-xmit-type, wl-xmit-type-p1
Tunnel Enabled – Serial Port 2	wl-tunnel-p2
Tunnel Port – Serial Port 2	wl-tunnel-port-p2
Tunnel Mode – Serial Port 2	wl-tunnel-mode-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
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
UDP Port – Serial Port 2	wl-udp-port-p2
UDP Receive Port – Serial Port 2	wl-udp-rxport-p2
UDP Target Server IP Address – Serial Port 2	wl-udp-ip-p2
UDP Transmit Mode – Serial Port 2	wl-udp-xmit-p2
Outbound Transmit Type – Serial Port 2	wl-xmit-type-p2
HTTP Port Accessible via Wireless	http-port
Telnet Port Accessible via Wireless	telnet-port
SSH Port Accessible via Wireless	ssh-port
Web Server Port	wl-http-port
Telnet Port	wl-telnet-port
Telnet Timeout	wl-telnet-timeout
Secure Shell Server Port	wl-ssh-port

Ethernet Settings

URL /Configuration/Ethernet Settings

Description Configures the Ethernet interface for AirborneDirect™ Ethernet devices.

Ethernet Parameters	Current Values
DHCP Server Enabled:	Enable
Ethernet Role:	Router
MAC Cloning:	Disable
Ethernet Port Speed/Duplex:	Autonegotiate

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

Wireless Routing Settings

URL /Configuration/Wireless Routing Settings

Description Configures the port forwarding routing rules for the wireless interface..

Wireless Routing Parameters		Current Values					
Wireless Routing Default:	FORWARD						
Wireless Routing Rule:	Protocol: TCP	Port: 2060	Action: FORWARD	Dest IP: 192.168.2.101	Port: 244	Remove: <input type="checkbox"/>	
Wireless Routing Rule:	Protocol: UDP	Port: 555	Action: FORWARD	Dest IP: 192.168.2.105	Port: 555	Remove: <input type="checkbox"/>	
<input type="button" value="Add rule"/> <input type="button" value="Commit"/> <input type="button" value="Cancel"/>							

Field	CLI Command
Wireless Routing Default	wl-route-default
Add rule [Button]	wl-route

Ethernet Routing Settings

URL /Configuration/Ethernet Routing Settings

Description Configures the firewall routing rules for the Ethernet interface..

Ethernet Routing Parameters		Current Values			
Ethernet Routing Default:	ACCEPT				
Ethernet Routing Rule:	Protocol: TCP	IP: 192.168.1.100	Port: 2020	Action: ACCEPT	Remove: <input type="checkbox"/>
Ethernet Routing Rule:	Protocol: ALL	IP: 192.168.1.101	Port:	Action: ACCEPT	Remove: <input type="checkbox"/>
<input type="button" value="Add rule"/> <input type="button" value="Commit"/> <input type="button" value="Cancel"/>					

Field	CLI Command
Ethernet Routing Default	eth-route-default
Add rule [Button]	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.

Advanced Parameters	Current Values
Version / User Management	
OEM Defined Version String:	oemverstr
Discovery Manufacturer Device Name:	DPAC-Airborne-IndustrialE
Discovery OEM Device Name:	OEM-Cfg1
Discovery Device Name:	Device
Manufacturing User Name:	
Administrator Password:	
Manufacturing Password:	
OEM User Name:	
OEM Password:	
CFG User Name:	
CFG Password:	
Regular User Name:	
Regular User Password:	
Encrypt Wireless Keys:	Disabled
SSH Settings	
SSH Default User Name:	
SSH Default Password:	
SSH Keysize (evenly divisible by 8):	1024
Power Save Settings	
Module Power Save Mode:	Active
Serial Port 1 Inactivity Timer:	0
Serial Port 2 Inactivity Timer:	0
Radio Startup Mode:	On
FTP Settings	
Internal FTP Server Enabled:	Enabled
Internal FTP Server Listen Port:	21
FTP Server IP Address or Name:	
FTP User Name:	
FTP Password:	
FTP Server Path:	
FTP File Name:	
WLAN Specific Settings	
Antenna Mode:	Antenna 2 Only
Beacons Missed Before Roaming:	6
Association Retry Count:	3
Association Backoff Time (msec):	10000
ARP Staleout Time:	120
ARP Reachable Time:	120
Use Directed Probes:	Disabled
Lost Association Link Timeout:	1

cont.

Startup Options	
Startup Message Mode:	Disabled ▾
Startup Message Text:	Ready
DHCP Vendor Class ID Strings	
WLAN DHCP Vendor Class ID String:	
Ethernet DHCP Vendor Class ID String:	
LED / GPIO Settings	
I/O Port F Bit Direction:	0xFF
I/O Port F Internal Pullup Resistor:	0xFF
I/O Port G Bit Direction:	0xFF
I/O Port G Internal Pullup Resistor:	0xFF
Enable LED Signal Strength Meter:	Disabled ▾
Enable POST LED:	Enabled ▾
Enable RF_LINK LED:	Enabled ▾
Enable WLN_CFG LED:	Enabled ▾
Enable CONN LED:	Enabled ▾
Other Advanced Settings	
Enable Echo for Telnet Sessions:	Enabled ▾
UDP Server Ping:	Disabled ▾
<input type="button" value="Commit"/> <input type="button" value="Cancel"/> <input type="button" value="Defaults"/>	

Field	CLI Command
OEM Defined Version String	
Discovery Manufacturer Device Name	name-manuf
Discovery OEM Device Name	name-oem
Discovery Device Name	name-device
Manufacturing User Name	user-manuf
Administrator Password	pw-root
Manufacturing Password	pw-manuf
OEM User Name	user-oem
OEM Password	pw-oem
CFG User Name	user-cfg
CFG Password	pw-cfg
Regular User Name	user
Regular User Password	pw
Encrypt Wireless Keys	cfg-encrypt
SSH Default User	ssh-default-user
SSH Default Password	ssh-default-password
SSH Keysize (evenly divisible by 8)	ssh-keysize
Module Power Save Mode	pm-mode
Serial Port 1 Inactivity Timer	wl-sleep-timer, wl-sleep-timer-p1
Serial Port 2 Inactivity Timer	wl-sleep-timer-p2
Radio Startup Mode	radio-startup
Internal FTP Server Enabled	ftp-server
Internal FTP Server Listen Port	ftp-server-listen-port
FTP Server IP Address or Name	ftp-server-address
FTP User Name	ftp-user
FTP Password	ftp-password
FTP Server Path	ftp-server-path
FTP Filename	ftp-filename
Antenna Mode	wl-ant
Beacons Missed Before Roaming	wl-beacons-missed

Association Retry Count	wl-assoc-retries
Association Backoff Time (msec)	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 Internal Pullup Resistor	io-pullup-f
I/O Port G Direction	io-dir-g
I/O Port G 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	wl-udp-ping

Upload Configuration File

URL /Configuration/Upload Configuration File

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

Upload a Configuration File to the Module

Select a Configuration File to upload and save on the module:

Select the destination filename:

User Configuration

Encrypted Configuration

OEM Configuration

Field	CLI Command
Upload Configuration [button]	put-cfg
User Config	put-cfg user_config.txt
Encrypted Configuration	put-cfg user_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.

Configuration File Listing

[oem_config.txt](#) 270 bytes
[user_config.txt](#) 75 bytes
2 Files 345 bytes
123904 bytes free

Field	CLI Command
Displayed Page	list-cfg

Delete Configuration File

URL /Configuration/Delete Configuration File

Description Allows configuration files saved to the device to be deleted.

Delete a Configuration File From Flash

Choose a Configuration File to Delete:

Choose a Configuration File...

Field	CLI Command
Delete File [Button]	del-cfg

Active Configuration

URL /Configuration/Active Configuration

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

Active Configuration

```
#/bin/qtsh
# /var/tmp/active_config.txt
#
ver-fw 1.40E
ver-omverstr
user-leap dpac
name-manuf DPAC-Airborne-IndustrialE
name-oem OEM.Cfg1
name-device Device
pm-mode active
esc-str 7E7E7E9473
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-telnet-port 0x0017
wl-telnet-timeout 0x00000000
wd-http-def index.html
```

Field	CLI Command
Displayed Page	cfg-dump active

User Configuration

URL /Configuration/User Configuration

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

User Configuration

```
#!/bin/qtsh
# /var/etc/config/user_config.txt
#
name-oem Quatech_DP501
```

Field	CLI Command
Displayed Page	cfg-dump user

OEM Configuration

URL /Configuration/OEM Configuration

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

OEM Configuration

```
#!/bin/qsh
# /var/etc/config/user_config.txt
#
wl-ssid Cisco110WPA
wl-security wpa-psk
wl-route-default forward
eth-route-default accept
```

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 Quatech factory.

Factory Configuration

```

# /bin/qtsh
# /etc/factory_config_ie.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-serial-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.

WPA Configuration

```
#
# /var/tmp/wpa_supplicant.conf
#

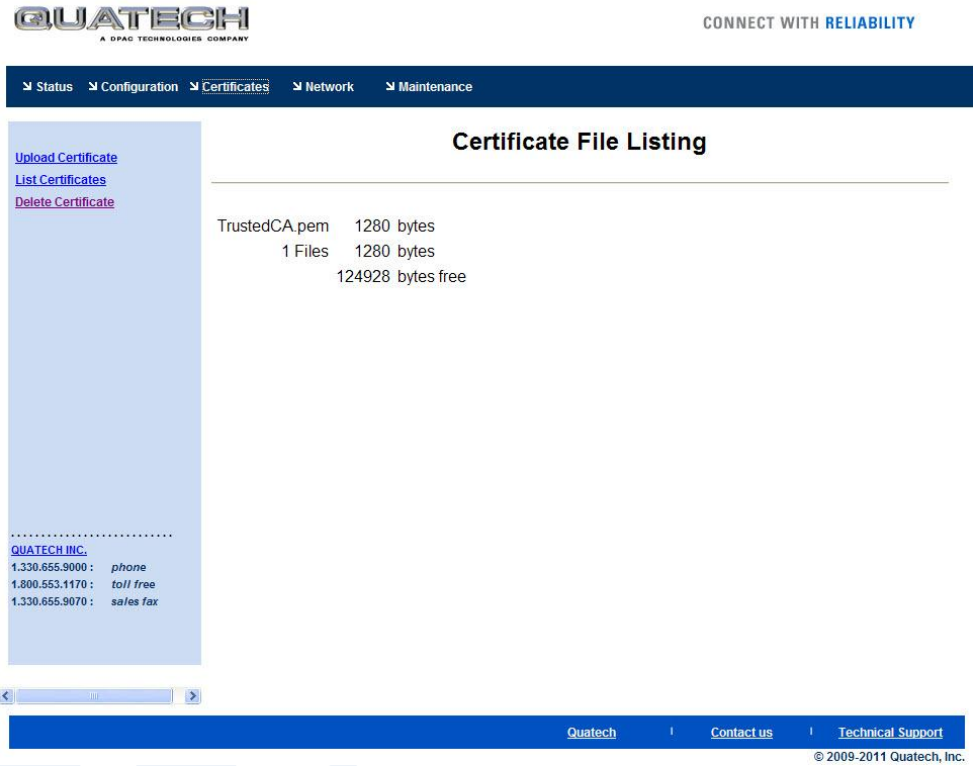
ctrl_interface=/var/run/wpa_supplicant
eapol_version=1
ap_scan=1
fast_reauth=1
assoc_retries=3
assoc_backoff=10
network={
ssid="Cisco1100WPA"
scan_ssid=1
mode=0
key_mgmt=WPA-PSK
proto=WPA
pairwise=TKIP
group=TKIP
}
```

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 Enables certificates and private keys to be uploaded to the device.

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[Status](#)
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Upload a Certificate to the Module

[Upload Certificate](#)
[List Certificates](#)
[Delete Certificate](#)

Select a Certificate File to upload and save on the module:

.....
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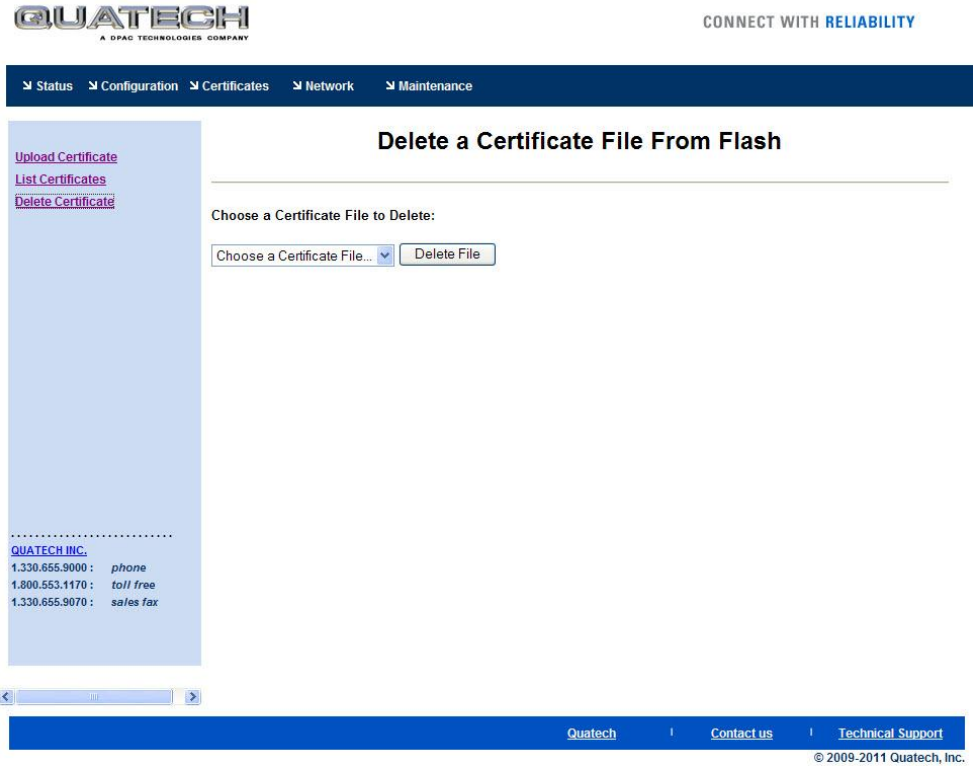
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Field	CLI Command
Upload Certificate [Button]	put-cert

Delete Certificate

URL /Certificates/Delete Certificate

Description Allows certificates stored on the device to be deleted.



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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[Discover Airborne Modules](#)
[Scan for Access Points](#)

Module Status

```

Module Firmware Version: 1.40E
Radio Firmware Version: 5.0.21.p1-210.
Link Status: Connected
SSID: Cisco1100WPA
MAC Address: 0006B7784C5
BSSID: 00131A16AC10
Transmit Rate (Mb/s): 54
Signal Level (dBm): -44
Noise Level (dBm): -90
IP Address: 192.168.1.199
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.1.3
Primary DNS: 192.168.1.3
Secondary DNS: 0.0.0.0
Up Time (Sec): 112838
    
```

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Field	CLI Command
Displayed Page	wl-info

Discover Airborne Modules

URL /Network/Discover Airborne Modules

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

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[Discover Airborne Modules](#)
[Scan for Access Points](#)

Discover Results

Device Name	IP Address	MAC Address	Device Type	FW Ver
OEM-Cfg1	192.168.1.102	000B6B7771C6	DIRECT-ETHERNET	4.3.0.41
OEM-Cfg1	192.168.1.146	000B6B77D199	DIRECT-ETHERNET	1.40

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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

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[Scan for Access Points](#)

Scan Results

```

wlan0 Scan completed :
Cell 01 - Address: 00:13:1A:16:AC:10
        ESSID:"Cisco1100WPA"
        Mode:Managed
        Frequency:2.412 GHz (Channel 1)
        Quality:0/10 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=dd180050f2020101810003a4000027a4000042435e0062322f00
        Extra:extra_ie
Cell 02 - Address: 00:30:44:02:E1:1C
        ESSID:""
        Mode:Managed
        Frequency:2.462 GHz (Channel 11)
        Quality:0/10 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=30180100000fac020200000fac02000fac0401000000fac020000
        Extra:wpa_ie=dd1a0050f20101000050f20202000050f2020050f20401000050f202
        Extra:wmm_ie=dd180050f2020101000003a4000027a4000042435e0062322f00
Cell 03 - Address: 00:20:A6:58:CD:A1
        ESSID:""
        Mode:Managed
        Frequency:2.427 GHz (Channel 4)
        Quality:0/10 Signal level=-74 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
                  12 Mb/s; 24 Mb/s; 36 Mb/s; 9 Mb/s; 18 Mb/s
                  48 Mb/s; 54 Mb/s
        Extra:wpa_ie=dd160050f20101000050f20201000050f20201000050f202
        Extra:wmm_ie=dd180050f2020101010003a3000027a4000042435e0062322f00
    
```

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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 module firmware to be updated.



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Upload Firmware to the Module

[Update Module Firmware](#)
[Reset to Factory Defaults](#)
[Restart Module](#)

[Blink the POST LED](#)
[Stop Blinking the POST LED](#)
[Change Module Personality](#)

Current Firmware Version = 1.40E
 Select the firmware image file to load and then click "Load New Firmware"

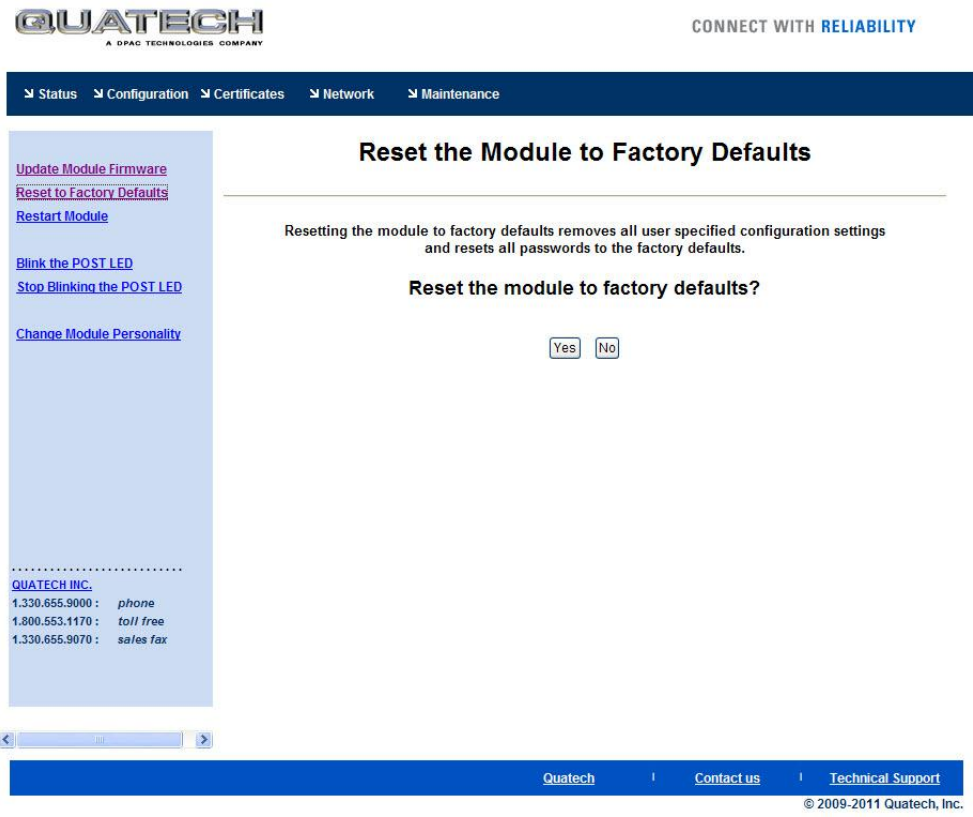
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Field	CLI Command
Load New Firmware [Button]	update

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.



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[Status](#)
[Configuration](#)
[Certificates](#)
[Network](#)
[Maintenance](#)

Restart the Module

Restarting the module will cause any unsaved changes to be lost.

Restart the module?

[Update Module Firmware](#)
[Reset to Factory Defaults](#)
[Restart Module](#)

[Blink the POST LED](#)
[Stop Blinking the POST LED](#)

[Change Module Personality](#)

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Field	CLI Command
Yes [Button]	restart

Blink the POST LED

URL /Maintenance/Blink the POST LED

Description Starts the POST LED blinking. This identifies the specific device being communicated with.



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.



CONNECT WITH **RELIABILITY**

[Status](#)
[Configuration](#)
[Certificates](#)
[Network](#)
[Maintenance](#)

Blink POST LED

Blinking of the POST LED turned OFF

[Update Module Firmware](#)
[Reset to Factory Defaults](#)
[Restart Module](#)
[Blink the POST LED](#)
[Stop Blinking the POST LED](#)
[Change Module Personality](#)

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Field	CLI Command
Displayed Page	blink-post-led off

Change Module Personality

URL /Maintenance/Change Module Personality

Description Allows devices personality to be modified, including the enabling or disabling of ports.

The screenshot shows the Quatech web interface. At the top, the Quatech logo is on the left and the slogan 'CONNECT WITH RELIABILITY' is on the right. A navigation bar contains links for Status, Configuration, Certificates, Network, and Maintenance. The main content area is titled 'Change Module Personality' and shows the current module personality as 'Industrial Ethernet'. Under 'Module Personality', there are radio buttons for UART, Direct Serial, Direct Ethernet, SPI, Industrial Serial, and Industrial Ethernet (which is selected). Under 'Enabled Ports', there are checkboxes for Serial Port 1, Serial Port 2, Ethernet, and Debug Port, all of which are checked. At the bottom of the form are 'Commit' and 'Cancel' buttons. A sidebar on the left contains various utility links like 'Update Module Firmware', 'Reset to Factory Defaults', and 'Restart Module'. A footer contains contact information for Quatech Inc. and a copyright notice for 2009-2011.

Field	CLI Command
Module Personality [Heading]	device-type
Serial Port 1 [Check Box]	serial-port, serial-port-p1
Serial Port 2 [Check Box]	serial-port-p2
Ethernet [Check Box]	ethernet-port
Debug Port [Check Box]	debug-port

25.0 Certification & Regulatory Approvals

The unit complies with the following agency approvals:

Table 47 - 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

25.1 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.

25.2 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.

25.3 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.

25.4 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 ABDG-XX-DP501 is covered by the following modular grants:

Table 48 - 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 part15 subpart C Intentional Radiator testing and certification, except where they wish to use an antenna that is not already certified.

Quatech supports a group of pre-approved antenna; 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 Quatech 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 Quatech.

The following documents are associated with this applications note:

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

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

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

25.5 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 Quatech Technical Support for details on enabling and using these modes.

26.0 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 49 - Mechanical Approvals

Test	Reference	Conditions
Temperature Range (Operational)	Table 1B, Type 2b	-40°C to +85°C
Temperature Range (Non-Operational)		-50°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 Quatech Technical Support, please contact directly for the latest documentation.

27.0 Change Log

The following table indicates all changes made to this document:

Version	Date	Section	Change Description	Author
1.0	2/2/2011	-	Initial Release	CHM
1.1	2/18/2011	4.0	Added product pictures	ACR
		6.1	Table 1: Added RS232 Power on pin 9 pin out.	
		6.6	Added section	
		12.0	Table 14: Added User and password dialog box to step 6. Matches AMC v0.72 functionality.	
		14.0	Table 18: Added User and password dialog box to step 6. Matches AMC v0.72 functionality.	
		16.0	Table 21: Updated wl-security information.	
		21.0	Table 42: Updated step 1 to match AMC v0.72 functionality.	
		22.0	Added section	
		24.4	Changed reference to ABDG from WLNG	

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