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Chapter 1. Installation

The FWB-205 Kit is shown in Figure 1. Each kit includes two radio modules, two 19-dBi MIMO antennas, RF cables, Ethernet PoE injector/powersupplies, and mounting hardware.

NOTE: The FWB-205 Kit and its two 19 dBi panel antennas are intended for fixed (non-mobile), point-to-point applications only. Any other use is prohibited.

Installation requires these tools:

• 1/2-inch open-end wrench

• 7/16-in open-end wrench

• 3/8-inch open-end wrench

• Phillips screwdriver

• Channel-lock or slip-joint pliers

• RJ-45 crimping tool and male plug

• Waterproofing tape or mastic for RF connections.

The assembly must be grounded. If the mast is not already properly grounded, you will need appropriate grounding hardware. Consult local codes.

Figure 1.   FWB-205 Kit Contents

The FWB-205 units have three antenna connectors for each radio. Each FWB-205 unit should be installed with its antenna on a sturdy pole or mast. It does not matter whether you install the antenna first or the radio unit first. In all cases, antennas should be installed by a qualified professional. Outdoor installations MUST have code-approved grounding and lightning-protection systems.

Antenna Installation

An assembled and mounted antenna is shown in Figure 2. The mounting systems consists of a pole clamp assembly, a pivot link, and an antenna bracket. These are shown in Figure 3.
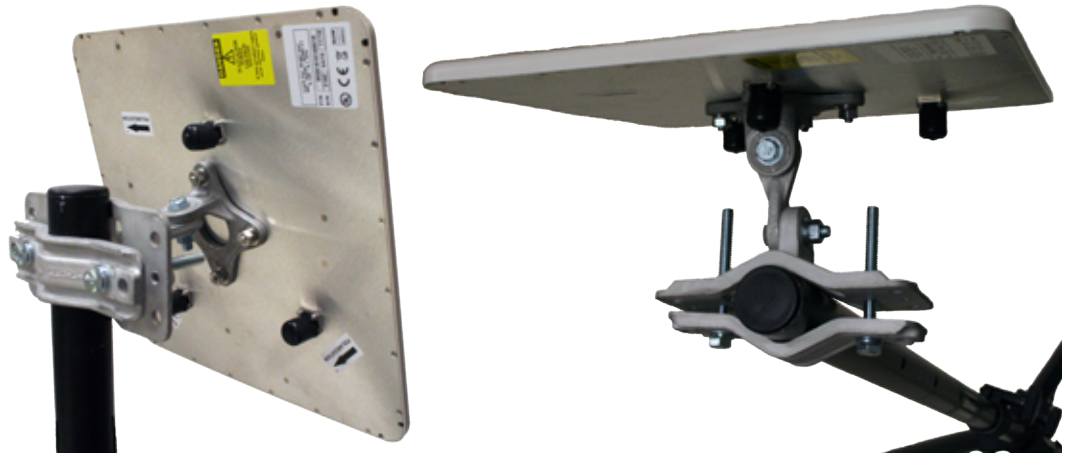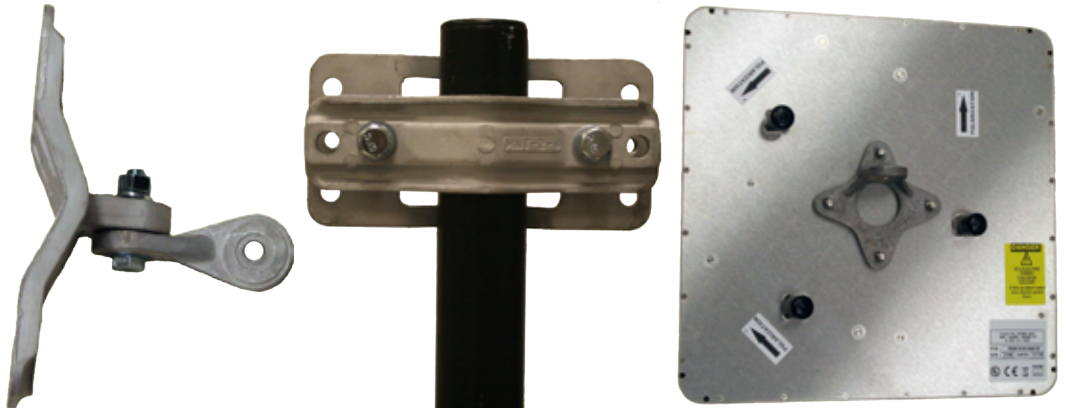
Figure 2.   Mounted Antenna

Figure 3.   Pivot Link; Pole Clamp Assembly; Antenna Bracket

Begin assembly by attaching the pivot link to the pole clamp assembly, as shown at left in Figure 3. Use a flat washer under the bolt head, and under the nut use a flat washer and lock washer.

Next, attach the pole clamp assembly to the pole, as shown at center in Figure 3. Again, use a flat washer under the bolt heads, and under the nuts use a flat washer and lock washer.

Mount the antenna bracket to the antenna such that the mounting lug is horizontal when the top of the antenna is up, as shown at right in Figure 3. Antenna polarizations must match between the two ends of a link.

The radio unit mounts with a two-piece mounting assembly. One half of the assembly is permanently attached to a pole or wall; the second half, on the radio itself, hooks over the first.

Figure 4.   Two-Piece Radio Mounting Plate Assembly

Hooks (4)

Hook Attachments (4)

Radio Unit with
Mounting Plate

Plate for Pole
or Wall Mount
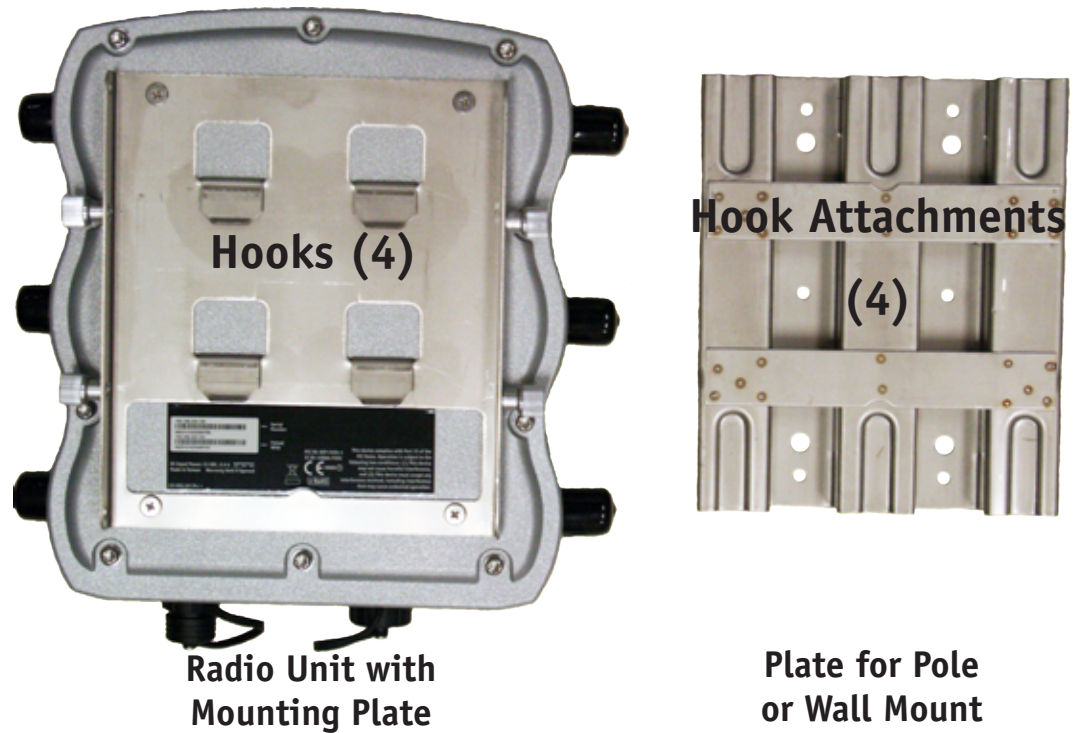
The FWB-205 is shipped with a two-piece mounting plate already attached, as shown in Figure 5. Loosen the four fasteners, two on each side, to remove the hook-attachment plate. The captive screws are tight; you will need channel-lock or slip-joint pliers.

Figure 5.   Radio and Mounting Plate Assembly, As Shipped

Captive Screws (4)
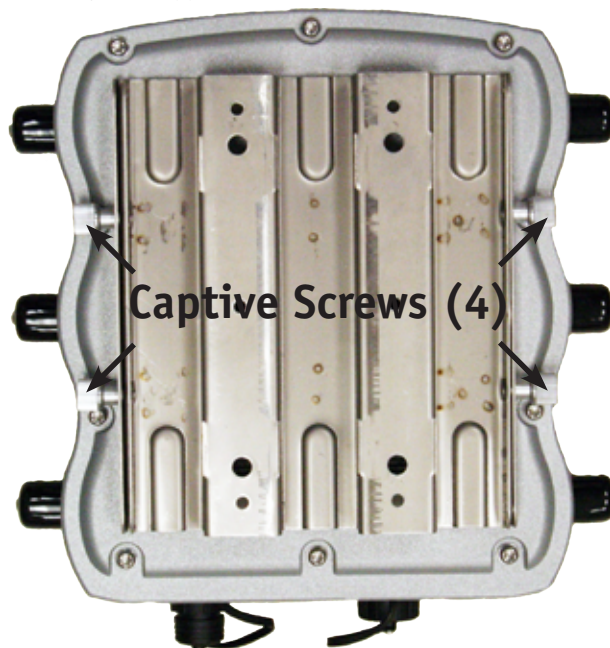
Attach two U-bolt assemblies to the mounting pole, as shown in Figure 6. The U-bolts are large enough to accomodate large poles; if you are mounitng on a smaller-dialmeter pole, you must either cut the U-bolts to length or use four additional spacer nutes, as shown at right in Figure 6.

Figure 6.   U-Bolt Attachment to Pole, Spacer Nuts on U-Bolts
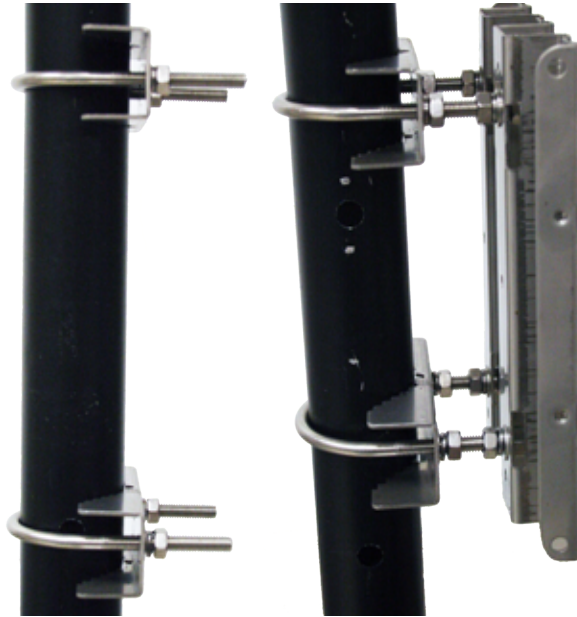
Now you can hang the radio unit on the bracket, and tighten the four captive screws.

Connecting the Antennas

Connect the radio unit to the antenna using the supplied cables. The cables are equipped with lightning-arrestor units, and should be installed with the arrrestors connected to the radio unit, not the antennas. This is shown at left in Figure 7.

Figure 7.   Cable-to-Radio Connections; Completed Installation

Cable connection pattern is critical. You must use the Radio 2 antenna connectors; these are on the right side of the unit when viewed from the front. The panel antennas included with the FWB-205 are 'handed'; the individual antenna connections on the radio unit must be connected to the antenna in a specific way, and it is slightly different on each end of the link.

On one end of the link, connect the three antenna leads as shown in red. On the other end, connect them as shown in green. Not that this reverses connections 2 and 3; this preserves matching antenna polarization

Figure 8.   Antenna Connections
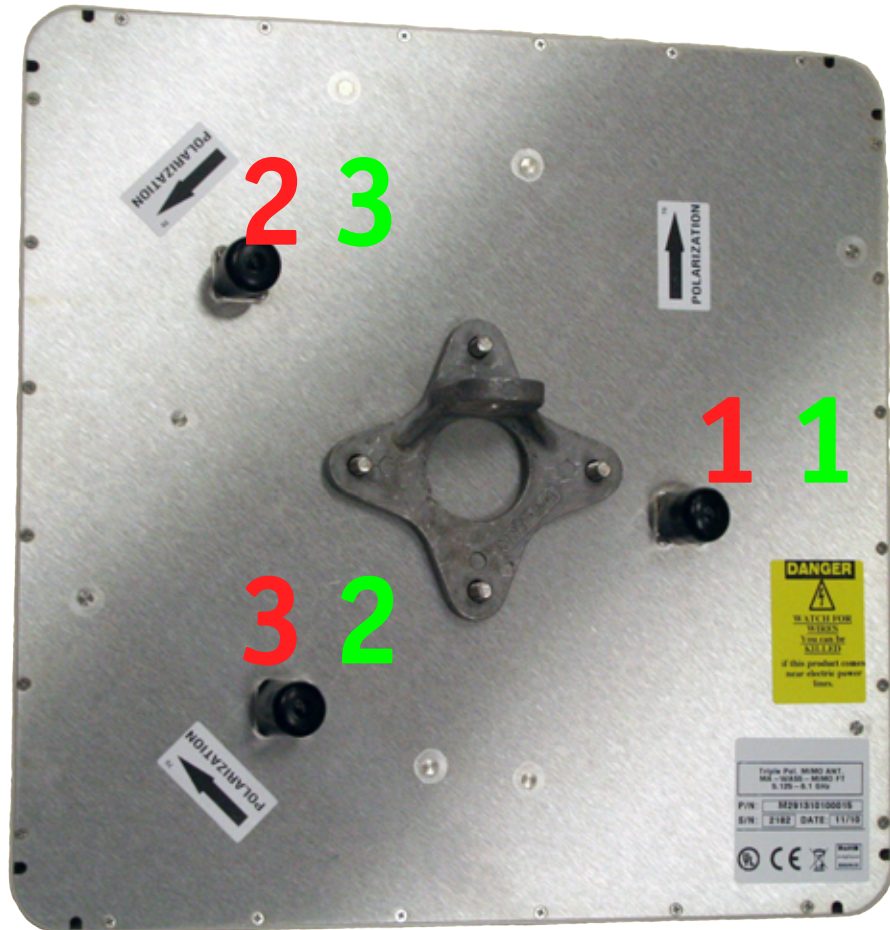
The final step is to fabricate the weatherproof Ethernet connect. Thread the cable as shown, and then attach it to the FWB-205 radio unit.

Figure 9.   Ethernet Cable Fabrication

Chapter 2. Initial Setup for the FWB-205

Initial Setup & Login

The FWB-205 units are sold in pairs. and each pair has been programmed at the factory to work with each other. Installation of the devices should only be done by qualified and experienced personnel. Outdoor installation involves many safety hazards, including electrocution, lightning strikes, and falls. Please be careful.

In all cases, test and configure the units before mounting it on the pole or mast. Set the two units up on the bench and apply power. Wait about 1-2 minutes for the units to boot up and establish a radio connection.

Each unit has a label, as shown, which identifies the unit and its partner. Connect your computer to the power insertion unit which feeds the lower-numbered member of the pair.
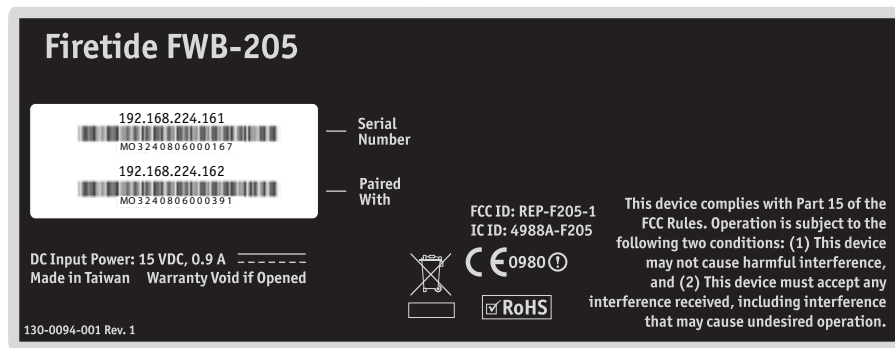
FWB nodes are paired, or "married", at the factory. Within each pair, the unit with the lower serial number is assigned IP address 192.168.224.161, and the unit with the higher serial number is assigned IP address 192.168.224.162. You can change these addresses if desired.

Configure the computer to have an IP address on the subnet 192.168.224.0/24. When you power up the two units on the bench, they will usually connect. The LEDs should look like .

Figure 10. LED Pattern for Normal Operation

Connect to the unit labeled with the 192.168.224.161 IP address. Point the browser at **https**://192.168.224.161. IE8 is the preferred browser, but most other common browsers will also work. Note: it is a secure web connection (**https)** not a conventional connection (http).

You will be asked for a login and password; the defaults are **admin** and **firetide**. You should change these when you configure the FWB units. Proceed to set the country code.

Website Security Certificate Warning

Website security certificate warnings may occur. Accept Continue with the Website prompts when they occur.

Chapter 3. Radio and System Settings

Radio and System settings include Link Configuration (RF settings), Node Configuration (IP and network settings), Node Management Settings, Node Status, and Firmware Upgrade commands.

Link Configuration

Operating Country

Firetide FWB-205 nodes require that you enter the country of operation to ensure compliance with the channel limitations, indoor/outdoor restrictions, and license requirements of your region. Selecting a country other than where you are using the device may result in illegal operation and may cause harmful interference to other systems. The node will reboot after you click Apply to set the country code.

Link Radio Settings

Link Status shows whether or not the two devices connected successfully. If the two nodes did not connect with each other, you must connect to and point your browser at the second node, at https://192.168.224.162. Log in as before, and set its country code. The nodes should connect. If not, check the radio settings on each node, and make sure the two nodes are set to the same channel and operating mode (a, n, etc).

Configuration options include: Wireless Mode, Channel, Auto Selection of Channel and Extended Range. Wireless Mode settings include: 11a, 11a static turbo, and 11n-20MHz and 11n-40MHz.

Extended Range can be set from 0 to 9 miles (0 to 14.5 km). Increasing the range setting does not actually increase the range or power of the radios. Rather, it affects the timing of pauses between packets. Longer links require longer pauses. Set this parameter to be greater than the path length. A too-short setting will result in frequent collisions and reduced throughput.

Click Apply to save settings.
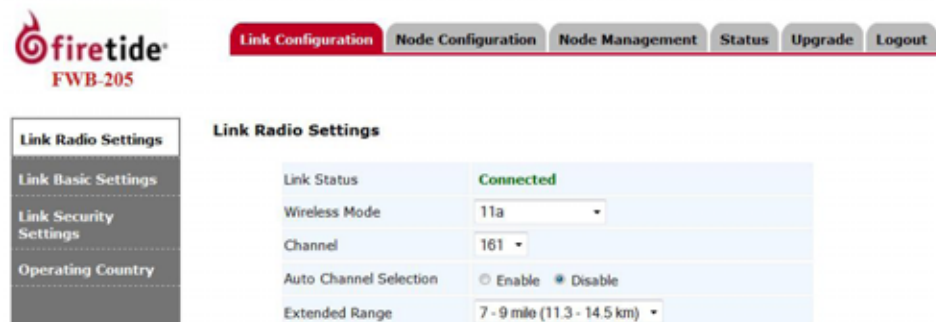
Link Basic Settings

Link Basic Settings include Multicast Data Rate, Fragmentation Threshold, and Management VLAN Settings.

The multicast data rate can be set from 1 Mbps up to 54 Mbps. Per the original 802.11 standard, many WiFi systems automaticlly slow down when sending multicast traffic, to maximize the likelihood of all recipients receiving the signal. In a point-to-point configuration this is not necessary, thus a setting of 54 Mbps is recommended.

The fragmentation threshold is generally best left at the default setting of 2346. Management VLAN status can be enabled or disabled. If enabled, select the appropriate management VLAN number. Click Apply to save settings.

Link Security Settings

Link Security Settings provide support for encryption. The default is Enabled, WPA2-PSK.

Node Configuration

IP Address Settings

Configure node IP address settings here. Enter the node IP address, IP Net Mask, and Gateway IP address. Click Apply to save settings.
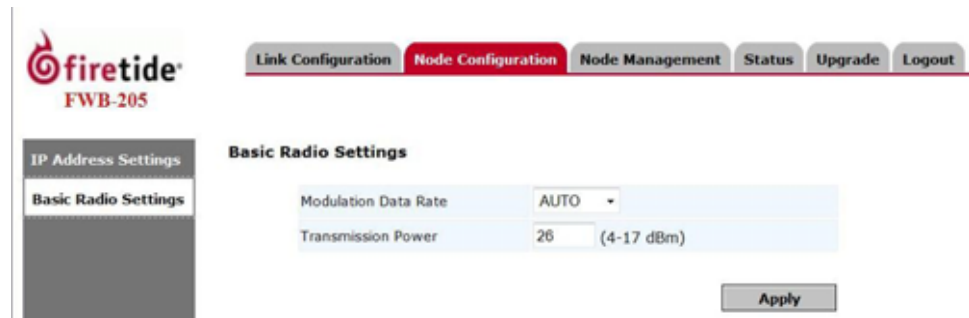

Basic Radio Settings

Radio settings used by the node are displayed on this page. Node settings for Modulation Data Rate and Transmission Power can be selected. Click Apply to save settings.

Node Management

User Settings

Configure users with configuration privileges here by adding User Name and Password.

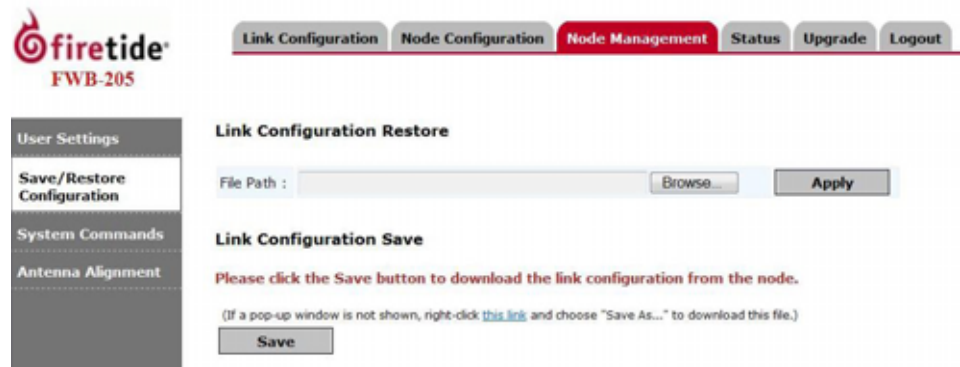## Save/Restore Configuration

You can save the current link configuration as a file by selecting Save. Nodes can be restored by using the Restore function to apply a previously-saved file.

System Commands

System Commands let you reboot the node or perform a factory reset. Note that a factory reset will re-enable the antenna alignment tool, and require you to re-specify the country code.

Antenna Alignment

Antenna alignment settings are available here. Alignment is on by default. To insure maximum performance, turn off the alignment feature after alignment is complete.

Status

Link Status

Link Status is displayed here. Click Refresh to see the current status. Link status includes current radio operating mode, RF channel, node MAC addresses, and IP addresses. The Manage Remote button lets you connect to and manage the remote node, as long as the RF link is up.

Node Status

Node Status is displayed here. Click Refresh to see the current status.

Upgrade

Firmware Upgrade

In order to upgrade firmware, you must have Java installed on your PC. When you begin this process, the Java applet will take a moment to load.

Browse to select upgrade image. Click Start Upgrade to begin. Once started the upgrade can be cancelled by clicking Cancel Upgrade.

Logout

Select the Logout tab to exit from the session.

Appendix A   FWB-205 Specifications

Wireless Interface

Model	Use
FWB-205	Outdoor, Worldwide, Radio 2: 5 GHz

Bands	Frequency (GHz)	Restrictions
802.11a	5.15-5.25	
802.11n	5.25-5.35	
	5.725-5.825	
	4.9-5.090	Japan only
	4.94-4.990	US Public Safety
	5.470-5.725	ETSI 301.893, U-NII

Bands (GHz)	Max TX Power
802.11a 5.725-5.825 UNII-3	20 dBm
802.11n	
5.725-5.825 UNII-3	20 dBm
5.470-5.735 UNII	20 dBm
5.25-5.36 UNII-2	20 dBm
5.15-5.25 UNII-1	17 dBm

Supported Data Rates & Standards

- 802.11a 6/9/12/18/24/36/48/54Mbps
- 802.11a Capable of switching to 1/4 and 1/2 rates for 4.940 – 4.990 GHz Public Safety Band
- 802.11g 6/9/12/18/24/36/48/54Mbps
- 802.11n 6.5/13/19.5/26/65/130 (20MHz LGB) 7.2/14.4/21.7/28.9/72.2/144 (20MHz SGB) 13.5/27/40.5/54/135/270 (40MHz LGB) 15/30/45/60/150/300 (40MHz SGB)
- Network Standards: IEEE 802.11a/d/e/f/h/i/n
- Security: WPA; 64/128/256 w/TKIP, AES

Power

- 48 VDC via DC connecter or 802.3af PoE

Environmental

- Humidity (non-condensing): 10% to 90%
- Storage humidity (non-condensing): 5% to 95%
- Maximum altitude 15,000 feet (4600 meters)

Network Port

- One 10/100/1000 Mbps Ethernet port with weatherproof connector
- IEEE 802.3, 802.3u compliant
- CSMA/CD 10/100/1000 autosense

Enclosure

- Cast aluminum NEMA-4X/IP66 enclosure
- Six N-type antenna connectors
- Weatherproof 48VDC power connector
- Weight: 3.75 lbs (1.7 Kg) with bracket
- Dimensions: 8.2" x 8.6" x 2" (205 x 214 x 100 mm)

Security, Authentication and Encryption

- 802.11i, WPA2
- 40-bit, 104-bit WEP keys
- SSID suppression

Management and Configuration

- Built-in web-based management
- Remote firmware upgrade

Network Ports

- One 10/100/1000 autosense Base-T port
- IEEE 802.3,802.3 at based PoE

Warranty

- Hardware: one year limited warranty
- Software: 90 days limited warranty

Appendix B   Reset Procedure

Firetide FWB-205s may be reset to factory parameters. This is useful when returning a unit from field service or in recovering a unit you cannot communicate with. To reset a unit, apply power and wait for the unit to fully boot. This takes 60 to 90 seconds. Use a paperclip to press and hold the reset button for 15 seconds. Wait for the units to reboot before removing power.

When a unit has been reset, it forgets the country code setting and operates at low power until the country code is re-established. Units that are already installed in the field are unlikely to communicate with each other after reset, due to the low power setting. You must connect to each unit in turn and set the country code.

Appendix C   Regulatory Notices

FCC Part 15 Note

These devices comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

• This device may not cause harmful interference.

• This device must accept any interference received, including interference that may cause undesired operation.

FCC Class B Notice

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

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

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

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

FCC Radiation Exposure

To ensure compliance with the FCC's RF exposure limits, the antenna used for this transmitter must be installed to provide a separation distance of at least 76 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter. Installers and end users must follow these installation instructions.

Modifications

Any modifications made to this device that are not approved by Firetide, Inc. may void the authority granted to the user by the FCC to operate this equipment.

Installation

The FWB-205 Kit and its two 19 dBi antennas are intended for fixed, point-to-point applications only. Any other use is prohibited. Antenna(s) for the FWB-205 outdoor unit must be installed by a qualified professional. Operation of the unit with non-approved antennas is a violation of U.S. FCC Rules, Part 15.203(c), Code of Federal Regulations, Title 47.

Canadian Compliance Statement

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations. Cet appareil numerique de la classe B respecte les exigences du Reglement sur le material broilleur du Canada.

FWB-205 devices are certified to the requirements of RSS-210 for 2.4 GHz spread spectrum devices. The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations. For further information, contact your local Industry Canada office.

NCC Statement

一、經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

二、低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
　　前項合法通信，指依電信法規定作業之無線電通信。
　　低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設 備之干擾。

Appendix D   Limited End User Product Warranty

Pursuant to all provisions described herein, Firetide hardware products and Firetide antennas are warranted for one (1) year from the date of purchase against defects in the build materials and workmanship. Firetide does not warrant that the Products will meet any requirements or specifications of any End User Customer. This warranty applies to the entire Firetide product, including the AC power adapter.

Pursuant to all provisions described herein, Firetide software products are warranted for ninety (90) days from the date of purchase against defects in the build materials and workmanship. Firetide also warrants that the Software will materially conform to the documentation supplied by Firetide with the Software. In the event that the Software fails to materially conform to the documentation and an authorized Firetide reseller is notified in writing of such failure within the warranty period, Firetide or its reseller shall use commercially reasonable efforts to promptly correct the nonconformity. Firetide does not warrant that the use of the Software will be uninterrupted or error free.

The above warranties are void if the alleged defect cannot be verified by Firetide or if, as determined by Firetide, the product failure was due to tampering, abuse, misuse, accident, shipping, handling, or storage; or if the product has been installed, used, or maintained in a manner not described in the product user manual; or if the product has been altered in any way; or if product serialization has been altered. Any attempt to disassemble or repair the product by anyone other than Firetide immediately voids this warranty.

This warranty applies only to the original End User purchaser of the product and may not be transferred to any other individual or entity.

The foregoing are the exclusive warranties applicable to the product including the software, and the exclusive remedy for defects in the product. Firetide disclaims all other warranties, whether express, implied, statutory or otherwise, including but not limited to implied warranties of merchantability, non-infringement or fitness for a particular purpose. Some laws do not allow the exclusion of implied warranties so to that extent this limitation may not apply to you.

In no event will Firetide be liable for any special, incidental, consequential, punitive or indirect damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or other pecuniary loss) arising out of the use or inability to use the product or the performance, interruption or failure of the product, irrespective of the cause of action, even if Firetide has been advised of the possibility of such damages. Firetide's cumulative liability for all claims arising out of or in connection with this warranty will not exceed the amount paid by the original End User purchaser to purchase the product. The amounts payable for the product are based in part on these limitations and these limitations shall apply notwithstanding the failure of essential purpose of any remedy. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so to that extent the above limitations or exclusions may not apply to you.

By using the product the original End User purchaser agrees to and is bound by these terms and conditions.

In the event that a product fails to meet this warranty and Firetide's authorized reseller is notified in writing of such failure within the warranty period, Firetide shall, at its own discretion, either repair the product or replace it with the same or a functionally-equivalent product free of charge. Replacement products may contain refurbished materials in whole or in part. Firetide will honor this warranty provided the product is returned through an authorized Firetide reseller or dealer with shipping charges prepaid, along with a proof of purchase describing the original purchase date and product serial numbers if applicable. The authorized reseller must acquire a Return Materials Authorization (RMA) number from Firetide prior to returning any product. Firetide does not accept shipments of defective products without shipping charges prepaid.

Please contact your Firetide dealer for instructions on returning defective or damaged products for repair or replacement. Do not return products to Firetide, Inc. Please keep all original packaging materials in the event they are needed to return the product for servicing.

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Reliable connectivity anywhere™