User Manual

HotPort 3100 Indoor Wireless Mesh Node

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HotPort Limited End User Product Warranty

Pursuant to all provisions described herein, Firetide products are warranted for one (1) year 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. 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 antennas and the AC power adapter.

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, 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 not-withstanding 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.

Explanation of Graphical Symbols

This symbol is intended to alert the user to the presence of important operating, maintenance, and servicing instructions in the literature accompanying this unit. Failing to comply with this instruction may result in electrical shock.

This symbol is intended to alert the user to the presence of important operating, maintenance, and servicing instructions in the literature accompanying this unit. Failing to comply with this instruction may result in a hazard.

DO NOT OPEN THE COVER

- Dangerous voltages inside.
- No serviceable parts inside.
- Refer to qualified service personnel.
- Unit must be disconnected from power prior to servicing.
- Unit has tamper-evident labeling that indicates when cover has been removed.

Table of Contents

Firetide™ HotPort™ 3103 Indoor Wireless Mesh Node

Firetide™ HotPort™ 3103 wireless mesh nodes enable instant deployment of wireless networks and provide a simple and reliable alternative to standard LAN cabling. Deploy Ethernet ports anywhere—instantly! HotPort nodes eliminate costly backhaul wiring for wireless access points and hotspots. In addition, they also enable wireless connectivity for standard networking devices, such as computers, printers, access points, surveillance cameras, and Ethernet switches. HotPort 3103 wireless mesh nodes provide a robust, flexible, and scalable LAN backbone solution. Because they form automatically without wires, Firetide mesh networks do not require elaborate site surveys or physical modifications to buildings and workspaces. Network installation costs will drop dramatically because the time-consuming process of creating wiring between offices, walls, floors, and different buildings is no longer necessary. Provisioning is also easy and fast because special drivers, setup, and interfaces are not required for the equipment you connect to a Firetide instant mesh network. A simple-to-use management client is available to configure the mesh for each network deployment.

The HotPort 3103 nodes provide fast and easy indoor network deployment. Their extended throughput ensures higher link performance over longer distances. A Firetide mesh also provides a portable network backbone, so moving your network is as easy as taking your HotPort nodes with you to your new site. HotPort 3103 indoor mesh nodes are fully compatible with HotPort outdoor mesh nodes, thereby enabling the mesh to extend to outdoor applications.

HotPort wireless mesh nodes employ a high-performance radio for optimized network coverage. Greater throughput between HotPort nodes enables you to extend your network applications with services that previously required greater bandwidth over expensive cabling.

Four standard 10/100 Ethernet ports are built into each HotPort node. You can use these ports for connecting standard networked client devices. You can also use these ports to link the Firetide mesh network with an existing wired LAN or to the Internet through a DSL modem or network gateway devices. Each HotPort mesh node can operate freestanding or mounted to a wall. An external transformer supplies power from a standard 120 volt AC outlet.

Firetide High-Performance Mesh Network

Firetide developed the high-performance mesh network, based on the HotPort mesh nodes, to enable faster, easier, and more affordable network deployment. Firetide's patented mesh networking technology (Firetide mesh routing protocol (FMRP)), makes it possible to survey, plan, and deploy an entire network within one day rather than weeks.

What is a Firetide Mesh Network?

Firetide mesh networks feature a self-configuring, self-healing, multi-hop topology. Because of these inherent self-organizing properties, a mesh network requires no manual configuration. Thus, creating a new network or adding or relocating network equipment is as easy as powering up new nodes. The network automatically discovers the new nodes and integrates them into the mesh.

A big advantage of a mesh network is its robustness and ability to heal itself. If a node is disconnected, congested, or fails to operate, neighboring nodes are notified, and data is routed around it. There is no need for a network engineer to intervene, troubleshoot, and fix the problem.
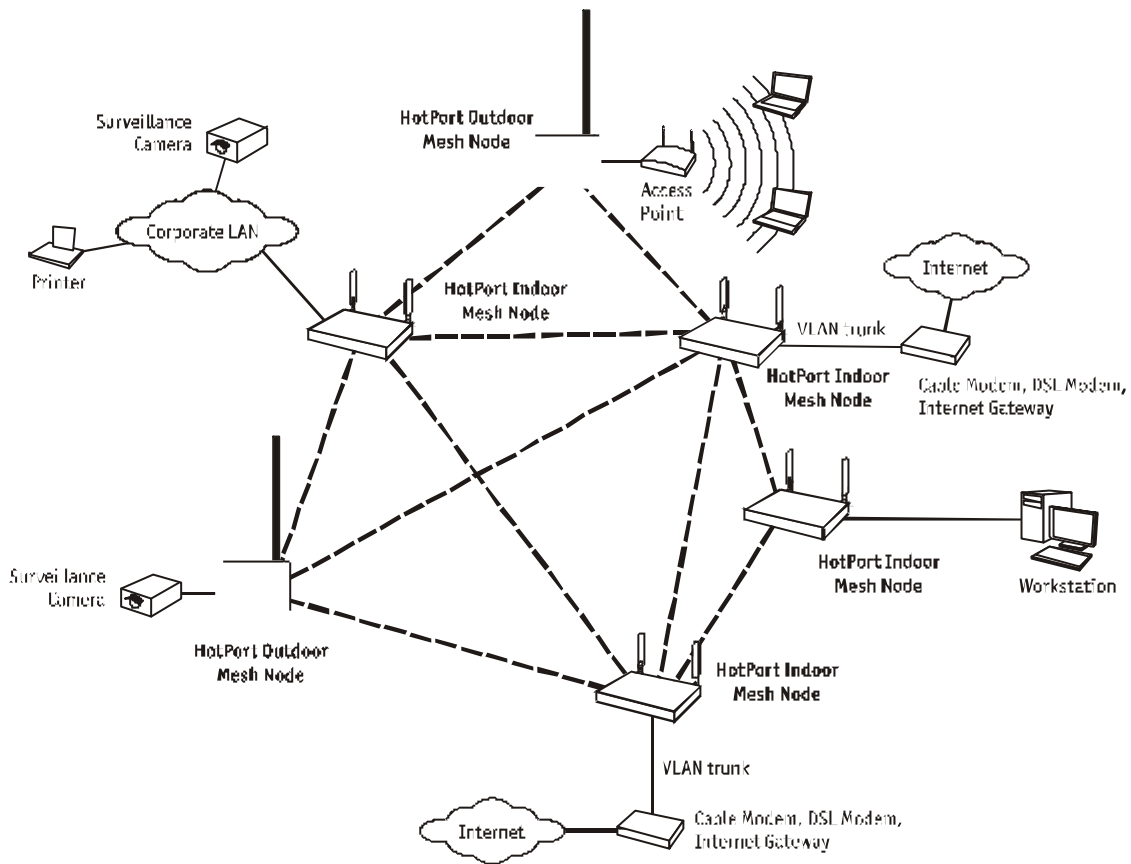
Firetide Mesh Network with Indoor and Outdoor Wireless Mesh Nodes

Mesh networking can be compared to the Internet, where data can be rerouted onto other paths if one path becomes disabled or congested. Losing a node or two or a link won' t bring down the entire mesh network. Unlike other WLAN technologies, a mesh network' s reliability and scalability can actually be improved by adding more nodes and enriching the density of the mesh. More redundant paths mean the network in aggregate can handle far more data traffic, and is therefore quite scalable. Mesh networks are ideal whenever the network must be reliable, scalable, and flexible. They are very portable and can adapt to many different physical environments.

Configuring the Mesh

To configure the mesh, it is recommended to connect the mesh utilizing the default configuration and then change the desired settings using the HotView software. The software lets you change the settings (SSID, Channel, Encryption, IP address, and so on) on all nodes, rather than changing one at a time. This will save you time and ensure that the entire mesh is configured the same way.

Security

HotPort wireless mesh nodes support data encryption to help protect the confidentiality of transmitted data. AES (Advanced Encryption Standard) encryption can be used to protect data exchanged between any two ports in a wireless mesh.

WEP (Wired Equivalent Policy) encryption is also available to protect data exchanged over the wireless links.

Speed, Duplex, and Class of Service Settings

You can configure each Ethernet port for 10 or 100 Mbps speed or for automatic speed negotiation. Network traffic between a HotPort node and devices connected to its Ethernet ports travels up to full wire rate (10 or 100 Mbps). Each port can also be configured for full- or half-duplex operation. You can also assign class of service settings to specific ports to configure the priority levels of these ports/services. Each port can be assigned a priority of Low, Medium, or High. The default priority of each port is Low.

VLANs

You can configure each Ethernet port to operate as part of a VLAN (Virtual Local Area Network). A HotPort wireless mesh can support multiple VLANs. You can assign ports to different VLANs. Only ports belonging to the same VLAN can switch traffic among themselves. You can define up to 4096 VLAN IDs and create up to 16 multiple, logically separated VLAN networks within a single mesh. The HotPort mesh also supports VLAN trunks.

Packet Filtering

The HotPort 3103 can filter packets based upon the MAC address of the traffic. You can configure each Ethernet port to deny or permit access for traffic coming from or to specific devices (identified by the devices' MAC addresses).

Radio Modes and Power

HotPort wireless mesh supports 2.4 GHz OFDM and DSSS radio modes as well as 5.0 GHz OFDM. The selected Radio Mode is applied to the entire wireless mesh. You can use the HotView software to display and modify the radio transmit (TX) power level for each node.

Transmit Power Control

The HotPort 3103 has the ability to Display/Modify Radio TX Power Level on a per node basis utilizing the HotView software. The maximum power (i.e., 100%) is a factory configured value that is unique to each country of operation, each channel of operation, and each antenna configuration and has been determined to be within an authorized limit. This value cannot be changed. However, using the HotView software a mesh administrator can set any node to operate at a reduced percentage of this maximum power (e.g. 75%, 50%, or 25%). The administrator can restore the HotPort to its approved maximum power by setting the power level back to 100%.

> 📄 Note: You can only adjust the output power in the following increments 25%, 50%, 75% and 100%. These are adjustments to the node radio, so care must be exercised when adjusting on an existing network as the lowered power level may cause the node to lose connectivity with any other mesh node.

For example if the maximum FCC-allowed power output for a certain country, channel, and antenna is 17dBm the settings would be:

```
100% = 17dBm
 75% = 16dBm
 50% = 14dBm
 25% = 11dBm
```

> 📄 **Note: Adjusting the power incorrectly could have an adverse effect on proper mesh operations.**

If you are not sure what the power should be adjusted to it is best to leave at default configuration. If you need additional technical assistance, please contact your Firetide dealer.

Network Gateway Interconnect (NGI)

You can configure the HotPort wireless mesh to exchange netwo rk data to and from multiple external networks through network gateway interconnects. In mesh nodes with multiple NGIs to the same network domain, the interconnects are organized into Gateway Groups. Each Gateway Group can support up to 16 network gateway interconnects. Each node on the mesh can have only one Gateway Group interconnect. Gateway groups are not required when connecting to different network domains or if only one NGI is being used.

The NGI feature provides both load balancing and redundancy when accessing various network services. This helps provide better wireless mesh data throughput because it allows packets to enter and exit the wireless mesh at the entry/exit point closest to the packet' s destination, thereby conserving wireless bandwidth and reducing the number of hops required to reach the desired destination.

Mesh Management Using HotView Software

You can configure and manage the HotPort mesh as well as change individual node settings using HotView software. HotView software runs on a separate workstation that can be connected directly to the mesh or remotely via a network gateway.

Building a Firetide Mesh Network

Installing, expanding, or even relocating a Firetide mesh network is easy and fast. Simply place a HotPort node wherever y ou need an Ethernet port and connect it to an AC power source. As long as the HotPort node is within operating range of other HotPort nodes, you can connect and operate your network devices immediately. Although network planning is often not required for basic installations, adhering to a few simple guidelines will help ensure that your network performs reliably and gives you the full benefits and performance that mesh networking has to offer.

Unpacking

Your HotPort 3103 package contains the following items :

- HotPort 3103 Indoor Wireless Mesh Node
- Two Antennas
- AC Power Adapter with country-specific AC cord
- User Manual
- Warranty Card
- End User License Agreement
- Getting Started Guide

Easy Installation

Note: The HotPoint 3103 is an indoor only product. Any modi fication to the hardware or software or enhancement of this product for use outdoors is strictly prohibited and will void your warranty

Attach Antennas
Attach both antennas to connectors on rear panel. Use only the antennas provided with the unit. Use of other antennas not authorized by Firetide is prohibited.

Connect Ethernet devices
Plug up to four Ethernet devices into the rear ports on the HotPort 3103.

Add Power
Connect the HotPort unit to AC power source. Also, start up all connected Ethernet devices.

All of the LEDs on the HotPort front panel will illuminate during startup before changing to their normal state. Refer to page 9 for a description of the LED functions.

Understanding HotPort Antenna Patterns
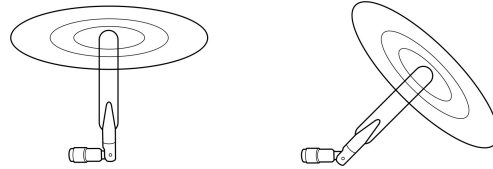
HotPort 3103 Indoor mesh nodes have omni-directional antennas that radiate in a broad circular pattern perpendicular to the antenna shaft. For optimum coverage, orient the antennas in your mesh network vertically (perpendicular to the ground). Since the coverage of the RF spectrum is differe nt in the various spectrum bands, orientation of the antennas will enhance your coverage area. The antennas support the following frequency bands: 5.15-5.25 GHz; 5. 25-5.35 GHz; 5.725-5.825 GHz; 2.41-2.484 GHz (OFDM and DSSS modes).
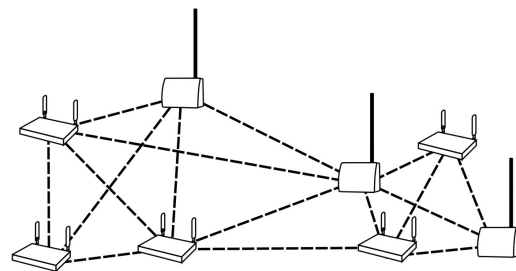
Line -of-Sight Improves Operating Distance

Although HotPort wireless mesh nodes can communicate between walls and buildings, you can increase the working distance of your Indoor mesh node by avoiding obstacles made of dense materials, such as concrete and metal. Positioning the HotPort 3103 units so the space between them provides an unobstructed, line-o f-sight view, will greatly increase the effective range and reliability of transmission. They should be located high enough above obstacles to prevent interference.

Creating a Mesh Topology for Maximum Performance and Reliability

Unlike simple point-to-point bridging, Firetide provides true mesh networking with flexible and redundant paths. This improves overall performance, allows the network to be extended over long distances, and reduces the chance of single point failures. To fully benefit from the self-forming and self-healing properties of the mesh, place each HotPort node within direct range of two or more HotPort nodes. It is not recommended to install your HotPort network in a linear, point-to-point configuration. The Firetide network protocol is optimized for two and three dimensional topologies, including vertical connections between multiple floors in a building.
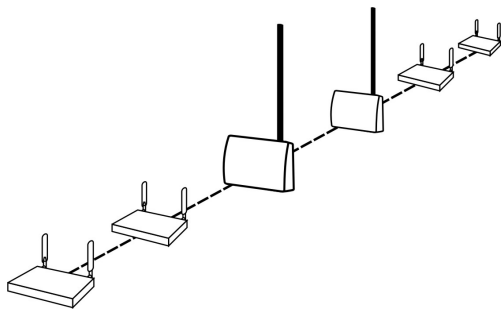
Linear or Point-to-Point Topology (incorrect)   **Multipoint to multipoint Mesh Topolgy (correct)**

Linear vs. Mesh Topology

HotView Mesh Management™ Software

The HotView mesh management software provides a convenient, browser-based interface for monitoring all of the HotPort nodes on your mesh network. The HotView software is a Java-based application compatible with most Internet browsers and platforms, including Windows, Macintosh, and Linux.

Although the HotView Mesh management software is not required for installing or operating your network, it provides an easy way to monitor and manage the mesh and your HotPort nodes. Because wireless connections between HotPort nodes are invisible, this software lets you "see" which units are within direct range of each other. The HotView software also provides additional security and optional configuration features. Registered users can download the HotView software and documentation from the Firetide web site (www.firetide.com/downloads).

Downloading and Installation Instructions

The HotView mesh management software and User Guide are provided on a CD included with your HotPort 3103. You can also download the software from the Firetide website.

1. Go to the Firetide web site: www.firetide.com/downloads

2. Download the appropriate version of the software and documentation. You will be asked to log in or to register before being permitted to download.

3. Install the software on your workstation as directed in the HotView User Guide.

Connecting the HotView Workstation to the Mesh

The recommended way to connect to the mesh is shown in the diagram below.
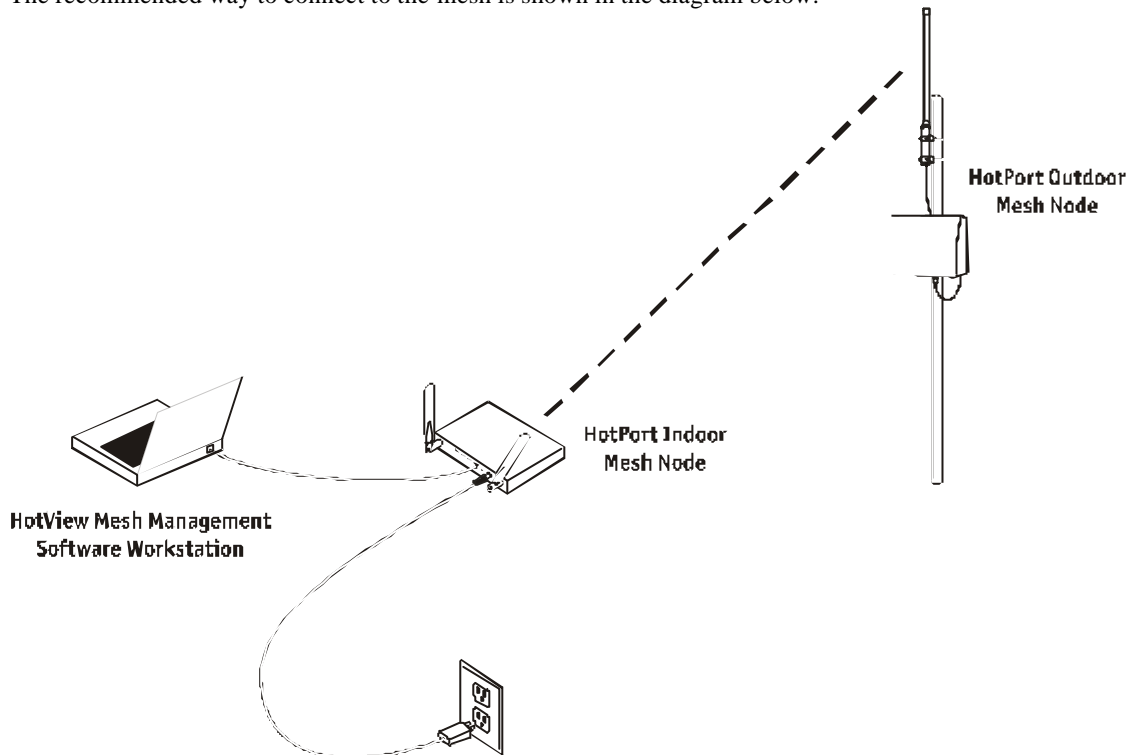
Connecting a Workstation Running HotView Mesh Management Software

1. Be sure all of your HotPort nodes are installed and powered.

2. Connect your workstation's network adapter directly to any one of the HotPort nodes using an Ethernet cable.

3. Turn on your workstation and configure your TCP/IP settings to:
   1. IP address: 192.168.0.200
   2. Subnet mask: 255.255.255.0
   3. Gateway is not used

4. Refer to your operating system documentation to configure the static address defined in step 3.

Getting Started with HotView Mesh Management Software

For complete information on HotView mesh management features and more detailed instructions on its operation, download the latest HotView User Guide, available at www.firetide.com.

Steps 1 and 2 below describe how to launch the HotView software under Windows. Your operating system may have a different procedure for launching applications. If necessary, refer to your operating system's documentation for instructions on how to launch applications.

1. From the Windows Desktop, click on the Start button.

2. Click on All Programs and select HotView software. The Login screen will appear.

3. Enter the following information to log into the mesh network:

   • Username: admin
   • Password: firetide
   • Mesh IP address: 192.168.0.1

4. Click on Login.

5. Wait for your computer to connect to the mesh. This may take a few seconds to several minutes, depending on how many nodes are in the mesh. You should see a screen with a list of all of the HotPort units on the mesh.

Configuring the TX mode and Channel Selection

Using the HotView software the mesh administrator is provided a selection of operating modes (e.g., 2.4 GHz DSSS, 2.4 GHZ OFDM, 5.2 GHz OFDM, 5.3 GHz OFDM, 5.8 GHz OFDM) along with a selection of channels for that mode. In this way the administrator is only able to operate the mesh in full compliance with approved certified frequencies.

HotPort 3103 LED Functions

Each HotPort node has LEDs on the front. These LEDs provide status information about the node and network connections.

LED	Startup LED Activity	LED Function (after startup is complete)
Power	During startup, this LED remains continuously on.	After startup, this LED remains continuously on to indicate that HotPort node is receiving power.
Status	During startup, this LED will remains continuously on to indicate a normal boot process.	After startup this LED will indicate the RF connection as follows: Slow flash = 2.4 GHz DSSS Fast flash = 2.4 GHz OFDM Continuously on = 5 GHz OFDM LED off = this node is disabled.
Fault	During startup, this LED will illuminate as a YELLOW light.	After start up, this LED color will change to GREEN to indicate normal conditions. If the LED remains YELLOW or changes to YELLOW, this indicates a fault condition.
Mesh	During startup, this LED will turn on.	After startup this LED will illuminate when the HotPort node meshes with other HotPort nodes. If this LED is off, the node is not connected to any other nodes.
Ethernet port LEDs	During startup, these four LEDs will turn on.	These four LEDs are numbered to correspond to the four rear panel ports. They will indicate the port status as follow: Continuously on=link but no activity Flashing = link and activity LED Off = no link

Restoring Default Settings

You can restore your HotPort node to its factory default settings. To do this, press the Reset button on the back of the HotPort node.

HotPort Factory Default Settings

AES encryption: Disabled
WEP encryption: Disabled
Mesh IP address: 192.168.0.1
Ethernet ports: All ports enabled
HotView username: admin
HotView password: firetide
802.11 operation: 5.3 GHz OFDM, Radio channel = 60, Power = 17 dBm, SSID = HOTPORT_MESH

Appendix A- Contacting Firetide

As a Firetide customer, you are entitled to receive free support services on our web site and from your authorized Firetide dealer.

Register with Us Now to Access our Support Web Site
Registering as a customer on our web site entitles you to free information and materials to help you get the most from your Firetide mesh network. Visit **http://www.firetide.com/support** for information on becoming a registered customer and for access to our support materials.

Dealer Provided Technical Support and Warranty Services
If you need additional technical assistance that is not available on our web site, please contact your Firetide dealer directly. All authorized Firetide dealers are trained and authorized to provide technical support and warranty services for our products and have qualified technical staff available to help you build and maintain your Firetide mesh network.

Product Returns
Please contact your Firetide dealer for instructions on returning defective or damaged products for repair or replacement. Do not return products to Firetide, Inc.

Sales Assistance
If you need additional HotPort wireless mesh nodes or accessories, please contact your Firetide dealer directly. If you do not know your dealer' s name, simply email sales@firetide.com and we will send you the dealer information you need. To help us provide the best service possible, be sure to include your phone number, address, and the serial numbers of the HotPort nodes at your location.

Appendix B- Specifications

Model
HotPort 3103

Protocol
Firetide Mesh Routing Protocol (FMRP)

Encryption
- 40 bit, 128 bit WEP keys
- 128 bit, 256 bit AES keys

Wireless interface
2.4 GHz spectrum
- 2.4–2.497 GHz
  (actual range available for use is subject to country-specific regulatory approvals)
- Radio TX Power: Maximum 29mW
- Ad Hoc Mode support

5 GHz spectrum
- 5.15 – 5.25 GHz
- 5.25 – 5.35 GHz
- 5.75 – 5.825 GHz
  (actual range available for use is subject to country-specific regulatory approvals)
- Radio TX Power: Maximum 40mW
- Dynamic Frequency Selection (DFS)
- Transmit Power Control (TPC)
- Ad Hoc Mode support

Network ports
- Four 10/100 Base-TX (RJ-45)
- IEEE 802.3, 802.3u compliant
- CSMA/CD 10/100 autosense

Enclosure
- Two antenna connectors (SMA reverse polarity)
- One power connector
- Four Ethernet data connectors (RJ-45)

- System indicator LEDs (power, status, mesh, fault).
- Ethernet indicator LEDs (link status, activity)
- Security slot for physical locking device
- Reset button (recessed)
- Weight: 2.1 lbs (.95 Kg) without external transformer
- Dimensions: 10" x 6" x 1" (25.4 cm x 15.2 cm x 2.5 cm)

Antennas
- Two detachable, omni directional, vertical polarization antennas
  - Spectrum: 2.4 GHz and 5 GHz
  - Connectors: SMA reverse polarity
  - Length: 6.25 in. (15.5 cm)
  - Range: up to 0.2 Miles (300 Meters)
  - Gain: up to 6 dBi

Power
- 5 VDC input
- 100-240 VAC, 50/60 Hz (external transformer)
- 13 W power consumption

Regulatory Agency Certifications
See Appendix C and D for countries of operation and regulatory agency information

Environmental specifications
- Operating temperature: 0° C to $+50^o$ C
- Storage temperature: -20° C to $+70^o$ C
- Humidity (non-condensing) 10% to 90%
- Storage Humidity (non-condensing): 10% to 90%

Warranty
One year limited warranty (see warranty card for details)

Appendix C – Countries of Operation

USA
- FCC Part 15/ClassB,15.107, 15.109, 15.407, 15.205, 15.209, 15.247, OET-65C
- Approved to allow operation in channels 1 through 11 on the 2.4-2.462 GHz band in DSSS and OFDM modes.
- Approved to allow operation on the 5.15-5.25 GH z, 5.25-5.35 GHz, and 5.75-5.825 GHz bansd in OFDM mode.

Canada
- RSP-100, RSS-210, RSS-139-1, RSS-102, IECS-003
- Approved to allow operation in channels 1 through 11 on the 2.4-2.462 GHz band in DSSS and OFDM modes.
- Approved to allow operation on the 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.75-5.825 GHz bands in OFDM mode.
- Industry Canada (IC) approved

Japan
- VCCI Class B, RCR STD-33, ARIB STD-T66, ARIB STD-T71
- Approved to allow operation in channels 1 through 14 on the 2.4-2.484 GHz band in DSSS mode and channels 1-12 on the 2.4-2.484 GHz band in OFDM mode.
- Approved to allow operation on the 5.15-5.25 GHz band in OFDM mode.
- TELEC approved

Korea
- RRL/MIC Notice 2003-13, Jan 15, 2003
- Approved to allow operation in channels 1 through 11 on the 2.4-2.483 GHz band in DSSS and OFDM modes.
- Approved to allow operation on the 5.725-5.825 GHz band in OFDM mode.
- MIC approved

Appendix D – Regulatory Notices

FCC Class B Notice
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note
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/television technician for help.

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.

FCC Radiation Exposure Statement
The antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter. OEM Integrators, end-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.