

HotPort

Firetide Installation Guide

HotPort 5020-M MeshNode



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About this document

This section lists the audience, purpose, summary of information, and conventions used in this document. It also includes how to contact customer service.

Audience

This document is intended for certified professionals who install Firetide wireless solutions.

Purpose

This document has the information and procedures necessary to install and do basic configuration and tests with Firetide® HotPort® 5020-M mesh node.

Conventions

Certain information has special meaning for the reader. This information appears with an icon that indicates a particular condition, such as a warning or caution, or a label, such as “Note” or “Best Practice”.



Electrical hazards are those environments where the danger of electrocution is probable. This image appears before each electrical hazard statement.



Warnings contain safety information that you must obey. If you do not obey the instruction in a warning, the result might include serious injury or death. This image appears before each warning statement.



Cautions contain information that you should obey to avoid minor injury, inconvenience, and damage to equipment. This image appears before each caution statement.

Notes contain optional advice and information particular to a special case or application.

Best practices contain specific recommendations based on industry-standard expectations.

Document feedback

If you find an error or content missing from this document, we want to hear about it. You can send your feedback about any of our documents to techpubs@firetide.com.

Contacting customer support

If you need support, depending on the problem, you might be asked for this information:

- Description of the problem
- Computer with HotView Pro and an installed management license
- Channel and frequency plans
- Recent spectrum analysis
- Device topology in Google Earth (KMZ file)
- Network map or topology plan with the names and device information

You must also have administrator access to the mesh to be able to receive technical support.

The next table lists the contact information for customer support.

Worldwide customer support	Days/Hours	Contact
Americas	Monday to Friday 7:00 am to 5:30 pm PST (Pacific standard time)	http://www.firetide.com/requestsupport 1 (877) FIRETIDE, extension 2 +1 (408) 399-7771, extension 2 +1 (408) 355-7271
Africa Asia Australia Europe	Monday to Friday 8:00 am to 5:30 pm IST (India standard time)	http://www.firetide.com/requestsupport +91 8040215111 Fax +1(408) 317-2257

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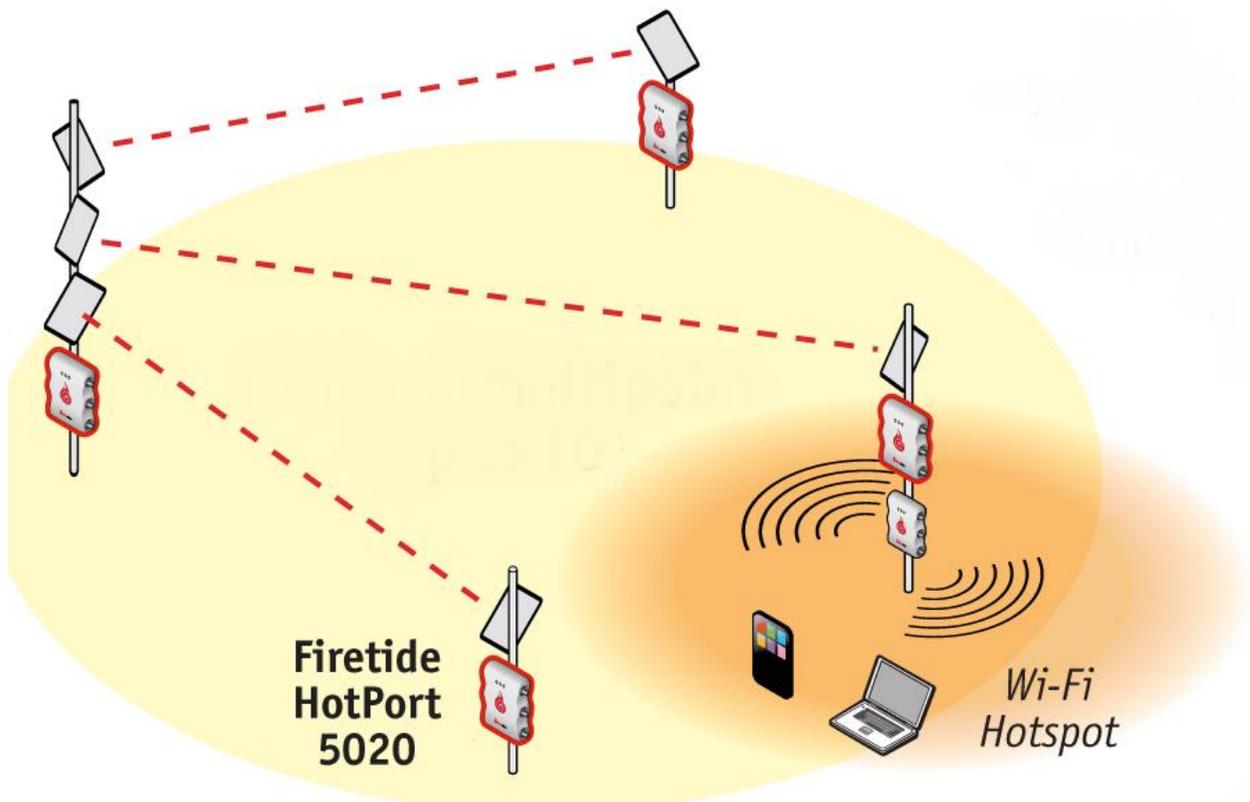
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HotPort 5020-M node

HotPort 5020-M node is a cost-effective infrastructure mesh node that has two radios to deliver up to 25 Mbps of UDP data.

HotPort 5020-M supports:

- Point-to-point
- Point-to-multipoint among HotPort 5020-E and Mand HotPort 7010/7020 nodes
- Linear and mesh applications



Supported countries

HotPort 5020-M nodes can be used in these countries: US, Australia, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, and Vietnam.

Note: If you try to set the country code to a country other than a supported country, the setting is not saved.

Before you permanently install

Before you install a HotPort 5020-M mesh node in a permanent location, you need to make sure that you have the correct and operational components.

Preparing what you need to install

To make sure you have everything you need to set up the mesh node:

1. Open the box.



2. Remove the contents.
3. Check the contents for damage.
4. Check the contents against the box contents list. See “Box contents for a HotPort 5020-M mesh node” on page 4.
If a part is missing or damaged, call your Firetide reseller.
5. If the contents are good and correct, keep the box for future use.

Box contents for a HotPort 5020-M mesh node

The HotPort 5020-M mesh node box contains these items:

- One HotPort mesh node with an attached mount plate and bracket
- Two 5 dBi omni-directional staging antennas



Caution. Do not use staging antennas outdoors. The staging antennas are rated for indoor use only and are recommended for pre-configuration purposes only. If you use the staging antennas outdoors, they can be damaged. Damage from incorrect deployment is not covered by the product warranty.

- Two RP-SMA to type-N adapters
- Mount kit
 - U-bolts, M6x1.0-80mm, with flat washers, split washers, nuts
 - Claw-tooth pole grippers
 - M6x1.0-40mm hex bolt
 - M6x1.0-20mm hex bolt
 - Hex-head socket wrench
- One DC power connector with waterproof backshell (field installable)
- One 802.3at Power over Ethernet (PoE) injector
- One AC power cable (USA type)

Note. Country-specific power cords are available for purchase.

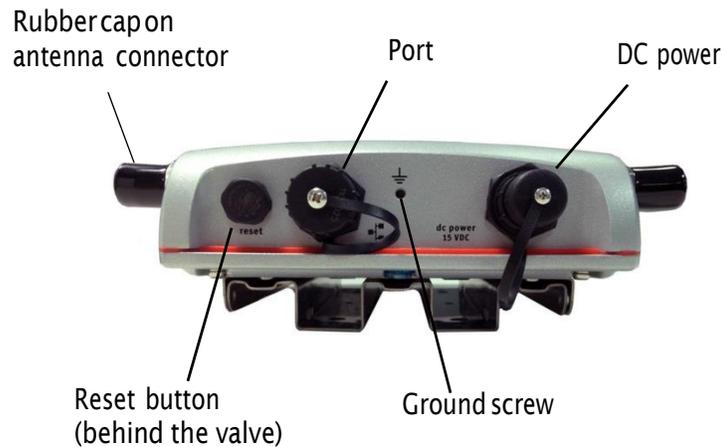
- One weatherized RJ-45 connector with waterproof backshell (field installable)
- One Cat5e cable
- Quick start sheet
- Warranty card

Parts of a HotPort 5020-M mesh node

The next picture shows the HotPort 5020-M mesh node. The LEDs are visible at the top of the node when it is oriented correctly for installation on a pole. Radio 1 is on the left side and Radio 2 is on the right side of the mesh node.



The next picture shows the connectors on the bottom panel of a HotPort 5020-M mesh node.



Weatherproof caps protect the connectors on the bottom panel. Rubber caps cover the antenna connectors.



Caution! Do not use the rubber caps outdoors. You must use 50 ohm terminators or weatherproof antenna connections on all antenna connectors. Damage from incorrect deployment is not covered by the product warranty.

Before you permanently install

The rubber caps are not weatherproof, and all unused antenna connectors must be terminated. Before you install the device, you must remove the rubber caps, attach a 50 Ohm terminator (not included) to each unused antenna terminator and correctly weatherize from the cable to the device chassis.

For information about cables and accessories approved for use with Firetide devices, refer to the *Firetide Antenna Guide*.

Ground screw

HotPort 5020-M mesh nodes must be connected to earth ground. Braided copper strap is the preferred material. The ground screw is on the bottom panel between the Ethernet port and the DC power connector.

LEDs

The panel that has the Firetide logo has these LEDs:

- Radio 1 and Radio 2, which indicate radio status

LED behavior	Meaning
Off	Radio is not active.
Steady green color	Radio is working correctly.

- Power, which is a steady green color when the device receives power. The LED is dark when the node does not receive power. The HotPort 5020-M device requires 15V.



Caution! Do not use port 2 or port 3 of a HotPort 7020 mesh node to power a HotPort 5020 node. A HotPort 5020 node needs PoE+ or 802.3at, and the ports of a HotPort 7020 mesh node are PoE 802.3af compliant only.



Caution! You cannot use a HotPort 7020 power source (12V) to power to a HotPort 5020-M mesh node, which requires 15V.

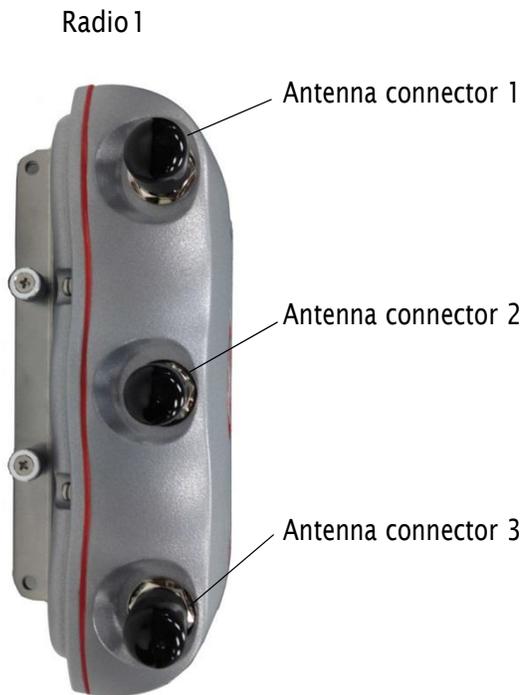
Reset button and pressure relief valve

The reset button is on the bottom panel and is covered by a weatherproof plastic pressure relief valve.

Antenna connectors

The next picture shows the Radio 1 side panel with its three antenna connectors, which are numbered top to bottom, 1, 2, and 3. The other side has three connectors for the second radio.

Note. For antenna connectors that you do not intend to use, you need to install 50 Ohm terminators (not included).



Test before you install

You should set up and test the mesh nodes indoors on a table before you install them in permanent locations.

The benefits of tests before you install include:

- Make sure all of the equipment works before you install it
- Consistent settings across mesh nodes to reduce software configuration errors in the field
- Test bandwidth and make sure that the radios work

Types of tests to do:

- Power on each device
- Test the reset button
- Attach all antennas and make sure you can see all devices in HotView Pro software
- Data and other application throughput tests

Before you permanently install

- Learn to position the antennas with the radio alignment tool
- Train installation personnel

Required items that are not included

You must purchase and install a 50 ohm terminator on each unused antenna connector of active radios. This protects the transmitter. A rubber, metal, or plastic cap is not a replacement for a terminator.

You need an administrator computer that has HotView Pro network management software and appropriate licenses. Before you set up the network, you must purchase all necessary licenses from your Firetide distributor.

Certification requirement

People who install and manage networks that contain Firetide products must complete the Firetide certification program.

Doing the tests

For efficiency, you want to configure six to eight mesh nodes at one time.

To do tests and capture data with HotView Pro software:

1. Put the mesh nodes on a table.
2. Attach the power cable to each mesh node.



Caution! You must use the power supply that comes with the mesh node. If you use a different power supply, you void the product warranty.



Caution. Do not use port 2 or port 3 of a HotPort 7020 mesh node to power a HotPort 5020 node. A HotPort 5020 node needs PoE+ or 802.3at, and the ports of a HotPort 7020 mesh node are PoE 802.3af compliant only.

3. Attach the staging antennas to each mesh node:
 - For OFDM mode, attach one staging antenna to one radio.
 - Dual radio MIMO mode, attach more than one staging antenna to each radio.
 - Panel antenna, attach the antenna cables in the correct order to keep the polarization correct.
 - For single radio MIMO, attach multiple antennas to radio 1.

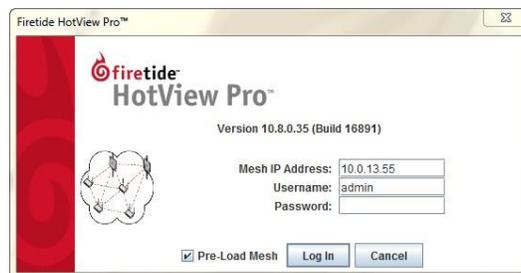
Note: For specific procedures to attach antennas, see the *Firetide Best Practices Guide*.

4. Change the IP address of the administrator computer to an IP address on the same subnet as the default IP address of the mesh node (192.168.224.150).

5. Single-click to start the Quick Launch feature of HotView Pro, which opens the server and client software at the same time.



6. Login with the correct user name and password. The default user name is hv_admin; and the default password is firetide.
The system initializes.
7. Go to **Mesh>AddMesh**> login with the default user name and password.



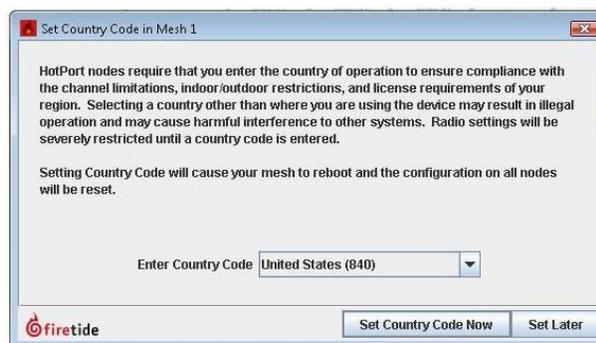
8. Make sure that all of the mesh nodes are visible in HotView Pro.
If you cannot see any or all of the mesh nodes, see the troubleshooting information in the *HotView Pro Product Configuration Guide*.
9. Set the country code for each node to change the device from a low-power, low range setting to a correct full-power operational mode.



Caution: Click **Set Later** if you put the nodes close together for staging.



Caution: Make sure you configure the device for the correct country. If you do not configure the country correctly, the device might operate in a manner that is not legal or create problems with other wireless devices.



Before you permanently install

- a. Select the country of operation from the drop-down list.
- b. Click **Set Country Code Now**.

The node reboots. When you set the country code the system refreshes the mesh configuration and gives all visible nodes the same country code. For a few minutes the mesh nodes might appear and disappear from the graphic mesh record in HotView Pro.

- c. Wait for three minutes for the system to finish the refresh.
- d. Login with the correct user name and password. The default user name is hv_admin; and the default password is firetide.

The system initializes.

- e. Go to **Mesh > Add Mesh** > login with the default user name and password.
10. To configure mesh-wide settings, go to **Mesh > Configure Mesh...**
- Set the operational mode as needed.
 - Set the extended range feature if the distance between the mesh nodes is more than 0.8 km (0.5 mile). To determine the longest link, you measure the distance between the mesh nodes on a map, such as Google Earth.
 - Set the multi-hop optimization feature if there might be hidden node interference.

Note: For information about specific features and the configuration process, see the *HotView Pro Product Reference Guide*.

11. Right-click a specific mesh node to configure mesh node-specific settings if needed.

Check network throughput from end to end and for each link with wired clients and then with several wireless clients.

Note: If you are not able to get the mesh to send and receive data, see “Troubleshooting” on page 33.

12. If this node will have a long RF path or if you use narrow beamwidth antennas in the installation, set the mesh RSSI threshold to be -93 dBm.

Note: This RSSI change prevents mesh instability because of flapping links.

13. After you finish the tests, remove the staging antennas.



Caution! The staging antennas are not rated for outdoor use.

You are now ready to permanently install the mesh nodes.

HotPort 5020-M node installation

After you do tests and configure the nodes, then you are ready to install the nodes in a permanent outdoor location.

The work process is:

1. Collect all required tools.
2. Do a site survey to make sure that no new safety hazards are present.
3. Prepare safety equipment and confirm earth ground procedures.
4. Attach the nodes and antennas to poles that attach to a mast, tower, or roof.
5. Install the node and antennas assembly and other devices, such as cameras or access points to a permanent location.

Tools required

For HotPort 5020-M mesh node, you need to use:

- #2 Phillips screwdriver
- Small adjustable wrench
- Wire cutters to cut tie wraps around cables
- Cable ties
- Electrical tape and butyl mastic or silicone tape to weatherproof the connectors

Other equipment you might need includes:

- Ladder
- Lift truck
- Safety equipment

Doing a site survey

Note: For more detailed procedures for an initial site survey, see the *Firetide Best Practices*.

Before you install any equipment outside, check the entire site:

- To identify possible hazards that might be new since the complete site survey
- To identify the presence of objects that might cause interference for the radios



Warning! Certified professionals must install Firetide products. If you do not install this equipment correctly, the equipment can be damaged, or you can be injured or die.



Electrical shock hazard warning! Make a plan to keep the installation personnel safe.



Warning! Do not install Firetide products where possible contact with power lines can be made. Antennas, poles, towers, guy wires, or cables can touch power lines. People can be injured or killed if they touch or hold any part of the equipment when it contacts electric lines. Make sure that equipment and personnel cannot directly or indirectly contact power lines.



Warning! Do not open the cover:

- Dangerous voltages inside.
- No serviceable parts inside.
- Refer to qualified service personnel.

Safe installation practices

Best practice: Install HotPort 5020-M mesh nodes on poles that are far enough away from power lines.

The horizontal distance from a tower, pole or antenna to the nearest power line should be at least twice the total length of the pole/antenna combination. This distance ensures that the pole will not contact a power line if it falls during or after installation.

- Select equipment locations that allow safe and simple installation.
- Do not work alone.
- Use approved non-conducting ladders, shoes, and other safety equipment. Make sure all equipment is in good condition.
- If a tower or pole begins falling, do not catch it.
- If a wire or pole touches a power line, do not touch it.
- Do not install antennas or towers on windy days.
- Make sure all towers and poles are correctly grounded. Make sure all electrical cables connected to antennas have lightning arrestors.

A connection to earth ground and a lightning arrestor can prevent fire damage or personal injury in case of lightning, static build-up, or short circuit within the equipment connected to the antenna.

- Use 10 AWG ground wire and corrosion-resistant connectors to connect the base of the antenna pole or tower directly to the building protective ground or to one or more approved grounding rods.
- Refer to the National Electrical Code for grounding information.

Preparing a node for outdoor installation

It is easier to install all devices to one object, such as a pole, and then attach the pole assembly to the roof. If you attach the devices to a pole attached to the roof top, factors, such as weather, can make the installation more difficult and dangerous.



Warning! Only use antennas that are rated for outdoor applications.



Warning! Failure to obey these instructions might result in severe personal injury including electrical shock or permanent damage to equipment.



Warning! Make sure that all safety equipment is in good condition. Do not use broken or damaged tools or equipment. Always use safe work practices and obey all local and national guidance for earth ground requirements and electricity.

Note: Collect all tools before you install nodes.

To prepare a node for outdoor installation:

1. Make sure that you use antennas correct for the application.

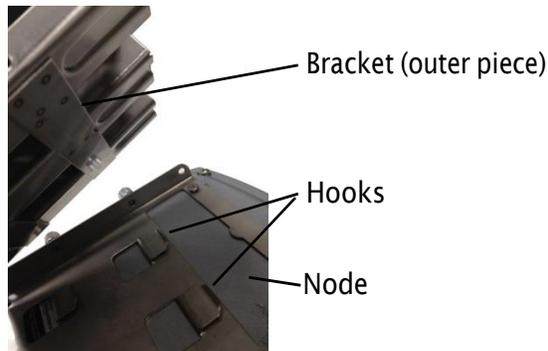
Note: Install the antenna and any other wireless devices higher than the HotPort node.

2. Remove the mount bracket from the node.
 - a. Use the Phillips screwdriver to loosen the four captive screws (two on each side).



Captive screws

- b. Remove the bracket from the hooks on the node.



- c. Put the node in a safe place while you attach the bracket to a pole or wall.
3. To a pole that you can install at a permanent outdoor site, attach these items:
 - Bracket for the node
 - Antenna bracket
 - (Optional) Other devices
4. Attach the antenna to the antenna bracket.
5. Attach the node to the bracket so that when it is in its permanent location the RJ-45 and power connectors are down, antenna connectors are on each side, and you can read the “Firetide” name.

The installation is correct if the device does not move side to side easily, the “Firetide” mark is oriented correctly, and the connectors are oriented to the ground.

Preparing earth ground



Warning. A HotPort node must be correctly connected to earth ground. Failure to do so can result in equipment damage, injury, or death.

The product warranty does not include damage from incorrect grounding. Obey all local building and electrical codes regarding antennas. If not available, refer to the National Electric Code (NEC).

Earth grounding guidelines include:

- If you attach a node and antenna to a tower or pole, attach the base of the tower pole to the building’s ground or to one or more approved grounding rods with 10 AWG ground wire and corrosion-resistant connectors.
- Connect the grounding cable to rain gutters only if the rain gutter is connected to earth ground.
- Ground rods are copper-plated and 1.8 to 2.4 meters (6 to 8 feet) long.
- Install all ground components in straight lines. If you must make a bend, do not make a sharp bend.
- Earth-to-ground should be less than or equal to 10 ohms.

- Some salt compounds are corrosive and can cause copper ground rods to corrode.

To prepare the soil for ground rods:

1. If the soil contains rocks or sand, insert the ground rods into the ground.
2. Pull out the ground rods.
3. Put in an approved ground enhancement material into the holes where the grounding rods go.
4. Put in the ground rods.

Grounding a HotPort node

The certified installer is responsible for the calculation of the correct gauge of the wire to be used to ground a mesh node.



Caution. If the structure to which the node is attached is not properly grounded, the node can be damaged by a power surge.

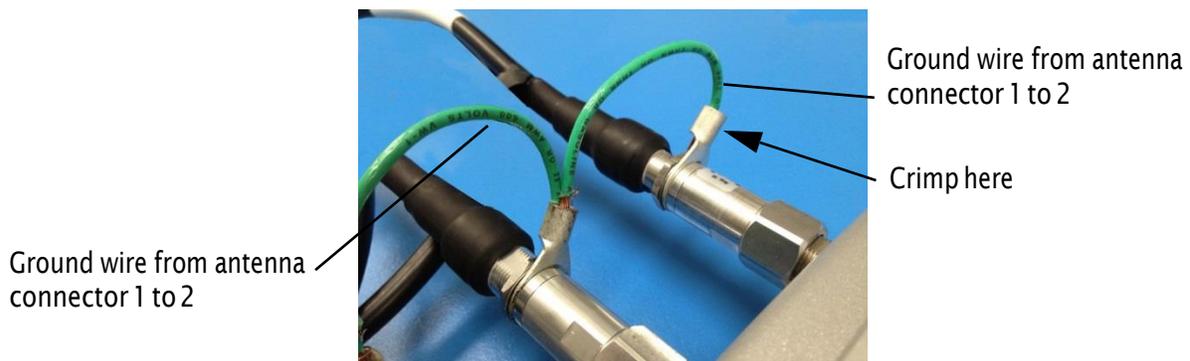
To ground a HotPort node:

1. Calculate the correct gauge of wire to be used in this procedure. Refer to the National Electrical Code for grounding information.

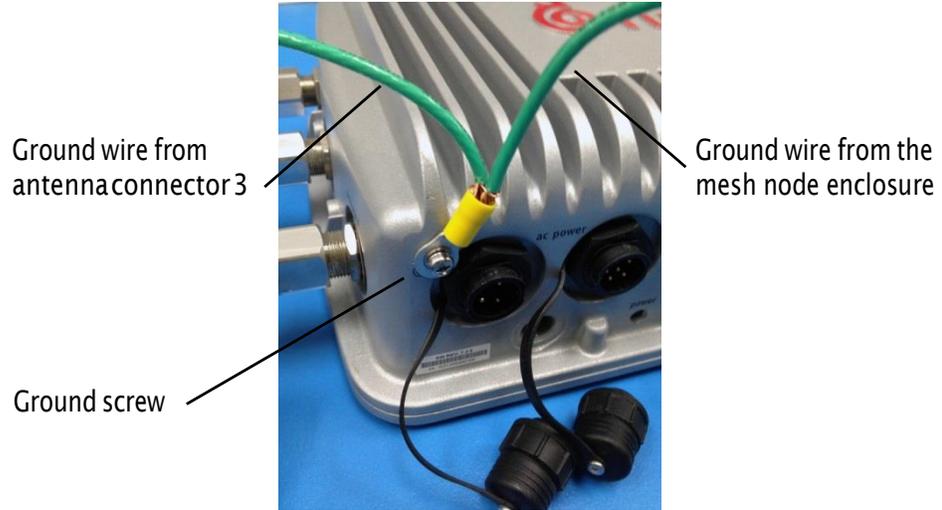


Caution. The certified installer is responsible for the correct calculation of the wire gauge and other accessories that might be required to ensure proper earth ground.

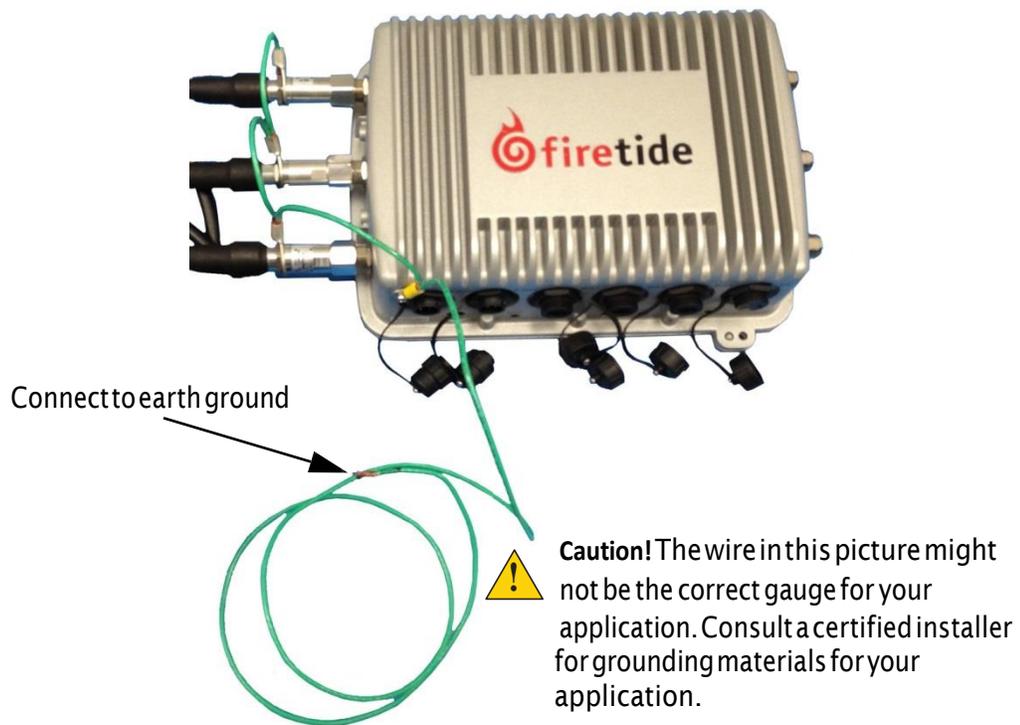
2. Terminate all antenna connectors. See the next picture.
 - a. Cut three correct lengths of the correct gauge of wire.
 - b. Attach the terminal lug and 50 Ohm antenna terminator to each of the three antenna connectors.
 - c. Attach the antenna cable.
 - d. Insert the wires to the antenna connectors as shown in the next picture.
 - e. Crimp the lug that holds with the wire for antenna connector 1.
 - f. Crimp the lug that holds the wire from antenna connectors 1 and 2.
 - g. Crimp the lug that holds the wire from antenna connectors 2 and 3.



- h. Repeat for second radio (if present).
3. Remove the ground screw from the bottom panel.
4. Insert the ground lug for the enclosure.
5. Tighten the ground screw to secure the ground lug to the node.



6. Crimp the lug that holds the wire from antenna connector 3 and the enclosure.



Now you are ready to weatherproof the cable connections.

Installing a node and antenna assembly

The process to install a node to a mast or tower is the same as a roof installation.

Note: Collect and take all tools and materials with you to the installation site.



Warning! Do not install this product on a windy or rainy day.

To install a node and antenna assembly in a permanent outdoor location:

1. Safely lift and carefully put the assembly on the roof.
2. Make sure that the ground wire is correctly terminated in a lug.



Caution. If you cannot correctly connect the mesh node to earth ground. Do not continue the installation.

3. Attach the pole to which the node and antenna are attached to a mast, tower, or roof.
 - Attach the cables that have integrated lightning arrestors, or attach the cables and install lightning arrestors.
 - Make drip loops with cables.
 - Install all grounding equipment. Loosen the ground screw, tighten the ground screw to secure the ground wire to the node., and then tighten the screw.
4. Make all connectors weatherproof. See the *Firetide Best Practices Guide*.



Caution. Do not use the 12 VDC power supply from a HotPort 7020 mesh node to power a HotPort 5020 node. The HotPort 5020 needs power from a PoE+ (802.3at compliant) or 15 VDC power supply.

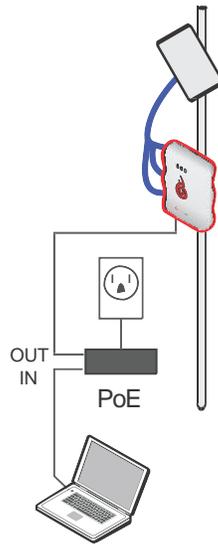


Caution. Do not use port 2 or port 3 of a HotPort 7020 mesh node to power a HotPort 5020 node. A HotPort 5020 node needs PoE+ or 802.3at, and the ports of a HotPort 7020 mesh node are PoE 802.3af compliant only.

5. (Optional) Attach the Power over Ethernet (PoE) assembly to power the device. See the next figure.



Caution. Do not connect to more than one power source at one time.



Note: Shown with a MIMO panel antenna connected to Radio 1.

- a. Put the correct end of the power cable into the PoE injector.
 - b. Put the plug end of the power cord into a grounded AC power source.
 - c. Attach an Ethernet cable from the wireless node to the IN port.
 - d. Attach an Ethernet cable from the out port to the Ethernet connector of the node.
6. Attach all other cables including the AC power cable if you do not use the PoE assembly.
 7. Attach 50 Ohm terminators on all unused antenna connectors.
 8. From the antenna cable to the device enclosure make each terminated antenna connector weatherproof. Use electrical tape and butyl mastic or silicone tape.
 9. Supply AC power to the mesh node.
If PoE is connected correctly, the LED becomes a steady green color.
After the nodes boot, they automatically make connections to each other. The nodes use the configuration that you created when you staged the network.
 10. Make the PoE connection weatherproof. See “Weatherproof procedures” on page 35.



Caution! The PoE injector is not for outdoor use. Do not expose the PoE injector to rain or direct sun.

11. Verify that the node works:
 - Ping the IP address
 - Use another mesh node

Opening the mount bracket

HotPort 5020-M nodes come with an assembled two-piece mount bracket. The next picture shows a radio-side of a node and the assembled bracket. Two captive screws are on each side of the device.



The next picture shows the bracket pieces and orientation to the node. The mount bracket has multiple holes and slots, so you can use bolts, straps, or other materials to attach the node to a surface.

Image A shows the side of the plate to which the chassis is attached. Image B shows the mount bracket on which you hang the node. This bracket attaches to a pole or other surface.



A



B

The mount kit includes extra nuts and bolts.

Required tools: #2 Phillips screwdriver

To open the mount bracket so you can attach the node to a wall or pole:

1. Use the Phillips screwdriver to loosen the four captive screws (two on each side).



2. Remove the mount bracket from the hooks on the node.
3. Put the HotPort 5020 mesh node in a safe place.
4. Attach the mount bracket to a pole or wall.

The next procedures list the steps to attach the bracket and node to different surfaces.

Attaching the node to a wall

Required materials:

- Mount bracket
- Four screws (included in the mount kit) or masonry anchors (not included in the mount kit)
- Node with one bracket piece with hooks

To attach a node to a wall:

1. Make sure you have enough space above the mount bracket so you can hang the mount plate hooks on the rails.
2. Use four screws or masonry anchors to attach the mount bracket securely to the wall. Put the screws or anchors in the two holes near the top and the two holes at the bottom of the bracket.
3. Hang the node by the plate hooks on the rail.

The installation is correct if the node does not easily move from side to side, and the connectors are oriented to the ground.

Note: You can add other straps or a sling to increase durability of the attachment to the wall.

Best practice: Use a spray to prevent corrosion on the bracket and mount hardware.

Attaching a node to a vertical pole

Required materials:

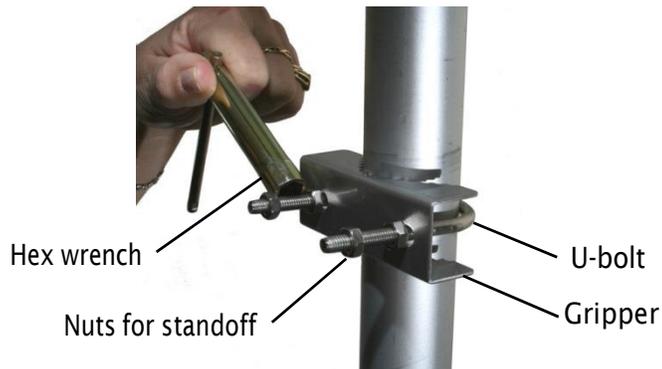
- Mount bracket
- Mount kit
- Node with one bracket piece with hooks

Recommended tool: hex wrench (included in mount kit) or small adjustable wrench

To attach the node to a vertical pole:

1. Put the two U-bolts through the holes in the gripper.
2. On each U-bolt, put a washer, a lock washer, and a nut.

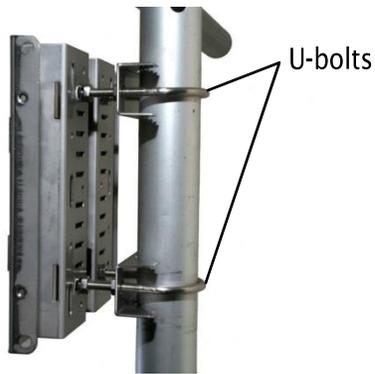
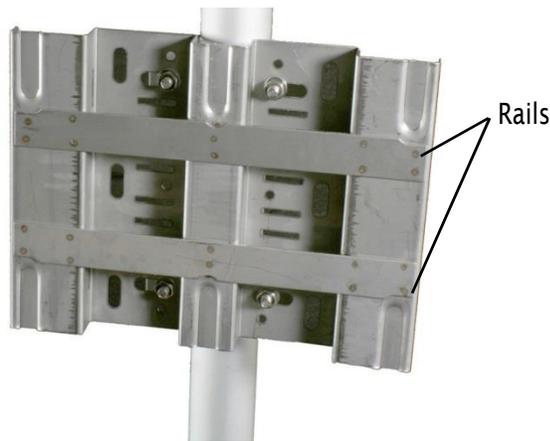
Note: A pole with a small diameter usually requires a second nut to hold the bracket away from the U-bolt.



3. Tighten the nuts by hand.
The U-bolt should extend 12 to 15 mm (0.5 to 0.6 inch) beyond the second nut.
4. Put on the second U-bolt and gripper. Use the bracket as a guide to correctly space the two U-bolts.
5. Tighten the nuts with the hex wrench.



6. Use lock washers and nuts to secure the bracket to the U-bolts.



7. Hang the node with the plate hooks over the rails of the mount bracket.



The installation is correct if the node does not easily move from side to side, and the connectors are oriented to the ground.

Note: If you need to, add other straps or a sling to increase durability of the attachment to the pole.

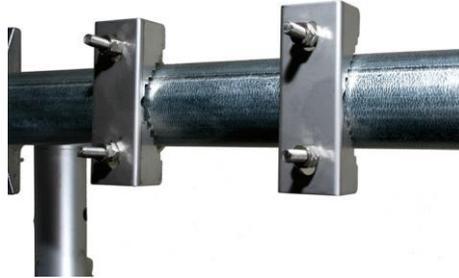
Best practice: Use a spray to prevent corrosion on the bracket and mount hardware.

Attaching a node to a horizontal pole

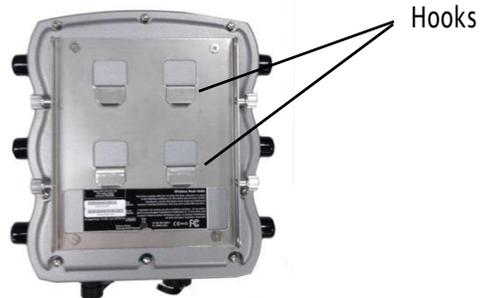
Recommended tool: hex wrench (included) or small adjustable wrench

To attach the node to a horizontal pole:

1. Attach the two grippers and U-bolts to the pole. Use the bracket to determine the correct space between the grippers.



2. Use lock washers and nuts to secure the bracket to the U-bolts.
3. Hang the node with the hooks over the rail of the bracket.



4. With the Phillips screwdriver tighten the four captive screws to secure the node to the bracket.

The installation is correct if the node does not easily move from side to side, and the connectors are oriented to the ground.

Note: If you need to, add other straps or a sling to increase durability of the attachment to the pole.

Best practice: Use a spray to prevent corrosion on the bracket and mount hardware.

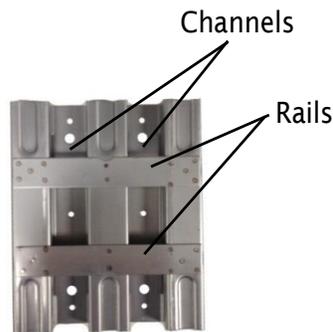
Attaching straps

You need to use straps when you use poles of 5 cm (2 inches) or more in diameter. You can also use straps for extra support and durability in corrosive environments.

Straps are not included in the box.

To attach the node to a pole with straps:

1. Position the universal mounting bracket against the pole.
2. Wrap two straps around the pole and thread them through the channels between the main piece of metal and the rails.



3. Secure the straps.
4. Hang the node with the hooks over the rail of the bracket.



5. With the Phillips screwdriver tighten the four captive screws to secure the enclosure to the bracket.

The installation is correct if the node does not easily move from side to side, and the connectors are oriented to the ground.

Note: If you need to, add other straps or a sling to increase durability of the attachment to the pole.

Best practice: Use a spray to prevent corrosion on the bracket and mount hardware.

Weatherizing the connectors

The HotPort 5020-M node comes with a field-installable weatherized Ethernet connector.

Correct weatherproofing includes:

- Sealing all antenna connectors and antenna connector terminators
- Installing the weatherized Ethernet connector
- Using a spray to prevent corrosion on the bracket and mount hardware

For weatherizing procedures, see “Weatherproof procedures” on page 35.

Power Consumption

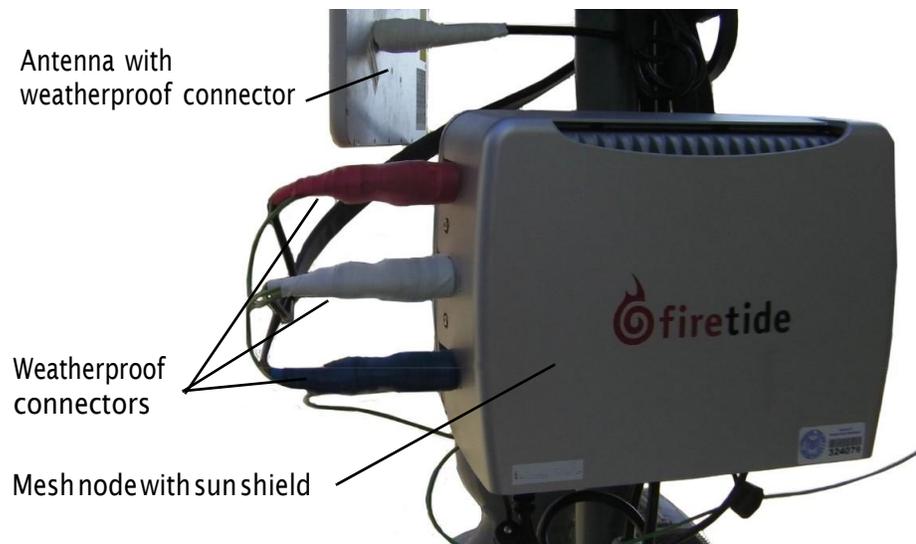
Power input from DC supply: 32 W (Typical), 37 W (Max)

Power input from PoE: 30 W (Typical), 34 W (Max)

Weatherproof procedures

Cable connections become loose over time due to vibration. Loose connections let moisture contact and erode the interface to a connector. To avoid performance problems due to moisture damage, Firetide recommends that you use butyl mastic and electrical tape or silicone tape to make all outdoor connections weatherproof.

The next picture shows correctly weatherproofed connectors on a HotPort 7020 mesh node with a sun shield.



Best practice: You can use colored tape for easy identification of the connectors from the mesh node to the antenna.

Butyl mastic is a synthetic rubber sealant that you can use to make a connection weatherproof. It is slightly sticky and stays flexible; it bonds to itself to make a good seal. Butyl mastic and a layer of electrical tape keeps the cable assembly clean, dry, and easy to change in the future.

Note: To make a strong watertight connection, keep a high level of tension in the butyl mastic when you stretch it over the cable and connector.

Tools and materials to weatherproof connections

To make a weatherproof connection you need the following tools and materials:

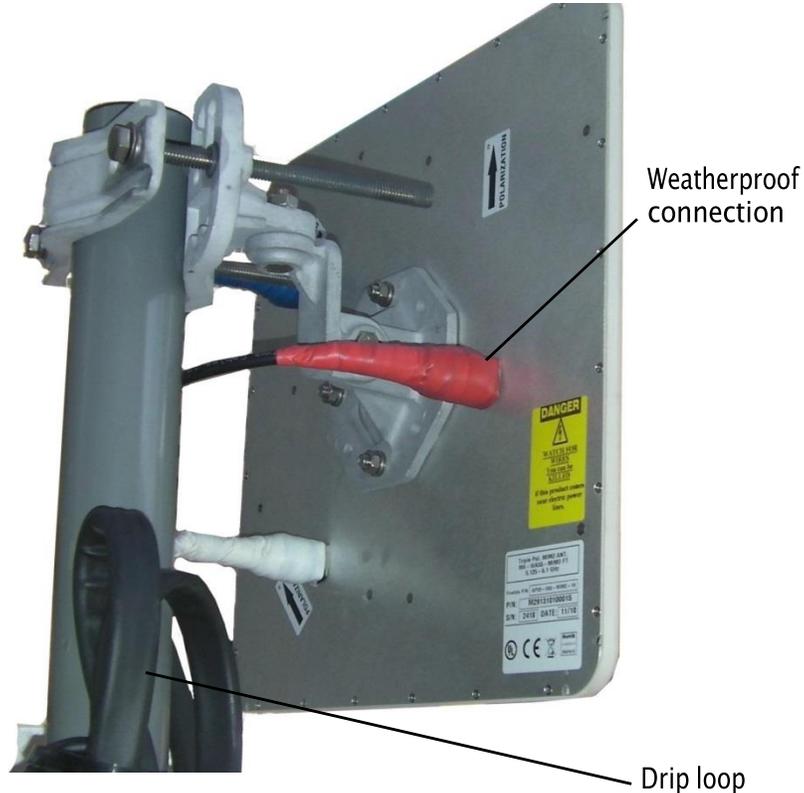
- Pliers
- Utility knife
- Vinyl electrical tape

Note: Vinyl electrical tape between the cable assembly and the mastic tape makes future changes easier than mastic tape put directly on the cable. Vinyl electrical tape as a cover over the mastic tape prevents the mastic from melting in hot weather.

- Rubber splicing or mastic tape (also known as self-amalgamating, self-sealing, self-fusing, non-vulcanized tape)
- Pencil or wooden dowel for small clearances
- Cleaning supplies (if necessary)
- Laptop running HotView software

Making a weatherproof antenna connection

You need to put tape around the antenna connectors to make them weatherproof. The next picture shows correct tape technique and a drip loop.



To make a weatherproof antenna connection:

1. Gather the tools and materials to do the procedure.



2. Ensure that the cable and connector is clean. Clean off oil, water, grease, and dirt before you continue.
3. Attach the cable connector to the antenna connector, and then use pliers to tighten the connection.
4. With a laptop running HotView Pro, make sure that the Firetide device works.
5. Wrap a layer of electrical tape (sticky side out) over the connector from the end to approximately 2.5 cm (1 inch) of cable. Overlap the tape by 40% with each turn.

Note: Wrap the electrical tape on a pencil or wooden dowel when you have little clearance.



Note: To make a strong watertight connection, keep a high level of tension in the butyl mastic when you stretch it over the cable and connector.

6. Tightly wrap a layer of mastic tape over the electrical tape. Make a 40% overlap on each turn. Start from the base of the unit to at least 2.5 cm (1 inch) of the cable.



7. Wrap a layer of electrical tape (smooth side out, sticky side in) over the mastic tape.



8. Wrap a second layer of electrical tape over the first layer of electrical tape. The antenna connector is ready for installation in an outdoor environment.

Making a weatherproof cable to node connection

You need to make weatherproof two connections:

- From the antenna cable to the lightning arrester
- From the lightning arrester to the node

To make a weatherproof cable to node connection:

1. Gather the tools and materials to do the procedure.



2. Remove the sun shield because you must put tape around all of the connector.
3. Ensure that the cable and connectors are clean. Clean off oil, water, grease, and dirt before you continue.



4. Wrap a layer of electrical tape (sticky side out) over the arrestor to node connector and wrap approximately 2.5 cm (1 inch) of cable. Overlap the tape by 40% with each turn.



5. Repeat for the antenna cable to arrestor connection.



Note: To make a strong watertight connection, keep a high level of tension in the butyl mastic when you stretch it over the cable and connector.

6. Tightly wrap a layer of mastic tape over the electrical tape. Make a 40% overlap on each turn. Start from the base of the unit to at least 2.5 cm (1 inch) of the cable.



7. Wrap a layer of electrical tape (smooth side out, sticky side in) over the mastic tape.



8. Wrap a second layer of electrical tape over the first layer of electrical tape. The lightning arrester connections are ready for installation in an outdoor environment.

Troubleshooting

If a HotPort node does not operate correctly, try these suggestions.

If you recorded the performance of your network when you set it up, you have a benchmark against which you can compare future performance. With benchmark information, you might be able to identify problem areas faster than if you try to diagnose a new problem.

DFS licenses

A DFS license is required to use DFS channels in the USA.

If you need to use DFS channels on this node, you need to do these things:

1. Take and pass the DFS certification training course.
2. Request DFS login credentials.
3. Apply DFS license to each node.

This product also requires a management license so that you can manage the device from HotView Pro network management software.

For more information about DFS management, refer to the *HotView Pro Reference Manual*.

Cannot see a node in HotView Pro

HotPort 5020 nodes are not supported in solutions that use mobility and mobile nodes. You cannot see these nodes in the HotView Pro FMC mobility view.

If you cannot see one or more nodes in HotView Pro, make sure that you set the extended range and multi-hop optimization feature as necessary:

- The extended range feature is for applications where nodes are 0.8 km (0.5 mile) or more apart. The extended range feature is a mesh-wide setting. This range should be the length of the longest individual link in the mesh.
- The multi-hop optimization feature decreases the possibility of packet collisions.

If you can see the head node but not other nodes, then you also might have a configuration problem.

Check the power and cables.

After multiple reboots a node is missing

If a node reboots five times within 10 minutes, the node loads the second saved firmware image.

- The previous firmware, if older or different from the firmware of the other nodes in a mesh network, might not be recognized by the mesh and HotView Pro will not detect the node.

To prevent this behavior, always upgrade the firmware image on each node two times, so both images are the same.

- When you upgrade an image, the system overwrites the current configuration. Any configuration changes you make to the new image are not copied to the backup image. Sometimes, when you revert to the backup image, a node might not immediately recover.
- Check for self-interference. Radios 1 and 2 in a node cannot connect to each other because HotView Pro does not let you configure Radios 1 and 2 within a node to use the same channel.

Self-interference on the same node is caused by antennas that are too close. In the case of directional antennas, we recommend at least 1 meter (3 feet) of physical separation.

Self-interference within a mesh happens when nodes operate on the same channel. You can reduce mesh interference with:

- Multi-hop optimization
- Strategic alignment of antennas
- More channel diversity in the mesh

Static routes

The use of static routes with an edge node is not recommended.

If you enable a static route on an edge node, and the neighbor radio to which the edge node connects becomes unusable, the node cannot recover the link with another neighbor.

Performance not as expected

If the network performance is not as expected:

- Identify reuse in your channel plan. If you have no channel reuse in the network, do a spectrum analysis.
- Check for self-interference. For example, the radios in a single device might connect to each other.
- Check the frequency plan and make sure that all the radios are configured correctly.
- Make sure that each node is connected to the correct devices and nodes.
- Determine the total throughput with an end to end test.

- Determine the throughput of each link with tests.
- Change the channel and modulation rates.
- Overly strong or poor RSSI can cause low performance. The RSSI calculator can help determine what RSSI values are correct for a particular link.
 - For MIMO applications, use -30 to -55.
 - For non-MIMO applications, use -30 to -60 or -70.

Resetting an outdoor node to factory default settings

Do a reset when you remove a device from the field or when communication with a device is lost.



Caution! When a HotPort 5020 edge node is reset, configuration information is erased.

Exception: The system does not erase the USA (840 and 842) country codes.

You can reset a HotPort 5020 edge node with the reset button. The reset button is behind the pressure relief valve on the bottom panel of the node.

For this procedure you need:

- Paper clip, stiff wire, or thin piece of plastic or wood, such as a skewer
- Computer with HotView Pro
- Ethernet cable
- Wrench or your fingers to turn the pressure valve

To reset a HotPort 5020 edge node:

1. Supply power to the node.
Wait until the status LED comes on. After one minute, the node is ready to be reset.
2. With a wrench or your fingers turn the pressure valve counter clockwise to remove it.
3. Put it in a safe place until you finish this procedure.
4. Put the node on its front panel.
5. Press and hold for 20 seconds the reset button with the paper clip or other tool.
When the Radio 1 LED blinks to indicate that the software is rebooting, you can stop pressing the reset button.
6. Wait one minute, and then log in with HotView Pro.
7. Configure the node or apply a previously saved configuration file.
8. Replace the pressure valve that covers the reset button.

Scheduling firmware upgrades and activation

By default, the system uses the configuration in cache for multiple upgrades.

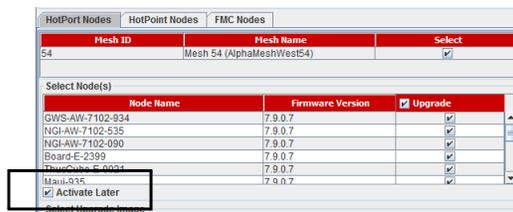
Best practice: Upgrade the image two times because you want the backup image and primary images to be the same. If a backup image is older than the primary image, the node might not support the same features.

You can:

- Upgrade and activate the firmware now.
- Upgrade the firmware now and activate it later.
- Upgrade the firmware on a specified day at a configured time and then activate it immediately or later.

By default, the scheduler activates the firmware immediately.

If you select the **Activate Later** check box, the scheduler copies the firmware image to the node but does not activate the firmware.

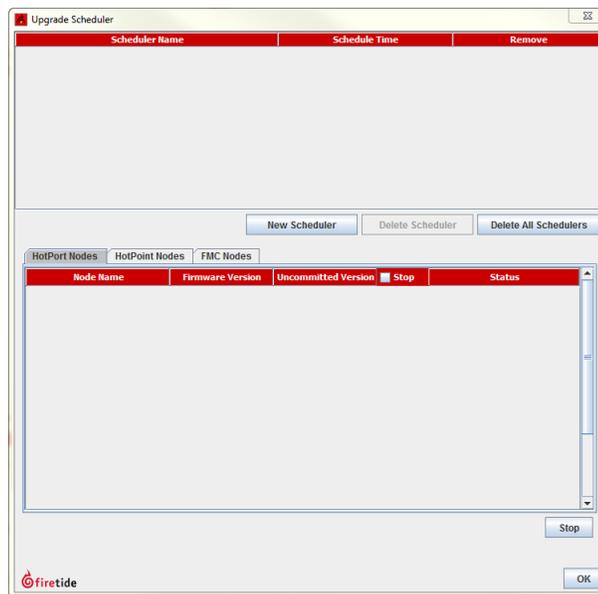


When you schedule an upgrade time (Scheduler Operation: Later), the HotView server, if it is running, starts the job at the scheduled time. If the HotView server is not running at the time scheduled, the scheduled jobs start immediately after you start the HotView server.

Best practice: If you choose to upgrade a production mesh, schedule the upgrade and activation for a convenient time. Firmware upgrades can consume considerable bandwidth. The mesh is not available for two minutes when you activate new firmware.

To schedule a firmware upgrade for a later date and for later activation:

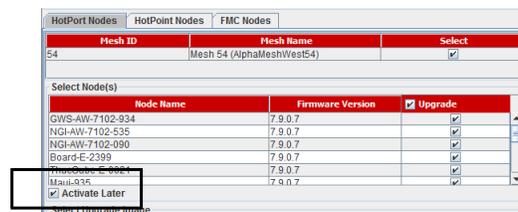
1. Go to **Network > Upgrade Firmware**
The upgrade scheduler appears.



2. Click **New Scheduler**.
 - a. Select Upgrade.
 - b. Select the time: Later. Use the calendar to a future date and time.
 - c. Click the tab to select a device type (HotPort Nodes for a mesh network, HotPoint Nodes for access points, or FMC for mobility controllers), and then select the mesh or device by ID or name.

Note: The system selects all nodes within a mesh for simultaneous upgrade because all of the nodes have to run the same firmware. If a node should not receive the upgrade image, you can remove the mark from the upgrade check box.

- d. Select **Activate Later**.



- e. Select the upgrade image.
3. Click **OK**.

The “upgrade complete” message means that the image file is on the node and is valid. You can then activate a few nodes at a time until all of the nodes are running the same firmware version.

Setting the country code on a new edge node

To set the country code on a new edge node:

1. Put the node on a table.
2. Attach the Ethernet cable from the administrator computer to the node.

Note. The administrator computer must have an IP address on the same subnet as the node. If the node is new, the default IP address is 192.168.224.150.

3. Attach the power cable to a power source.



Caution! You must use the power supply that comes with the node. If you use a different power supply, you void the product warranty.

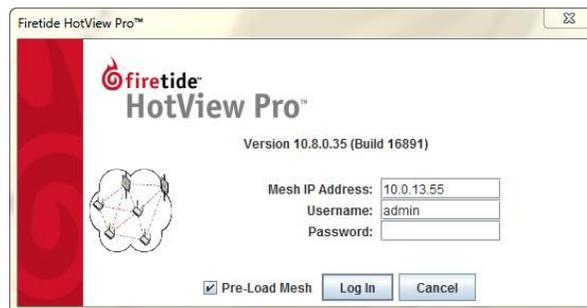
4. Give the node power.
The power LED comes on. The node boots and is ready to use in one minute.
5. Attach staging antennas appropriate to your network application.

Note: For specific procedures to attach antennas, see the *Firetide Best Practices Guide*.

6. Single-click to start the Quick Launch feature of HotView Pro, which opens the server and client software at the same time.



7. Login with the correct user name and password. The default user name is hv_admin; and the default password is firetide.
The system initializes.
8. Go to **Mesh > Add Mesh** > login with the default user name and password.

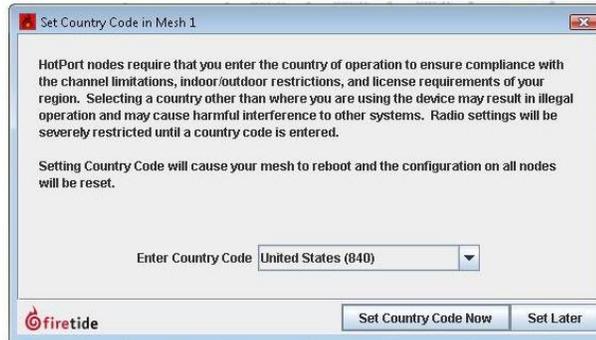


When you add the mesh, the system prompts you for the country code.

9. Set the country code for the node to change the device from a low-power, low range setting to a correct full-power operational mode.



Caution: Make sure you configure the device for the correct country. If you do not configure the country correctly, the device might operate in a manner that is not legal or create problems with other wireless devices.



- a. Select the country of operation from the drop-down list.
- b. Click **Set Country Code Now**.
When you set the country code the system refreshes the mesh configuration and gives all visible nodes the same country code. For a few minutes the nodes might appear and disappear from the graphic mesh record in HotView Pro.
- c. Wait for three minutes for the system to finish the refresh.