



Azalea Networks

Wireless broadband anytime and anywhere

AZALEA WIRELESS MESH ROUTER

MSR4000 INSTALLATION GUIDE

v2.6

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Safety Warnings

MSR4000 must be installed by trained professional installation technician. All below warning information must be read before installation.

General Safety Warnings



You can be killed or injured if performing antenna installation near electrical power lines. Carefully read and follow all instructions in this guide. Please be sure there are no high voltage and electronic field.

Working aloft Warning



When work on tower or roof, the person on high place must wear safety belt, All the tools he take up must be tied to waist or shoulder. The people below must wear safety helmet.

Lightning Activity Warning



Make sure not to connect or disconnect cables during periods of lightning activity.

A surge protective device should be installed to prevent potential damage from very high surges, for instance, the peak surges caused by lightning.

Explosive Device Proximity Warning



Do not operate wireless network device close to explosive merchandise or environment, for example, a vicinity to a gas station.

Antenna Placement Warning



Do not install any antenna near overhead power lines or other electric light, or where the antenna can come into contact with such circuits. When installing antennas, take extreme care not to come into contact with such electrical circuits, as they can cause serious injury or death.

Grounding Warning



Please always remember to protect your MSR4000 system by installation of grounding lines. The ground connection must be complete before connecting power to the MSR4000 enclosure. The requirement of grounding is to make sure the resistance must be less than 0.1 ohm between the ground termination point to grounding tier.

Power Installation Warning



The installation of power switch must be performed by a trained professional technician.

The power switch is not supplied with the MSR4000. The power cord must be assembled by a professional installer, and the final assembly must comply with related requirements.

Solar Irradiation and high Temperature Protection



Please pay attention of sunlight which will make the working temperature of MSR4000 higher then the specification

MR4000 would be located under sunlight. The solar shield which provided in Azalea standard package should be installed to outdoor MSR4000. The Azalea Warrantee policy does not cover those outdoor products which Solar shield is not installed for it. Please contact Azalea technical support engineers for detail information.

RF Device Protection



Before powering up MSR4000, RF port must be connected to valid load, powering up with unloaded RF port is not allowed. Improper operation with power can cause damage of RF module. Azalea will not take any responsibility for such damage.

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1 MSR4000 Quick Installation Guide

This Quick Installation Guide provides step by step instructions for installing and setting up the MSR4000. Content includes methods to access the MSR4000. For configuration, please refer to manuals in the attached CD ROM.

1.1 Further Reading

More detailed configuration instructions can be found in the CD-ROM.

2 Abstract

2.1 Function Introduction

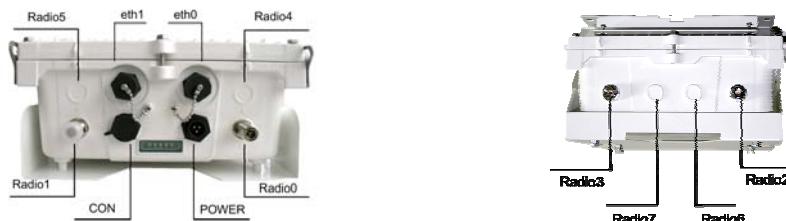
MSR 4000 is a multi-functional wireless mesh router, which can be connected with end user equipment directly or other MSR routers and wire networks to set up wireless network. The basic functions are listed below:

- Can work as a Wi-Fi AP, can servie end user equipment, such as notebook, PDA and Wi-Fi phone
- Can work with other MSR4000 to setup backbone mesh network.
- Can be connected to wire network via its own ethernet port
- Intelligent radio frequency management, automatic network routing and smart end user administration and roaming

When the functions above are combined and configured properly, a wireless network based on MSR series routers can provide its users within coverage

- the connectivity to internet and any other user in the network
- multiple service, such as WWW, file sharing, VOIP, video stream.
- Seamless roaming in the wireless network

2.2 Appearance and Interfaces



Ports of MSR4000 includes

- Four RF ports: R0, R1,R2,R3 (R4-R7 are sealed and reserved for future product)
- 2 Ethernet Cable Interfaces: Eth0, Eth1
- 1 Console Cable interface : CONsole
- 1 Power cable interface : Power
- 1 LED panel

2.3 Operating Range

Operating Temperature Range	-40°C ~ +55°C
Storage Temperature Range	-40°C ~ +80°C
Non-Condensing Humidity Range	10% ~ 90%
Wind Survivability Rating	165mph
Power input (VAC)	100/240 (50/60 Hz)
AC Power Consumption	5W (typical)

2.4 Environmental Rating

Ingress Protection (IP) Ratings	66
Shock and Vibration Rating	ETSI 300-19-2-4 spec T41.E class 4M3

2.5 LED Panel



LED Panel

Eth0:	Green.	Blinking for data traffic on Eth0.
Eth1:	Green.	Blinking for data traffic on Eth1
PWR:	Red.	On for Power On.
RDA:	Yellow.	Blinking for Radio0 is up .
RDB:	Yellow.	Blinking for Radio2 is up

2.6 Ethernet Cable

Figure below shows one end of the Ethernet cable for connecting to the Ethernet port on the MSR4000, and the other end of the cable with a standard RJ45 jack. Between the two cable connectors in the diagram shows the pin arrangement

Cable Color	Pin Mapping			
White/green	Pin 1			
Green	Pin 7			
White/orange	Pin 5			
Orange	Pin 4			
White/blue	Pin 2			
Blue	Pin 3			
White/brown	Pin 6			
Brown	Pin 8			
Ground	Pin 9			

2.7 Console Cable

The weather insulated console cable plug and pin mapping are shown in the figure below. The other end of the console cable which connecting to the laptop is a standard DB9 connector.

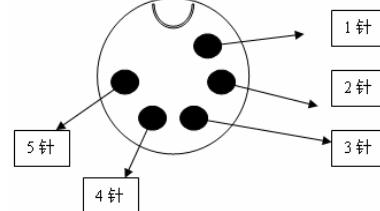
Azalea adopts generally applied Ethernet cable to build the Console Cable.

Circular side

Orange	Pin1
White/Green	Pin2
White/Blue	Pin3



Other wires and pins left free



DB9 side

White/green	Pin 2
Orange	Pin 3
White/blue	Pin 5

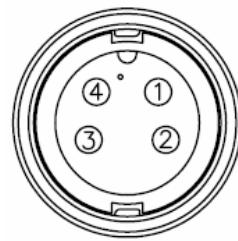


Other wires and pins left free

2.8 Power Cable

- Circular connector

The black connector of power cable is shown in following figure, which has four pins



Connection guide for power cable:

Phase (Live Line) – 2nd pin of 3 pin power cable with water protection

Neutral (Zero Line) – 3rd pin of 3 pin power cable with water protection

Grounding – 1st pin of 3 pin power cable with water protection

- Power Plug

The other side of power cable is a standard connection according to local regulation

2.9 Screws

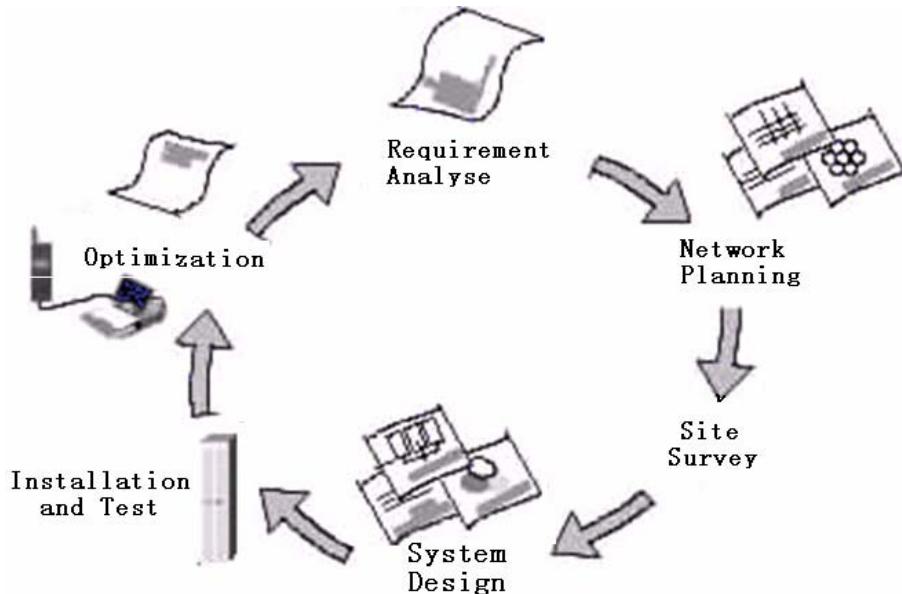


1. Sun Shade Assembly
2. Mounting Brackets Assembly
3. Holding the Chassis Box
4. Hanging the Chassis Box
5. Grounding

3 Installation Preparation

3.1 Site Survey

site survey is the key step in wireless network project, which is decisive to the reasonablity of system design and the smooth implementation of deployment.



3.2 Site survey tools

The site survey tools should be prepared and checked before departure, the tools include:

- ✓ Laptop
- ✓ GPS
- ✓ Compass
- ✓ Scale
- ✓ Digital camera (recommended)
- ✓ Telescope (recommended)
- ✓ Spectrum Scanner (optional)



3.3 The principle of site survey

- 1) The principles of site survey of MESH networks are as: Mesh No obstacle in 60% of the 1st fresnel zone. It will secure LOS in most areas and the coverage capability is secured and the number of sites could be saved.
- 2) If no LOS secured, area in NLOS area could be covered as well, but the distance of coverage and area of coverage are decreased, more sites are needed to provide coverage for same area than LOS scenario.
- 3) Interference must be considered in site selection. New site should avoid known interference, unless the interference is controllable.

3.4 Site Survey Guide

Site survey mainly include location selection and detail site study

- Site Selection

The site survey engineer should be experienced with good knowledge of microwave propagation, antenna ,feeder, MSR products and experiences in wireless network deployment.

Site location selection is the most important step of site survey. MESH network design engineer will do on site analysis of target area and recording all required site data, the site data includes terrain information, end-user distribution and their behavior, radio environment and the coverage target of MESH networks. Power availability, line access availability , permit of antenna installation are mandatory aspects to be considered in site survey. It is suggested to hunt more locations than actual needs that back-up sites can be used if the availability of some sites changed. Actual measuremet is suggested done for complex radio environment. The ideal site should meet following requirement:

- minimum obstacles to the target coverage area from the antenna.
- Availability of power
- Availability of Line access for Gateway
- Permit of antenna installation and MSR4000 mounting.

- Detailed site study

Site survey engineer should conduct detail measurements according to the plan, the measurements and records include site location information, antenna selection, MSR4000 mounting position etc. Site survey report is suugested to prepared after all site survey works finished.

- Eye measurement: building information, terrain information

Eye measurement is to verify there are any obstacle and reflection in wave propagation environment and terrain informing, such as building, trees, etc.

- Spectrum measurement (optional): radio environment

Spectrum measurement is to get familiar with radio environment in the target coverage area and antennas. The interference could from Wi-Fi APs and other systems.

- Site investigation: the availability of power, installation of antenna and MSR4000.

3.5 Tools

- ✓ Safety tape, safety cap
- ✓ Insulation tool
- ✓ Installation Tool
- ✓ Measurement Tool
- ✓ Power Panel
- ✓ Template of Installation

3.6 Security Check Before Start

- ✓ Check mast installation, the material of pole and its installation should comply related installation specification(Pole should be vertical, and grounding should be done, the diameter is around 40—60mm);
- ✓ Grounding is prepared already;
- ✓ Check the distance between MSR4000 and Grounding point;
- ✓ If cabling need to go through wall or ceiling;
- ✓ Special installation material or tools are needed or not.

3.7 Equipment Check

- ✓ Check the integration of equipment list in the package;
- ✓ Check the integration of antenna, feeders and installation packages;
- ✓ Check the preparation of Adhesive Tape, PVC tape and strap to be enough for installation;

4 Antenna Installation

4.1 Principles

- Height of antenna installation:
 - The antennas height can be different even for antennas connected to same MSR4000. It would be determined by the space of installation, or by design requirement;
 - The antenna height for access could be 20 meters in open and flat area of city. It could be 30 meters in open area in rural flat area;
 - Too high antenna installation will decrease the coverage capability close to antenna, it is much popular when using omni antennas;
 - Too high antenna installation will have another negative impact for system performance by interference to sites in surrounding areas. Its signal strength will be seen by many other sites, which is hard to avoid interference.
- Antenna azimuth:
 - The main beam of antenna should point to the most dense traffic area to have better coverage and link quality;
 - The overlapping coverage between two neighboring site should be less than 10% of its total coverage area in urban scenario;
 - Overlapping area should not be too large in suburban and country area as well, and the angle of two neighboring antenna main beam should not be less than 90 degree;
 - To avoid over coverage of an antenna, the antenna main beam should not point to the center of straight streets.

It should notice that the coverage capability changed if the azimuth of antenna adjusted, to improve coverage in one direction will give negative impact to other direction. The proper azimuth is very important in network building up stage.

- Antenna down-tilt angle design:
 - Down-tilt is widely used to have better coverage and less interference to neighboring sites;
 - The down-tilt angle should be well designed, too high down-tilt will impact antenna beam form, and have the negative impact of coverage;
 - The design of down-tilt antenna angle should consider the output power, antenna height, target coverage area, radio environment, etc. It should be done after site survey.

4.2 Installation of directional antenna

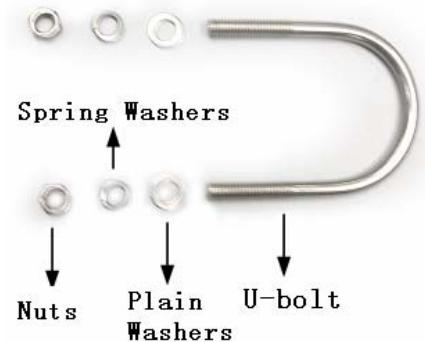
- Assembling of installation accessories

Installation accessories of directional antenna includes:

- ✓ directional antenna
- ✓ Antenna up-bracket (length adjustable)
- ✓ Antenna down-bracket
- ✓ U-bolt
- ✓ Nuts to connect antenna and bracket

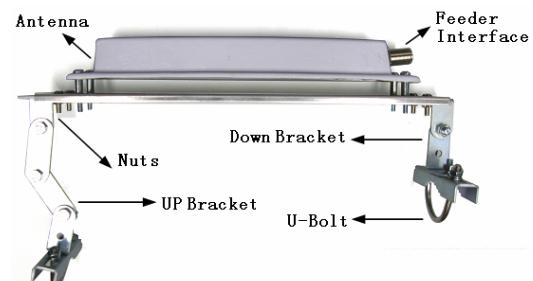
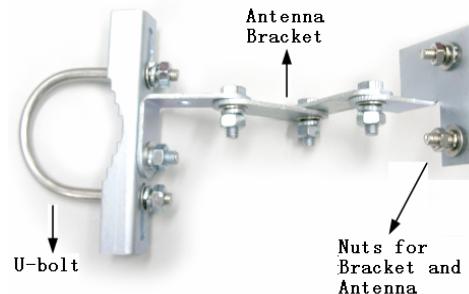
Tools of antenna installation

- ✓ Screwdriver (crosspoint head)
- ✓ Spanners (size 8 and 10)



The procedure of antenna installation is:

- ✓ Install U-bolt to arc side of antenna bracket
- ✓ connect antenna and antenna bracket by tightening nuts



Please notice the adjustable bracket should be installed in upper position, that are more flexible to adjust downtilt angles.

- Antenna Installation

Tools: Spanners size 10

1. The height of antenna must follow the requirement in design documentation (enough isolation should be secured between antennas, vertical isolation is much better than horizontal isolation);
2. Put antenna to pole by U-bolt, start from upper U-bolt then down one;
3. Fix antenna on bracket, don't strengthen the nut too tight because the antenna azimuth will be adjusted.



- Azimuth and Tilting Adjustment

Tools needed: Spanner, Compass, and Inclinometer.

Adjusting azimuth:

1. To measure the azimuth by compass;
2. Compare the difference between the actual azimuth with design value;
3. Slightly adjust azimuth to design value;
4. Measure the azimuth again to secure the difference less than 5 degree;
5. Fix the down U-bolt by screwdriver.



Adjusting down tilt angle:

6. Measure the down tilt angle by angle inclinometer;
7. Compare the difference between actual figure with design value;
8. Slightly adjust the down-tilt angle by stretching or shrink the up-bracket.
9. Measure the down-tilt angle again to secure the difference between actual down-tilt angle and actual one less than 0.5 degree;
10. Fasten nuts in upper bracket to complete the installation of directional antenna.



4.3 Omni Antenna Installation

Tools:

Adjustable Spanner



Installation material package of omni antenna:

- ✓ Omni antenna:
- ✓ Installation bracket of omni antenna(2 sets of fasten nuts included)



The procedure of omni antenna installation is:

1. Mount the bracket to pole by one set of nuts, fasten the nuts by Spanner;
2. Mount the omni antenna to the bracket by another set of nuts;



3. Adjust antenna to secure it installed vertically;
4. Fasten the nuts by Spanner.



Safety protection must be guaranteed when aloft work



The installation should be done by experienced antenna installer. Power line and high electric field must be avoided.



Don't stand on side of antenna of MSR4000 when MSR4000 is operating, there are strong electromagnetic field surrounding the antenna

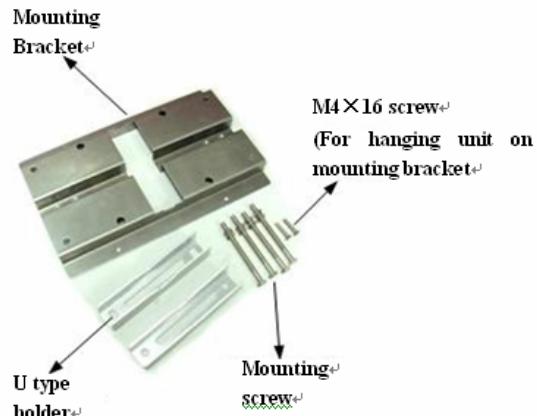


Don't do any installation works during raining time.

5 MSR4000 Installation

Installation kit

- ✓ 1 Solar shield
- ✓ 4 shield fastening bolts
- ✓ 1 Installation Bracket
- ✓ 2 pipe holders
(mounted on pole)
- ✓ 4 long bolts for pipe holder
- ✓ 4 expansion bolts
(mounted on wall)
- ✓ 2 MSR4000 Fastening bolts



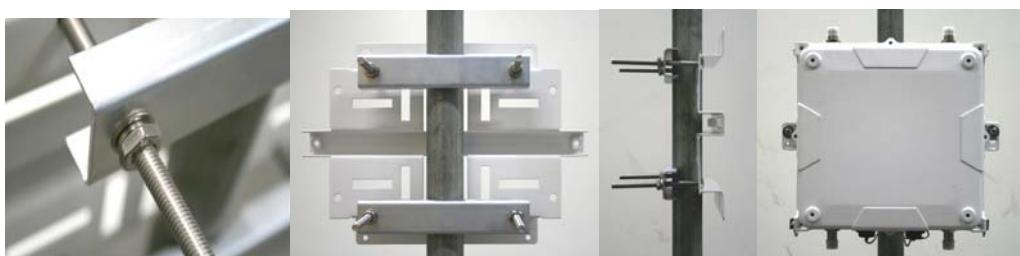
5.1 Install MSR4000 on Mast

Tools: Spanners size 10 and 14.

Installation Procedure

1. use long bolts to fasten the pipe holder and bracket to the mast
2. use 2 MSR4000 fastening bolts to mount the MSR box to the bracket
3. use the 4 shied bolts to mount solar shield to MSR400

And MSR4000 could also be mounted on horizon pole by mounting bracket equipped.



5.2 Mounting MSR onto wall

Tools needed: Mark pen, Percussion drill, Percussion Drill Hammer, and adjustable Spanner.



The process of installing MSR4000 on a wall is as:

1. Put the MSR4000 bracket against the wall and mark the 4 position of nut holes;
2. Drilling on the 4 mark positions;
3. Hit expansion bolts into wall;
4. Put MSR4000 bracket on the expansion bolts;
5. Use the 2 MSR fastening bolt to fix MSR onto the bracket
6. Use shield fastening bolts to install the solar shield onto MSR4000



5.3 Grounding of MSR4000

The grounding of MSR4000 is to protect MSR4000 from electrostatic damage, there is grounding terminal on the enclosure of MSR4000.

Tools needed: Paper knife, Pliers, Crimping Pliers, and Cross Screwdriver.

The procedure of grounding is as:

1. Put naked side of grounding wire into the copper ring, and press it firmly by Crimping Pliers;
2. Unmount the screw of in the grounding terminal.
3. Put the copper ring into the grounding terminal.
4. Fasten the screw by Cross Screwdriver;
5. Connect the other side of grounding wire with grounding bar;
6. Daub butter on both side of grounding wire



Never skip grounding in the MSR4000 installation, and it must be finished before powering up MSR4000. The resistance of grounding wire must be less than 5 ohm.

5.4 Assembling Solar Shield

Secure screws through the holes on the corner of shield to MSR4000.



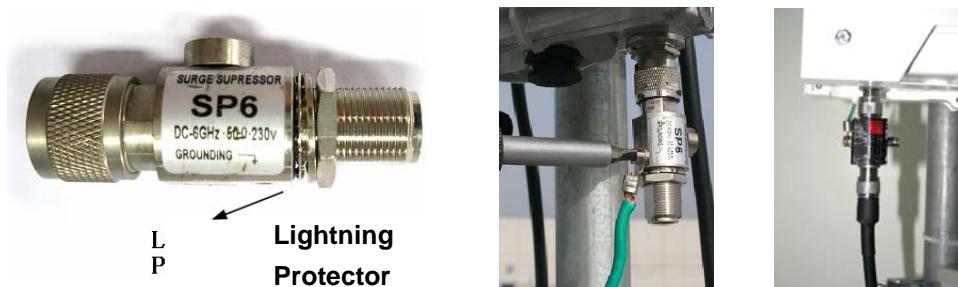
6 Lightning Protection Installation

The lightning protector is to protect MSR4000 to avoid damage by burst high current from lightning. Lightning protector should be installed between radio port and antenna feeder, and the lightning protector should be connected with lightning system of the building .

Tools needed: Paper knife, Pliers, Crimping Pliers, Cross Screwdriver, and Spanners.

The procedure of lightning protector:

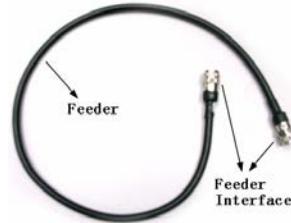
1. Connect the lightning protector to radio port of MSR4000;
2. Fasten the lightning protector by Spanner;
3. Unpack the copper ring of grounding.
4. Put the naked side of grounding wire into copper ring and pressed firmly by Crimping Pliers;
5. Connect the grounding copper ring with lightning protector and fasten it by Cross Screwdriver;
6. Connect the another side of grounding wire with grounding bar;
7. Daub butter on both side of grounding wire;



7 Feeder Installation

Feeder is used to connect antenna with MSR4000. Due to the high propagation loss for high frequency waves, the feeder must be as short as possible to get minimum loss of signal strength. If long feeder must be used, higher diameter feeder is recommended.

The typical propagation loss of 100 meters is listed in the table below:



Feeder type	Cable loss for 2.4GHz (dB/100m)	Cable loss for 5.8GHz (dB/dB/100m)
1/2"	12.8	21.4
7D	25.7	42.6

Tools needed for feeder installation: adjustable Spanner, paper knife, Diagonal Pliers.

The procedure of feeder installation:

- 1 Connect feeder to antenna port. Fasten the connection by turning the feeder connector clockwise slowly;
- 2 Further tighten the connector with spanner;
- 3 Cabling the feeder following the pole, and be careful of the arrangement of cabling, and without any sharp bend of the cable.

The radius of cable bend should be less than following figures of different types

Cable type	Cable Bending Radius (mm)
1/2"	125
7D	60



- 4 connect to the other side to lightning protector;
- 5 Secure the feeder on pole by black sheaf rope and don't hang the feeder in the air;
- 6 Airproof the connectors by insulating tape and PVC insulating tape.



8 Ethernet Cable Installation

Ethernet cable connects MSR4000 mesh network to wire network. Ethernet cable is needed, only when MSR4000 used as gateway. The performance of network cable will degrade seriously with length longer than 100 meters. So in MSR nodes planning, it is better to choose access point to wire network within 100 meters.

The process of Ethernet cable installation

1. Unscrew the protective cap on the Ethernet enclosure.
2. Plug Ethernet cable RJ45 head to MSR4000 Ethernet interface.
3. Water proof the connection by wiring insulation Adhesive Tape and PVC insulation type;

9 Power Cord Installation

MSR4000 use 100-240V AC as power, the power interface is on the left bottom of MSR4000. Power cable should be the last step of installation.

Tools: Diagonal Pliers, paper knife

The procedure of power cable installation:



1. Point the female power plug to MSR4000 power port
2. lug the power cable firmly to the port, further tighten the connection by turning the coupling ring, (which is already attached to the plug) clockwise;
3. Water proof the connection by wiring insulation Adhesive Tape and PVC insulation type;
4. Secure the power cable follow to the pole with strap, but don't make it too tight
5. The other side of power cable plug use normal 3 male pin connection to power supply.



Installation of power cable must be done by experienced technician. Please read the installation manual carefully before installation.



Before finally power up MSR4000, make sure grounding is done correctly

10 Completed Installation

Picture of site with completed installation:



11 Administrating the MSR4000

There are two methods of performing the quick start configuration: using the Quick Setup Wizard provided by MSR series' Web-based Management Interface (WMI), or using the setup command of the router's Command Line Interface (CLI). Azalea recommends using the Quick Setup Wizard which is accessible from most modern internet browsers such as Internet Explorer. The Quick Setup Wizard simplifies the initial configuration of the router into answering a few simple questions.

11.1 Sample Network

The following figure shows the topology of a typical network formed by the MSR series routers:

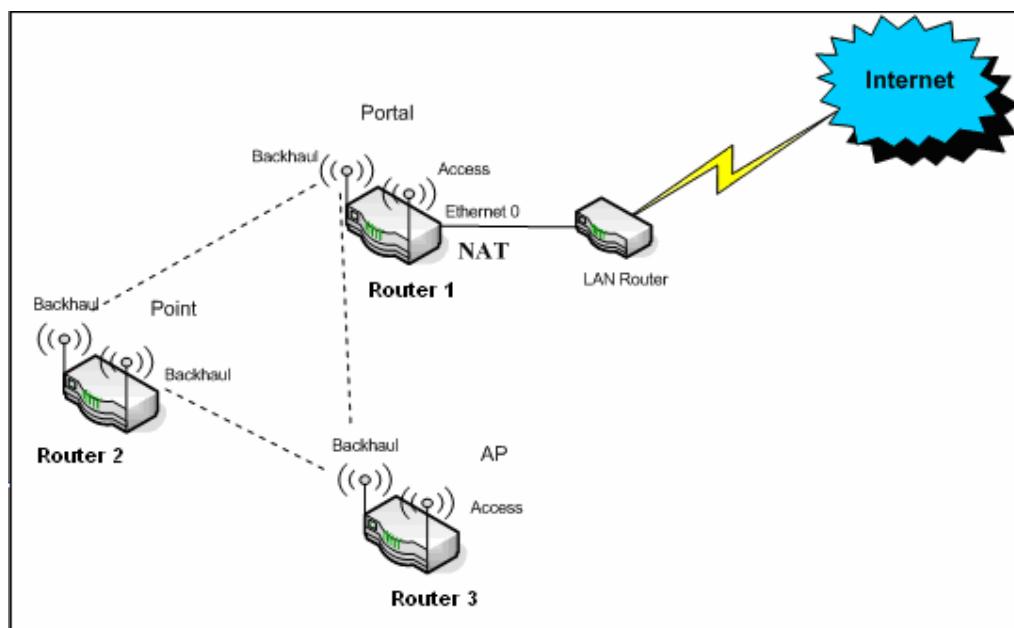


Figure 1 Sample MSR series Mesh Network

This network contains three MSR series routers (or nodes, as referred to hereon). Node 1 is referred to as a *portal node* because it has a direct, wired connection to the internet. It also contains two wireless connections formed by its two radios. The first radio is configured in access mode, which means it services as one or more virtual access points (AP) for end-user devices that might be around this node. In this example, the SSID for the virtual AP is "Public" and any client device that uses this SSID is connected to node 1. The other radio forms backhaul connections to the two other MSR series nodes, node 2 and node 3. The backhaul connections allow node 1 to send and receive network traffic to and from these other nodes, giving these other nodes an indirect connection to the internet.¹

¹ The portal node presented in this quick start guide presents only one of many possible configurations of a portal node. The only requirement for a portal node is a wired connection; it may or may not have an access radio or provide virtual AP service. Please refer to the Configuration Guide for information on how to configure portal nodes differently.

Unlike node 1, node 2 does not serve any client devices but only forwards traffic to and from other nodes. As such, both of its radios are configured in backhaul mode. Such a relay-only node is known as a *point node*.

Node 3 is similar to node 1 in that it has one backhaul radio and one access radio, which means it is also capable of connecting to other MSR series routers and servicing client devices. However because it is not directly connected to a wired network, it is called an *AP node*.

Configuration Summary

Table 1 summarizes the basic configuration settings required for each of the three nodes:

Table 1 Node configuration summary

Name and Type	MSR4000_1 (Portal)	MSR4000_2 (Point)	MSR4000_3 (AP)
Node ID ²	1	2	3
Router ID ³	192.168.10.1	192.168.10.2	192.168.10.3
Ethernet-port IP/Mask ⁴	206.10.5.2/24	192.168.1.2/24	192.168.1.3/24
Ethernet Gateway ⁵	206.10.5.1	N/A	N/A
SSID for AP ⁶	Public	Not set	Public
DNS servers ⁷	206.10.10.12, 206.10.10.13	Not set	206.10.10.12, 206.10.10.13
Roaming (Motrix) ⁸	Enabled	Disabled	Enabled
NAT ⁹	Enabled	Disabled	Disabled

11.2 Configuring nodes with the Quick Setup Wizard

The basic software requirement for the web-interface is:

- Web Browser: Internet Explorer 5.5 and above with Javascript enabled
- Optimal Resolution: 1024 X 768 and above

² Node ID can be any integer 1 and 8191, and must be unique within a single mesh network.

³ Router ID is an IPv4 loopback address that identifies the router, and is usually the best way to connect to the administration functions of an operational router; must be unique within a single mesh network.

⁴ This is the IP address and netmask of the Ethernet port 0 on the MSR series. Depending on the exact model, there may be one or two Ethernet ports. This quick start guide only uses Ethernet port 0.

⁵ This is the IP address of the gateway router that the Ethernet port 0 is connected to.

⁶ SSID is the alphanumeric identifier of a wireless AP which clients use to connect.

⁷ DNS server information is needed for the clients to connect to the internet; this information is passed to the client when the client uses the DHCP protocol to obtain an IP address from the AP on the MSR series.

⁸ Motrix-roaming is a service provided by the MSR series that allows wireless clients to move from the coverage area of one AP to another without experiencing any disruption in service. For details, refer to the Configuration Guide.

Accessing the Quick Setup Wizard

To log in the web interface of a MSR series router, input the router IP address and the port address, such as 111.168.15.229 for router IP, and then input <http://111.168.15.229:9080> in the web browser address. A pop-up dialog box would appear and request a username and password (see Figure 2).

On an un-configured MSR series router, it can connect a client PC to the router's Ethernet 0 port and the port's default IP address is 192.168.0.1.

The default username is 'root' and password is 'public'. After the successful authentication, the home page for WMI would appear (see Figure 3).



Figure 2 Logging into Web Management Interface (WMI)

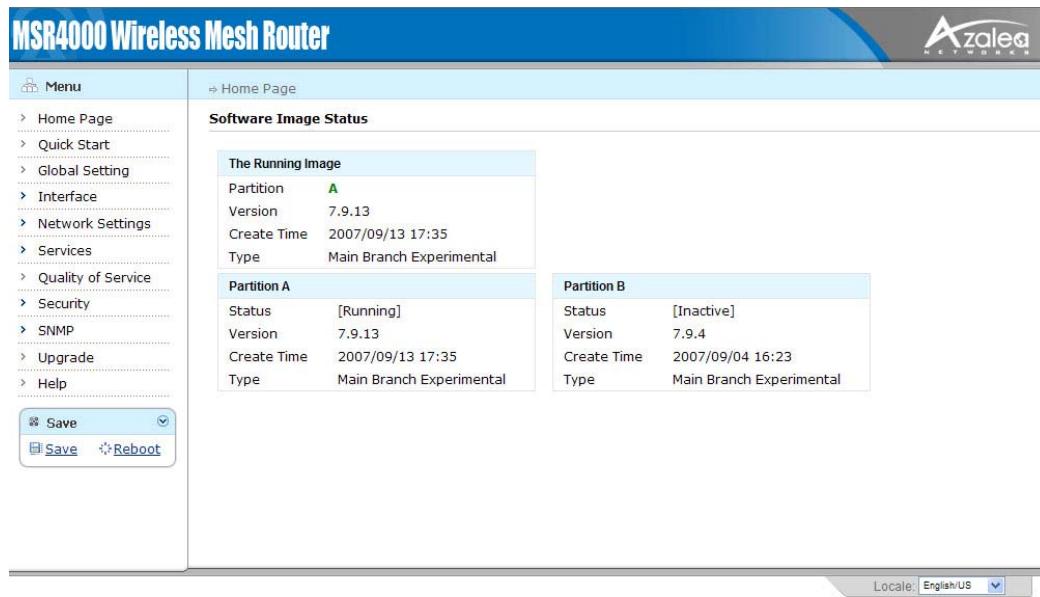


Figure 3 Web Management Interface Home Page

To open the Quick Setup Wizard, click the “Quick Setup” link in the left-side menu tree. The Step 1 of the Quick Setup Wizard appears at the right side of the web page (see Figure)

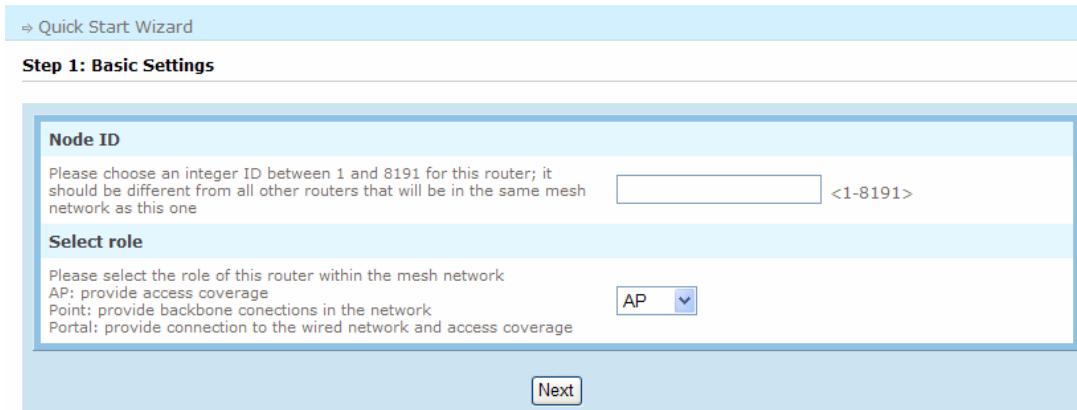


Figure 4 Web Management Interface Home Page

Using the Quick Setup Wizard

To configure a node with the Quick Setup Wizard, answer the questions asked during each step of the wizard. After entering the answers for all the questions at one step, click the “Next” button to go to the next step. The “Back” button could be used to return to the previous step, and clicking the “Finish” button at the end of the wizard completes the configuration.

Example Configuration 1: Portal node

The following figures show how the example portal node can be configured by answering the questions on each screen.

⇒ Quick Start Wizard

Step 1: Basic Settings

Node ID
Please choose an integer ID between 1 and 8191 for this router; it should be different from all other routers that will be in the same mesh network as this one

Select role
Please select the role of this router within the mesh network
AP: provide access coverage
Point: provide backbone connections in the network
Portal: provide connection to the wired network and access coverage

Next

Figure 5 Configuring the portal node, step 1

⇒ Quick Setup Wizard

Step 2: Networking Settings

Router ID
Please specify a loopback IP address for this router, it should be unique within the IP network IPv4 Address

IP Address/Netmask
Please specify the IP address and Netmask for the FastEthernet 0 port of this router
 Static IP Address/Mask Type:A.B.C.D/M

Gateway
Please specify the IP address of the gateway that the FastEthernet 0 port is connected to Type:A.B.C.D

NAT
Please choose whether NAT should be enabled on the FastEthernet 0 port Enable Disable

Back **Next**

Figure 6 Configuring the portal node, step 2

⇒ Quick Setup Wizard

Step 3: Wireless Settings

BSS SSID
Please specify an SSID that can be used by wireless clients to access this router

DNS Server IP Address
Please specify a list of DNS addresses for the router Type:A.B.C.D,A.B.C.D...

Back **Finish**

Figure 7 Configuring the portal node, step 3

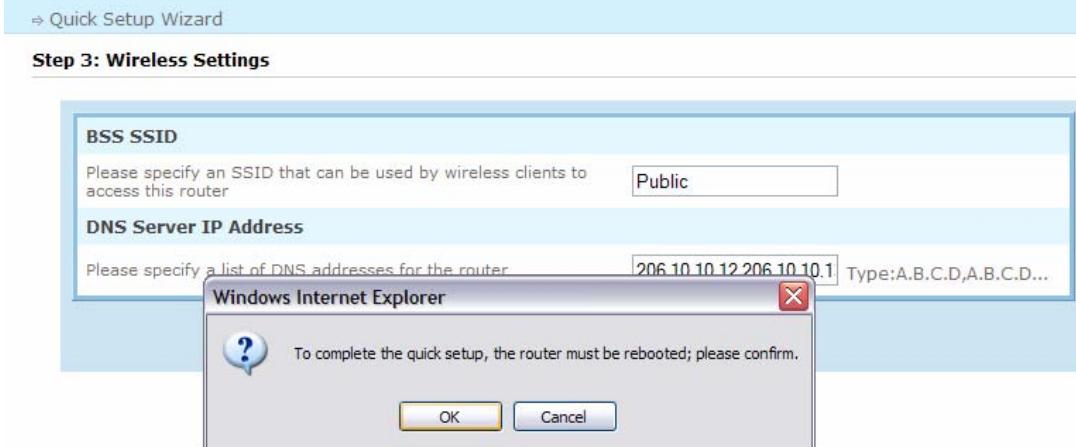


Figure 8 Configuring the portal node, step 4

After the last step of confirming the reboot is performed, the web interface would stop responding for a few seconds while the router reboots itself. Note that since the quick setup changes the IP address of the Ethernet 0 port on the router, you may need to re-open the web interface using the new IP address if you were using Ethernet 0 to connect to the router.

Example Configuration 2: Point node

The following figures show how the example point node can be configured by answering the questions on each screen.

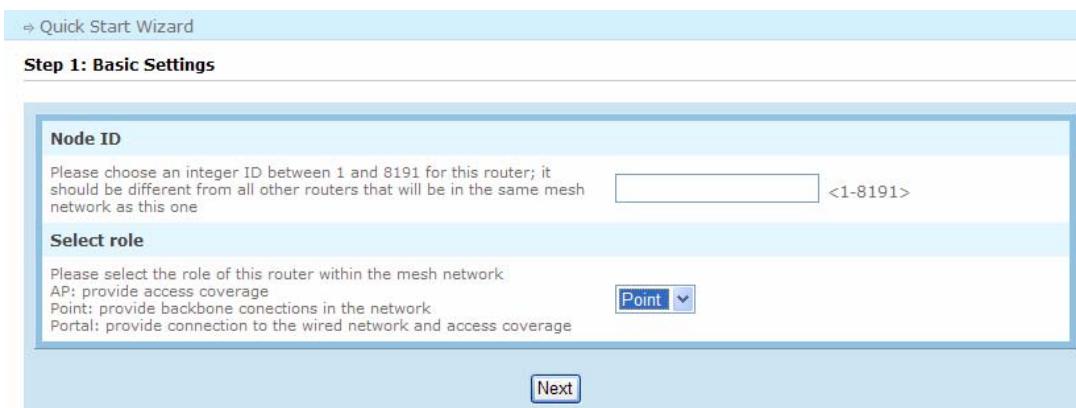


Figure 9 Configuring the point node, step 1

⇒ Quick Setup Wizard

Step 2: Networking Settings

Router ID
Please specify a loopback IP address for this router, it should be unique within the IP network IPv4 Address

IP Address/Netmask
Please specify the IP address and Netmask for the FastEthernet 0 port of this router Static IP Address/Mask Type:A.B.C.D/M

Back **Finish**

Figure 10 Configuring the point node, step 2

⇒ Quick Setup Wizard

Step 2: Networking Settings

Router ID
Please specify a loopback IP address for this router, it should be unique within the IP network IPv4 Address

IP Address/Netmask
Please specify the IP address and Netmask for the FastEthernet 0 port of this router Static IP Address/Mask Type:A.B.C.D/M

Windows Internet Explorer
To complete the quick setup, the router must be rebooted; please confirm.

Figure 11 Configuring the point node, step 3

Example Configuration 3: AP node

The following figures show how the example AP node can be configured by answering the questions on each screen.

⇒ Quick Start Wizard

Step 1: Basic Settings

Node ID
Please choose an integer ID between 1 and 8191 for this router; it should be different from all other routers that will be in the same mesh network as this one

Select role
Please select the role of this router within the mesh network
 AP: provide access coverage
 Point: provide backbone connections in the network
 Portal: provide connection to the wired network and access coverage

Next

Figure 12 Configuring the AP node, step 1

⇒ Quick Setup Wizard

Step 2: Networking Settings
Router ID

Please specify a loopback IP address for this router, it should be unique within the IP network

192.168.10.3

IPv4 Address

IP Address/Netmask

Please specify the IP address and Netmask for the FastEthernet 0 port of this router

 Static IP Address/Mask

192.168.1.3/24

Type:A.B.C.D/M

Back

Next

Figure 13 Configuring the AP node, step 2

⇒ Quick Setup Wizard

Step 3: Wireless Settings
BSS SSID

Please specify an SSID that can be used by wireless clients to access this router

Public

DNS Server IP Address

Please specify a list of DNS addresses for the router

206.10.10.12,206.10.10.1

Type:A.B.C.D,A.B.C.D...

Back

Finish

Figure 14 Configuring the AP node, step 3

Note: The scope of this document does not cover tuning the mesh network for total coverage. For more detailed configuration instructions, please refer to the respective guides available in the CD-ROM.

Appendix

- MSR4000 basic specifications
 - ♫ 802.11a/b/g and 4.9GHz
 - ♫ Quad radio
 - ♫ Antenna changeable
 - ♫ Power range: 100 ~ 240 VAC 50/60Hz
 - ♫ Power consumption: 10W
 - ♫ Output power: 100mw(20dBm) 400mw(26dBm, b/g)
 - ♫ Operating temperature: - 40 ~ +55°C
 - ♫ Storage temperature: - 40 ~ +80°C
 - ♫ Operating humidity: 10%~90% non condensing
 - ♫ Wind Survivability: <165mph
 - ♫ Weather rating: IP 66 Weather tight

- MSR4000 physical information

- Length: 325mm
- Width: 290mm
- Height: 135mm
- Weight: 7kg (w/o mounting bracket and solar shield)
- Chassis material : Aluminum
- Chassis color : white

FCC Warning:

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, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this unit not expressly approved by the party responsible for compliance will void the user's authority to operate the equipment. Any change to the equipment will void FCC grant.

**RF Exposure Warning:**

This equipment complies with FCC radiation exposure limits set forth for General Population/Uncontrolled environment. The antenna(s) must be professionally installed in accordance with the instructions; and it must be operated with minimum 70 cm distance between the antennas and person body (excluding extremities of hands, wrist and feet) during wireless mode of operation. Further, this transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

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/TV technician for help.