

---

# Backbone R1

## Quick Installation Guide



V2.1.15 July 2010

---

---

## Copyright

Copyright © 2010 all rights reserved. No part of this publication may be reproduced, adapted, stored in a retrieval system, translated into any language, or transmitted in any form or by any means without the written permission of the supplier.

## About the Installation Guide

This Installation Guide is intended to guide professional installer to install the Backbone R1. It includes procedures to assist you in avoiding unforeseen problems.

## Conventions



- 
- This indicates a warning or caution that you have to abide.
- 



- 
- This indicates an important note that you must pay attention to.
-

---

# Chapter 1 Introduction

## Introduction

The Backbone R1 is a high-performance outdoor-deployable wireless bridge that provides wireless connectivity among multiple network locations. It supports Base Station, CPE, PTP and PTMP connectivity. Moreover, the Backbone R1 has a built-in 23dBi planar antenna that can deliver up to a 40Km connection. With high throughput and long-distance transmission, the Backbone R1 is an ideal backhaul solution for Carriers, Service Providers and Enterprises!



---

# Chapter 2 Preparation before Installation

This chapter describes safety precautions and product information you have to know and check before installing Backbone R1.

## Professional Installation Required

1. Please seek assistance from a professional installer who is well trained in the RF installation and knowledgeable in the local regulations.
2. The Backbone R1 is distributed through distributor and system installer with professional technicians and will not be sold directly through retail store.

## Safety Precautions

To keep you safe and install the hardware properly, please read and follow these safety precautions.

1. If you are installing an antenna for the first time, for your safety as well as others', please seek assistance from a professional installer who has received safety training on the hazards involved.
2. Keep safety as well as performance in mind when selecting your installation site, especially where there are electric power and phone lines.
3. When installing your antenna, note the following:
  - ◆ Do not use a metal ladder;
  - ◆ Do not work on a wet or windy day;
  - ◆ Wear shoes with rubber soles and heels, rubber gloves, long sleeved shirt or jacket.
4. When the system is operational, avoid standing directly in front of the antenna. Strong RF fields are present when the transmitter is on.

---

## Installation Precautions

To keep the Backbone R1 well while you are installing it, please read and follow these installation precautions.

1. Users **MUST** use a proper and well-installed surge arrestor and grounding kit with Backbone R1; otherwise, a random lightning could easily cause fatal damage to Backbone R1. **EMD (Lightning) DAMAGE IS NOT COVERED UNDER WARRANTY.**
2. Make sure PoE is correctly connected to the RJ-45 port on the Backbone R1 labeled PoE+Data. **DO NOT CONNECT TO THE PORT LABELED “Warning!! No POE”**, otherwise the extender will be severely damaged!

## Product Package

The product package you have received should contain the following items. If any of them are not included or damaged, please contact your local vendor for support.

- Backbone R1 with integrated 23dBi antenna      × 1
- Mounting Kit      × 1
- PoE Injector & Power cord      × 1
- Grounding Wire with Screw      × 1
- Water Proof RJ-45 Connector Kit      × 1
- Quick Installation Guide      × 1
- Product CD      × 1

 **Note:**

- 
- Product CD contains Management Tool, Quick Installation Guide and User Manual!
-

---

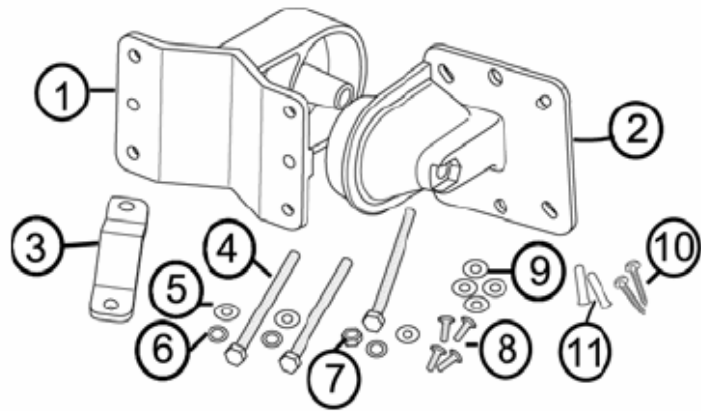
## Mounting Kit

- **Wall/Pole Mounting Bracket**

1. T-Form Bracket × 1
2. Articulation Pole × 1
3. Pole Mount Bar × 1

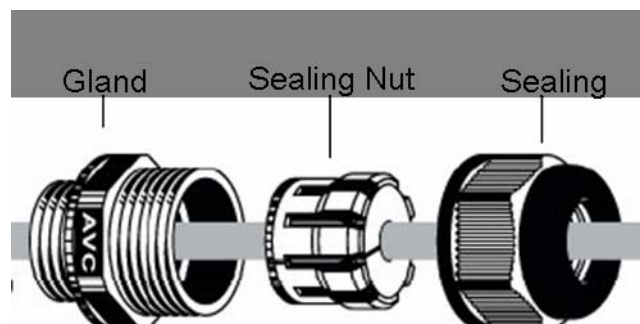
- **Fasteners**

4. M8 × 80 Screw × 2
- M8 × 90 Screw × 1
5. M8 Washer × 3
6. M8 Spring Washer × 3
7. M8 Nut × 1
8. M5 × 16 Screw × 4
9. M5 Washer × 4
10. Wood Screw × 4 (for Wall Mount)
11. Wall/Gyprock Plug × 4 (for Wall Mount)



## Waterproof RJ-45 Connector Kit

1. Gland × 1
2. Sealing Nut × 1
3. Sealing × 1

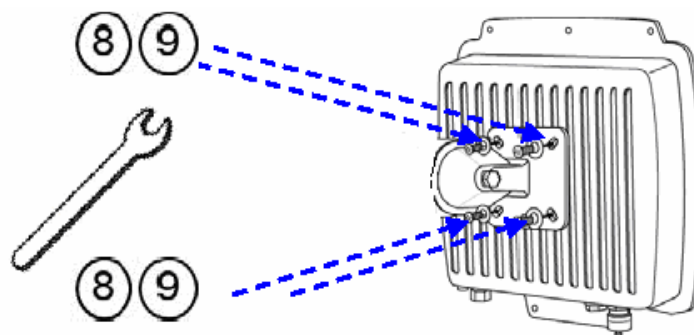


---

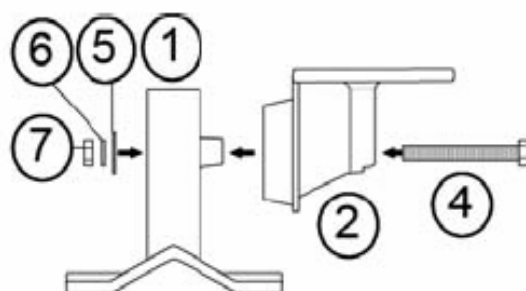
# Chapter 3 System Installation

## Assemble the Mounting Bracket

1. Place the main bracket into the seating and use a spanner to fasten the bracket to the Backbone R1 with M5x16 screws and M5 washers provided in the hardware packets;



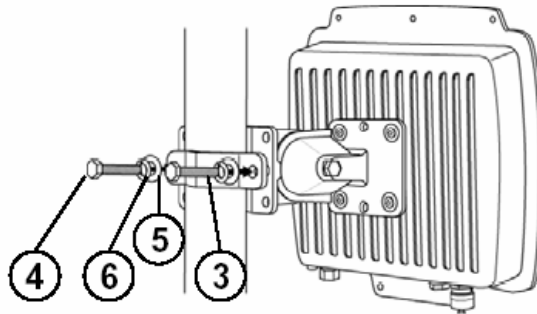
2. Assemble the main bracket by placing articulation pole to the T-form bracket via a M8x90 screw through the insertion axe and fix with the M8 washer, spring washer and M8 nut ;



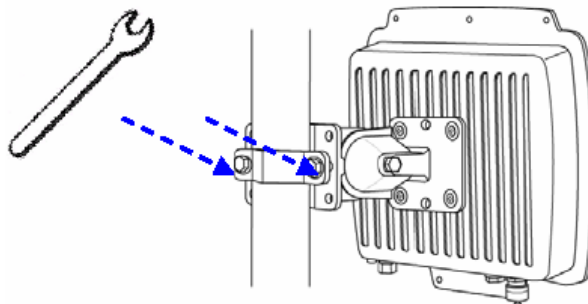
---

## Pole Mounting

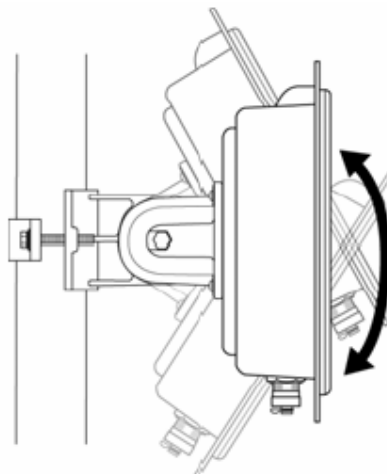
1. Install the main bracket and the pole mount bar over the top of the pole by securing the drill holes of the pole mount bar to the main bracket ones and insert two M8x80 screws, spring washers and washers through the drill holes and main bracket;



2. Fasten two M8x80 screws and washers through the drill holes and main bracket with a spanner;



3. Adjust the antenna for appropriate tilt / vertical orientation.



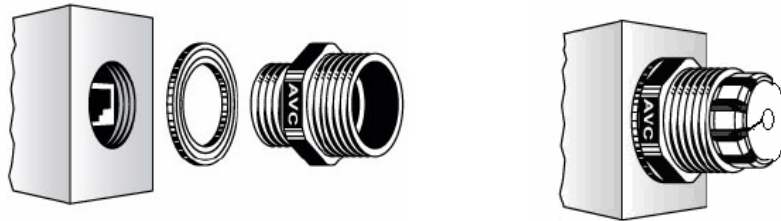


---

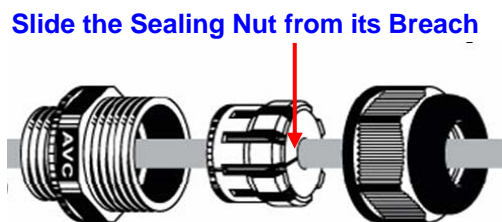
## Connect Up

Before installing the Ethernet cable with a waterproof RJ-45 connector, it is recommended that the Cat-5 RJ-45 coaxial cable be used for the bridge to power injector connections.

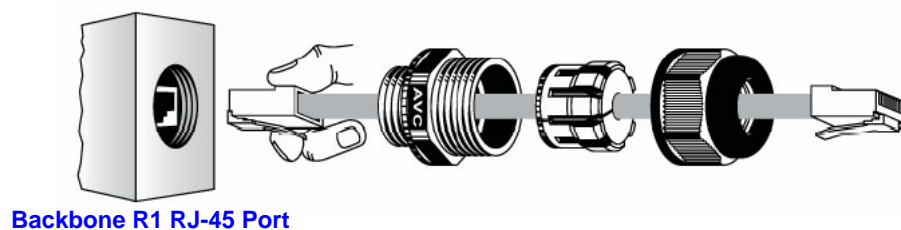
1. To connect to the hole labeled **PoE+Data**, open the black cover in advance by using a coin or a slotted screwdriver and then screw in the body of the gland and tighten.



2. Slide the sealing nut to the RJ-45 cable from its middle breach and then insert the sealing into the cable.



3. Insert the RJ-45 connector and make sure that the locking tab snaps home.



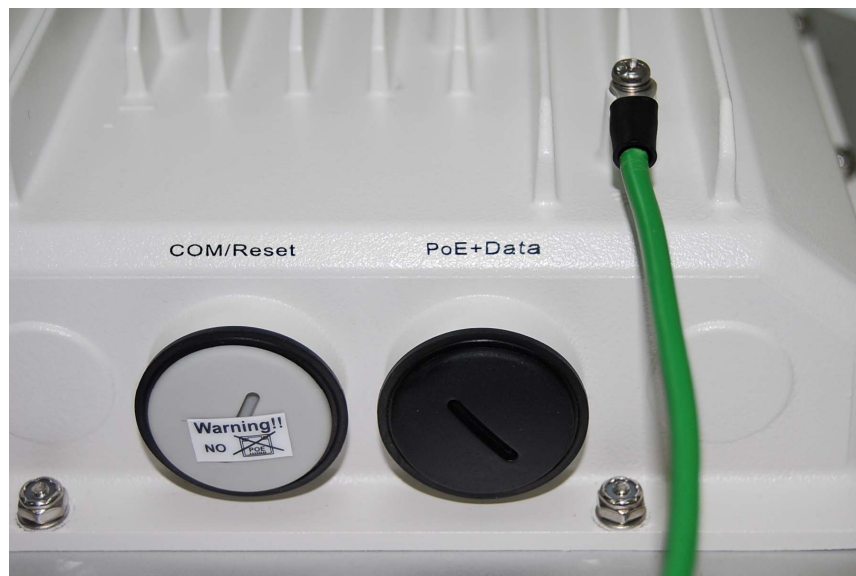
4. Screw the sealing on the gland and tighten.



---

## Ground the wire

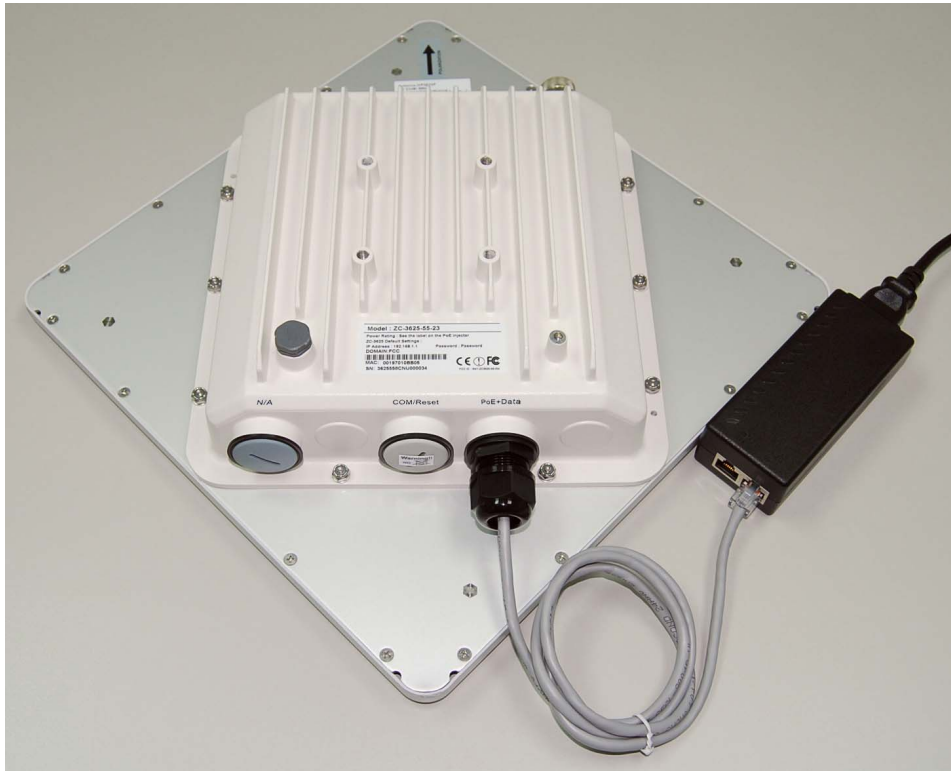
The Backbone R1 is shipped with a grounding wire. The unit must be properly grounded to protect against power surges. The grounding point can be found on the bottom of the unit. It is supplied with an appropriate grounding lug for attachment to the ODU.



## Power On

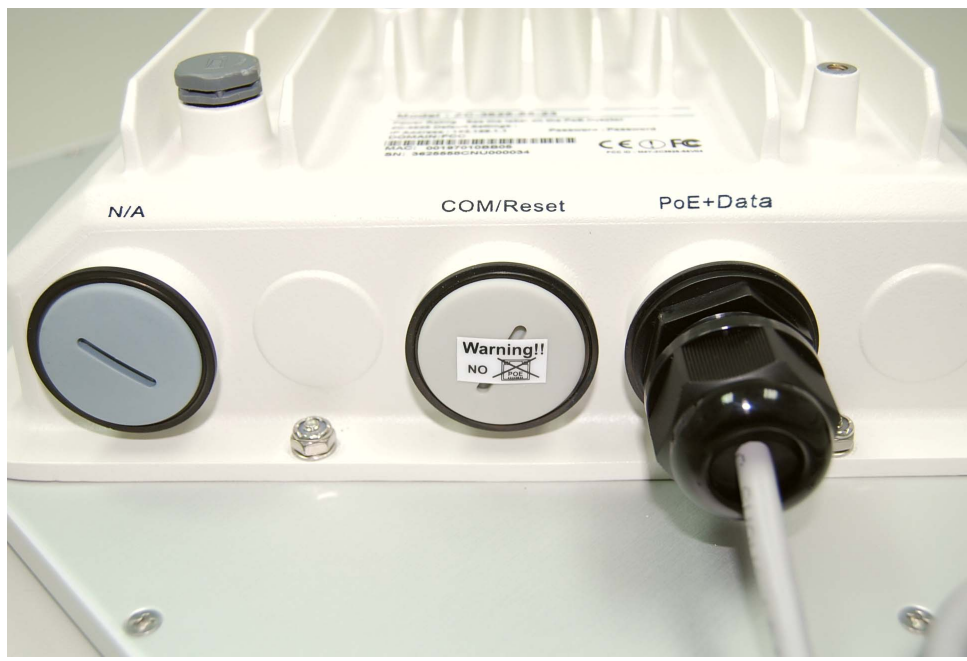
To power up the Backbone R1, follow the steps below:

1. Plug a user-supplied Cat-5 Ethernet cable from your wired LAN (or a computer) into the power injector RJ-45 jack (**DATA IN**);
2. Plug a user-supplied Cat-5 Ethernet cable from the Backbone R1 into the power injector RJ-45 jack (**P+DATA OUT**);
3. Connect the power module to the power injector and plug the AC cord into an AC power receptacle.
4. After being powered on, the device will send out the beep sound lasting about 1.5 seconds, informing you that the Backbone R1 powered up! Wait for about 60 seconds the system will be initialized and start working.



 **Warning:**

- Make sure PoE is correctly connected to the RJ-45 port on the Backbone R1 labeled PoE+Data. **DO NOT connect to the port labeled "Warning!! No POE"**, otherwise the extender will be severely damaged!



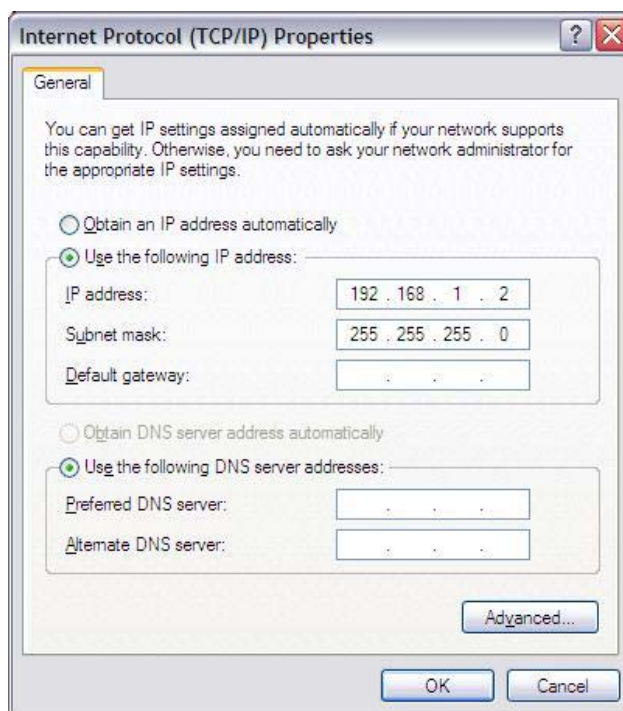
---

# Chapter 4 Configuration

## Connect the Backbone R1 to a Local Computer

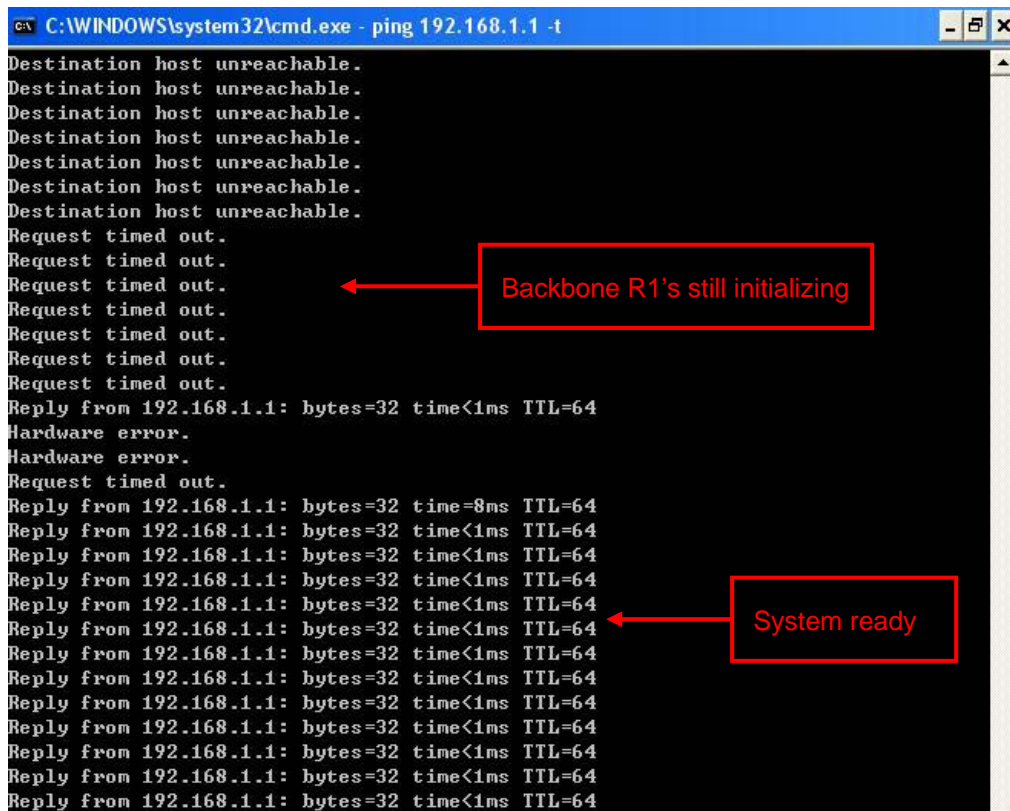
If you are configuring the Backbone R1 locally (without connecting its power injector to a wired LAN), connect a PC to the power injector's Ethernet port using a Category 5 Ethernet cable.

1. Assign a static IP address to your PC which is in the same network segment with the Backbone R1. As the default IP address of this unit is 192.168.1.1, you may choose from 192.168.1.2 to 192.168.1.254.



2. Test the link status between your PC and the Backbone R1. Start a command prompt and execute a continuous ping command "ping 192.168.1.1 -t". If ping to the wireless bridge is successful (as shown below), open Internet browser and enter the bridge's IP address in the address field and press Enter.

```
C:\WINDOWS\system32\cmd.exe - ping 192.168.1.1 -t
Destination host unreachable.
Destination host unreachable.
Destination host unreachable.
Destination host unreachable.
Destination host unreachable.
Destination host unreachable.
Destination host unreachable.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Hardware error.
Hardware error.
Request timed out.
Reply from 192.168.1.1: bytes=32 time=8ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
```



 **Note:**

- 
- Considering convenient configuration, it is recommended to configure local and remote Backbone R1 respectively on two computers.
  - TTL time may vary depending on the operating system.
-

---

## How to Establish Wireless Bridge Mode

The Backbone R1 supports four operating modes, which are Base Station, CPE, Peer-to-Peer (CSMA) and Peer-to-Peer (TDMA). Normally, Wireless Bridge is the typical mode on this unit. Here we will illustrate how to establish wireless bridge connectivity with Backbone R1.

- Enter the user name (admin) and password (password) to login and make configurations.



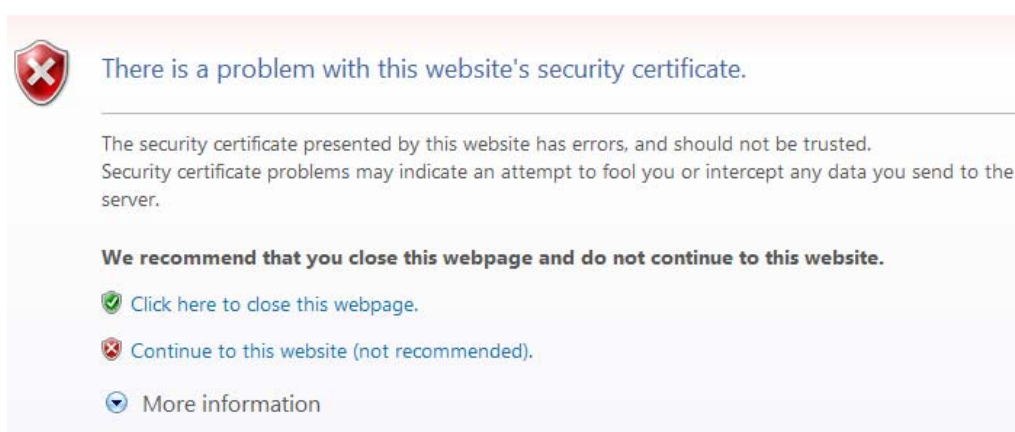
Rural Connectivity Platform


Name

Password

 **Note:**




- 
- Due to browser's security trusted sites, 192.168.1.1 might not able to be opened. You may choose to continue to the website.



 There is a problem with this website's security certificate.

The security certificate presented by this website has errors, and should not be trusted. Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.

**We recommend that you close this webpage and do not continue to this website.**

-  [Click here to close this webpage.](#)
-  [Continue to this website \(not recommended\).](#)
-  [More information](#)

- 
- Open “**Basic Setup**” in “**System**”, set the IP address of two Backbone R1s in the same network segment. e.g. local Backbone R1 as 192.168.1.1 and remote Backbone R1 as 192.168.1.2 and set the IP Subnet Mask on both as 255.255.255.0



Rural Connectivity Platform Logout

---

System    **Wireless**    Status    Management

---

About

**Basic Setup**

Basic »

RADIUS Settings

Wireless Device Name: DEVICE10bb16

Country / Region: United States

Ethernet Data Rate: Automatic

Spanning Tree Protocol (STP):  Enable  Disable

STP Forward Delay:  Turbo (default 1 sec)  Normal 4 sec (standard 4-30 sec)

VLAN(802.1Q):  Enable  Disable

Management VLAN ID: 0

System Monitor:  Enable  Disable

---

IP Settings:  Manual  DHCP Client

IP Address: 192.168.1.1

IP Subnet Mask: 255.255.255.0

Default Gateway: 0.0.0.0



**Warning:**

- Each IP address is unique within a LAN, otherwise IP collision may occur!

- Open “**Radio**” in “**Wireless**” and you will find the default operating mode is Peer-to-Peer (CSMA). Select to use the Peer-to-Peer (CSMA) operating mode and keep the Channel/Frequency and Bandwidth on both Backbone R1s identical. Click “**Apply**” to save settings.

Rural Connectivity Platform Logout

---

System    **Wireless**    Status    Management

---

Radio »

**Radio Settings**

Peer-to-Peer Setup

Operating Mode: Peer-to-Peer(CSMA)

Wireless Mode: 802.11a

Channel / Frequency: 149 / 5.745GHz

Transmit Rate: Best

Output Power: 100%

Band Width: 20MHz

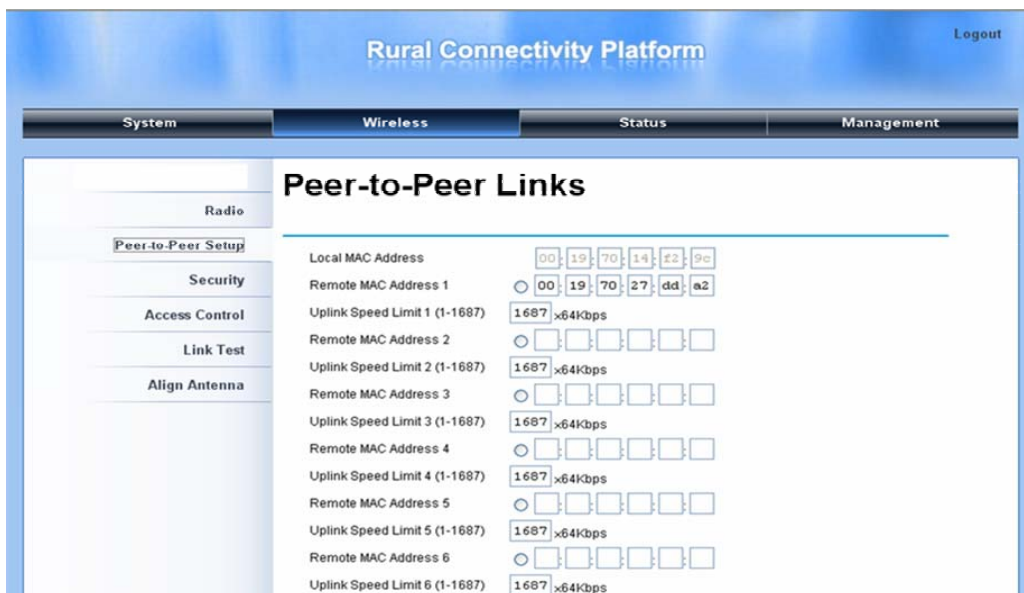
WMM Mode:  Enable  Disable

Super Mode:  Enable  Disable

- Login the Web-based interface of remote Backbone R1, open “**About**” in “**System**” and record the wireless MAC address of it.



- Login the Web-based interface of local Backbone R1 and open “**Peer-to-Peer Setup**” in “**Wireless**”, input the WLAN MAC address of the remote one to “**Remote MAC Address 1**” field and click “**Apply**”;

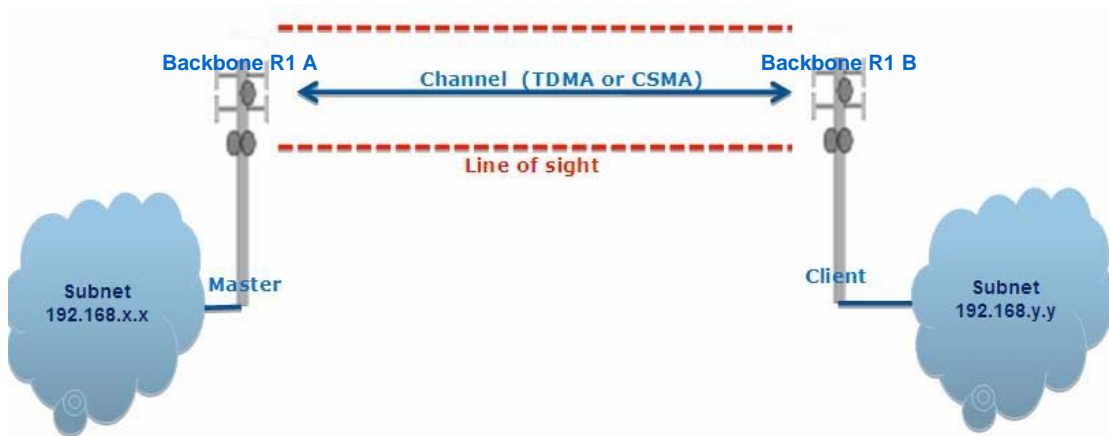


 **Warning:**

- The MAC address on the housing of Backbone R1 is the ETH MAC address; therefore it can not be used in Peer-to-Peer links.
- The IP address of your PC should be in the same network segment to the one of bridges.



- Use ping to check whether the link between the two Backbone R1 is OK.



- To get a better wireless connectivity, antenna alignment is strongly recommended after both Backbone R1s are installed long distance apart.

Login the Web-based interface of the local Backbone R1 and open “**Peer-to-Peer Setup**” in “**Wireless**”. Enter the MAC address of the remote bridge and click on the **Apply** button. Then click the “**Align Antenna**” button and the “**Antenna Alignment Tool**” window will popup. Specify the Target RSSI and click “**Start**” to begin the antenna alignment.

## Antenna Alignment Tool

---

Local MAC: 00:60:b3:3c:ab:1a  
 Remote MAC: 00:60:b3:3c:12:34

Signal Strength:

Current RSSI (dBm): 0

Target RSSI (dBm) :  -65

Transmit Packets: 0  
 Receive Packets: 0

---

- 
- Fix the local antenna and adjust the remote antenna elevation and horizontal direction. During the adjustment, observe “**Current RSSI**” in local Backbone R1. Fix the remote antenna when it reaches your expectation. Usually, RSSI between -60 and -70dBm indicates rather good signal strength.
  - Adjust the local antenna after fixing the remote one. During the adjustment, observe “**Current RSSI**” in the remote Backbone R1. Fix the local antenna when it reaches your expectation.
  - During the antenna alignment, the Backbone R1 will issue beep sound to indicate current RSSI. Frequency of beep indicates the following RSSI.

**RSSI-Beep Frequency**

RSSI	Beep Frequency
>-50	100 /sec
-50~-60	50 /sec
-60~-70	5 /sec
-70~-80	2 / sec
-80~-90	1 /sec
< -90	No beep sound

Congratulations! You have primarily completed configuration on Backbone R1 and they can be put into operation. For more advanced configurations, please refer to the User manual.

---

# Chapter 5 Troubleshooting

This chapter provides troubleshooting procedures for basic problems with the Backbone R1.

## Q 1. What if my Backbone R1 fails to connect to the remote one?

- **Ethernet Link:** Check the availability of power to the bridge by observing the LED status on the power injector.
  - Green: The Backbone R1 is connecting to the backhaul network.
  - Off: The Backbone R1 disconnects from the wired network, check whether the power cord and Ethernet cables to the network and bridge are correctly connected.
- **Basic Configurations:** Mismatched basic settings among bridges are the most common cause of connectivity fail. If the bridge does not associate with a remote bridge, check whether options in each device are identical.
- **Security Settings:** Remote bridges attempting to authenticate to your Backbone R1 must support the same security options configured in your bridge, such as WEP and WPA (2)-PSK. If your bridge fails to associate with others, check whether the security settings are the same as your bridge settings.
- **Antenna Alignment:** If the methods above are all checked to be correct, you can observe and verify antenna alignment with RSSI value.

## Q 2. What if I would like to reset the unit to default settings?

You may restore factory default settings in “**Backup/Restore Settings**” from “**Management**”

## Q 3. What if I would like to backup and restore my configuration settings?

You may do the backup by generating a configuration file or retrieve the settings you have backed up previously in “**Backup/Restore Settings**” from “**Management**”.