The Innovation Behind Broadband Wireless

Broadband Wireless IP Backhaul

605-0001-801 Rev A

FlexNET Link Products

FlexNET ASN-700:
Single RF, Internal Antenna, Pt-Pt link

FlexNET ASN-800:
Dual RF, No Antenna, Link Repeater

User's Guide

Connecting the World

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PREFACE

Thank you for purchasing Airspan's FlexNET ASN-700/800 (hereafter referred to as ASN-700/800) device. The ASN-700/800 is part of Airspan's AS.NET product family.

This section discusses the purpose, audience, conventions, and customer support of this guide.

Purpose

This Web-based WiFi management User's Guide provides step-by-step instructions for configuring and managing your ASN-700/800 using a standard Web browser.

Targeted Audience

This guide is intended for the end user.

Conventions

This guide uses the following typographical conventions:

Convention	Meaning	Example
Bold	Command, icon, button, and field	Click the **Next** button.
"**To**" in bold face and at the beginning of a sentence	Introduces a numbered procedure	**To download a SW file:** 1. ...
	Note that provides useful information	--
	Warning that provides information that can prevent and avoid bodily or mechanical harm	--

SAFETY INSTRUCTIONS (FRENCH TRANSLATION IN APPENDIX A)

This document must be reviewed for familiarization with the product and instructions before operation.

Verify that an un-interruptible safety earth ground exists from main power source and the ground circuitry of the product.

Verify that correct AC power source is available for the AC adapter to produce 12...24 VDC for the product.

Disconnect the product from operating power before cleaning.

Warning!

A professional installer must install the base station and antennas.

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment. (FCC 15.21)

Note on electromagnetic emissions

This device complies with part 15 of the Federal Communications Commission (FCC) rules. Operation is subjected to the following conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received including interference that cause undesired operation
3. Warning! Electromagnetic radiation. Please keep this product and related antennas at a distance 20 cm from human body.

Regulatory notice

The specifications and parameters of the device described in this document are subject to change without notice.

For American regulatory information, see www.fcc.gov. For Canadian regulatory information, see www.ic.gc.ca.

This equipment generates, uses and radiates energy on radio frequencies and, if not installed and used in accordance with this guide, 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 correct the interference by one or more of the following methods:

1. **reorient or relocate the receiving antenna**
2. **move the equipment and receiver farther apart**
3. **connect equipment to an outlet on a circuit different from that to which the receiver is connected**

Please study first allowed regulatory guidelines shown in Appendix 5, which describe allowed product configurations. The FlexNET ASN-700/800 product is only allowed to be used with Airspan antennas and accessories (PSU-3 power supply) and power dividers. In USA and Canada maximum allowed transmit power levels and channel frequencies are shown in Appendix 5.

INTRODUCTION

This guide contains information on how to operate and manage the ASN-700/800 products.

PACKAGE CONTENTS

The ASN-700/800 package contains the following items:

- ASN-700/800 product
- Mounting kit with downtilt
- One weather proof power connector kit
- One weather proof RJ-45 connector kit
- Outdoor power supply unit PSU-3
- Factory default tool
- Mounting instruction
- Documentation CD-ROM

PHYSICAL INTERFACES AND DESCRIPTION

Key features of the ASN-700/800 are:

- Aluminum enclosure supports outdoor installation
- Industrial temperature rating (-40...+55 °C)
- Two external antenna connectors (ASN-800 only)
- One (ASN-700) or two (ASN-800) 10/100 Base TX Ethernet ports
- Activity indication LED
- Detachable power connection with RS-485 connection for remote management

Antenna

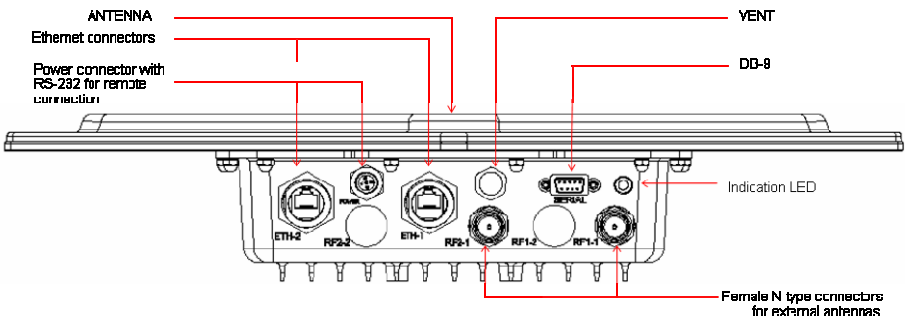
The ASN-700 is delivered with an integrated 5 GHz 23dBi patch antenna. Integrated link antenna element is covered with a white radome to protect it. The ASN-800 does not have an integrated antenna.

Aluminum enclosure

The base station unit uses an aluminum enclosure that supports outdoor operating environments and supports an industrial temperature operating range.

Connectors

All connectors are located on the bottom of the housing. Depending on your product version the number of Ethernet and antenna connectors may differ from the overview example presented here.



LED indicator

The LED indicator is also located on the bottom of the housing. The operation of the LED indicator is as follows:

- **Reboot:** flashing blue once per second
- **Committing configuration and initializing the radios:** flashing blue twice per second
- **Factory reset:** solid red when erasing the configuration
- **Upgrade software:** flashing red once per second

MAIN FUNCTIONALITIES

FlexNET link products are designed for wireless point-to-point and repeater applications. The main purpose of the link products is to provide a secure and high capacity transmission for backhaul and transit connections. The FlexNET link products operate on unlicensed frequency bands, 5.470-5.725 and 5.725-5.850 GHz frequencies using OFDM radios based on adaptive modulation scheme.

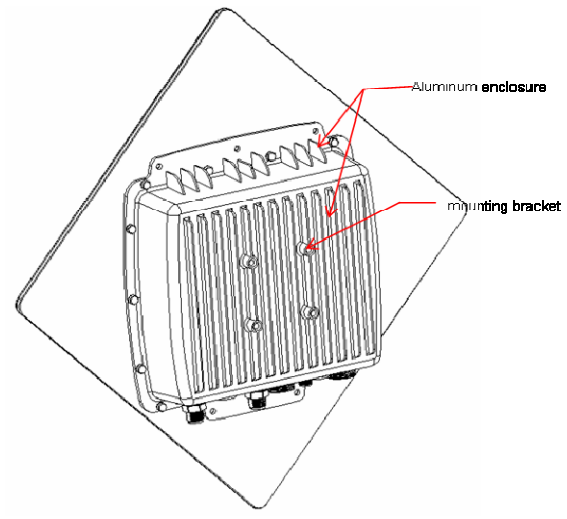
FlexNET link products offer versatile features for different deployment models. Link products can be configured to operate either in a routed or bridged mode. Wireless bridging mode is very important application area for these products. Routed link mode is supported in either static routing mode, or dynamic routing mode based on OSPFv2 routing protocol. OSPF (Open shortest path first) is widely used routing protocol, which allows links to be deployed to support redundant back routes, load balancing, multiple paths to end connections and automatic re-configuration in case of malfunctioning link unit with back-up route. OSPF supports also advanced integration of wired/wireless connections, where operators' network routing topology can be maintained across wired/fibre/wireless connections.

The FlexNET link products are available with integrated and external antennas. FlexNET single radio version (ASN-700) includes an integrated high gain antenna. FlexNET two radio version (ASN-800) does not have an integrated antenna; it is used with external, flexibly scalable antenna solutions.

INSTALLATION INSTRUCTIONS

The ASN-700/800 is designed for outdoor installation environment, on a tower, a tall building or an antenna mast.

A professional installer must install the base station and the antennas. The installer should also be familiar with network structures, terms, and concepts.

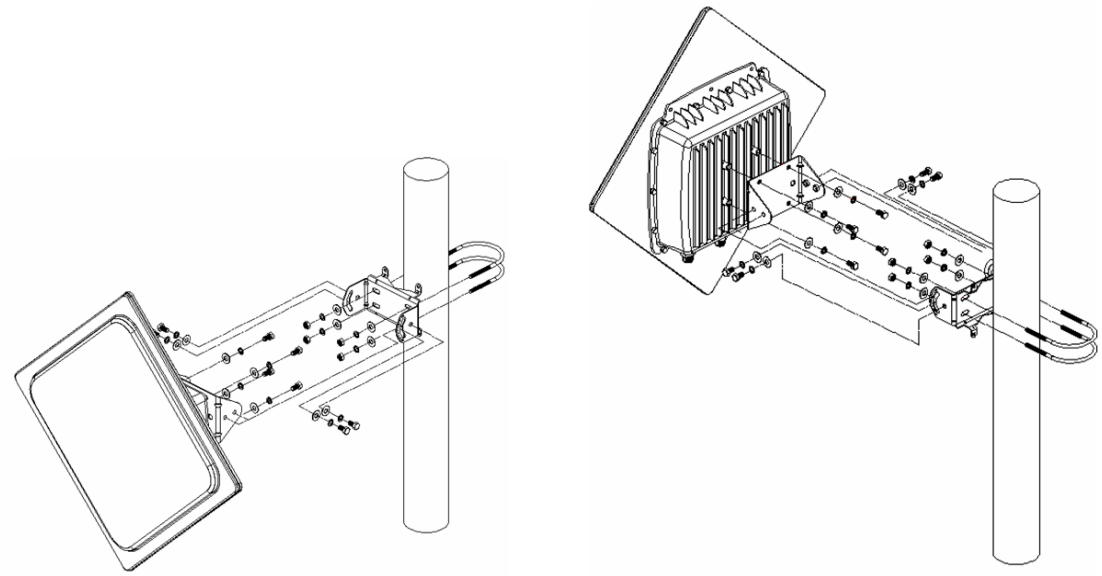


Installation direction

Connectors must always be downwards in outdoor installations. In indoor installations (e.g. warehouses etc.) direction can be freely selected if the integrated antenna is not used.

Antenna mast installation

The following figures present installation in an antenna mast pipe; antenna pipe diameters 45…60mm (approx. 1 3/4…2 1/3 inches).



Aligning the antenna

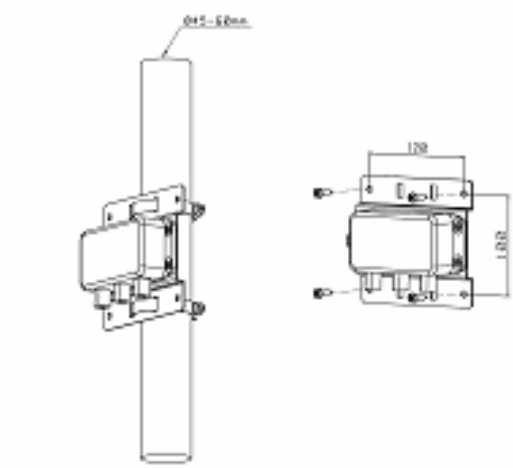
Installation technician must mechanically align the antennas for the best possible coverage.

Power divider

You may connect two sector antennas to one radio by using a power divider. For the best possible operation, the antennas using the same radio should point directly opposite directions from each other. Also the length of the cables between the antennas and the power divider should be the same to ensure even signal strength to both cells.

The power divider reduces the output signal level by 3 dBm.

The following figures present the installation of the power divider.



Lightning Protection

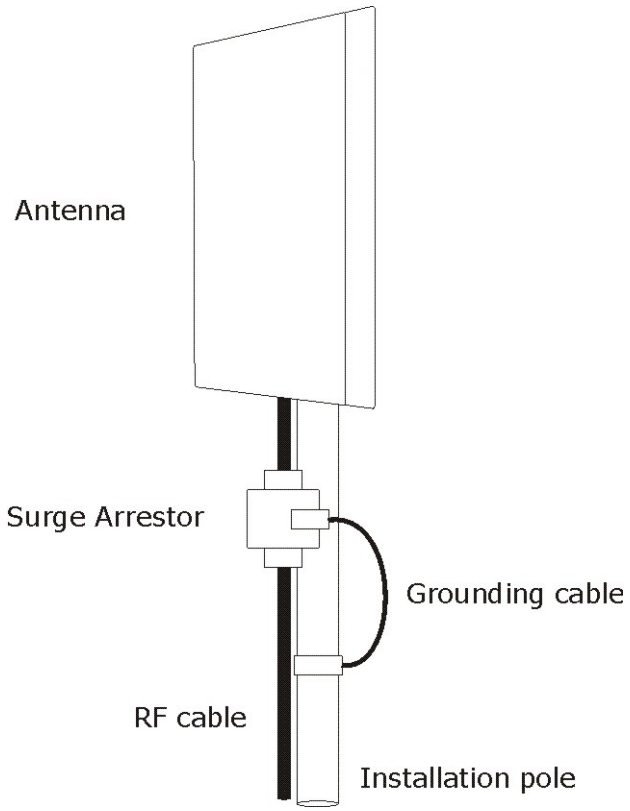
Airspan's surge arrestor MOB00208 can protect the radio units of a base station from damage due to a lightning strike. Statistically a lightning strikes to the highest electrical conductor in an area and then follows the lowest resistance and shortest path to ground. Since antennas are usually mounted in high places, they are very susceptible to lightning strikes. Therefore, the antenna location and the way how it has been mounted is the major point when discussed about the lightning protection.

Airspan recommends you not to mount your antennas on the highest building or tower and place them always at least a few feet below the top of the mast. Furthermore, the mast should be grounded by using a thick enough grounding cable.

Protection of the radio unit can be provided by installing a surge arrestor following the antenna connector. Surge arrestor MOB00208 uses a gas discharge tube to protect electrical equipment from lightning surges, which means that the tube must be replaced after a strike. Because the surge arrestor will not inform the user that it is going to a short circuit some repetitive maintenance is required.

It is also important that the surge arrestor is grounded with a grounding cable. This is needed to conduct the lightning bolt energy straight to the ground instead of the radio unit. The shorter the wire is the better result is achieved.

The following figure demonstrates how to install the surge arrestor MOB00208 correctly.



Power cabling using PSU-3 power supply

The PSU-3 power supply unit can feed one ASN-700/800 base station product. The power supply is an external unit designed for operation in outdoor environment. The supply voltage of the power supply is 24 VDC. The power supply unit provides RS-485 connector for remote management of the base station unit. RS-485 pins must be wired from the base station unit to power supply if RS-485 remote management is needed. Wiring can be done by 4-wire power cable.

RS-485 is a data communications interface standard approved by the Electronic Industries Association (EIA) for multipoint communications with serial devices. It is ideal for industrial applications due to its noise immunity.

The transmitted data is represented by voltage differences between the two wires of the power cable. RS-485 requires specific serial port hardware that supports RS-485 voltages and conventions.

Detailed cabling instructions are in Appendix 1.

Power cabling using PSU-2 power supply (accessory)

The PSU-2 power supply is an external unit designed for operation in outdoor environment. The PSU-2 power supply unit can feed up to two ASN-700/800 products. The supply voltage of power supply is 12 VDC. The power supply unit has an inbuilt sealed lead-acid rechargeable battery to ensure at least a few minutes of operation when the main supply voltage is lost. This battery back-up time depends on the condition of the battery. It is recommended to replace the battery from time to time, e.g. once a year. This replacement time depends on ambient temperature of the power supply unit.

Ethernet cabling

The maximum length of Ethernet cabling without repeaters or amplifiers is 100 meters (330 feet). Ethernet cabling must fulfil CAT5 category FTP outdoor cable specifications. Detailed cabling instructions can be found in Appendix 1.

Protective connector cover

If the Ethernet connectors are not used you must cover the connectors by a protective cover. The ASN-700/800 is shipped with protective covers on both Ethernet connectors by default.

Applying coax seal tape

When using the unit with external antennas, you must weather seal the N connectors using seal tape. N connectors that are not properly sealed permit moisture to enter the connection, which leads to performance degradation or coverage problems.

CONFIGURATION OVERVIEW - BEFORE YOU BEGIN

The ASN-700/800 link router product can be used for versatile link deployments. Different configuration alternatives are possible. This product is used in networks based on IP routing. Key issues described in this manual focus on basic configuration of both wireless and wired interfaces of this product. Before you begin to install this product, make sure that you have following basic issues prepared necessary for router installation: IP network plan where the ASN-700/800 is to be installed, IP addresses for wired/wireless interfaces of the ASN-700/800, and radio network plan for the use of 802.11a radios and channels, as well as radio settings appropriate to your network and hardware (see page 19).

Connecting to the ASN-700/800 products

The ASN-700/800 is configured via a practical web-based configuration utility. The configuration utility can be accessed using an ordinary web browser, and allows you to edit, manage and monitor your ASN-700/800 settings and functionality.

The configuration utility supports the following web browsers:

- Internet Explorer versions 5.0, or higher
- Mozilla versions 0.9, or higher
- Netscape Navigator versions 6.1, or higher
- Opera, versions 7, or higher

Other web browsers may also be acceptable, but have not been tested. Only the web browsers listed above can be guaranteed to function correctly when used to configure the ASN-700/800.

Establishing the initial connection

First, plug in the power cable of the ASN-700/800 to power up the unit.

Establish a physical connection to the ASN-700/800. If you are using a laptop or a desktop computer, this can be done using a cross wired twisted pair Ethernet cable to connect your PC to ethernet1 port of the ASN-700/800.

Set your computer IP addresses as follows:

- IP address: 192.168.1.2
- Subnet mask: 255.255.255.0

Once the unit is powered up and your IP parameters are set, you may use your web browser to connect to the IP address of the ASN-700/800. The ASN-700/800 is pre-configured with default IP addresses “192.168.1.1” on the ethernet1 interface.

Default IP address

Factory default value: 192.168.1.1

Default IP address may be later changed by an administrator (see page 18 for information about changing the IP address of an interface). To connect to the configuration utility, perform the following steps:

1. Enter the IP address of the ASN-700/800 in your browser's address or location bar.
2. Press **ENTER**. This will bring you to the login screen shown in Figure 1.

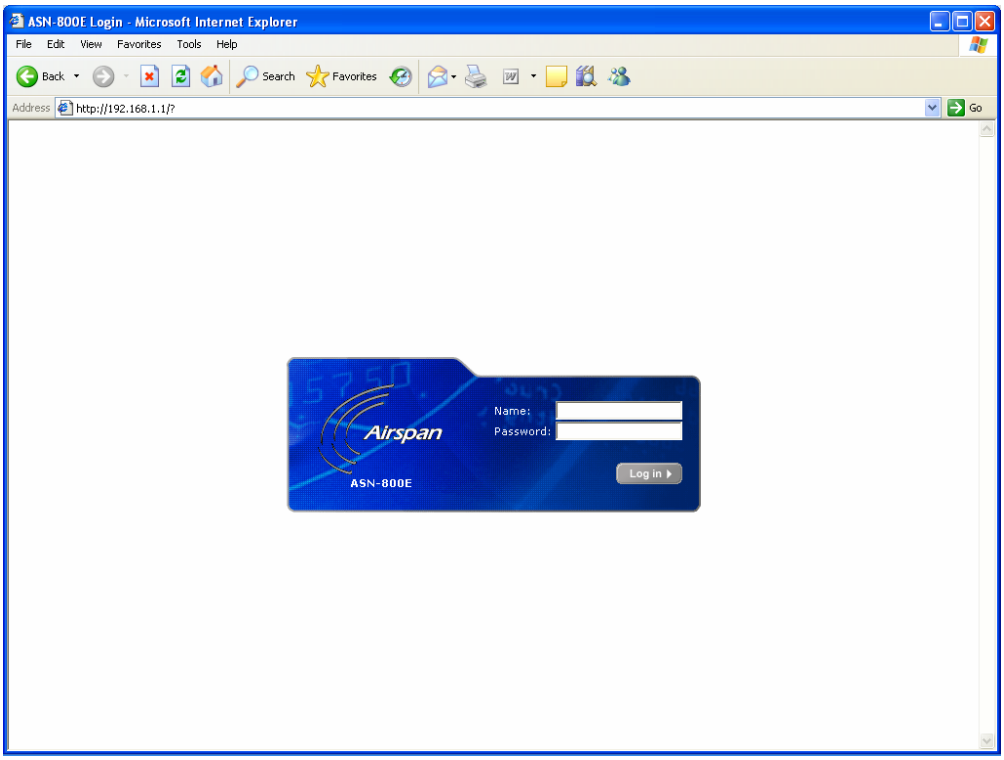


Figure 1 The login screen of ASN-700/800 products

Providing username and password

Enter your administrator username and password into the fields on the login page. When shipped, the ASN-700/800 is pre-set with a single default administrator account. To access this account, use the following login information:

Username: admin

Password: default

Usernames and passwords are case-sensitive. Additional administrator accounts and passwords can be set up from the Security menu (see page 24). To protect your ASN-700/800 against unauthorized access, Airspan Networks strongly recommends that you change the default password as soon as possible

Click the **Log in** button to send your login information to the ASN-700/800. Once you have successfully logged in, you will be presented with the ASN-700/800 configuration menu and Home page.

Note: As a security measure, the ASN-700/800 configuration utility will automatically log you out after 15 minutes of inactivity. If this happens, simply enter your administrator username and password at the login page again.

THE CONFIGURATION HOME PAGE

Upon logging in, you will first see the ASN-700/800 configuration Home page, shown in Figure 2.

Note: Depending on your choice of product version and web-browser, your screen may not appear exactly as depicted in this document.

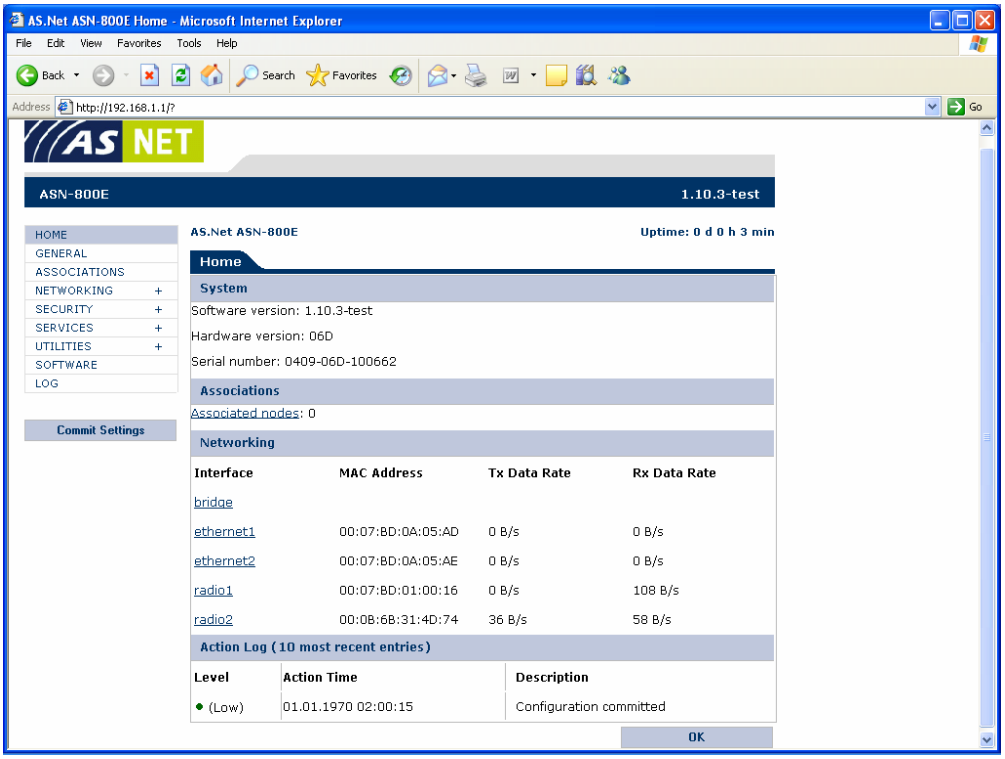


Figure 2 The configuration Home page

The Home page displays a brief summary of the configuration and current status of your ASN-700/800 product. At the top of the page you can read the name and uptime of the device.

Additional information about the ASN-700/800 is grouped under the four sections: System, Associations, Networking, and Action log. These constitute the remainder of the page.

System

The system info section displays the following information regarding your ASN-700/800 unit.

Software version

The firmware version of the unit. For information about updating the ASN-700/800 firmware, consult page 36.

Hardware version

The hardware version of the unit.

Serial number

The serial number of your unit. This number is important when you need to contact customer service.

Associations

The number of other link units connected to this ASN-700/800 unit is displayed here.

Networking

The Networking section of the Home page contains information about the network interfaces of your ASN-700/800:

- Bridge interface. The bridge interface is a virtual interface. Binding two or more of the remaining interfaces to the bridge will allow them to share a common IP address.
- 2 Ethernet ports; ethernet1 and ethernet2. Both ports are standard 10/100 Base-T Ethernet ports, capable of a connection rate up to 100Mbit/s.
- 2 radio interfaces; radio1 and radio2. These interfaces consist of a pair of radio transceiver/receivers, with an 802.11 MAC layer, used to obtain wireless connectivity.

Note: The ASN-700 comes with one Ethernet and one radio interface only, ethernet1 and radio1.

For each active interface, the following information is displayed:

MAC Address

The unique hardware identification code of the interface.

Tx Data Rate/Rx Data Rate

The rate of data being sent and received through the interface.

Action log

The ten most recent log entries are displayed at the bottom of the configuration Home page. For more information about accessing and editing the log, see page 38.

NAVIGATING THE CONFIGURATION MENU

Use the configuration menu on the left of the screen (see Figure 3), to access the other pages of the configuration utility. Clicking on one of the menu entries will open a sub-menu containing links to further configuration pages.

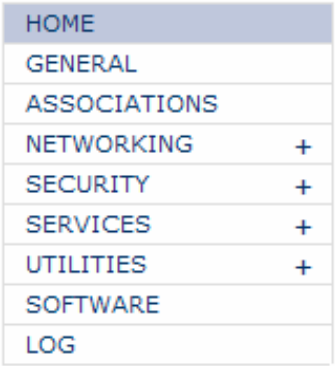


Figure 3 The configuration menu

HOME

The first page displayed at login, containing a summary of information about the ASN-700/800 and its configuration. See Figure 2 on page 11.

GENERAL

Contains general information about your ASN-700/800. See Figure 6 on page 15.

ASSOCIATIONS

Lists additional devices connected to your WLAN. See Figure 8 on page 16.

NETWORKING

Advanced options for configuring the Ethernet and radio interfaces of the ASN-700/800. Refer to page 17.

SECURITY

Add and remove administrators, and change administrator passwords. Refer to page 25.

SERVICES

Set up network services, such as DHCP. Refer to page 27.

UTILITIES

Network utilities to test the connectivity of your network. Refer to page 33.

SOFTWARE

Update your ASN-700/800 with the latest firmware. Refer to page 36.

LOG

Edit and examine the ASN-700/800 activity log. Refer to page 38.

Saving and committing changes

The two action buttons **OK** and **Commit Settings** are used to implement or undo changes to the configuration of the ASN-700/800.

Figure 4 The action buttons

OK

Clicking the **OK** button after editing any configuration page will save the new settings to the ASN-700/800. The new settings will not be enabled until **Commit Settings** button is clicked (see below).

Commit Settings

Click the **Commit Settings** button to enable saved settings to persist after reboot of the ASN-700/800. The currently saved settings will be written into the non-volatile memory of the ASN-700/800 and will be read at each reboot.

Note: To make permanent changes to the configuration of the ASN-700/800:

1. Navigate to the appropriate configuration page and enter new settings.
2. Click the **OK** button to accept and apply your changes.
3. Using the menu, navigate to any further pages you wish to configure and repeat steps (1) and (2).
4. When you are satisfied with the configuration of the device, click the **Commit Settings** button to permanently record your changes.

GENERAL

The general screen presents common information about your ASN-700/800.

Figure 5 The General link

Click on the **GENERAL** link to view and set the following information of the ASN-700/800 base station unit (see Figure 6):

GENERAL SETTINGS

Contains the name, location and coordinates of your base station unit.

TIME ZONE

The correct time zone should be set here.

SYSTEM TIME

Enter the correct time and date here and click **Set**.

NETWORK TIME PROTOCOL

If you wish to synchronize the system time with a time server, click **Enabled** and enter the IP address of the server you want to you use.

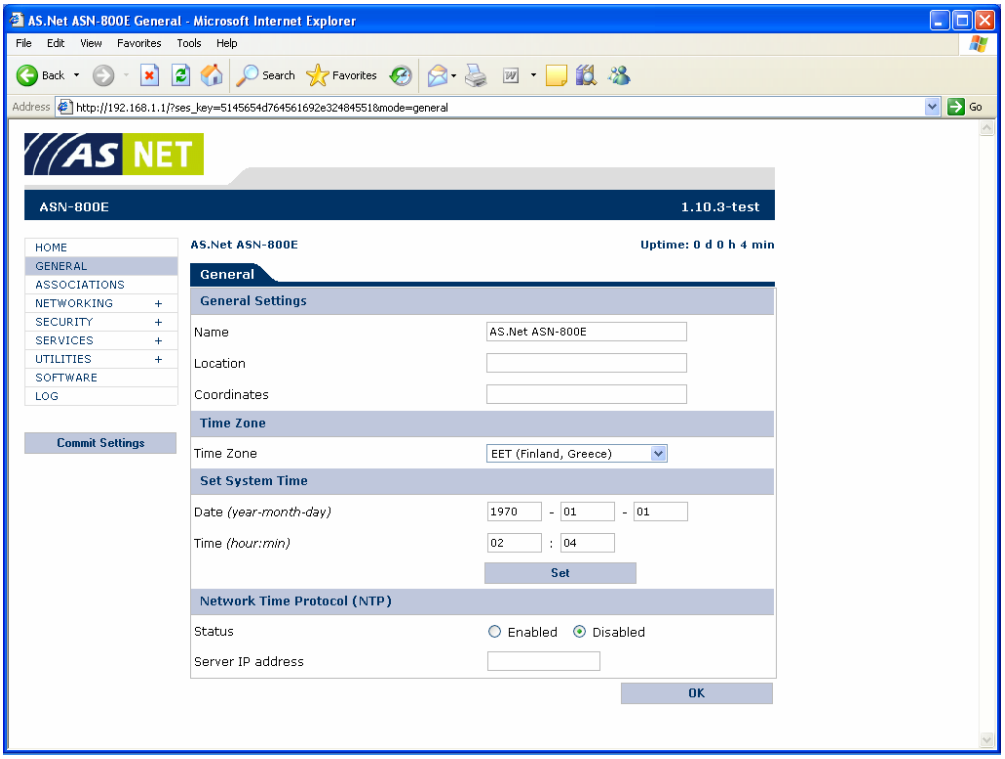


Figure 6 The General screen

Note: Remember to click on the **OK** button to apply your changes, and click **Commit Settings** to permanently accept the new configuration.

ASSOCIATIONS AND NODES

The Associations screen lists all nodes currently connected to the ASN-700/800, and provides information about the signal strength of each connection. Click on the **ASSOCIATIONS** link in the configuration menu to access the Associations page.

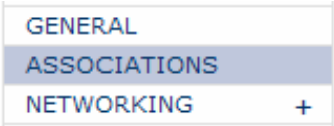


Figure 7 The Associations link

Nodes connected to the ASN-700/800 are listed in rows across the Associations screen. Information about current connection conditions is displayed in the columns of the table.

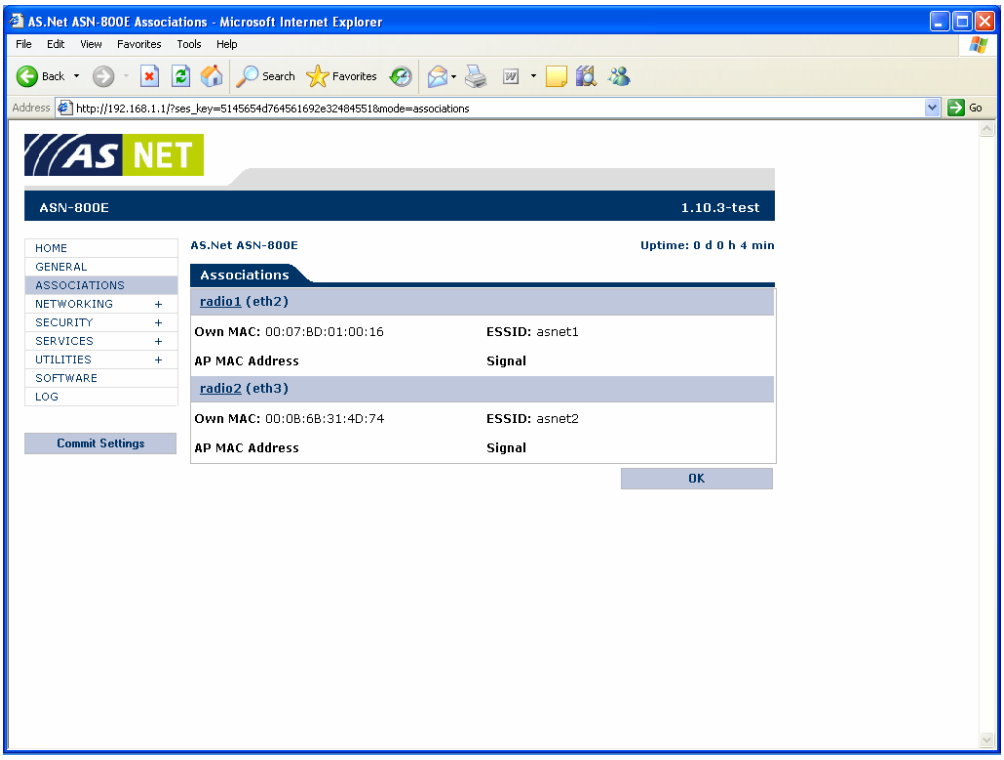


Figure 8 The Associations screen

AP MAC Address

The hardware address of the connected node.

Signal

The strength of the connection's radio signal.

NETWORKING

Click on the **NETWORKING** entry in the configuration menu (Figure 9) to open links to the networking configuration pages, and the routing table.

Use these pages to set hostnames and IP addresses - or alternatively, specify a DHCP server - for the network interfaces of your ASN-700/800. The networking configuration pages can also be used to enable or disable interfaces, to bind interfaces to the bridge, or to set operating parameters for the special radio interfaces.

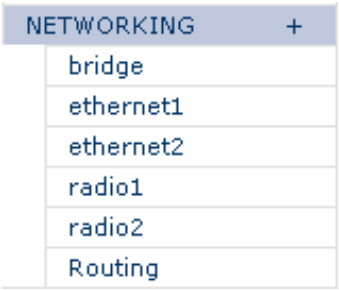


Figure 9 The Networking menu

Note: The ASN-700 comes with one Ethernet and one radio interface only, ethernet1 and radio1.

Changing Ethernet settings

Click on the **NETWORKING>ethernet1** or **NETWORKING>ethernet2** link in the configuration menu to open the configuration page for the respective Ethernet interfaces. Figure 10 shows the configuration page for the ethernet1 interface.

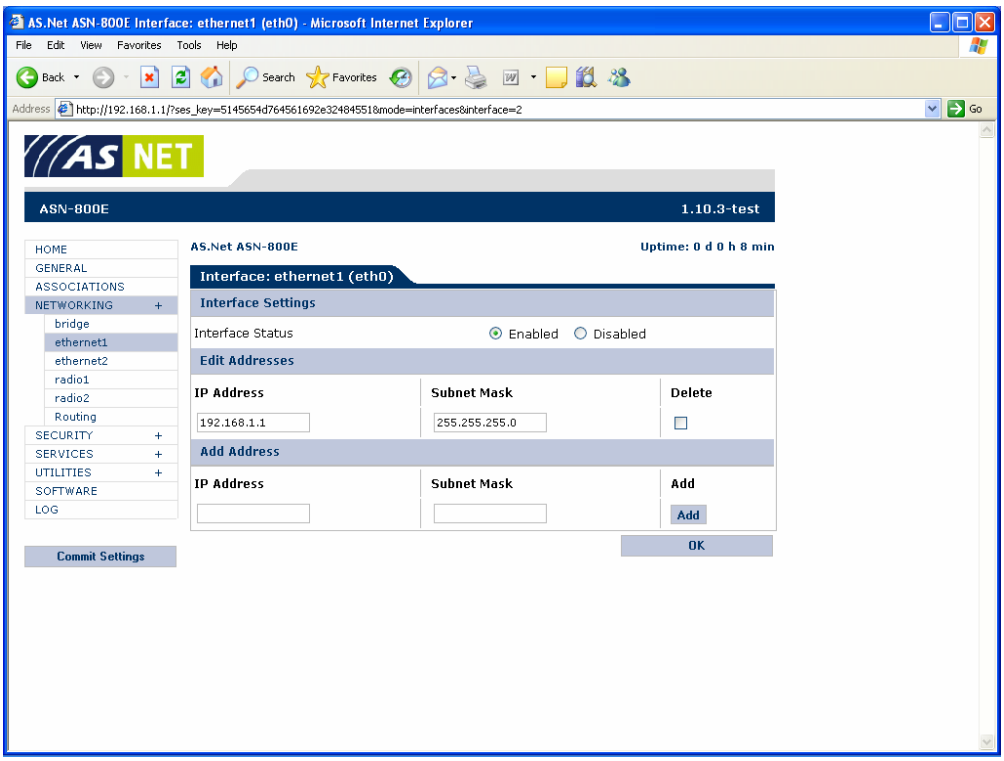


Figure 10 Configuring an Ethernet interface

Basic interface settings

The process of editing the basic interface settings is described below. Remember to click the **OK** button to apply the changes you make.

Interface status

This pair of radio buttons shows whether the selected interface is currently enabled. To enable the interface, click on the **Enabled** radio button. To disable the interface, click on the **Disabled** button. Click the **OK** button to apply the change.

Editing existing IP addresses

The current IP addresses of the selected interface are listed below the basic interface settings, in the Edit Addresses section of the configuration screen.

To modify an IP address click in the **IP Address** and/or **Subnet Mask** fields. Edit the IP address/subnet mask, and click the **OK** button.

To delete an IP address click the **Delete** checkbox beside the IP address(es) you wish to delete. Click the **OK** button to remove the checked address(es).

Adding a new IP address

Assign a new IP address to the selected interface by using the **Add Address** fields at the bottom of the configuration screen. Enter a new IP address and subnet mask in the respective text fields of the selected interface, and click the **Add** button.

Note: Remember to click on the **OK** button to apply your changes, and click **Commit Settings** to permanently accept the new configuration.

Changing bridge settings

Click on the **NETWORKING>bridge** link in the configuration menu to open the configuration page for the bridge interfaces.

The process of editing the basic interface settings (interface label and status) is exactly as described for Ethernet interfaces in Section **Basic interface settings**, on page 18. Interface settings specific to the bridge interface are described here (see Figure 11 on page 19).

The ASN-700/800 should be configured so that the first Ethernet port (Ethernet 1) is used to connect the base station towards the Internet or an Airspan ControlNET Server.

Transparent bridging with Ethernet tunnel

A pair of link units can be used as a transparent bridge with Ethernet tunneling option. Both ends of the radio link must have the same tunnel setting. The bridge configuration shows option (Activate tunnel) to turn on tunneling for the radio interface. By default the tunnel is on. When bridging the AP/Master end of a link only, disable the tunnel for the radio in the bridge. The tunnel setting has no effect when bridge is not enabled.

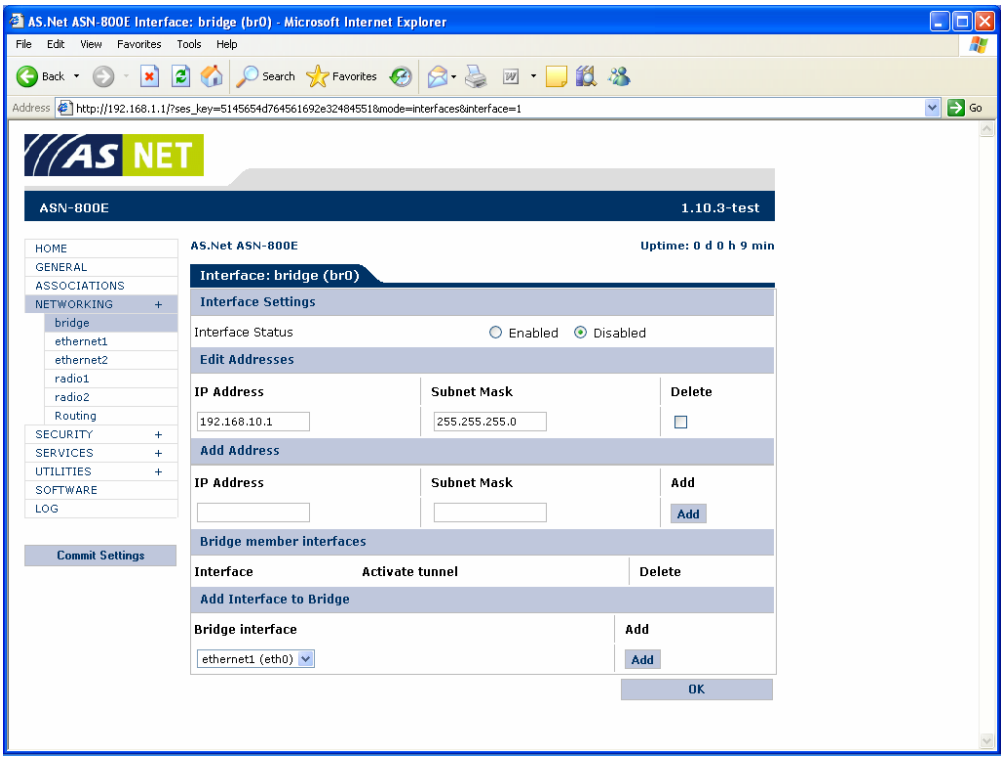


Figure 11 Configuring the bridge interface

Removing an interface from the bridge (ASN-800 only)

The Bridge member interfaces section of the configuration page is used to remove interfaces from the bridge. Available interfaces are listed in the Interface combo box.

To remove an interface from the bridge (ASN-800 only)

1. Using the combo box, select the network interface to be removed.
2. Click the **Delete** checkbox beside the selected interface.
3. Click the **OK** button to remove the selected interface from the bridge.

Binding an interface to the bridge (ASN-800 only)

The Add Interface to Bridge section of the configuration page is used to bind interfaces to the bridge. Available interfaces are listed in the Bridge Interface combo box.

To bind an interface to the bridge (ASN-800 only)

1. Using the combo box, select the network interface to be bound to the bridge.
2. Click the **Add** link beside the selected interface.
3. Click the **OK** button to bind the selected interface to the bridge.

Changing radio interface settings

Click **NETWORKING>radio1** or **NETWORKING>radio2** links in the configuration menu to open the configuration pages for the first and second radio interfaces, respectively.

Interface settings specific to the radio interfaces are described here (see Figure 12). Depending on the product version you are configuring some of the **Radio Settings** might be missing or appear differently.

Note: The ASN-700 comes with one Ethernet and one radio interface only, ethernet1 and radio1.

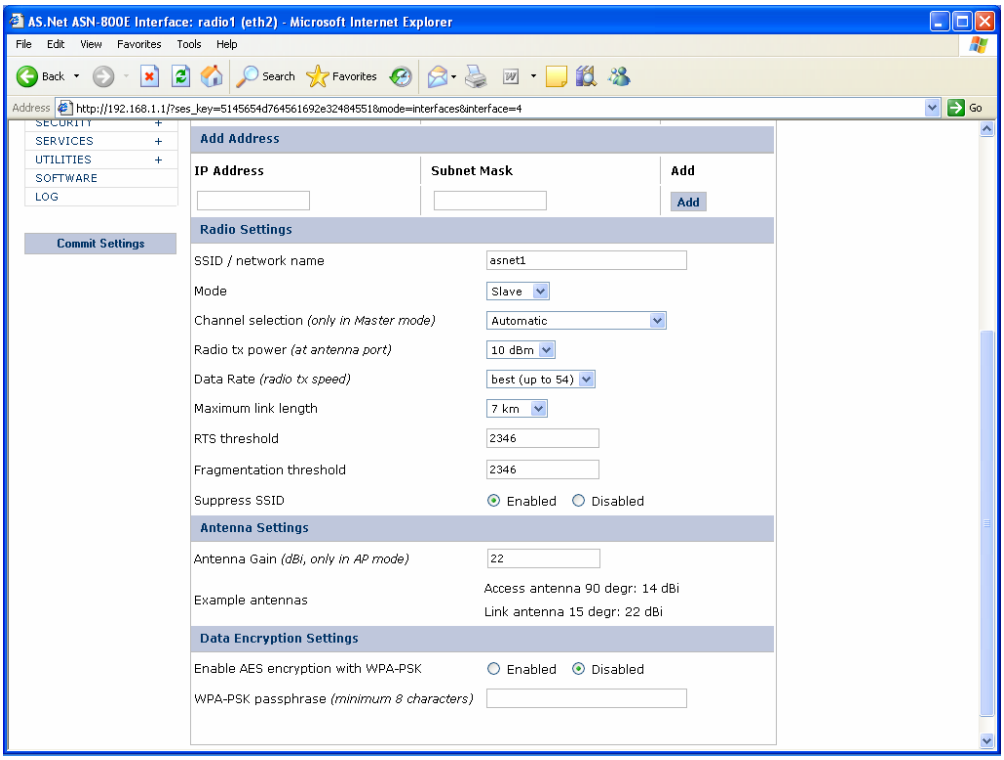


Figure 12 Configuring the radio interfaces

Edit the SSID

To change the SSID of a radio interface, enter the new SSID in the SSID/network name text box and click **OK**. The SSID may contain a maximum of 32 characters. Associated link units should be configured to use the same network name in order to communicate.

Set the Operation mode

Use the Mode combo box to specify whether the interface will operate as an AP/Master or a Station/Slave.

Channel selection

Use the Channel selection combo box to select an operating frequency for the link connection (AP/Master mode only). The radio channel frequency is expressed in MHz. At 802.11a channels use only automatic channel selection. In Station/Slave mode this selection is not effective.

Dynamic frequency selection (DFS) is always enabled in ASN-700/800 products as a basic setting. Keeping channel frequency setting in automatic mode assures that this feature is functional.

Set transmit power

Use the Radio tx power combo box to set the transmit power. The radio transmit power directly affects hop length. Do not exceed the maximum EIRP (effective radiating isotropic power) power (EIRP = tx power - cable loss + antenna gain), which is limited by the local radio authority.

When using external antennas, the cable loss should also be taken in account. Use the Radio tx power combo box to select your desired power level and click the **OK** button.

Data rate

Using the Data Rate combo box, you can set a constant data rate. If “best” is chosen, the link unit will always use the best possible data rate.

Maximum link length

Use maximum link length selection combo box to select an appropriate maximum link distance. Choose one of the following alternatives from the combo box:

- **500 m:** Use this setting for point-to-point link deployments where the other end is located close to the access point, from distances of 500 m to 3000 m
- **7 km:** Use this setting for point-to-point link deployments where the other end is located max 7 km from the access point
- **15 km:** Use this setting for point-to-point link deployments where the other end is located max 15 km from the access point
- **25 km:** Use this setting for point-to-point link deployments where the other end is located max 25 km from the access point

Set the RTS threshold

This value determines the maximum packet size allowed before the RTS/CTS handshaking protocol takes effect. To avoid packet loss when multiple stations/slaves are sending packets to an AP/master, the RTS/CTS protocol will be activated whenever a packet exceeds the specified threshold. A threshold value of 1 implies automatic RTS/CTS. Values in the range {1-2346} are supported. To change the RTS threshold, enter the new value in the RTS threshold text box and click the **OK** button.

Set the Fragmentation threshold

In a noisy radio environment, packet fragmentation is used to split large frames to smaller frames to minimize the decrease in network capacity. If the size of a frame exceeds the fragmentation threshold, the frame will be fragmented into small frames. Values in the range {256-2346} are supported. To change the Fragmentation threshold, enter the new value in the Fragmentation threshold text box and click the **OK** button.

Suppress/Enable SSID broadcast

This pair of radio buttons indicates whether the SSID is broadcast over the wireless network. Disabling SSID broadcast can increase wireless network security. Click the appropriate radio button to enable or disable SSID broadcast and click the **OK** button.

Defining the antenna gain

Enter the gain of the antenna (for example, 22) in use in this field.

Integrated antenna

Integrated antenna is a 23 dBi gain panel antenna. After you have selected Integrated antenna from combo box (Integrated/external), write the antenna gain “23” to Antenna Gain input value in the related text box.

External antenna

External antennas of varying gain levels can be used. We recommend using Airspan PlanAir antennas only. The gain of Airspan PlanAir access antennas are typically between 12-22 dBi. Write the antenna gain value into the related text box.

Note on transmit power limits

When using external antennas, make sure that the maximum EIRP power does not exceed the applicable power limitations set by the national radio legislation. Check applicable maximum radio transmit power + antenna combinations from Appendix 5 of the manual where equipment details are shown.

Enable AES encryption

If you wish to enable AES encryption, choose **Enabled** on this pair of radio buttons.

WPA-PSK passphrase

If AES encryption is enabled also a WPA-PSK passphrase needs to be set. The passphrase must be the same in both devices of a link connection.

Note: Remember to click on the **OK** button to apply your changes, and click **Commit Settings** to permanently accept the new configuration.

Interface notes (all interfaces)

Interface notes section is shown at the bottom of the screen whenever an interface is configured as a member of an active bridge, or if Services (DHCP Server or DHCP Relay) is configured to use the interface. Interface notes provides links to bridge or service configuration.

Routing

To set up routing information for the ASN-700/800, click on the **NETWORKING>Routing** link in the configuration menu. This will open the routing table configuration page (see Figure 13).

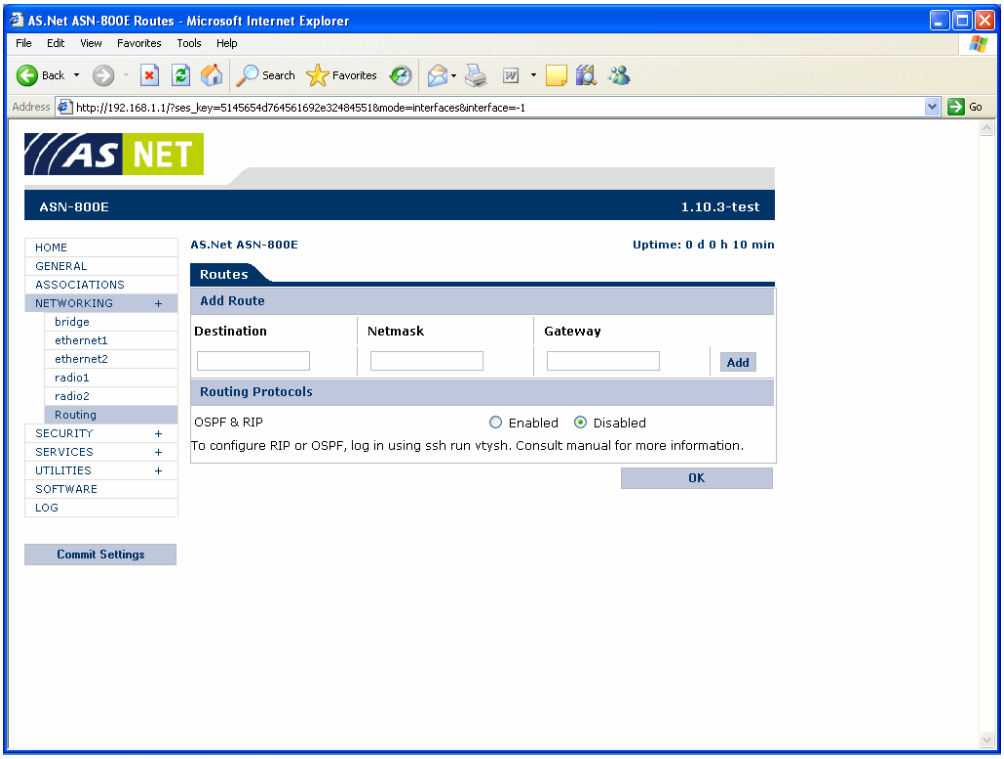


Figure 13 The Routing table

Editing an existing route

Existing routes are displayed in the Edit routes section of the configuration screen.

To modify an existing route click in the **Destination**, **Gateway** and/or **Netmask** fields. Edit the existing information and click the **OK** button.

The **Interface** field shows which interface is used for sending packets to the gateway. The interface is the one which has an IP subnet that matches the gateway IP address. If there is no IP subnet for the gateway IP address, the **Interface** field displays "Unknown!". In this

case, either the gateway IP address or the IP settings of interfaces of the unit have to be changed.

Adding a new route

Assign a new route by using the **Add Route** fields at the bottom of the configuration screen.

To add a new route

Enter the destination network in the **Destination** text field, and the associated gateway and subnet mask in the **Gateway** and **Netmask** fields. Click the **Add** link beside the new route information.

Default gateway

To set the default gateway, use “0.0.0.0” for both, the **Destination** and the **Netmask**.

OSPF & RIP

The ASN-700/800 can also be upgraded to support OSPFv2 (Open shortest path first) dynamic routing. Additional information and manual for OSPF support is available from Airspan Networks in ASN-700/800 OSPF-manual and documentation set. OSPF and RIP can be enabled from the user interface. The actual configuration command line interface can be used with SSH. Refer to additional information provided in Airspan Networks OSPFv2 routing manual, which is separate document delivered with ASN-700/800/900 products supporting OSPF routing.

Note: Remember to click on the **OK** button to apply your changes, and click **Commit Settings** to permanently accept the new configuration.

SECURITY

Click on the **SECURITY** entry in the configuration menu to access the remote login and administrator setup screens.

Figure 14 The Security menu

Use these pages to expand or limit access to the configuration interface of the ASN-700/800. The remote login page allows you to determine which protocols can be used to connect to the configuration interface of the base station unit. The administrator page lets you modify a list of users who are authorized to make changes to the ASN-700/800.

Configuring remote login services

To set the accepted configuration login services, click the **SECURITY>Remote Login** link in the configuration menu.

The configuration system of the ASN-700/800 supports the SSH and HTTP services. Use the radio buttons, as illustrated in Figure 15, to enable or disable each service.

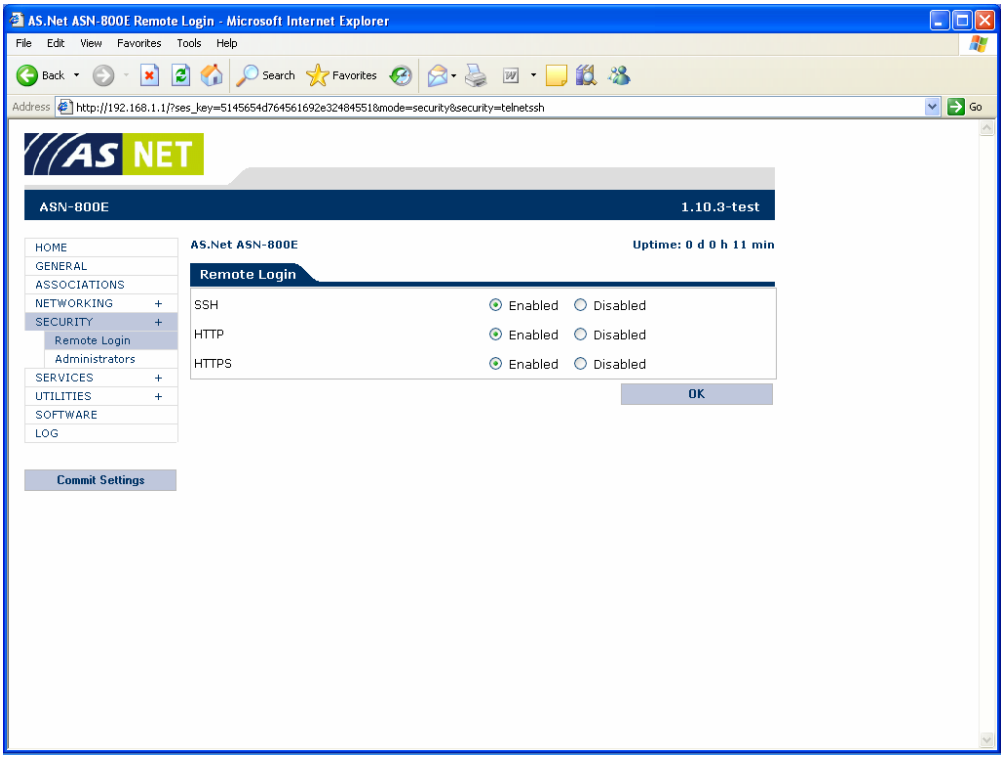


Figure 15 Remote login services

SSH

The SSH service allows an administrator to access the ASN-700/800 configuration system from a text-based terminal.

HTTP

The HTTP service enables an administrator to connect to the ASN-700/800 configuration system using a web browser.

HTTPS

The HTTPS service enables an administrator to establish an encrypted and secure HTTPS connection (encrypted using SSL, Secured Sockets Layer) to the ASN-700/800 configuration system using a web browser.

WARNING! Under no circumstances should you disable all remote login services! At least one remote login service should remain operational, to enable you to access and configure the ASN-700/800.

Click the **OK** and **Commit Settings** buttons to retain any changes you make.

Configuring administrator accounts

Click on the **SECURITY>Administrators** link in the configuration menu to open the Administrators configuration page.

The ASN-700/800 is shipped factory-set with the following single administrator account:

Username: admin
Password: default

It is strongly recommended that you change the factory-set password to one of your own as soon as possible, in order to prevent unauthorized access to the configuration system of your ASN-700/800 unit.

Note: When changing the password, the new password will also be your new SSH password.

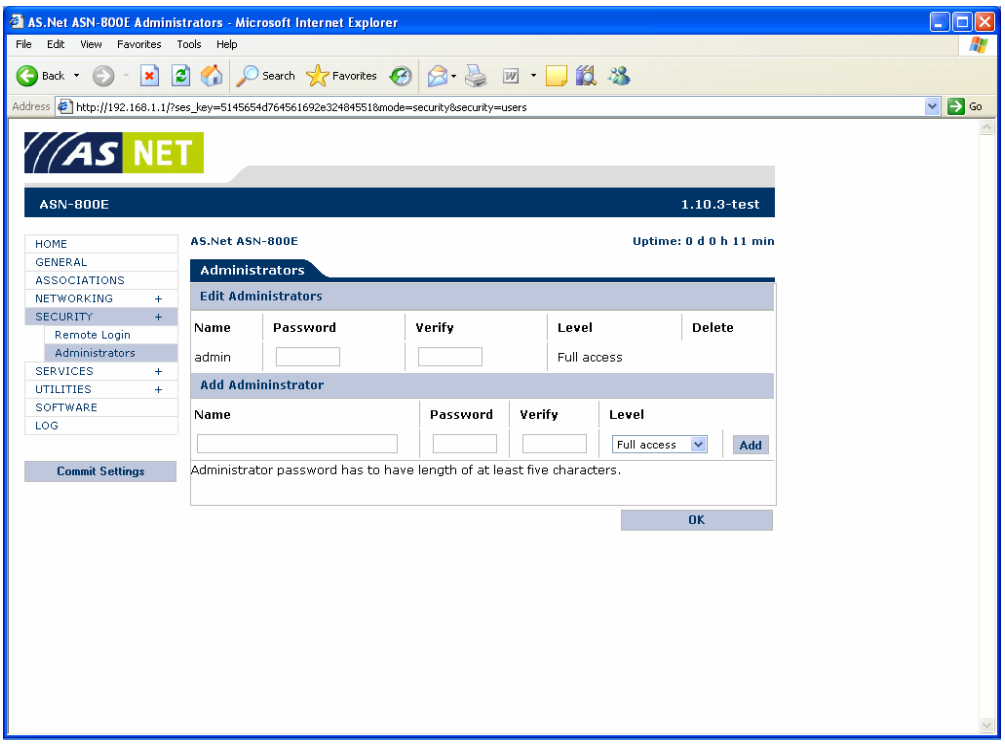


Figure 16 Editing administrator information

Adding a new administrator account

Any number of additional administrators may be created, using the Add user section of the Administrators configuration page. To create a new administrator account, enter the required information in the text fields provided:

Name

Provide a login name for the new administrator. This is the name that must be entered at the configuration interface's login screen (see page 10).

Password

Provide a password for the new administrator. For security reasons, the password is being displayed on the screen as a series of asterisks. Note that the password must also be entered in the **Verify** field (see below) in order to be accepted.

Verify

New passwords must be entered both here and in the **Password** field (see above). The requirement to enter the password twice is a precaution against a mistyped password. The passwords in the **Password** and **Verify** fields must match, or the new administrator account will not be created.

Level

Administrators may be assigned to one of two levels. To set the access level of an administrator, select the desired level from the combo box:

> **Full access**
>
> An administrator with Full access has a complete control over the ASN-700/800 configuration interface, and may create, modify and save any of the available settings.
>
> **Read access**
>
> Administrators with Read access are able to examine logs and configuration information, but are barred from implementing any changes to the settings of the ASN-700/800.

Click the **OK** button to make the new administrator account active. To retain a permanent record of the new administrator, continue by clicking on the **Commit Settings** button.

Deleting an administrator account

To delete an existing administrator account, click the **Delete** checkbox at the end of an administrator record, and click the **OK** button. To make the deletion permanent, click on the **Commit Settings** button.

The administrator account that is currently logged in cannot be deleted.

Editing administrator passwords

The list of current administrators is displayed at the top of the Administrator configuration screen. To change the password of an administrator account, simply enter the new password in the text fields and click **OK**.

SERVICES

DHCP server

DHCP server is a system to dynamically allocate IP addresses to a client network. To set up network services, begin by clicking on the **SERVICES** link in the configuration menu.

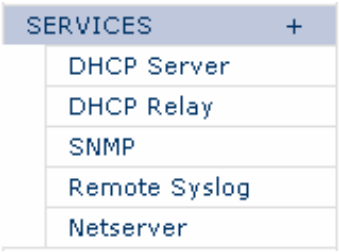


Figure 17 The Services menu

Configuring the DHCP server

You may access the DCHP configuration page through the **SERVICES>DHCP** menu link. The DHCP server enables the ASN-700/800 to dynamically assign IP addresses to clients on the local network.

The DHCP configuration page is divided into three sections, General DHCP Server Settings, Client IP Pool and Client Network Settings. Each section is described below. To activate the DHCP server, complete the configuration fields with values appropriate to your network.

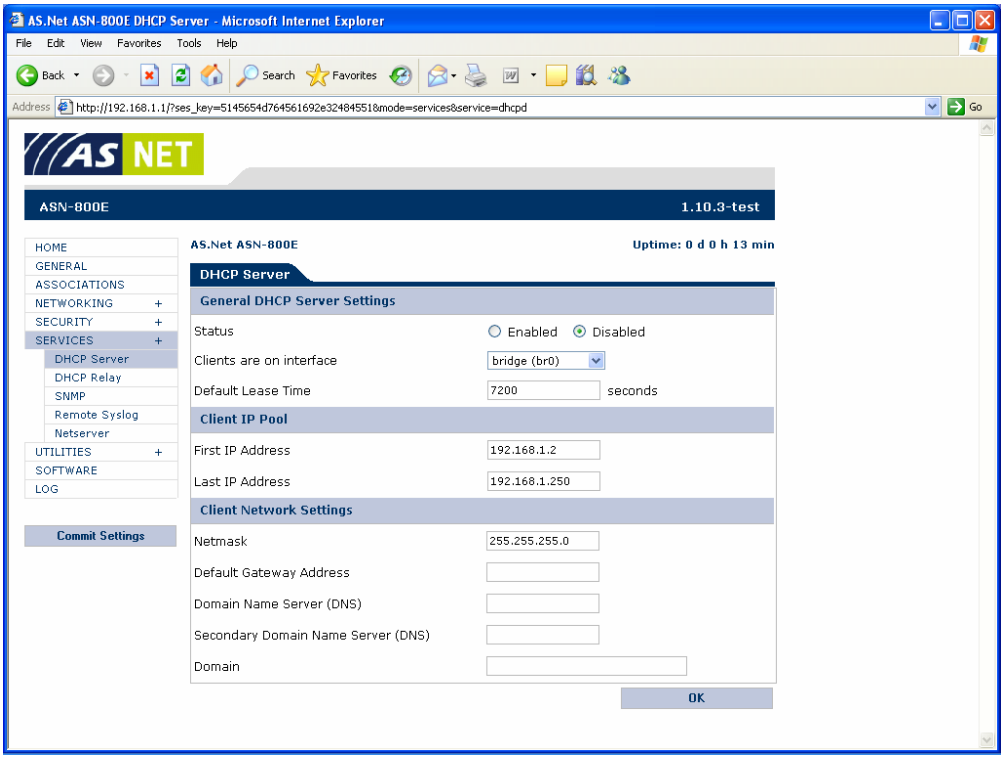


Figure 18 Configuring the DHCP server

General DHCP Server Settings

The general settings determine whether or not the DHCP server is active, over which network interface it operates, and lease times for IP addresses.

Status

Select the **Enabled** radio button to make the DHCP server active. Clicking the **Disabled** button tells the ASN-700/800 not to activate the DHCP server.

Interface

This setting determines which interface of the ASN-700/800 will act as a DHCP server interface. Choose bridge, ethernet1, ethernet2, radio1 or radio2 from the options using the combo box.

Default lease time

Enter the default lease time here, in seconds. This value will be used if the client does not request a specific lease time.

Client IP Pool

The client pool refers to the range of available IP addresses that will be served by the DHCP server of the ASN-700/800. Specify the address range by providing the lowest and highest IP addresses that will be served.

First IP address

Enter the lowest IP address that will be served to clients.

Last IP address

Enter the highest IP address that will be served to clients.

Client Network Settings

In addition to a dynamically assigned IP address, the DHCP server will provide the following network information to clients. Enter the appropriate values for your network.

Netmask

The subnet mask that will be passed to the clients.

Default Gateway Address

The IP address of the clients' default gateway.

Domain Name Server (DNS)

The IP address of the clients' DNS server.

Secondary Domain Name Server (DNS)

The IP address of the clients' secondary DNS server.

Domain

The domain name that will be served to hosts.

Remember to click the **OK** button to apply all changed DHCP settings. To permanently record the DHCP configuration, click on the **Commit Settings** button.

DHCP Relay

On this page you may enable or disable DHCP relaying.

If you choose to enable the DHCP Relay, you must select the interfaces for client distribution and the DHCP Server from the corresponding combo boxes. DHCP requests received from the client distribution interface are forwarded to the DHCP server. Also enter the IP address of the DHCP Server in the **Server IP Address** field. If there is a ControlNET Server in your network, which also acts as a DHCP server and RoamNET is in use, you should enter the IP of your ControlNET server in this field.

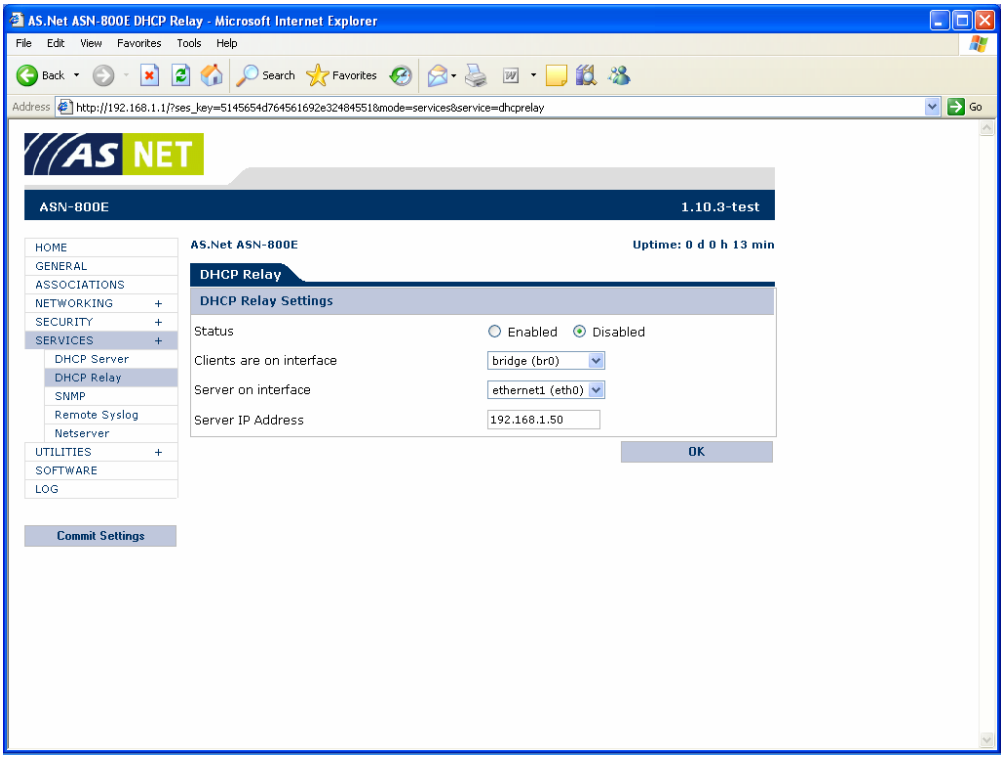


Figure 19 The DHCP Relay page

SNMP

Simple Network Management Protocol (SNMP) is a protocol designed for centralized management of network devices. The ASN-700/800 supports the reading of networking-related values (bytes sent/received for example) with SNMP.

Currently the ASN-700/800 supports MIB-II, a known SNMP definition for general network devices.

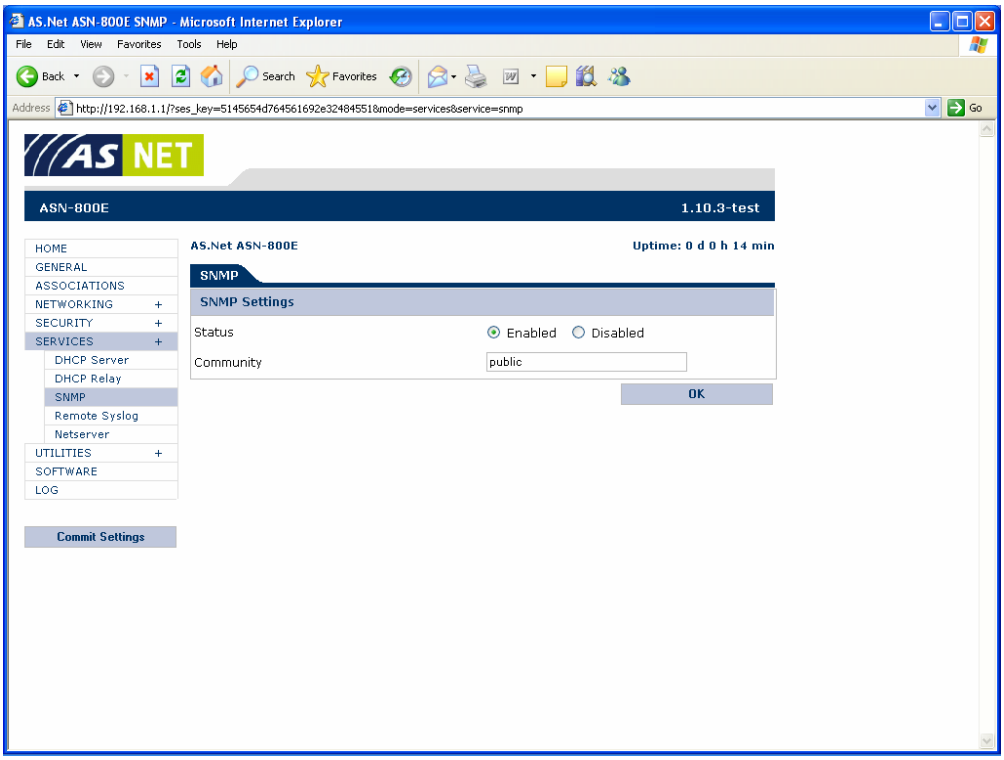


Figure 20 The SNMP page

To configure SNMP, you need to enable it first by selecting the 'Enabled' option after 'Status', and then enter the community name in the **Community** field. Community is the term used in SNMP for the authentication of a network management software, very much like a password. It is important to select a good community name since malicious users can exploit some of the information available with SNMP; it allows to gather quite a lot of information about the network in a very easy manner.

Remote Syslog

Remote syslog sends system messages to remote system over UDP. This allows logs to be gathered from multiple devices. Some network management systems utilize syslog in addition to SNMP to monitor state of the network and the devices.

To use remote syslog, set the status to enabled state and enter the IP address of the host, which collects the logs as destination. Also it is possible to set the destination port number. Usually the syslog servers run on default UDP port 514.

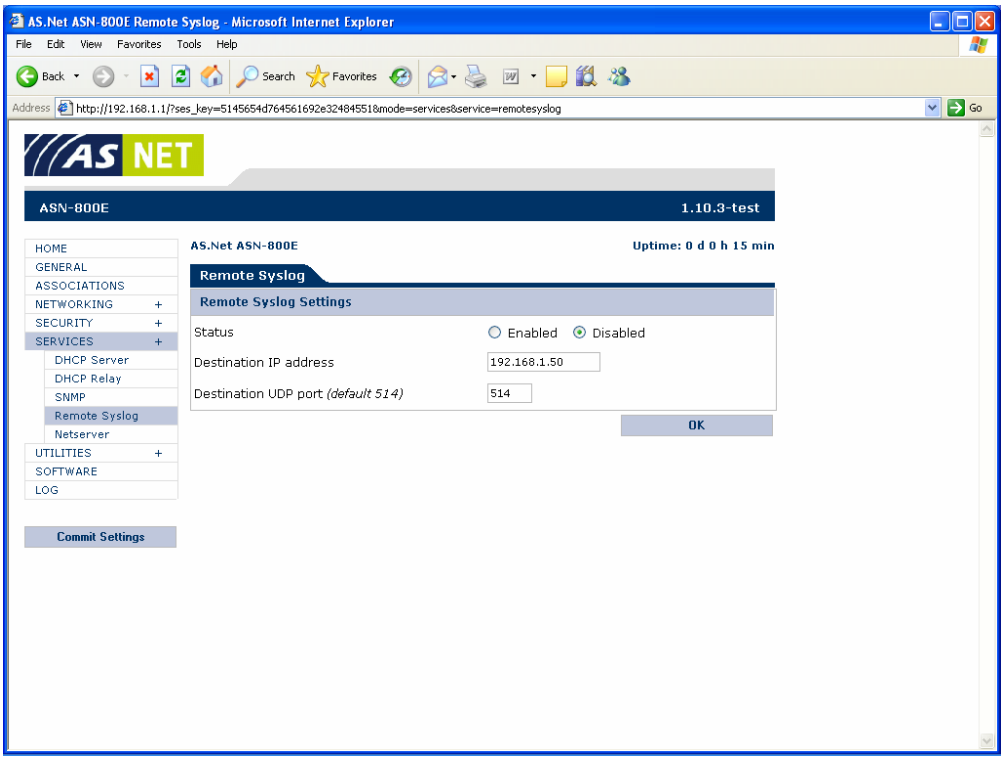


Figure 21 The Remote syslog page

Bandwidth Limits (ASN-700 only)

It is possible to enable Bandwidth Limits either uplink, downlink or on both interfaces on the ASN-700, any value in increments of 1kbps can be used. The Bandwidth Limits option can be used when the unit is used as a CPE type solution in a multipoint setup; the bandwidth does not effect over the air traffic and is applied on traffic at the Radio interfaces and/or the Ethernet interface. The Bandwidth Limit is for the complete unit, and can not be defined on a per stream or per user basis currently.

Choose Enabled on the interface you want to configure and set limit in kbit/s.

Netserver

Netserver listens to connections from a netperf benchmark. Enable this to allow other hosts to run netperf test against this unit.

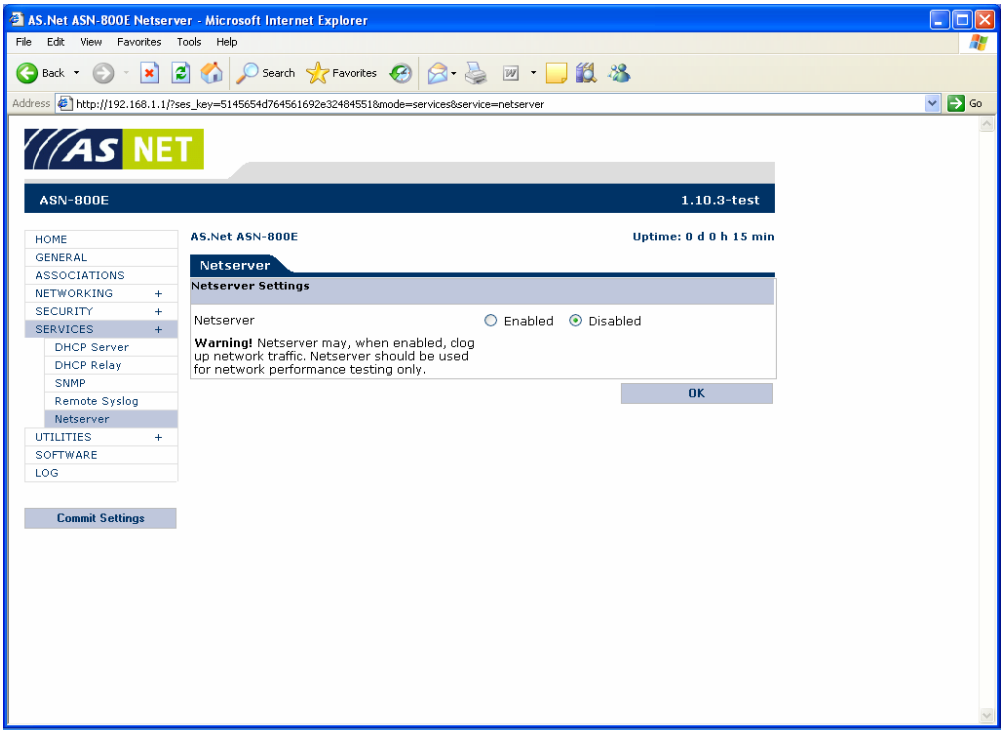


Figure 22 The Netserver page

Warning: As the netperf test fully loads the link, enabled netserver exposes the unit and possibly network to a denial of service attack. Do not keep netserver enabled when not running tests.

UTILITIES

During configuration of your wireless network, you may wish to test the status and connectivity of nodes. The configuration system of the ASN-700/800 comes with a set of useful features; ability to view the current state of the unit's ARP Table and Ping & Traceroute testing tools. To access these features, click on the **UTILITIES** link in the configuration menu.

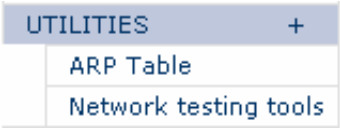


Figure 23 The Utilities menu

ARP table

A table of the most recent IP-to-physical address bindings.

Viewing the ARP table

The ARP (Address Resolution Protocol) table lists the most recently acquired associations between MAC (physical-layer) addresses and IP addresses on the network. Click on the link **UTILITIES>Arp Table** to view the most recent ARP table.

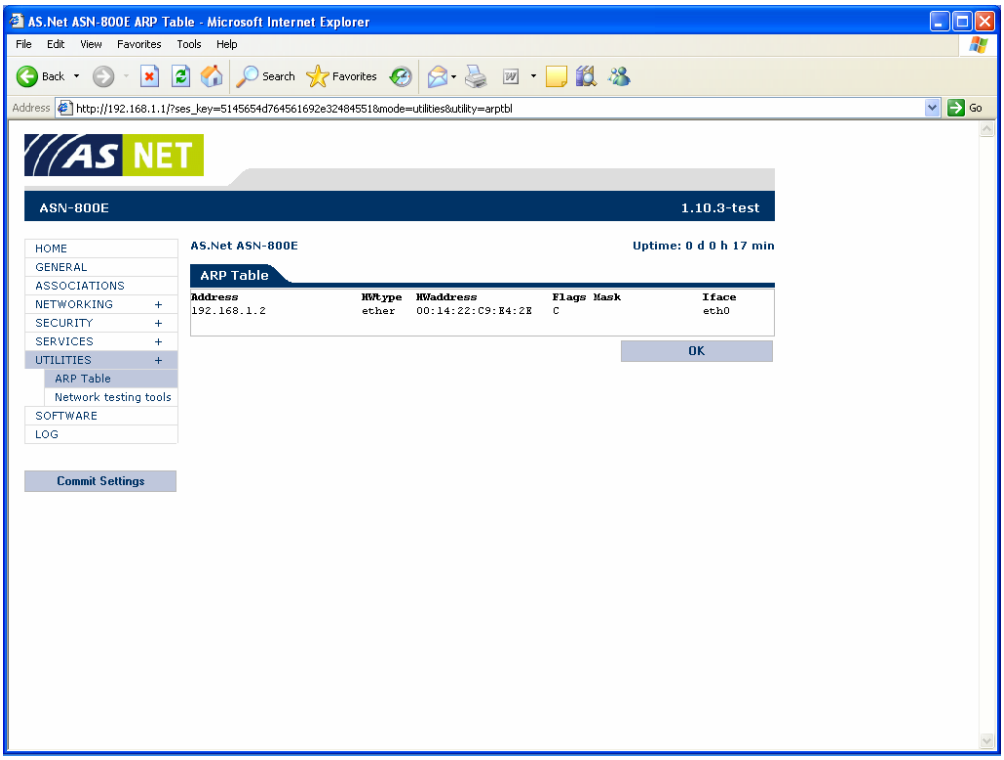


Figure 24 The ARP table

Locally connected hosts are displayed as rows in the table. The table's columns provide information about each host:

Address

The IP address of a host.

HWtype

A label signifying the type of a physical connection of a host. All nodes connected to the ASN-700/800 will display ether, indicating an Ethernet connection. This is true even in case of wireless connections, as the wireless interfaces transmit Ethernet frames.

HWaddress

Hardware address. The Ethernet or WLAN MAC address of a host.

Flags

The symbols listed in the Flag column indicate how the address has been obtained. The symbol C indicates complete entries in the ARP cache.

Mask

The subnet mask of the host. As the ARP table only retains local addresses, this column should remain empty for all entries.

Iface

The name of the interface of the ASN-700/800 through which the host was found.

Network testing tools

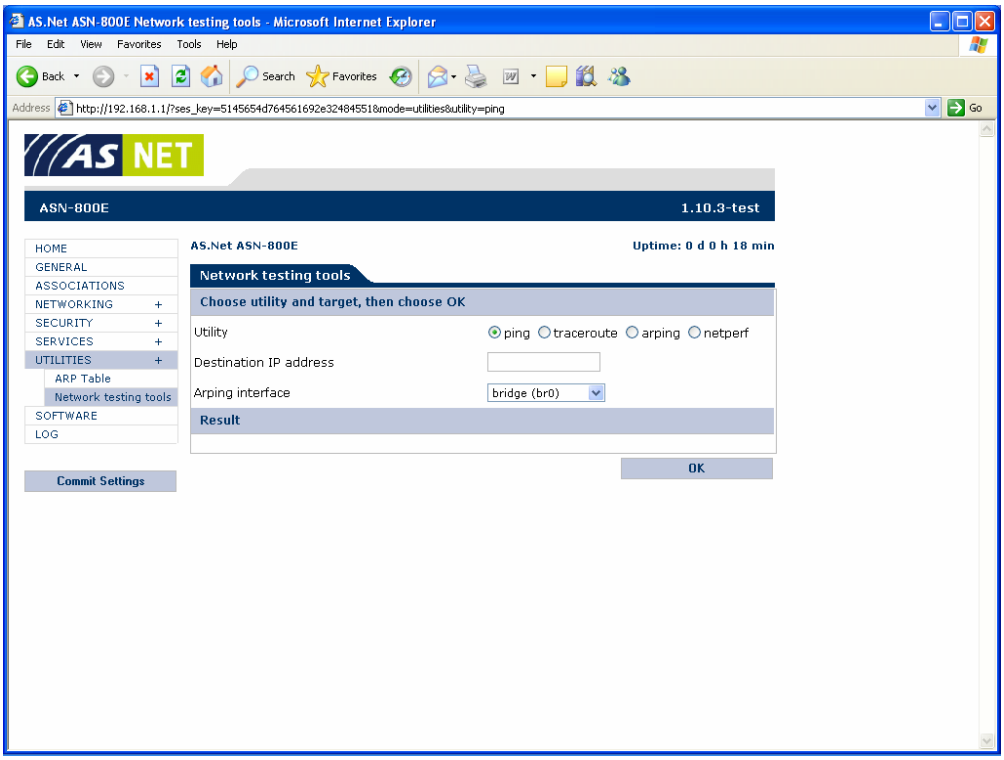


Figure 25 Network testing tools

Ping

The ping utility sends five ICMP request packets and waits for a reply. The response shows the time it takes (round trip time, rtt) to reply for each packet (time in milliseconds). The statistics summarize received reply packets (received and packet loss). Last line shows minimum, average and maximum round trip times. Also the maximum deviation from average is shown, though the five packets used here are not sufficient for rtt statistics. Firewalls may block ping packets.

Traceroute

Traceroute maps a route to a given host. The host and intermediate routers send ICMP replies to requests sent by the base station. It should be used primarily for manual fault isolation. Traceroute helps to detect faulty routing or the location where packets are lost (after the last router that responds).

Each result line represents intermediate or target host and contains:

- Index (starting from 1)
- IP address
- Round trip time for each of three test packets. Replaced with an asterisk if a packet is lost. Some routers may not send reply packets or they may be blocked by a firewall.

Arping

Arping is similar to ping, but uses ARP protocol instead of ICMP. ARP is not routed, so arping works only to locally connected hosts. Some hosts that do not answer to ping because of firewall settings answer to arping.

The utility sends five request packets and reports a round trip time for each response.

Netperf

Netperf runs a TCP/IP stream test and measures bulk data transfer rate. To run the test, enter the target host IP address and select **OK**. The target machine must have Netserver running. The test takes 10 seconds**.**

SOFTWARE

From time to time, firmware upgrades may become available for your ASN-700/800. Check the Airspan website, **http://www.airspan.com/**, for a list of updates currently available. Firmware updates are distributed as files. The procedure for updating the ASN-700/800 firmware is as follows:

1. Locate the appropriate update file on the Airspan website.
2. Right-click on the file name to save it on your computer. You will find it most convenient if you save the file on the same computer that you use to access the ASN-700/800 configuration utility.
3. Log in to the ASN-700/800 configuration utility, and open the Software update screen to upload the update file to the ASN-700/800 unit (see below).

Using the Software Update page

The Software Update page provides the means of transferring the firmware update file from your computer to the ASN-700/800 unit. To access the Software Update screen, click on the **SOFTWARE** link in the configuration menu.

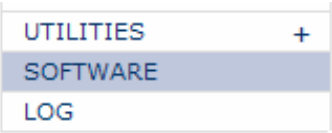


Figure 26 The Software update menu link

At the top of the page, the current software and hardware version numbers are displayed, along with the unit's serial number. Near the bottom of the page, a blank text box and a pair of buttons allow you to select and upload the new firmware (see Figure 27).

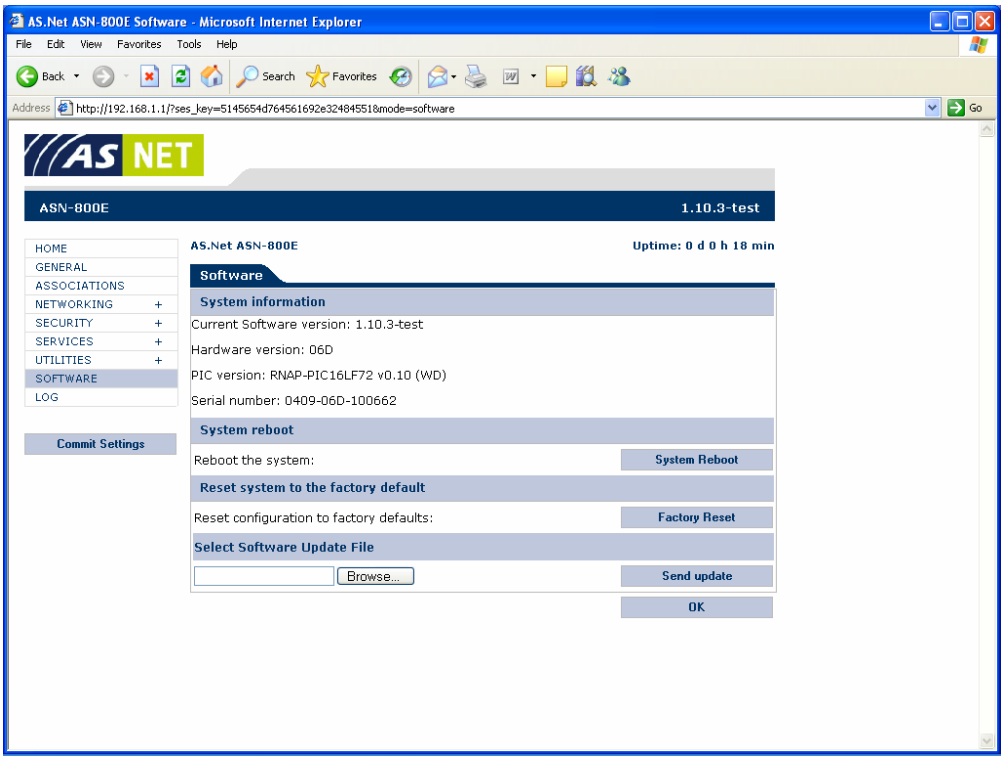


Figure 27 The Software update screen

Provide the location of the downloaded update file. You may either:

Type the full path of the file into the blank Select Software Update File text box, or

Use the **Browse** button to open a file-request dialog box. Locate the folder containing the file, then click on the update file name, and click the **Open** button.

Once the location of the update file has been provided, click the **Send** update button to upload the file to the ASN-700/800. It may take time for the update file to be transferred.

Important: The ASN-700/800 is automatically rebooted after the new firmware has been loaded. The procedure takes approximately four minutes. Do not unplug the power cable during this procedure. The new firmware has been successfully loaded when you can reach the login page again.

Factory Defaults

Click here to undo all changes to the device and restore the initial factory-determined settings. Note that these newly loaded defaults will be lost upon reboot of the ASN-700/800 unless they are permanently stored via the **Commit Settings** button.

Important: Depending on the changes made, it may take up to 1 minute for newly committed settings to take effect. Do not switch off the ASN-700/800 during this time!

Changes made to a page only take effect if the **OK** button is clicked. Note that changes to a page will not take effect if you navigate away from the page (using the configuration menu or your browser's **Back** button) before saving.

PIC version

Shows information about the PIC microcontroller of the unit. The microcontroller controls low-level functionality of the device. This is not important for the end user in normal operating mode of the equipment.

LOG

Use the Log page (see Figure 28) to add entries to the system log of the ASN-700/800. You may also read log entries made by the system and other administrators.

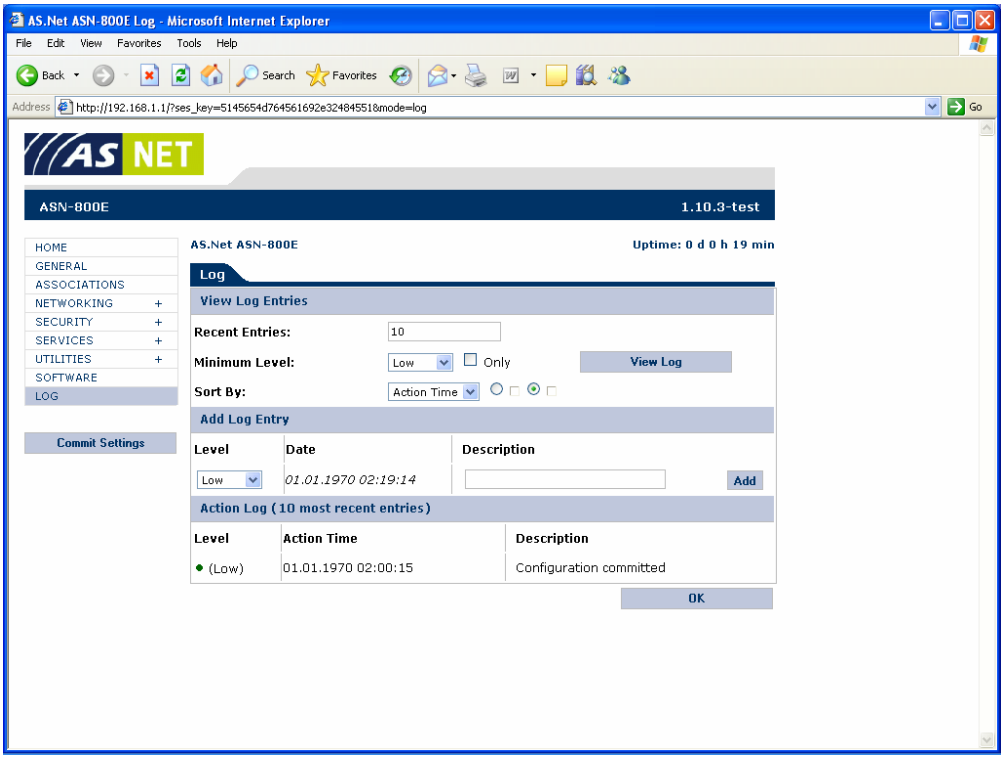


Figure 28 The Log page

The ASN-700/800 generates log entries automatically. Log entries may also be added by administrators as maintenance notes.

Log entries are divided into three levels of severity: Low, High and Critical.

Low severity

Informational messages and notifications of unexceptional events.

High severity

Error messages and warnings. Log entries at this level indicate a problem with the hardware or software of the ASN-700/800 that may affect its performance.

Critical severity

Emergency messages and critical alerts. If you are seeing log entries at this severity level, the ASN-700/800 has become unstable and requires your immediate attention.

The severity level of each log entry is noted in the Action Log (see below).

Viewing log entries

The ten most recent log entries are displayed in the Action log, at the bottom of the Log screen. To view more log entries, or to display log entries matching specific criteria, complete the View log entries form shown in Figure 28. The available parameters are described below:

Recent Entries

Enter the number of log entries you wish to view. Only the most recent entries will be displayed.

Minimum Level

Select the minimum severity level of the log entries you wish to view. Messages with a severity below the level you select will not be displayed. Select All to display all log entries, regardless of level. Checking the Only box will limit displayed log entries to only those exactly matching the selected severity level.

Sort by

Select how you want to view the log entries. Sorting by Action time will display log entries in chronological order. Selecting Description will display the log entries in alphabetical order. Choosing Level will group log entries by severity level (see above). The radio buttons **Ascending** and **Descending** apply to all forms of sorting, and allow you to display the log entries in standard or reverse order respectively.

Press the **View Log** button to refresh the screen and update the Action log with your selected criteria.

The Action Log

The Action log (see Figure 28), at the bottom of the Log screen, displays either the last ten log entries or the results of a log search (see Viewing log entries). Each log entry comprises three columns, containing information about the event that generated the log:

Level

The severity level of the event, either Low, High or Critical (see above).

Action time

The time and date when the log entry was generated or submitted.

Description

A brief description of the event that caused the log entry.

Adding a log entry

As an administrator, you may wish to add a log entry manually. This may be useful to notify other administrators if you have recently maintained or reconfigured the Airspan base station unit. To add a log entry, complete the Add Log Entry form (shown in Figure 29).

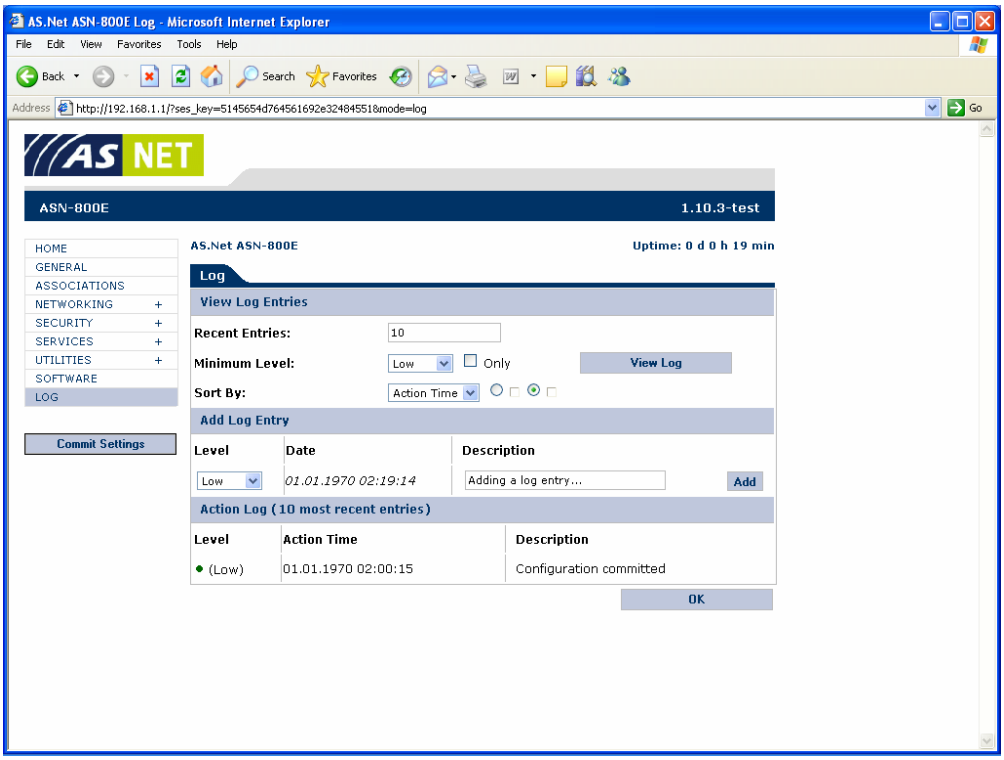


Figure 29 Manually adding a log entry

To add a log entry, follow the steps below:

1. Decide the severity level of the note you wish to create, and select the corresponding value from the Level combo box.
2. Enter the text of your note into the Description box.
3. Click the **Add** button. The time and date will be automatically recorded with your new log note.

Log messages

The ASN-700/800 generates the following messages during normal operation.

Configuration committed

This message is generated during normal operation, whenever settings are successfully written to the ASN-700/800 using the **Commit Settings** button.

Associated

New association. The log message contains the MAC address of the peer.

Association lost

The association has been lost. This message contains the MAC address of the peer that lost the association.

The next two types of log messages result from exceptional behavior of the unit and might need your attention.

Error committing configuration

This critical message indicates a problem with the unit. The specific error may be identified from the text accompanying the message in the action log.

Boot triggered by watchdog

This critical message indicates that the watchdog has rebooted the system because of a hardware or software problem.

RESETTING THE UNIT

Resetting the unit to factory defaults is committed with the factory default tool delivered with the package. The factory default tool is labelled as “reset” tool.

Follow these steps to reset the unit.

1. Switch off the unit.
2. Place the factory default (reset) tool into the serial connector.
3. Power up the unit.
4. Wait while the unit reboots. During the start-up process, the led-indicator is first blinking blue, then it turns to solid red and when the process is finished it turns to solid blue.
5. You may disconnect the factory default tool when the led-indicator lights as solid blue.
6. The unit is now reset to factory defaults.

WARRANTY

Airspan Networks provides a 12 months guarantee for equipment failure. Guarantee period starts from the delivery of the product. Equipment failure is defined as a fault that is caused by a component failure or a system malfunction that prevents the use of the product according to specifications, in circumstances where the product has been used within the specified conditions in terms of environmental conditions and appropriate interfaces (data interfaces, power supply). Equipment guarantee does not cover failures caused by natural forces (thunder), variations in electricity supply, purposeful mistreatment or misuse like reverse engineering of the product.

Airspan Networks guarantees that the product is compliant with the FCC 15.247 (802.11 a/b/g), FCC 15.407 (802.11a), IC 15.247 (802.11 a/b/g), IC 15-407 (802.11a) and IEC 60950 standards. ETSI R&TTE requirements for IEEE 802.11 a/b/g EN 300 328, EN 301 893, IEEE 802.3, EN 301 489: 1& 17. As well as IEC 60068, IEC/EN 60950 with USA and IC Canadan CB certificate, FCC 15.C, IC RSS 210, cTÜVus certificate.

Failed equipment shall be returned to Airspan Networks or its distributing partner within 30 days of the failure. Customer shall send the product to Airspan Networks for repair and analysis. In case of severe equipment fault, Airspan Networks may then send a replacing unit. Customer will pay the shipment cost related with the return of the product. Airspan Networks will pay for the shipment cost when equipment is returned after repair, or shipment of a replacement unit.

DISCLAIMER

The guarantee and maintenance policy of Airspan Networks is that the equipment is handled as an integrated unit. When spare parts or accessories are considered these are outside of the scope of this equipment guarantee. Instructions for spares and their use are specified separately. In no event shall Airspan Networks be responsible for the consequences of an equipment malfunction to the customer's activities in business or other activities. Airspan Networks is neither responsible to compensate any damages or consequences to customers, or stakeholders of that, which are caused by incorrect, unspecified, illegal, misuse or wrongful implementation of the equipment in use. See product documentation for detailed instructions on use and installation, according to the specified purpose of use.

APPENDIX 1: DETAILED INSTRUCTIONS FOR CABLING (INSTRUCTIONS DETAILLEES POUR LE CABLAGE)

Power cabling

The PSU-3 power supply is used to power up the ViaNET AP/MT units. It converts the 100…240V AC input voltage to a 24V DC output voltage.

The assembly of the power connector

PSU-3 specifications:

- Input voltage level: 100-240V AC.
- Output voltage level: 24V DC.
- Output maximum power level 33W
- Environmental specifications: -40°C…+55°C, IPX54

Note: PSU-3 does not support Power over Ethernet.

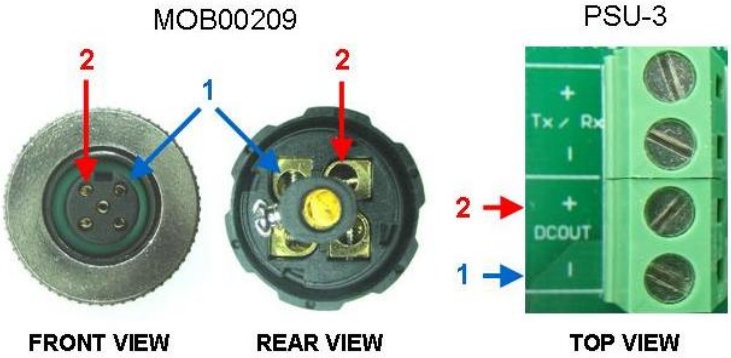
In the following, a step-by-step example on the electric installations is provided.

Check that you have all the needed components for electric installation.

- PSU-3 power supply delivered with the base station product.
- MOB00209 -power connector delivered with the base station product.
- A two-wire cable to deliver the DC power.
  Note! Use numbered or colour-coded cable.
- A power cable to deliver the mains power (100-240V AC) to the PSU-3 power supply.

PSU-3's output installations are wired according to the example below.

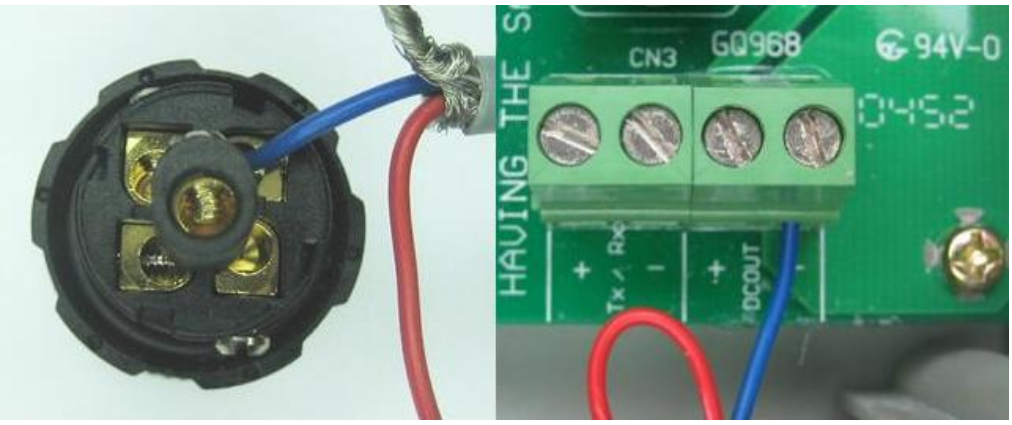
POWER CONNECTOR MOB00209 SOCKET NUMBER	DESCRIPTION WIRE	POWER SUPPLY PSU-3 SOCKET NAME
1	DC 0V	DCOUT -
2	DC +12...24V ±5%	DCOUT +



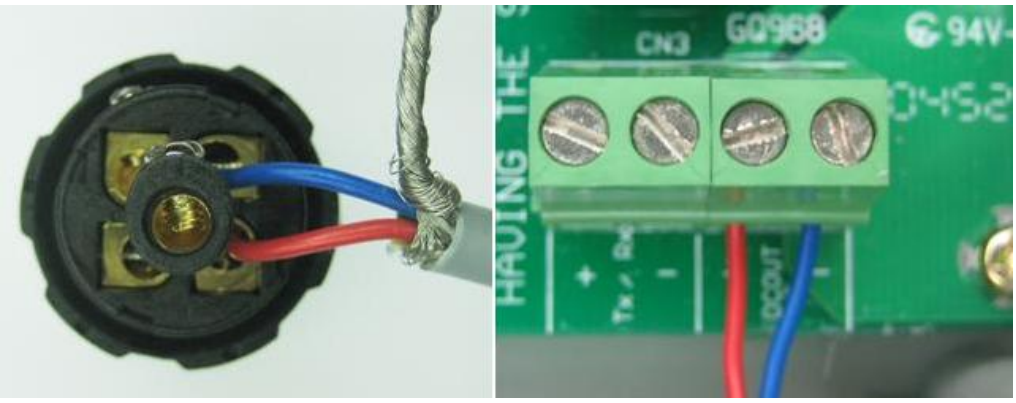
1. Open the cover of the PSU-3 power supply. See figure below.

2. Install the two-wire cable through the MOB00209–power connector as shown in the figure below.

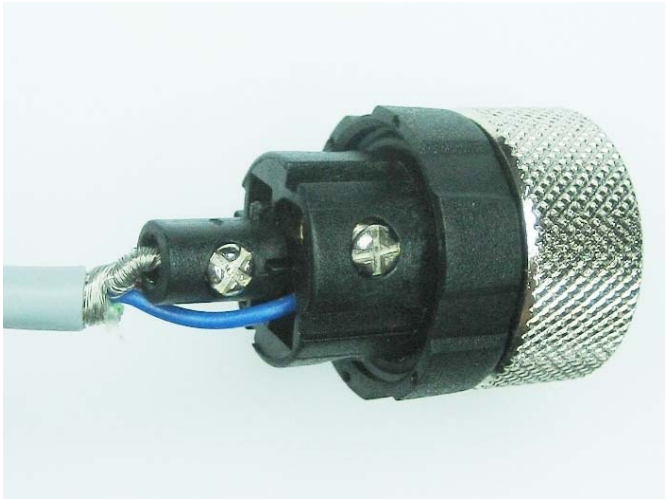
3. Install the DC OUT- (Ground / 0V) -wire from the first socket from right in the PSU-3's output connector to the number 1 socket of the MOB00209–power connector as shown in the figure below.



4. Install the DC OUT+ (24V) -wire from the second socket from right in the PSU-3's output connector to the number 2 socket of the MOB00209–power connector as shown in the figure below.



5. Install the Ground-wire to the MOB00209–power connector as shown in the following figure. The other end (PSU-3) is left unattached.

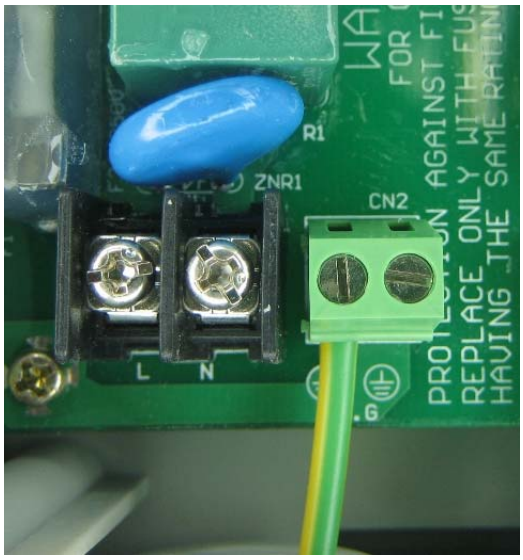


6. Now, you may assemble the MOB00209 power connector as shown in the figure below.

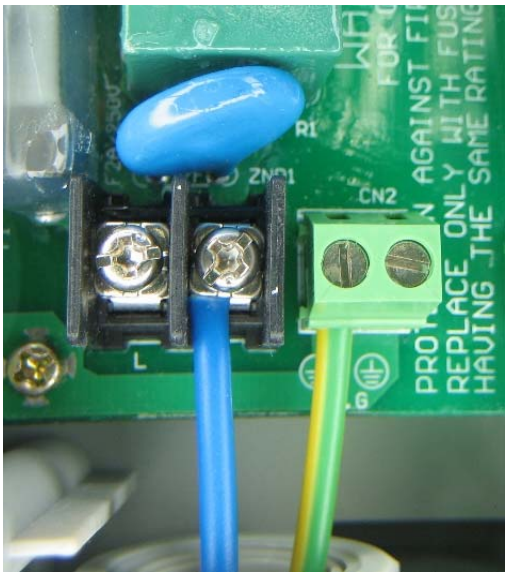
PSU-3's input (High Voltage, 100-240V AC) installations are wired according to the table below.

SOCKET NAME	DESCRIPTION
L	LINE (100-240V AC)
N	NEUTRAL (100-240V AC)
G	GROUND

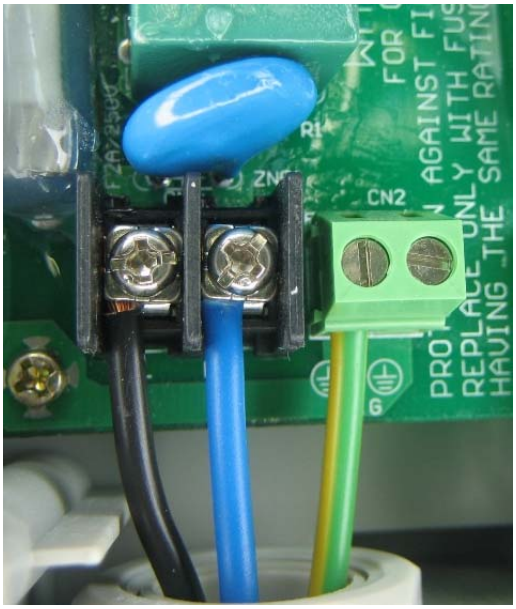
7. Install the mains Ground-wire to the Ground-socket of the PSU-3 connector as shown in the following figure. This cable is not compulsory because the power supply has a floating ground level.



8. Install the mains Null-wire to the N-socket of the PSU-3 mains connector as shown in the figure below.

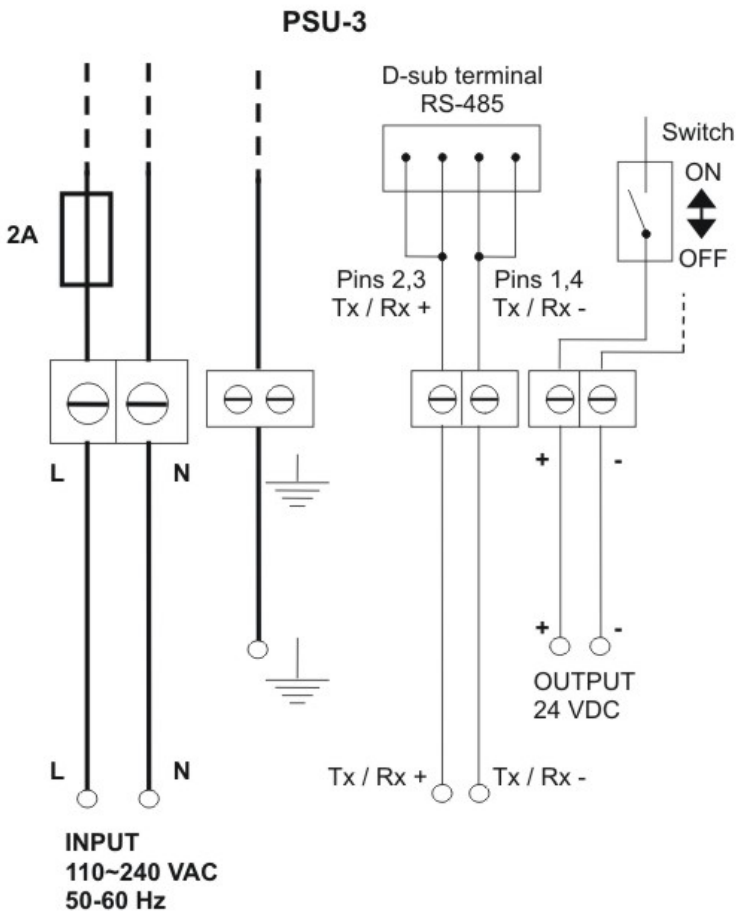


9. Install the mains Line-wire to the L-socket of the PSU-3 mains connector as shown in the following figure.



10. Remember to attach the safety cover (glassy plastic shield) to cover the AC connector.

11. Finally, tighten the strain relieves around both cables (AC in-cable and DC out-cable) and close the cover of the power supply unit.



Wiring diagram of PSU-3 power supply

The conductor area of the power cable must be adequate to avoid malfunction of the unit and overheating of the power cable. The length of the power cable should not exceed 100 meters (330 feet).

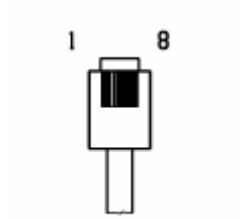
See the table below for correct cabling between the ASN-700/800 and the power supply unit.

Distance	**Conductor area mm^2**
1 - 100 meters (1 - 330 feet)	1,5 mm^2

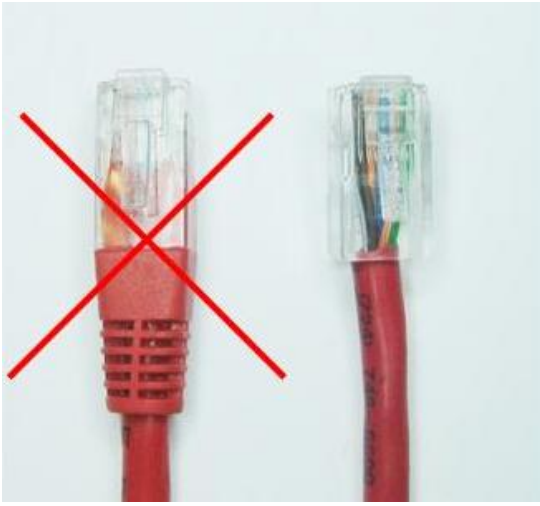
Ethernet cabling

Maximum length of the Ethernet cable is 100 meters. The Ethernet cable must fulfil CAT5 category FTP outdoor cable specification.

The assembly of the Ethernet connector



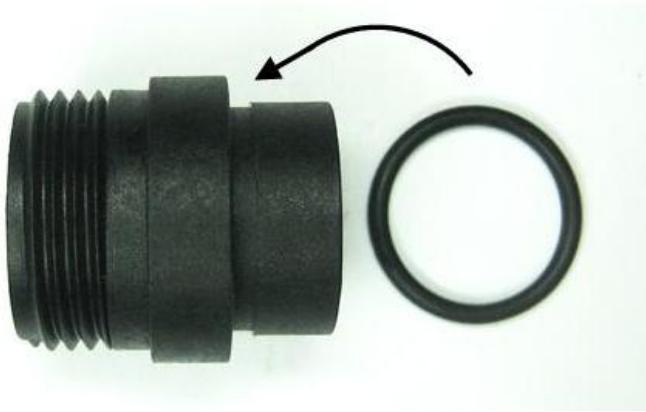
RJ-45 connector pin numbering



Use the type of Ethernet cable shown on the right side

1. Install the Ethernet cable through the MOB00209–power connector as shown in the figure below.

2. Mount the rubber ring over the plastic piece as shown below.



3. Pull the Ethernet cable through the connector piece as shown below.

4. Assemble and tighten the pieces together firmly as shown in the figures below.

Twisted pair Ethernet cable (Câble d'Ethernet de twisted pair):

RJ-45 pin number (borne numéro de RJ-45)	Color (Couleur)	Color (Couleur)
1	White/orange (Blanc/orange)	White/orange (Blanc/orange)
2	Orange (Orange)	Orange (Orange)
3	White/green (Blanc/vert)	White/green (Blanc/vert)
4	Blue (Bleu)	Blue (Bleu)
5	White/blue (Blanc/bleu)	White/blue (Blanc/bleu)
6	Green (Vert)	Green (Vert)
7	White/brown (Blanc/brun)	White/brown (Blanc/brun)
8	Brown (Brun)	Brown (Brun)

Cross over Ethernet cable (Câble d'Ethernet de traverse):

RJ-45 pin number (borne numéro de RJ-45)	Color (Couleur)	Color (Couleur)
1	White/orange (Blanc/orange)	White/green (Blanc/vert)
2	Orange (Orange)	Green (Vert)
3	White/green (Blanc/vert)	White/orange (Blanc/orange)
4	Blue (Bleu)	Blue (Bleu)
5	White/blue (Blanc/bleu)	White/blue (Blanc/bleu)
6	Green (Vert)	Orange (Orange)
7	White/brown (Blanc/brun)	White/brown (Blanc/brun)
8	Brown (Brun)	Brown (Brun)

Recommended Ethernet cable types (Types recommandés de câble d'Ethernet):

Cable manufacturer (Fabricant de câble)	Cable type (Type de câble)
LAPP CABEL	UNITRONIC. EtherLine-P Flex CAT.5 4 x 2 x AWG26 Art. Nr. 2170300

APPENDIX 2: FURTHER READING

IEEE 802.11 LAN/MAN standards

Physical and MAC layer standards for WLAN networks

http://www.ieee802.org/11/

IEEE 802.11a-1999 Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications-Amendment 1: High-speed Physical Layer in the 5 GHz band

IEEE 802.11h-2003 Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: Spectrum and Transmit Power Management Extensions in the 5GHz band in Europe

IEEE 802.11g-2003 Amendment to IEEE Std 802.11, 1999 Edition (Reaff 2003) IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements—Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications—Amendment 4: Further Higher-Speed Physical Layer Extension in the 2.4 GHz Band.
http://standards.ieee.org/reading/ieee/std/lanman/restricted/802.11g-2003.pdf

Wi-Fi interoperability

http://www.wi-fi.com

Wi-Fi test requirements for 802.11a/h (Wi-Fi 5), WPA

Wi-Fi technology and business news

Wi-Fi Planet: http://www.wi-fiplanet.com

Wi-Fi security

AES Strong data encryption method substitutes WEP as more secure wireless encryption solution: http://csrc.nist.gov/CryptoToolkit/aes

APPENDIX 3: FACTORY SETTINGS

The ASN-700/800 is shipped with the settings listed below. Clicking the **Factory defaults** button in the configuration utility will reset the settings of the unit to these values.

Category	Setting	Value
Bridge:	Status	Disabled
	IP address	192.168.10.1
	Subnet mask	255.255.255.0
	Bridge member interfaces	None
Ethernet1:	Status	Enabled
	IP address	192.168.1.1
	Subnet mask	255.255.255.0
Ethernet2:	Status	Enables
(ASN-800 only)	IP address	192.168.2.1
	Subnet mask	255.255.255.0
Radio settings:	Status (both radios)	Enabled
	IP address, radio 1	192.168.3.1
(ASN-800 only)	IP address, radio 2	192.168.4.1
	SSID, radio 1	asnet1
(ASN-800 only)	SSID, radio 2	asnet2
	Wireless mode	Station/Slave
	Channel selection	Automatic
	TX Power	10 dBm
	Data rate	Best (up to 54)
	Maximum link length	7 km
	RTS Threshold	2346 (=disabled)
	Fragmentation Threshold	2346 (=disabled)
(ASN-700 only)	Station/Slave MAC address	00:01:02:03:04:05
	AES encryption	Disabled
	AES key	(no key)
Routing:		(empty)
Remote login:	All services	Enabled
Administrators:	Name	Admin
	Password	default
	Level	Full access
DHCP server:	Status	Disabled
	Clients are on interface	Bridge
	Default Lease time	7200 seconds
	Maximum Lease time	7200 seconds

Category	Setting	Value
	Client pool	192.168.1.2- 192.168.1.250
	Domain Name Server (DNS)	(none)
	Gateway	(none)
	Netmask	255.255.255.0
	Domain	empty
DHCP Relay:	Status	Disabled
	Clients are on interface	Bridge
	Server on interface	Ethernet1 (eth0)
	Server IP address	192.168.1.50
SNMP:	Status	Enabled
	Community	public
Remote Syslog:	Status	Disabled
	Destination IP address	192.168.1.50
	Destination UDP port	514
Bandwidth limits:	Downlink (RN-700 only)	Disabled, 0 kbps
	Uplink (RN-700 only)	Disabled, 0 kbps
Netserver	Status	Disabled

APPENDIX 4: ALLOWED CHANNELS IN 2,4 GHZ AND 5 GHZ FREQUENCY BANDS (CANAUX PERMIS BANDES DE FREQUENCE DANS DE 2.4 GIGAHERTZ ET DE 5 GIGAHERTZ)

USA and Canada channels (Les États-Unis et canaux du Canada)

Standard: 2.4 GHz (IEEE 802.11b/g)	
No	Carrier center frequency (MHz)
1	2 412
2	2 417
3	2 422
4	2 427
5	2 432
6	2 437
7	2 442
8	2 447
9	2 452
10	2 457
11	2 462

Standard: 5 GHz (IEEE 802.11a)	
No	Carrier center frequency (MHz)
149	5 745
153	5 765
157	5 785
161	5 805
165*	5 825

* not yet included in 1999 version of IEEE 802.11a

Standard: 5 GHz (IEEE 802.11a) ETSI	
No	Carrier center frequency (MHz)
9	5500
10	5520
11	5540
12	5560
13	5580
14	5600
15	5620
16	5640
17	5660
18	5680
19	5700

APPENDIX 5: ALLOWED TRANSMIT POWER LEVELS, AND RADIO + ANTENNA COMBINATIONS WITH AIRSPAN FCC/IC-CANADA PRODUCTS (LAISSE TRANSMETTEZ LES NIVEAUX DE PUISSANCE, ET LES COMBINAISONS DE RADIO + D'ANTENNE AVEC DES PRODUITS DE AIRSPAN FCC/IC-CANADA)

Product Model	Application	Radios	Frequency area (GHz)	Radio unit transmit power levels (dBm)	Antennas	Max configurable transmit power levels (incl. 0.5dBm cable loss)	Max EIRP allowed
ASN-700/800 FCC/IC-Canada	Point-to-Multipoint link	1-2 x IEEE 802.11a	5.725 – 5.850GHz (5 channels)	9…23dBm	External MTI omni 8.5dBi	31dBm	36dBm
ASN-700/800 FCC/IC-Canada	Point-to-Multipoint link	1-2 x IEEE 802.11a	5.725 – 5.850 GHz (5 channels)	9…23dBm	External Airspan 90° PlanAir HiperAccess 14dBi	36.5dBm	36dBm
ASN-700/800 FCC/IC-Canada	Point-to-Multipoint link	1-2 x IEEE 802.11a	5.725 – 5.850 GHz (5 channels)	9…23dBm	External MTI 120° sector 15dBi	37.5dBm	36dBm
ASN-700/800 FCC/IC-Canada	Point-to-Multipoint link	1-2 x IEEE 802.11a	5.725 – 5.850GHz (5 channels)	9…23dBm	External MTI 60° sector 17dBi	39.5dBm	36dBm
ASN-700/800 FCC/IC-Canada	Point-to-Point link	1-2 x IEEE 802.11a	5.725 – 5.850GHz (5 channels)	9…23dBm	External Airspan 15° PlanAir HiperLink 22dBi	44.5dBm	No limit
ASN-700/800 FCC/IC-Canada	Point-to-Point link	1-2 x IEEE 802.11a	5.725 – 5.850GHz (5 channels)	9…23dBm	External ARC 5° parabolic 30dBi	52.5dBm	No limit
ASN-700/800 FCC/IC-Canada	Point-to-Point link	1-2 x IEEE 802.11a	5.725 – 5.850GHz (5 channels)	9…23dBm	External ARC 3° parabolic 34dBi	56.5dBm	No limit
ASN-700 FCC/IC-Canada	Point-to-Point link	1 x IEEE 802.11a	5.725 – 5.850GHz (5 channels)	9…23dBm	Integrated 10° panel 23dBi	46dBm	No limit

APPENDIX 6: RADIO CARD SPECIFICATIONS FOR FCC/IC-CANADA PRODUCTS

Transmit Power

Rate	Power
6-24 Mbps	26 dBm, +/- 1 dB
36 Mbps	24 dBm, +/- 1 dB
48 Mbps	22 dBm, +/- 1 dB
54 Mbps	21 dBm, +/- 1 dB

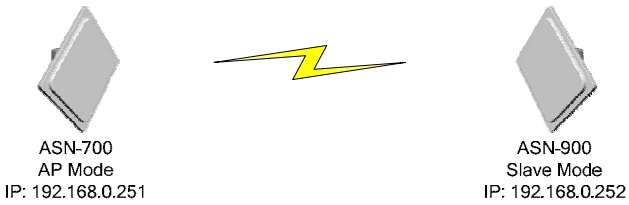
Receiver Sensitivity

Rate	Level
6 Mbps	-94 dBm, +/- 2 dB
9 Mbps	-93 dBm, +/- 2 dB
11 Mbps	-92 dBm, +/- 2 dB
12 Mbps	-91 dBm, +/- 2 dB
18 Mbps	-90 dBm, +/- 2 dB
24 Mbps	-86 dBm, +/- 2 dB
36 Mbps	-83 dBm, +/- 2 dB
48 Mbps	-77 dBm, +/- 2 dB
54 Mbps	-74 dBm, +/- 2 dB

APPENDIX 7: CONFIGURING A POINT-TO-POINT BRIDGING LINK

In order to create a point-to-point bridging link between an ASN-700 (AP/Master) and ASN-900 (Station/Slave) follow these steps:

Example:



ASN-700

1. Login to the web interface of the unit.

2. Go to **NETWORKING>radio1** page. Change the operating mode to AP/Master. Define a proper SSID and channel. If you would like to use AES encryption, enable it and enter a key in the field. You also need to set the MAC address of the station/slave unit (ASN-900) into the corresponding field. Delete the IP address of the radio interface and press **OK**.

3. Go to **NETWORKING>ethernet1** page and delete the IP address. Press **OK**.

4. Go to **NETWORKING>bridge** page and enable bridge. Make sure that the **Activate tunnel** box for the radio interface is checked. Change the IP address to one in accordance with your network plan and press **OK**.

5. Go to **NETWORKING>Routing** page and set the default route for the unit (e.g. [0.0.0.0] [0.0.0.0] [*IP of the gateway*]). Press **OK**.

6. You might also want to change other parameters such as passwords, time/date, snmp-community, etc.

7. Press **Commit Settings**. The new settings will now be taken into use.

ASN-900

1. Login to the web interface of the unit.

2. Go to **NETWORKING>radio1** page. Check that the operating mode is Station/Slave. Enter the same SSID as you did for the ASN-700 unit (AP/Master) earlier. Change the wireless mode to 11a. If you enabled the AES encryption on the ASN-700 unit, also enable it on the ASN-900 with the same key. Delete the IP address from the radio interface, and press **OK**.

3. Go to **NETWORKING>ethernet1** page and delete the IP address. Press **OK**.

4. Go to **NETWORKING>bridge2** page and delete the ethernet1 interface from the bridge2. Press **OK**.

5. Go to **NETWORKING>bridge1** page and delete the radio2 interface from the bridge1. Add the ethernet1 interface to the bridge1. Change the IP address to one in accordance with your network plan. Enable bridge and make sure that the **Activate tunnel** box is checked. Press **OK**.

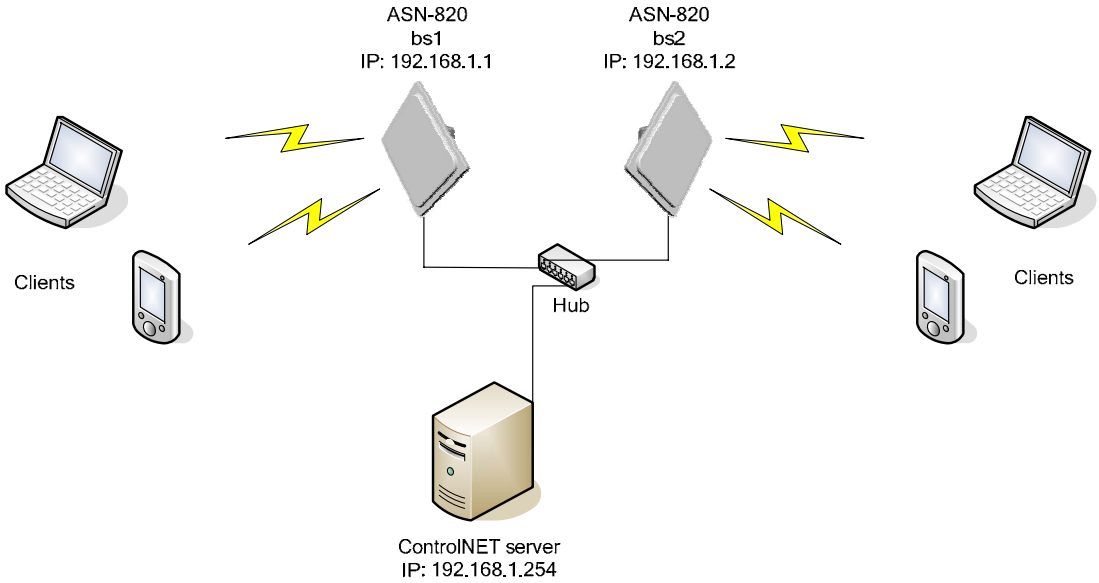
6. Go to **NETWORKING>Routing** page and set the default route for the unit (e.g. [0.0.0.0] [0.0.0.0] [*IP of the gateway*]). Press **OK**.

7. You might also want to change other parameters such as passwords, time/date, snmp-community, etc.

8. Press **Commit Settings**. The new settings will now be taken into use.

APPENDIX 8: CONFIGURING A NETWORK

In the following, an example on how to configure a small network is provided.



1. Install the ControlNET server.

2. Login to the server's web interface via eth1 using the IP address 192.168.1.254/24.

3. Click the **Base stations** link on the Navigation menu. Click **Add new base station**.

4. Enter the following information in the corresponding fields. **Name:** bs1, **IP:** 192.168.1.1, **RoamNET range:** 172.16.0.0/24, **RoamNET passwd:** default, **SNMP Community:** public

5. Press **Save**.

6. Click **Add new base station**.

7. Enter the following information in the corresponding fields. **Name:** bs2, **IP:** 192.168.1.2, **RoamNET range:** 172.16.1.0/24, **RoamNET passwd:** default, **SNMP Community:** public

8. Press **Save**.

9. Click the **Bandwidth management** link on the Navigation menu. Click **Add new bandwidth limit entry**.

10. Enter the following values: **To subscriber**: 1024, **From subscriber**: 512

11. Press **Create.**

12. Click the **Guests preferences** link on the Navigation menu.

13. Click **Enabled**. Enter the following information in the corresponding fields. **Network**: 192.168.255.0/24, **IP range**: 192.168.255.0/24, ***Select bandwidth limit***, **Domain**: test.network, **Gateway**: 192.168.255.1, **DNS 1 and 2**: *your DNS server names* (can be the same), **Lease time**: 1d, **Comment**: Guests class.

14. Press **Save**.

15. Click the **Routes** link on the Navigation menu. Click **Add routes**.

16. Enter the following values. **Network**: 172.16.0.0/24, **Gateway**: 192.168.1.1, **Comment**: RoamNET range for bs1

17. Click the **Routes** link on the Navigation menu. Click **Add routes**.

18. Enter the following values. **Network**: 172.16.1.0/24, **Gateway**: 192.168.1.2, **Comment**: RoamNET range for bs2

19. Press **Apply routes**.

20. Click the **Guest preferences** link on the Navigation menu. Click **Save**. Click **Restart RoamNET**.

21. Click the **Statistics** link on the Navigation menu. Click **Update statistics configuration**.

22. Configuration of the ControlNET server is ready.

23. Have two ASN-820 units and label them as **bs1** and **bs2**.

24. Login to the web interface of bs1 via ethernet1 using the IP address 192.168.1.1.

25. Go to **NETWORKING>bridge**

26. Change the IP address to 192.168.255.1. Press **OK**.

27. Go to **NETWORKING>ethernet1**. Check that the IP address of bs1's ethernet1 interface is 192.168.1.1. (When configuring **bs2**, change the IP address to 192.168.1.2.) Press **OK**.

28. Go to **NETWORKING>Routing**. Enter the following values. **Destination**: 0.0.0.0, **Netmask**: 0.0.0.0, **Gateway**: 192.168.1.254. Click **Add**.

29. Go to **SERVICES>DHCP Relay**. Check **Enable** box and change the server IP address to 192.168.1.254. Press **OK**.

30. Go to **SERVICES>RoamNET**. Check **Enable** box and change the server IP address to 192.168.1.254. Press **OK**.

31. Press **Commit Settings**. The new settings will now be taken into use.

32. Repeat the same procedure with **bs2**.

33. Configuration of the base stations is now ready.

34. Connect the base stations and the ControlNET server to a network. Client terminals should now be able to associate and communicate with the base stations.

APPENDIX A: (TRADUCTIONS FRANÇAISES DES MAJEURES PARTIES POUR DES CONDITIONS DE NORMALISATION CANADIENNES)

Disclaimer (Déni (voir l'annexe A pour la traduction française)

Tandis que tout effort a été fait de rendre ce livre aussi complet et aussi précis comme possible, aucune garantie ou forme physique n'est impliquée. Les informations fournies ici sont sur "de même que" la base. Les auteurs et l'éditeur n'auront ni la responsabilité ni la responsabilité à toute personne ou l'entité en ce qui concerne n'importe quelle perte ou des dommages résultant de l'information contenue en ce livre.

Safety instructions (Instructions de sûreté)

Ce document doit être passé en revue pour la familiarisation avec le produit et les instructions avant opération. Vérifiez qu'un au sol non interruptible de la terre de sûreté existe de la source d'énergie principale et des circuits moulus du produit. Vérifiez que la source correcte de courant alternatif Est disponible pour l'adapter à C.A. pour produire 12...24 volts continu pour le produit. Démontez le produit de la puissance fonctionnante avant le nettoyage.

Avertissement !

Un installateur professionnel doit installer la station et les antennes de base. Vous êtes averti que les changements ou les modifications pas expressément approuvés par la pièce responsable de la conformité pourraient vider l'autorité de l'utilisateur pour actionner l'équipement. (FCC 15.21)

Note sur les émissions électromagnétiques

Ce dispositif est conforme à la partie 15 des règles fédérales de la Commission de communications (FCC). L'opération sous réserve des conditions suivantes :

1. Ce dispositif peut ne pas causer l'interférence nocive.
2. Ce dispositif doit accepter n'importe quelle interférence reçue comprenant l'interférence qui causent l'opération peu désirée
3. Avertissant ! Rayonnement électromagnétique. Veuillez garder ces produit et antennes relatives à une distance 20 centimètres de corps humain.

Notification de normalisation

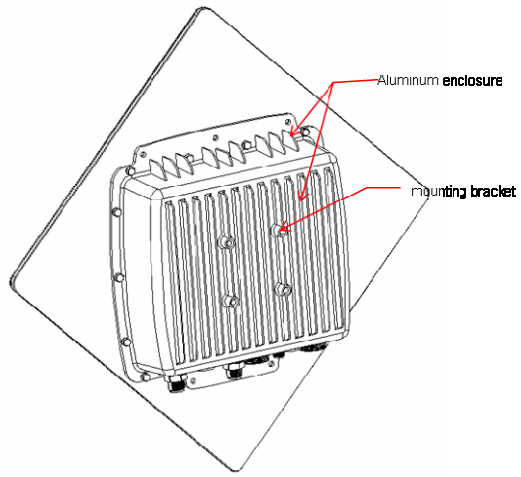
Les caractéristiques et les paramètres du dispositif décrit dans ce document sont sujets au changement sans communication préalable.

Pour l'information de normalisation américaine, voir le www.fcc.gov. Pour l'information de normalisation canadienne, voir le www.ic.gc.ca.

Cet équipement produit, emploie et rayonne de l'énergie sur les fréquences par radio et, si non installé et utilisé selon ce guide, peut causer l'interférence nocive aux communications par radio. Cependant, il n'y a aucune garantie que l'interférence ne se produira pas dans une installation particulière. Si cet équipement cause l'interférence nocive à la radio ou la réception des émissions télévisées, qui peut être déterminée en mettant l'équipement au loin et en marche, l'utilisateur est encouragé à corriger l'interférence par un ou plusieurs des méthodes suivantes : - réorientez ou replacez l'antenne de réception - séparez l'équipement et le récepteur plus loin - reliez l'équipement à une sortie sur un circuit différent de celui auquel le récepteur est relié Veuillez étudier les directives de normalisation d'abord permises montrées dans l'annexe 5, qui décrivent des configurations permises de produit. On permet seulement à le produit de ASN-700/800 d'être employé avec des antennes de Airspan et des accessoires (alimentation d'énergie PSU-3) et des diviseurs de puissance. Aux États-Unis et le maximum du Canada permis transmettez les niveaux de puissance et des fréquences de canal sont montrées dans l'annexe 5.

Instructions d'installation

Le ASN-700/800 est conçu pour l'environnement extérieur d'installation, sur une tour, un bâtiment grand ou un mât d'antenne. Un installateur professionnel doit installer la station et les antennes de base. L'installateur devrait également être au courant des structures, des limites, et des concepts de réseau.



-Upper mounting bracket (Support d'Uppoer)

-Grounding bolt (Fondre le boulon)

-Lower mounting bracket (Abaissez le boulon de fixation)

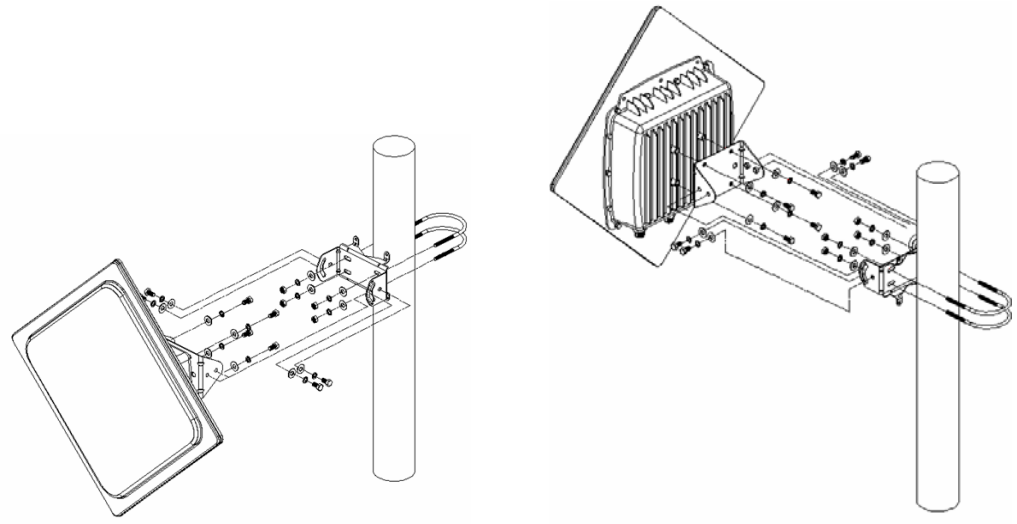
-Aluminum enclosure (Clôture en aluminium)

Direction d'installation

Les connecteurs doivent toujours être en bas dans les installations extérieures. Dans les installations d'intérieur (par exemple entrepose etc...) la direction peut être librement choisie si l'antenne intégrée n'est pas utilisée.

Installation de mât d'antenne

Les figures suivantes présentent l'installation dans la pipe de mât d'antenne ; diamètres de pipe d'antenne 45... 60mm (approximativement 1 3/4... 2 1/3 pouce).



Aligner l'antenne

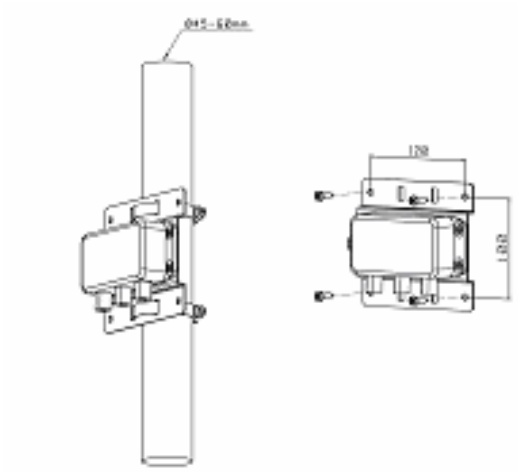
Le technicien d'installation doit mécaniquement aligner les antennes pour la meilleure assurance.

Diviseur de puissance

Vous pouvez relier deux antennes de secteur à une radio en employant un diviseur de puissance. Pour la meilleure opération, les antennes employant la même radio devraient se diriger directement vis-à-vis des directions de l'un l'autre. En outre la longueur des câbles entre les antennes et le diviseur de puissance devrait être identique pour assurer la force égale de signal aux deux cellules.

Le diviseur de puissance réduit le niveau du signal de sortie par le dBm 3.

Les figures suivantes présentent l'installation du diviseur de puissance.



Puissance câblant en utilisant l'alimentation de l'énergie PSU-3

L'unité d'alimentation de l'énergie PSU-3 peut alimenter un produit de station de base de ASN-700/800. L'alimentation d'énergie est une unité externe conçue pour l'opération dans l'environnement extérieur. La tension d'alimentation de l'alimentation d'énergie est de 24 volts continu. L'unité d'alimentation d'énergie fournit le connecteur RS-485 pour la gestion à distance de l'unité de station de base.

Les goupilles RS-485 doivent être câblées à partir de l'unité de station de base à l'alimentation d'énergie si la gestion RS-485 à distance est nécessaire. Le câblage peut être fait par le cable électrique 4-wire. RS-485 est une norme d'interface de communications de données approuvée par l'association électronique d'industries (EIA) pour des communications multipoint avec les dispositifs périodiques. Il est idéal pour des applications industrielles dues à sa immunité de bruit.

Les données transmises sont représentées par des différences de tension entre les deux fils du cable électrique. RS-485 exige le matériel spécifique de porte série qui soutient les tensions RS-485 et les conventions.

Les instructions de câblage détaillées sont dans l'annexe 1.

Puissance câblant en utilisant l'alimentation de l'énergie PSU-2 (accessoire)

L'alimentation de l'énergie PSU-2 est une unité externe conçue pour l'opération dans l'environnement extérieur. L'unité d'alimentation de l'énergie PSU-2 peut alimenter jusqu'à deux produits de ASN-700/800. La tension d'alimentation de l'alimentation d'énergie est de 12 volts continu. L'unité d'alimentation d'énergie a une batterie rechargeable d'acide de plomb scellée incorporée pour assurer au moins peu de compte rendu d'opération quand la tension d'alimentation principale est perdue. Ce temps de support de batterie dépend de l'état de la batterie. On lui recommande de remplacer la batterie de temps en temps, par exemple une fois par an. Ce temps de remplacement dépend de la température ambiante de l'unité d'alimentation d'énergie.

Câblage d'Ethernet

La longueur maximum de l'Ethernet câblant sans répéteurs ou amplificateurs est de 100 mètres (330 pieds). Le câblage d'Ethernet doit accomplir des caractéristiques de câble extérieur de ftp de la catégorie CAT5. Des instructions de câblage détaillées peuvent être trouvées dans l'annexe 1

Couverture protectrice de connecteur

Si les connecteurs d'Ethernet ne sont pas utilisés vous devez couvrir les connecteurs par un dispositif de couverture protecteur. ASN-700/800 est embarqué avec les dispositifs de couverture protecteurs sur les deux connecteurs d'Ethernet par défaut.

Application de la bande coaxiale de joint

En utilisant l'unité avec les antennes externes, vous devez survivre à au joint les connecteurs de N à l'aide du joint attachez du ruban adhésif. Connecteurs de N qui ne sont pas humidité correctement scellée de laiss pour écrire le raccordement, qui mène aux problèmes de dégradation ou d'assurance d'exécution.

GARANTIE

Airspan Networks fournit une garantie de 12 mois pour l'échec d'équipement. La période de garantie commence à partir de la livraison du produit. L'échec d'équipement est défini comme défaut qui est provoqué par un échec composant ou un défaut de fonctionnement de système qui empêche l'utilisation du produit selon des caractéristiques, dans les circonstances où le produit a été employé dans les conditions indiquées en termes de conditions environnementales et interfaces appropriées (les données connectent, alimentation d'énergie). La garantie d'équipement ne couvre pas des échecs provoqués par les forces normales (tonnerre), les variations dans l'approvisionnement de l'électricité, le mauvais traitement utile ou l'abus comme le désossage du produit.

Airspan Networks garanties que le produit est conforme avec les normes de la FCC 15.247 (802.11 a/b/g), de la FCC 15.407 (802.11a), de l'IC 15.247 (802.11 a/b/g), de l'IC 15-407 (802.11a) et du CEI 60950.

L'équipement défaillant sera retourné à Airspan Networks ou à son associé de distribution dans les 30 jours de l'échec. Le client enverra le produit à Airspan Networks pour la réparation et l'analyse. En cas de défaut grave d'équipement, Airspan Networks peut alors envoyer une unité de remplacement. Le client payera l'expédition coûtée reliée avec le retour du produit. Airspan Networks payera l'expédition coûtée quand l'équipement est retourné après la réparation, ou l'expédition d'une unité de rechange.

DÉNI

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