EnRoute500

Installation Guide

Rev. A4

Internetworking the Physical World™

Sensoria Corporation
15950 Bernardo Center Drive, Suite J, San Diego, CA 92127
www.sensoria.com
technical support email: support@sensoria.com

FCC Notice to Users and Operators

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

This equipment has been tested and found to comply with the limits for Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Any changes or modification to said product not expressly approved by Sensoria Corporation could void the user's authority to operate this device.

INFO

The Sensoria EnRoute500 Mesh Router must be installed by a trained professional, value added reseller, or systems integrator who is familiar with RF cell planning issues and the regulatory limits defined by the FCC for RF exposure, specifically those limits outlined in sections 1.1307.

EnRoute500 Interfaces

The interfaces available on the EnRoute500 are power, Ethernet and 2 radio antenna ports.

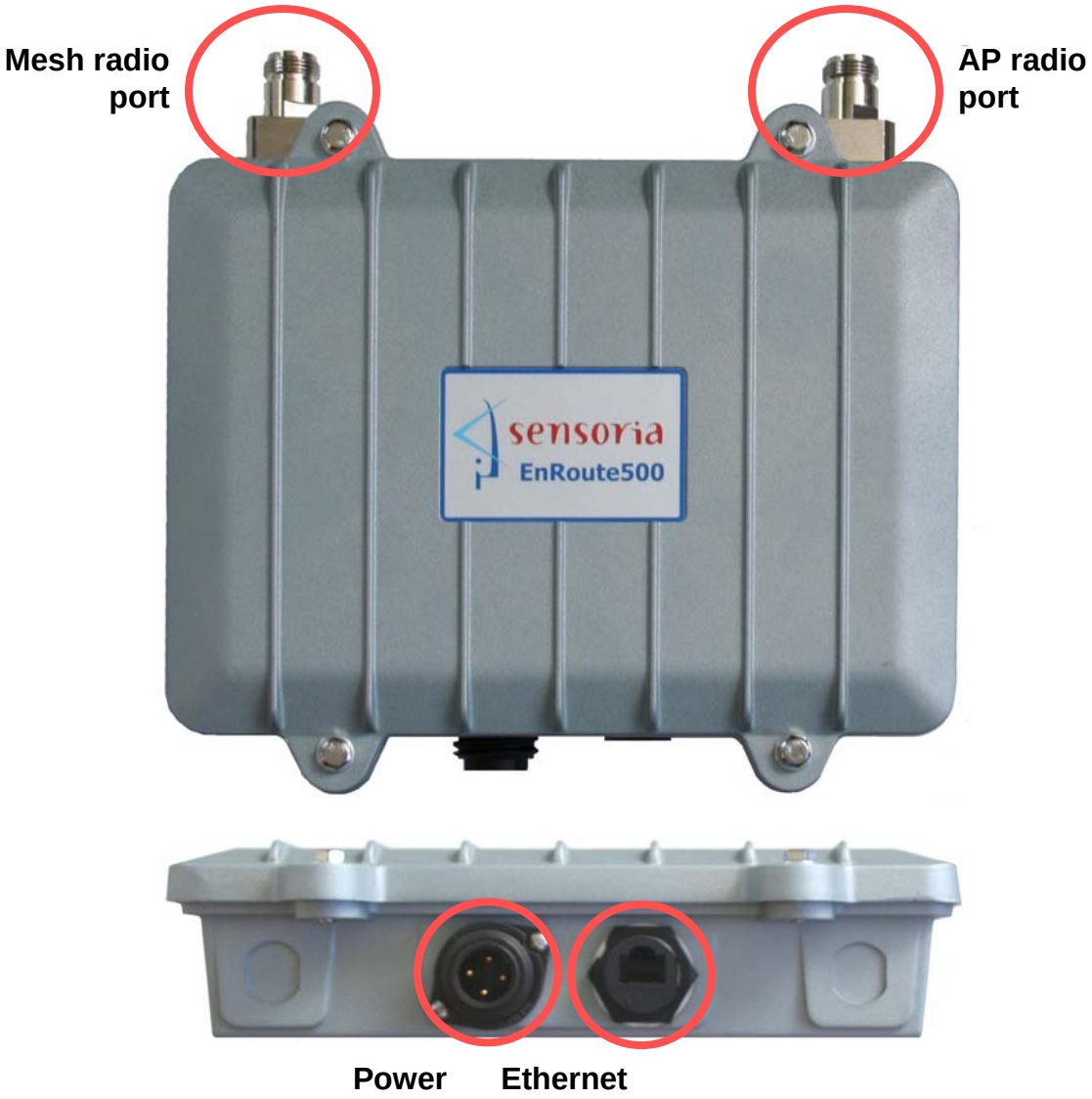

Figure 1. EnRoute500 interfaces

Interface	Description
Power (100-240VAC)	Main Power input
Radio 1	5.8GHz mesh radio antenna connector
Radio 2	2.4GHz access point antenna connector
Ethernet	10/100 Mbit Ethernet interface
Ethernet (POE)	Secondary power input (9-28VDC) Use supplied equipment only. *Not compatible with IEEE 802.3af*

Installation Equipment

Mounting kits that cater to different applications are available for the EnRoute 500.

E500 Mounting and power kit, wall	SNMNTPW-W
E500 Mounting and power kit, small vertical pole	SNMNTPW-V
E500 Street lamp power and mounting kit, horizontal pole	SNMNTPW-H

Wall Mounting (SNMNTPW-W)

- Mount to wood structures, with 1/4 " lag bolts
- Mount to masonry with masonry anchors

Figure 2. Wall mount bracket

Vertical Pole Mounting (SNMNTPW-V)

The EnRoute500 can be mounted to any vertical pole up to 1.5” using the SNMNTPW-V Vertical Pole Mount Kit. The kit includes a mounting bracket, U-bolts and the ancillary hardware necessary to affix the bracket to the enclosure.

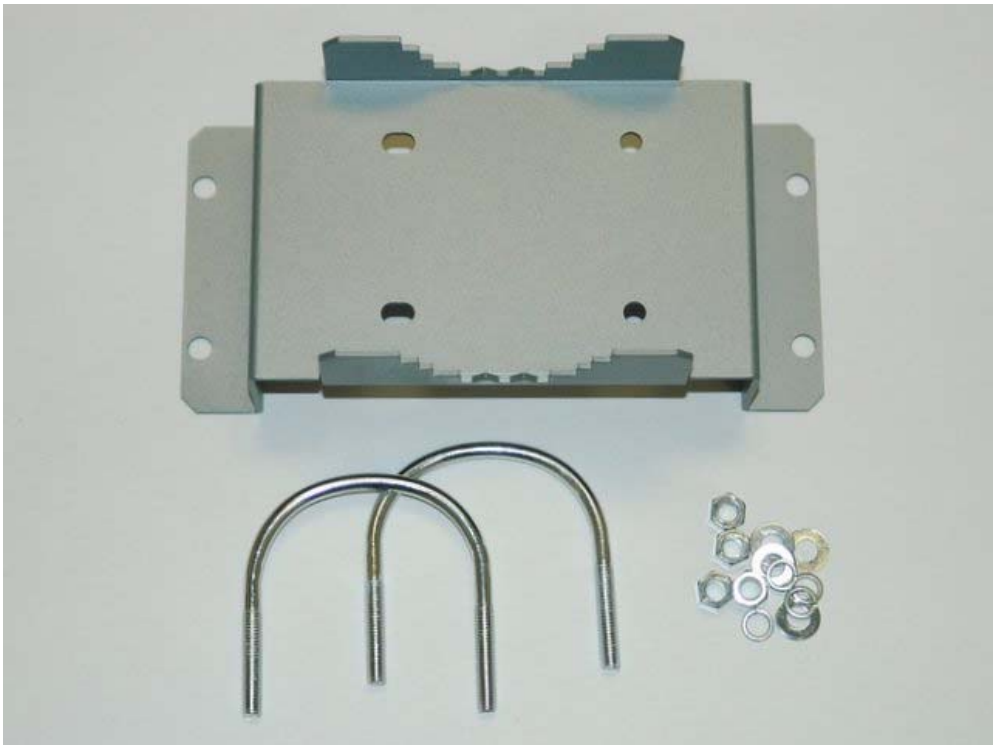

Figure 3. Pole Mount bracket installation kit

Streetlight Horizontal Pole Mounting (SNMNTPW-H)

The Horizontal Pole Mounting kit includes two channel bracket mounting rails, two 2” pipe support straps, four Allen screws and lock washers. It also includes a streetlight power tap adapter used for supply power to the EnRoute500.

Figure 4. Streetlight horizontal pole mounting bracket kit

Figure 5. Streetlight power tap adapter

Channel Brackets and Pipe Straps

Attach the two channel brackets to the EnRoute enclosure with Allan screws and lock washers. A ball-head Allan driver will need to be used to affix the screws. See Figure 6.

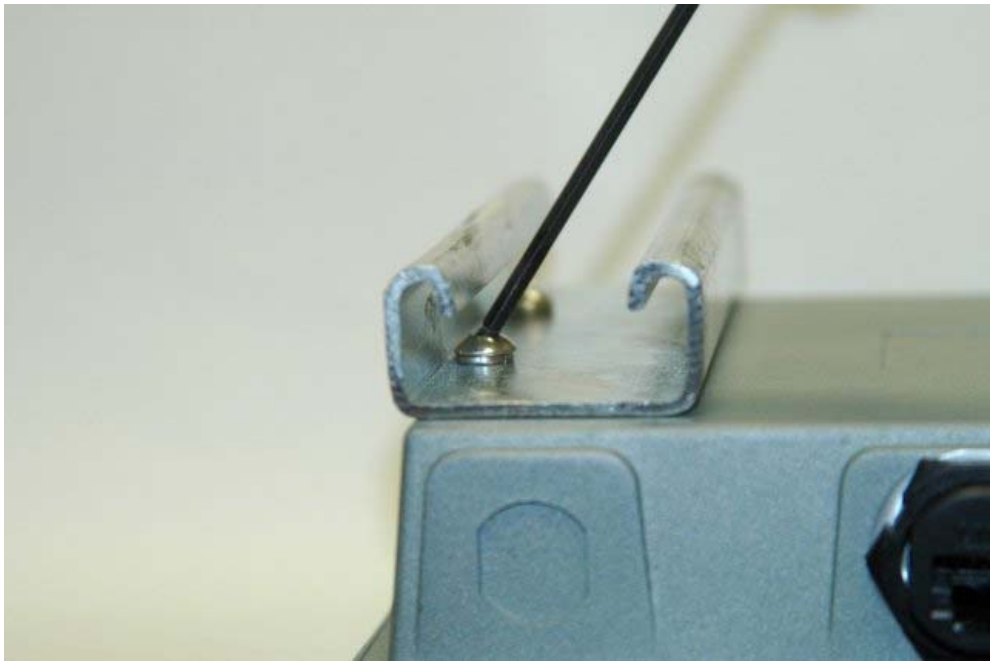

Figure 6. Channel bracket positioning

The EnRoute500 can be affixed to poles up 1.5” to 2” using the supplies pipe straps. Poles with diameters larger than 2” up to 4” can be accommodated with the corresponding straps. See Table 1.

Description	Part Number
E500 Mounting accessory, pole strap, 2.5”	SNMNTPW-2.5
E500 Mounting accessory, pole strap, 3.0”	SNMNTPW-3.0
E500 Mounting accessory, pole strap, 3.5”	SNMNTPW-3.5
E500 Mounting accessory, pole strap, 4.0”	SNMNTPW-4.0

Table 1. Horizontal pole mounting accessories

Figure 7. Channel bracket pipe strap

Secure pipe straps to the pole as shown in Figure 7. Pipe strap screws should be tightened with enough force to prevent the enclosure from rotating.

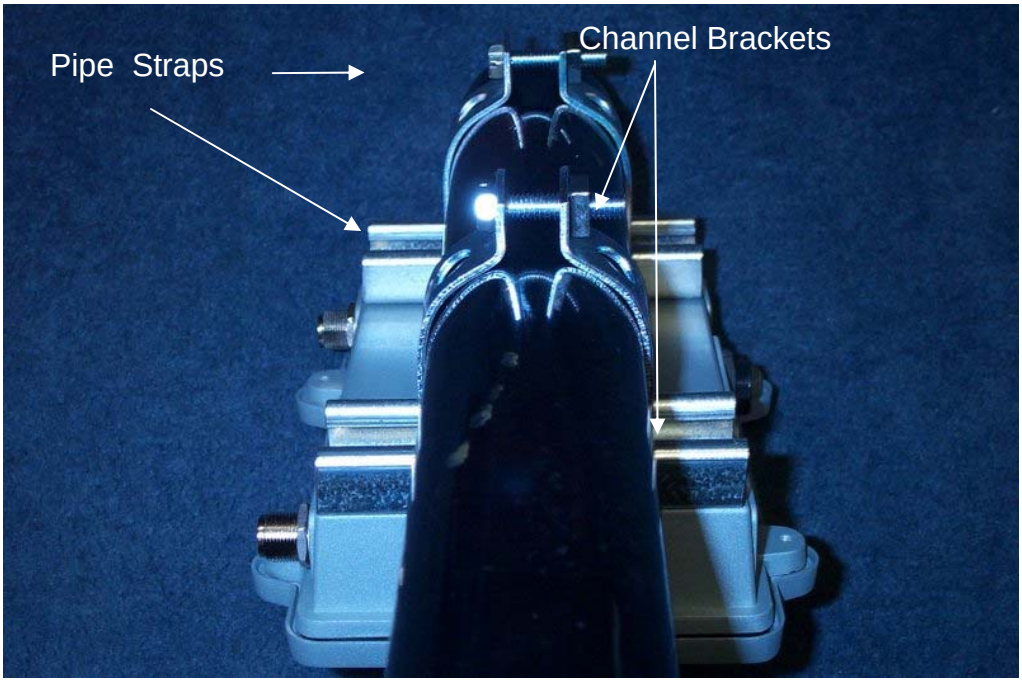

Figure 8. Pole Mount bracket installation kit

Power Connections

The streetlight power tap adapter should be installed before the cable is connected to the EnRoute500. Remove the existing light sensor by twisting and pulling up. Once disengaged, insert the power tap adapter in the socket and twist to lock. Re-install the light sensor in the socket on top of the power adapter. Plug the opposite end of the power adapter cable into the EnRoute500. Secure any excess cabling with wire ties. If the Ethernet port is not being used, install the weather proof dust cap.

Figure 9. EnRoute500 power connection

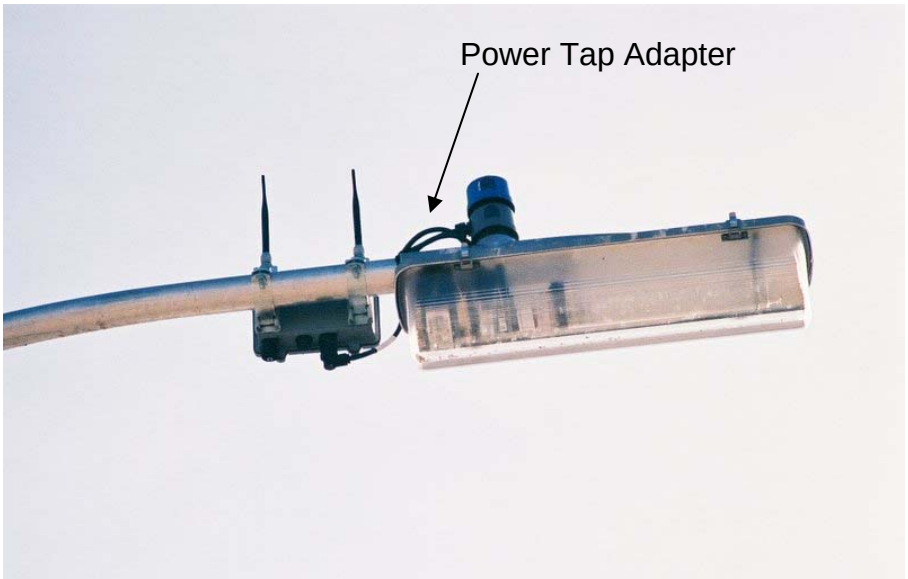

Figure 10. Pole Mount bracket assembled

Figure 11. Pole Mount bracket streetlight assembly

EnRoute500 Antennas

Radio 1

Radio-1 is the antenna port for the 5.8GHz mesh radio. Install the ECO6-5800 5.0-6.0GHz 6dBi antenna on the Radio-1 port. The antenna is manufactured Mobile Mark. The datasheet can be viewed in the Appendix C.

Radio 2

Radio-2 is the antenna port for the 2.4GHz access point radio. Install the rubber duck style omni directional 2.4GHz 5dBi antenna on Radio-2 port. The antenna is manufactured by Wanshih. The datasheet can be viewed in the appendix.

Figure 12. EnRoute500 radio ports

Appendix A: Safety Information for the EnRoute500

The Federal Communications Commission (FCC) with its action in ET Docket 96-8 has adopted a safety standard for human exposure to RF electromagnetic energy emitted by FCC certified equipment. The Sensoria EnRoute500 meets the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper operation of this radio according to the instructions found in this manual and the hardware and software guides on the Sensoria EnRoute500 will result in user exposure that is substantially below the FCC recommended limits.

- Do not touch or move the antenna(s) while the unit is transmitting or receiving.
- Do not hold any component containing a radio such that the antenna is very close to or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- Do not operate the radio or attempt to transmit data unless the antenna is connected; otherwise, the radio may be damaged.
- Use in specific environments:
    - Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment unless it is a type especially qualified for such use.
    - The use of wireless devices in hazardous locations is limited to the constraints posed by the safety directors of such environments.
    - The use of wireless devices on airplanes is governed by the Federal Aviation Administration (FAA).
    - The use of wireless devices in hospitals is restricted to the limits set forth by each hospital.
- Antenna use:
    - In order to comply with FCC RF exposure limits, dipole antennas should be located at a minimum distance of 7.9 inches (20 cm) or more from the body of all persons.
    - All antennas are designed to be professionally installed and should be located at a minimum distance of 12 inches (30 cm) or more from the body of all persons. Please contact your professional installer, VAR, or antenna manufacturer for proper installation requirements. EnRoute500 Professional Installer Guide Draft rev-A1: Feb 24, 2006 © 2006, Sensoria Corp.

Appendix B: Configuring Radio Transmit Power

An EnRoute500 is configured through its Ethernet port. The procedure below describes how to use the user interface to set the radio transmit power for the mesh and access point radios.

1. Connect an Ethernet cable from the Ethernet port of the EnRoute500 to the computer that you will use to configure the unit.

INFO

The EnRoute500 is equipped with an auto-sensing Ethernet port that allows both regular and cross-over cables to be used to connect to it.

2. Configure the computer that you are using to log in to the EnRoute500 to have an IP address on the same subnet as the EnRoute500. The parameters for the EnRoute500's configuration Ethernet interface are listed in Table 2.

Parameter	Setting
IP address	169.254.253.253
Protocol	SSH v2
User name	admin
Default password	mesh

Table 2. EnRoute500 Ethernet configuration interface settings

3. Attach the power cable supplied with the EnRoute500 to the power connector on the bottom of the unit. The EnRoute500 will automatically power up.
4. Log in to the EnRoute500 using an SSH client. The IP address of the EnRoute500 is 169.254.253.253, the user name is 'admin', and the default admin password is 'mesh'.

```
Last login: Mon Feb 20 23:11:57 2006 from 169.254.253.1
Shell timeout: 360 minutes.

Press '?' for help..
>
```

Figure 13. Prompt after login

5. After logging in, you will be presented with a prompt similar to that shown in Figure 13. Enter

   `use mesh0`

   to select the mesh interface.
6. Use

   `set txpower=<tx power>`

   to set the transmit power of the mesh radio.

You must set the value of 'mesh0.txpower' to be in the range from 1 to 60 to be in compliance with FCC regulations.

7. Enter

   `use wlan1`

   to select the wlan1 interface.
8. Use

   `set txpower=<tx power>`

   to set the transmit power of the access point radio. The maximum allowed value for 'txpower' depends on the access point channel that has been selected, as shown in Table 3. The minimum allowed value is 1.

INFO To determine the currently selected channel for the access point, use the command 'show channel'.

You must set the value for 'wlan1.txpower' to be in the ranges shown in Table 3 to be in compliance with FCC regulations

Channel	txpower setting
1	13
2 – 10	25
11	05

Table 3. Access point transmit power limits

9. Repeat step 8 for all APs that are enabled on the EnRoute 500. To select a new access point to configure, use the command

   `use wlanN`

   where N is in the range from 1 to 4.