Xnet Viper Series

Indoor/Outdoor Multiple Radio Mesh Node

802.11a/b/g

Reference Guide

Author	Ivo van Ling
Software Release	HopWARE 3.1.x
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Covering Product codes	**HV.11.1000 Xnet Viper-I 2.4GHz/5GHz (ETSI)** **HV.11.1100 Xnet Viper-II 2.4GHz/5GHz (ETSI)** **HV.11.1110 Xnet Viper-III 2.4GHz/5GHz (ETSI)** **HV.11.1111 Xnet Viper-IV 2.4GHz/5GHz (ETSI)** **HV.11.2000 Xnet Viper-I 2.4GHz/5GHz (FCC)** **HV.11.2200 Xnet Viper-II 2.4GHz/5GHz (FCC)** **HV.11.2220 Xnet Viper-III 2.4GHz/5GHz (FCC)** **HV.11.2222 Xnet Viper-IV 2.4GHz/5GHz (FCC)**

Contents

Revision History

Revision	Reason	Author	Date
1.0	First version.	Ivo van Ling	15-04-2007
1.01	1. Added 5GHz indoor limits – FCC requirement (7.1.9) 2. Changed title to accommodate indoor Viper units 3. Added notice that this unit is meant to be installed by qualified technicians only – FCC requirement (4)	Michel Stam	30-08-2007
1.02	1. Added 5GHz indoor limits for IC (Canada) (7.1.6) 2. FCC and IC RF exposure information added (FCC and IC regulatory requirement) (Appendix B)	Michel Stam	3-9-2007

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1 Introduction

This Reference Guide provides information and procedures that will enable system administrators to install, configure, manage, and use the Xnet Viper Series access points and mesh routers.

The Xnet Viper is a modular WiFi mesh radio unit capable of using up to four radios that provides high-speed and cost-effective wireless connectivity between multiple fixed or mobile networks and clients.

This reference guide gives information on how to use the advanced features of the Xnet Viper. Further down this document the Xnet Viper-I, Xnet Viper-II, Xnet Viper-III and Xnet Viper-IV will be referred to simply as "**Xnet Viper**". In case there are differences between the various routers then the router types will be specifically mentioned.

Experience with the TCP/IP Networking as well as high frequency radio propagation is necessary. Familiarity with the Linux operating system is advantageous, but not necessarily required.

1.1 Documentation Conventions

These document conventions should be obvious, but we'll include them for completeness.

Bold — Used to mark **new concepts, WARNINGS** and **keywords.**

Italics — Used for *emphasis* in text, and occasionally for quotes at the beginning of a section. Also used to indicate commands for the user to type when showing screen interaction.

<slanted> — Used to mark **meta-variables** in the text, especially in representations of the command line. For example,

ls –l <foo>

Where <foo> would stand for a filename, such as `/config/hopling/`

`Typewriter` — Used to represent screen interactions, as in

```
XnetMkII-c36c74:~$ ls -l /config/hopling/

-rw-r--r--    1 root     root          3356 Mar 30 10:16 hopling.conf
-rw-r--r--    1 root     root           135 Mar 30 10:16 hw_type.conf
drwxr-xr-x    6 root     root          1024 Mar 30 10:16 virtual_gw
drwxr-xr-x    2 root     root          1024 Mar 30 10:16 webconfig
drwxr-xr-x    4 root     root          1024 Mar 30 10:16 wifi_backbone
```

Also used for code examples, whether it is C code, a shell script or to display general files such as configuration files. When necessary for clarity's sake, these examples or figures will be enclosed in thin boxes.

`Key` — Represents a key to press. You will see this in the form:

Press `return` to continue.

1.2 Overview

This information in this guide applies to the "**Xnet Viper**" Series products, including the following units.

ETSI versions

Type Number	Type Name	Frequencies	Number of Radios	Data Rate/Radio	Maximum Output Power
HV.11.1000	Xnet Viper-I	2.4GHz/5GHz	1	54Mbps	100mW/20dBm
HV.11.1100	Xnet Viper-II	2.4GHz/5GHz	2	54Mbps	100mW/20dBm
HV.11.1110	Xnet Viper-III	2.4GHz/5GHz	3	54Mbps	100mW/20dBm
HV.11.1111	Xnet Viper-IV	2.4GHz/5GHz	4	54Mbps	100mW/20dBm

FCC versions

Type Number	Type Name	Frequencies	Number of Radios	Data Rate/Radio	Maximum Output Power
HV.11.2000	Xnet Viper-I	2.4GHz/5GHz	1	54Mbps	400mW/26dBm
HV.11.2200	Xnet Viper-II	2.4GHz/5GHz	2	54Mbps	400mW/26dBm
HV.11.2220	Xnet Viper-III	2.4GHz/5GHz	3	54Mbps	400mW/26dBm
HV.11.2222	Xnet Viper-IV	2.4GHz/5GHz	4	54Mbps	400mW/26dBm

1.3 Xnet Viper System Features

The Xnet Viper can be configured to operate in a number of different network topologies:

- Point-to-Point (PtP) systems.
- Point-to-Multi-Point (PtMP) systems as WiFi Access Point.
- Point-to-Multipoint (PtMp) systems as WiFi Access Point with integrated Hotspot Access controller.
- Network Mesh systems with each Xnet Viper acting as Mesh router and Access Point.
- Hotspot Mesh systems, with each Xnet Viper acting as Mesh router and Access Point with integrated Hotspot Access Controller.

The Xnet Viper unit has the following features:

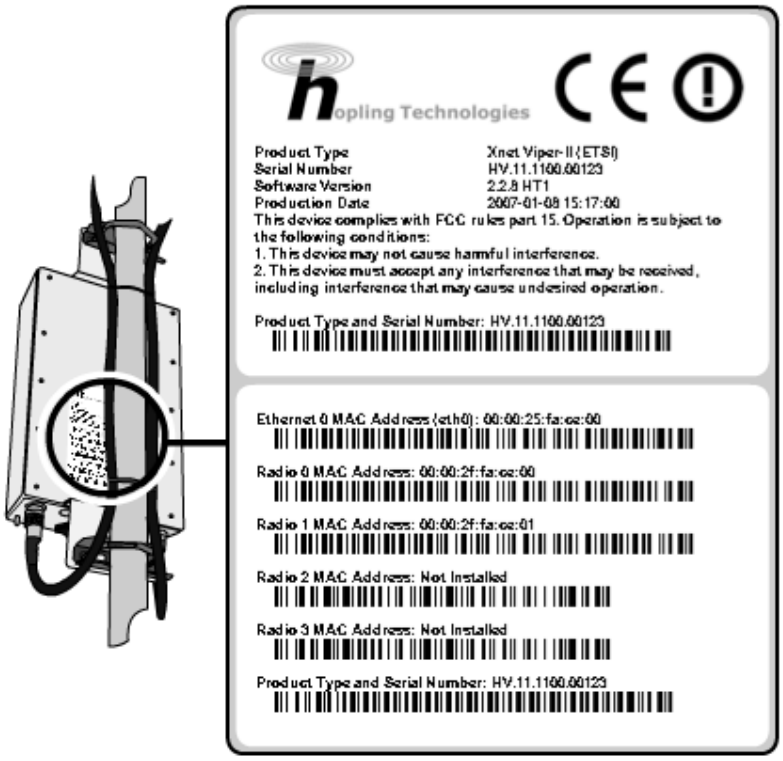
- Fast transmission speeds, up to 54Mbps raw data rate, with a typical data throughput of 20+Mbps per radio.
- Total bandwidth is 20 MHz with an occupied bandwidth of 16.6 MHz per radio.
- Hopling Discovery Protocol (HDP) to automatically discover and configure neighboring Xnet (Viper, Mark-I and Mark-II) units.
- Easy-to-operate user interface and system configuration.
- Built-in Mesh Stumbler application for easy alignment of antennas.

1.4 Identifying the Xnet Viper Unit

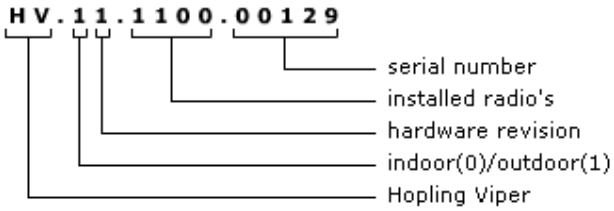
On the back of the Xnet Viper radio unit you can find two labels uniquely identifying the radio unit. The first label contains the Product Type, Serial Number, Software Version and Production Date. The second label contains the MAC addresses of the installed Ethernet and wireless interfaces of the radio unit.

Xnet Viper serial number label contains the following information:

- The Xnet Viper model number followed by the serial number, such as HV.11.1100.00129.
- MAC addresses of the main Ethernet port, such as Ethernet 0 MAC Address (eth0): 00:19:ae:40:84:e3.
- MAC addresses of the fitted radio cards, such as Radio 0 MAC Address, 00:00:2f:fa:ce:00.
- Production date, such as 2007-01-08 15:17:00.



The serial number indicates what type of Viper unit this is (indoor or outdoor), the revision of the hardware and what radio cards are installed. The breakdown of the Xnet Viper product type and numbering is as follows:



The Xnet Viper can have up to 4 radio cards fitted. Those radio cards can be a mix of high power and low power cards operating at different frequencies. The following are the types of radio cards that are supported:

0: no radio card fitted
1: ETSI variant 2.4GHz/5GHz (802.11a/b/g, 100mW) card fitted.
2: FCC variant 2.4GHz/5GHz (802.11a/b/g, 400mW) card fitted.
3: High Power 3.5GHz (630mW) card fitted.
4: High Power 4.9GHz (400mW) card fitted.
5: High Power 5GHz (400mW) card fitted.
9: High Power 900MHz (630mW) card fitted.

Not all combinations of radio cards are valid combinations. For example an Xnet Viper unit that has a combination of FCC certified radio cards and ETSI certified radio cards installed is unlikely to exist because this will invalidate type approval in either the FCC or ETSI territory. Some examples of valid system model numbers can be found below:

- HV.11.1000 outdoor Viper-I with 1x ETSI variant 2.4GHz/5GHz (802.11a/b/g/ 100mW) radio card fitted.
- HV.01.2000 indoor Viper-I with 1x ETSI/FCC variant 2.4GHz/5GHz (802.11a/b/g, 63mW) radio card fitted.
- HV.11.1100 outdoor Viper-II with 1x ETSI variant 2.4GHz/5GHz (802.11a/b/g/ 100mW) radio card fitted.

1.5 Customer support contacts

Users of Xnet Viper equipment who require technical assistance must contact their Value Added Reseller. For information on Value Added Resellers in your area, please visit **http://www.hopling.com/partners.htm**

1.6 Value Added Reseller Technical Support

Value Added Resellers may contact Hopling Technologies Technical Support Center on Xnet Viper products. Please note that you always need your product model and serial number when requesting support from Hopling Technologies Technical Support Center. The following information is useful when placing a support call:

- Configuration of the system, including product model, software version and serial number.
- Antenna type.
- Site information, including possible RF path problems, such as trees, buildings and other RF equipment in the area.
- Description of the problem.

1.7 Contacting Hopling Technologies Technical Support

- By Telephone, call: **+31 36 548 68 61**
- By e-mail, send an e-mail message to **support@hopling.com**

The support desk is open during Central European Business hours: 9:00 a.m. to 5:00 p.m. (CET, GMT+1).

2 Before You Begin

It's best to use a computer with a wireless Ethernet adapter for configuring the Xnet Viper. All Xnet Viper units are set to receive an IP address from an external DHCP server on the Ethernet interface marked Ethernet 0. You will need to assign your computer an IP address within the same range as the Xnet's IP address for the purpose of configuring the Xnet Viper.

The Xnet Viper units use Linux as operating system. To log into an Xnet Viper you have to connect to the machine using a **web browser** such as Internet Explorer, Netscape or Firefox. Alternatively you can log in using **Secure Shell** (SSH). SSH is a program for logging into a remote machine and for executing commands on a remote machine. It is intended to replace rlogin and rsh, and provide secure encrypted communications between two un-trusted hosts over an insecure network. X11 connections and arbitrary TCP/IP ports can also be forwarded over the secure channel.

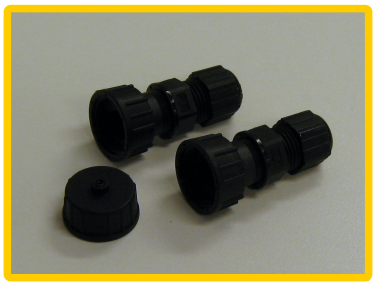
SSH connects and logs into the specified hostname (with optional user name). The user must prove his/her identity to the remote machine using one of several methods depending on the protocol version used.

2.1 Check Your Package Contents

These are the items included with your Xnet Viper purchase:

1x Xnet Viper unit

1x PoE Power Supply unit



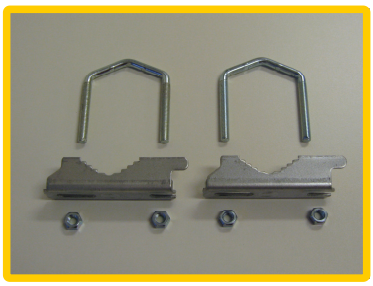
2x RJ45 plug assembly
1x RJ45 watertight cap

Mains Power cables
Dependent on the territory different power supplies will be supplied. In Europe a European style 220V/AC power cable is supplied. In Canada and the USA an 110V/AC power cable is supplied.

European 220V/AC cable

USA/Canadian 110V/AC cable

Multi function mounting kit
The multi function mounting bracket mounts on the back of the Xnet Viper unit housing. The two ubolts and clamps mount through the four mounting holes on the unit.



2x ubolt, 2x ubolt clamp and 4x M8 nut

3 Description

This chapter presents an overview of the Xnet Viper series product.

3.1 Mesh Routing Explained

The Xnet Viper employs mesh routing capabilities. With wireless mesh routing the Xnet Viper can be deployed to create a standalone IP network connecting multiple area's within a facility, buildings or individual customers. Every Xnet Viper mesh node employs an innovative method for routing IP packets between nodes. It allows these nodes to pass these packets through their neighbors to nodes with which they cannot directly communicate. A Xnet Viper mesh node is also able to handle changes in routes and can create new routes if there is an error. Using this mesh routing method you can build out seamless networks as large as you need, even spanning a complete campus or metropolitan area.

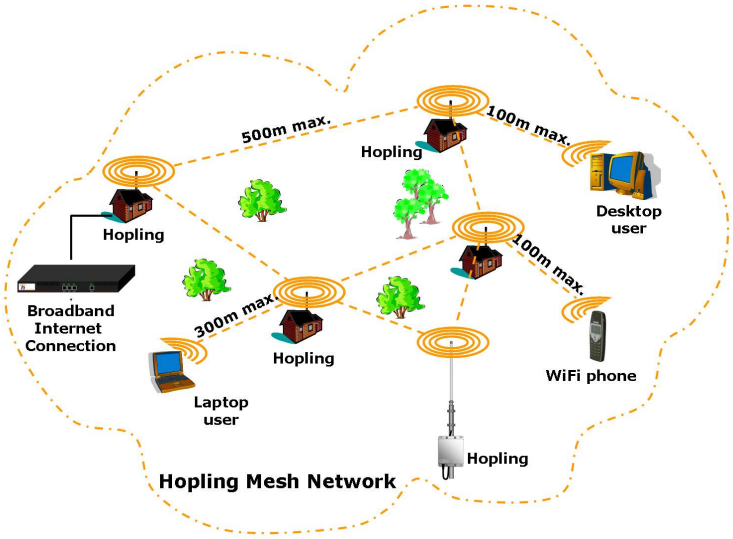


Figure 1: Xnet Viper mesh network

3.2 Hopling Discovery Protocol (HDP) Explained

The Hopling Discovery Protocol is part of the Hopling Mesh Architecture that serves as a discovery and information mechanism that is installed on all Hopling Technologies products starting with HopWARE release 3.1 and onwards. Its primary purpose is to collect data from a network in order to maintain a mesh network. In order to maintain security, any data exchanged between nodes is encrypted.

The information gained through HDP can be used in two ways; automatically and manually.
An example of automatic usage of this information is when using the Hopling Auto Mesh. In this case the information is used by mesh nodes to exchange information with potential neighbors, known as peers.
An example of manual usage of this information would be by providing support technicians with basic information about the current state of the mesh network.

Configuration
To configure HDP one should set a Network ID for the network and a network key. The network key is the unique identifier that makes the network different from any other. The Network ID makes it possible to distinguish which part of the network belongs to which Operator.

To prevent nodes from becoming part of someone else's network, the HDP key should first be set. This key must be identical for all nodes for one operator. It is a 32 byte string which means you need a sequence of 32 ASCII characters.

The HDP Network ID divides the network into logical subnets which can then be used to segment networks over different areas.

For example: when you have a city wide network with for example 9 distinct (separate) entworks it is possible to use separate digits to indicate which node belongs to which Mesh Network.

3.3 Hopling and Hotspot mode Explained

The Xnet Viper nodes are capable of running in two different modes. These modes are:

- Hopling mode.
- Hotspot mode.

In **Hopling** mode the Xnet Viper transparently bridges all network traffic from the end users' wireless device to the operators' backbone. In this mode the Xnet Viper behaves like a transparent layer 2 bridging device.

In **Hotspot** mode the Xnet Viper behaves like a layer 3 router for the network traffic coming from the end user's wireless device. A firewall is placed between the end users' device and the operators' backbone to be able to control the flow of network traffic. The firewall is controlled from the operators back office and can be opened and closed using the "Direct User Control" protocol (see chapter: 10.2).

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3.4 Virtual Gateways Explained

The Virtual Gateway concept is Hopling Technologies' way of giving the network operator the ability to share the Wireless Infrastructure with several Service Providers. The Xnet Viper node can be split into one or more (maximum 4) Virtual systems called **Virtual Gateways**. Each Virtual Gateway can be fully configured to correspond exactly with the different operators needs. For example each Virtual Gateway can be set to either work in **Hopling** or **Hotspot** mode. When one or more Virtual Gateways are put into Hopling mode, the use of VLAN (Virtual LANs) on the Ethernet interfaces is mandatory.
It is possible to define different default Login Pages, SSIDs and VLANs per Virtual Gateway. Furthermore each Virtual Gateway has its own defined Walled Garden set so that users can access a pre-determined area of the Internet prior to authentication. Authentication can take place via Radius or through the Hopling Technologies' "Direct User Control" protocol.

3.5 Hopling Mode Explained

The operation of the Xnet in **hopling** mode is that of a Layer two bridge. The bridging functionality connects the wireless end user device straight into the operators back bone. The bridge receives packets on one port and re-transmits them on another port. The bridge will not start re-transmission until it receives a complete packet. Because of this, stations on either side of a bridge can transmit packets simultaneously without causing collisions.

3.6 Hotspot Mode Explained

The operation of the Xnet in **Hotspot** mode is very simple. TCP/IP Traffic can not pass-through to the backbone network until the user of a certain terminal (identified by IP and/or MAC address) has authenticated himself. For the authentication process the Xnet captures the first HTTP request the terminal sends and redirects the terminal's web browser to a HTTPS-secured authentication page where the user name and password information is entered. This method is often called the captive portal. The Xnet then checks the validity of the authentication information against the back office server and opens TCP/IP access to the backbone network for the authenticated terminal.

Whether to use Hopling mode or Hotspot mode can be set per Virtual Gateway. It is possible to have one Virtual Gateway to function as a Layer Two bridge and a second Virtual Gateway to function as a Layer Three router. When one or more Virtual Gateways are put into Hopling mode, the use of VLAN (Virtual LANs) on the Ethernet interfaces is mandatory.

3.7 The Xnet Viper and Linux

The Xnet Viper wireless router uses Linux. This Linux is an Operating System, which acts as a communication service between the hardware and the software of the Hopling computer system. The Linux Kernel contains all of the features that you would expect in any Operating System. Some of the features included are:

- Multitasking (a technique for sharing a single processor between several independent jobs)
- Virtual Memory (allows repetitive, extended use of the computer's RAM for performance enhancement)
- Fast TCP/IP Drivers (for speedy communication)
- Shared Libraries (enable applications to share common code)
- Multi-user Capability (this means hundreds of people can use the computer at the same time, either over a network, the Internet, or on laptops/computers or terminals connected to the serial ports of those computers).
- Protected Mode (allows programs to access physical memory, and protects stability of the system)

All this makes the Xnet Viper extremely versatile and the basic system incorporates a lot of useful network features. Software updates can be incorporated quickly into the existing system, even if the system is already installed. All this versatility comes with a price however; configuring a Xnet Viper is somewhat more complex than the average off-the-shelve access point. Some basic knowledge of the Linux operating system is required in order to configure the Xnet Viper. If you are unsure about changes you want to make, please consult your reseller first.

This manual describes the most common system settings of the Xnet Viper. Most system settings are held in configuration files that are stored on each Xnet Viper unit. You can edit the configuration settings through the web interface of the Xnet Viper or by using the Secure Shell and using the incorporated *vi* Editor (see Appendix A: using the Xnet vi Editor).

4 Mounting the Xnet Viper outdoor

The Xnet Viper can be mounted on the side of a building or mounted to a mast. A wall (side) mount allows for mounting the Xnet Viper on the side of a building. This will provide a convenient mounting location when the roof overhang is not excessive and/or the location is high enough to provide a clear line of sight.

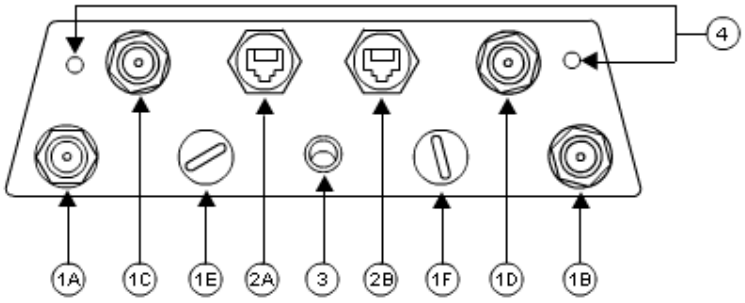
A safe grounding system is necessary to protect your Xnet Viper from lightning strikes and the build-up of static electricity when installed in an outside environment. So direct grounding of the antenna mast and Xnet Viper is very important. When mounting the Xnet Viper on an antenna mast, you have to connect the Xnet Viper to the same grounding system with the AC wall outlet.

The grounding system must comply with the National Electrical Code and safety standards that apply in your country. Always check with a qualified electrician if you are in doubt as to whether your outdoor installation is properly grounded.

Please note that FCC regulatory requirements demand that this unit is installed by qualified technicians only.

4.1 Connectors on the Xnet Viper Unit

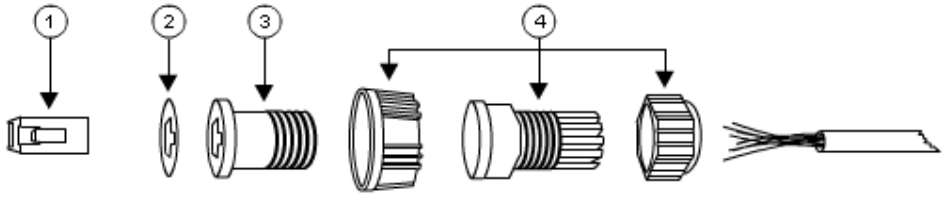
This section provides an overview of the connectors on the Xnet Viper unit.



1A	Radio 0, N-connector female
1B	Radio 1, N-connector female
1C	Radio 2, N-Connector female
1D	Radio 3, N-connector female
1E	Optional radio connector
1F	Optional radio connector
2A	Ethernet 0, including 802.3af PoE
2B	Ethernet 1, including RS485 console port
3	Blue power LED (on = power on)
4	Ground (earth) connectors

4.2 Assembling the Power-over-Ethernet RJ-45 connector

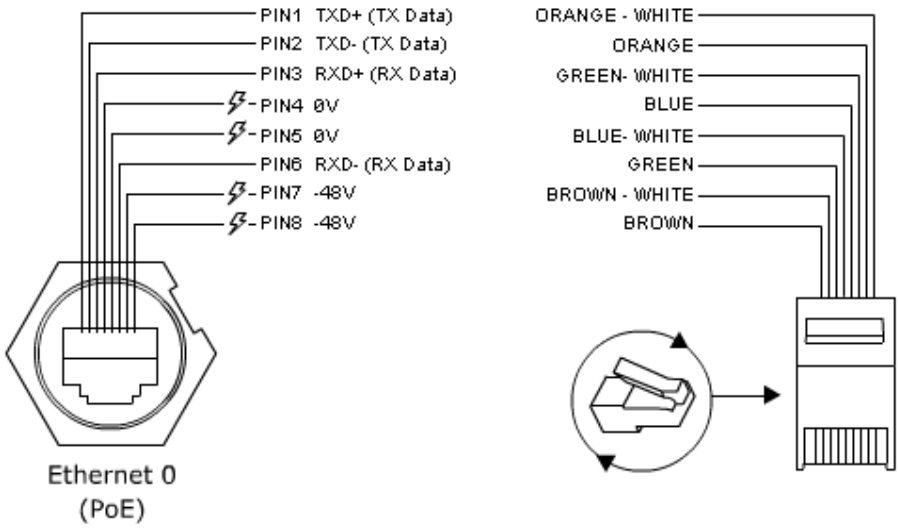
This section provides instructions for connecting the Power-over-Ethernet cable to the Xnet Viper enclosure. The port labeled "Ethernet 0 (PoE)" provides both the Ethernet data connection to the unit as well as the 48V/DC (802.3af compliant) power connection.



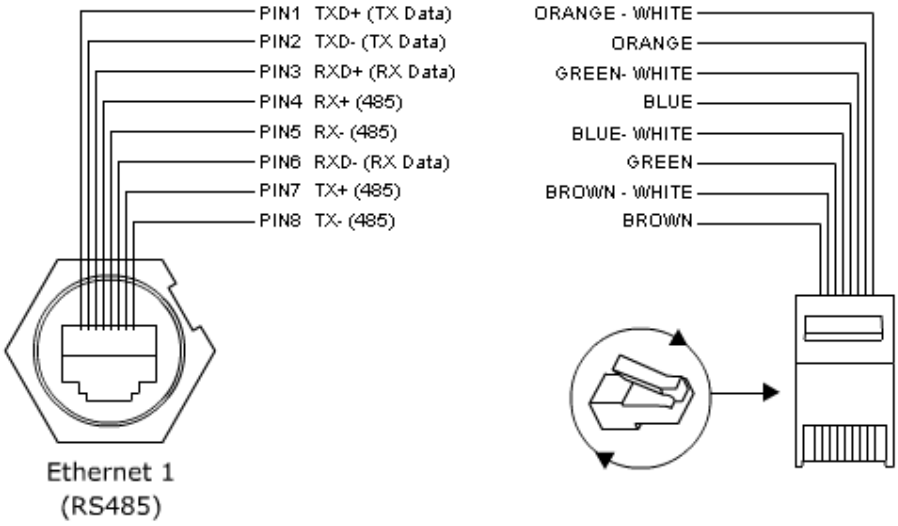
1	RJ45 plug
2	Gasket seal
3	Plug holder
4	Seal assembly

Assemble the water tight RJ-45 connector plug and connect the RJ-45 connector plug to the Ethernet cable.

4.3 Ethernet 0 (PoE) Pin Assignments



4.4 Ethernet 1 (RS485) Pin Assignments



4.5 Antenna Alignment

For optimal performance of your wireless link, make sure that the antennas are properly aligned. The height of the antenna must be sufficient to allow the antenna to be installed at least 50 cm (2 ft.) above the peak of the roof. In case you want to align directional antennas: Use a pair of binoculars and/or a map of the area and compass to point the antennas to one another. Omni-directional antennas are characterized by a wide radiation pattern. Therefore alignment of this type of antennas is less critical than for directional antennas.

To perform antenna alignment:

1. Assemble antennas according to the assembly instructions according to the instructions that came with the antenna set.
2. Mount the antennas as high as possible.
3. Connect the coaxial cable to the Xnet Viper.
4. Connect the coaxial cable to the antenna.

4.6 Antenna Polarization

Antenna polarization must be the same at either end of the link. In most applications, the preferred orientation is vertical polarization. Above-ground propagation of the signal is better when it is polarized vertically.

4.7 Antenna Seal

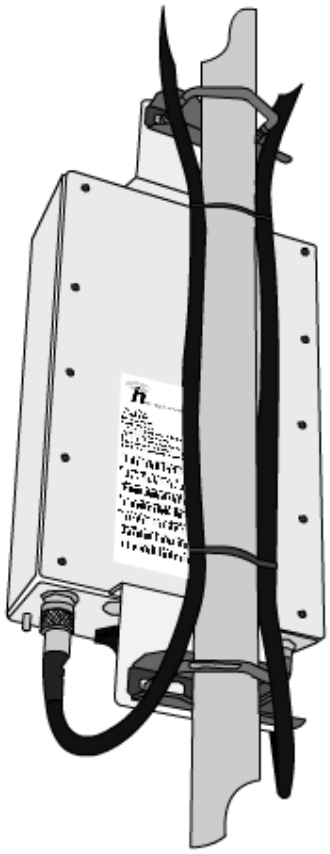
When using 8, 12, 18, or 24 dBi outdoor antennas, you must seal the antennas against rain with the provided amalgamation tape. Otherwise the antennas are not suitable for use in outdoor installations.

4.8 Hardware Installation Overview

The Xnet Viper is a radio device capable of transmitting in the 2.4GHz, 3.5GHz, 4.9GHz and 5GHz non-licensed bands. Because the Xnet Viper unit operates in the unlicensed radio frequency bands it is susceptible to interference that can reduce throughput and range. Follow these simple guidelines to optimize product performance:

- Install the Xnet Viper in an area where structures, trees, or hills do not obstruct radio signals to and from the unit.
- Install the Xnet Viper at a height sufficient to provide a clear line-of-sight signal path.

The Xnet Viper can be mounted on an antenna tower or, with an optional wall mounting bracket, to the side of a building. The optional wall mounting bracket will provide a convenient mounting location when the roof overhang is not excessive and/or the location is high enough to provide a clear line of sight.

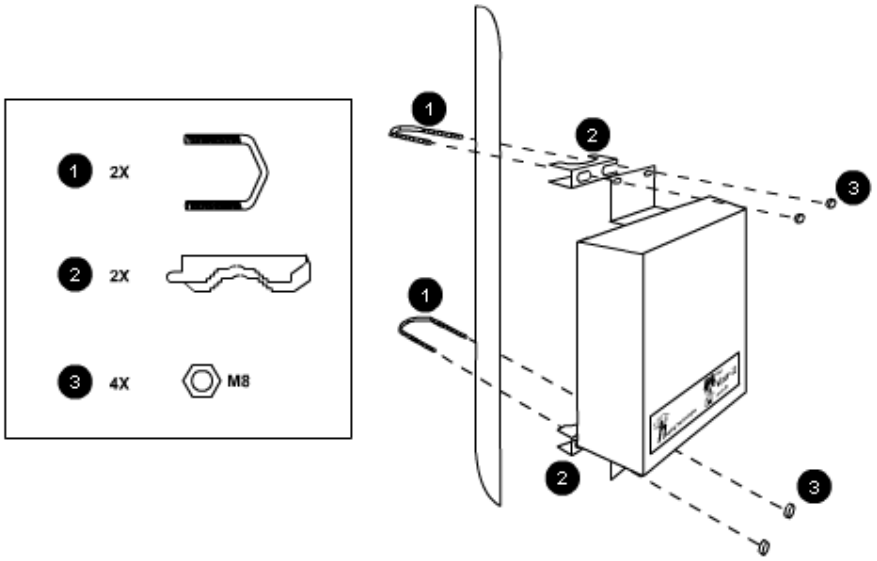


4.9 Hardware Mounting Diagram

To mount the Xnet Viper onto a vertical pole attach the U-bolts (no. 1) to the brackets (no. 2), then slide the completed enclosure assembly over the pole.

Adjust the Xnet Viper enclosure to the desired position on the pole (up and down or rotational).

Use a nut wrench to tighten the U-bolts (no.3) and secure the Xnet Viper enclosure in place. Tighten all four nuts. When tightening the U-bolts, ensure that the bolts are not twisted. The ends of each U-bolt should be protruding through the bracket evenly at the same distance.



Check that the U-bolts are tight and that the Xnet Viper enclosure is securely anchored to the pole.

4.10 Connecting the Xnet Viper Unit to your network

A. Connect an Ethernet cable to the port labeled "**Ethernet 0**" on the Xnet Viper.

B. Connect the other end of the Ethernet cable to the port labeled "**J1 Data & PWR**" on the Power-over-Ethernet (PoE) power supply.

C. Connect an Ethernet cable to the port labeled "**J2 data**" on the Power-over-Ethernet (PoE) power supply.

D. Connect the other end of the Ethernet cable to a router or a LAN with a DHCP server attached.

E. Connect the power cable to the back of Power-over-Ethernet (PoE) and power the unit on.

When you have completed the above steps the power LED on the Xnet Viper should be lit and the connected network should look like this:

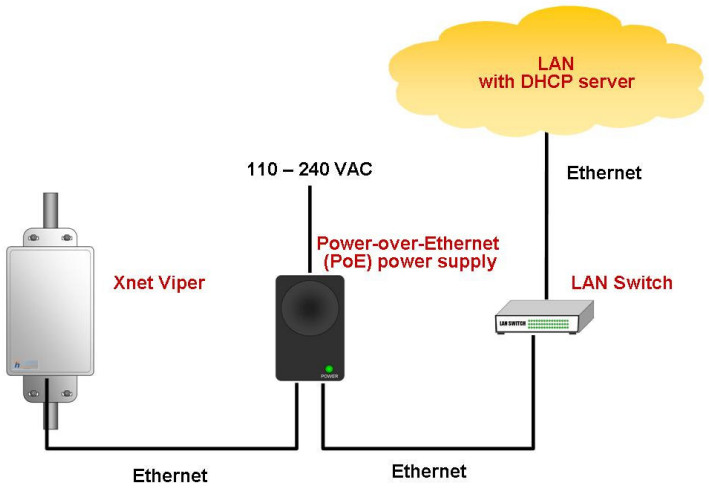


Figure 2: Xnet Viper Ethernet Connections

4.11 Hopling power supply, Power over Ethernet

All Hopling outdoor routers and customer premise equipment are powered using **Power-over-Ethernet**. Power-over-Ethernet (PoE) eliminates the need to run separate 110/220 VAC power cables to the equipment that is installed at rooftops, or other places where VAC power is not readily available. Using the Power-over-Ethernet system you need to run only a single CAT5 Ethernet cable that carries both power and data to each device. This allows greater flexibility in the locating of equipment and network devices and significantly decreasing installation costs in many cases. The Xnet Viper ships with two outdoor Ethernet connectors. These connectors can be connect to a straight cat5e cable. When standard cat5e cable is used the maximum cable length between the power supply and the Hopling can be 100 meters.

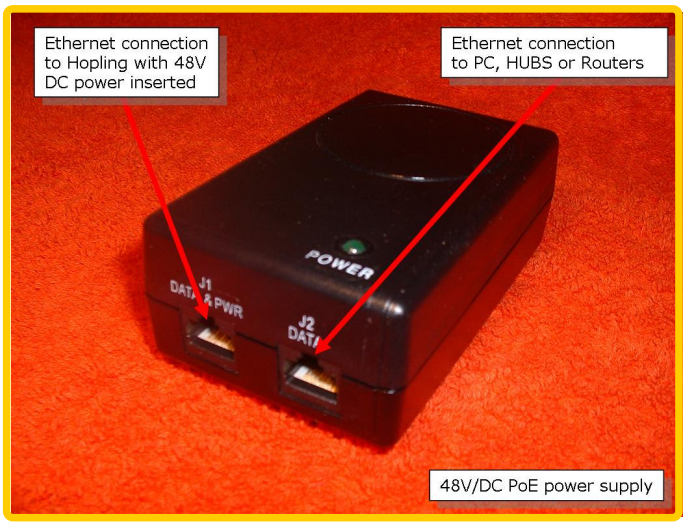


Figure 3, Hopling 48V/DC Power over Ethernet system

4.12 Power over Ethernet explained

Power over Ethernet comes in a number of flavors.

- Midspan. This is a standalone injector which just adds power to a network cable. It is used when adding PoE functionality to an existing network, normally available in 1, 6, 12 or 24-port versions.
- Endspan. This refers to network switches that have built-in PoE functionality in addition to its switching functionality.

The standard covers two different means to carry the power. The first one is built around using spare wires (4,5,7 & 8) in a Cat 5 or 5e cable, while the other one uses the data wires (1,2,3 & 6) and so called Phantom feeding which means that power and data will share the same physical wires.

The Hopling Power over Ethernet supply is a 1 port midspan solution which uses the spare wires in a Cat 5 or 5e cable. The power supply is providing power according to the diagram in Figure 4.

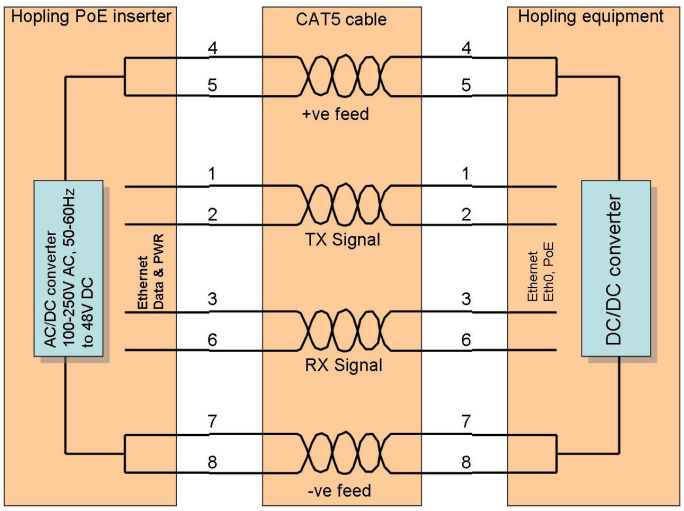


Figure 4, Hopling power over Ethernet cabling

All Hopling outdoor routers and customer premise equipment accept the injected DC power directly from the CAT5 cable through their RJ45 jack. These devices are considered to be "PoE-Compatible" or "Active Ethernet Compatible".

The Xnet Viper units are capable of using both types of PoE power supplies and are also compatible with legacy (non 802.3af compliant) Cisco Power-over-Ethernet power supplies. The Xnet Vipers' PoE interoperability has been verified with the following PoE power supplies:

- Hopling Technologies Single Port 20W Power Over Ethernet Adapter.
- Phihong Single Port 15.4W Power Over Ethernet Adapter.
- Cisco Catalyst 3560 Series 10/100 Switches.
- HP ProCurve 2600 series Switches.
- 3Com SuperStack 3 4400 PWR Switches.
- Gemtek Systems E-820 Managed PoE switch.
- PowerDsine 6500 series Ethernet midspan solution.
- Level-One FSW-1670TX 8+8 POE 10/100 Mbps Web Smart Switch.
- Repotec RP-PE168L PoE Switch 16x10/100 (8x PoE 802.3af).

5 Accessing configuration of the Xnet Viper

This section explains how to access and make changes the configuration of the Xnet Viper. For most configuration changes in the Xnet Viper you will be talking to the system through the use of the **web interface**. Alternatively you can edit the configuration changes through the use of an interactive **shell**. A shell is a program which takes user input (.e.g., commands that you type) and translates them into instructions. The Xnet Viper has three possible interfaces that let you update the configuration.

1. Web Interface.
2. Console login in via SSH.
3. Console login through the RS485 interface (additional RS485 interface required).

The Xnet Viper is set up to receive an IP address from your network automatically on the interface labeled "**Ethernet 0**" using DHCP.

5.1 Login via the web interface

To configure the Xnet Viper, you can either use a computer which is connected to the unit with a wireless interface card or a computer which is connected to the Local Area Network (LAN) to which the Xnet Viper is connected. The default SSID of the Xnet Viper is "**Hopling Technologies 0"**.

- Connect to the Xnet Viper with your wireless device.

When you are associated with the wireless interface of the Xnet Viper your computer should also automatically receive an IP address. You can connect to the Xnet Viper through the IP address that has been assigned to the unit by the Xnet Viper's DHCP server.

- When associated with the wireless interface the Xnet Viper can be reached through IP address 192.168.0.1.
- When your are connected to the Xnet Viper through the LAN then the Xnet Viper can be reached through the IP address that is assigned to it by the DHCP server on your LAN.

In this guide we are connected to the Xnet Viper through the LAN and we use IP address 192.168.18.86 for the examples.

- Start your web browser program (Internet Explorer, Netscape Navigator, Firefox).
- Then type the IP address and http port of the Xnet Viper in the address field (e.g. http://192.168.18.86) and press Enter.

Make sure that the IP addresses of the Xnet Viper and your computer are in the same subnet. After the connection is established, you will see the user identification window as shown in Figure 5.

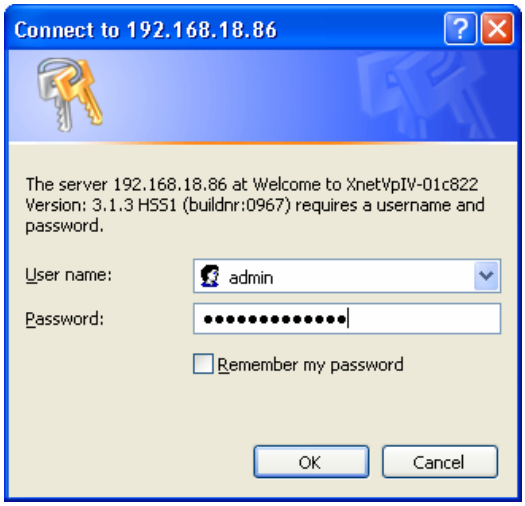


Figure 5, Login through the Xnet Viper web interface

- Type **admin** in the User Name field
- Type **hoplingtech01** in the Password field
- Click **OK**

Note: If you have changed the password, make sure to enter the correct password.

You will now enter the main screen of the Xnet Viper web interface. This a single screen as shown below that displays all of the parameters that the user needs to set up the unit.

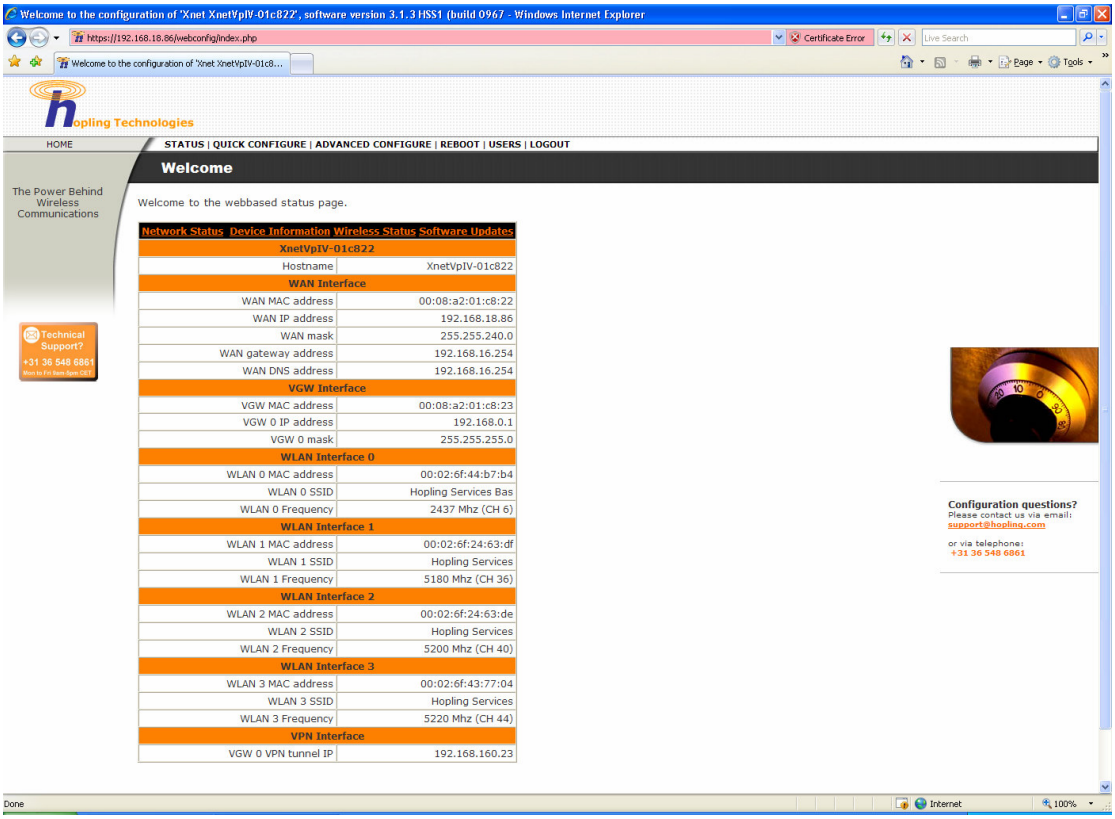


Figure 6, Opening screen of the Xnet Viper web interface

Many of the parameters on this screen can be found in more detailed menus as discussed later on in this document. The main navigation buttons are found on the top of the screen.

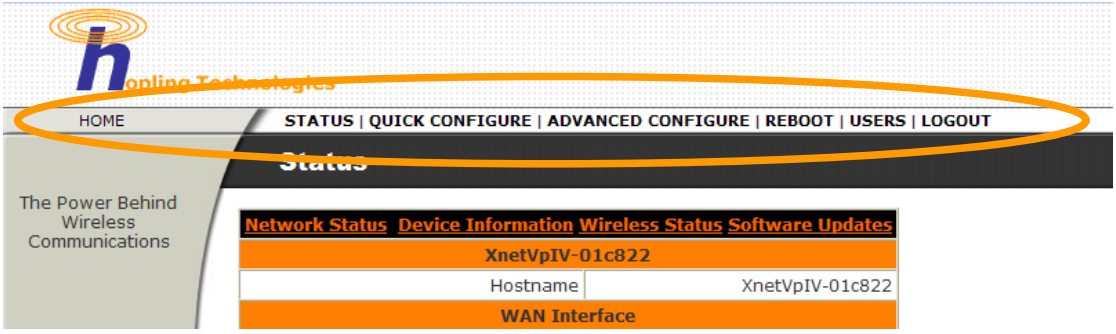


Figure 7, Main navigation buttons of the Xnet Viper web interface

- Click **QUICK CONFIGURE** to configure the most commonly used parameters on the system, such as IP addresses, SSIDs and Channels.