

## Configuring a boat WiFi and cellular network

Jerry Woodward

Directions for setting up a long range WiFi and cellular data system for a boat network. This is the system installed on my PDQ 32 catamaran, Terrapin. I suggest you configure everything first and get it all working before running cable and attaching the antennas to their permanent homes. Total cost was about \$450.00.

### **Use:**

The long range WiFi radio and antenna mounted outside the boat will connect to different WiFi hotspots and supply internet to a router inside the boat. Likewise, a cellular 4G LTE modem with a sim card will connect to a separate MIMO (multiple in, multiple out) antenna mounted outside and will deliver cellular data to the router and either WiFi or 4G can be selected with a switch. The router can then be accessed by different devices, laptops, tablets, phones, all using the same SSID and password, and access the internet.

### **Equipment:**

#### For WiFi connection:

Ubiquiti Bullet M2:

\$110.00, Amazon. Comes with POE injector (Power Over Ethernet) designed to plug into 110v AC.

#### POE injector:

If desired you can get an inexpensive POE injector designed to hook directly to a DC source. The Ubiquiti Bullet supplied POE injector puts out 24V, so I wired in a 12V-24V DC transformer to wire up a separate POE injector directly to the boat DC system. Others have said that the Bullet can work fine on 12V, so you may want to do some research on that.

#### WiFi Antenna:

Alfa 2408 Marine Omni antenna, 8db (there are many other similar antennas that will work), \$70-100.00, various suppliers. Make sure you get the correct connector to screw the antenna directly to the Bullet. Outdoor rated ethernet cable long enough to run from the router to the Bullet. Some locate the Bullet up the mast, but I located it about 8' up on a pole at the stern. Easier to access and avoids the "shadow" of the mast interfering with reception.

#### For cellular data connection:

Netgear 4G LTE modem LB1120, \$100.00 on Amazon

#### 4G Antenna:

4G LTE MIMO Omni Antenna with two pigtails: LMO7270 NB SMSM, Symmetry Electronics, \$70.00.

Coaxial cables to run from modem to antenna: Proxicast 25 ft Low-Loss Coax Extension Cable (50 Ohm) - SMA Male to SMA Female – Amazon \$36.95 each. You will need two identical coaxial cables (there are two connectors on the antenna and two on the 4G LTE modem. Also, you will need two SMA female plug to TS9 male plug RF coax connector adapters to attach the cables to the Netgear 4GLTE modem (about \$6.00 on Amazon)

#### Router:

Netgear M600 wireless dual band router. \$50.00, Best Buy. Any basic modern (dual band) router should do. We are going to use it as a "dumb switch" in Access Point mode.

### Switch

MT-Viki 2-port router switch, splitter selector hub, \$6.75 on Amazon.

Miscellaneous short Ethernet cables to connect the router to the switch and modem.

Note: The Bullet is a high powered WiFi radio and it will interfere with the boat router WiFi if it is on high power and the same frequency. Most shoreside WiFi hotspots are still broadcasting at 2mhz, so the 2mhz Bullet is a better choice than the 5mhz one. The boat router should be dual band so you can use the 5mhz band as your boat WiFi. This will avoid the interference with the Bullet.

### Powering devices:

The Bullet POE injector, router, and modem are all designed to plug into a 110V socket. Thus, you will need to turn on your inverter to use them. Alternatively, you can easily cut off the transformer from the modem and router and wire them directly to the boat 12V system. The POE injector that comes with the Bullet can't be wired directly to the boat 12V system, but you can buy one that can be directly wired to DC (less than \$10.00). The Bullet (may) require 24V, so you will also need to wire in a 12V to 24V converter and then attach to the POE injector (see above discussion).

### **Bullet, Router and 4G LTE modem configuration:**

#### **Bullet configuration**

First, make sure the Bullet is attached to an antenna. You don't want to power up the Bullet without an antenna attached. Next plug the POE injector into an AC outlet, the light should indicate power to the POE. Then plug an Ethernet cable from the Bullet to the port on the POE injector labeled "POE". Then with another Ethernet cable, plug your laptop or PC Ethernet port into the LAN port on the POE injector. You will then be able to directly access the Bullet operating system via your browser by entering the IP address of the Bullet, usually 192.168.1.20. At the password screen, type Password UBNT, Username, UBNT. Note, depending on your browser you may get a warning about connecting to this "site". Simply accept the warnings and connect anyway. Use the [Beginner's Setup Guide for Nanostation M2](#) (appended to the end of this document) to configure your Bullet. Note, the interface will be the AirOS operating system common to many Ubiquiti devices so these instructions apply to the Bullet as well as the Nanostation. Following this Setup Guide, you will be setting the IP address of the Bullet to 192.168.10.20. Once set up, disable your PC WiFi or internet connection and try to connect to a WiFi access point (your own WiFi or one that you have a password to) via the Bullet. If set up properly, you should be able to see a list of WiFi access points, select one, and connect. One addition to the Guide: once you select an access point and enter the WPA key if required and then click "Apply" you should be connected. This is verified by seeing a MAC address and signal strength bar on the Main tab. If you're not connected and you're sure you entered the right key, try rebooting the Bullet device: System Tab, Reboot button. Take some time here and make sure you are familiar with logging into the Bullet and connecting to different WiFi hotspots before moving on. This is because you will be doing this every time you move into a new location and want to connect to a new WiFi hotspot.

#### **Router Set-up:**

You will be changing the settings on the router to turn it from a real router into what is commonly called a "dumb switch". It will simply pass on whatever information enters through its LAN ports to the devices logged into it.

Unplug the Bullet and set it aside. Plug the computer Ethernet cable into one of the LAN ports on the Router. Power up the router. In your browser, enter the IP address of the router, typically 192.168.1.1. At the login window, enter the router username/password. For a Netgear router this would be: username= admin and password = password. Check your router documentation to make sure. Navigate to Wireless Setup, Advanced tab. This is the main place where you need to make changes. The following is for the Netgear M600 but you should be able to make similar changes in other routers.

Click on the Wireless button

Here under the Basic tab, you can change the SSID to something you and your guests will recognize, I used the name of our boat. Change the name for both the 2.4 and 5 GHz radios. You will then have two different frequencies to choose from when you log into the router, 5 ghz is better. You can also change the password if you want. Leave the security settings alone.

Next, navigate to: Wireless>advanced Setup>Wireless Settings

Here you want to check the box "Enable AP Mode".

Device name: same as the SSID you entered above.

Uncheck the boxes for "Get IP Address Dynamically" and "Get DNS Server Address Dynamically".

In the IP address box, enter 192.168.10.99 (this will be the new static IP address of the Router).

IP Subnet Mask: 255.255.255.0

Gateway IP address: 192.168.10.1

Primary DNS: 192.168.10.1

Click "Apply" and the changes will take effect.

At this point you will lose your connection to the router, but that's ok, you should be done setting it up. If you need to log back into the router, enter 192.168.10.99 in your browser because that is your new IP address for the router.

### **Final set up for Bullet:**

Power down the Router. Plug the Bullet into the router by connecting an Ethernet cable from the LAN side of the POE injector into one of the LAN ports on the router. Nothing will be plugged into the Yellow WAN port that you are used to plugging a modem into. Now plug the Bullet into the POE side of the POE injector using a long Ethernet cable. Power on your router and wait a few minutes for everything to power up completely. Move the Bullet as far away as possible from the Router because the high power Bullet will interfere with the router, particularly on the 2.4GHz band. Plug in the POE injector to power up the Bullet.

Now, using a laptop or tablet or phone with WiFi, you should be able to see two SSIDs for your router, same name but with a 2 or 5 appended to indicate 2 ghz or 5 ghz. Connect to the 5 ghz SSID (5 ghz will have less interference from the Bullet and other WiFi signals in the area) and enter your WiFi password. If the Bullet was previously connected to an active WiFi access point, you should have internet access. To change access points, enter the Bullet IP address, 192.168.10.20, into your browser and log back into the Bullet like you did initially. This is best done with a laptop or tablet because it's hard to navigate the menus with a smartphone. If you can't log into the Bullet while logged into the router via WiFi, something is wrong and you should go back to double check your settings. You should be able to view the different access points within range of the

Bullet and connect to whichever one you want as outlined in the Beginners Setup Guide. Click Change, then Apply and you will be connected to that access point. Make sure you test it with a known access point.

Now you can log onto the router with multiple laptops, tablets or phones and all should have internet access through the Bullet.

### **Netgear 4g LTE modem:**

Install a data sim card into the Netgear modem as described. Make sure you are in a good area for 4G LTE service. Plug an Ethernet cable from the modem to your PC or laptop. Power up the modem wait a few minutes and you should get a bunch of green bars as indicated in the manual. You may need to log into the modem to set the APN number for your particular sim card (carrier) as outlined in the instructions. Logging into the modem also allows you to see your data usage. If you are in an area with good 4G reception, you don't need an antenna attached to the 4G modem.

Once you are able to access the internet through the 4G LTE modem plugged directly into a PC, plug the Netgear Modem into one of the LAN ports on the Router (previously configured as a "dumb switch"). The Bullet should not be plugged in. Now, log into the router with laptop or tablet and you should have internet connection (assuming you have green bars showing on the Netgear modem). Finally, plug the Netgear Modem into the 4G LTE MIMO antenna using the two coaxial cables. There are two pigtailed coming out of the antenna and two connections on the back of the Netgear Modem. There are several different types of connectors for these devices so you may have to get an adapter of the correct gender to connect everything up. If you locate the 4G LTE MIMO antenna outside, you should see better reception (more bars) on the modem.

### **Summary:**

The Netgear Router is acting as a switch. Devices can connect to the router wirelessly but it will only pass through whatever is plugged into the LAN ports. We will have either the Bullet WiFi or the 4G Modem plugged in. One or the other, not both. You can do this manually by plugging and unplugging the respective Ethernet cables into the router when you want to use either the Bullet or 4G LTE modem, or there is an inexpensive manual switch that you can use.

Write down all your log information. You will have an IP address, username and password in order to log into the main menus for the router, modem and Bullet. Then you will have the SSID, and password to log into the router from your WiFi devices (this is different from the password to log into the router menu). Make sure you have a WiFi connection to the router before trying to access the router, modem or Bullet operating systems.

Once set up, you will not have to access the router menu or the 4G LTE modem unless you need to change settings. You will need to access the Bullet menu any time you move to a new location and need to access a new WiFi access point. Of course, most WiFi access points are now password protected so you will need to know the password. Some are still open however. Use common sense precautions when using WiFi networks as your data are not secure. Finally, in the Bullet menu, there is a slider bar to control the power of the Bullet radio. This is a high power radio and can easily cause interference with others close by. So, if you are in a

marina close to the WiFi access point with lots of other boaters trying to access the same point, turn down the power. If you are out and far from an access point, turn the power up.

**Last step:**

Install the Bullet/antenna at a suitable location. Higher is generally better to a point. Top of the mast would be too high. Mine is about 6' high at the stern. Then, mount the 4G LTE MIMO antenna, I don't think that needs to be high up because of the nature of cellular signals and the height of most cell towers. Mine is mounted on the stern rail. Then run the three cables (one Ethernet and two small coaxial antenna cables) to the inside of the boat and connect everything. Happy surfing!

# Beginner's SETUP GUIDE for NANOSTATION-M2 as receiver

and other Ubiquity airMAX devices using AirOS firmware v5 (Windows/MacOS)

This guide is primarily intended for **mobile users** (boaters, campers and truckers) who often change access points. Fixed users can also use it, although there might be other more suitable configurations for them.

Make sure the Nanostation-M2 (Nano for short) "Main" LAN socket is connected to your computer's network card with network cables, via the POE power injector (for a 12VDC power source, use a passive power injector rather than the AC one normally supplied). There should then be at least one LED lit on the back of the Nanostation. On the original Nanostation shipping box, find and write down the default IP address (we assume: 192.168.1.20), the user name and password (should both be "ubnt"). Do not lose this information!

- 1) Set your computer to communicate with Nano (only done once)
  - 1a) Windows
  - 1b) Mac OS X
- 2) Program Nano as receiver (station) and router (only done once)
- 3) Choose and connect to a WIFI signal (done to find a new access point)

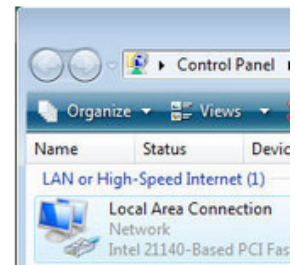
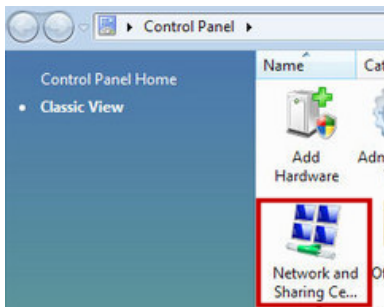
## 1a

### Windows XP

- Open **Start/ Control panel/ Network Connections**.
- Or in Classic Start menu: **Start/ Settings/ Control panel/ Network Connections**.

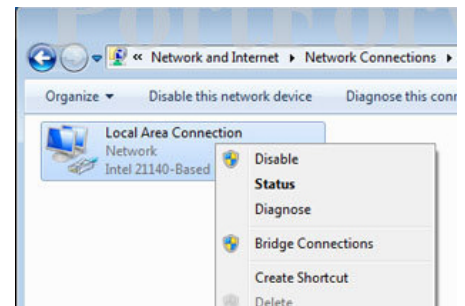
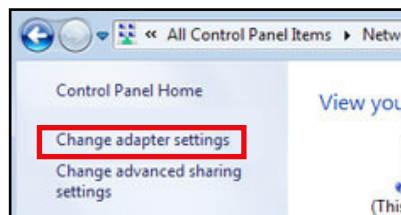
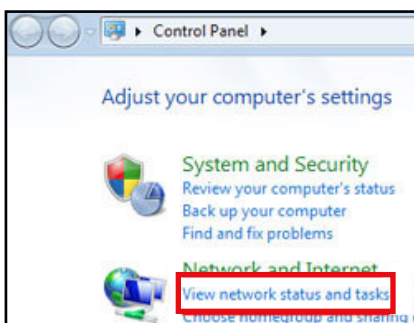
### Windows Vista

- Open **Start**, right-click on **Network** and then **Properties** (or Start/Control Panel).
- Double click **Network and Sharing Center**, click **Manage network connections**.  
**Network Connections** window will appear:



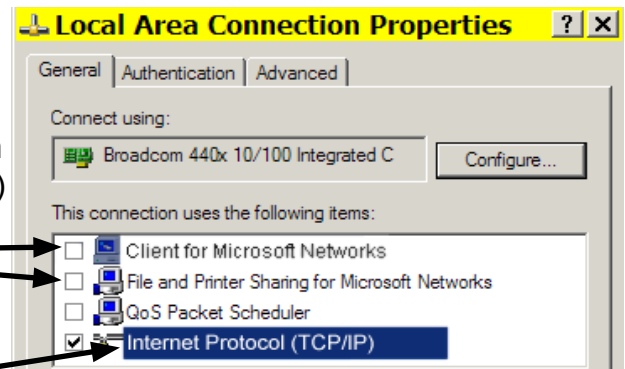
### Windows 7

- Open the **Start** orb, click on **Control Panel**,
- Click **View Network Status and Tasks**, then **Change adapter settings**:



- Enable your network card: right-click on **Local Area Connection** and select **Enable** (if it's already enabled, the option would be "Disable" and just leave it as is).
- If there is a built in WIFI card, it should be disabled (right click and choose "Disable" if not already so).

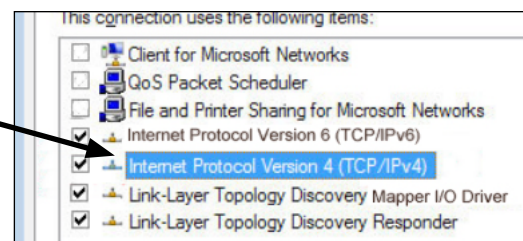
- Right click on **Local Area Connection** and select **Properties**:



- If you do not need to share files or a printer on your local network you should disable (un-tick) "Client..." and "File and..." for added security.

- WinXP: double click on **Internet Protocol**:

- Vista and Win7: double click on **Internet Protocol Version 4(TCP/IPv4)**:



- Fill in as pictured here:

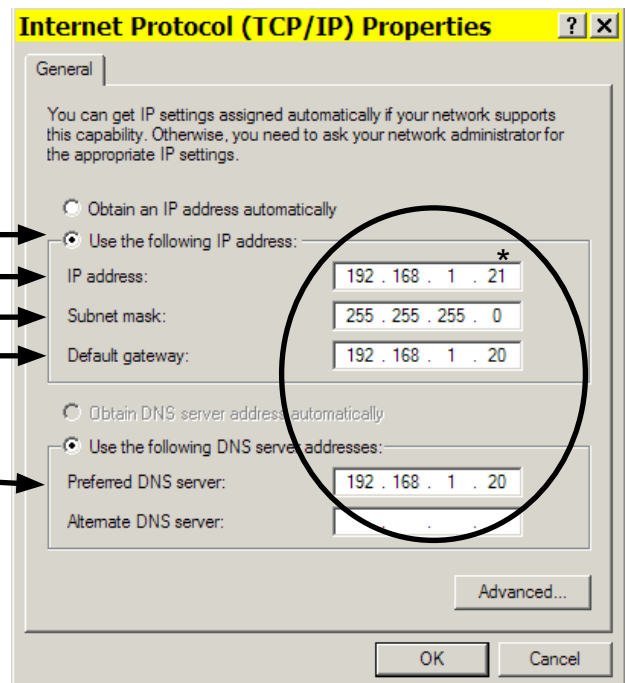
We're entering a static (fixed) IP address

This will be your computer's IP \*

This is always so

This is the IP of the Nano

Nano IP here too  
(The Nano will be acting as a DNS server)

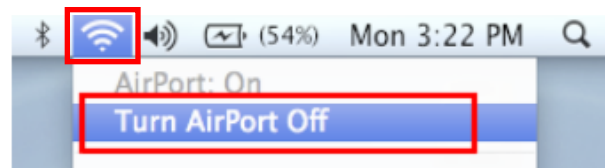


\* Note: The last number can be any number from 1 to 254 except 20 which is taken.

- Click **OK** twice. There should be 2 LEDs lit on the Nanostation (power + network cable).
- Go to page 5.

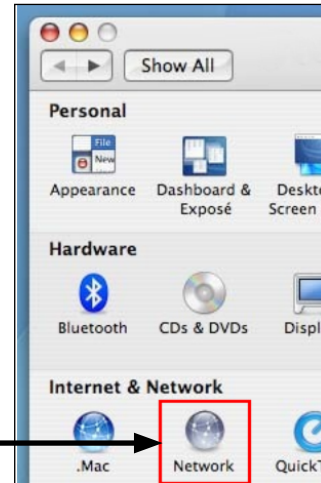
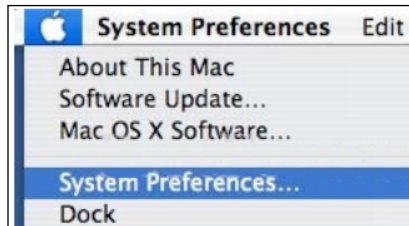
## 1b Mac OS X

If the **AirPort** is on, best to turn it off:

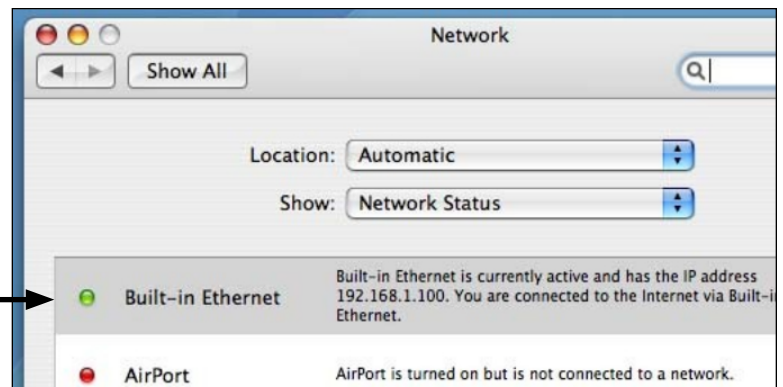


### Mac OS X 10.4

- Click on the **Apple** icon then **System Preferences**:



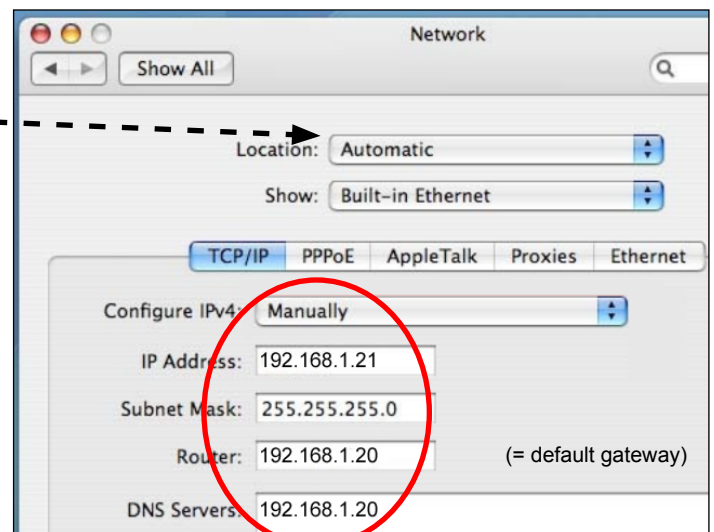
- Click on **Network**:



- Select the **Built-in Ethernet**:

- then click on **Configure**.

(Option: create a new **Location** configuration named *Nano* to quickly return to these settings in the future)



- Fill in as pictured here:

- Click on **Apply**.
- There should now be 2 LEDs lit on the Nanostation (power + network cable).
- Goto page 5.



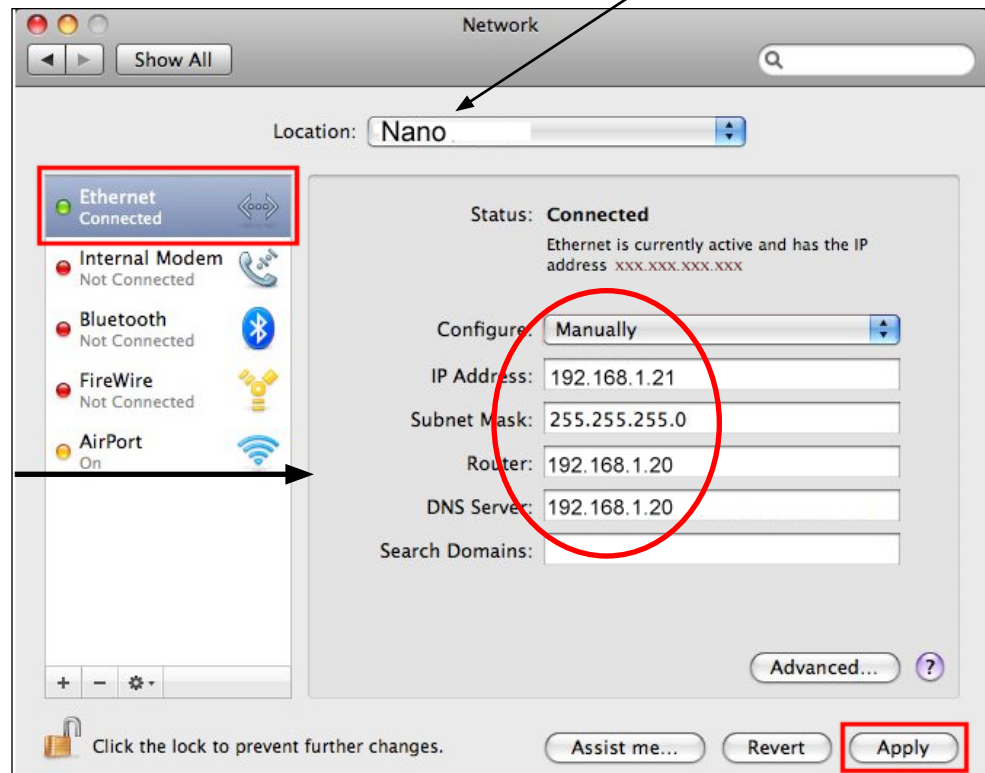
## AC OS X 10.5 (Leopard)

- Click on the **Apple** icon then **System Preferences**
- Click on **Network**:

(Option: create a **Location** configuration named *Nano* to quickly return to these settings in the future)

- Select **Ethernet**:

- Fill in like like this:



- Click on **Apply**:

- There should now be 2 LEDs lit on the Nanostation (power + network cable).

NOTE for other Mac versions: if you have two TCP/IP settings, then choose IPv4.

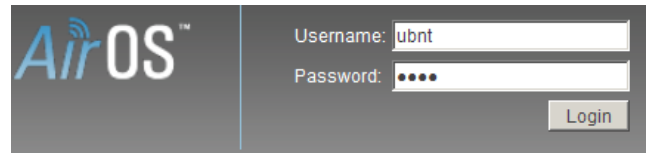
### **GENERAL NOTES**

- **AirOS firmware versions** (firmware on a device is like the operating system on a computer): the current version is AirOS 5.3.2 as pictured here in the screen shots. If you receive a unit with a later firmware (or if you update it later), additional settings may be visible.
- **Resetting device:** Should you be unable to connect to the Nanostation after changing any settings (by mistake), it can be reset to it's original default configuration (a hard reset) by pressing the reset button (little hole, inside cover) for 20-30 seconds, with the power on. The LED light should flash after releasing button.
- **Directional antenna:** The built in antenna points to the front of unit (LEDs are on back) with a horizontal beam width of about 60 degrees:

## 2 Setting up the Nano

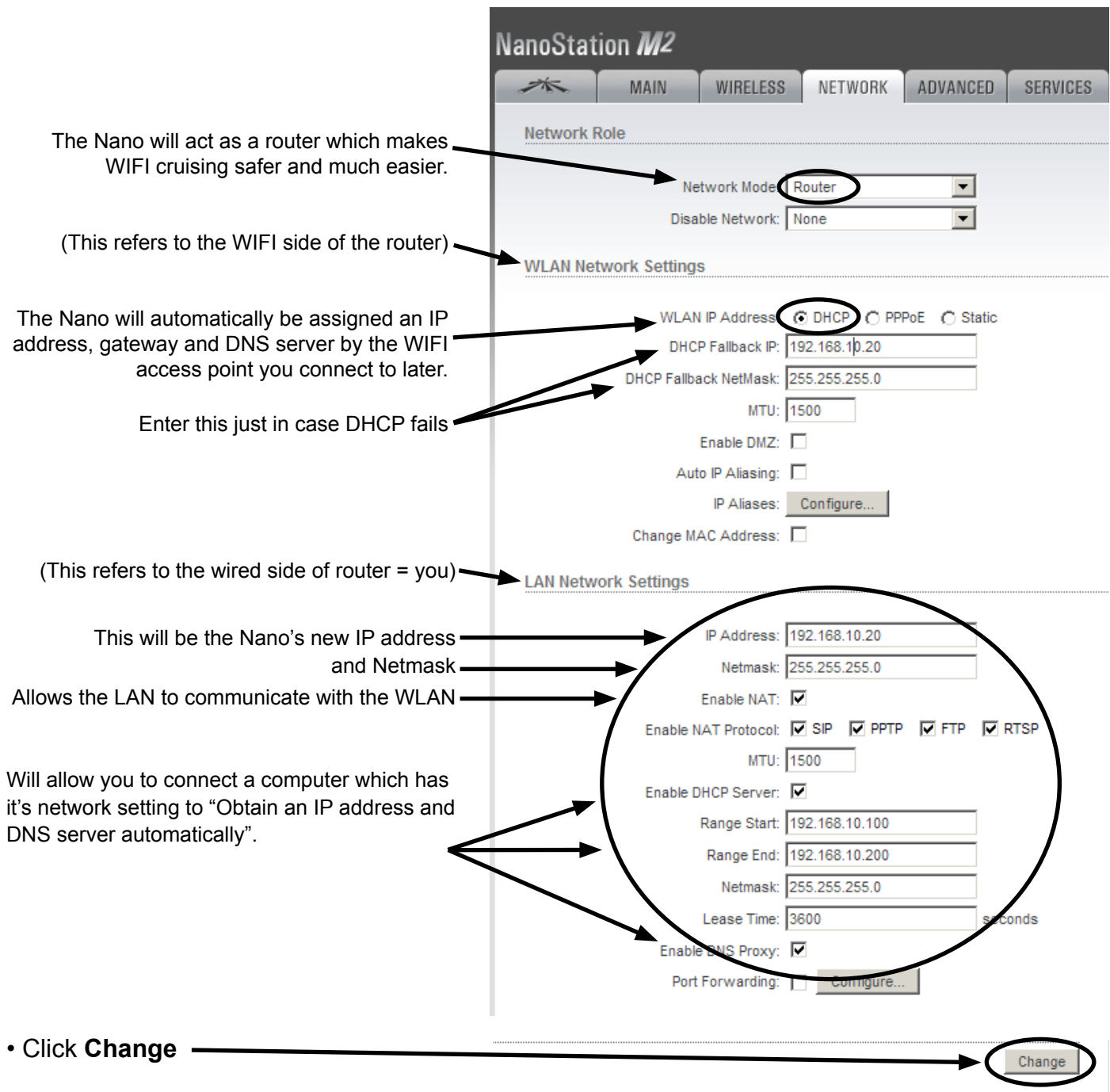
- Open your browser (e.g. Internet Explorer, Firefox, Opera, etc.) and type in address bar: **http://192.168.1.20** (the default address of the Nano) then press the Enter key.

- Type in *ubnt* twice and click **Login** →  
(If this window did not appear, there may be a problem with the wiring, the network card or a firewall).



A screenshot of the AirOS login interface. On the left is the 'AirOS' logo. On the right, there are two input fields: 'Username:' with 'ubnt' entered and 'Password:' with four dots. Below these fields is a 'Login' button.

- Select the **Network** tab and change Nano settings as follows:



The screenshot shows the 'NanoStation M2' configuration page, specifically the 'NETWORK' tab. The page is divided into sections: 'Network Role', 'WLAN Network Settings', and 'LAN Network Settings'. Annotations with arrows point to various settings:

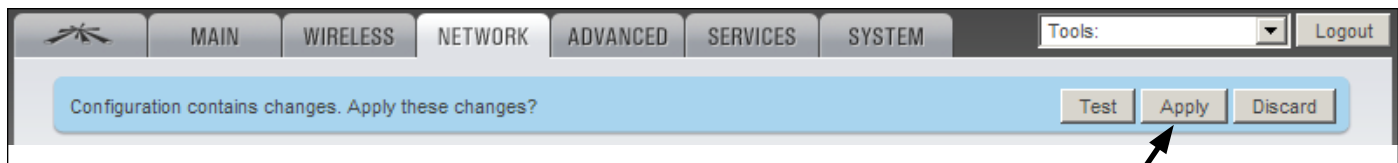
- Network Role:** 'Network Mode' is set to 'Router' (circled). 'Disable Network' is set to 'None'.
- WLAN Network Settings:** 'WLAN IP Address' is set to 'DHCP' (circled). 'DHCP Fallback IP' is '192.168.10.20'. 'DHCP Fallback NetMask' is '255.255.255.0'. 'MTU' is '1500'. 'Enable DMZ', 'Auto IP Aliasing', and 'Change MAC Address' are unchecked. 'IP Aliases' has a 'Configure...' button.
- LAN Network Settings:** 'IP Address' is '192.168.10.20'. 'Netmask' is '255.255.255.0'. 'Enable NAT' is checked. 'Enable NAT Protocol' has checkboxes for SIP, PPTP, FTP, and RTSP, all of which are checked. 'MTU' is '1500'. 'Enable DHCP Server' is checked. 'Range Start' is '192.168.10.100'. 'Range End' is '192.168.10.200'. 'Netmask' is '255.255.255.0'. 'Lease Time' is '3600' seconds. 'Enable DNS Proxy' is checked. 'Port Forwarding' has a 'Configure...' button.

Annotations on the left side of the screenshot provide context for these settings:

- 'The Nano will act as a router which makes WIFI cruising safer and much easier.' points to the 'Router' selection.
- '(This refers to the WIFI side of the router)' points to the 'WLAN Network Settings' section.
- 'The Nano will automatically be assigned an IP address, gateway and DNS server by the WIFI access point you connect to later.' points to the 'DHCP' selection.
- 'Enter this just in case DHCP fails' points to the 'DHCP Fallback IP' and 'DHCP Fallback NetMask' fields.
- '(This refers to the wired side of router = you)' points to the 'LAN Network Settings' section.
- 'This will be the Nano's new IP address and Netmask' points to the 'IP Address' and 'Netmask' fields.
- 'Allows the LAN to communicate with the WLAN' points to the 'Enable NAT' checkbox.
- 'Will allow you to connect a computer which has it's network setting to "Obtain an IP address and DNS server automatically".' points to the 'Enable DHCP Server' checkbox.

At the bottom, a 'Change' button is circled, with an arrow pointing to it from the instruction: 'Click **Change**'.

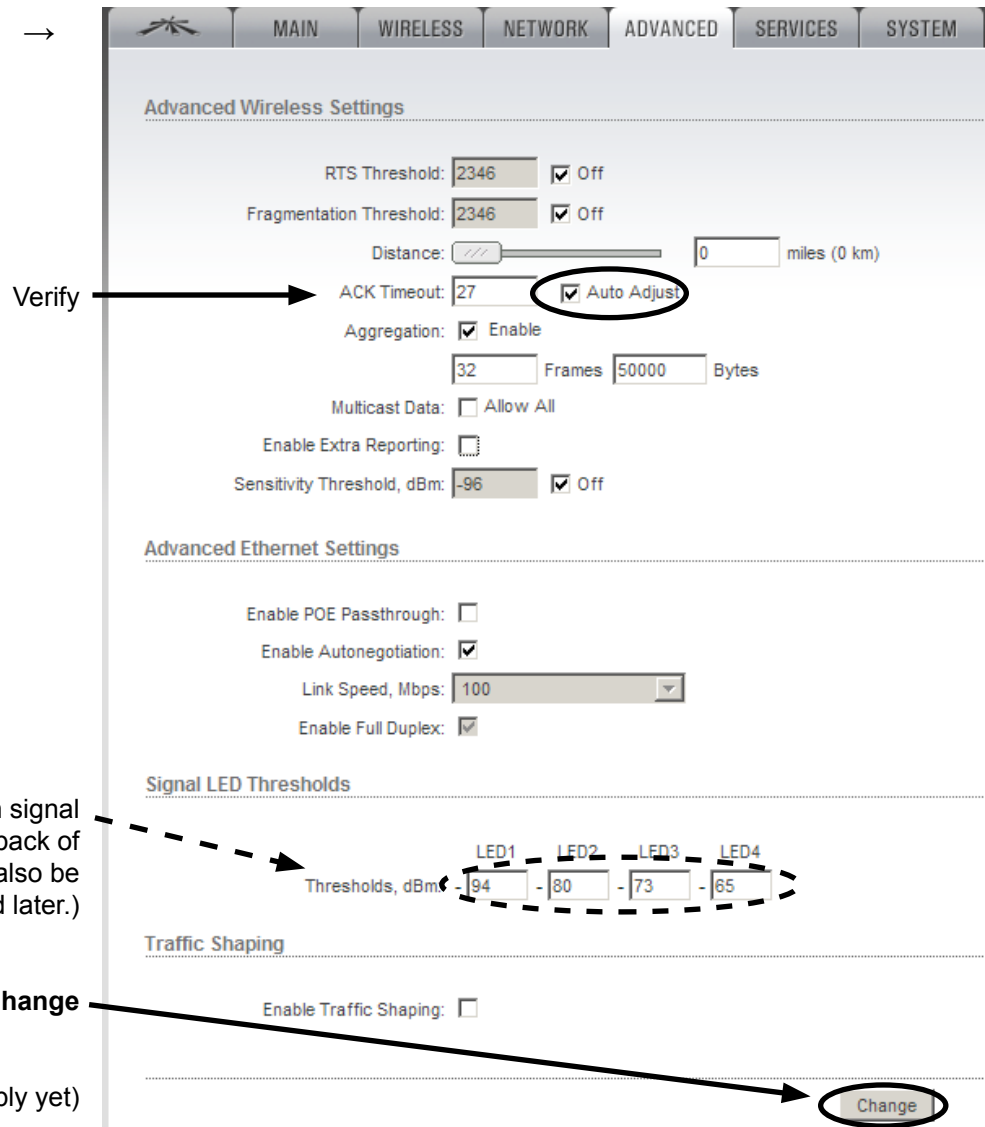
- You'll notice that this now appears at the top of the window:



The changes made on the previous page are memorized but not yet in effect. Only after clicking “**Apply**” with they take effect. Since we still need to make some other changes, we’ll “Apply” them all later.

DO NOT APPLY YET!

- Click on the **Advanced** tab →



(Optional: adjust at which signal strength the LEDs at the back of the Nano light up. This can also be tweaked later.)

Click **Change**

(Do not click Apply yet)

### NOTES

- Just like there are several ways to skin a cat, the network settings of the Nano and computer can be many. The settings here have been found most convenient while cruising because connecting to new WIFI access points in different places require a minimum of effort.
- Since the default Nano IP address is in the very common range 192.168.1.x, and we cannot risk having the same range on our own local LAN as the WLAN ashore, we have changed the original Nano IP from 192.168.1.20 to 192.168.10.20. We have also activated the Nano's DHCP server which means that the computer can get network settings assigned automatically (an IP in the range 192.168.10.100 to 200, plus the Gateway and DNS server = IP of the Nano). We still need to set the computer to acquire the IP automatically (see end of next page).

- Click on the **Wireless** tab →

Change Nano mode to **Station**  
(i.e. receiver or 'client')

Make sure output power is on max

Leave rest as shown.

Click **Change**

The screenshot shows the 'Basic Wireless Settings' page with the following settings: Wireless Mode: Station, SSID: (empty), Lock to AP MAC: (empty), Country Code: United States, IEEE 802.11 Mode: B/G/N mixed, Channel Width: Auto 20/40 MHz, Channel Shifting: Disabled, Frequency Scan List, MHz: (empty), Output Power: 12 dBm, Max TX Rate, Mbps: MCS 15 - 130 [300], Automatic: checked. The 'Change' button is circled.

- Click **Apply** when it appears at the top:  
Now all the changes will come into effect.

The screenshot shows the top navigation bar with the 'Apply' button circled. Below it, the word 'YES' is written.

- Note:** At this point communication with the Nano is lost because we still need to change the computers IP address to be in the same (new) range as the Nano (192.168.10.x). The setting can be either fixed (manually to e.g. IP=192.168.10.21, Subnet mask=255.255.255.0, Gateway/Router/DNS=192.168.10.20), or **automatic** which is simpler and more flexible (as it allows you to take the computer to another wired network and automatically acquire the settings):

- Windows:** refer back to page 1 and 2 to open **Internet Protocol Properties**:

Change like this:  
Then click **OK** twice.

- Mac OS:** refer to pages 3 and 4 and change **Configure** from **Manually** to **DHCP**, then click **Apply**.

From now on, all these settings will remain in place and you'll only need to take step #3 to connect to an new WIFI access point.  
What a relief!

The screenshot shows the 'Internet Protocol (TCP/IP) Properties' dialog box with the 'General' tab selected. The 'Obtain an IP address automatically' radio button is circled. Below it, the 'Obtain DNS server address automatically' radio button is also circled. The 'OK' button is at the bottom right.

### 3 Connecting to a WIFI signal

- In the browser address bar type **http://192.168.10.20** (the new address of the Nano) then press the **Enter** key.
- Click on the **Link setup** tab, then on **Select** (second line at right) to get:

Select a strong signal (without encryption) by clicking in the button. Then click "Select"

Clicking once on "Signal" will sort the list with the strongest at the top

This is the strongest in the list. Any figure lower than about 90 is normally usable.

MAC Address	SSID	Device Name	Encryption	Signal / Noise, dBm	Frequency, GHz	Channel
00:23:97:CC:C3:B7	09FX12071609		WEP	-81 / -89	2.437	6
00:02:6F:56:04:F5	Zahniser's Yachting Center		NONE	-82 / -88	2.447	8
00:23:28:00:C5:E2	CalvertMarina1		WPA	-88 / -88	2.462	10
52:B7:70:45:7B:D4	Sea Fox Printer		WEP	-88 / -89	2.437	6
68:7F:74:D7:83:C0	SpringCove E-Dock		WPA	-88 / -91	2.422	4
00:23:F8:A5:84:9E	SpringCove		WPA	-89 / -91	2.412	3
2A:74:86:DD:9A:29	hpsetup		NONE	-89 / -96	2.462	10
C0:3F:0E:6B:D5:FA	Swant_Time_2		WPA	-92 / -96	2.412	3

Selectable SSID's must be visible and have compatible channel bandwidth and security settings

Lock to AP Select Scan

- Click on **Change**, wait; click **Apply** at top of new page, wait 10-15 seconds for device to reboot and for connection (some access points take a while to connect). That's it. There should be 3 or more LEDs lit on the back of the Nano.
- To verify the connection, click on **Main** tab. This page has no settings, only information to confirm a connection. (You may have to refresh the browser page to get current info).

A number here means that the Nanostation has associated with the WIFI access point

Received signal strength

Wireless connection speeds (transmit/receive). Most public access points can reach 54Mbps (internet connection speed is usually much lower).

This number will increase with long distance connections

Click on **DHCP Client**:

The numbers here tell us that the WIFI access point has assigned all the necessary numbers to the Nano for connecting to the internet. Numbers will vary with access points. If blank, internet access will not work. Some access points can take up to 30s to assign numbers and sometimes you have to click "Renew" for success.

MAIN WIRELESS NETWORK ADVANCED SERVICES SYSTEM Tools: Logout

Status

Device Name: UBNT  
Network Mode: Router  
Wireless Mode: Station  
SSID: Zahniser's Yachting Center  
Security: none  
Version: v5.3  
Uptime: 01:51:13  
Date: 2011-01-14 16:33:09

AP MAC: 00:02:6F:56:04:F5  
Signal Strength: -81 / -81 dBm  
Horizontal / Vertical: -81 / -81 dBm  
Noise Floor: -88 dBm  
Transmit CCQ: 97 %  
TX/RX Rate: 5.5 Mbps / 12.0 Mbps  
AirMax: -

Channel/Frequency: 8 / 2447 MHz  
Channel Width: Auto 20 MHz  
ACK/Distance: 35 / 0.7 miles (1.2 km)  
TX/RX Chains: 2X2

WLAN MAC: 00:27:22:26:13:AA  
LAN MAC: 00:27:22:27:13:AA  
LAN1/LAN2: 100Mbps-Full / Unplugged

Monitor

Throughput | AP Information | DHCP Client | ARP Table | Routes | Port Forward | DHCP Leases | Log

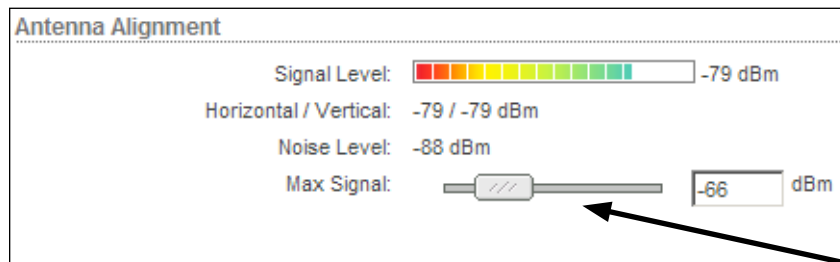
DHCP Client Information

IP Address: 192.168.0.180  
Netmask: 255.255.255.0  
Gateway: 192.168.0.1  
Primary DNS IP: 208.67.222.222  
Secondary DNS IP: 208.67.220.220

DHCP Server: 192.168.0.5  
Domain:  
Total Lease Time: 02:00:00  
Remaining Lease Time: 01:59:49

Renew Release Refresh

- Clicking on Tools, **Align antenna** will bring up a received signal strength indicator, useful for improving signals by rotating the Nanostation:



Since the number is negative, a lower figure is stronger.

Moving this slider allows the signal bar indicator to better display different strengths.

- Assuming you have connected to an 'live' WIFI access point, you should be ready to access the internet. This may involve logging-in to a marina or hotel welcome page, or paying for access.
- To connect to another WIFI access point in the future, just log-in to the Nano with your browser and repeat step #3.** Also see Bookmark recommendation below.
- An alternative to step #3 is to type "Any" in ESSID (second line on tab "Wireless"), then Save and Apply. From then onwards, the Nano will automatically connect to any un-encrypted access point, without any intervention from your part. However, in locations with many WIFI signals, it might not end up being the most desirable one.
- Connecting to an encrypted wireless network (WEP or WPA) requires knowing the encryption key and performing additional steps in #3.

### Recommendations

- For **security**, use a firewall (e.g. Windows firewall or free Zone Alarm) and a virus scanner (e.g. Norton or free AVG).
- Make a **bookmark** (or 'favorite') to the Nanostation address (<http://192.168.10.20>) and save the log-in info (ubnt; ubnt) in your browser for quicker access.
- The supplied white **cable ties** for mounting the device may fail after exposure to sunlight. It's much better to use black ties, a good string, or hose clamps.
- If you do not use your computer elsewhere, you may prefer to give it a fixed network setting (manually to e.g. IP=192.168.10.21, Subnetmask=255.255.255.0, Gateway/Router/DNS=192.168.10.20), as this removes the initial delay of being assigned settings when turning on the computer.
- To serve more than one computer you can use a network switch. To serve two computers the Secondary LAN port of the Nano can be used as well.

### Online resources

- Download a more **recent firmware** (improvements and bug fixes; not necessary but recommended) at: <http://www.ubnt.com/support/downloads>. Once downloaded, log-in to the Nano, click on **System** tab, then **Upgrade**. Previous configuration settings will not be lost.
- For an advanced manual (**AirOSv5 User guide**) go to [http://www.ubnt.com/wiki/Main\\_Page](http://www.ubnt.com/wiki/Main_Page) and look under *AirOS/AirMax/M Series Products*.
- For technical support use the UBNT Forum at: <http://ubnt.com/forum>



# ADDENDUM

## Possible reasons for not getting online

- Cannot associate with AP (access point)
  - AP fault or intentional restriction
  - Your signal not good enough/ distance too far (using a directional antenna helps)
  - Interference from many other WIFI users (using a directional antenna helps)
  - Look for another AP on a less busy channel (for example, in the USA only channels 1, 6, and 11 do not overlap/interfere with each other).
- Associated with AP (access point) but not online
  - AP may be disconnected from internet
  - AP's DHCP server may not work and this would be evident on the Nano Main tab. If you can find or guess the settings, then these can be entered manually on Nano tab Network, WLAN Network Settings: *static*. You'll have to enter the IP (often 192.168.0.90 or 1.90, Netmask 225.225.255.0), the Default Gateway (often 192.168.0.1 or 1.1) and at least one DNS Server (208.67.222.222 goes to OpenDNS and will always work). Then Save and Apply.
- If only some of your services work (e.g. Skype)
  - It could be that only the DNS server is wrong or missing. Manually enter (as above) the IP and Default Gateway that were assigned automatically, but change the DNS server to 208.67.222.222.
- Problems sending email with SMTP
  - Your usual SMTP server may not accept your outgoing email if you get online via a different provider and/or you are not authenticated. Your SMTP provider can usually tell you what their authenticated connecting settings should be. Alternatively try another SMTP provider, or use browser webmail instead of an email program (e.g. Outlook).
- Directional antenna
  - For weak signals, aiming the antenna is required.
  - For strong signals the direction is often not critical, as signals tend to bounce and come from multiple directions.
- Typical passive POE for 12-24VDC
  - Do not exceed 24VDC!

