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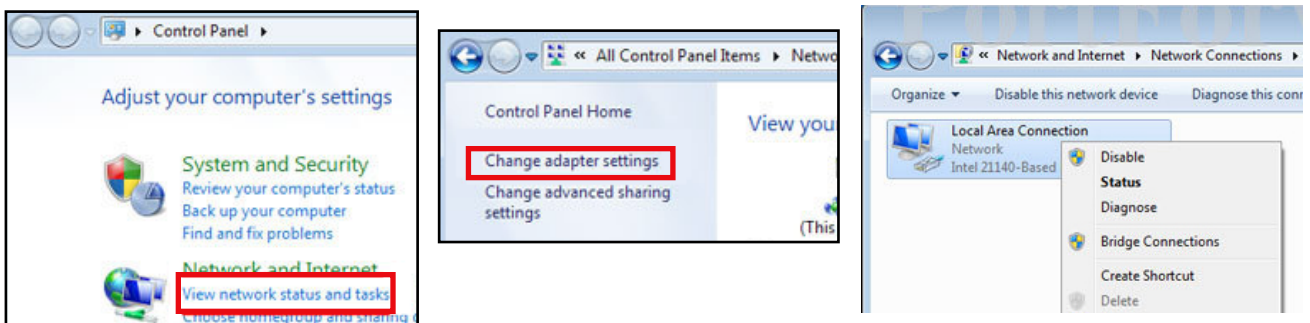
Windows Vista
- Open **Start**, right-click on **Network** and then **Properties** (or Start/Control Panel).
- Double click **Network and Sharing Center**, click **Manage network connections**. **Network Connections** window will appear:
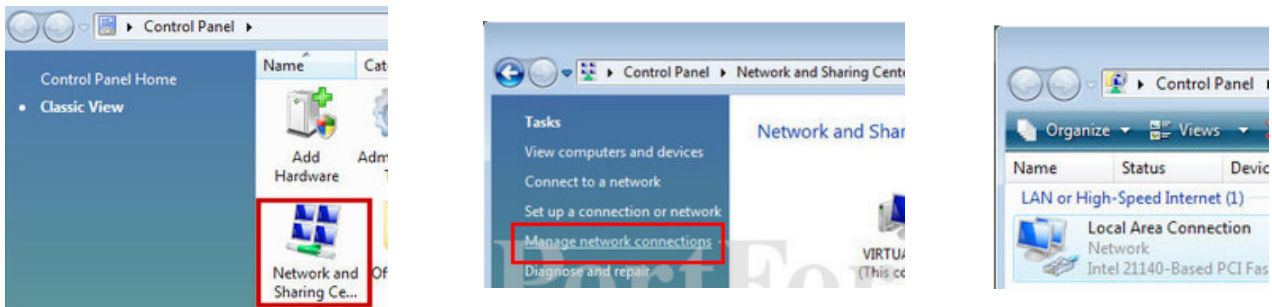

Windows 7
- Open the **Start** orb, click on **Control Panel,**
- Click **View Network Status and Tasks,** then **Change adapter settings:**
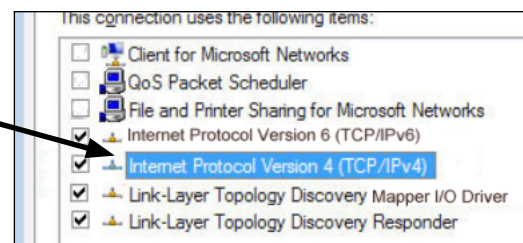
- Enable your network card: right-click on **Local Area Connection** and select **Enable** (if it's already enabled, the option would be "Disable" and just leave it as is).

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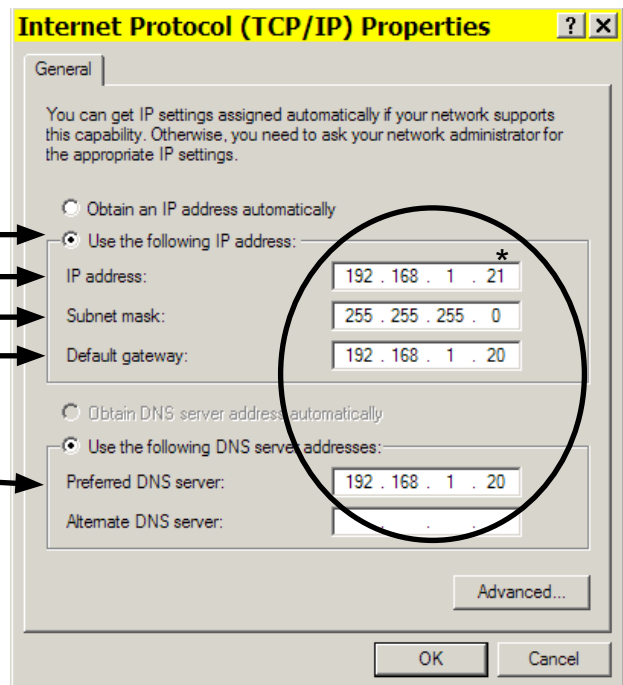 and select **Properties**:
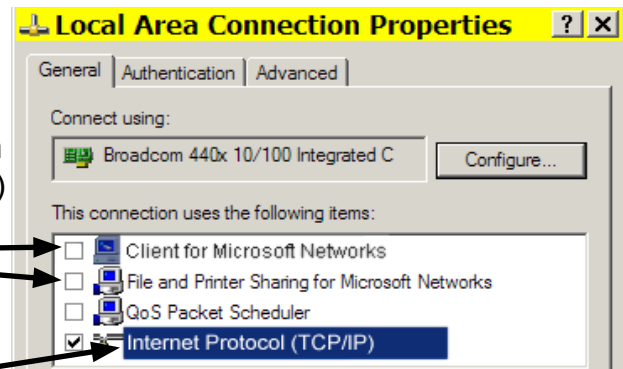
  - If you do not need to share files or a printer on your local network you should disable (un-tick) "Client..." and "File and..."
    for added security.

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

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

Local Area Connection Properties   ? X

General | Authentication | Advanced

Connect using:
Broadcom 440x 10/100 Integrated C   Configure...

This connection uses the following items:
☐ Client for Microsoft Networks
☐ File and Printer Sharing for Microsoft Networks
☐ QoS Packet Scheduler
☑ Internet Protocol (TCP/IP)

This connection uses the following items:
☐ Client for Microsoft Networks
☐ QoS Packet Scheduler
☐ File and Printer Sharing for Microsoft Networks
☑ Internet Protocol Version 6 (TCP/IPv6)
☑ Internet Protocol Version 4 (TCP/IPv4)
☑ Link-Layer Topology Discovery Mapper I/O Driver
☑ Link-Layer Topology Discovery Responder

  - Fill in as pictured here:

Internet Protocol (TCP/IP) Properties   ? X

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

We're entering a static (fixed) IP address → ○ Obtain an IP address automatically
 ⦿ Use the following IP address:
This will be your computer's IP * → IP address: 192 . 168 . 1 . 21 *
This is always so → Subnet mask: 255 . 255 . 255 . 0
This is the IP of the Nano → Default gateway: 192 . 168 . 1 . 20

○ Obtain DNS server address automatically
⦿ Use the following DNS server addresses:
Nano IP here too → Preferred DNS server: 192 . 168 . 1 . 20
(The Nano will be acting   Alternate DNS server:
as a DNS server)

Advanced...

OK   Cancel

 * 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).
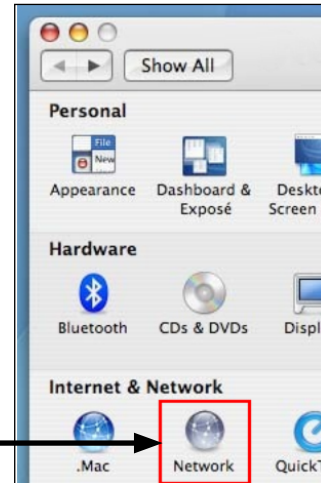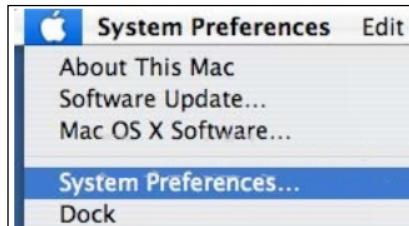
- Go to page 5.

1b Mac OS X

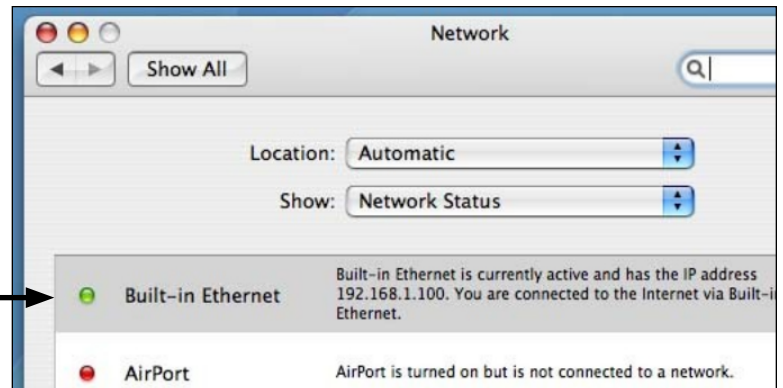If the **AirPort** is on, best to turn it off:
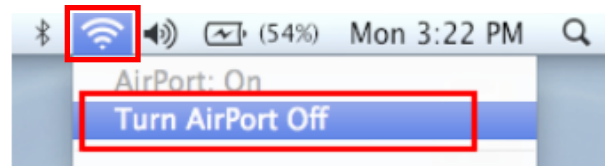
Mac OS X 10.4

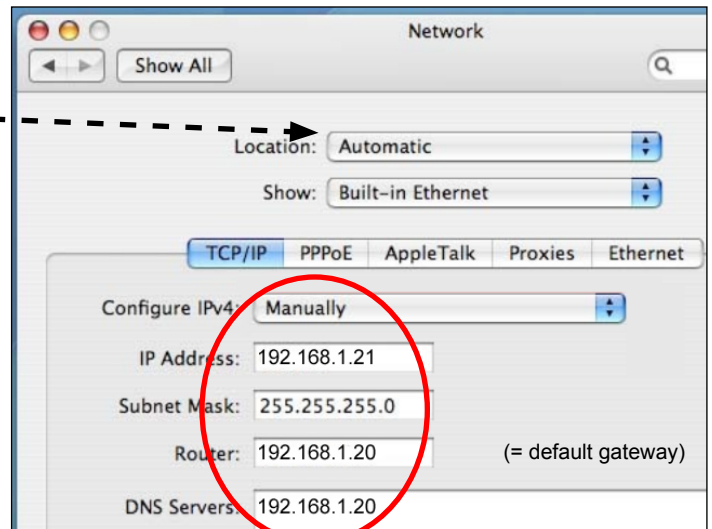• Click on the **Apple** icon then **System Peferences:**

• 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).
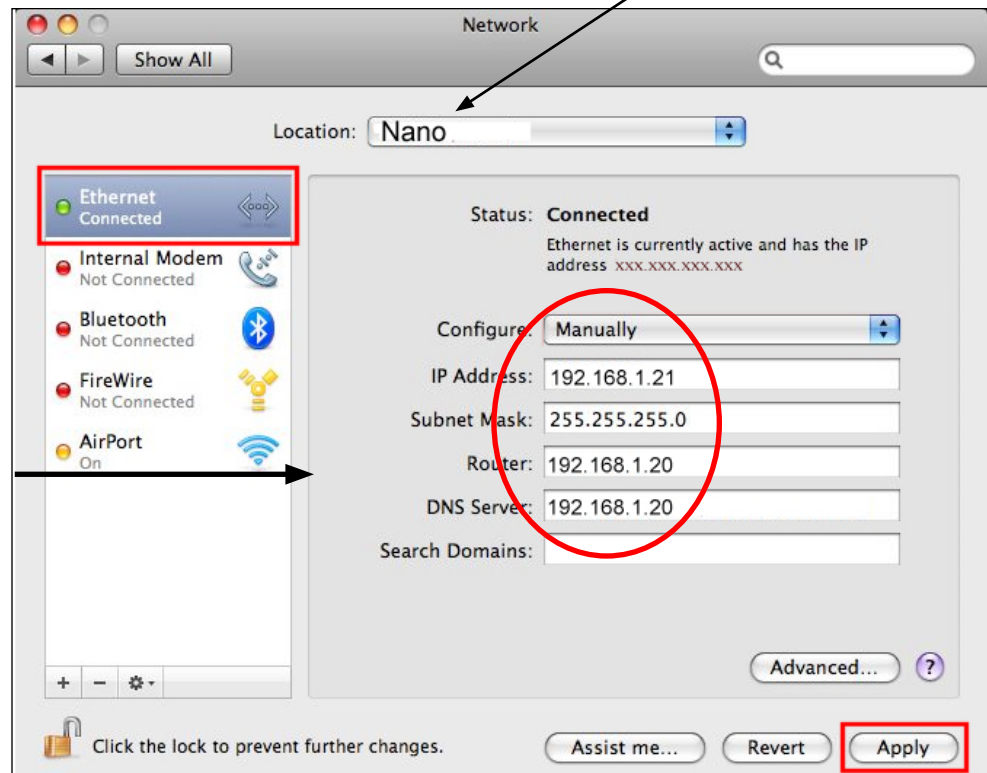• Goto page 5.

AC OS X 10.5 (Leopard)

• Click on the **Apple** icon then **System Peferences**

• Click on **Network:**

• 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).

Air OS ™
Username: ubnt
Password: ●●●●
Login
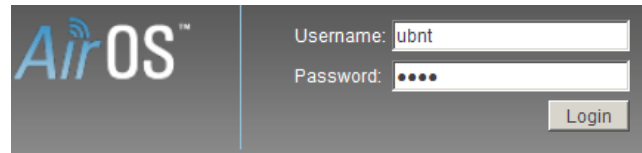
- Select the **Network** tab and change Nano settings as follows:

NanoStation M2

| MAIN | WIRELESS | NETWORK | ADVANCED | SERVICES |

Network Role

The Nano will act as a router which makes WIFI cruising safer and much easier.

Network Mode: Router
Disable Network: None

(This refers to the WIFI side of the router)

WLAN Network Settings

The Nano will automatically be assigned an IP address, gateway and DNS server by the WIFI access point you connect to later.

Enter this just in case DHCP fails

WLAN IP Address: ● DHCP ○ PPPoE ○ Static
DHCP Fallback IP: 192.168.10.20
DHCP Fallback NetMask: 255.255.255.0
MTU: 1500
Enable DMZ: ☐
Auto IP Aliasing: ☐
IP Aliases: Configure...
Change MAC Address: ☐

(This refers to the wired side of router = you)

LAN Network Settings

This will be the Nano's new IP address
and Netmask
Allows the LAN to communicate with the WLAN

Will allow you to connect a computer which has it's network setting to "Obtain an IP address and DNS server automatically".

IP Address: 192.168.10.20
Netmask: 255.255.255.0
Enable NAT: ☑
Enable NAT Protocol: ☑ SIP ☑ PPTP ☑ FTP ☑ RTSP
MTU: 1500
Enable DHCP Server: ☑
Range Start: 192.168.10.100
Range End: 192.168.10.200
Netmask: 255.255.255.0
Lease Time: 3600 seconds
Enable DNS Proxy: ☑
Port Forwarding: ☐ Configure...

- Click **Change**
Change

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

| | MAIN | WIRELESS | NETWORK | ADVANCED | SERVICES | SYSTEM | Tools: ▼ | Logout |

Configuration contains changes. Apply these changes?   Test | Apply | Discard
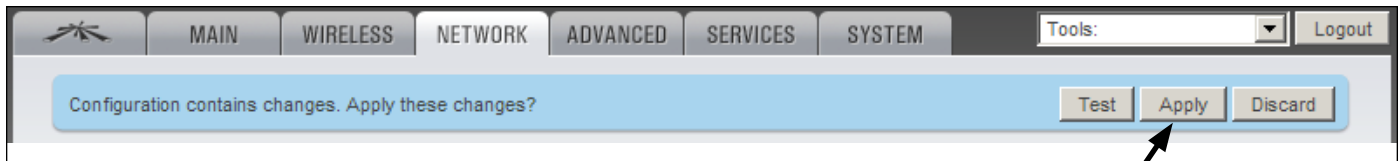
The changes made on the previous page are memorized but not yet in effect. Only after clicking "**Apply**" with they take effect. Since we still need to make some other changes, we'll "Apply" them all later.

DO NOT APPLY YET!

• Click on the **Advanced** tab →

| | MAIN | WIRELESS | NETWORK | ADVANCED | SERVICES | SYSTEM |

Advanced Wireless Settings

RTS Threshold: 2346 ☑ Off
Fragmentation Threshold: 2346 ☑ Off
Distance: [////____] 0 miles (0 km)

Verify → ACK Timeout: 27 ☑ Auto Adjust
Aggregation: ☑ Enable
32 Frames 50000 Bytes
Multicast Data: ☐ Allow All
Enable Extra Reporting: ☐
Sensitivity Threshold, dBm: -96 ☑ Off

Advanced Ethernet Settings

Enable POE Passthrough: ☐
Enable Autonegotiation: ☑
Link Speed, Mbps: 100 ▼
Enable Full Duplex: ☑

Signal LED Thresholds

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

LED1   LED2   LED3   LED4
Thresholds, dBm -94 -80 -73 -65

Traffic Shaping

Click **Change**

Enable Traffic Shaping: ☐

(Do not click Apply yet)   Change

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**

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

  YES

- **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!

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:

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

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

Then click "**Select**"

Site Survey

Scanned Frequencies:
2.412GHz 2.417GHz 2.422GHz 2.427GHz 2.432GHz 2.437GHz 2.442GHz 2.447GHz 2.452GHz 2.457GHz 2.462GHz

	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	
○	00:23:28:00:C5:E2	CalvertMarina1		WPA	-88 / -88	2.462	
	52:B7:70:45:7B:D4	Sea Fox Printer		WEP	-88 / -89	2.437	
○	68:7F:74:D7:83:C0	SpringCove E-Dock		WPA	-88 / -91	2.422	
○	00:23:F8:A5:84:9E	SpringCove		WPA	-89 / -91	2.412	
	2A:74:86:DD:9A:29	hpsetup		NONE	-89 / -96	2.462	
○	C0:3F:0E:6B:D5:FA	Sweet_Time_2		WPA	-92 / -96	2.412	

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

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

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).

| MAIN | WIRELESS | NETWORK | ADVANCED | SERVICES | SYSTEM | Tools: ▼ | Logout |

Status

Device Name:	UBNT	AP MAC:	00:02:6F:56:04:F5
Network Mode:	Router	Signal Strength:	-81 dBm
Wireless Mode:	Station	Horizontal / Vertical:	-81 / -81 dBm
SSID:	Zahniser's Yachting Center	Noise Floor:	-88 dBm
Security:	none	Transmit CCQ:	97 %
Version:	v5.3	TX/RX Rate:	5.5 Mbps / 12.0 Mbps
Uptime:	01:51:13	AirMax:	-
Date:	2011-01-14 16:33:09		
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		

A number here means that the Nanostation has associated with the WIFI acces 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

Monitor

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

DHCP Client Information

IP Address:	192.168.0.180	DHCP Server:	192.168.0.5
Netmask:	255.255.255.0	Domain:	
Gateway:	192.168.0.1	Total Lease Time:	02:00:00
Primary DNS IP:	208.67.222.222	Remaining Lease Time:	01:59:49
Secondary DNS IP:	208.67.220.220		

Renew   Release   Refresh

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.

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

Antenna Alignment

Signal Level:	-79 dBm
Horizontal / Vertical:	-79 / -79 dBm
Noise Level:	-88 dBm
Max Signal:	-66 dBm
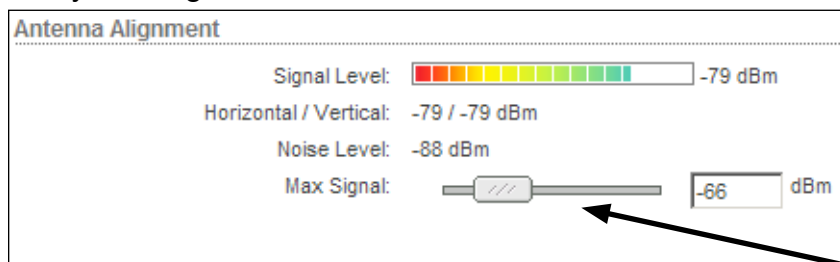
Since the number is negative, a lower figure is stronger.

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* 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 enterned 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 autheticated. 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!

Horizontal Azimuth