Beginner's SETUP GUIDE for NANOSTATION-2 as receiver
and other Ubiquity devices using AirOS firmware V3.6 (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 2 (Nano for short) is connected to your computer's network card with network cables, via the power injector (supplied with 12V either from the included wall-wart or another 12VDC source). 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 Nanostation
>   1a) Windows
>   1b) Mac OS X
> 2) Program Nanostation as receiver (station) and router
> 3) Choose and connect to a WIFI signal

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:
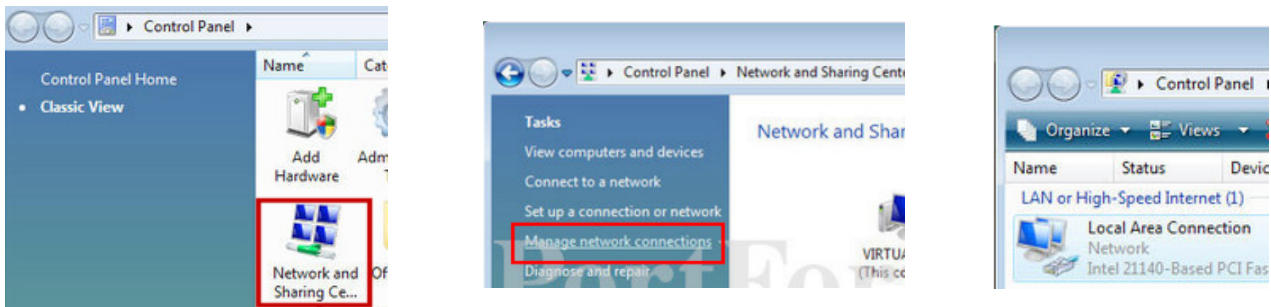

Windows 7
- Open the **Start** orb, click on **Control Panel,**
- Click **View Network Status and Tasks,** then **Change adapter settings:**
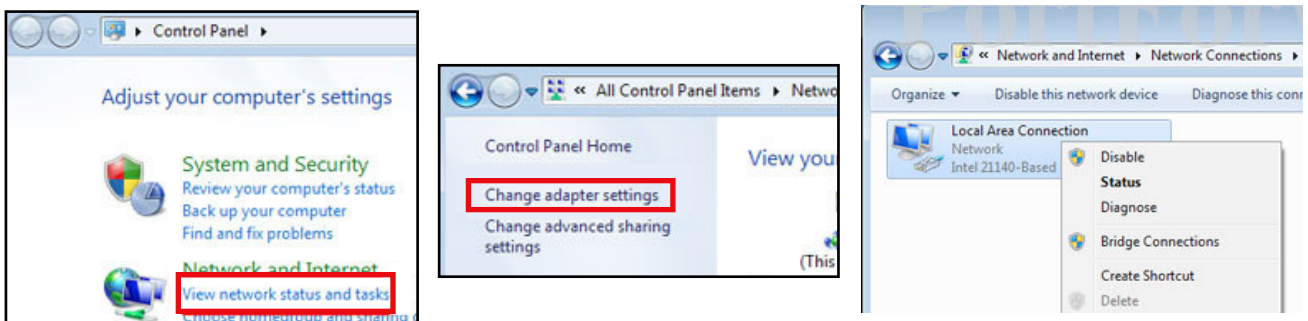
- Enable your network card: right-click on **Local Area Connection** and select **Enable** (if it's already enabled, the option would be "Disable" and just leave it as is).

- If there is a built in WIFI card, it should be disabled (right click and choose "Disable" if not already so).
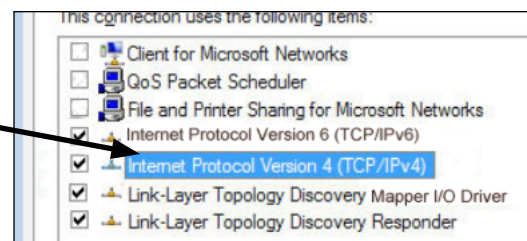
- Right click on **Local Area Connection** and select **Properties**:

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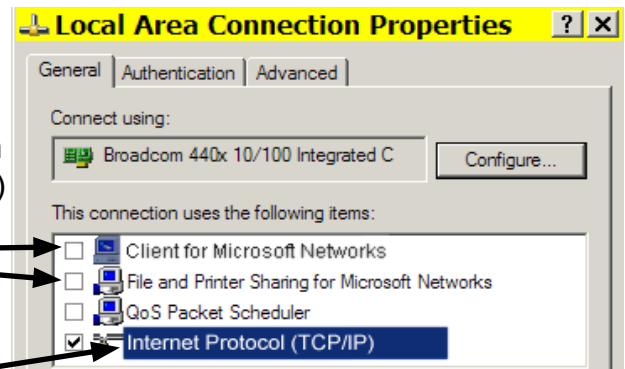
  - WinXP: double click on **Internet Protocol:**

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

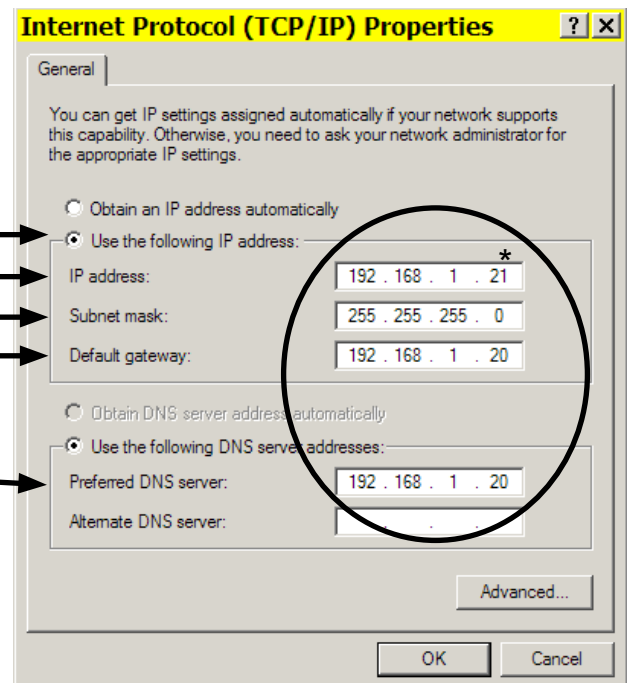 - Fill in as pictured here:

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:
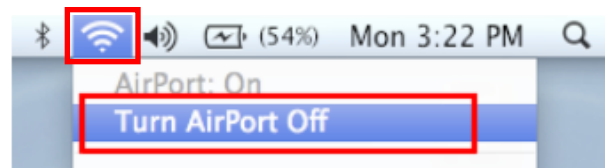
Mac OS X 10.4

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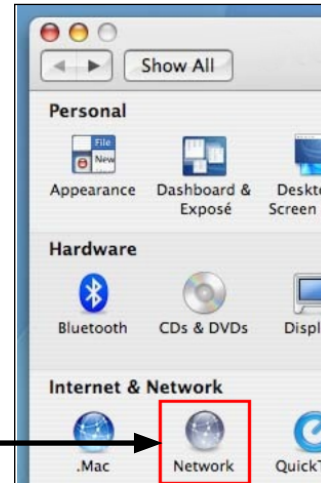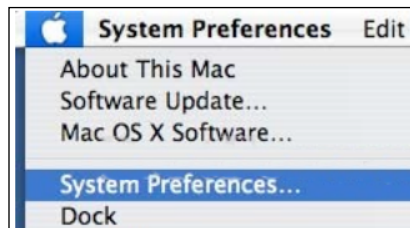
• Click on **Network:**

• 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:**

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

• Select **Ethernet:**

• Fill in like like this:
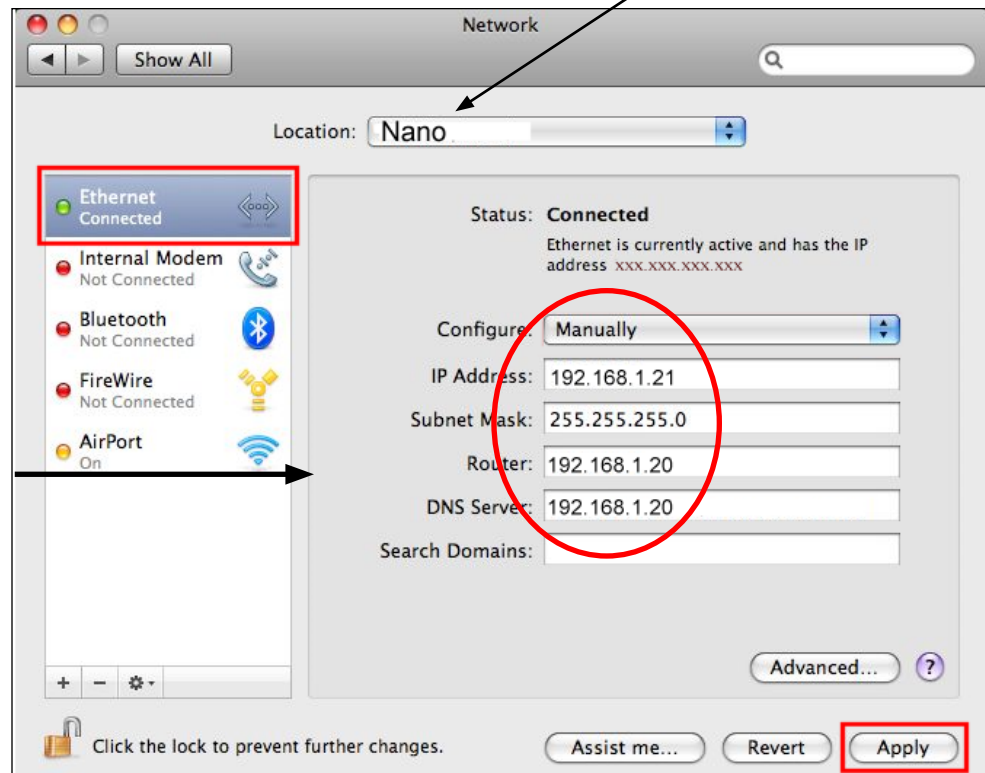
• Click on **Apply:**

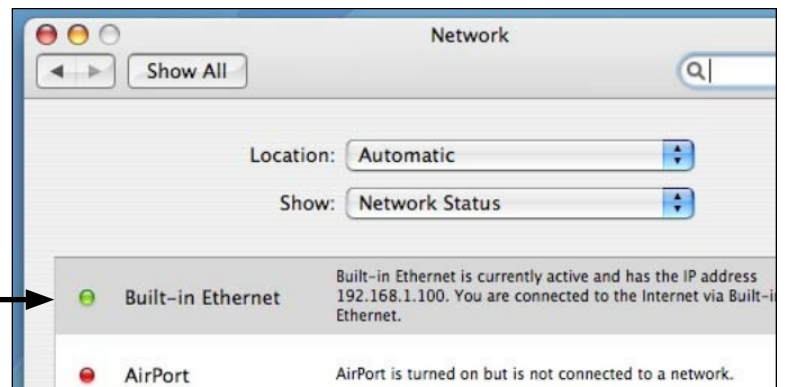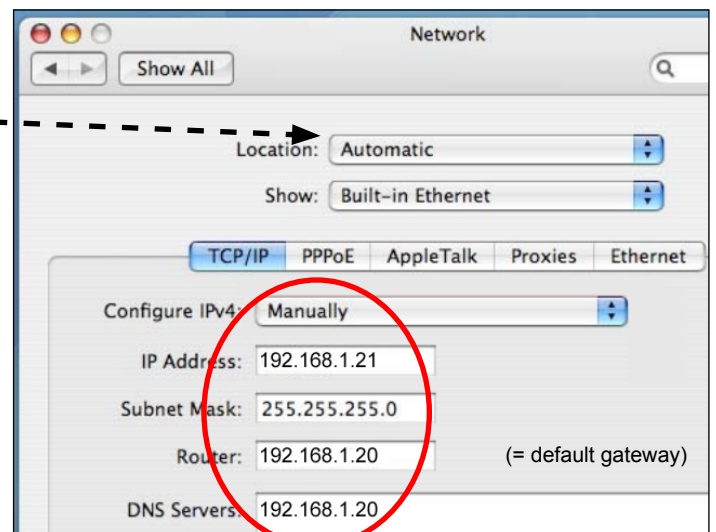• There should now be 2 LEDs lit on the Nanostation (power + network cable).

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 3.6 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.

• **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.

• **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.

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 **OK** →
  (If this window did not appear, there may be
  a problem with the wiring, the network card
  or a firewall).

Authentication Required ✕

❓ Enter username and password for http://192.168.1.20

User Name: | ubnt |
Password: | ●●●● ubnt |

[OK] [Cancel]
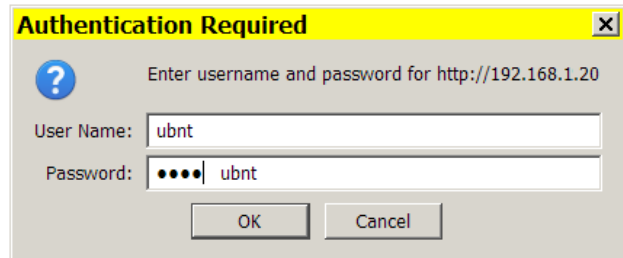
- Select the **Network** tab and change Nano settings as follows:

| Main | Link Setup | Network | Advanced | Services |

The Nanostation will act as a router which makes WIFI cruising much easier.

Network Mode: Router ▼
Disable Network: None ▼

(This refers to the WIFI side of the Nanostation)

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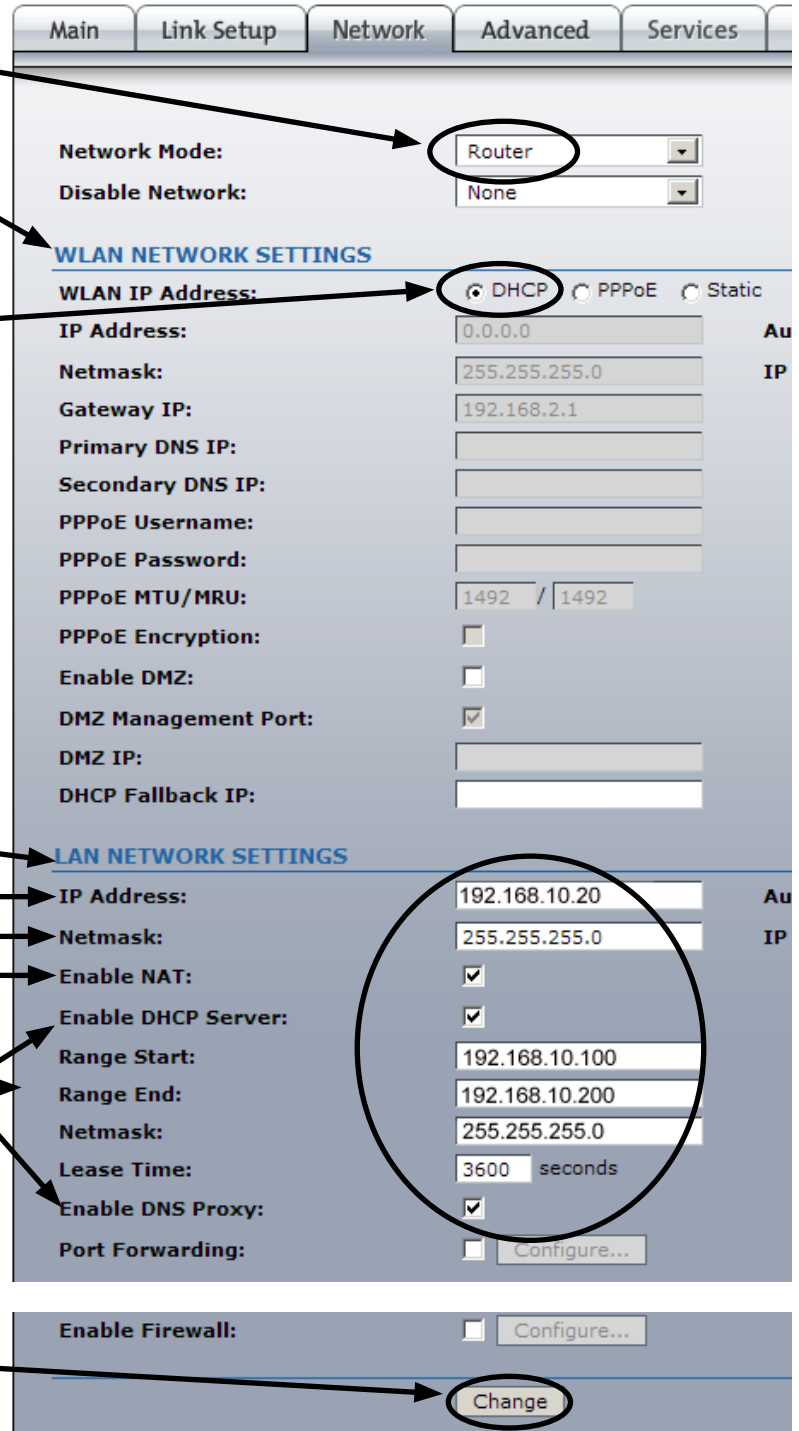
The Nano will automatically be assigned an IP address, gateway and DNS server by the WIFI access point you connect to later.

WLAN IP Address: ⦿ DHCP ○ PPPoE ○ Static
IP Address: 0.0.0.0   Au
Netmask: 255.255.255.0   IP
Gateway IP: 192.168.2.1
Primary DNS IP:
Secondary DNS IP:
PPPoE Username:
PPPoE Password:
PPPoE MTU/MRU: 1492 / 1492
PPPoE Encryption: ☐
Enable DMZ: ☐
DMZ Management Port: ☑
DMZ IP:
DHCP Fallback IP:

(This refers to the local wired side = you)

LAN NETWORK SETTINGS

This will be the Nano's new IP address → **IP Address:** 192.168.10.20   Au
Always so → **Netmask:** 255.255.255.0   IP
Allows the LAN to communicate with the WLAN → **Enable NAT:** ☑
Enable DHCP Server: ☑

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

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**

Enable Firewall: ☐ Configure...

[Change]

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

| Main | Link Setup | Network | Advanced | Services | System |

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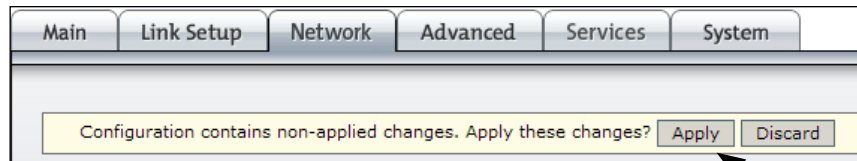
The changes made on the previous page are memorized but not yet in effect. Only after clicking "**Apply**" with they take effect. Since we still need to make some other changes, we'll "Apply" them all later.

DO NOT APPLY YET!

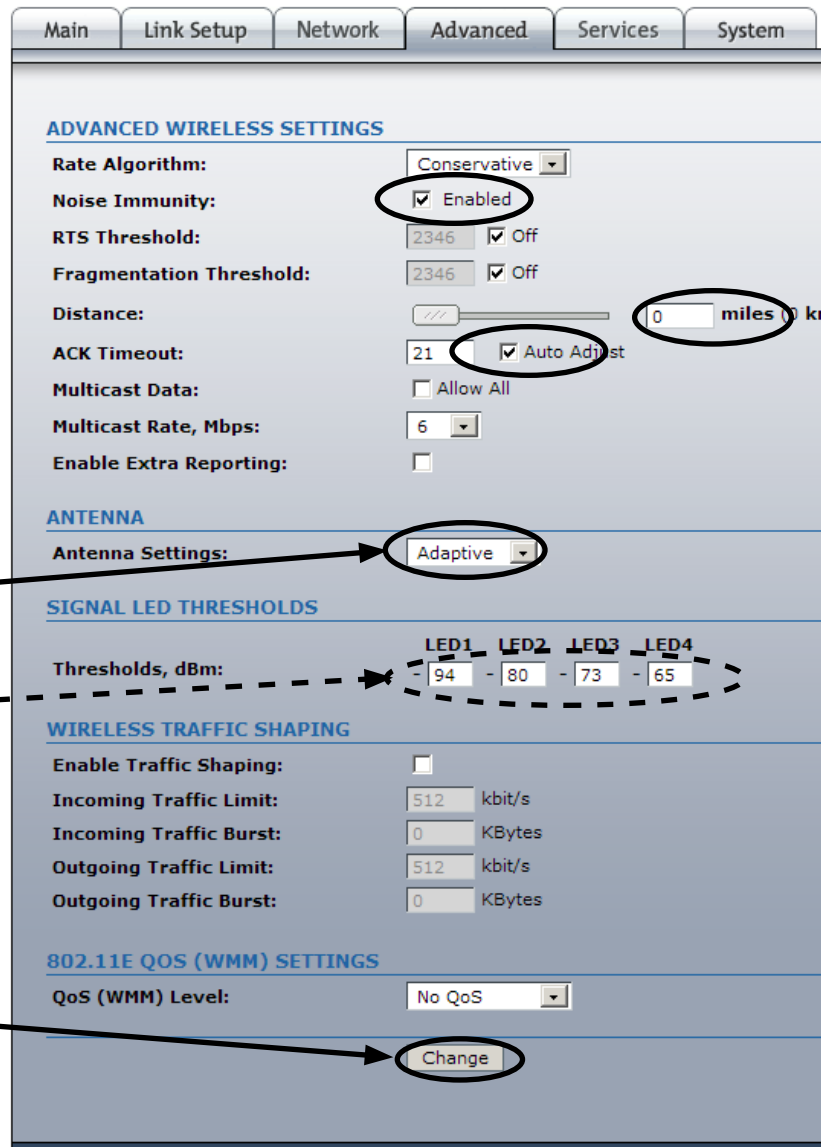• Click on the **Advanced** tab →

| Main | Link Setup | Network | Advanced | Services | System |

ADVANCED WIRELESS SETTINGS

Rate Algorithm:	Conservative
Noise Immunity:	☑ Enabled
RTS Threshold:	2346 ☑ Off
Fragmentation Threshold:	2346 ☑ Off
Distance:	0 miles (0 k
ACK Timeout:	21 ☑ Auto Adjust
Multicast Data:	☐ Allow All
Multicast Rate, Mbps:	6
Enable Extra Reporting:	☐

Verify items marked by ovals:

ANTENNA

Antenna Settings:	Adaptive

Change to **Adaptive**. The device will choose the best of the 2 built-in antennas (vertical or horizontal polarization).

SIGNAL LED THRESHOLDS

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

(Optional: adjust at which signal strength the LEDs at the back of the Nano light up)

WIRELESS TRAFFIC SHAPING

Enable Traffic Shaping:	☐
Incoming Traffic Limit:	512 kbit/s
Incoming Traffic Burst:	0 KBytes
Outgoing Traffic Limit:	512 kbit/s
Outgoing Traffic Burst:	0 KBytes

802.11E QOS (WMM) SETTINGS

QoS (WMM) Level:	No QoS

Click **Change**

[Change]

(Do not click Apply yet)

NOTES
• Just like there are several ways to skin a cat, the network settings of the Nanostation 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 **Link Setup** tab　→

| Main | Link Setup | Network | Advanced | Services | System |

BASIC WIRELESS SETTINGS

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

Wireless Mode:[?]　Station
ESSID:
Lock to AP MAC:
Country Code:　United States
IEEE 802.11 Mode:　B/G mixed
Channel Spectrum Width:[?]　20MHz　Max Datarate: 54Mbps
Channel Shifting:[?]　Disabled
Channel Scan List:　☐ Enabled

Make sure output power is on max

Output Power:　26　dBm　☐ Ob

Data Rate, Mbps:　54　☑ Auto

Leave rest as shown.

WIRELESS SECURITY

Security:　none
Authentication Type:　⦿ Open ○ Shared Key
WEP Key Length:　64 bit　Key Type:　HEX

Click **Change**　Change

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

Configuration contains non-applied changes. Apply these changes　Apply　Disc

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, 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:**

Internet Protocol (TCP/IP) Properties ? X

General | Alternate Configuration |

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.

⦿ Obtain an IP address automatically
○ Use the following IP address:
IP address:
Subnet mask:
Default gateway:

Change like this:

Then click **OK** twice.

⦿ Obtain DNS server address automatically
○ Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:

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

Advanced...

OK　Cancel

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. That's 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):

> Clicking once on "**Signal**" will sort the list with the strongest one at the bottom

Site Survey - Mozilla Firefox

http://192.168.10.20/survey.cgi

	MAC address	ESSID	Encryption	Signal, dBm	Frequency, GHz	Channe
○	00:60:B3:AB:D1:AD	NewBernGrandMarina	-	-90	2.462	11
○	00:18:39:6B:74:C9	McCotter	WPA	-94	2.437	6
○	00:17:94:17:46:00	stayonline	-	-83	2.437	6
○	00:60:B3:AB:DD:FC	NewBernGrandMarina	-	-82	2.437	6
○	00:22:6B:45:BF:83	TehHax0rs	WPA	-80		11
○	00:17:5A:1E:99:B0	stayonline	-	-72		11
⦿	00:17:59:09:23:40	stayonline	-	-64		1

Select Scan   Close this window

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

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

• Click on **Change,** wait**;** click **Apply** at top of new page, wait a few seconds 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.

• Optional: 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 after a while).

| Main | Link Setup | Network | Advanced | Services | System | NanoSta |

Base Station SSID: stayonline
Signal Strength: ■■■□□□□□□ -90 dBm
TX Rate: 24 Mbps
Frequency: 2412 MHz
Antenna: Adaptive
Security: none
Transmit CCQ: 100%
Uptime: 03:23:36
LAN Cable: ON
LAN MAC: 00:15:6D:AA:3F:ED
WLAN MAC: 00:15:6D:A9:3F:ED
Extra info: - - - -

AP MAC: 00:13:5E:4C:B0:B5
RX Rate: 54 Mbps
Channel: 1
Noise Floor: -95 dBm
ACK Timeout: 34
QoS Status: No QoS
Date: 2010-11-29 15:34:31
Host Name: NSb
LAN IP Address: 192.168.2.22
WLAN IP Address: 192.168.1.10
Tools: - - - -

Tools dropdown:
- - - -
Align Antenna...
Speed Test...
Ping...
Traceroute...
Site Survey...
DHCP Client...

LAN STATISTICS

	Bytes	Packets
Received:	2047733	12572
Transmitted:	6089384	11154	0

WLAN STATISTICS

> A number here means that the Nanostation has associated with the WIFI station

> This number will increase with long distance connections

> A number here means that the Nanostation has received an IP address (also see below).

> Note: The numbers here tell us that the WIFI access point has assigned all the necessary numbers to the Nanostation for connecting to the internet. Numbers will vary with access points. If blank, internet access will not work.

DHCP CLIENT INFORMATION

IP address	172.16.0.76
Netmask	255.255.254.0
Gateway IP	172.16.0.1
Domain Name	e-centre.net
DNS IP	172.16.0.1
DHCP Lease Time	12:00:00
DHCP Lease Time Left	09:15:11

• Clicking on Tools, **Align antenna** will bring up a received signal strength indicator, useful for improving signals by rotating the Nanostation:
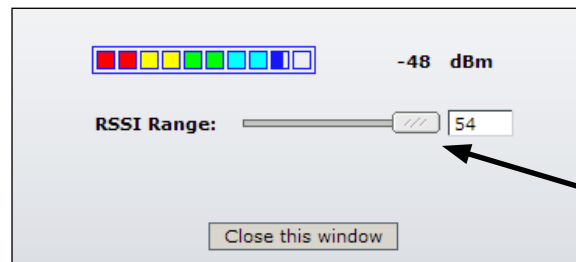
Since the number is negative, a lower figure is stronger.

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 second recommendation below.

• An alternative to step #3 is to type "**Any**" in ESSID (second line on tab "Link Setup"), 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 quick 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 switching on the computer.

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** on the AirOS firmware go to *http://www.ubnt.com/wiki/ Main_Page* and look under *802.11a/b/g Products.*
• For technical support use the UBNT Forum at: *http://ubnt.com/forum*

Leo Lindstrand, nano@3dym.com ©02/2011   (not connected with Ubiquity Networks)

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 (as an 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).