



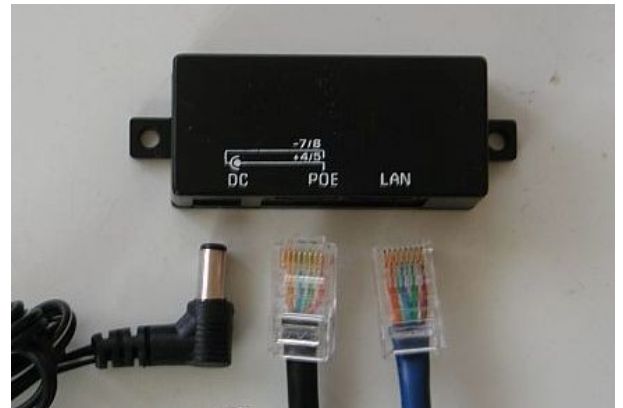
**Bullet** - Your IslandTime System is built around the Ubiquiti Bullet 2HP. This is the wifi radio attached to the base of your antenna. The Bullet is the best wifi radio on the market with very high receive sensitivity and user controlled transmit power allowing power outputs from 10 dbm (10 mw) to 29 dbm (800 mw).



The LED lights on the Bullet show its status. The power and LAN LED on the Bullet must both be lit for normal operation.

**AP** – Access Point or hotspot. A router that the Bullet connects to for internet access.

**POE** – **P**ower **O**ver **E**thernet injector. A small junction box that breaks the cable between your computer or router and inserts 12 volt power into the black cable that runs to the Bullet.



**Ethernet cable** – Networking cable used to connect your computer or router to the Bullet on the antenna. Ethernet cable has 4 pairs of wires in it. 2 pair carry data and 2 pair carry power.

**RJ45 Connector** – The clear plastic terminal on the end of the ethernet cable (CAT5e cable)

**IP Address** – Internet **P**rotocol **A**ddress. Every device in a network has an IP address. The IP address is assigned by the DHCP server on the network your computer is part of and this address may change from connection to connection. There are private and public IP addresses. Public addresses are used to designate a unique location on the world wide web. Private addresses are used within an individual network and do not refer to a specific location on the internet. Your Bullet has a private IP of 192.168.221.20. For detailed information about IP addresses or any other networking term or abbreviation do an online search. Wiki's are a good place to start.

**AirOS** – The operating system used in your Bullet 2HP. It is a small linux program permanently stored in the Bullet. It provides the operating controls for the radio and is accessed by entering the IP address of the Bullet in a web browser (IE, Chrome, Safari, Firefox etc).

For specific information about all the AirOS functions see the Wiki provided by Ubiquiti at [http://www.ubnt.com/wiki/AirOS\\_3.4](http://www.ubnt.com/wiki/AirOS_3.4)

Your Bullet has been configured to provide the functionality desired on a cruising boat. The configuration of the Bullet can be saved to your computer and used to return your Bullet to the setup it had when you received it from IslandTime.

The IslandTime Bullet is set as a NAT/Router. It acts as a DHCP server providing IP addresses between 192.168.221.50 & 192.168.221.99 for any equipment connected to the LAN side of the Bullet. The wireless side of the Bullet is a WAN port and receives DHCP information from the AP it is connected to. The Bullet has a Static IP address of 192.168.221.20 and has a fall back address of 192.168.1.20.

**There are three settings in the Bullet that should not be changed unless you are very familiar with networking techniques. Changing any one of these 3 settings will render the Bullet unusable. DO NOT CHANGE THESE SETTINGS:**

- 1. On the Wireless tab the Wireless Mode must be "STATION"**
- 2. On the Network tab the Network Mode must be "Router". Don't make any changes on the Network tab.**
- 3. On the System tab do not click the "Reset to Defaults" button. Also do not use the "Reset" button on the base of the Bullet. About the only thing the reset button is good for is if you've changed the access password from "itcb" to something else and have forgotten it.**

**While the above settings do have legitimate uses they are only for advanced users with a good working knowledge of networks.**

**If one of these settings is inadvertently changed and you can't get back in the Bullet contact Bob at 850-890-2815 or [rstewart@islandtimepc.com](mailto:rstewart@islandtimepc.com) for instructions on fixing the problem.**

Most of the important settings in a Bullet are set to an Automatic mode or a fixed value that works best best for average distances. There are times when changing from the automatic mode can improve a connection.

In the following pages we will go through the AirOS and mention settings that can be changed to improve a connection or make a connection possible in adverse conditions.

For any changes made on a tab in the AirOS to take effect you must click the "Change" button at the bottom of the page and the "Apply" button that appears in a band across the top of the page.

The Main tab is a status page. The information is a snapshot of the data as it was when the page loaded. The "Refresh" button in the lower left will update the information.

If you attempt to connect to an AP that has a relatively strong signal strength shown in the Scan window but find no color bars showing then the AP is probably using MAC address filtering to control access.

Some Marinas will use MAC address filtering and will need your MAC address to allow you to use there connection. Give them the WLAN MAC address shown here.

The screenshot shows the 'STATUS' page of the BULLET 2HP interface. It features a navigation bar with tabs: MAIN, WIRELESS, NETWORK, ADVANCED, SERVICES, and SYSTEM. The 'Tools' dropdown is set to 'Tools' and there is a 'Logout' button. The status information is organized into two columns:

- Left Column:** Base Station SSID: itpc; Signal Strength: -39 dBm (indicated by a color bar); AirMax Quality: -%; TX Rate: 1 Mbps; Frequency: 2427 MHz; Antenna: Main; Security: WPA; Transmit CCQ: 97%; Uptime: 05:56:42; LAN Cable: ON; LAN MAC: 00:27:22:17:9E:95; WLAN MAC: 00:27:22:16:9E:95; Extra info: ---
- Right Column:** AP MAC: 00:02:6F:87:79:94; AirMax: Disabled; AirMax Capacity: -%; RX Rate: 48 Mbps; Channel: 4; Noise Floor: -95 dBm; ACK Timeout: 41; QoS Status: No QoS; Date: 2011-11-16 20:23:58; Host Name: -; LAN IP Address: 192.168.221.20; WLAN IP Address: 192.168.229.60

A 'Refresh' button is located at the bottom right of the status area.

When your Bullet is connected to an AP it will receive a WLAN IP Address from the AP. If it doesn't get an address from the AP you will not be able to have an internet connection. When the Bullet cannot get an IP address it will self-assign one. The self-assigned address is always 192.168.1.20. If you see any other number then it is from the AP. If you see 0.0.0.0 then you've gotten to the Main tab before the Bullet has had time to receive an IP or self-assign one. Hit the "Refresh" button to update the WLAN IP Address box.

There are a number of reasons for not getting an IP address. Some professionally installed AP's limit the number of connections that can be made at the same time to prevent the AP from being overloaded and provide slow service. If there is a lot of radio noise in the area the Bullet or the AP may have constant packet errors preventing any data flow.

### Wireless tab

If a marina or other AP does not broadcast its SSID but you know the name you can type the name in the ESSID box and connect to it.

If you find that there are multiple AP's with the same name you should copy the MAC address of the one you want from the Scan window and paste it in the "Lock to AP MAC" window. This will keep the Bullet on the one you chose.

If your Country Code is set to "United States" it is locked and cannot be changed from the GUI. If you require another country code contact me and I will send you a configuration file that will change from the "United States". Once it is changed it will be unlocked unless it is changed to back to "United States"

The screenshot shows the 'BASIC WIRELESS SETTINGS' page of the BULLET 2HP interface. The navigation bar is the same as in the status page. The settings are as follows:

- Wireless Mode: Station (dropdown menu)
- ESSID: itcb (text box) with a 'Select...' button
- Lock to AP MAC: (empty text box)
- Country Code: UNITED STATES (dropdown menu)
- IEEE 802.11 Mode: B/G mixed (dropdown menu)
- Channel Spectrum Width: 20MHz (dropdown menu) with Max Datarate: 54Mbps
- Channel Shifting: Disabled (dropdown menu)
- Channel Scan List:  Enabled (checkbox) with an 'Edit...' button
- Antenna Gain: 8 dBi (text box)
- Cable Loss: 0 dB (text box)
- Output Power: 26 dBm (text box) with a slider and  Auto EIRP regulatory limiter
- Data Rate, Mbps: 54 (dropdown menu) with  Auto

The "Data Rate" should normally be left at 54 with "Auto" checked. If you are working with a weak signal (-85 to -90 db) you may find that unchecking "Auto" and setting the Data Rate to 1 gives you a more stable connection but first try it at the normal 54 Mbps and "Auto".

In Auto the Bullet and the AP will try to maximize the throughput and sometimes this wastes time rather than increasing data flow.

The output power is variable. It can be changed by moving the slider or by typing the number directly into the box. "dbm" is a logarithmic measure. An increase 3 dbm doubles the power and a decrease halves the power.

- 29 dbm = 800 mw
- 26 dbm = 400 mw
- 23 dbm = 200 mw
- 20 dbm = 100 mw
- 17 dbm = 50 mw

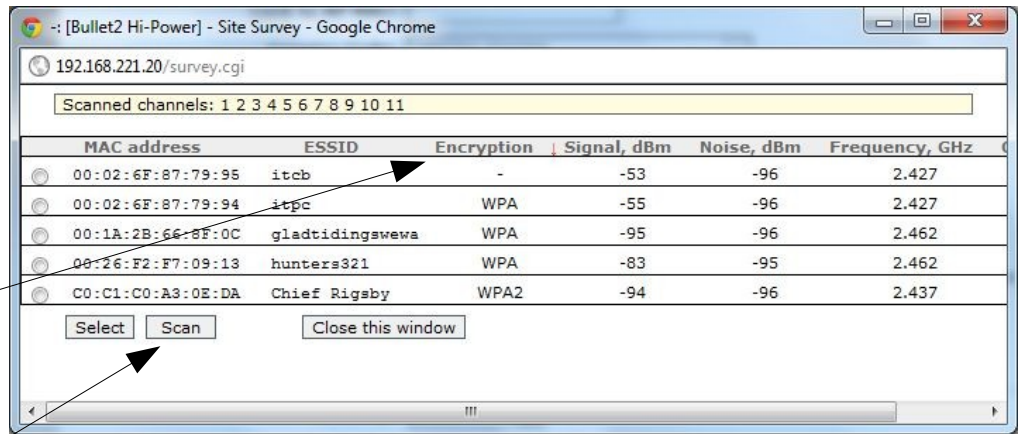
When using a very strong AP (signal strength stonger than -55 db) you need to keep your output power as low as possible to maximize the data throughput. Signal strengths of -60 to -55 dbm are considered 100%. Anything stonger (-55—30) will overload the receiver and reduce or stop data flow. If you have a choice between a -60 AP and a -40 AP go for the weaker -60 signal.

## SCAN WINDOW

The Scan window is opened by clicking the "Select" button on the Wireless tab.

If you have a large number of AP's shown you can click on the column heading titled "Encryption" and all unencrypted Ap's will be grouped together at the top of the window.

Not all AP's may be found on the first scan. You can rescan by clicking the "Scan" button at the bottom of the window.



## Wireless Security

If you have been given the encryption key of a secured network you can connect to it by "Selecting" it in the scan window and then entering the encryption key in the lower half of the "Wireless" tab.

The "Security" type will be set automatically by the Bullet (WEP, WPA etc)

If the AP is using WEP you will have to know if the "WEP Key Length" is 64 bit or 128 bit and if the "Key Type" is HEX or ASCII. The operator of the AP should give you this information when they give you the key. If you don't know this information you can count the characters in the key and tell what type of WEP it is.

- 5 characters = 64 bit ASCII
- 10 characters = 64 bit HEX
- 13 characters = 128 bit ASCII
- 26 characters = 128 bit HEX

After you have set the "WEP Key Length" and the Key Type enter the code in the "WEP Key" Box.

If the AP is using one of the WPA types of encryption all you need to do is enter the encryption you have been given in the "WPA Preshared Key" box. WPA preshared keys will be 8 to 63 characters and case is important.

If the AP you are using has WEP encryption you should not consider this secure. The transmission from you boat to the AP can easily be intercepted.

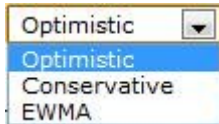
WPA encryption will provide much better security with WPA2 (AES) being essentially unbreakable.

**No changes should be made on the Network tab .**

### Advanced tab

The “Rate Algorithm” is the formula the Bullet uses to attempt to keep the data flow at the highest possible value. There are three algorithms available.

Conservative – The default setting. This is usually best all around setting.



EWMA – Exponentially Weighted Moving Average. Try this with strong stable signals.

Optimistic – Fastest throughput if you get lucky

Distance & ACK Timeout – These are related values. Changing one changes the other. 90% of the time you should leave “Auto Adjust” checked and let the Bullet decide.

Occasionally because of radio noise or reflected signals the ACK number will be incorrectly calculated causing a slow connection. The ACK Timeout number on the Main tab shows the number actually calculated by the Bullet. If this number is a 3 digit number it is probably too high and things can be improved by unchecking “Auto Adjust” and setting the ACK Timeout to 48 or lower.

Any time you know the approximate distance to an AP you can manually set the “Distance” to 150% of the distance to the AP. When you set the “Distance” manually the Bullet will receive any AP closer than that distance but not one that is greater than the set distance.

The Bullet and the AP it is connected to are constantly monitoring their signals and trying to provide the fastest data flow with minimum errors. The hardware usually can do a better job than you can but sometimes the signal strength, radio noise and other factors vary so rapidly that the Bullet and the AP spend all their time making adjustments at the expense of data flow. In these cases any automatic adjustment you can set manually will help to improve data flow.

**There are no useful settings on the Services tab.**

### System tab

The first section is the Firmware Management section. The firmware rarely requires upgrading but occasionally it is required. You can obtain the latest firmware by emailing IslandTime PC at [marinewifi@islandtimepc.com](mailto:marinewifi@islandtimepc.com) or by downloading the latest version from <http://www.ubnt.com/support/downloads>

The settings for Product and Model are shown at the right. The latest “Available Firmware” will be at the top of the list.

Click “Download” and agree to the software user terms.

1. Place the Firmware file on your computer.  
2. Open your browser and go to the AirOS pages at <http://192.168.221.20>.

3. Go to the "System" tab and go down to the "Firmware" section. This is the first section and the current firmware version will be shown.

4. Click "Upgrade" then "Browse" for the firmware file. Click on it once to select it then click the "Open" button.

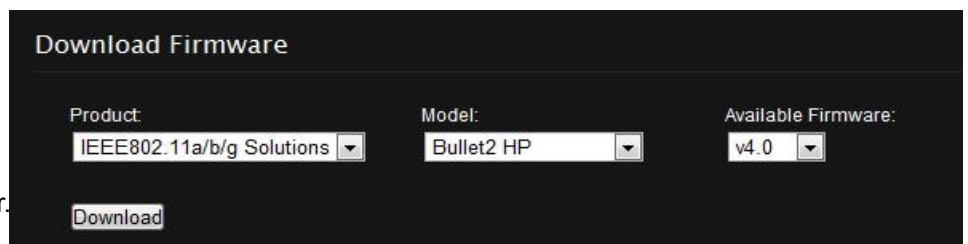
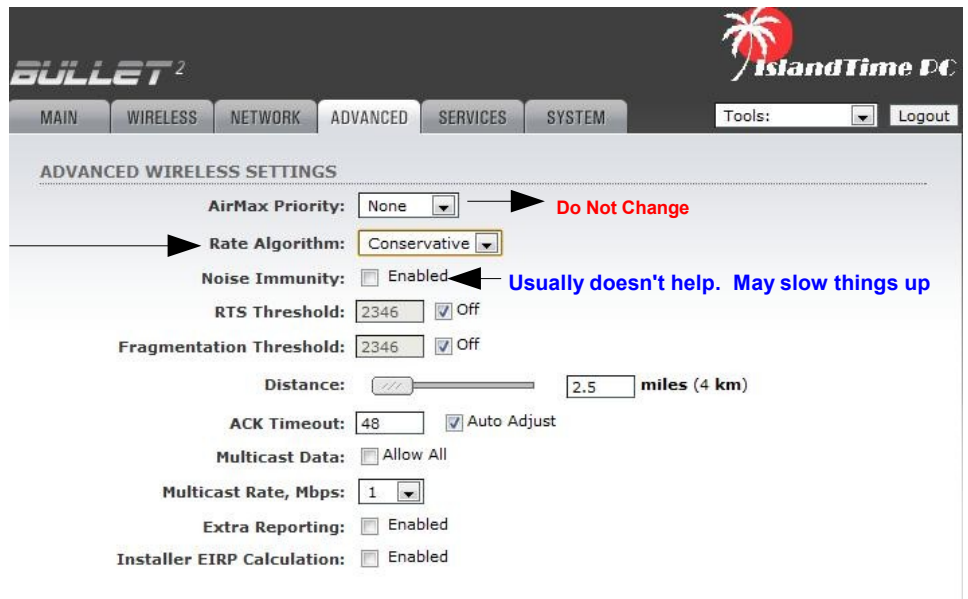
5. You will be taken back to the "System" tab.

6. Click "Upload". The file will take about 10 seconds to upload from your computer to the Bullet temporary storage location.

7. Click "Upgrade". The Upgrade window will appear with a progress bar and a warning not to turn off the power until the upgrade is complete. The upgrade will take about 3-4 minutes.

8. It is best to just step away from the computer and until the upgrade is complete.

9. When the upgrade is complete the progress window will close and you will be requested to sign in. The Username and Password will remain the same as they were before the upgrade.



FIRMWARE

Firmware Version: XS2.ar2316(v4.0.4974.110823.1727

Upgrade...

Current Firmware version

HOST NAME

Host Name: -

Change

The Host Name will appear on some AP's. The "-" is for anonymity but it can be changed to any value you want

ADMINISTRATIVE ACCOUNT

Administrator Username: ubnt

Current Password: \*\*\*\*

New Password:

Verify New Password:

Change

This is where you can change the Username and/or Password used to access these pages. If you make a change be sure to make it something easy to remember. If the username or password is lost the only way to access the AirOS and use the system will be to do a Factory Reset by holding down the button on the base of the Bullet and then reconfiguring.

READ-ONLY ACCOUNT

Enable Read-Only Account:

Read-Only Username:

Password: \*\*\*\*\*

Change

DATE SETTINGS

Timezone: (GMT) Western Europe Time

Enable Startup Date:

Startup Date:

Change

LOCATION

Latitude:

Longitude:

Change

INTERFACE LANGUAGE

Language: English [dropdown] Set as default

LOGO CUSTOMIZATION

Enable Custom Logo:

Logo Target URL: http://www.islandtimep

Logo File: Choose File No file chosen

Upload

CONFIGURATION MANAGEMENT

Backup Configuration: Download...

Upload Configuration: Choose File No file chosen

Upload

Use the "Download" button to back up your AirOS configuration. Do this before you start making tweaks to the setup. Use this .CFG file to reset your Bullet to the original settings that you know worked. Browse for the file, open it and click "Upload".

DEVICE MAINTENANCE

Reboot...

Reset to defaults...

**DO NOT USE RESET**

Support Info