

ⓘ IMPORTANT NOTES

This V2.00 Quick Start Guide is for AIT5000 units manufactured after March 2020, that feature a new wireless Web Interface and which are identified by a wireless network name (SSID) of “**DY-AIS-xxxx**”. If your AIT5000 transmits a wireless network name of “**DY-AIT5000-xxxx**” please refer to V1.00 Quick Start Guide.

If you intend to permanently connect the AIT5000 to an onboard computer via USB, we recommend using our NMEA to USB Adaptor cable for extra protection against static discharges and supply voltage spikes.

AIT5000 CLASS B+ AIS TRANSPONDER

Installation and instruction Manual



1. Introduction

Congratulations on the purchase of your AIT5000 Class B+ AIS Transponder. It is recommended that your transponder is installed by a professional installer.

- i** This Quick Start Guide will provide basic information on the AIT5000 to allow you to install and get the AIT5000 working, we suggest that you consult the manufacturer's user manuals for any other equipment that you will be connecting the AIT5000 to.

2. Before you start

You will need the following items and tools to complete the installation:

- Class B+ AIS Transponder.
- Dedicated VHF antenna and cable – not supplied
- Dedicated GPS antenna and cable - supplied
- Access to 12V or 24v DC power supply where the unit is to be installed.
- Four M4 screws or other fixings appropriate to the mounting location.

To configure the unit you will need:

- An MMSI number for your vessel
- A wireless mobile device such as a smart phone or tablet, which has a modern web browser like; Safari, Google Chrome, Firefox, Microsoft Edge, etc.

Note: You can obtain an MMSI (Maritime Mobile Service Identity) from the same authority that issues ship radio licences in your area. An MMSI may have already been provided with your existing VHF radio licence. The MMSI number used for the AIS Transponder should be the **same** as that programmed into your VHF DSC radio.

- i** If you do not have an MMSI number the AIS Transponder will operate in receive only mode.
Do not enter an invalid MMSI number.

3. Installation

Before starting installation select a suitable location for the AIS Class B+ Transponder. The unit is water resistant; however it should be installed below deck in a dry location. When locating the unit you should consider:

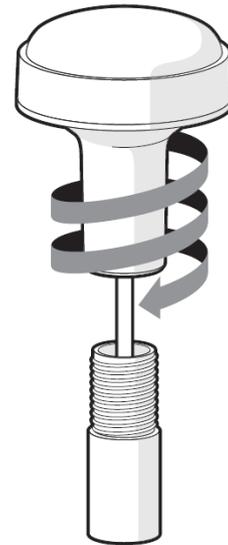
- Routing of power and antenna cables to the unit.
- Provision of sufficient space behind the unit for cable connections.
- Routing of data connections to PC or chart plotter from the unit.
- Maintaining the compass safe distance of 0.5m.
- Visibility of the front panel indicators.

Installation Step 1 - Antennas

- The AIT5000 has an integrated "Zero Loss" VHF antenna splitter that allows AIS reception/transmission through the boat's existing VHF antenna. A PL259 to PL259 link cable is supplied to allow connection between the AIT5000 and your VHF radio.
- Disconnect the boat's existing VHF antenna from the VHF radio and connect it to the VHF antenna connector on the AIT5000. Using the supplied PL259 link cable connect the VHF Radio Connector of the AIT5000 to your VHF radio.
- The VHF radio and the AIT5000 can both transmit and receive using the same antenna but they cannot transmit simultaneously, priority is always given to the VHF radio.



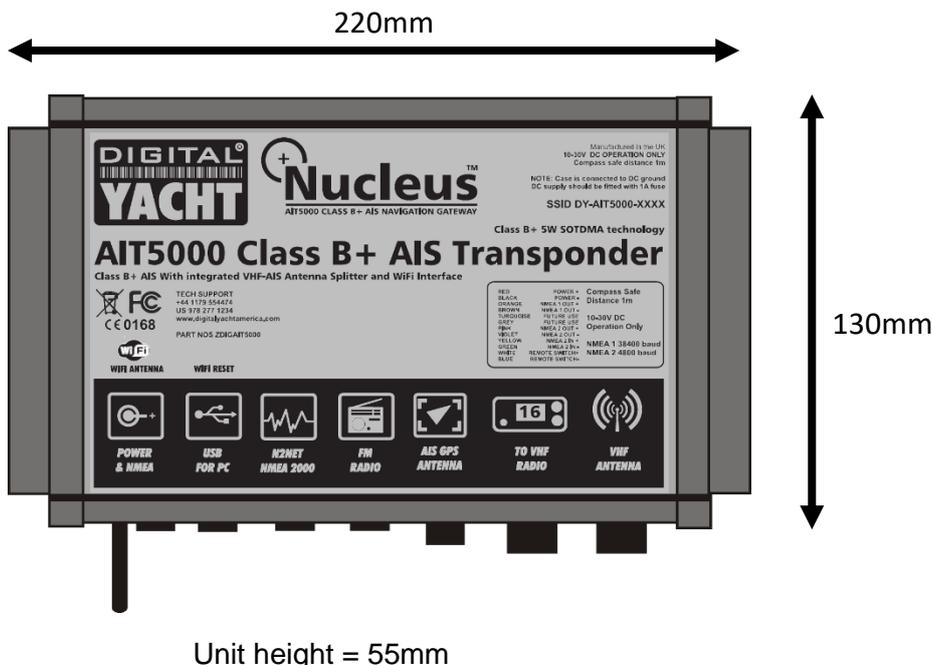
- The supplied GPS antenna is designed to be fitted to a standard 1"x14 TPI threaded VHF pole mount, which are available in many different styles from all good marine electronic dealers and chandleries.
- You should ensure the GPS antenna has a good clear view of the entire sky. It is not recommended that the GPS antenna is mounted up a mast where the motion of the vessel will cause the antenna to swing and potentially reduce the accuracy of the GPS position.
- Do not mount your antenna in the direct path of a radar transmitter.
- Feed the ten metre long cable attached to the GPS antenna, through the pole and screw the antenna onto the pole mount as shown.
- Route the cable to your AIT5000 unit, adding any necessary extension cables.
- Connect the cable from the GPS antenna to the GPS connector on the AIT5000. The GPS antenna is terminated in a threaded TNC type connector.



Installation Step 2 – Mechanical Fixings

- Access to the fixing holes is achieved by removal of the two green decal strips down each side of the AIT5000. Once fixed in place, the green decal strips can be clicked back in place.
- Secure the AIS Transponder to a flat surface in the selected location. Use four M4 wood screws or other fixings suited to the material the unit is being fixed to. The unit may be installed in any orientation

Dimensioned Drawing





Installation Step 3 - Power

- Provide power connections to the unit. Power is connected to the eight core PWR/DATA cable on the Red and Black wires. The Red wire is the positive (+) connection. The Black wire is the negative (-) connection.
- Connect the stripped wires to the nearest source of primary 12V or 24V DC power. Ensure that the supply is connected via a 3A fuse (not supplied) or suitable circuit breaker. Add the fuse in the positive power connection to the unit if necessary.
- The AIT5000 Class B+ Transponder is designed for 12V or 24v DC systems.

Installation Step 4 – NMEA 0183

- The AIT5000 can be connected to other AIS compatible equipment via the NMEA0183 connections on the PWR/DATA cable, via the NMEA 2000 interface cable and/or to a PC via the USB interface.
- A table showing what each of the 12 wires of the PWR/DATA cable does is printed on the AIT5000 Transponder and repeated below for your convenience;

Wire colour	Description	Function
RED	Power in +	Power supply connections
BLACK	Power in -	
BLUE	Switch input-	External switch connection for silent mode
WHITE	Switch input+	
ORANGE	NMEA0183 port 1 TX+	High speed NMEA0183 output (38,400 baud) intended for connection to chart plotters
BROWN	NMEA0183 port 1 TX-	
TURQUOISE	NMEA0183 port 1 RX+	High speed NMEA0183 input (38,400 baud) Not normally used
GREY	NMEA0183 port 1 RX-	
PINK	NMEA0183 port 2 TX+	Low speed NMEA0183 Output (4,800baud) intended for connection to other NMEA0183 devices requiring a GPS feed. Note AIS data is not available on this output.
VIOLET	NMEA0183 port 2 TX-	
YELLOW	NMEA0183 port 2 RX+	Low speed NMEA0183 input (4,800baud) intended for connection to other NMEA0183 compatible sensors for multiplexing of data to the chart plotter
GREEN	NMEA0183 port 2 RX-	

- The most common connection to a dedicated chart plotter is to take the NMEA Output 1 (Orange+ and Brown –) from the AIT5000 Transponder and to connect it to a free NMEA Input on the plotter. You must then tell the chart plotter that AIS data is connected to this port and set the baud rate to 38,400 Baud – the standard speed for AIS data. Consult the instruction manual supplied with your Chart Plotter to understand how this is configured.
- The AIT5000 has a second NMEA 0183 output that can be used to pass GPS data to a VHF radio or instrument system. NMEA Output 2 transmits GPS data at 4800 baud – RMC, GGA and GGL sentences.
- NMEA 0183 data from other equipment can be connected to either of the NMEA Inputs of the AIT5000, although this is most commonly connected to NMEA Input 2 (Yellow+ and Green-) at the normal 4800 baud rate for NMEA 0183. This data is then multiplexed with the AIS data and output on the NMEA Output 1 at 38,400 baud and also on the USB – useful when connecting to equipment that only has one NMEA input.



Installation Step 5 – N2Net (NMEA2000)

- The AIT5000 also has an N2Net connection which is Digital Yacht's NMEA2000 compliant interface. To connect to other NMEA2000 products, simply find or add a spare NMEA2000 "T" piece on the existing NMEA2000 network and connect the AIT5000 N2Net connector to the "T" piece.
- The N2Net cable is just over 1m long and is terminated in an NMEA2000 Micro Male Connector.
- The AIT5000 does not take any power from the NMEA2000 network
- The AIT5000 outputs AIS and GPS data on to the network. All currently (Dec 2018) defined AIS PGNs are transmitted including those for Class B+ Static Data, AIS Sarts and AIS AtoNs, which some chart plotters do not support.
- The AIT5000 does not convert any of the NMEA0183 data that it receives in to NMEA2000 data or vice versa.

Installation Step 6 – USB Interface

- The USB cable of the AIT5000 can be used for configuring/programming the unit during installation using the proAIS2 software for PC or Mac. However, the AIT5000 also features a new web interface that can be used for this purpose and which this Quick Start Guide focuses on. If you want more information about configuring the AIT5000 using proAIS2, please visit <https://digitalyacht.net/2019/06/12/configure-an-ais-transponder/>
- If you intend to permanently connect the AIT5000 to a PC or MAC via a USB interface, we recommend that you use one of our NMEA to USB adaptor cables (P/No ZDIGUSBNMEA) which will protect the AIT5000 from voltage differences, noise and electrical spikes that can occur in marine installations.
- When connected to a PC or MAC via the USB cable, the AIT5000 will only get enough power from the computer to power the microprocessor and the AIS receiver. This allows you to program the MMSI number and other static data at home or in the office prior to installation. The AIT5000 will not transmit or get a valid GPS position fix when only powered from the USB interface and the RED Status LED will always be lit when powered from the USB cable.
- If you need to extend the USB cable, please use a USB extension cable that is no more than 4m in length. The maximum length of USB cable without the use of a powered extender cable or Hub is 5m.
- Please do not plug in the USB cable of the AIT5000 to your PC. We will cover this in section 4 - Configuration.

Installation Step 7 – Remote Switch

- To connect a remote "Silent" switch that allows you to turn on/off the transmission of your own vessels position (good etiquette when moored or in congested but safe conditions), you will need a conventional toggle type switch (SPST), connected between the White and Blue wires.
- This can be mounted anywhere on the boat, thus allowing you to mount the AIT5000 below deck but having a switch in the cockpit or wheel house to control the Silent Mode operation.
- When the remote "Silent" switch is ON (closed) the AIT5000 will be in Silent mode (not transmitting) and when the switch is OFF (open) the AIT5000 will be in normal transmitting mode.

Installation Step 8 – Power Up

- Turn on the 12V or 24v power to the AIT5000
- Verify that the Power LED flashes once and then the Silent, Status, Time Out and Power LEDs all flash once together and then the amber and red LED's should come ON.
- If the Wi-Fi is working correctly, then the Wi-Fi LED should be flashing in a series of 3 flash bursts and if you scan for wireless networks on your wireless device you should see a wireless network called "DY-AIS-xxxx" where xxxx is a four-digit code unique to your AIT5000.





- Make your device join this network and you will be asked to enter a password which is “**PASS-xxxx**” where **xxxx** is the same four-digit code as in your network name. You can change both the network name and password in the AIT5000 unit's web interface, which will be explained later in this manual.
- The VHF LED will only illuminate when you press the Transmit button on the VHF handset. To make sure that the AIT5000's internal splitter is working OK, make a VHF transmission and ensure that the VHF LED illuminates all of the time that you are pressing the VHF Transmit button.
- If you have fitted a Silent switch, then turn on the switch (closed) and ensure that the Blue Silent LED illuminates and goes out when you turn off the switch (open).
- Installation is now complete. The AIT5000 needs to be configured using the proAIS2 software – see next section.

4. Configuration

The AIT5000 transponder must be correctly configured with the MMSI and static data for your vessel before operation. All configuration information must be entered carefully as this information will be transmitted to other AIS equipped vessels and shore stations.

 In the United States of America, the MMSI and static data must only be entered by a competent installer. The end user of the equipment is not authorised to enter their own vessel data. If you are a US resident and intend to use your AIS class B transceiver in US waters, you should make sure that your retailer has configured your product prior to supplying it to you. If your AIS transceiver has not been pre-configured, please contact your dealer for details of how to have it configured.

The AIT5000 has a simple web interface that allows configuration of the MMSI and static data via any modern web browser, without the need of any special app or software. This same web interface can be used to configure the Wi-Fi network, set the data protocol (TCP or UDP), remotely turn on/off the transponders “Silent Mode” and monitor the correct operation of the transponder.

To access the web interface, connect to the AIT5000 wireless network, open a web browser (Safari, Chrome, Firefox, Edge, etc.) and either enter the IP address of the AIT5000...

<http://192.168.1.1>

...or if your device supports Bonjour/mDNS you can enter the following URL...

<http://dy-ais.local>

...which is useful if you have connected the AIT5000 to another wireless network and don't know what IP address it has been given.

You should now see the AIT5000 web interface, which is shown on the next page.

The page is in four sections...

4.1 Network Settings

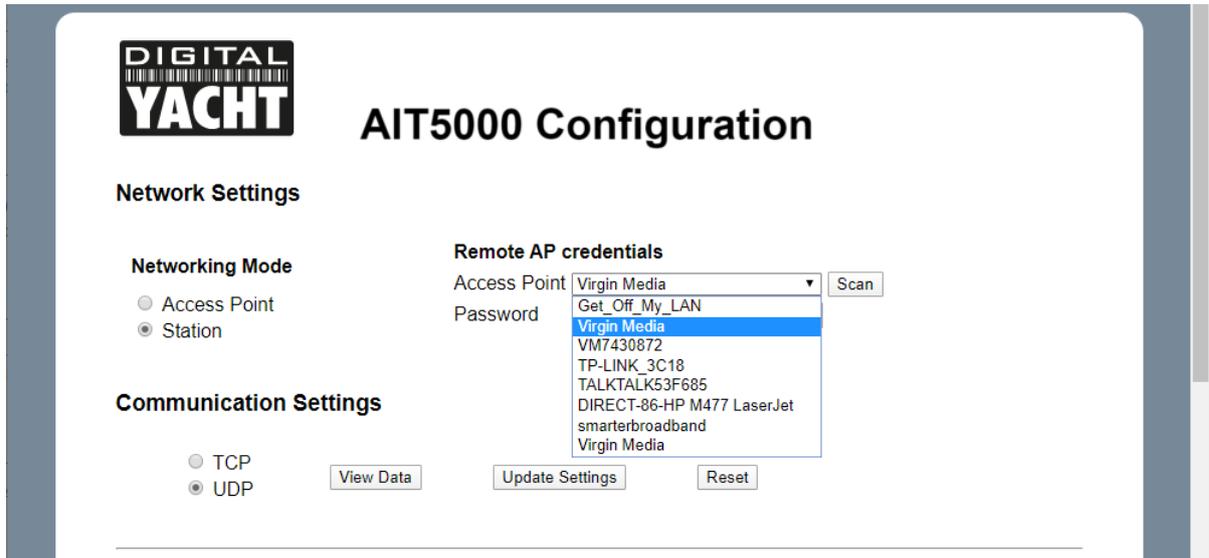
By default, the AIT5000 unit is in “Access Point” mode, that means it creates its own password protected wireless network and automatically provides network settings to any device that connects to it (via DHCP). You can change the default network name and password, if required, and the wireless channel that the AIT5000 uses (Channel 1 by default).

If you already have a wireless network on the boat and you would prefer the AIT5000 to be part of this network, rather than create another wireless network of its own, you can make it operate in “Station” mode. Select “Station” mode and then select from the drop down list the network you would like to join and enter that network's password.

Once you are happy that everything is correct, click the “Update Settings” button and the AIT5000 will store the new



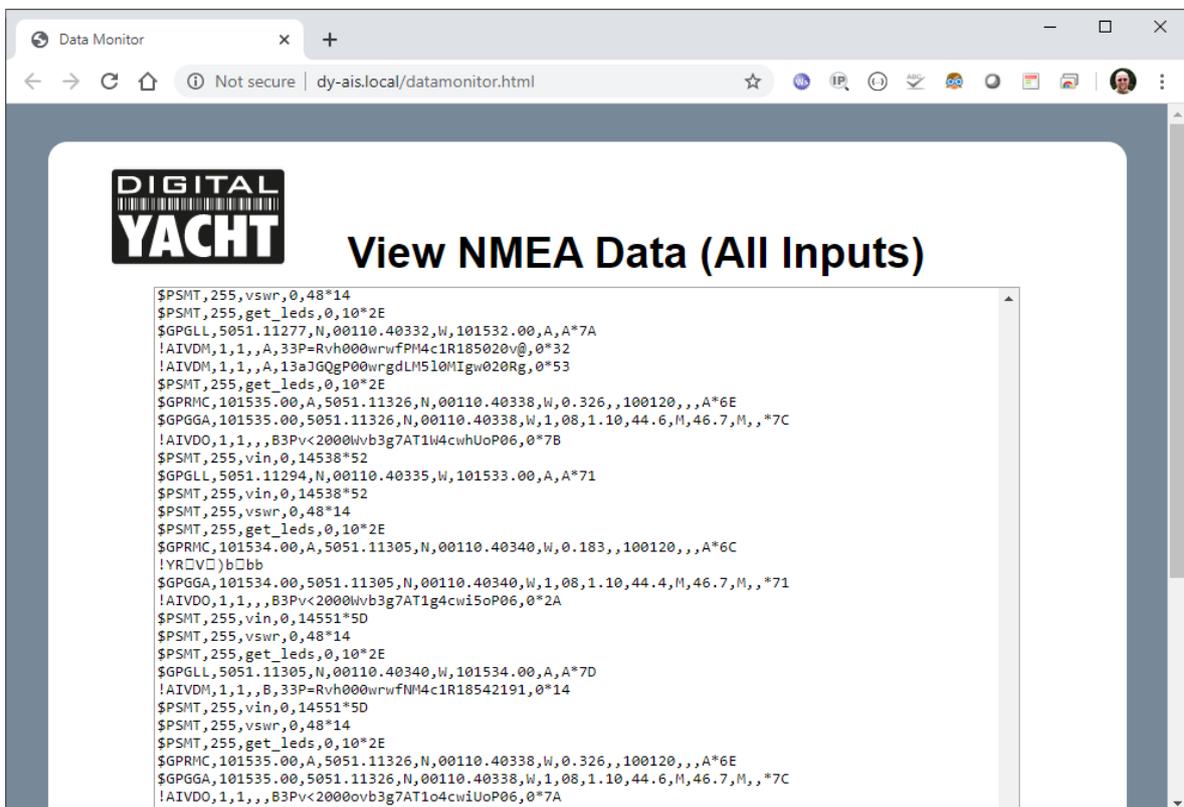
settings and reboot which normally takes about 20 seconds.



By default, the AIT5000 transmits wireless NMEA data in UDP mode which is the easiest mode to setup in most apps – just tell the app that the UDP data is on port 2000 and it should start receiving data. In some apps, such as the popular Navionics Boating app, the AIT5000 will even be detected automatically and no app setup is required.

Some apps require a TCP connection, for added security and bi-directional data transfer, and you can easily select TCP mode and click the “Update Settings” button. The AIT5000 will store the new settings and reboot which normally takes about 20 seconds.

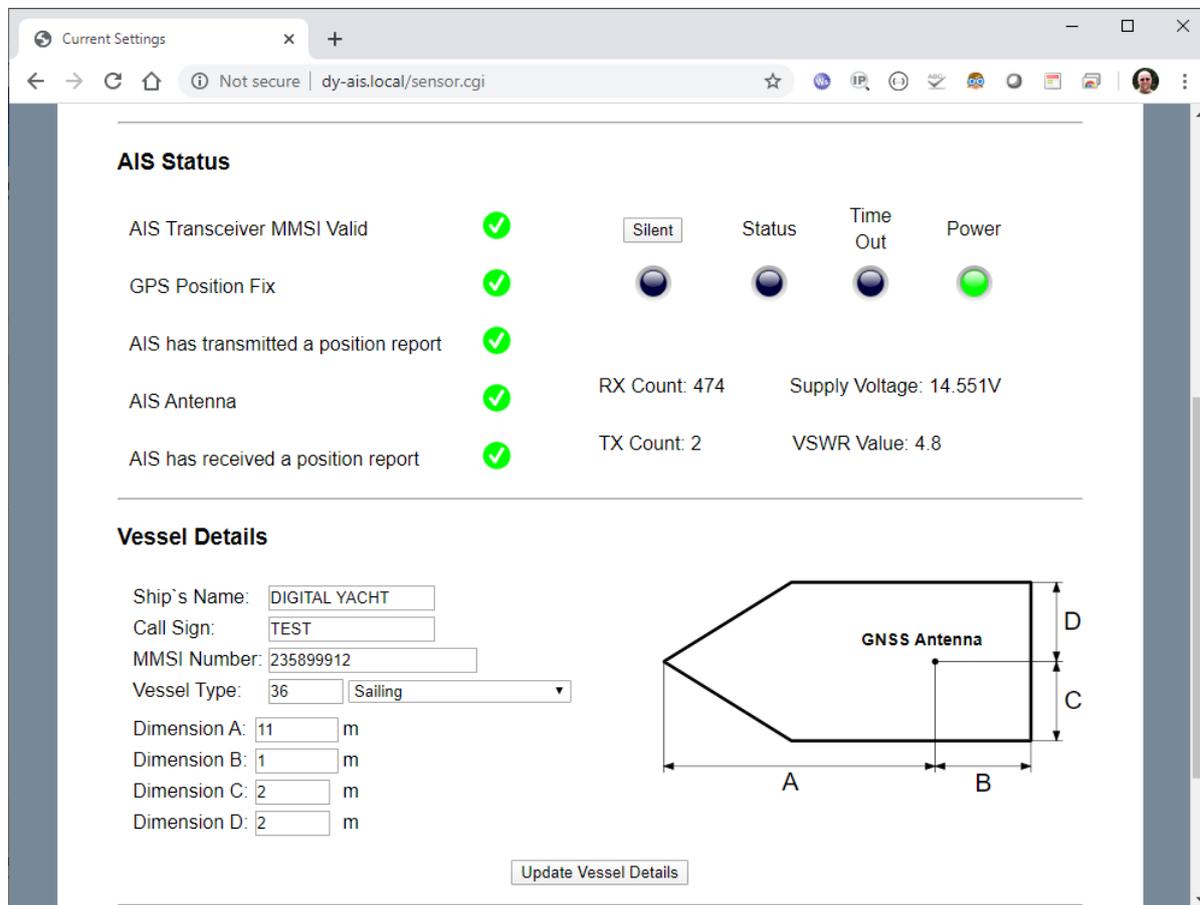
You can view the raw NMEA0183 Sentences that the AIT5000 transmits over Wi-Fi by clicking the “View Data” button, which opens a new window as shown below...





4.2 AIS Status

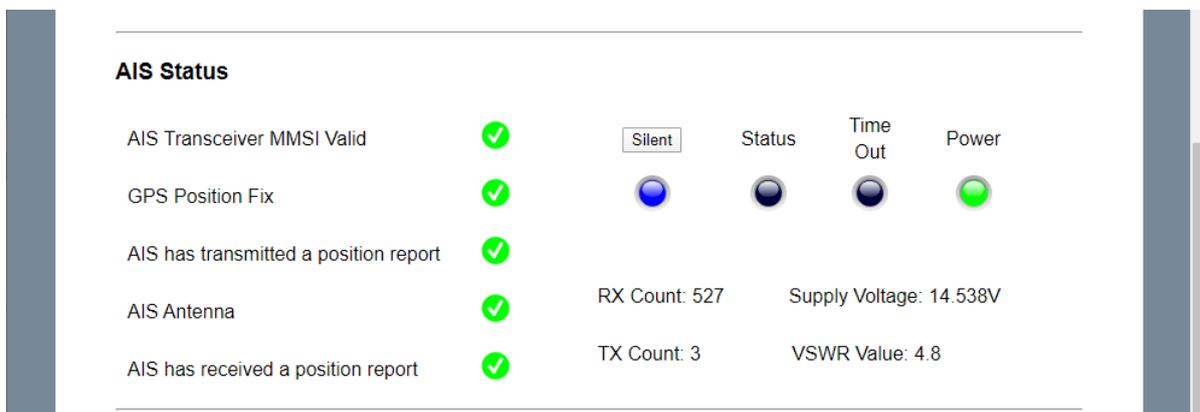
Once the AIT5000 is configured, it is sometimes useful to check on how the transponder is performing or to remotely switch the transponder in to “Silent Mode”. The new web interface gives real-time display of the LED Status of the unit, useful if it is hidden away behind a panel, shows the status of the key factors that affect the transponder i.e. Supply Voltage, GPS fix and VSWR value.



A series of simple Tick and Cross icons give an immediate indication of correct operation and you also have the RX and TX count to show how many targets have been received and how many successful transmissions the AIT5000 has made.

Please note that when you first display this web page, you will need to wait until the AIT5000 makes a transmission before it can check/tick the “AIS Antenna” and “AIS has transmitted a position report” status.

To switch the AIT5000 in to “Silent Mode”, click the “Silent” button and the blue Silent LED should illuminate.





If you leave the AIT5000 in “Silent Mode” for more than a few minutes, the green “Power” LED will go off and the yellow “Timeout” LED will illuminate.

AIS Status

AIS Transceiver MMSI Valid	✔	<input type="button" value="Silent"/>	Status	Time Out	Power
GPS Position Fix	✔	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
AIS has transmitted a position report	✔				
AIS Antenna	✘	RX Count: 701		Supply Voltage: 14.551V	
AIS has received a position report	✔	TX Count: 3		VSWR Value: --	

To start transmitting again, simply click the “Silent” button again and the blue “Silent” LED will go off and as soon as the AIT5000 makes its next transmission the green “Power” LED should illuminate, and this indicates that everything is working correctly, with all self-tests passed.

4.3 Vessel Details

This is the section in which you enter the MMSI and Static data to program the AIT5000. The MMSI number can only be programmed once, so particular care should be taken to check that it is correctly typed in. All other data can be changed at any time.

Vessel Details

Ship's Name: <input type="text" value="DIGITAL YACHT"/>	
Call Sign: <input type="text" value="TEST"/>	
MMSI Number: <input type="text" value="235899912"/>	
Vessel Type: <input type="text" value="36"/> <input type="text" value="Sailing"/>	
Dimension A: <input type="text" value="11"/> m	
Dimension B: <input type="text" value="1"/> m	
Dimension C: <input type="text" value="2"/> m	
Dimension D: <input type="text" value="2"/> m	

The ship's name and call sign will automatically appear and be stored as capitals, regardless of whether you entered them in upper or lower case.

Select the Vessel type by clicking on the drop-down list and selecting the vessel type most applicable to your vessel.

Finally enter the four offset measurements of where the GNSS (GPS) antenna is mounted on your boat. These values are to the nearest meter and it is better to round up, rather than down. For most pleasure craft these measurements are more for informational interest for any vessel receiving the data, but for larger boats and commercial vessels they are important as some chart systems draw the AIS targets to scale on the electronic chart, based on the measurements you enter.

Once you are happy that all your boat's static data has been entered correctly, remembering to double check the MMSI number, click the “Update Vessel Details” button and the details will be stored in the AIT5000 unit. Now power cycle the AIT5000, waiting a couple of seconds between powering off and then on.

Now when you connect wirelessly to the AIT5000 and bring up the web interface again, you should see the static data that you previously entered.



4.4 Firmware Update

From time to time, Digital Yacht may release new firmware updates to add features or fix bugs in the AIT5000. Only use this section to update your unit if told to do so by Digital Yacht or one of their dealers.

In this section you just have two buttons; a "Choose File" button to select a firmware update file that you have downloaded and stored on your mobile device and an "Upload Firmware" button that once you have selected a file, initiates the upload process.

A percentage status indicator will count up in the bottom left corner of the browser, to show the progress of the upload. When the upload is complete, you should see a screen confirming everything is OK and saying that the AIT5000 will reboot in 20 seconds.

5. Operation

Once installed and configured, correct operation of the AIS transponder is pretty much automatic, simply turn the unit on and it will either create its own wireless network (Access Point Mode) or join another wireless network (Station Mode) if this is how you have set it up.

Within about 10-20 seconds after powering up, you should be able to connect wirelessly to the AIT5000 and start receiving AIS data from other vessels.

After about one minute, it should receive a valid GPS position and start transmitting your position. This continues every 30 secs whilst sailing (over 2 knots) or every 3 minutes whilst moored.

Correct operation should be verified as follows:

1. Check that the green "Wi-Fi" LED flashes when you first turn the AIT5000 on and goes to a solid ON, as soon as you have connected wirelessly to the AIT5000 (Access Point Mode) or it has successfully joined another wireless network (Station Mode).
2. The yellow "Data" LED should flash regularly to indicate that the unit is receiving GPS/AIS data.
3. The yellow "Timeout" LED will initially flash to indicate that the AIT5000 is waiting for its first GPS position fix. As soon a position fix is achieved the "Timeout" LED will go to a solid ON and then within 3 minutes the "Timeout" LED should go off and the green "Power" LED should illuminate.
4. If the red 'Error' LED is illuminated please go to the web interface and check the unit is correctly programmed, the supply voltage is above 10v, GPS fix status is good and the VSWR reading is below 5.
5. If the unit does not have GPS fix within a few minutes check that the AIT5000's GPS antenna cable is firmly screwed in to the FME to TNC adaptor.

AIT5000 is designed to be used with compatible navigation software or apps that support wireless AIS over UDP or TCP.

For UDP operation simply set the app to port 2000 and for TCP operation enter the IP address as 192.168.1.1 and the port as 2000.

For more information on compatible software and apps, please visit our blog <http://digitalyacht.net> and search for "iOS Apps" or "Android Apps".



6. Troubleshooting

If the AIT5000 does not appear to be working correctly, use the web interface to check for problems:

1. Is the MMSI number programmed?

Check in the web interface if there is a red cross next to the "AIS Transceiver MMSI Valid" item then you have not correctly configured the MMSI.

2. Does the unit have a GPS position fix?

Check in the web interface if there is a red cross next to the "GPS position fix" item then the unit does not have GPS fix. Check your GPS antenna and connections.

3. Is the VSWR reading too high > 5?

Check in the web interface what the VSWR value is and if greater than 5, then you need to check the state of your VHF antenna and its connections. Any poor connections, partial shorts, damage to the cable, corrosion can affect the VSWR reading and the higher this is, the less power is being transmitted.

4. Is there a good supply voltage?

Check in the web interface if the DC supply is higher than 9.8v which is the level at which the AIT5000 will stop transmitting. It needs a good 12v or 24v supply for correct operation and you will need to check the power connections for excessive voltage drop.

5. Are you wirelessly connected to the AIT5000?

Many mobile devices will automatically switch to another wireless network that they recognise if it has an internet connection. The AIT5000 being a wireless device, rather than a wireless router, does not have an internet connection and sometimes this can cause your wireless smart phone or tablet to switch to another wireless network or revert to a 3G/4G connection.

6. Are there any other marine navigation apps open on your device?

Both iOS and Android operating systems allow multiple apps to be opened and when you switch to another app, the apps that are in the background can still be connected to network resources, blocking another app from connecting. If you have trouble receiving the wireless data on an app, close all other open apps including the app you are trying to use and then open it again on its own and see if you can now receive data. If all else fails, turn off the wireless device and then power it on again, which will reset all network connections and services.

7. Is there an external power connection?

When connected to a computer via USB, the AIT5000 can take enough power from the USB port to work as an AIS receiver but not as a Class B+ transponder. Occasionally if a fault occurs in the boat's wiring, a fuse blows or the circuit breaker trips, then the AIT5000 will lose external power and only have the USB power. In these circumstances, the AIT5000 will receive AIS targets but not transmit its own position and the Red and Yellow LEDs will be lit.

For more general information about AIS please Google "Introduction to AIS White Paper" or "Non-Idiots Guide to AIS" or "Is my AIS Transponder Transmitting" to find three useful AIS articles that we have published.