DIGITAL YACHT

SAIL BOAT | SPORT FISHING | MOTOR BOAT

ⓘ IMPORTANT NOTES

Our new Class B+ transponders need to be programmed/configured using a new updated version of our proAIS2 software. Please download the relevant version of our new proAIS2 software V1.10 from our "Online CD" website https://support.digitalyacht.net

If you intend to permanently connect the AIT2500 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.

AIT2500 CLASS B+ AIS TRANSPONDER

Installation and instruction Manual

1. Notices

Congratulations on the purchase of your AIT2500 Class B+ AIS Transponder.

⚠ **When reading this manual please pay attention to warnings marked with the warning triangle shown on the left. These are important messages for safety, installation and usage of the product.**

1.1 Safety warnings

⚠ **This equipment must be installed in accordance with the instructions provided in this manual.**

⚠ **This AIS transponder is an aid to navigation and must not be relied upon to provide accurate navigation information. AIS is not a replacement for vigilant human lookouts and other navigation aids such as RADAR. The performance of the transponder may be seriously impaired if not installed as instructed in the user manual, or due to other factors such as weather and or nearby transmitting devices. Compatibility with other systems may vary and is reliant on the third party systems recognising the standard outputs from the transponder. The manufacturer reserves the right to update and change these specifications at any time and without notice.**

⚠ **Do not install this equipment in a flammable atmosphere such as in an engine room or near to fuel tanks.**

1.2 General notices

Position source

All marine Automatic Identification System (AIS) transponders utilise a satellite based location system such as the Global Positioning Satellite (GPS) network.

The accuracy of a GPS position fix is variable and is affected by factors such as the antenna positioning, how many satellites are used to determine a position and how long satellite information has been received for.

Compass safe distance

The compass safe distance of this unit is 0.2m or greater for 0.3° deviation.

RF emissions notice

Caution: The AIS transponder generates and radiates radio frequency electromagnetic energy. This equipment must be installed and operated according to the instructions contained in this manual. Failure to do so can result in personal injury and / or AIS transponder malfunction.

Caution: Never operate the AIS transponder unless it is connected to a VHF antenna.

To maximise performance and minimise human exposure to radio frequency electromagnetic energy you must make sure that the antenna is mounted at least 1.5 metres away from the AIS transponder and is connected to the AIS transponder before power is applied. The system has a Maximum Permissible Exposure (MPE) radius of 1.5m. This has been determined assuming the maximum power of the AIS transponder and using antennas with a maximum gain of 3dBi.The antenna should be mounted 3.5m above the deck in order to meet RF exposure requirements. Higher gain antennas will require a greater MPE radius. Do not operate the unit when anyone is within the MPE radius of the antenna (unless they are shielded from the antenna field by a grounded metallic barrier). The antenna should not be co-located or operated in conjunction with any other transmitting antenna. The required antenna impedance is 50 Ohms.

Warranty

This product is supplied with standard 2 year RTB warranty.

⚠ **Any attempt to tamper with or damage this product will invalidate the warranty.**

Disposal of this product and packaging

Please dispose of the AIS transponder in accordance with the European WEEE Directive or with the applicable local regulations for disposal of electrical equipment.

Every effort has been made to ensure the packaging for this product is recyclable. Please dispose of the packaging in an environmentally friendly manner.

Accuracy of this manual

The AIS transponder may be upgraded from time to time and future versions of the AIS transponder may therefore not correspond exactly with this manual. Information contained in this manual is liable to change without notice. The manufacturer of this product disclaims any liability for consequences arising from omissions or inaccuracies in this manual and any other documentation provided with this product.

Radio Equipment Directive

The manufacturer of this product declares that this product is in compliance with the essential requirements and other provisions of the Radio Equipment Directive 2014/53/EU and as such, displays the CE mark. The RED declaration of conformity is provided as part of this documentation pack

C E

FCC notice

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

⚠ **WARNING: It is a violation of the rules of the Federal Communications Commission to input an MMSI that has not been properly assigned to the end user, or to otherwise input any inaccurate data in this device.**

Industry Canada notice

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and

2. This device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus complies with Canadian ICES-003.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage, et

2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le Fonctionnement.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

It is recommended that your transponder is installed by a professional installer.

⚠ **This Quick Start Guide will provide basic information on the AIT2500 to allow you to install and get the AIT2500 working, we suggest that you consult the manufacturer's user manuals for any other equipment that you will be connecting the AIT2500 to.**

2. Before you start

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

- Class B+ AIS Transponder.
- Dedicated VHF/AIS 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:

- A PC running Microsoft Windows XP®/Vista® / 7/8/10 or Mac OSX with a free USB port.
- proAIS2 Class B+ AIS Transponder configuration software – Windows and Mac versions of the software are available for download from our "Online CD" at https://support.digitalyacht.net
- An MMSI number for your vessel.

⚠ *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.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

- Install the VHF/AIS antenna (not supplied) according to the hand book instructions supplied with the antenna.

- If you are going to share the boat's existing VHF antenna i.e. use the antenna for both the VHF and AIS, you will need to install a suitable antenna splitter. It is very important that this splitter is suitable for use with an AIS Transponder as some of the lower cost splitters only switch one input and are only suitable for use with an AIS receiver. We recommend our SPL2000 "Zero Loss" Technology splitter.

- The AIS antenna connector on the AIT2500 is a BNC type connector and it may be necessary to get a PL259 to BNC adaptor if you are connecting a normal VHF antenna to the AIT2500 as these are terminated in the standard PL259 VHF connector.

- 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 AIT2500 unit, adding any necessary extension cables.

- Connect the cable from the GPS antenna to the GPS connector on the AIT2500. The GPS antenna is terminated in a threaded TNC type connector to differentiate it from the AIS/VHF antenna which is terminated in a bayonet BNC type connector.
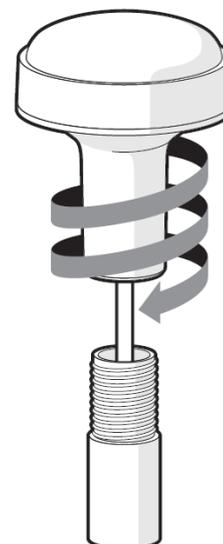
Installation Step 2 – Mechanical Fixings

- Access to the fixing holes is achieved by removal of the two green decal strips down each side of the AIT2500. 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

Fixing location drawing
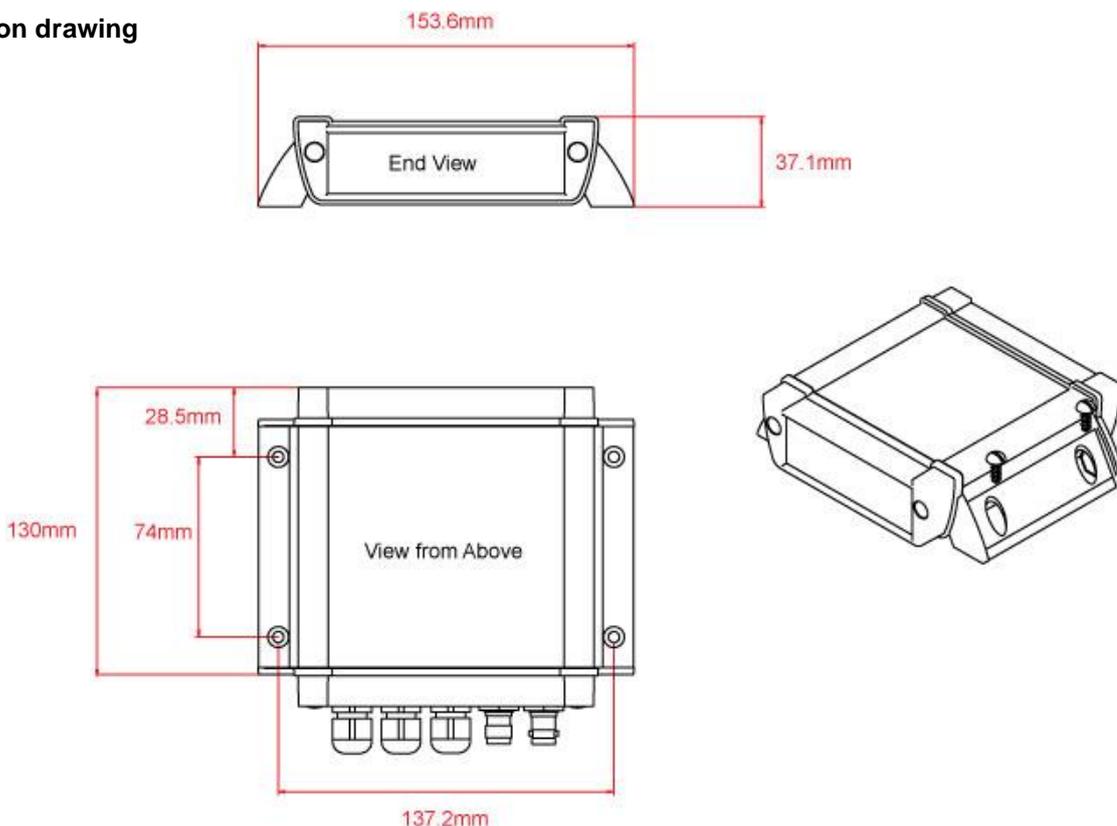
Installation Step 3 - Power

- 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 the supplied 3A fuse or suitable circuit breaker. Add the fuse in the positive power connection to the unit if necessary.

- The AIT2500 Class B+ Transponder is designed for a 12V or 24v DC systems.

Installation Step 4 – NMEA 0183

- The AIT2500 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 AIT2500 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 AIT2500 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 AIT2500 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 AIT2500, 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 AIT2500 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 AIT2500 N2Net connector to the "T" piece.

- The N2Net cable is just over 1m long and is terminated in an NMEA2000 Micro Male Connector.

- The AIT2500 does not take any power from the NMEA2000 network

- The AIT2500 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 AIT2500 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 AIT2500 is designed to be used for configuring/programming the unit during installation and not for permanent connection to the boat's Navigation PC.

- If you intend to permanently connect the AIT2500 to a PC or MAC via a USB interface, we recommend that you use our NMEA to USB adaptor cable which will protect the AIT2500 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 AIT2500 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 AIT2500 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 AIT2500 to your PC at this stage. 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 AIT2500 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 AIT2500 will be in Silent mode (not transmitting) and when the switch is OFF (open) the AIT2500 will be in normal transmitting mode.

Installation Step 8 – Power Up

- Turn on the 12V or 24v power to the AIT2500

- Verify that the green LED illuminates for a short period and then all four LED indicators on the front of the unit flash once, followed by illumination of the amber and red LED's.

- Installation is now complete. The AIT2500 needs to be configured using the proAIS2 software – see next section.

4. Configuration

The AIT2500 transponder must be correctly configured 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.

The AIS transponder is configured by connecting to a PC or Mac running the 'proAIS2' configuration tool supplied. For the purposes of programming, the AIT2500 can take sufficient power from the USB cable to communicate with the computer but not to operate as a Class B+ Transponder which requires an external 12v or 24v DC supply.

- Visit our "Online CD" at https://support.digitalyacht.net and look for the proAIS2 software for Windows or Mac. Download the one applicable to your computer and either unzip and run the Setup.exe for Windows or install the proAIS2.dmg for Mac. During installation the USB drivers will be automatically installed.

- Plug in the AIT2500 USB cable in to your computer and then launch proAIS2. Select the COM port that the AIT2500 has been allocated by Windows or OSX. Click the 'Connect' button The computer will now query the AIT2500 and display any "Static" boat data stored in the unit. All new units will have no data stored and so you will just have a series of blank boxes in which you will need to enter your boat's data (see below).
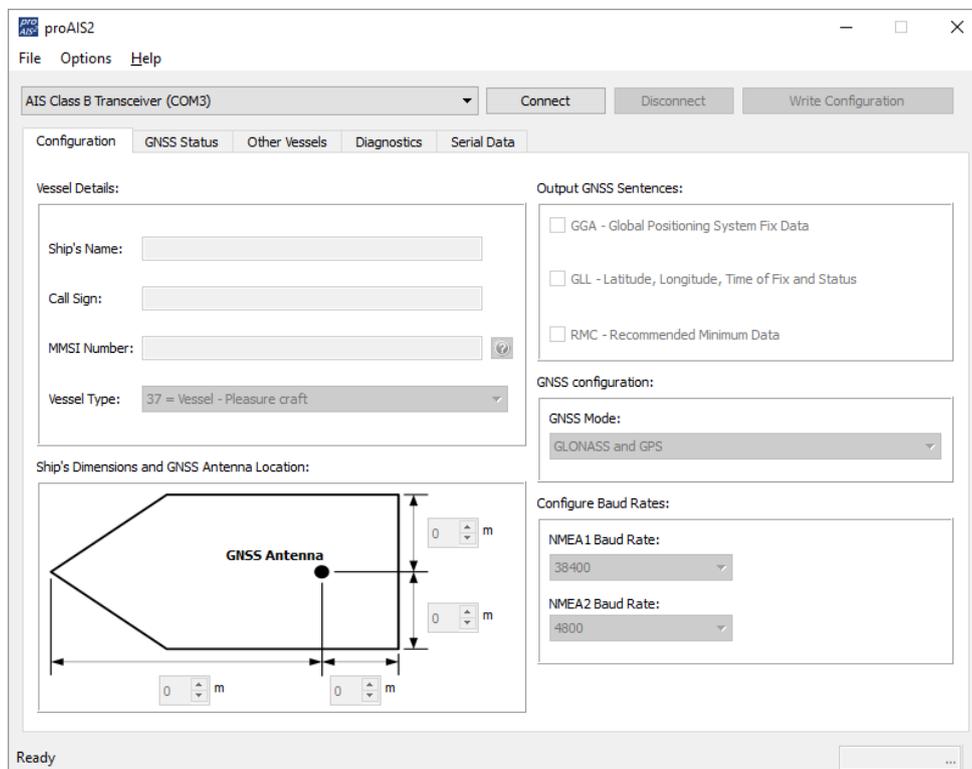
1. Enter Vessel Name, Call Sign and MMSI

2. Enter vessel dimensions and location of GPS antenna to the nearest metre.

3. Select the most appropriate vessel type.
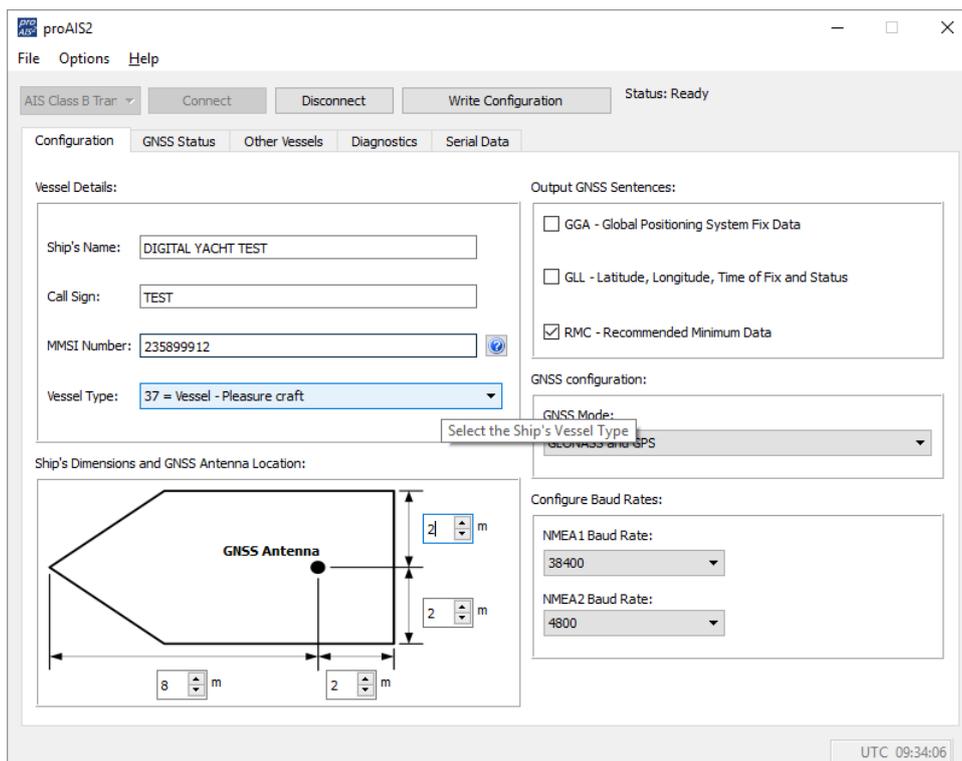
4. Click "Write Configuration" to save the data to the AIT2500

5. Read the warning message carefully and proceed only if the MMSI number is correct.

6. If you are configuring a new unit with a new MMSI number then a warning message will be displayed
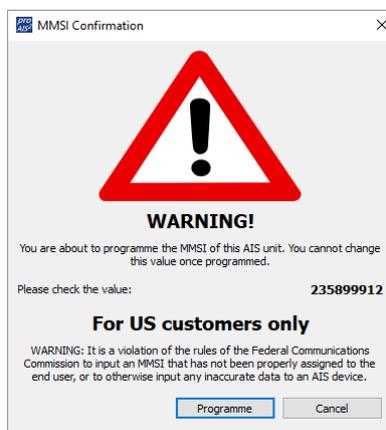
7. Read the warning message carefully and proceed only if the MMSI number is correct.

8. Should you make a mistake or need to change anything in the future, all configurations and settings, except the MMSI, can be changed by running proAIS2 and following this procedure again

9. Configuration of the AIS Class B+ Transponder is now complete

*Note: *For security reasons the MMSI can only be programmed once. Make sure you enter the correct number and double check when ProAIS2 warns you regarding MMSI programming. The MMSI can only be changed by returning the unit to your dealer.*

5. Operation

Once installed and configured, correct operation of the AIS transponder should be verified as follows:

1. After turning ON the 12v/24v supply to the AIT2500 and the initial flash of the four transponder LED lights, ensure that the Yellow "*Time Out*" LED flashes while the AIT2500 waits to receive its first GPS fix. Then the Yellow "*Time Out*" LED will stay ON until the AIT2500 makes its first AIS transmission < 3 minutes.

2. As soon as the AIT2500 makes its first AIS transmission the Yellow "*Time Out*" LED will go out and the Green "*Power*" LED will come ON. This is the normal, everything is OK, indication and as long as the Green "*Power*" LED is ON, you can be confident that the AIT2500 is working correctly and transmitting your position.

3. If the RED "*Status*" LED comes on then a serious problem has occurred with either the supply voltage or the transmission through the VHF antenna.

4. If the Yellow "*Time Out*" LED illuminates then something has stopped the AIT2500 from transmitting, such as another AIS transponder stealing its time slot or a temporary loss of GPS signal. This should only happen occasionally and normal operation should quickly be resumed. If the Yellow "Time Out" LED regularly comes on or flashes for long periods, then this may indicate a problem with the GPS antenna.

5. The proAIS2 program can be used to diagnose problems and has a very good Diagnostics page that in conjunction with the GPS Status page provides a good indication of how the AIT2500 is performing.
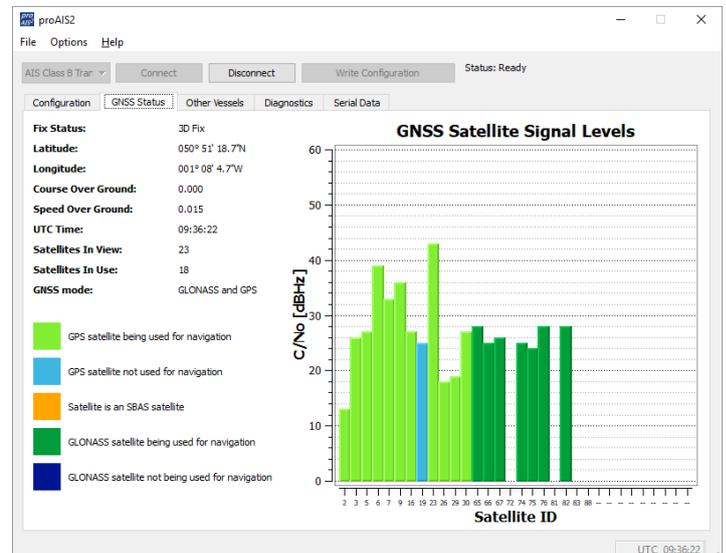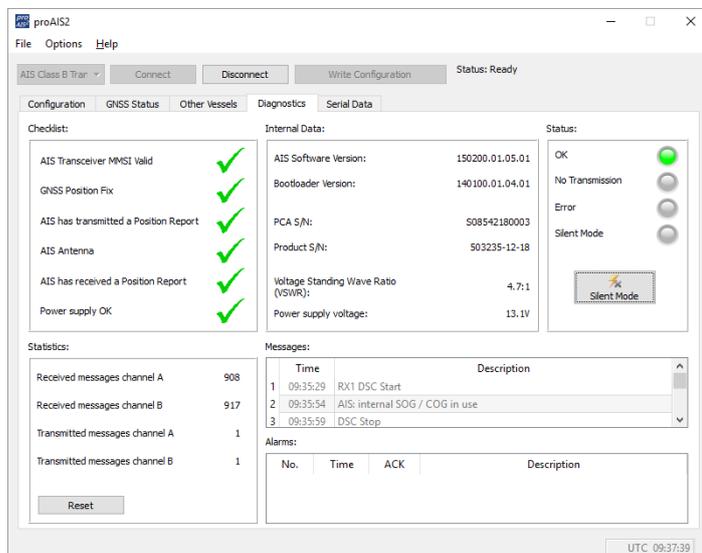
6. Many customers like to use Marine Traffic or other similar AIS websites to check if they are transmitting. This is often a very good check, but do make sure that the website you are using has a good receiving station within 5-8 miles (clear line of sight) of your position and allow a few hours for your new transponder to be registered on their system and appear on their website.

7. Ensure that the AIT2500 is passing NMEA0183 or NMEA2000 AIS data to your chart plotter or USB data to your computers navigation program. Please note that on PCs and Macs, only one software program can receive data at a time from the USB interface, so close proAIS2 before running your navigation software or vice versa.

8. You can use proAIS2 to display the received AIS data or the free SmarterTrack Lite software that we include on the "Online CD" at https://support.digitalyacht.net

6. Troubleshooting

If the green LED is not illuminated after around 5 minutes then please check the following:

1. Is the MMSI number programmed?
Check the "Diagnostics" tab in proAIS2. If there is a red cross next to the "AIS Transponder MMSI Valid" item then you have not correctly configured the MMSI.

2. Does the unit have a GPS position fix?
Check the "Diagnostics" tab in proAIS2. 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 unit reporting any alarms?
Check the "Active alarms" area in the "Diagnostics" tab of ProAIS2 & refer to the troubleshooting guide at the back of the ProAIS2 user guide.

4. Is there an external power connection?
When connected to a computer via USB, the AIT2500 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 AIT2500 will lose external power and only have the USB power. In these circumstances, the AIT2500 will receive AIS targets but not transmit its own position and the Red and Yellow LEDs will be lit.

For more troubleshooting information on the AIT2500 transponder please consult Tech Note 00036-2012 in the Support section of www.digitalyacht.co.uk