

IMPORTANT NOTES

Your Nomad 2 unit has been upgraded to the latest Class B+ (5W SOTDMA) technology and must be powered via the integral 12v power lead that is designed to plug in to a standard “cigarette lighter” socket.

Nomad 2 unit creates a wireless network which has the network name (SSID) of...

NOMAD2-XXXX

...where XXXX is a 4 digit code unique to your unit. By default the password for this wireless network is...

PASS-XXXX

...where XXXX is the same 4 digit unique code that is in the wireless network name (SSID).


NOMAD2 CLASS B+ AIS TRANSPONDER

Installation and instruction Manual





1. Introduction and Notices

Congratulations on the purchase of your NOMAD2 Class B+ AIS Transponder. This product is designed to be portable, with quick and simple installation that can be carried out by any practical person. With its wireless interface, NOMAD2 will work with any of the AIS apps on the market today, that support wireless NMEA data via UDP or TCP.

 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. DO NOT install the equipment in a flammable atmosphere such as in an engine room or near to fuel tanks.

 This Digital Yacht CLASS B+ 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 CLASS B+ 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 is reliant on third party systems recognising the standard outputs from the CLASS B+ TRANSPONDER. Digital Yacht reserves the right to update and change these specifications at any time and without notice.

1.2 Position source

All marine Automatic Identification System (AIS) transceivers utilise a satellite based location system, which is referred to as Global Navigation Satellite System (GNSS). This includes Global Positioning System (GPS), Globalnaya Navigazionnaya Sputnikovaya Sistema (GLONASS), Galileo, and BeiDou.

The accuracy of a GNSS 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.

1.3 Compass safe distance

The compass safe distance of this unit is 0.5m or greater for 0.3° deviation. We suggest you always mount the unit 1m away from any compass and check for any localised interference

1.4 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.

1.5 Warranty

The CLASS B+ TRANSPONDER is supplied with a standard 2 year return to base warranty as defined in the accompanying warranty information. Any attempt to tamper with or damage this product will invalidate the warranty. Physical damage and damage caused by salt water ingress are not covered under this warranty.

1.6 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.

1.7 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.

1.8 Declaration of conformity

Digital Yacht declare that this product is in compliance with the essential requirements and other provisions of the R&TTE directive 2014/53/EU.

The product carries the CE mark.



The RED declaration of conformity is provided as part of this documentation pack. The declaration of conformity is provided with the product document pack.

1.9 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.

1.10 Important information for US customers

US CUSTOMERS ONLY: In the USA it is illegal for an end user to configure their own AIS with their vessel data. To do so is a violation of the rules of the United States Coast Guard (USCG).

This must be done by a competent installer, such as Digital Yacht, a Digital Yacht dealer or competent marine electronics professional. If your transceiver has not been pre-configured for you please refer to your dealer or contact support at Digital Yacht for advice on how to have the transceiver configured legally.

If purchasing direct from Digital Yacht online we can configure it for you and dispatch it pre-configured at no extra cost, if you are purchasing from one of our dealers, then they will do it for you.



WARNING: 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.

The following information about this transponder is required to complete license applications:

- FCC ID **07D-ZDIGAIT2000**
- FCC Type Accepted Parts 15 and 80
- Output Power: 2 watts
- Modulation: GMSK
- Frequency Range: 156.025 MHz to 162.025 MHz

In addition, the NOMAD2 unit: CONTAINS FCC ID **2AC7Z-ESP32WROVERE**



1.11 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.



2. Before you start

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


- NOMAD2 Class B+ AIS Transponder.
- GV30 combo VHF/GPS antenna and 10m cables – supplied
- A 12v power socket “cigarette lighter” type
- 2x Velcro Strips (not supplied) or 4x M4 screws (not supplied) or other fixings appropriate to the mounting location.

 NOMAD2 now features Class B+ (5W SOTDMA) technology and can no longer be powered via USB as previous Nomad models were.

To configure the unit you will need:

- An MMSI number for your vessel
- A wireless PC/Phone/Tablet running a modern web browser to access the NOMAD’s internal web interface.

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.*

 *If you do not have an MMSI number the AIS Transponder will still 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 not be permanently installed outside on-deck and we only recommend permanent mounting below deck in a dry location. The NOMAD2 unit can be temporarily mounted outside, in which case choose a sheltered location where it will not be subjected to constant exposure to water. Basically, if you would be happy to leave your smart phone or tablet in the same location, then it will be fine for NOMAD2. When locating the unit you should consider:

- Routing of the 12v Power cable to a suitable power source
- Mounting of GV30 VHF/GPS antenna and routing the cables to the unit
- If you need Wi-Fi reception around the whole boat
- Maintaining the compass safe distance of 0.5m
- Visibility of the LED indicators

3.1 – Installing the GV30 VHF/GPS Antenna

- Install the GV30 VHF/GPS antenna (supplied) as high up as possible. The antenna has an integral 1”x14 TPI threaded base that can be screwed to any standard VHF mount. For maximum performance, the antenna should be mounted on a horizontal surface so that it is pointing vertically into the air.
- The GV30 VHF/GPS antenna supplied with the NOMAD2 comes with two 10m cables and a pair of adaptors – one for a BNC and one for a TNC type connector. The cables are terminated in a pair of identical FME connectors that screw into the supplied adaptors. Care must be taken to fit the BNC adaptor to the AIS labelled cable and the TNC adaptor to the GPS labelled cable (see Figure 1).
- **IMPORTANT** – The two 10m Coax cables of the GV30 are used as matched ground planes and should not be shortened or lengthened as this will affect the transponder performance.



GV30 ANTENNA DIMENSIONS

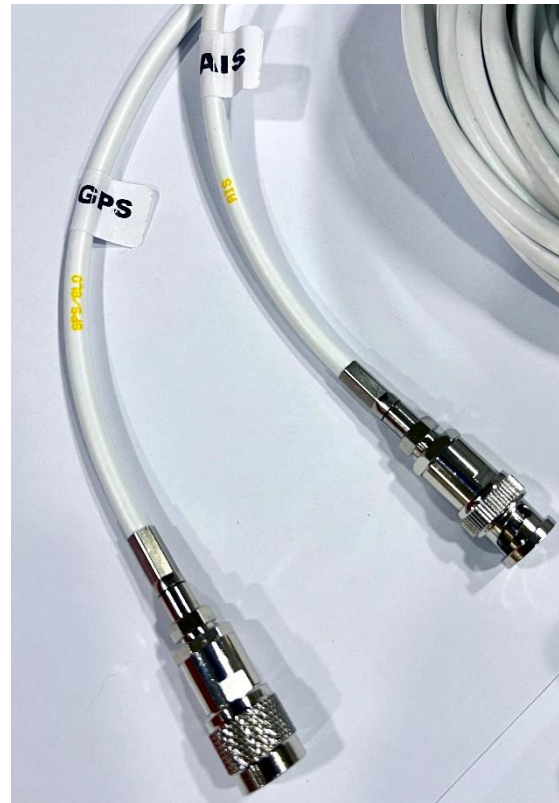
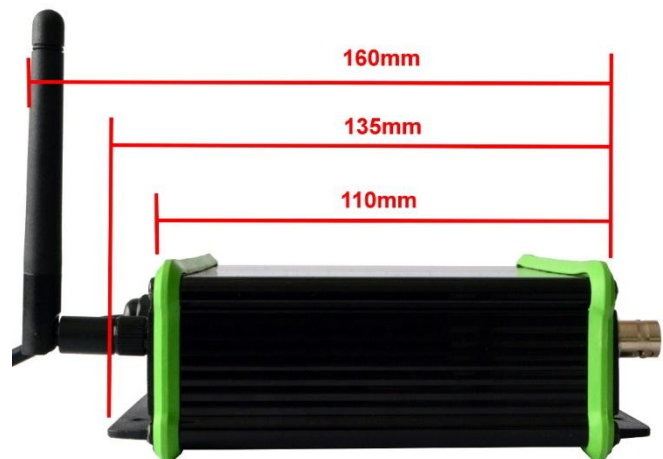


Figure 1

3.2 – Installing the NOMAD2 Unit

Unit Dimensions



- The NOMAD2 can be mounted in any orientation but should be located at least 1m away from a compass.
- For temporary mounting, secure the NOMAD2 to a suitable horizontal or vertical surface using two strips of Velcro (not supplied) or for permanent mounting, use four M4 wood screws (not supplied) or other fixings suited to the material the unit is being fixed to.



3.3 – Connecting 12v Power

- Power is supplied to the unit, via its integral power cable. Simply plug the “cigarette lighter” plug into a suitable 12v Power socket onboard the boat. The NOMAD2 unit will take approximately 0.3A of current at 12v.
- Verify that on the top end cap of the NOMAD2, that the green LED illuminates for a short period and then all four LED indicators flash once, followed by illumination of the amber and red LED's.
- Verify that the Data and WiFi LEDs on the bottom end cap are flashing.
- Scan for wireless networks and confirm that there is a new network called “Nomad2-xxxx” where **xxxx** is a four digit code unique to your NOMAD2 unit.
- Installation is now complete. The NOMAD2 needs to be configured using its built-in web interface – see next section.



Top End Cap



Bottom End Cap



4. Configuration

An AIS transponder must be correctly configured with the MMSI and static data for your vessel before operation. Care should be taken entering this information as it 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 NOMAD2 transponder must be configured wirelessly using its built-in web interface.

The NOMAD2's simple web interface allows configuration of the MMSI and static data via a modern web browser, without the need of special apps or software. This 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 NOMAD2 wireless network as follows:

- On your mobile wireless device, scan for wireless networks and confirm that you can see a new network called "NOMAD2-XXXX" where XXXX is a four-digit code unique to your NOMAD2 unit.
- 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 in your network name. You can change both the network name and password in the NOMAD2 unit's web interface, which will be explained later in this manual.

Once wirelessly connected to the NOMAD2, open a web browser (Safari, Chrome, Firefox, Edge, etc.) and either enter the IP address of the NOMAD2...

<http://192.168.1.1>

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

<http://nomad2>

...useful if connected to another wireless network and don't know what IP address the NOMAD2 has been given.

You should now see the NOMAD2 web interface, which is shown in Fig 2.

The home page gives you access to three additional pages; the main **Status** page, the NMEA **View Data** and the system and network **Settings** page.

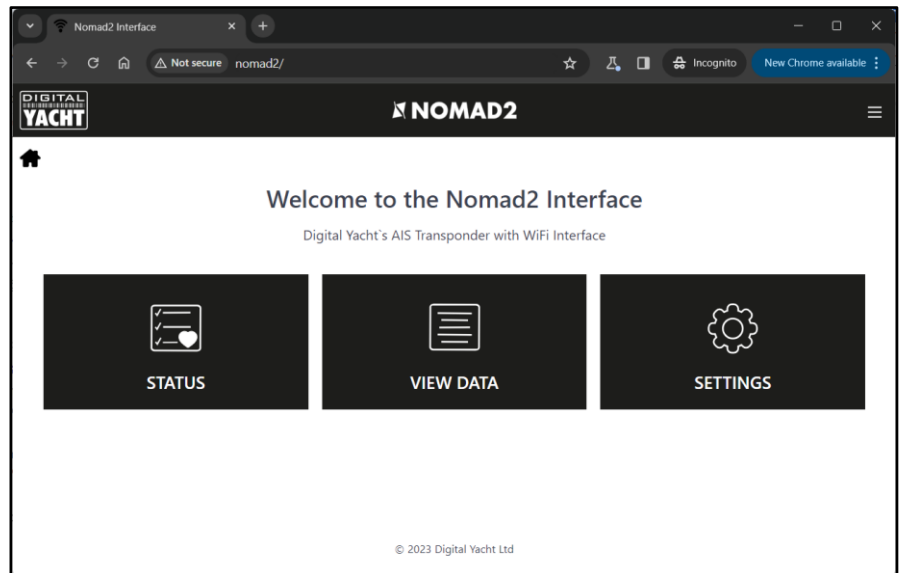


Figure 2

4.1 Status Page

In the main Status page, is where you do the initial configuration of the transponder, entering the boat's static data; MMSI number, boat name, dimensions, etc. It is also the page where you can monitor the status and performance of the transponder.

Before the NOMAD2 has been configured with an MMSI number, most of the conditions will be shown with a red cross icon, and the Status and Timeout LEDs will be illuminated. To configure the transponder, go to section 4.2.

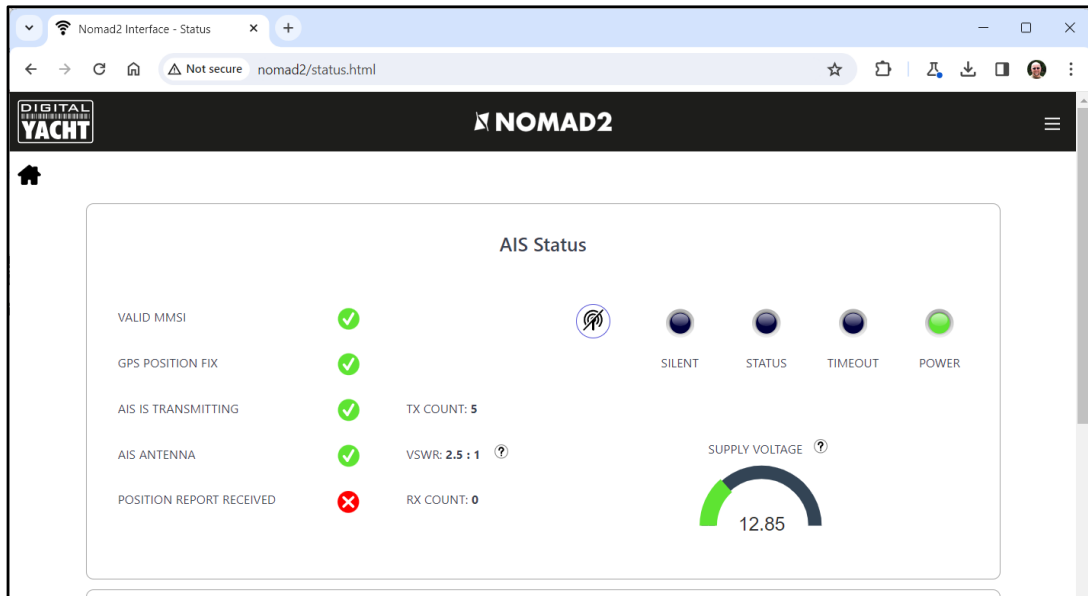



Figure 3

To put the NOMAD2 in to “Silent Mode” click the  button and the blue Silent LED will illuminate. Pressing the button a second time will exit silent mode.

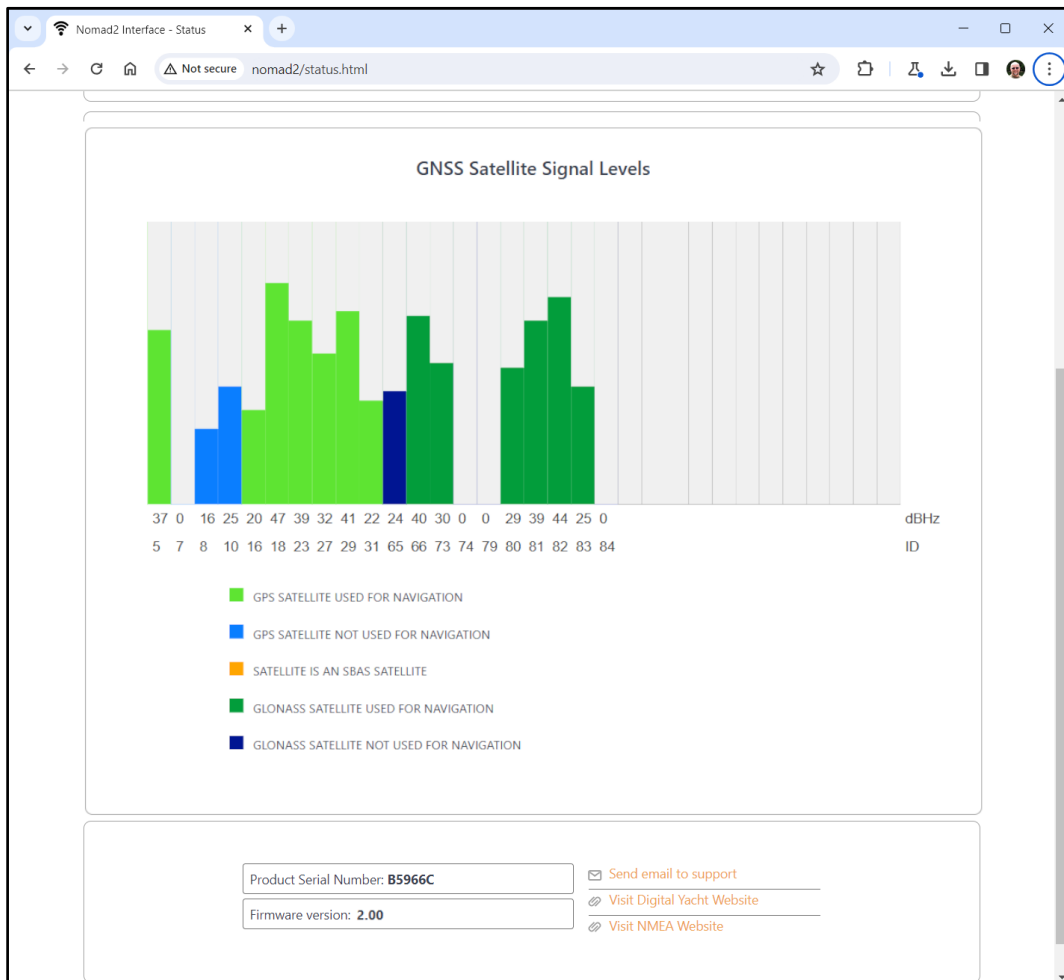


Figure 4



4.2 Settings Page - Vessel Details

In order for the transponder to transmit your vessels position, it must be configured with your boat's information (known as AIS Static Data). From the NOMAD2 web interface Home Page, click the Settings panel and you will be taken to the Settings page (Fig 5).

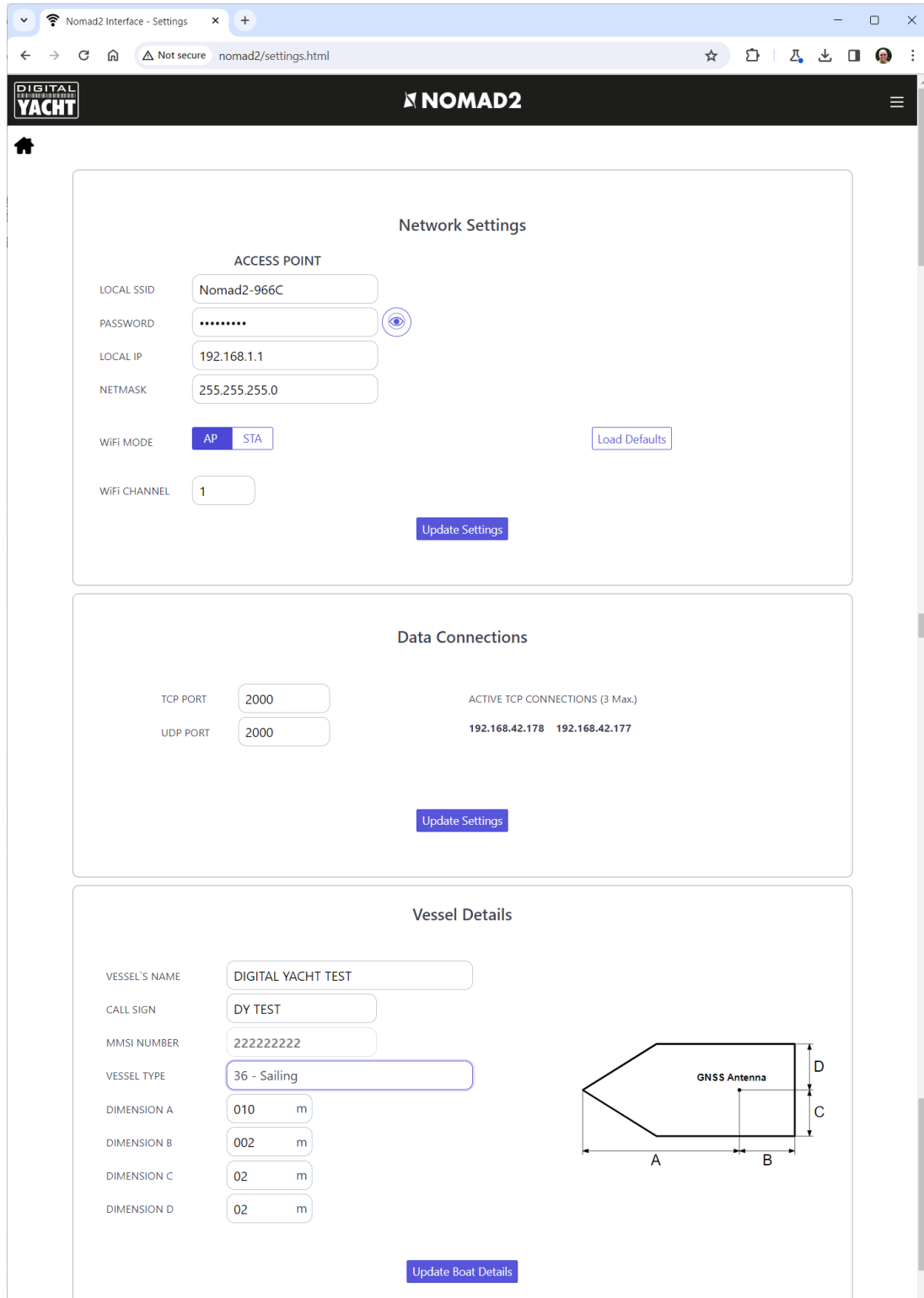


Figure 5



Scroll down to the lower Vessel Details section, where you can start to enter the boat's data.

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.

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.

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 just for information 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 Settings" button and the details will be stored in the NOMAD2's non-volatile memory.

Now power cycle the NOMAD 2, waiting a couple of seconds between powering OFF and then back ON again.

The screenshot shows a web interface titled "Vessel Details". On the left, there are several input fields with the following values: VESSEL'S NAME: DIGITAL YACHT; CALL SIGN: TEST; MMSI NUMBER: 234567890; VESSEL TYPE: 36 - Sailing; DIMENSION A: 11 m; DIMENSION B: 1 m; DIMENSION C: 2 m; DIMENSION D: 3 m. At the bottom right of the form is a blue "Update Settings" button. To the right of the form is a diagram of a boat's hull cross-section. The diagram shows a trapezoidal shape with a pointed bow. A "GNSS Antenna" is indicated by a vertical line on the right side of the hull. Dimension lines are labeled: A (length from bow to antenna), B (length from antenna to stern), C (height from deck to antenna), and D (total height from waterline to antenna).

Figure 6

Now when you connect wirelessly to the NOMAD2 and bring up the web interface again, you should see the static data that you previously entered (Fig 6).

4.3 AIS Status

Once the NOMAD2 is configured, it is sometimes useful to check on how the transponder is performing or to remotely switch the transponder in to "Silent Mode". This can all be accessed by clicking the "Status" panel on the NOMAD2 web interface Home Page and viewing the "AIS Status" section (Fig 5).

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, and also gives a useful GNSS satellite status graph showing the satellites being tracked and used for navigation.

A series of simple Tick and Cross icons give an immediate indication of correct operation. You also have the RX and TX count to show how many targets have been received and how many successful transmissions the NOMAD2 has made.

Please note that when you first display this web page, you will need to wait until the NOMAD2 makes a transmission before it can check/tick the "AIS Antenna" and "AIS has transmitted a position report" status. Also, if you close the browser window and re-open it, all of the TX and RX counts will return to zero.

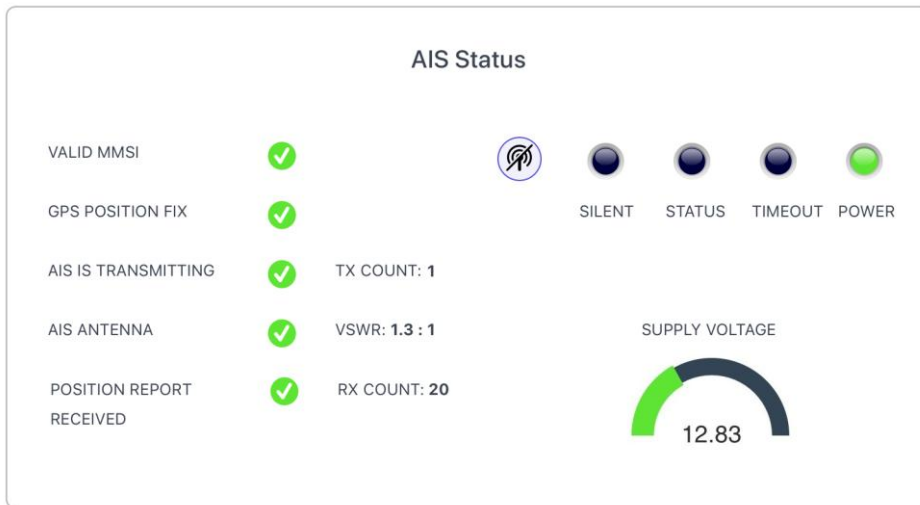


Figure 7

To put the NOMAD2 in to “Silent Mode”, click the “Silent” button and the blue Silent LED will illuminate (Fig 6). If left in Silent mode for more than a few minutes, the green “Power” LED will go off and the yellow “Timeout” LED will illuminate.

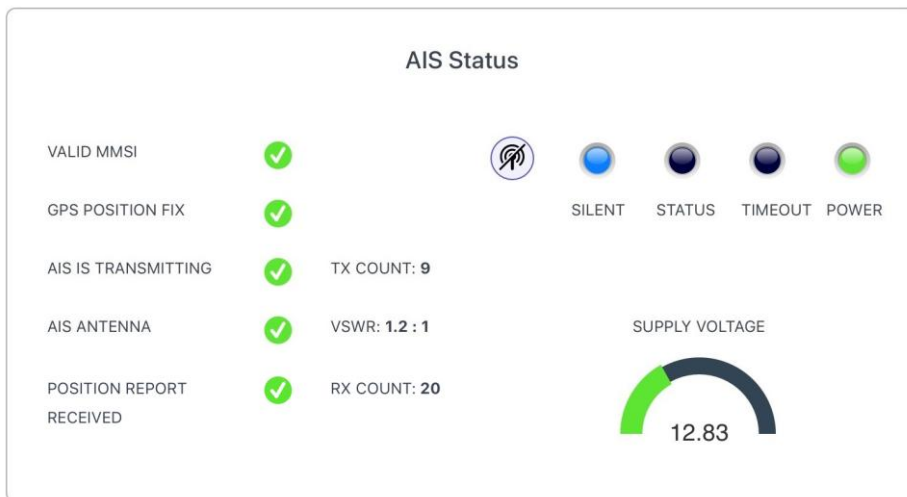


Figure 8

To start transmitting again, simply click the “Silent” button again and the blue “Silent” LED will go off and as soon as the NOMAD2 makes its next transmission the green “Power” LED should illuminate, and this indicates that everything is working correctly, with all self-tests passed.

4.4 View Data Page

Sometimes it is useful to monitor the NMEA data that the NOMAD2 is outputting on its high speed NMEA 0183 Output (Orange+ and Brown- wires). The same data is also sent to Apps on its wireless and USB interfaces. If you are using the 4800 baud input to multiplex other NMEA0183 data then this also appears in this data stream and so you can check that this multiplexed data is present.

From the NOMAD2 web interface Home Page, click the “**View Data**” panel and you should see the page shown in Fig 9.

As well as viewing the data, it is also possible to record a log file of the data, which can be useful for diagnostics.

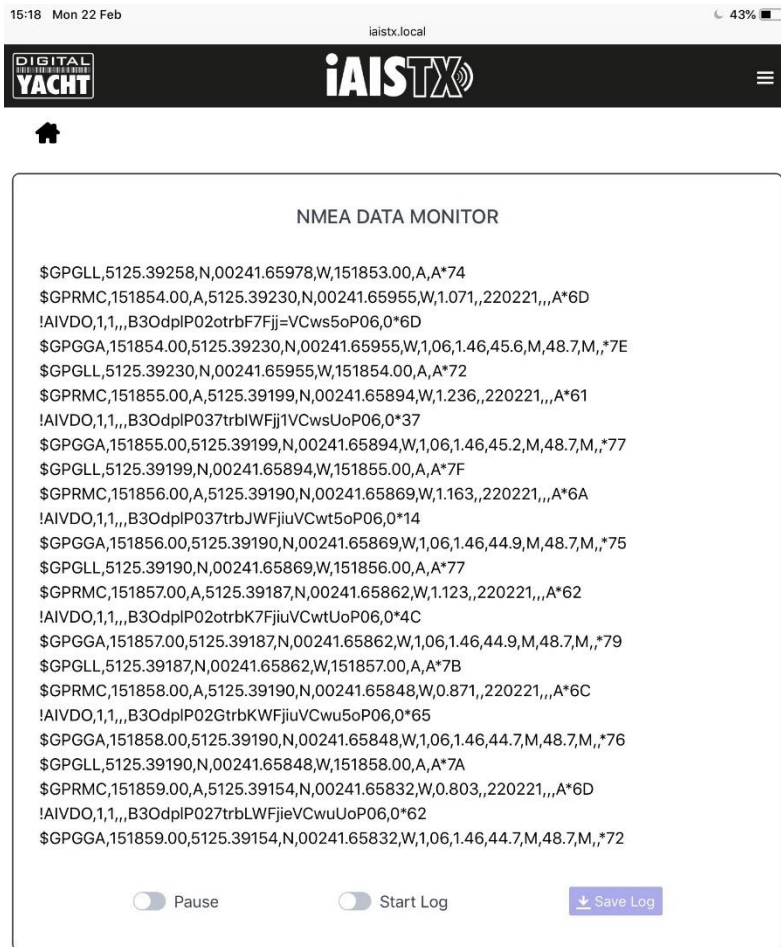


Figure 9

Click the “Start Log” switch, wait a suitable amount of time to collect the data you need and then click the “Stop Log” switch. To Save (download) the log file, click the “Save Log” button.

The “Pause” button can be used at anytime to freeze the scrolling data to make it easier to read.

4.5 Network Settings

By default, the NOMAD2 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 NOMAD2 uses (Channel 1 by default).

If you already have a wireless network on the boat and you would prefer the NOMAD2 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 NOMAD2 will store the new settings and reboot which normally takes about 20 seconds.

Please note that when operating in “Station” mode, the NOMAD2 also maintains its own wireless network and is operating in a combined AP+STA mode. Should you have any difficulties in connecting the NOMAD2 to another network; because the other network is turned off, has a fault or you have got the password wrong, then you can still connect to the NOMAD2’s own wireless network and access the web interface, check settings, etc.

The network settings can be accessed from the NOMAD2 web interface Home Page, by clicking the “Settings” panel and they are at the top of this page (Fig 10).

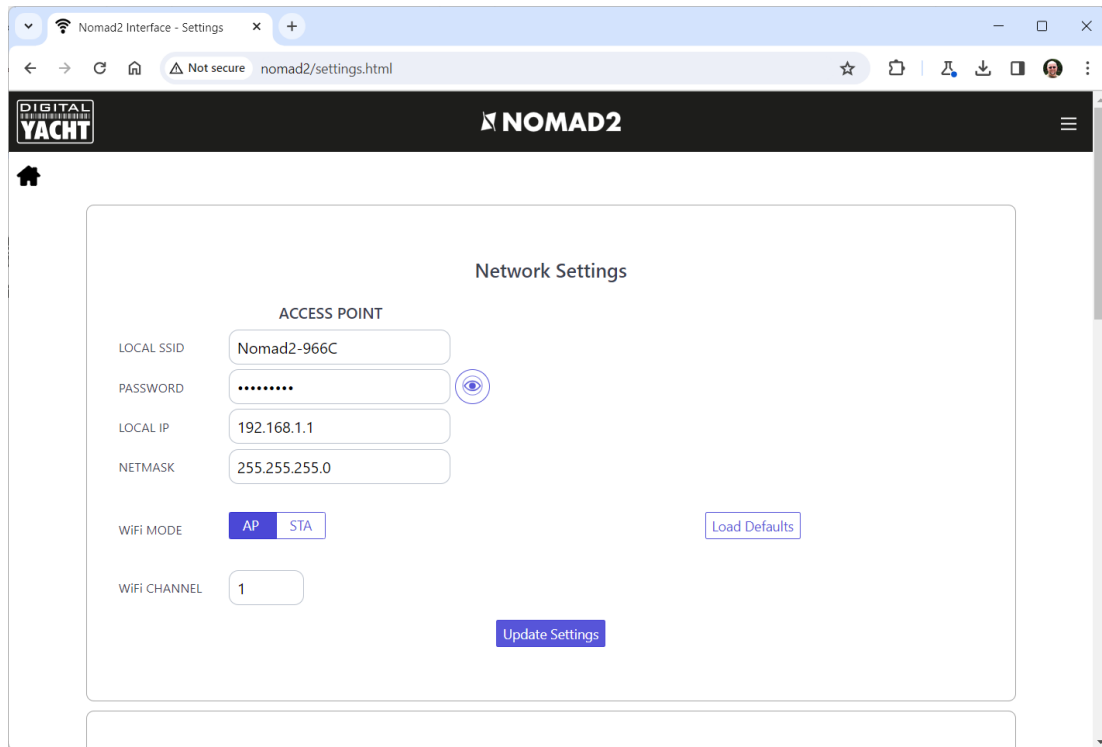


Figure 10

To activate “Station” mode, set the “WiFi Mode” switch to STA and the NOMAD2’s Settings web page will change to that shown in Fig 11.

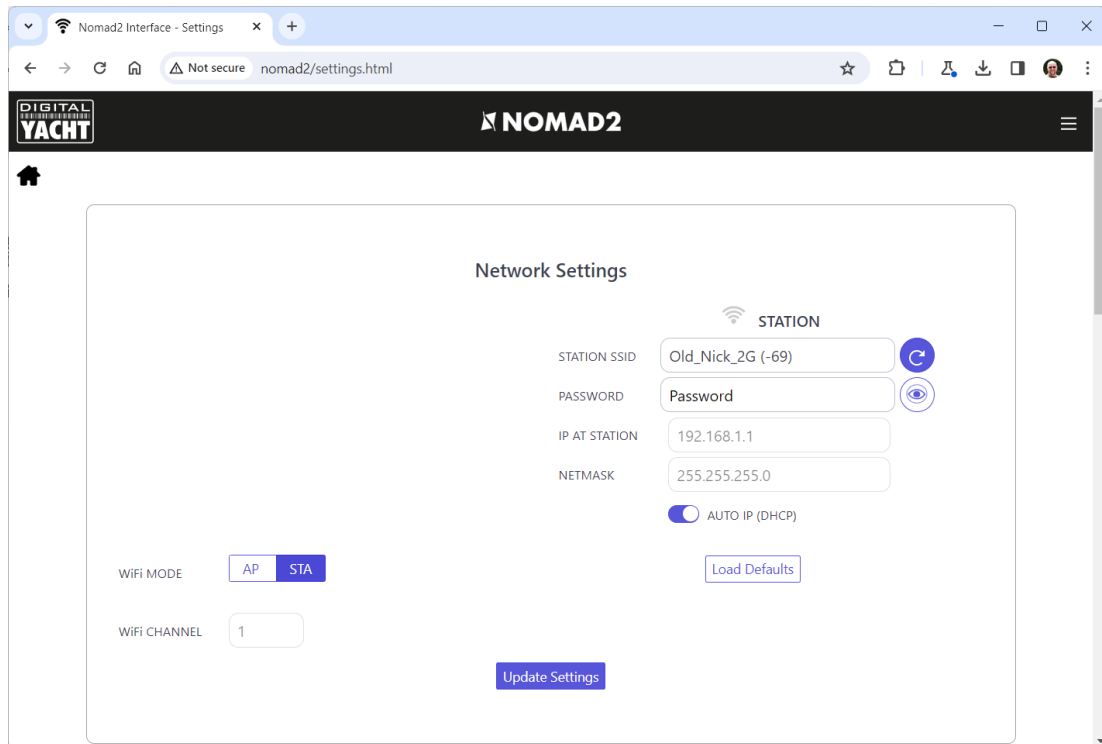


Figure 11

The NOMAD2 will already have scanned for wireless networks and you can display them all by clicking in the STATION SSID box. If you want to rescan, click the blue button with the rotating arrow.



Select the wireless network that you would like the NOMAD2 to connect to and if it has a wireless password, please enter this in the PASSWORD box, you can click on the EYE icon to display the wireless password you have typed in. Once you have selected the wireless network and entered the correct password, click the “Update Settings” button.

In “Station” mode, the NOMAD2 will attempt to connect to the wireless network you have setup and stored. After power up, the Wi-Fi LED will be ON and stay ON if the NOMAD2 has successfully connected to the wireless network. If the NOMAD2 fails to connect to the wireless network, because the network is not available or the password has been entered incorrectly, then after 20 seconds the WiFi LED will start to flash and the NOMAD2 will temporarily be in Access Point (AP) mode so that you can connect to it and make any changes needed.

If the selected wireless network was turned off, once the network is turned on and operating correctly, NOMAD2 should automatically connect to it but if this does not happen, simply power cycle the NOMAD2 and it should now connect and the NOMAD2 WiFi LED should stay permanently ON.

By default, the NOMAD2 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 NOMAD2 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. The NOMAD2 supports up to three TCP simultaneous connections. On the App, select a TCP connection with IP address = 192.168.1.1 (this will be different if in STA mode) and Port = 2000. The IP address of each device that is connected via TCP is displayed in the Settings page, as shown in Fig 12.

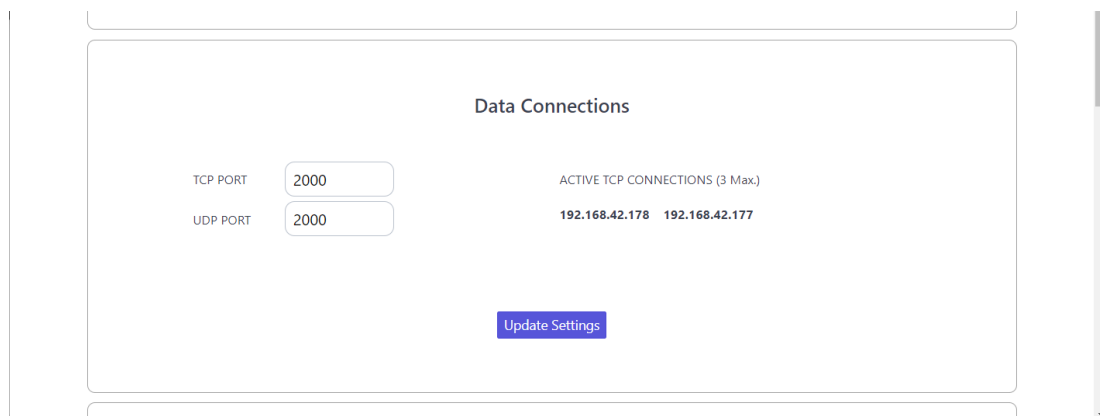


Figure 12

You do not need to switch between UDP and TCP mode on the NOMAD2 and it can support concurrent UDP and TCP connections.

4.6 Firmware Update

From time to time, Digital Yacht may release new firmware updates to add features or fix bugs in the NOMAD2. Only update your unit if told to do so by Digital Yacht or one of their dealers.

At the bottom of the “Settings” page is the Update Firmware 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.

The firmware files are downloaded as ZIP files and inside will be either a one or two BIN files. If there are two BIN files, both files will need to be uploaded (one at a time) and it does not matter which order this is done in.

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 NOMAD2 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 NOMAD2 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 turn the NOMAD2 on and continues to flash after you have wirelessly connected a device to the NOMAD2 in Access Point Mode. If you are operating in Station Mode, ensure the WiFi LED turns ON at power up and stays ON as it successfully joins another wireless network.
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 NOMAD2 is waiting for its first GPS position fix. As soon as 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 12v, GPS fix status is good and the VSWR reading is below 5.
5. If the supply voltage is less than 12v, then please try plugging the NOMAD2 in to a different USB power supply or power pack.
6. If the unit does not have GPS fix within a few minutes check that the NOMAD2's GPS antenna cable is firmly screwed in to the FME to TNC adaptor.

NOMAD2 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”. For information on how to configure a specific App to work with our wireless products, please visit our support site <https://digitalyacht.net/configure-apps-software/>

For more general information about AIS please Google “Introduction to AIS White Paper” and/or “Non-Idiots Guide to AIS” to find two useful AIS articles that we have published.