

vYacht Wifi Router

The vYacht's Wifi Router brings instrument data to your iPad and on-board computer. The router comes in three different versions which all have galvanically isolated inputs:

- **2 x NMEA0183**
- **NMEA0183/Seataalk**
- **NMEA2000**

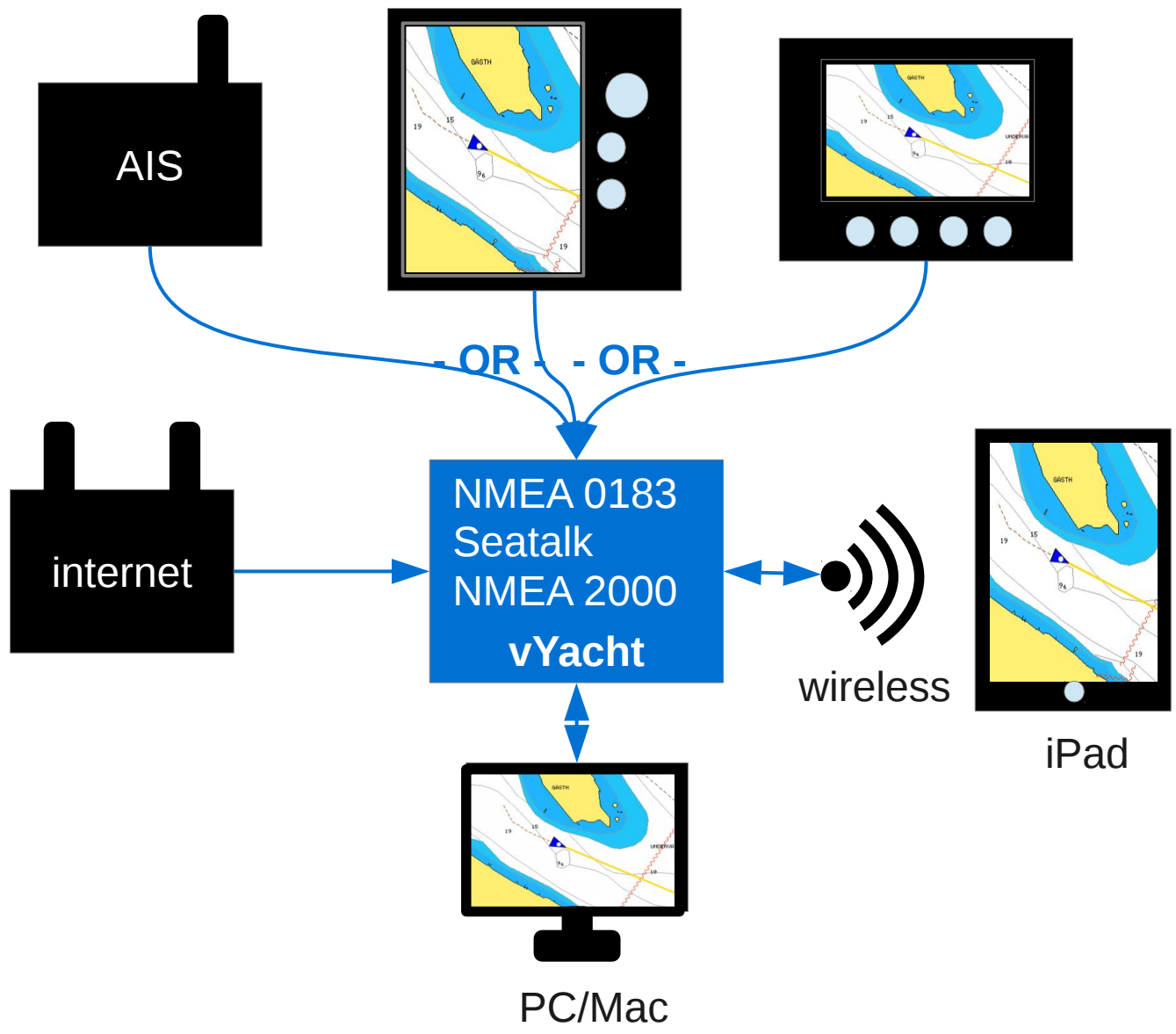
Simply attach the output of your charting plotter or instrument to the router and the data is automatically routed in a secure way via WiFi and ethernet. The router uses TCP connections. This allows all instrument data to be used in marine charting software like iNavX on the iPad or most PC based navigation software. Many parallel clients (iPads, iPhone, Android devices and other) can be connected via wifi and is only limited by the performance of the router.

The standard and cheaper iPad Wifi does not come with a GPS. If you still want to use it for navigation the Wifi router is the perfect option. In addition to GPS it can even transfer AIS or instrument data. If you purchased the version with additional ethernet then you can even route internet through the same wireless network.

About this manual

This manual describes all three version of the vYacht Wifi Router MK III: NMEA 0183, Seataalk and NMEA 2000.

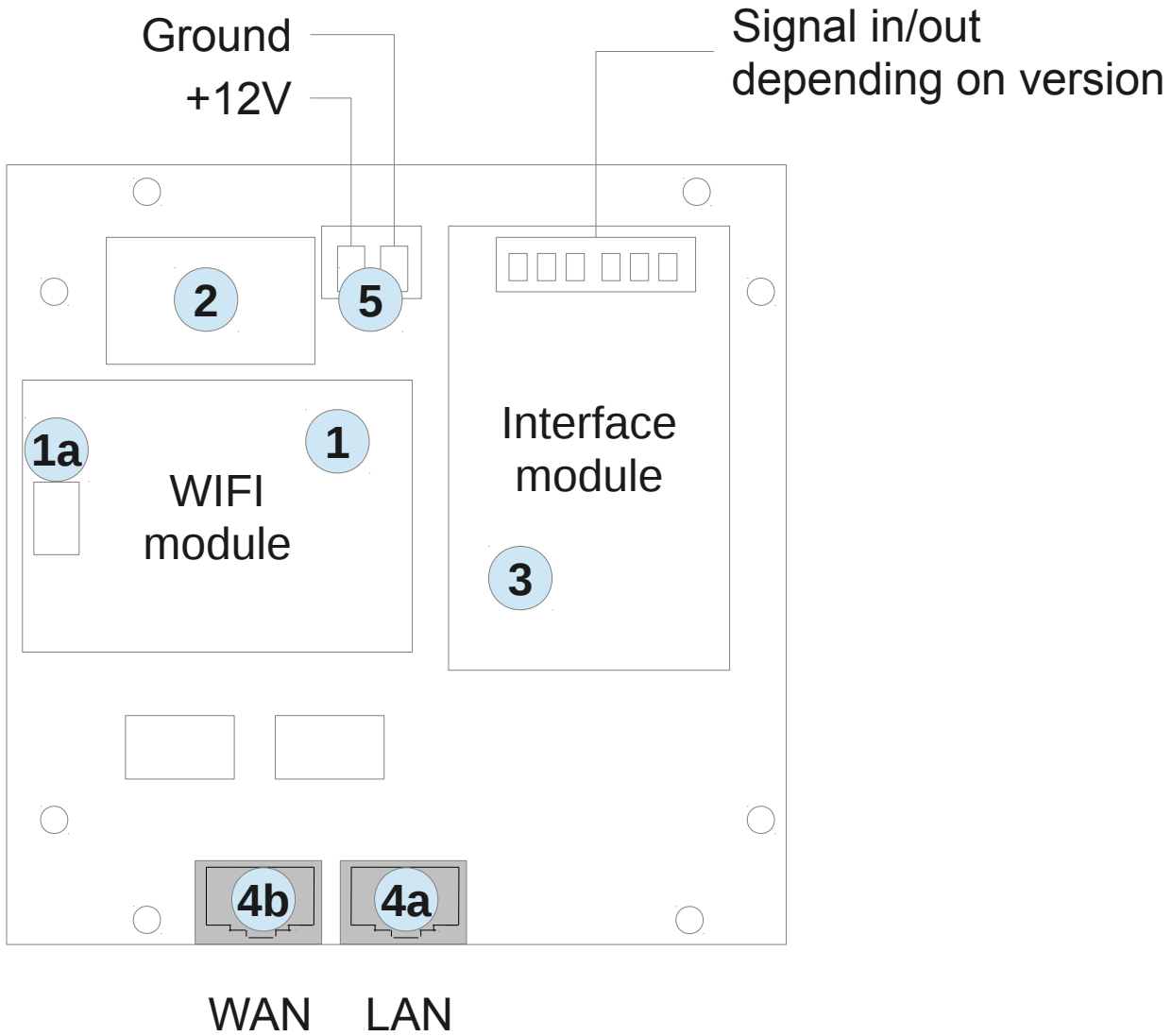
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Features

Hardware	
NMEA or Seatalk Interfaces (3 different options - mutually exclusive)	2 x galvanically isolated NMEA 0183 interfaces or 1 x Seatalk and 1 x NMEA 0183 interfaces or 1 x NMEA 2000 interface
WiFi / internet interfaces	WiFi for wireless TCP network to iPad, PC and Mac Two optional 10/100Mbps-LAN/WAN-Port for cable network to PC and Mac and internet
Powersupply	12V (26V absolute maximum) DC on-board For fixed installations attach to navigational instrument switch/fuse.
Size(l x w)	100mm x 100mm (board only)
Wireless range	Depended on the location of the router or the hull material. Installed centrally the router works well everywhere on sailing vessels measuring 40 feet with the built in chip antenna.
Temperature range	Most components are rated -40 to +85 °C. However the RT3050 chip on the actual wireless module is rated -10 to +55 °C operating temperature.
Power consumption	The FCC certified wireless module on this board consumes the vast amount of power. But even if used for heavy duty downloads it will consume max. 1.5W.
Case	
Available Colors	Black with white front
Size(l x w x h)	111 mm x 111 mm x 33 mm (4.3 in x 4.3 in x 1.3 in)
Material	ABS 94HB
Water resistance	The router should be installed into a dry place. The WiFi only version can be made watertight by using marine sealant.
Software	
OS	OpenWrt firmware (Linux optimized for embedded systems and routers such as this router)
NMEA GPS & AIS processing	Modified GPSD
Source code	https://github.com/vyacht/nmea

Connections and overview



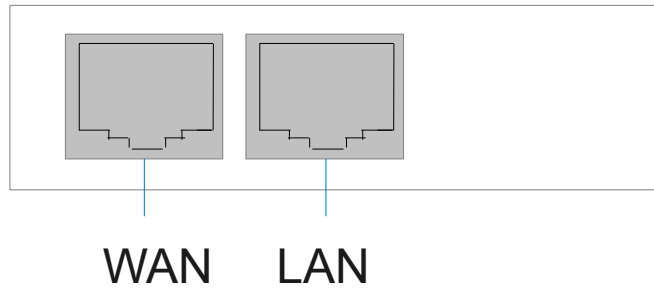
Drawing 1: Connection and components overview

Power supply connections

When connecting the router to the 12V on-board system please make sure to protect the power supply for the router is protected by a 2A fuse.

Board components and modules	
1	Wireless module running NMEA processing software on a Linux (openwrt) kernel (integrated chip WiFi antenna and LED status indicators)
2	Power supply based on an efficient TPS54231 step down converter
3	Interface module (NMEA 0183, Seataalk and NMEA 2000 module options) with isolated power supply and signal isolation for ground loop and over-current protection.
4a	Ethernet module/jack by default configured for cable bound LAN access to NMEA data.
4b	Ethernet module/jack by default configured for WAN access. Connect this jack to an active internet connection. The vYacht WiFi Router will automatically share internet and NMEA data via wireless.
5	12 V power connector

Ethernet connections detail view (front view)

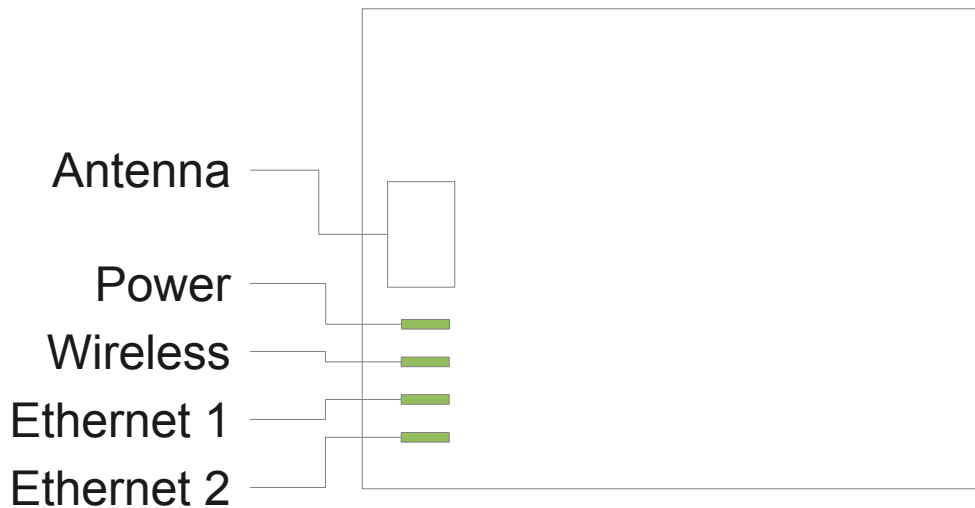


Drawing 2: Wired ethernet connections

Wifi Module detail view: Status LED & Antenna (top view)

The WiFi module has an on-board chip antenna. This chip antenna is usually strong enough to even provide larger boats with reliable wireless coverage.

The module's LEDs indicate the power, wireless and ethernet status.

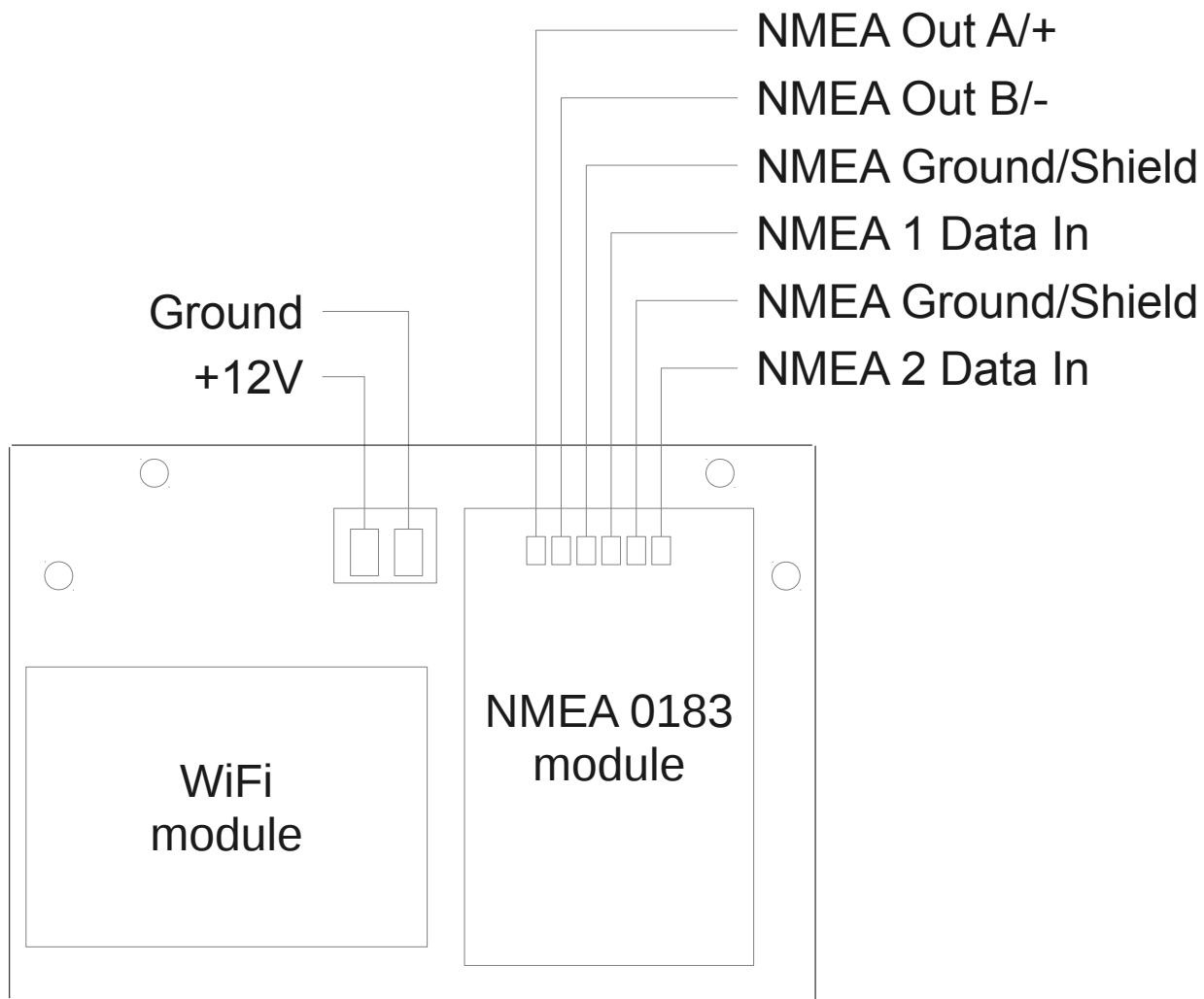


Drawing 3: Detailed wireless module view

LED	Meaning
Power	This status LED indicates that the module is connected to the power supply. It will always be on as soon as the 12V to 3.3V on-board power converter supplies the required internal 3.3V.
Wireless	This status LED indicates the availability of a wireless signal. This LED will be on independent of any wireless connection to the router.
Ethernet 1	The ethernet 1 status LED will only be on if the router was connected to the ethernet port of a laptop or PC.
Ethernet 2	The ethernet 2 status LED will only be on if the router was connected to the ethernet port of a laptop or PC.

NMEA 0183 connections

This section describes the the board connections if you purchased the NMEA 0183 version of the board.



Drawing 4: vYacht WiFi Router and its NMEA 0183 inputs

NMEA 0183 version 1 and 2

There are two different electrical versions defined in the NMEA 0183 standard. The old version 1 NMEA 0183 standard is very similar to the RS232 PC-serial interface standard. The

newer version 2 standard uses a differential signal and is based on the RS422 standard.

The NMEA 0183 version of the vYacht Router can handle both versions, the old version and the differential signals.

Differential signals are usually marked with A and B or + and -.

NMEA 0183 wiring

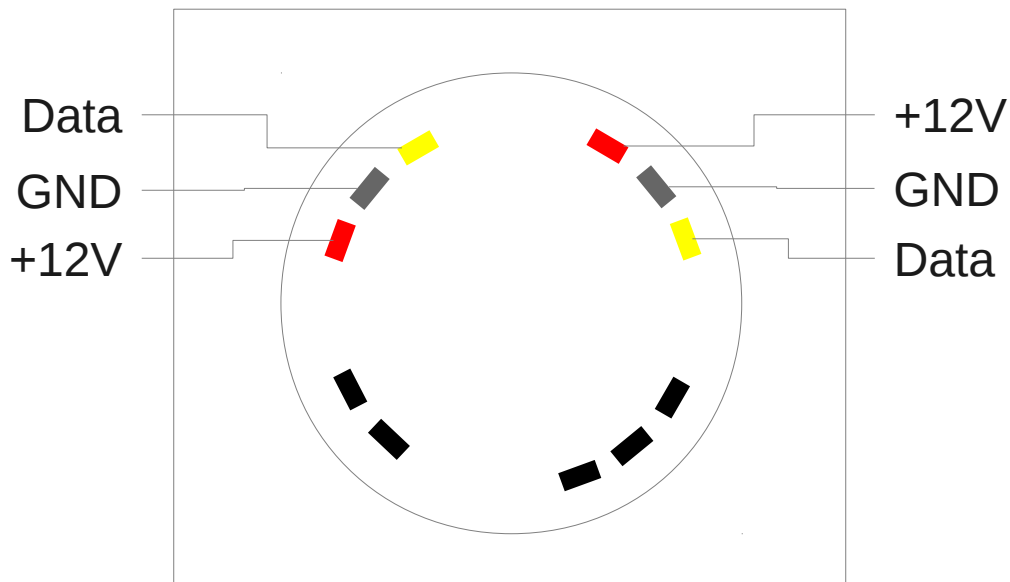
Table 1 lists how to connect the various NMEA 0183 outputs to the vYacht router. Please note that instruments manuals claim NMEA Version 2 compatibility but deliver NMEA Version 1 electrical signals. In this case the compatibility refers to the software protocol rather than the electrical characteristics.

In summary: only ground and the A (or +) data output of the instrument will be connected.

NMEA 0183 instrument out	NMEA 0183 router input	NMEA 0183 Version
Output B or -	Not connected	Version 2
Instrument Ground	NMEA Ground Shield	Version 1 and Version 2
Output A or +	NMEA Data In	Version 1 and Version 2

Table 1: NMEA 0183 connection table

Seataalk connections



Drawing 5: Typical Seataalk Instrument

This section describes the the board connections if you purchased the Seataalk input version of the board. The Seataalk version of the router has

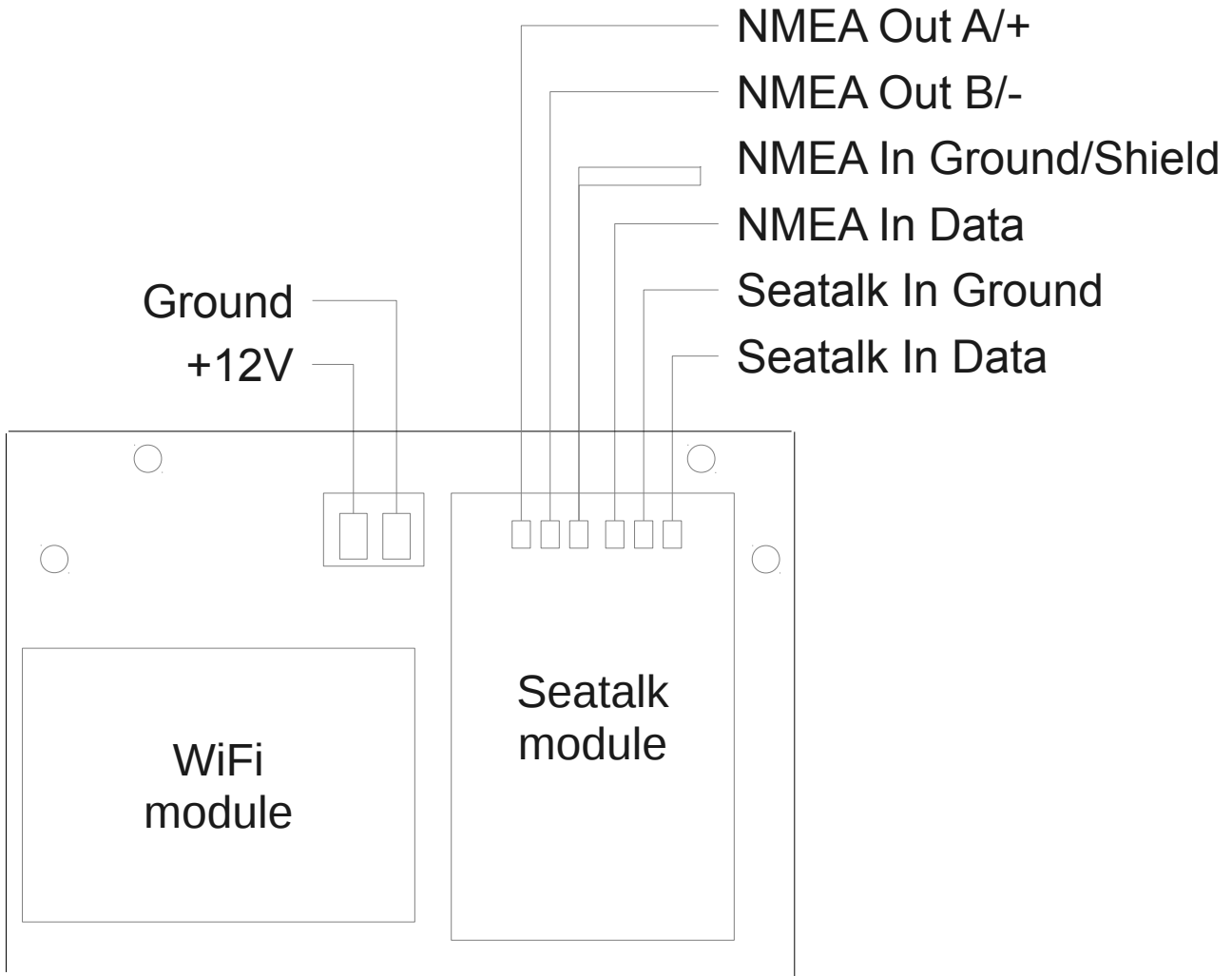
- 1 x NMEA 0183 input
- 1 x NMEA 0183 output
- 1 x Seataalk input.

Both inputs and the output are galvanically isolated.

Drawing 5 shows the typical instrument with its Seataalk connections. In order to connect the vYacht router to the Seataalk network the free data (yellow) and ground (gray) output of the instrument are connected to the Seataalk data and Seataalk ground input of the vYacht Router.

As the router board has its own power supply the 12V Seataalk will not be connected.

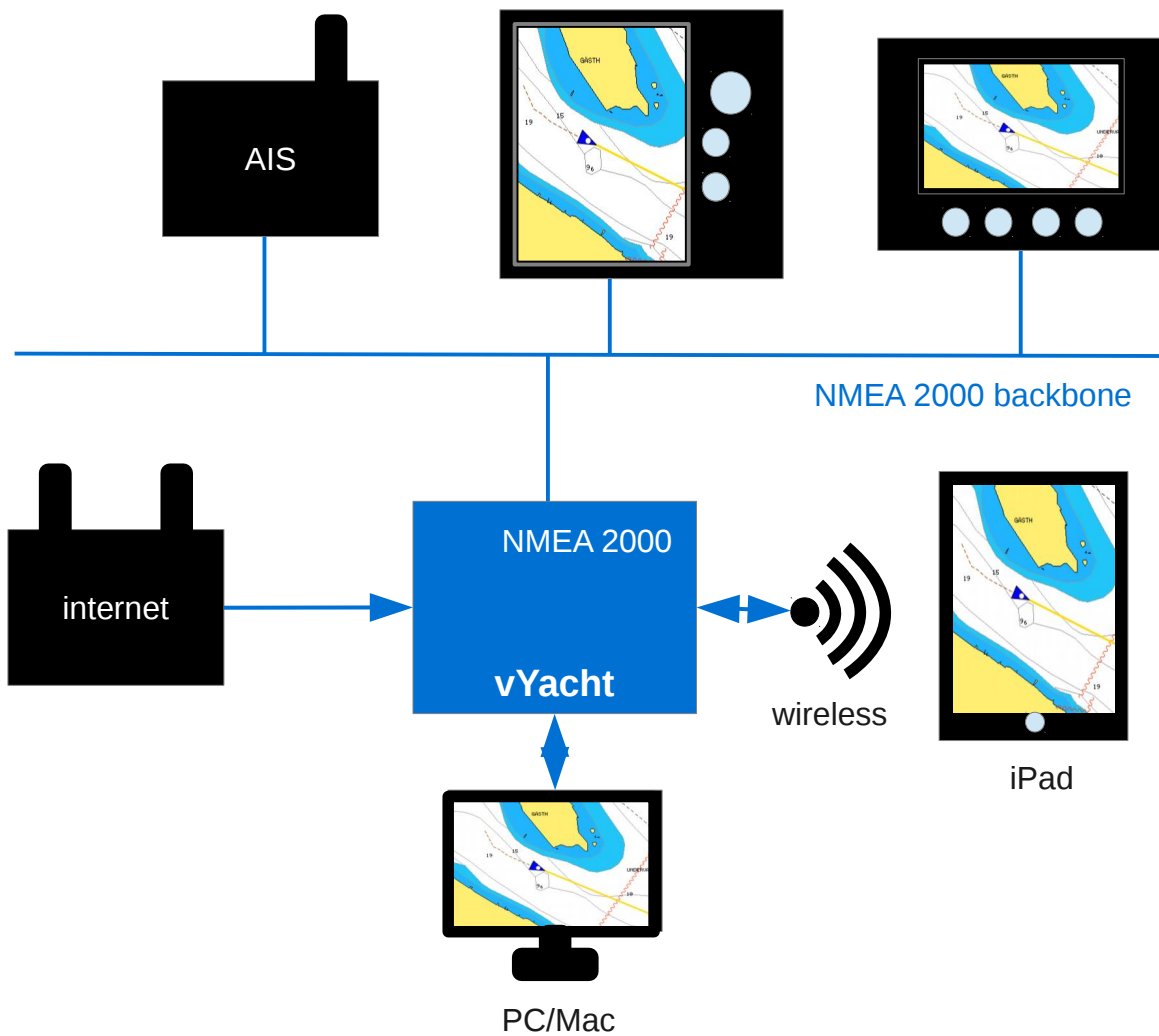
The router has no Seataalk output relaying signals. The router will thus usually be installed at the end of the Seataalk network or connected to an additional 2nd output available at some plotters and autopilots.



Drawing 6: vYacht Wifi Router and its NMEA 0183 and Seataalk connections

NMEA 2000 network

This section describes the the board connections of the NMEA 2000 input version of the board. This version version has a single isolated NMEA 2000 connection.

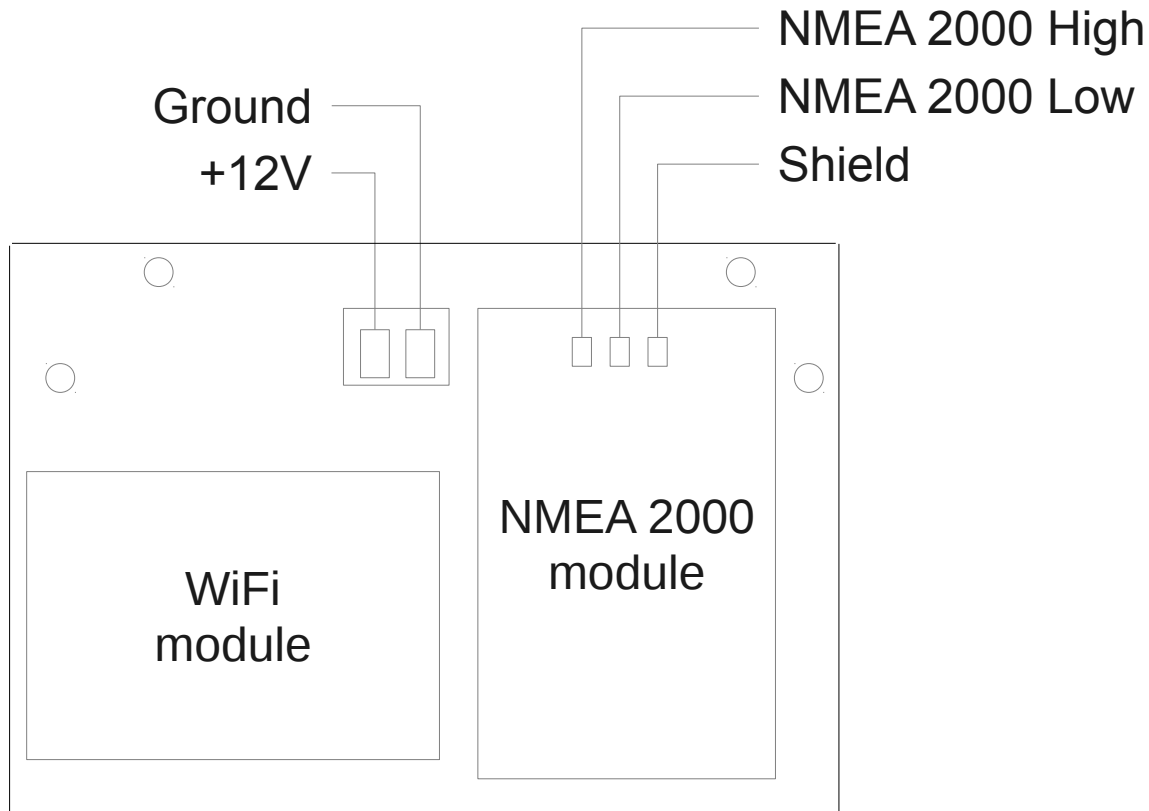


Drawing 7: vYacht WiFi Router connected to a NMEA 2000 network

vYacht Wifi and the NMEA 2000 standard

Please note that this router has **no NMEA 2000 certification**. All NMEA 2000 functionality has been programmed and was designed using publicly available information and testing against NMEA 2000 certified devices. At no point in time the NMEA 2000 standard was available.

The NMEA 2000 network is known to be a simple CAN network electrically. CAN networks are common in cars and many technical devices. On the software protocol side the NMEA 2000 standard is based on the SAE J1939 standard and has specific messages for the marine environment.



Drawing 8: vYacht Wifi Router and NMEA 2000 connections

Installation

The vYacht Wifi Router is not watertight. It should be installed into a dry location below the deck.

1. Connect 12V on-board power supply to the vYacht Wifi Router's 12V input
2. Connect the NMEA 0183, Seataalk or NMEA 2000 output of your charting plotter, AIS or any other source to either of the isolated inputs of the router.
3. Depending on the source and the interface connected you will need to set the transfer speed to usually 4800 Baud (standard), 4800 Baud (Seataalk), 38.4k Baud (e.g. AIS) or NMEA 2000. This setting is performed via the WiFi Router Configuration (described below).

Usually no further steps are needed to serve instrument data to your iPad or Android device via WiFi.

In case you use a laptop or PC/Mac it is recommended to use the cable bound ethernet connection rather than WiFi to save power. Please refer to the Mac/PC set-up section.

iPad set-up

The vYacht Wifi Router is configured as an automatic Access Point. This means that usually no particular installation steps are necessary to retrieve data from it.

1. Connect iPad to the vYacht Wifi Router. Select the access point with the name (SSID) vYachtWifi
2. Configure charting software to use vYachtWifi as the hostname (or the default IP address 192.168.10.1) and 2947 as the port.

iPad and iNavX

As an example the configuration of iNavX on an iPad is shown. Instead of the router name vYachtWifi the alternative IP address 192.168.1.1 was used to demonstrate that both possibilities can be used.

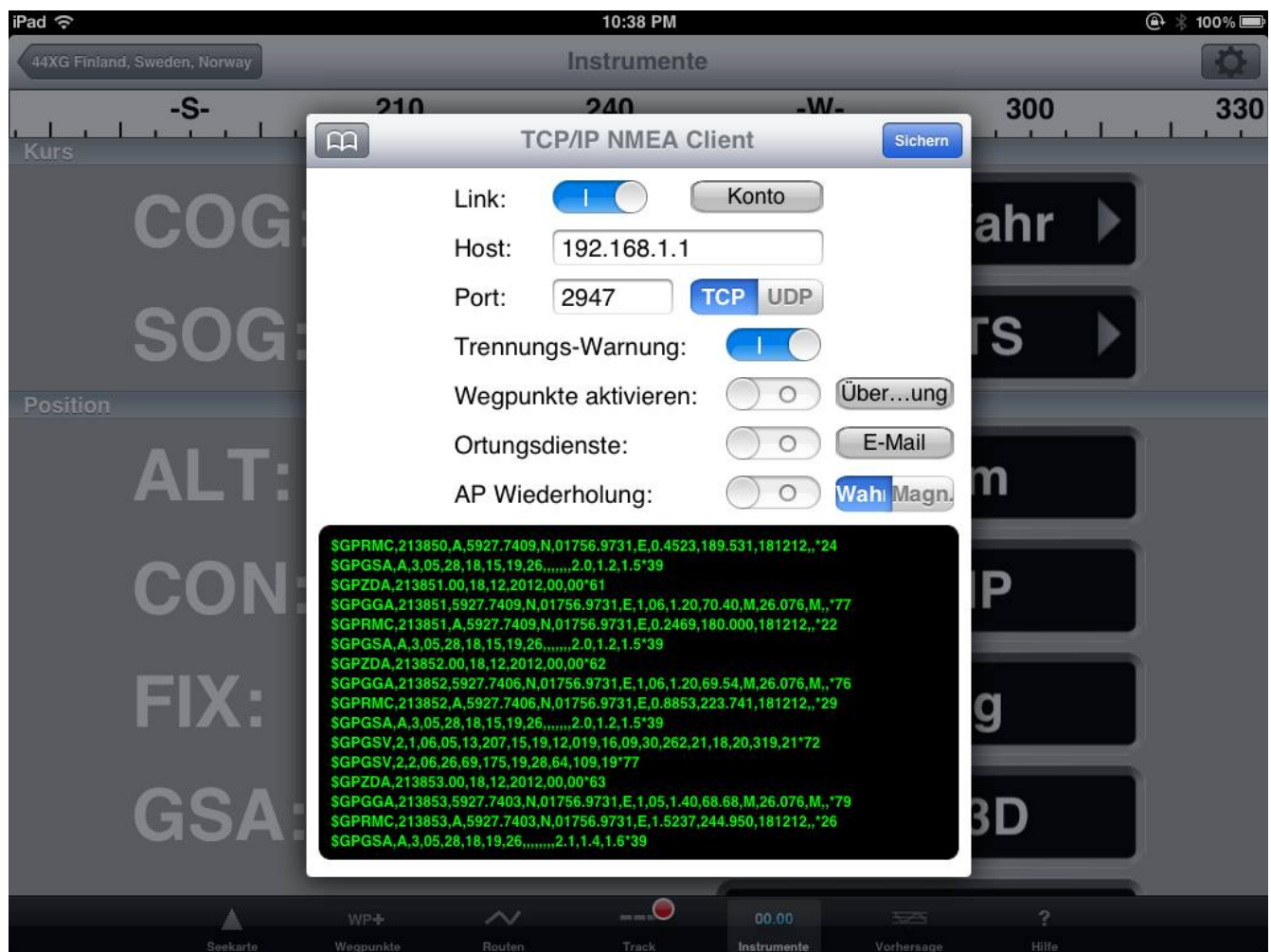


Illustration 1: wireless NMEA output in iNavX

PC or Mac set-up

When using your PC or Mac in order to connect the the vYacht Wifi Router you have two choices. Either you use the wireless access or you use the wired cable bound ethernet connection.

Ethernet cable connection

1. Connect your PC/Mac's ethernet port with the router's ethernet port using a **standard ethernet** cable. **Do not** use a cross cable! Cross cables are for direct connections between two PCs only.
2. For Windows 7, please go to Start → Settings → Control Panel
Look for the section Internet and Network
Click on View network status and tasks → Manage network connection.
Right click Wireless Network Connection, and select Properties.
3. For Windows 7, double click Internet Protocol Version 4 (TCP/IPv4).
Select “Obtain an IP address automatically” and “Obtain DNS server address automatically”.
Click OK to finish the settings.

Using the router with internet connections

Some boats have a 3G or other internet routers on board. The Wifi Router is configured to allow the internet network traffic to be routed through the same vYachtWifi connection.

Just make sure that the internet router has a different IP address from the vYacht Wifi Router. The internet router needs to provide an IP address to the vYacht Wifi Router via DHCP.

Connect the internet router to the WAN ethernet jack of the vYacht Wifi Router. The ethernet 2 connection of the router needs to be set to the “WAN (internet)” setting in the configuration tool.

vYacht Wifi Router Configuration

The vYacht Wifi Router provides a configuration tool which is installed on the router. The configuration tool allows changes to the wireless IP address and the data port number.

In order to access the configuration tool you need to connect to the router as described above. You can perform this configuration from any device with a web-browser (such as Internet Explorer, Firefox or Safari).

The configuration can either be performed directly from your iPad after connecting to the vYacht Wifi Router or from your PC/Mac.

Once connected open a web browser and type vYachtWifi into the browser's address field.

C Update View

Info		
Name	vYachtWifi	
Firmware	OpenWrt Barrier Breaker r34180	
Uptime	2343234	
Status		
GPS port (network)	<input type="text" value="2947"/> <input type="button" value="Change"/>	Running
NMEA 0183 I	<input type="text" value="4800 (standard)"/> <input type="button" value="Change"/>	...
NMEA 0183 II	<input type="text" value="4800 (standard)"/> <input type="button" value="Change"/>	...
WiFi	<input type="text" value="192.168.10.1/24"/> <input type="button" value="Change"/>	Up
WiFi password	<input type="password" value="●●●●●●●●"/> <input type="button" value="Change"/> <input type="checkbox"/> Show password	
Ethernet 1	<input type="text" value="192.168.1.1/24"/> <input type="button" value="Change"/>	Up
Ethernet 2	<input checked="" type="radio"/> WAN (Internet) <input type="radio"/> LAN <input type="text" value="192.168.11.1"/> <input type="button" value="Change"/>	Up

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After a moment the configuration screen will appear informing about the status of the router. You will see two edit text fields and a change button. Use these to choose more appropriate settings for your environment.