Dealer Information From Digital Yacht

Technical information on Digital Yacht products
for marine electronic installers

February 2020

Key Areas of Discussion Today

- First look at our latest iAIS TX wireless transponder
- How to use the new proAIS2 web interface
- Installing our new CLA2000 Class A Transponder
- Using iKommunicate and Signal K with OpenCPN
- Using iKonvert and NavLink2 NMEA2000 gateways

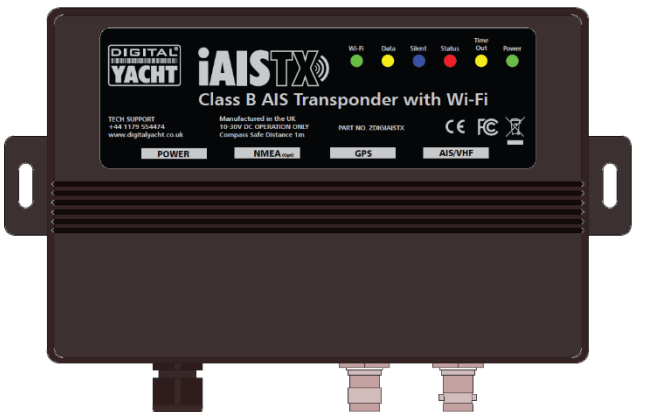
Introducing the new iAIS TX wireless Class B AIS Transponder

Digital Yacht Products

World’s First Wireless only Transponder

With the Navionics Boating App now supporting live AIS data, there is a market for a simple, wireless only, Class B AIS transponder

iAIS TX Class B AIS Transponder



- New wireless interface design
- New Web Interface for configuration
- New enclosure design
- Outputs wireless NMEA in TCP or UDP
- Sends both AIS and GPS data
- Supplied with external GPS antenna
- 12v or 24v Operation
- “Virtual” TX silence switch in web app
- NMEA2000 version also available
- Requires dedicated VHF antenna or Splitter (SPL1500/2000)

DIGITAL YACHT

RRP £420.00 + VAT (Standard version)
RRP £520.00 + VAT (NMEA2000 version)

Easily Interfaces to Navionics Boating App

- Automatically discovered by the Navionics Boating App
- Creates a new AIS Device
- Set “Location Services” to off for the App and it will take AIS and GPS data from the iAIS TX
- Using external GPS gives better position fixes where ever you have your mobile device
- iOS, Android, Windows 10, LINUX and Raspberry Pi compatible

Other good marine apps are available!

(and we work with all of them)

New proAIS2 Web App

Digital Yacht Products

New Web App to Configure iAIS TX

- One of the benefits of the new wireless interface design is that it features a built-in web server
- Digital Yacht have developed a Web App version of the proAIS2 configuration software
- Now any mobile device, with a modern web browser can configure the iAIS TX
- This new design will gradually be implemented in our other wireless transponders;
  - AIT5000 units from the end of Q1/2020
  - AIT3000 units from the end of Q2/2020

Network Modes

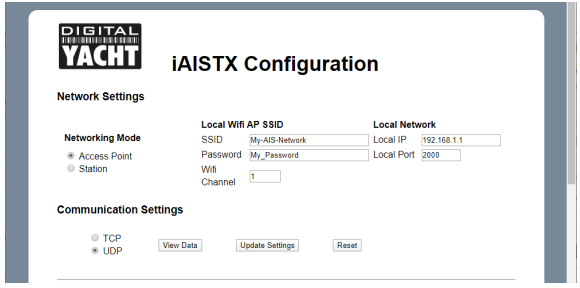
- Out of the box, the iAIS TX creates its own wireless network;

  SSID = DY-AIS-xxxx
  PWD = PASS-xxxx

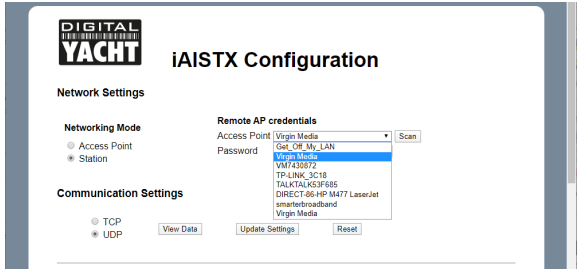
  Where xxxx = last 4 digits of device's Mac Address

- You can easily change the SSID and Password

- If you already have a wireless network onboard or you want to use it with a Furuno DRS4W radar you can select Station Mode (STA)



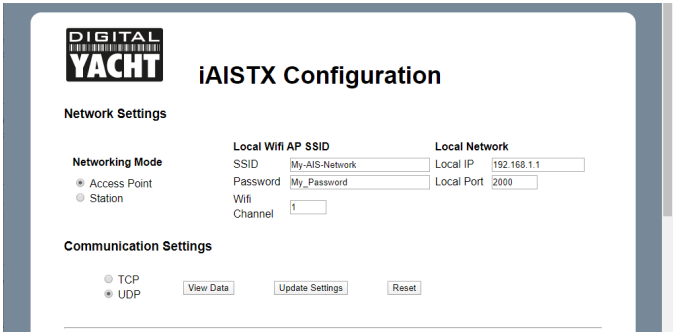
AP Mode (Default)



STA Mode

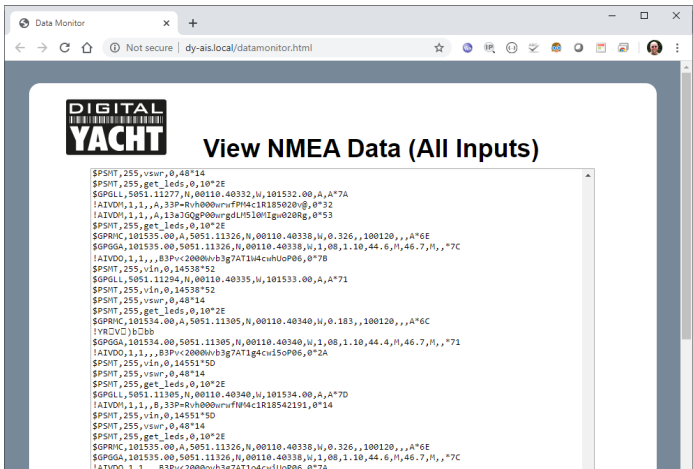
Communication Settings

- Out of the box, the iAIS TX outputs wireless NMEA data in UDP mode on Port 2000
- The Navionics Boating App should automatically discover the iAIS TX and create a new Device called “Digital Yacht WLN10” which was our first wireless device
- If you are using other apps, you simply need to setup a UDP connection to Port 2000.
- If you want a more secure “1 to 1” connection, for instance to control an autopilot, change to TCP mode and then on the app set IP address to 192.168.1.1, Port to 2000 and mode to TCP



View Data Page

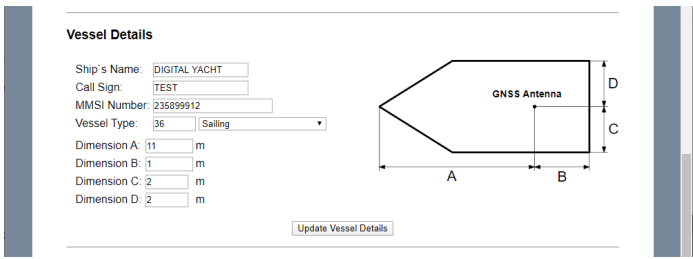
- You can view the actual NMEA 0183 wireless data being sent out of the iAIS TX by clicking the “View Data” button
- You can click the “Pause” button if you want to stop the data scrolling to read a particular sentence



DIGITAL YACHT

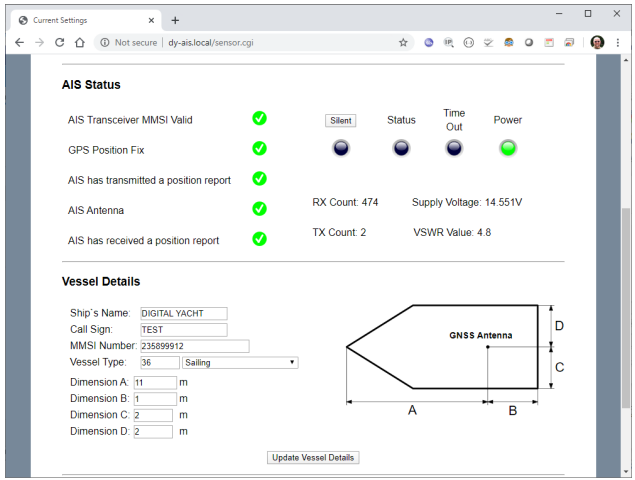
Transponder Configuration

- Traditionally, it would have been necessary to have proAIS2 installed on a PC/Mac in order to configure the transponder
- Now the new configuration web page allows you to setup all of the boat's static data
  - MMSI
  - Boatname
  - Call Sign
  - Vessel Type
  - Dimensions
- After entering the details, press the "Update Vessel Details" button to save them to the iAIS TX



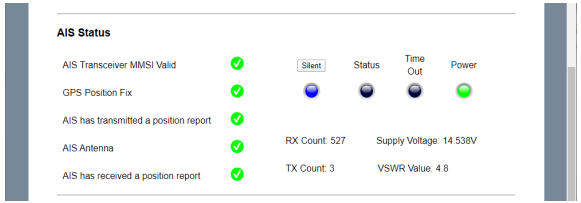
Transponder Status

- After the iAIS TX is configured, it should start to transmit your position every 3 minutes when stationary or every 30 seconds if SOG > 2 knots
- If everything is OK you should see the five green ticks.
- Remember for a transponder to transmit you need (VGA)…
  - Voltage > 9.8v
  - GPS Position fix
  - Antenna VSWR < 5:1
- The web app also keeps a count of the number of transmissions the iAIS TX has made and how many position reports it has received

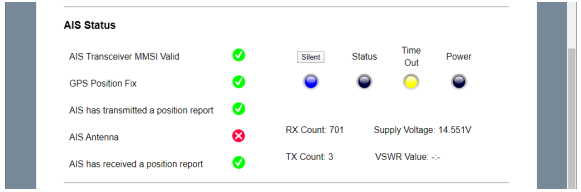


“Silent” Mode

- You can now turn on/off the “Silent” mode from the new web app
- In “Silent” mode the iAIS TX stops transmitting but continues to receive AIS and GPS data
- Click the “Silent” button to enable silent mode and the blue “virtual” LED should illuminate
- If the iAIS TX has been in silent mode for a few minutes, the yellow Time Out LED will come on
- To return to normal mode, click the “Silent” button again and after 30-60 secs the iAIS TX will transmit and the green Power LED will come on



Silent Mode (just activated)



Silent Mode (Time Out)

Installing our new CLA2000 Class A Transponder

Digital Yacht Products

CLA2000
New Design

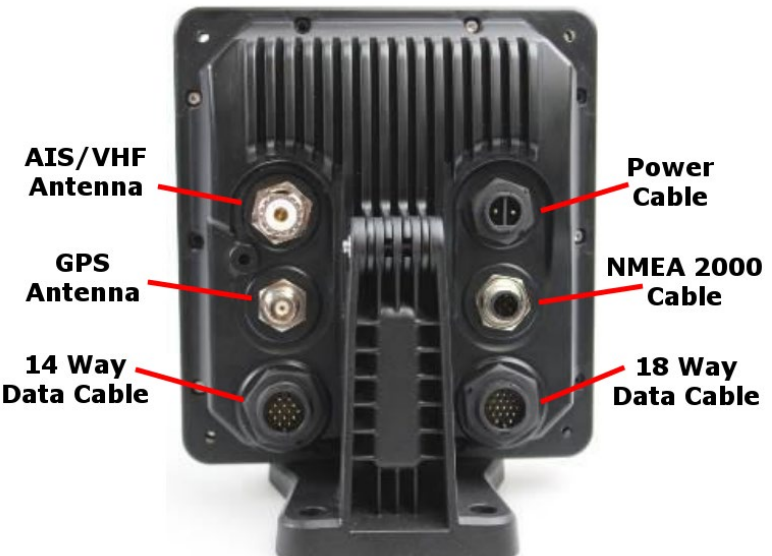
Previous CLA1000

- Sunlight viewable Colour LCD
- C-Map MAX chart plotter
- Wi-Fi
- NMEA 2000
- New UI for simple configuration
- Built-in CPA and TCPA alarms

CLA2000
Connections

- Supplied with our normal MA800 GPS antenna with 10m cable (TNC)
- Needs a dedicated VHF antenna* (PL259)
- Has standard M12 male NMEA 2000 connector (optional drop cable available)
- Two multi-core data cables supplied for all interfacing to sensors and other NMEA 0183 equipment

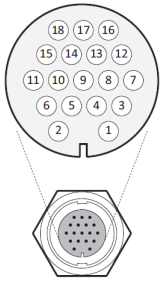
* NOTE – Using a splitter with a Class A transponder is not recommended



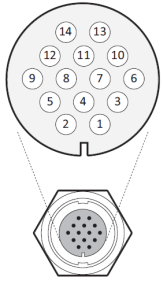
CLA2000
Interfacing

- The CLA2000 has two large multi-core cables:-
  - 18 Way Data Cable for NMEA 0183 ports
    - Long Range/DGPS Port
    - Pilot Plug Port
    - External Display Port
  - 14 Way Data Cable for Sensor Inputs
    - Three Sensor Inputs
    - Silent Switch Input
    - Blue Sign Input (Inland)

SIGNAL	WIRE COLOUR	PIN
LR DGPS TX B	ORANGE	3
LR DGPS TX A	BROWN	4
LR DGPS RX B	PURPLE	7
LR DGPS RX A	BLUE	8
LR DGPS COM	BLACK	1
PILOT TX B	RED	2
PILOT TX A	RED / WHITE	5
PILOT RX B	PINK	6
PILOT RX A	YELLOW	10
PILOT COM	GREEN	11
ALM NC	GREY	16
ALM COM	WHITE	12
EXT DISPLAY TX B	ORANGE / WHITE	13
EXT DISPLAY TX A	BLACK / WHITE	17
EXT DISPLAY RX B	BROWN / WHITE	14
EXT DISPLAY RX A	YELLOW / WHITE	18
EXT DISPLAY COM	GREEN / WHITE	15
CHASSIS	DRAIN WIRE	9



SIGNAL	WIRE COLOUR	PIN
BLUE SIGN N	BLACK	1
BLUE SIGN P	BROWN	3
SILENT N	BLUE	6
SILENT P	RED	7
SENSOR 1 RX B	ORANGE	2
SENSOR 1 RX A	PURPLE	5
SENSOR 1 COM	GREEN	8
SENSOR 2 RX B	WHITE	9
SENSOR 2 RX A	WHITE / BLACK	12
SENSOR 2 COM	GREY	11
SENSOR 3 RX B	YELLOW	14
SENSOR 3 RX A	RED / BLACK	13
SENSOR 3 COM	PINK	10
CHASSIS	DRAIN WIRE	4



CLA2000
Interfacing

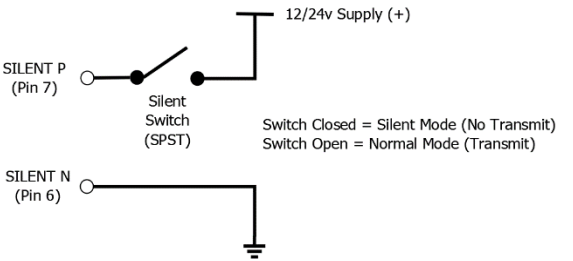
- The three bi-directional ports have been allocated for specific tasks (LR/Pilot/Ext) but they can be configured/interchanged as necessary
- The three sensor ports are for external GNSS connection, Rate of Turn sensor and Gyro Heading (True)
- The CLA2000 is NMEA2000 certified and supports the PGNs shown in the table

PGN (Dec.)	PGN (Hex)	Title in NMEA database	Usage	NMEA 0183
059392	0E800	ISO Acknowledgment	in, out	
059904	0EA00	ISO Request	in, out	
060416	0EC00	ISO Transport Protocol - Data	in, out	
060160	0EB00	ISO Transport Protocol - Connection	in, out	
060928	0EE00	ISO Address Claim	in, out	
065240	0FED8	ISO Commanded Address	in	
126208	1ED00	Group Function	in, out	
126464	1EE00	PGN list - Group Function	in, out	
126992	1F010	System time	out	
126993	1F011	Heartbeat	out	
126996	1F014	Product Information	in, out	
126998	1F016	Configuration Information	out	
127250	1F112	Vessel Heading	in	HDT/THS
127251	1F113	Rate if Turn	in	ROT
129025	1F801	GNSS Position (Rapid Update)	out	RMC
129026	1F802	GNSS Direction data	in, out	RMC
129029	1F805	GNSS Position data	in, out	RMC
129038	1F80E	AIS Class A Position Report	out	VDM/VDO
129039	1F80F	AIS Class B Position Report	out	VDM/VDO
129040	1F810	AIS Class B Extended Position Report	out	VDM/VDO
129041	1F811	AIS AtoN Report	out	VDM/VDO
129545	1FA09	GNSS RAIM	in	GBS
129793	1FB01	AIS UTC and Date Report	out	VDM/VDO
129794	1FB02	AIS Class A Static and Voyage Related Data	out	VDM/VDO
129795	1FB03	AIS Addressed Binary Message	out	VDM/VDO
129796	1FB04	AIS Acknowledge	out	VDM/VDO
129797	1FB05	AIS Binary Broadcast Message	out	VDM/VDO
129798	1FB06	AIS SAR Aircraft Position Report	out	VDM/VDO
129801	1FB09	AIS Addressed SRM	out	VDM/VDO
129802	1FB0A	AIS Safety Broadcast Binary Message	out	VDM/VDO
129809	1FB11	AIS Class B CS Static Data Report Part A	out	VDM/VDO
129810	1FB12	AIS Class B CS Static Data Report Part B	out	VDM/VDO

CLA2000

Enabling Silent Switch

- If the CLA2000 is being used in a Non-SOLAS or Inland mode, you can fit a “Silent Switch” (like a Class B)
- The “Silent” switch connections should be wired as shown
- To enable the feature go to…



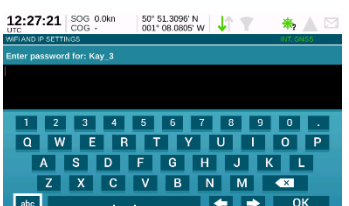
Menu ->System Settings ->System Information ->Enable features

- Enter "SILENT“
- There should now be a 'Silent mode' menu where you can enable/disable transmit, go to…

Menu ->System Settings ->Advanced ->Radio & Long range settings

CLA2000
Configuration

- With its colour graphics screen, all of the configuration of the transponder can be done through the units user interface
- Configuring all of the Ship's Static data, Voyage data, Alarm/Sensor configuration, NMEA setup, etc. is all done on the unit
- There is no ConfigAIS software for the CLA2000
- An onscreen keyboard makes entering text and numbers "easier"



CLA2000

C-Map MAX Charts

- The CLA2000 supports C-Map MAX charts
- Waterproof Micro SD card slot (front bottom left)
- The new chart function is only available in Non-SOLAS mode (off by default), to enable go to…

Menu ->System Settings ->Operating Mode

- Now with added chart plotter functionality, the CLA2000 is a powerful AIS display and backup to the vessel's main charting system
- For more information on C-Map MAX visit…

https://store.c-map.com/?technology=NTMAX

CLA2000

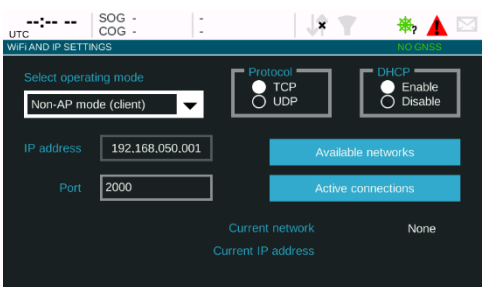
CPA and TCPA Alarms

- New alarm functionality has been added to the CLA2000 that allows you to set CPA and TCPA alarms
- Also to reduce clutter and focus on potentially dangerous targets, you can filter the AIS display

CLA2000

Now with Wi-Fi

- The new CLA2000 has a powerful Wi-Fi interface for sending AIS data to mobile devices
- It supports TCP and UDP modes for maximum App compatibility
- Can work in AP mode, creates its own wireless network, or Client (STA) mode where it joins an existing wireless network



CLA2000

Summary

- The all new CLA2000 is a fully IMO type approved Class A transponder
- Can operate in SOLAS, Non-SOLAS or Inland modes
- Has colour display, C-Map MAX chart support and CPA and TCPA alarms
- Built-in Wi-Fi for mobile app support
- Very powerful and flexible functions and features, that can be configured via the UI
- Lots of NMEA and Sensor interfacing options

iKommunicate Signal K Gateway and OpenCPN

Digital Yacht Products

Background

What's iKommunicate ?

- Next generation Universal Gateway
- Three NMEA0183 Ports and one NMEA2000 interface
- Outputs multiple protocols over Ethernet/Wi-Fi…
  - TCP/UDP
  - Signal K (JSON)
  - Rosepoint
- Has its own webserver that can host web apps, document storage, custom web pages, etc.

Background

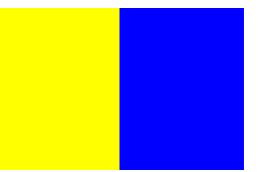
What's Signal K ?

- Signal K is an "Open Source" data format, based on JSON, that allows marine data to be stored and communicated
- Uses standard web protocols and techniques to create apps and web servers that can run on low cost mobile devices
- For more info visit…

https://signal.org

Signal K

The Open Marine Data Standard



K – Kilo

"I Wish to Communicate with you"

Background

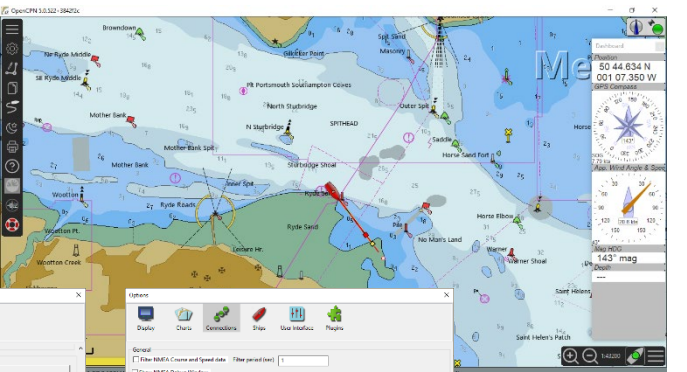
What's OpenCPN ?

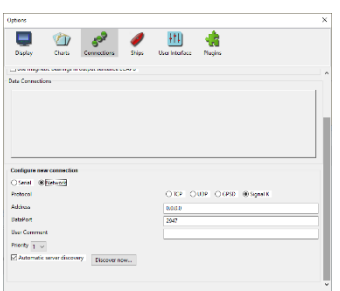
- The most widely used Marine navigation software in the world
- Open Source (Free) software for Windows, Mac, LINUX + Android
- Hundreds of thousands of users

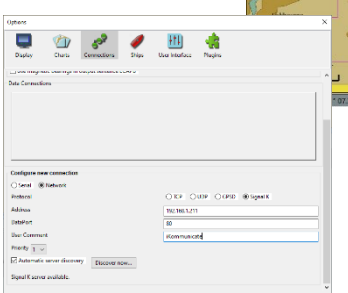
News

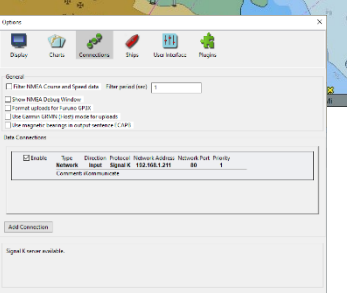
OpenCPN to Support Signal K

- Currently in Beta testing, Signal K support has been added to OpenCPN
- iKommunicate Auto-Discovery









Using NMEA 2000 Gateways

Digital Yacht Products

Background

What's iKonvert ?

- "All in one" NMEA Gateway
- Can operate in a number of different modes;
  - RAW NMEA2000 Mode (230400)
  - NMEA0183 <> NMEA2000 (4800)
  - NMEA0183 <> NMEA2000 (38400)
- ISO or USB versions (same price)
- No special libraries required to read the RAW NMEA2000 data

Applications

What can iKonvert do?

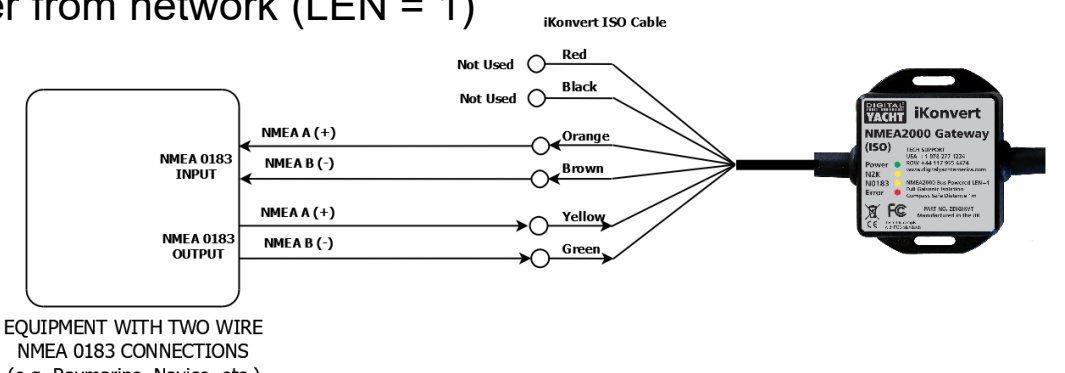
- Typical applications we are seeing iKonvert used for are;

1. Taking GPS position from NMEA 2000 network for legacy VHF DSC radio
2. Taking next WP navigation data from NMEA 2000 network for driving legacy autopilot
3. Taking legacy instrument data into a new MFD on a NMEA 2000 network
4. Taking legacy transducers onto a new NMEA 2000 network

Installation

Wiring Up an iKonvert ISO

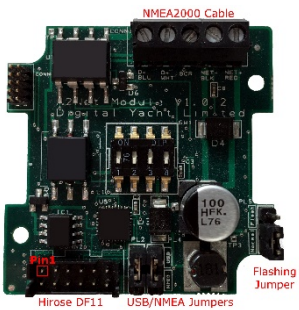
- Two wire opto-isolated NMEA 0183 Input and two wire differential Output
- Built-in NMEA 2000 drop cable through which it takes power from network (LEN = 1)



How does it work ?

Easy Mode Selection

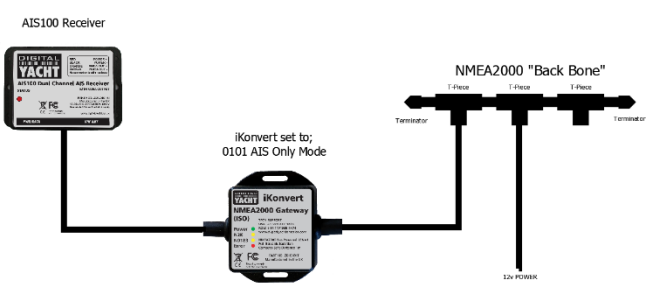
- DIP Switches or Telnet to configure modes
- Modes chosen to match the most common installations
- Direction of conversion chosen automatically based on first data received

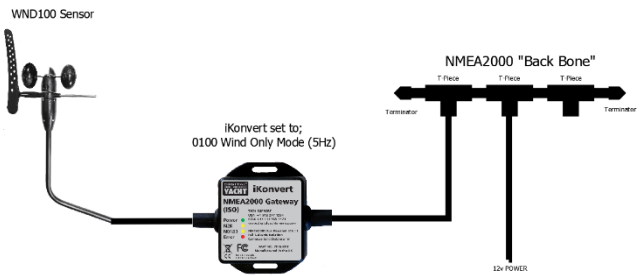


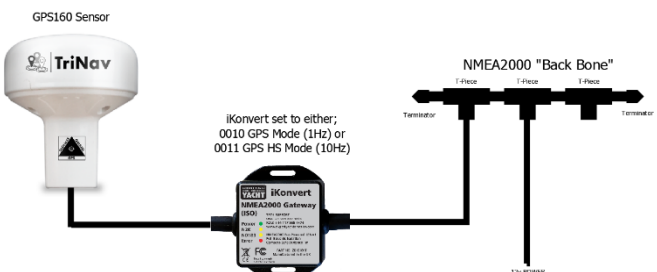
Switches 1234	MODE	BAUD	NMEA DATA	Sentences
	Gateway Mode	4800	GPS/Navigation/Instruments	RMC, HDG, VHW, MWV, DPT, MTW, APB, RMB, VLW, XTE, ROT, RSA
	Gateway HS Mode	38400	All Supported Sentences	RMC, HDG, VHW, MWV, MTW, DPT, APB, RMB, VLW, RSA, ROT, VDO and VDM
	GPS Mode (1Hz)	4800	GPS Only (1Hz)	RMC, GSA, GSV, ZDA
	GPS HS Mode (10Hz)	38400	GPS Only (10Hz)	RMC, GSA, GSV, ZDA
	Wind Mode (5Hz)	4800	Wind Only (5Hz)	MWV
	AIS Mode	38400	AIS Only	VDO, VDM and RMC
	Heading Mode	4800	Heading Only (10Hz)	HDG
	Instrument Mode	38400	GPS/Navigation/Instruments	RMC, HDG, VHW, MWV, DPT, MTW, APB, RMB, VLW, XTE, ROT, RSA
	Depth Mode	4800	All Supported Sentences (1Hz)	DPT, MTW, RMC
	Autopilot Mode	4800	Autopilot Only (1Hz)	APB, RMB, XTE, MWV, RSA
	Not Currently Defined/Used			
	Not Currently Defined/Used			
	Not Currently Defined/Used			
	Not Currently Defined/Used			
	Not Currently Defined/Used			
	RAW Mode	230400	RAW NMEA2000 data over serial	Not Applicable

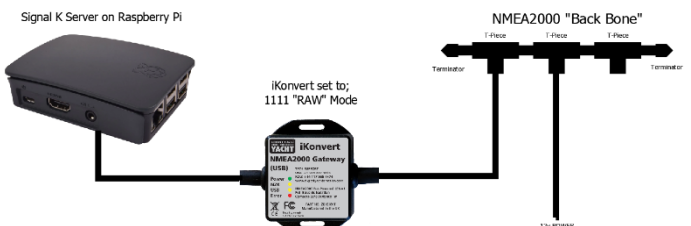
Installation

iKonvert Configuration









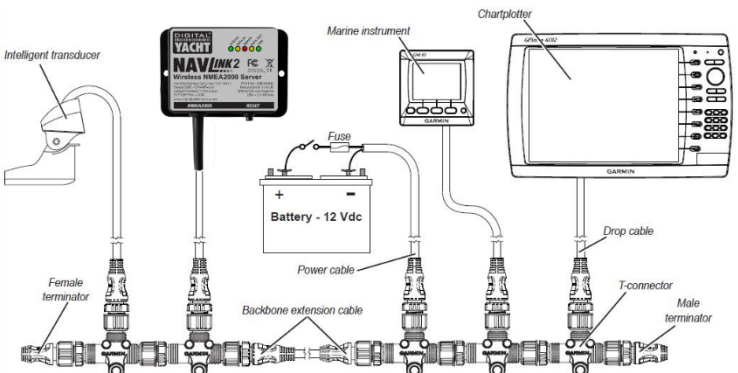
Wireless Interfacing

New NavLink 2

- Released in Q3/2019
- NMEA2000 Wireless Gateway
- Bus Powered
- Latest “Smart” Server Technology
- iKonvert + WLN10SM in one box

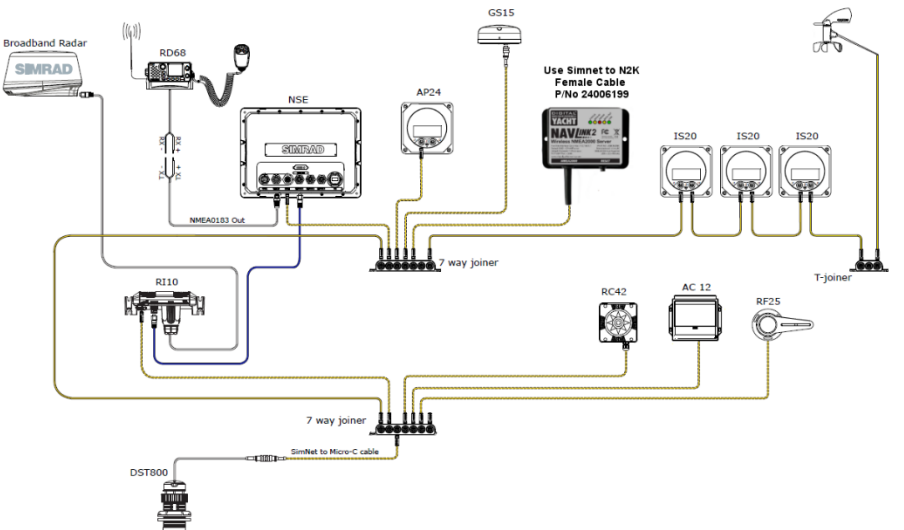
Perfect Accessory

Whatever the network



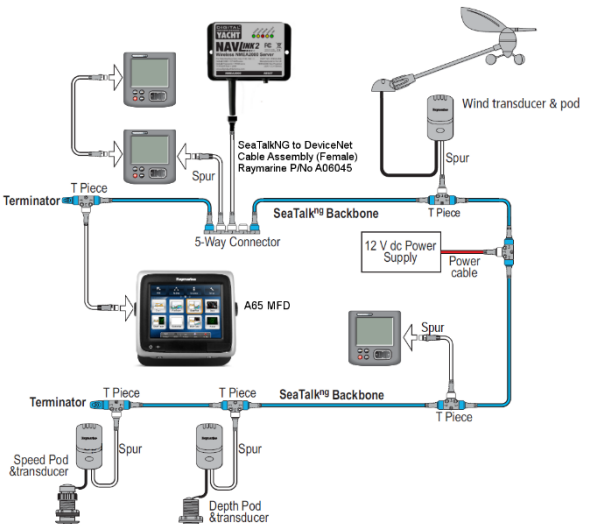
Perfect Accessory

Whatever the network



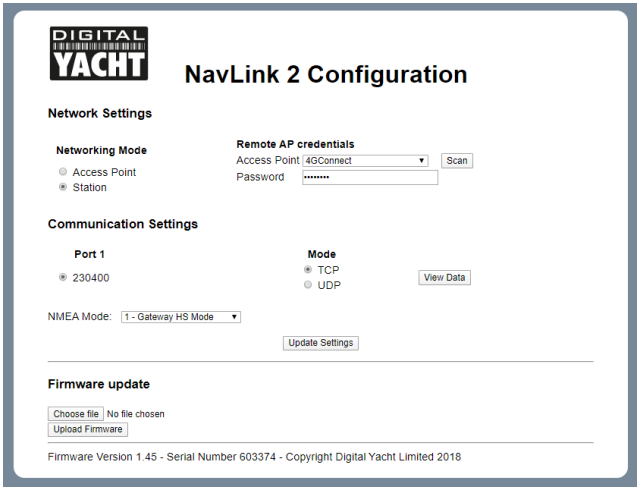
Perfect Accessory

Whatever the network



Configuration
Web Interface

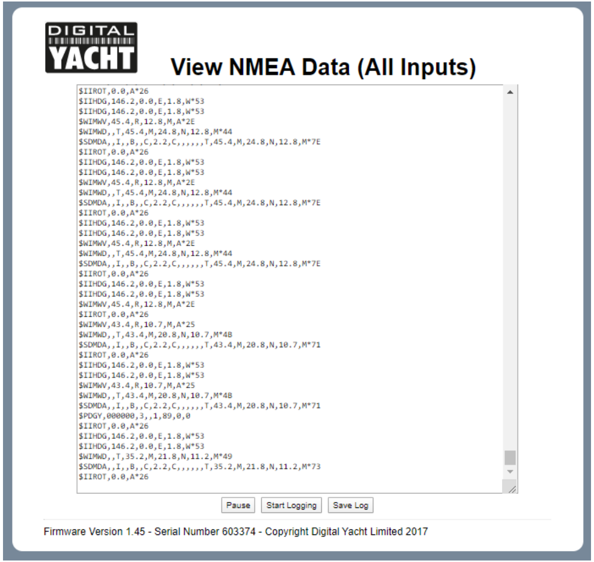
- Features the same web interface as our WLN10 Smart server
- Defaults to 230400 baud
- TCP/UDP mode (TCP by default)
- AP or STA modes
- Password protected
- Factory Reset = push switch for 10s
- NEW – select NMEA Mode



Configuration

View and Log Data

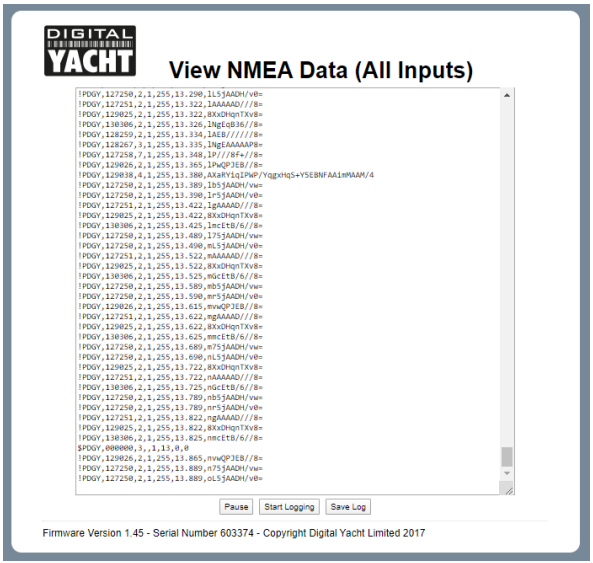
- Display the RAW NMEA 0183 data being converted
- **Pause** button to freeze scrolling
- **Start Logging** button which changes to **Stop Logging**
- Once you have enough data, stop the logging
- Then click **Save Log** button to download the data to your device and save as filename of your choice



Mode 15

RAW NMEA 2000 data

- NavLink2 features the same RAW NMEA 2000 mode as iKonvert
- This RAW mode is supported by the Signal K Node Server
- Also useful for logging NMEA 2000 data for analysis of conversion issues or odd data instances

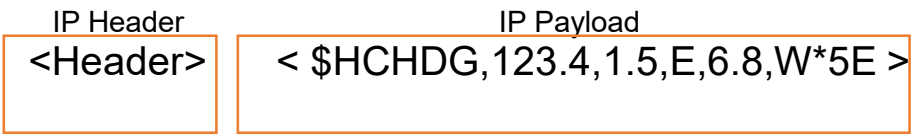


Wireless Interfacing

Wireless NMEA Spec

Digital Yacht's Wireless NMEA format is NMEA0183 data (ASCII) encapsulated in TCP or UDP network packets. This "open" standard is already supported by many apps and new apps are constantly being released that support our products

- All current products IP address = 192.168.1.1 and Port = 2000
  (pre-2017 units had IP address = 169.254.1.1)
- Complete NMEA0183 sentence in one network packet for reliability…



Wireless Interfacing

TCP versus UDP

- TCP is a more reliable one to one bi-directional connection with error checking and hand shaking – requires an IP address and Port number
- UDP is simpler, faster and is broadcast on network address xxx.xxx.xxx.255 to multiple devices/listeners – just requires a Port number

TCP Segment Header Format

Bit #	0 – 7	8 – 15	16 – 23	24 – 31
0	Source Port		Destination Port	
32	Sequence Number			
64	Acknowledgment Number			
96	Data Offset	Res	Flags	Window Size
128	Header and Data Checksum		Urgent Pointer	
160...	Options			

UDP Datagram Header Format

Bit #	0 – 7	8 – 15	16 – 23	24 – 31
0	Source Port		Destination Port	
32	Length		Header and Data Checksum