Dealer Update
NMEA 2000 Gateways

Technical information on Digital Yacht's iKonvert and NavLink 2 products for marine electronic installers

March 2020

Background

What is iKonvert ?

- “All in one” NMEA Gateway
- Can operate in a number of different modes;
  - NMEA0183 <> NMEA2000 (4800)
  - NMEA0183 <> NMEA2000 (38400)
  - RAW NMEA2000 Mode (230400)
- ISO or USB versions (same price)
- No special libraries required to read the RAW NMEA2000 data (3rd party developers)

Applications

What can iKonvert do?

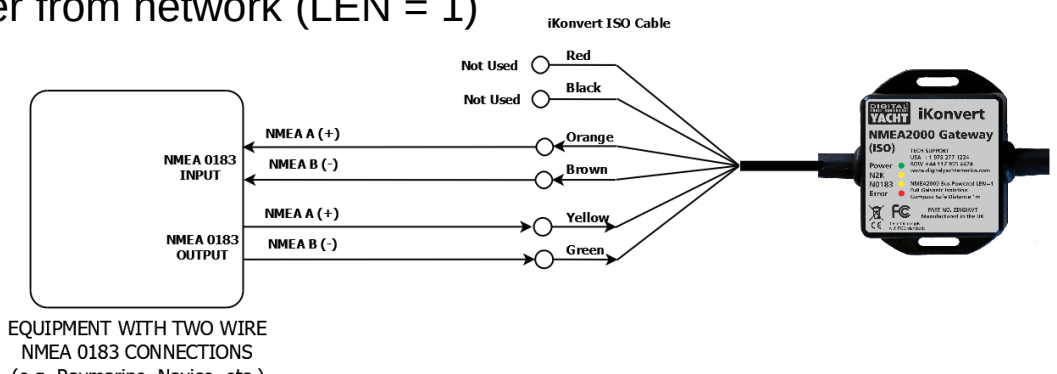
- Typical applications we are seeing iKonvert used for are;

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 data from a legacy AIS to a new NMEA 2000 network
5. 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)



Installation

Wiring Up an iKonvert USB

- Integral USB (type A) cable – “Plug and Play”
- Integral NMEA 2000 drop cable through which it takes power from network (LEN = 1)
- Uses industry leading FTDI USB-Serial chipset for maximum driver compatibility…
  - Windows 10
  - Mac OSX
  - LINUX (including Raspberry Pi)
  - Android
- Creates virtual COM port compatible with all navigation software packages
- Baud rate set by whichever operating mode is selected

How does it work ?

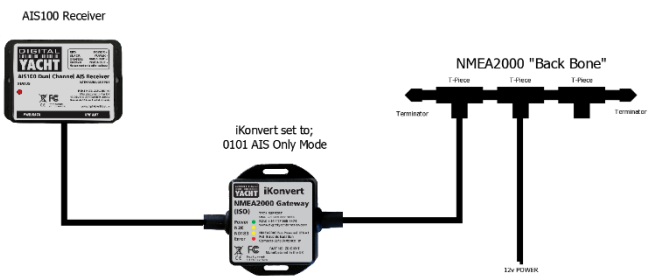
Easy Mode Selection

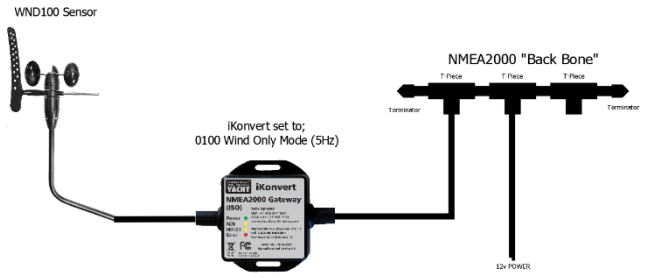
- DIP Switches or Telnet to configure modes
- Modes chosen to match the most common installations
- Direction of conversion chosen automatically based on first data received

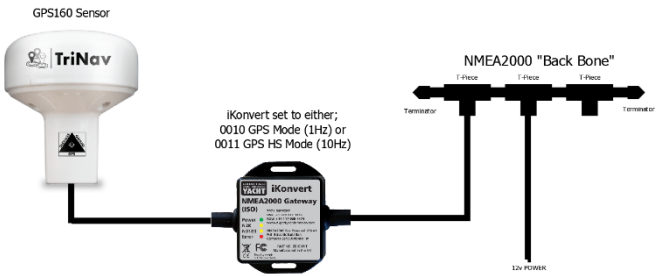
Switches 1234	MODE	BAUD	NMEA DATA	Sentences
	Gateway Mode	4800	GPS/Navigation/Instruments	RMC, HDG, VHW, MWV, DPT, MTW, APB, RMB, VLW, XTE, ROT, RSA
	Gateway HS Mode	38400	All Supported Sentences	RMC, HDG, VHW, MWV, MTW, DPT, APB, RMB, VLW, RSA, ROT, VDO and VDM
	GPS Mode (1Hz)	4800	GPS Only (1Hz)	RMC, 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

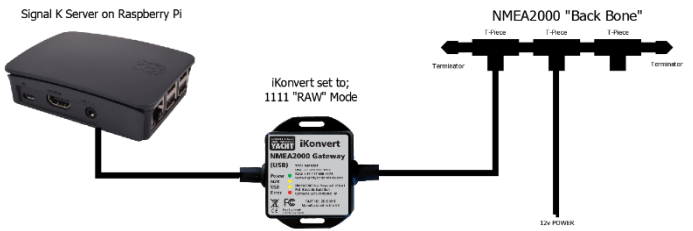
Installation

iKonvert Installations









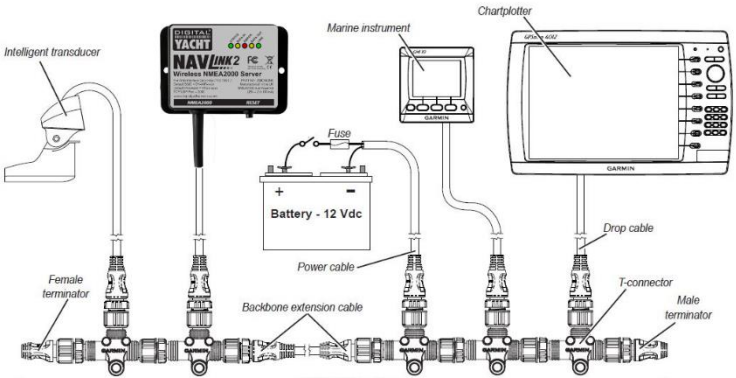
Background

What is NavLink 2 ?

- NMEA2000 Wireless Gateway
- Bus Powered
- Latest “Smart” Server Technology
- iKonvert + WLN10SM in one box
- Has the exact same conversions and operating modes as iKonvert
- Modes set via web interface

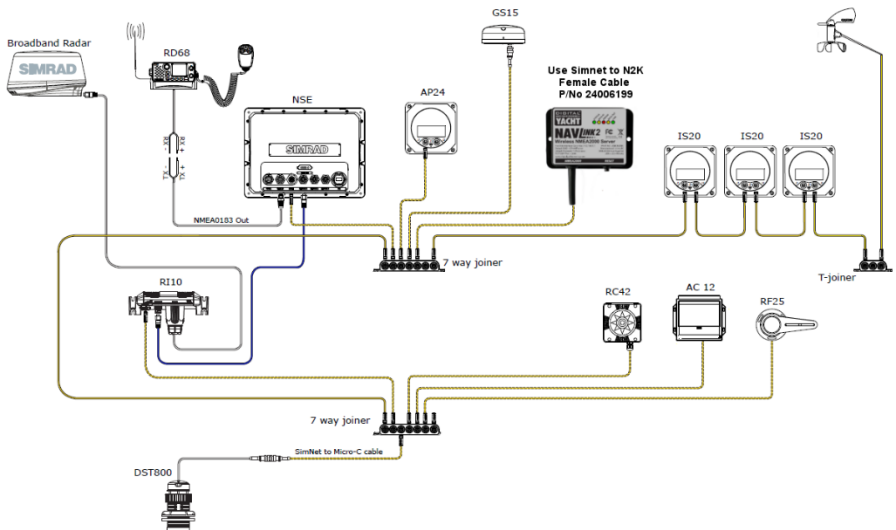
Perfect Accessory

Whatever the network (Garmin)



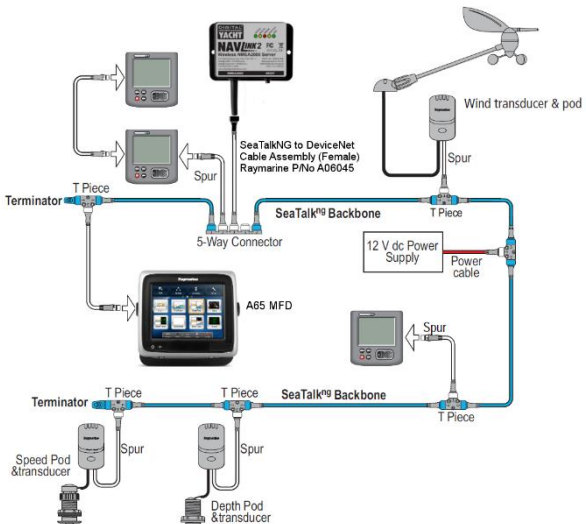
Perfect Accessory

Whatever the network (Simrad)



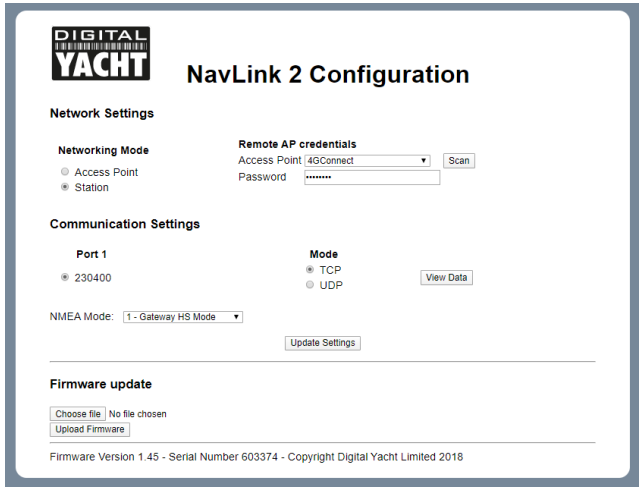
Perfect Accessory

Whatever the network (Raymarine)



Configuration
Web Interface

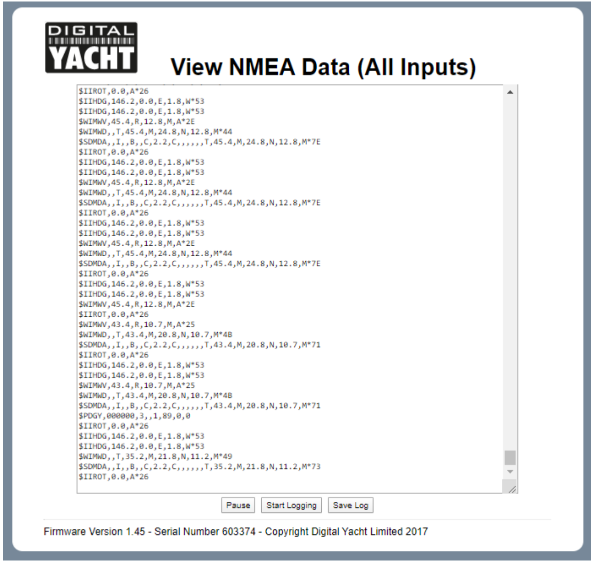
- Features the same web interface as our WLN10 Smart server
- Defaults to 230400 baud
- TCP/UDP mode (TCP by default)
- AP or STA modes
- Password protected
- Factory Reset = push switch for 10s
- NEW – select NMEA Mode



Configuration

View and Log Data

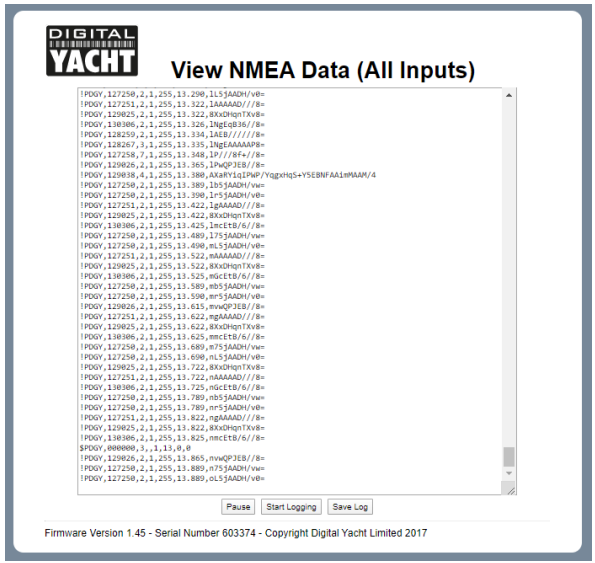
- Display the RAW NMEA 0183 data being converted
- **Pause** button to freeze scrolling
- **Start Logging** button which changes to **Stop Logging**
- Once you have enough data, stop the logging
- Then click **Save Log** button to download the data to your device and save as filename of your choice



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

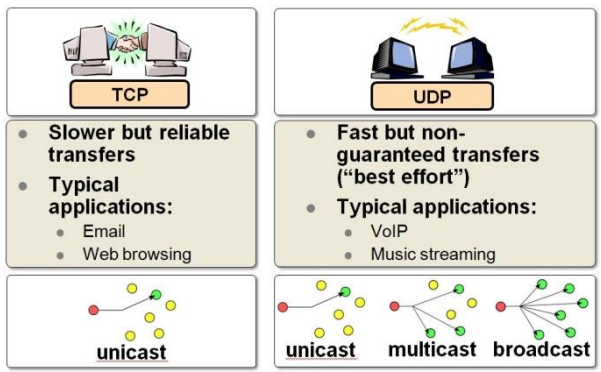
- TCP is a more reliable one to one bi-directional connection with error checking and hand shaking – requires an IP address and Port number
- UDP is simpler, faster and is broadcast on network address xxx.xxx.xxx.255 to multiple devices/listeners – just requires a Port number

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	



3rd Party Developers

Using “RAW” NMEA 2000 Data

- Digital Yacht’s iKonvert and NavLink 2 products both support a “RAW” NMEA 2000 mode where the PGN binary data is output as a proprietary NMEA 0183 sentence, the format of which can be found here…

  https://github.com/digitalyacht/iKonvert/wiki/4.-Serial-Protocol

- Developed in consultation with the Signal K developers, these are the best NMEA 2000 certified gateways for the Signal K server running on a Raspberry Pi.
- We welcome enquiries from other developers looking for an easy way to support NMEA 2000 in their software

Gateways
Summary

- NMEA 2000 Certified wired and wireless gateways
- Ideal for getting NMEA 2000 data in to Apps and Navigation Software
- Makes connecting new and legacy equipment together both easy and effective
- Gives 3rd Party Developers a way to read and write RAW NMEA 2000 data in their applications
- Just two SKUs; ISO or USB which are the same price
- Compact design, featuring integral cables, simple mode selection and IP54 rating