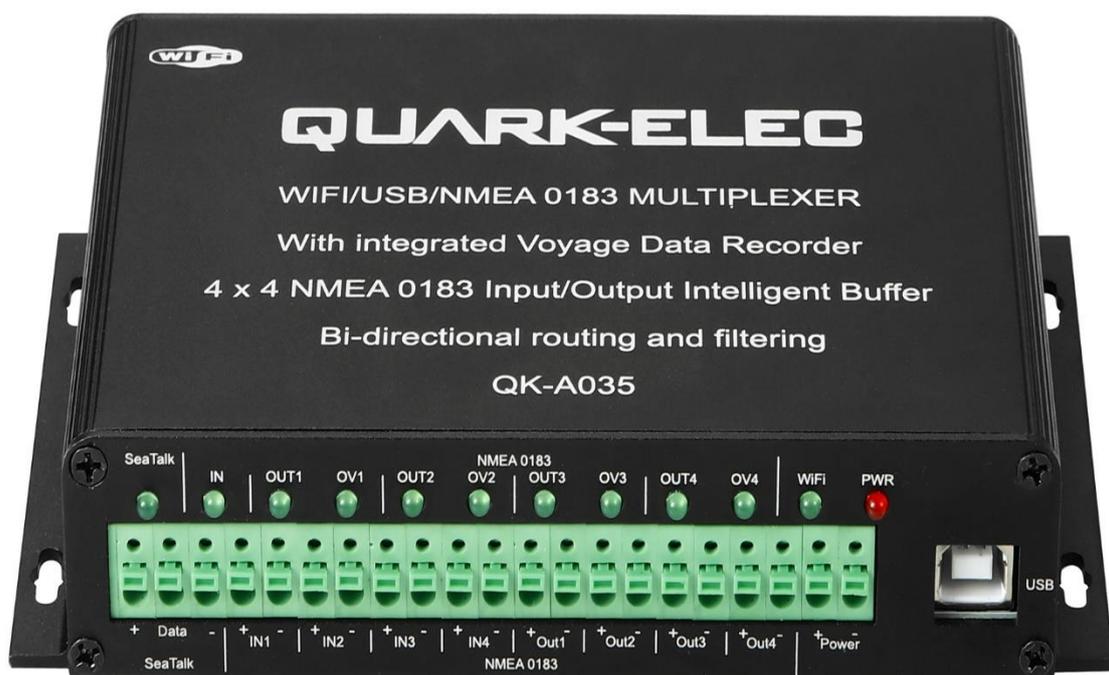


## QK-A035 Manual

# NMEA 0183 4x4 Multiplexer with SeaTalk<sup>1</sup> Converter and Integrated Voyage Data Logger



Designed in UK



## Features

- Multiplex up to 4 NMEA 0183 inputs and SeaTalk<sup>1</sup> devices
- Configurable baud rates (4800, 9600, 38400bps)
- Simultaneous WiFi, USB and NMEA output
- Galvanically isolated NMEA and SeaTalk<sup>1</sup> input ports
- Bi-directional USB/WiFi interface enables connection between navigation devices and autopilot
- WiFi – Ad-hoc mode allows up to 4 devices to connect to the internal WiFi module simultaneously
- WiFi – Station mode allows for the connection of the A035 to your router/ access point for greater number of wireless users and WiFi range
- Compatible with Windows, Mac, Linux (configuration tool is only windows compatible)
- Compatible with Android and iOS excluding configuration and USB functions. (Please note configuration must be done using Windows software)
- Advanced filtering and routing functions allow for full overflow reduction and additional configuration of the multiplexer
- Automatic data recording on an SD card that offers tracking, data backup, sharing and export
- Monitoring of NMEA data passing through the device

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## 1. Introduction

The QK-A035 is a sophisticated 4x4 NMEA 0183, Seatalk<sup>1</sup>, WiFi and USB multiplexer with an integrated voyage data recorder (VDR).

Through advanced filtering and routing, the A035 NMEA enables controlled routing of data to specific outputs, blocking of excess data and overflow reduction.

The A035 is capable of recording the messages transmitted from every input device. All messages are stored within an integrated SD card. The stored data can be accessed by using an SD card reader (not included). Using an SD card with 32GB storage space (expandable), the A035 can store up to an average of 12 weeks' worth of vessel data. Users won't have to worry about losing the most recent data since A035 uses a circular buffer where the oldest data is overwritten only when memory is full.

Similar to most Quark-elec products, the A035 can be used straight out of the box with the standard factory settings or can be configured for customized use.

**Default standard functionality:** The multiplexer combines up to 4 NMEA 0183 inputs and one Seatalk<sup>1</sup> device. All these messages are then-sent to 4 NMEA 0183 outputs, USB and WiFi interface.

- **Bi-directional WiFi:** With 2-way WiFi connectivity, the A035 allows for wireless connection to autopilots and other NMEA devices if desired. Data from instruments is available wirelessly through WiFi connections, giving complete freedom to navigate, monitor and control from anywhere on board. Up to 4 connections from iPads, iPhone, Android phones and tablets or other WiFi enabled devices can connect directly to the A035 with no need for a WiFi access point. (Though it can also be connected to an access point/router if desired (see WiFi section).
- **Bi-directional USB:** The USB port also supports bi-directional communication. It allows computer-based, navigation applications to send sentences through the multiplexer to control an autopilot and other devices. The USB port is also used for configuration of specific WiFi and NMEA port settings.
- **Records all inputs devices' activity** for vessel tracking and performance analysis or any diagnostic work accordingly (SD card needs to be fitted).

**Additional configurable functionality (through Windows software via USB):**

- **Routing options:** The powerful routing feature allows the NMEA, SeaTalk<sup>1</sup>, USB and WiFi input data to be routed from any input to specific outputs.
- **Filtering options:** Each input also has a flexible filter that can be configured to pass or block specific sentences. This frees up bandwidth, significantly reducing the possibility of data overflow and resulting in the loss of data.
- **Additional WiFi options:** including connection to an access point to share marine data across your entire WiFi network or connect the A035 to the Internet. WiFi can be disabled if desired.
- **VDR date saving frequency type:** This allows users to choose a preferred saving frequency to match with the most suitable situation. The default setting is leisurely. In a typical situation on the sea or near the beach, this setting allows the A035 to save the data every 30 to 45 mins (depending on how many devices are connected to the inputs and the input data update rate. Heavy data leads to quicker saving frequency). With the rapid option, the saving frequency will be 10 times quicker compared to the same situation as leisurely. Don't use the rapid option if you have heavy input data flow (for example, 10hz updated instruments), as the very quick

saving frequency could lead to a jam of saving data and in the worst case this could lead to a crash of the running programme.

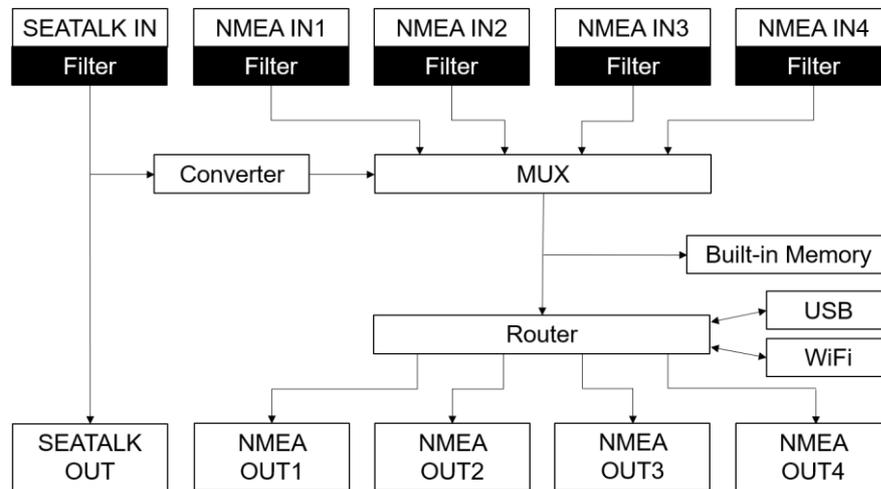


Figure 1 Function diagram

## 2. Mounting

The A035 is aimed at the commercial, leisure, fishing boat and vessel monitoring markets.

It is not waterproof so needs to be mounted in a dry place such as behind the instrument panel on a flat surface. **Please allow 0.5m between the A035 and other WiFi devices.** This will help avoid interference problems.

If USB is not being used, then please use the USB dust cover provided. This will help keep dust out of the unit.

The SD card dust cover should be applied at all times even when no SD card is being used.

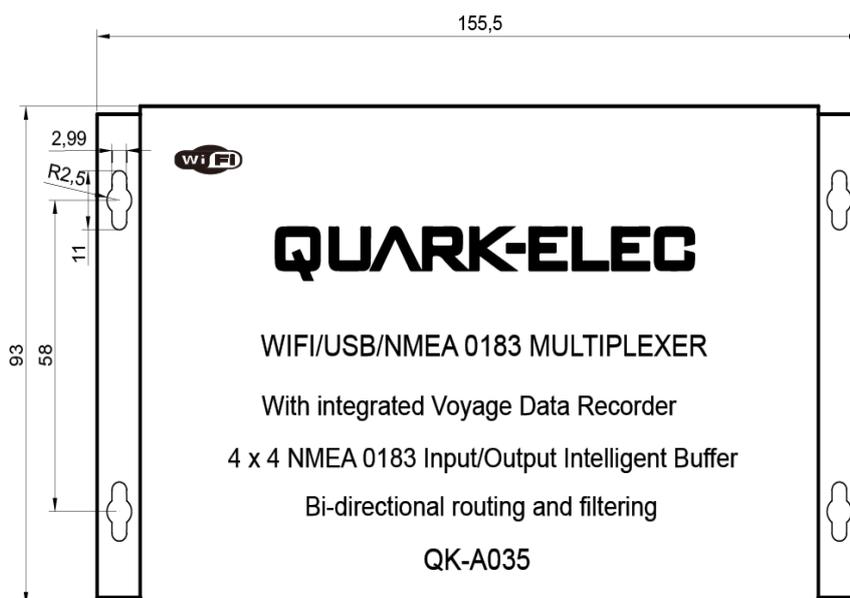


Figure 2: A035 Dimensions are in mm

### 3. Connections

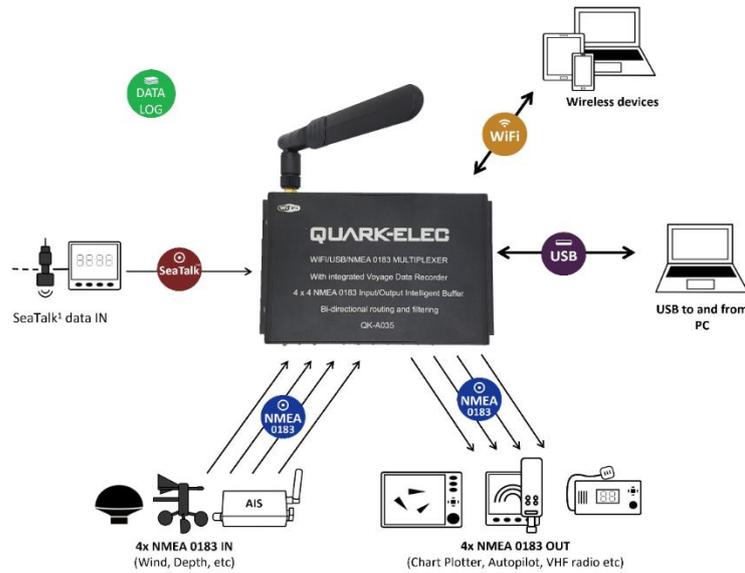
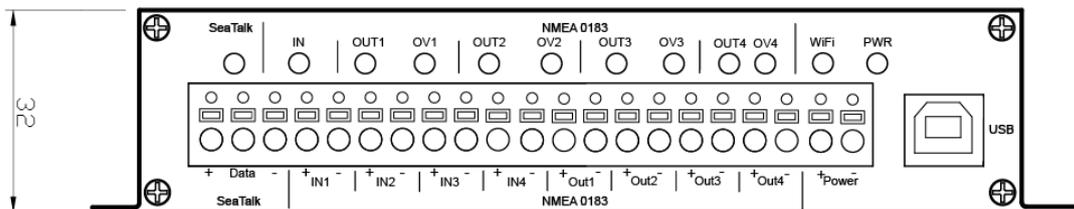


Figure 3 Typical system connection

The A035 multiplexer has the following options for inputs, outputs, and host devices.

- 4x NMEA 0183 inputs
- 1x SeaTalk<sup>1</sup> input
- 4x NMEA 0813 outputs
- Bi-directional WiFi interface
- Bi-directional USB
- SD card slot

Buttons are used to secure the terminal connections; no screwdriver needed for connection.



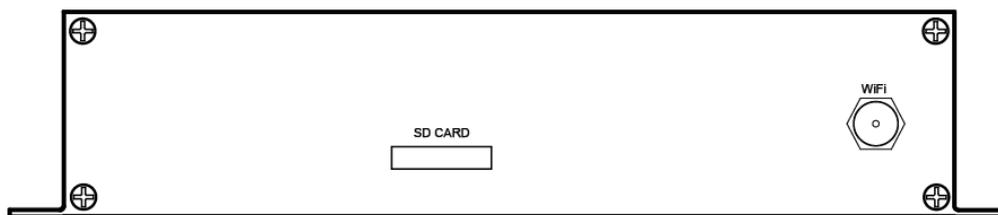


Figure 4 Side view drawing



Power off all the devices before connecting!

### 3.1 Status LEDs

A035 features 12 LEDs which indicate SeaTalk<sup>1</sup> in, NMEA input, NMEA output, overflow, USB, WiFi, and power status respectively. The status LEDs on the panel show port activity and system status.

- **PWR (Power):** LED light is constantly lit in red when the device is powered.
- **SeaTalk<sup>1</sup>:** LED will flash for each valid message received.
- **NMEA 0183 input (IN):** LED will flash for each valid message received from any of the 4 NMEA 0183 inputs.
- **OUT1-4 (NMEA 0183 outputs):** LED will flash for each valid message sent out from the related output.
- **OV1-4 (Overflow):** LED will flash if the NMEA 0183 output experiences data overflow due to an excessive queue, above the buffer allowance (potential data loss).
- **WiFi:** LED will flash for each valid NMEA message sent to the WiFi output.



Figure 5: LED functions

### 3.2 NMEA 0183 wiring - RS422 or RS232?

The A035 uses the NMEA 0183-RS422 protocol (differential signal), however some chart plotters or devices may use the older NMEA 0183-RS232 protocol (single-ended signal). With the following tables, the A035 can be connected to most NMEA 0183 devices, no matter RS422 or RS232 protocol. Occasionally, for some older 0183 devices if it still doesn't work, consider our [QK-AS03 protocol bridge](#). The QK-AS03 connects and converts RS422 to the older RS232 and vice-versa, through a simple connection, with no configuration needed.

#### 3.1.1. Connecting to NMEA 0183 (RS232) devices

For RS232 interface devices, it normally has only one signal wire while GND will be used as a reference signal. Occasionally, you may need to swap 'GND' and the signal wire (TX or RX) if the following wiring doesn't work.

QK-A035 wires	Connection needed on RS232 device
NMEA IN+ ----->	GND *
NMEA IN- ----->	NMEA TX

NMEA OUT+ ----->	GND *
NMEA OUT- ----->	NMEA RX

\* Swap two wires if the A035 does not work.

**TAKE CARE:** There may be two GND connections on your NMEA 0183-RS232 device.

One is GND for the NMEA Connection, and one is GND for Power.

Ensure you check the above table and your device’s documentation carefully before connection.

### 3.1.2. Connecting to NMEA 0183 (RS422) devices



For RS422 interface devices, these wires need to be connected

QK-A035 wire	Connection needed on RS422 device
NMEA IN+ ----->	NMEA OUT+ *
NMEA IN- ----->	NMEA OUT-
NMEA OUT+ ----->	NMEA IN+ *
NMEA OUT- ----->	NMEA IN-

\* Swap two wires if the A035 does not work.

### 3.3 SeaTalk<sup>1</sup>

The built-in SeaTalk<sup>1</sup> to NMEA converter translates SeaTalk<sup>1</sup> data into NMEA sentences. The SeaTalk<sup>1</sup> port has 3-pin terminals for connection to the SeaTalk<sup>1</sup> bus. Ensure the wires are connected correctly before powering up your devices as an incorrect connection could damage the A035 and other devices on the SeaTalk<sup>1</sup> bus.

The SeaTalk<sup>1</sup> converter converts the Seataalk<sup>1</sup> messages as per the conversion table below. When a SeaTalk<sup>1</sup> message is received, the A035 checks if the message is supported. When the message is recognized as being on the SeaTalk<sup>1</sup> data table (below), the message is extracted, stored, and converted to an NMEA sentence. Any unsupported datagrams are ignored. These converted NMEA messages are filtered and then combined with NMEA data received on the other inputs.

This function allows the NMEA multiplexer to listen on the SeaTalk<sup>1</sup> bus. Only one SeaTalk<sup>1</sup> input is needed since the SeaTalk<sup>1</sup> bus is a single-cable system that connects all the instruments together through one cable. The SeaTalk<sup>1</sup> to NMEA converter in the A035 works in one direction only. No NMEA sentences are converted into SeaTalk<sup>1</sup>.

Supported SeaTalk Datagrams		
SeaTalk	NMEA	Description
00	STDBT	Depth below transducer
10	STMWV	Wind angle, (10 and 11 combined)
11	STMWV	Wind speed, (10 and 11 combined)
20	STVHW	Speed through water, includes heading when present
21	STVLW	Trip mileage (21 and 22 combined)
22	STVLW	Total mileage (21 and 22 combined)
23	STMTW	Water temperature
25	STVLW	Total and Trip mileage
26	STVHW	Speed through water, includes heading when present

27	STMTW	Water temperature
50	---	GPS latitude, value stored
51	---	GPS longitude, value stored
52	---	GPS speed over ground, value stored
53	STRMC	Course over ground. RMC sentence is generated from stored values from other GPS Related datagrams.
54	---	GPS time, value stored
56	---	GPS date, value stored
58	---	GPS lat/long, values stored
89	STHDG	Magnetic heading, including variation (99)
99	---	Magnetic variation, value stored

The table shows that not all datagrams result in an NMEA 0183 sentence. Some datagrams are only used to retrieve data, which is combined with data from other datagrams to create one NMEA 0183 sentence.

### 3.4 NMEA Inputs and Outputs

Every NMEA input on the A035 is galvanically isolated (also called opto-isolation). A galvanically isolated input prevents unwanted currents flowing between the instruments and the multiplexer. These currents can damage equipment or interfere with radio signals and should therefore be avoided.

NMEA baud rates are set to the following default settings:

- NMEA IN 1: 4.8kbps
- NMEA IN 2: 4.8kbps
- NMEA IN 3: 38.4kbps
- NMEA IN 4: 4.8kbps
- NMEA OUT 1: 4.8kbps
- NMEA OUT 2: 4.8kbps
- NMEA OUT 3: 38.4kbps
- NMEA OUT 4: 38.4kbps

These can be adjusted as required, using the configuration software (see the configuration section).



Connect the + and - terminals of the NMEA input/output on the A035 to the + and - terminals of the output/input on the instrument (e.g., wind sensor, autopilot, chart plotter). These terminals may also be labelled as A/B, Data+/Data-, RX+/RX-, In+/In-.

#### 3.3.1 NMEA Inputs

The A035 has 4 NMEA inputs called IN1 to IN4. Each input should be connected to one output device only. These inputs are galvanically isolated from the A035 multiplexer, as specified by the NMEA 0183 standard.

Each input has an internal filter which can be configured to pass or block specific sentences from the input devices (See the configuration section).

The A035 combines these filtered NMEA 0183 inputs with the NMEA sentences converted from the SeaTalk<sup>1</sup> input as well as WiFi and USB messages into one NMEA0183 serial data stream.

Regarding connections to external NMEA devices:

Although the NMEA 0183 standard specifies signal names, voltage levels and connection methods clearly; in reality, this standard has been interpreted with variation between manufacturers. To ensure your A035 is not damaged please double-check the specifications of the devices before connecting them.

### 3.3.2 NMEA Outputs

The A035 provides 4 independent NMEA outputs. These NMEA 0183 outputs are capable of driving the combined data from the inputs.

Each output has an internal router which can be configured to pass or block specific input ports (see the configuration section).

### 3.3.3 Additional Functions

See the configuration section below for:

- Filtering input data (blocking certain data from entering the multiplexer)
- Routing of input data to specific outputs (instead of sending all data to all outputs)

## 3.5 Micro SD card slot

The A035 comes pre-fitted with a standard Micro SD card.

If the operator has their own SD card, they wish to use with the A035, please use a computer to format it with FAT32 type and then insert into the A035 before powering up. The A035 can support 1GB to 512GB size SD cards.

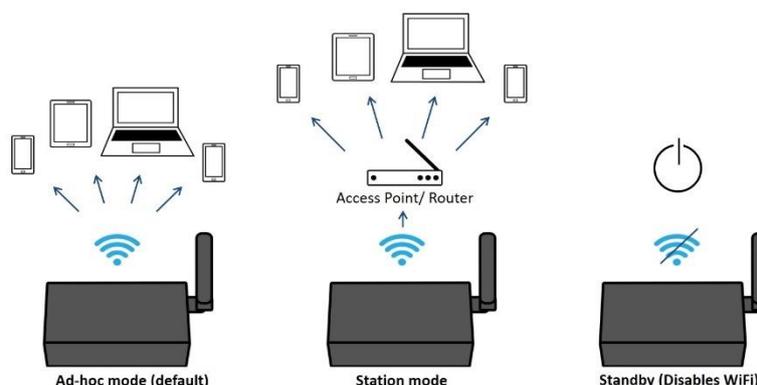
The SD card dust cover should be applied at all times even no SD card is being used.



## 4 Wireless Connections

The A035 allows users to view their data through WiFi on a PC, tablet, smartphone or other WiFi enabled device. Users can access marine network data including vessel course, speed, position, wind speed, direction, water depth, AIS etc. These data sets can be viewed on your chart. WiFi connections are bi-directional so the chart plotter software can also send cross track and waypoint information to an autopilot to steer a programmed course.

The IEEE 802.11b/g wireless standard has two basic modes of operation; Ad-hoc mode (peer to peer) and station mode (also called infrastructure mode).



The A035 supports 3 different WiFi modes:

- In **Ad-hoc mode:** wireless devices connect directly (peer to peer) without a router or access point.

For example, your smartphone can connect directly to the A035 to receiver marine data.

- In **Station mode**: wireless devices communicate through an access point (AP) such as a router that serves as a bridge to other networks (such as the Internet or LAN). This allows your router to handle the data and traffic from your device. This data can then be picked up through your router anywhere on your local area network, increasing the WiFi range. Similar to plugging the device directly into the router by wire, but instead using wireless technology. This way, your mobile devices receive both your marine data and other AP connections such as internet (see configuration section).
- WiFi can also be disabled via the **standby mode** option. This helps reduce the power consumption or may be used when connecting 2 WiFi enabled devices (see configuration section).

The A035 is set to Ad-hoc mode as a default setting but can be easily setup to station mode or standby mode through the configuration tool.

### 4.1 WiFi Ad-hoc mode

Around 15 seconds after the A035 has powered up, users will be able to scan for a WiFi network with an (SSID) of 'QK-A035xxxx' or similar, on their mobile devices (phone, laptop etc.).

Connect to 'QK-A035xxxx' with the default password: '88888888'.

<b>Device SSID</b>	Similar to 'QK-A035xxxx'
<b>WiFi password</b>	88888888

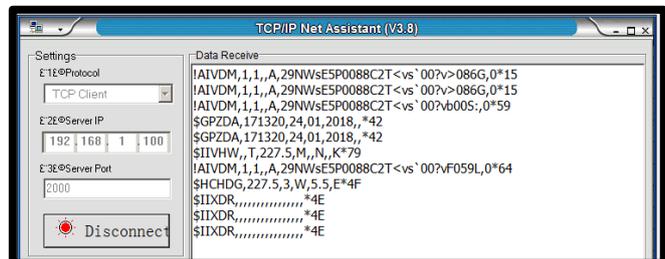
In the chart plotter (or navigation software): Set the protocol to 'TCP', IP address to '192.168.1.100' and the port number to '2000'.

<b>Protocol</b>	TCP
<b>IP address</b>	192.168.1.100
<b>Data Port</b>	2000

With the above settings, a wireless connection should be established and the user will be able to receive the data through the chart software.

**Note: In Ad-hoc mode, the IP address should not be changed.**

**SSID and password can be changed (password should be 8 to 12 characters long).**



The wireless connection can be checked with TCP/IP port monitoring software as shown. (Figure 6 TCP/IP Net Assistant)



For station mode, WiFi or for setting WiFi on standby, see the 'configuration' section.

## 4. Connecting Via USB Port

A035 is supplied with a USB connector. This connector provides data input and output as standard. The USB port is also used to configure A035 and to update the firmware.

This USB connector can be linked directly to a USB port on the PC. It can also be connected to other mobile devices via an USB OTG (On the Go) connection using the supplied cable.

### 4.1.1. Windows:

To enable the USB data connection of A035 to other devices, related hardware drivers may be needed, dependent on the system requirements. The driver can be found on the included CD or can be downloaded from <https://www.quark-elec.com>

Usually drivers are installed automatically to the computer if it is running Windows 10 (non-upgraded version). The A035 registers itself as a virtual serial com port. A new COM port will automatically show up in the device manager after the A035 has been plugged in.

After the driver has been installed, run device manager, and check the **COM number** (this is the number associated with the USB port being used. The port number is the number that Windows assigns as an input device. These can be generated randomly by the computer). The chart software may require the COM number in order to access the data.

The port number for the A035 can be found in Windows 'control panel->system->device manager' under 'ports (COM & LPT)'. Find the A035 in the list for the USB variant. To change this number, double click the A035 and select the 'port settings' tab. Click the 'advanced' button and change the port number to the one required.

**Checking the USB data flow:** If desired, the USB data can always be checked with a terminal monitor application, like Putty or HyperTerminal. To do this, enter the following into the COM port settings: **Bits per second: 38400bps, Data bits: 8, Parity: None, and Stop bits: 1** as shown below.

Using HyperTerminal on Windows as an example

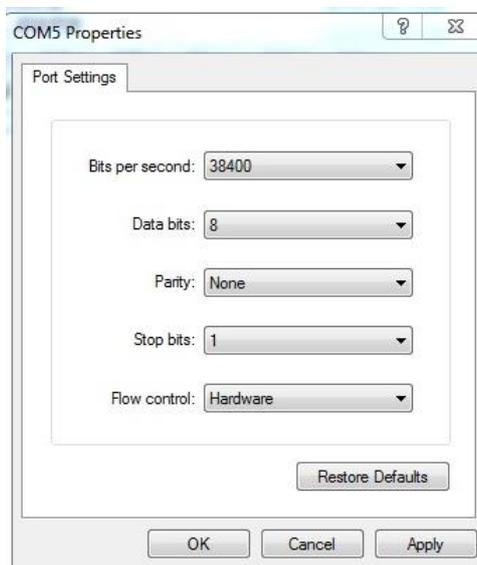
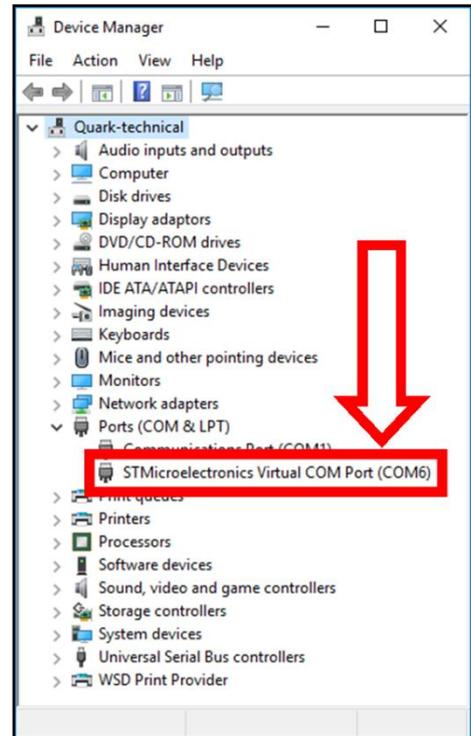


Figure 7 HyperTerminal settings

#### 4.1.2. Mac:

For Mac OS X, the A035 will be recognized and shown as a USB modem. The ID can be checked with the following steps:

1. Plug the A035 into a USB port and launch Terminal.app.

2. Type: less /dev/\*sub\*
3. The Mac system will return a list of USB devices. A035 will be displayed as -  
"/dev/tty.usbmodemXYZ" where XYZ is a number. Nothing further needs to be done if it is listed.

### 4.1.3. Linux:

No driver is required for Linux. When plugged into the computer, A035 will show up as a USB CDC device on /dev/ttyACM0 or similar.

## 5. Configuration (via USB)

The configuration tool can be found on the free CD or it can be downloaded from our website:  
<https://www.quark-elec.com/downloads/configuration-tools/>

The A035 Windows configuration tool can be used to setup the port routing, sentence filtering, NMEA baud rates, SD card data saving frequency, and WiFi settings for the A035. It can also be used to monitor and send NMEA sentences through the USB port. The configuration tool must be used on a windows PC (or a Mac using BootCamp or other Windows simulating software) while the A035 is connected via USB cable.

The configuration tool cannot access the A035 via WiFi. And it will not function while another program is using the A035. Please close all applications using the A035 when using the configuration tool.

When the A035 is connected to a Windows PC and powered up, the 'Connected' message will be shown on the status bar at the bottom of the configuration software window. The software version is also shown on the status bar. Once settings have been changed the user must click on the 'config' button to save the new settings to the device and then click 'disconnect'. Please re-power the A035 to activate the new settings. The unit is now ready for use.

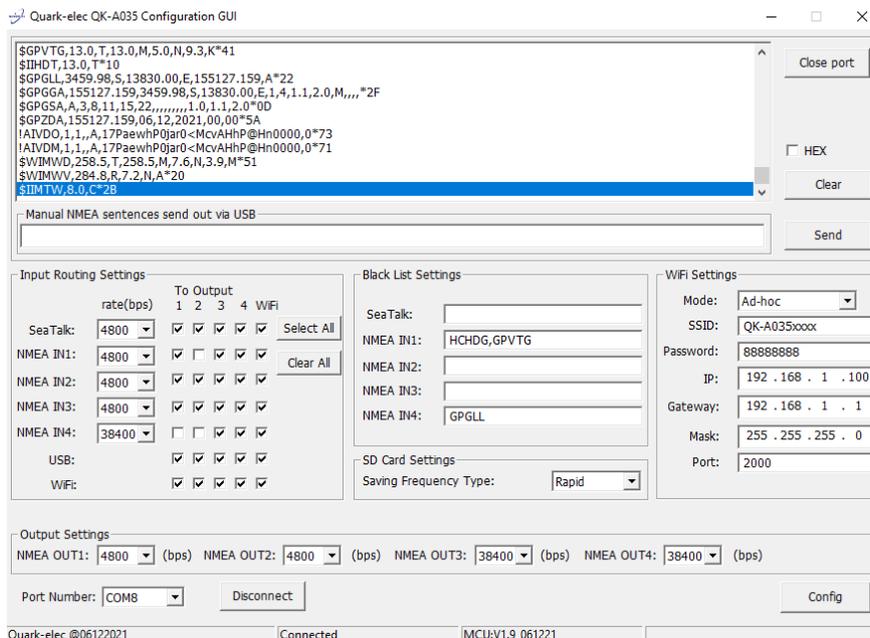


Figure 8 Configuration tool

### 5.1 Configuring baud rates

The NMEA 0183 input and output baud rates can be setup from the dropdown menu. The A035 can work with standard NMEA 0183 devices (4800bps) or high-speed NMEA 0183 devices (38400bps). 9600bps can also be chosen, if required.

NMEA baud rates can be adjusted as required.

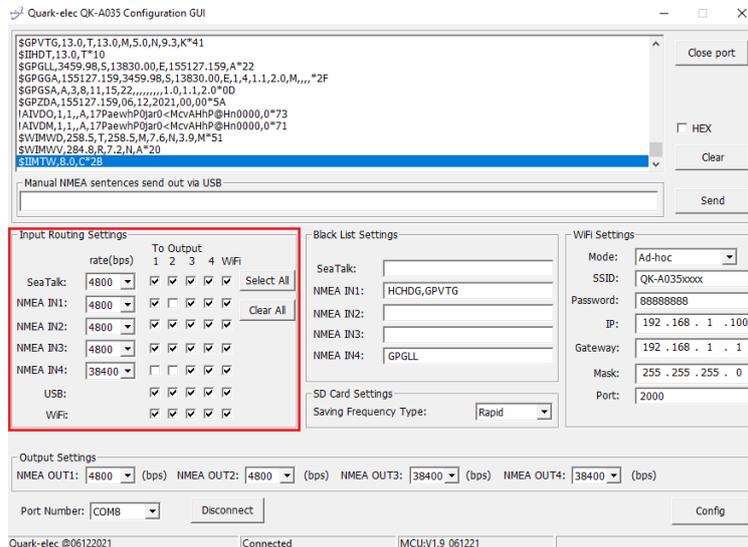


Figure 9 Baud rate setup

Once the desired input and output baud rates have been set, click on the ‘Config’ button to save the new settings to the device.

Wait until a pop-up window showing ‘Done’ comes up, then click on ‘disconnect’ to safely remove the device from the PC.

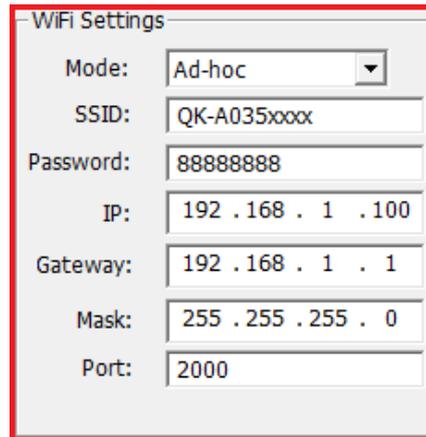
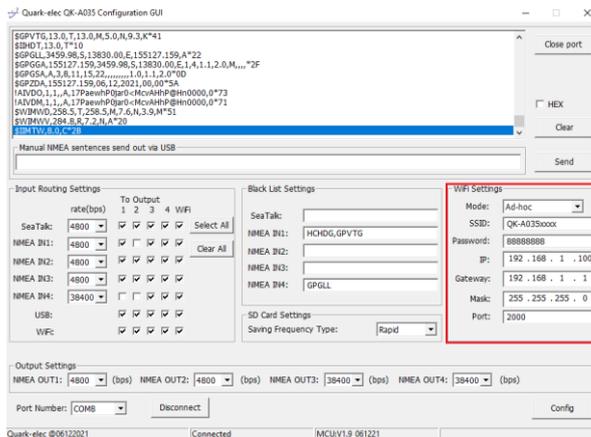
Re-start the A035 to activate the new settings.

### 5.2 WiFi - station mode

The WiFi is set to ad-hoc mode by default. Station mode allows your router/access point to handle the data and traffic from your device. This data can then be picked up through your router anywhere on your local area network. Similar to plugging the device directly into the router, but instead using wireless technology.

This allows your main mobile device to still receive internet and for you to be able to view the data simultaneously.

To set up station mode, the A035 should be connected to a computer running Windows (Mac users can use BootCamp) via USB.



1. Connect the A035 to a Windows computer using a Micro USB B cable.
2. Run the configuration software (having closed any other programs that would access the A035.) and check connection the status of the A035 at the bottom of the Configuration Tool window.
3. Change working mode to '**station mode**'
4. Enter your router's **SSID**.
5. Enter the **password** for your network.
6. Enter the **IP address** assigned to the A035. This normally starts with 192.168. The third group of digits depends on your router's configuration (commonly 1 or 0). The fourth group must be a unique number between 0 and 255) This number must not be used by any other equipment connected to your router.
7. Enter your **router's IP address** in the **gateway** section. This can usually be found on the router. No other settings need to be changed.
8. Click on the '**config**' button in the bottom right-hand corner and wait for 60 seconds. After 60 seconds click on the '**disconnect**' button.
9. Switch off and back on the A035. It will now attempt to connect to the router.

10. In your chart software set the protocol to '**TCP**'  
 Insert the **IP address** you assigned to the A035.  
 Enter the port number as '**2000**' in the chart software.

<b>Protocol</b>	TCP
<b>IP address</b>	(check your router)
<b>Data Port</b>	2000

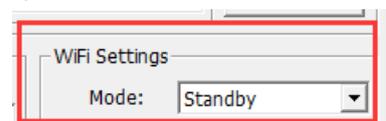
You should now be connected and see your marine data in your chart software. If not, then check your router's **IP address list** and confirm the **IP address** that your router has assigned to the A035. Occasionally, a router assigns a different **IP address** to a device than the one you chose to assign to it during configuration. If this is the case, copy the **IP address** from the router into your chart software. If the **IP address** in the router's **IP address list** is the same as the one you input into your chart software, then the connection will work in station mode. If you are unable to see any data, please repeat the steps and check that all the data has been input correctly.



If you are not able to view your data in station mode, the likely cause is either the data has been input incorrectly, or the IP address is different in your chart software to that of your router.

### 5.3 WiFi - standby

By setting up the WiFi as standby, the WiFi module will be disabled.



## 5.4 Configuring routing and filtering

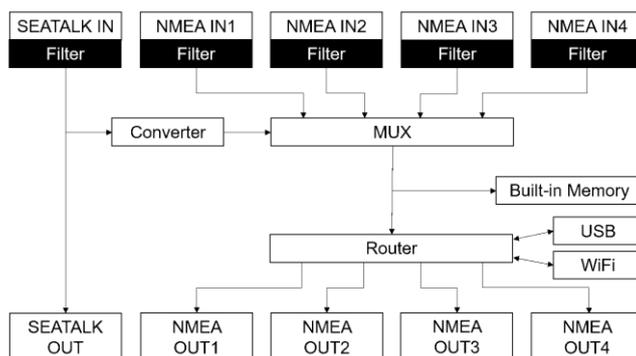


Figure 10 Routing &Filtering

The A035 features filtering and routing. Specific input data can be filtered out and ignored by the multiplexer while the remaining data can then be routed to specific outputs.

**Filtering options:** Each input also has a flexible filter that can be configured to pass or block specific sentences from entering the multiplexer. This frees up bandwidth, significantly reducing the possibility of data overflow and the resulting loss of data.

**Routing options:** The powerful routing feature allows the remaining NMEA, SeaTalk<sup>1</sup> and WiFi input data to be routed from any input and limited to the desired outputs.

Filtering and routing allow the A035 to reduce the processing data load by disabling these unneeded input sentences from specific NMEA outputs. GPS receivers for example often transmit an abundance of sentences every second and can fill much of the available bandwidth of an NMEA 0183 port at 4800bps. By filtering out any unnecessary data, bandwidth is saved for other devices' data.

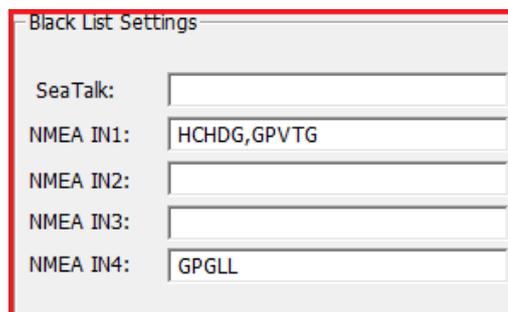
It also solves the conflict in the case where two similar NMEA devices provide the same types of sentences. Operators may choose to enable this data on one input only (filtering), and/or to route each input to a specific output (routing).

### 5.4.1 Filtering: black list setup

Each input port's black list can block up to 8 types sentences.

Most chart plotters have their own sentence filter, however for most PC/mobile phone-based applications, this is not the case. Using the black list to filter unnecessary sentences is very helpful.

Remove the '\$' or '!' from the 5-digit NMEA talker and sentence identifier and insert the input separated by commas as shown here:



- For example to block '!AIVDM' and '\$GPAAM' enter 'AIVDM,GPAAM'. If blacklisting SeaTalk<sup>1</sup> data, the corresponding NMEA message header should be input (see SeaTalk<sup>1</sup> section for a full list of converted messages).

### 5.4.2 Routing data away from chosen outputs

As a default, all inputs' data (excluding any filtered data) is routed to all outputs (NMEA<sub>0183</sub>, WiFi and

USB). Data can be routed to limit the data flow to only certain output/s.

Simply un-tick the corresponding boxes in the configuration software.

### 5.5 VDR

The A035 continuously stores data received from all NMEA 0183 and SeaTalk<sup>1</sup> inputs onto the flash memory, erasing the oldest data stored as new data is recorded. The data includes position, vessel course, wind speed/angle, depth, heading, AIS messages, atmospheric pressure, state of digital switching equipment, tanks, battery status, voltage, current, and engine information. This data is saved as txt files on the SD card, so that in the event of an accident or the boat owner just wants to review the data, then the SD card can be removed from the A035 and read with a SD card reader (not included) on a computer. An analysis of the events or the sailing trip may be conducted.

The recorded data is named sequency (eg. 00000001 to 99999999). Using an SD card with 32GB storage space (expandable), the A035 can store up to an average of 12 weeks' worth of vessel data. Users won't have to worry about losing the most recent data since A035 uses a circular buffer where the oldest data is overwritten only when memory is full.

By default, the A035 saves the log file for every 1M bytes size. This is normally relative to 30 mins to 45 mins every file for most small or medium size boats in sailing conditions. Customers can set the saving frequency to be 'Rapid' via the configuration tool. This way the file will be saved every 100k bytes (0.1M bytes), so it will be saved more frequently. Saving frequency doesn't affect the length of the record history, but there are three points to be aware of when setting this parameter:

- 1, In case the A035 is powered off, the buffered data (the data volume under 1M bytes, which hasn't been saved on the SD card) will be lost, so, choosing a larger file size will lead to more lost data.
- 2, If there is a high-speed data input (e.g. some 10Hz sensors) with the smaller file size selected, there is a risk that the SD card could have a data 'traffic jam' while saving the data, potentially leading to data overflow and the whole system could crash (in this case, A035 will restart).
- 3, In most of cases (if all inputs are normal frequency sensors or there is only one high speed sensor) we would recommend keeping the default setting.

### 5.6 USB configuration: monitoring and sending NMEA messages

Connect the A035 to your Windows computer and click on the 'open port' button in the Configuration Tool window. All sentences sent to the output will be monitored and displayed in the application window.

Users can also manually send NMEA 0183 format sentences, either for testing or for specific data transfer, e.g., autopilot control sentences or waypoint information, through the tool. For this, input the sentence in the empty field and then click on the 'send' button, to send the sentence to the output.



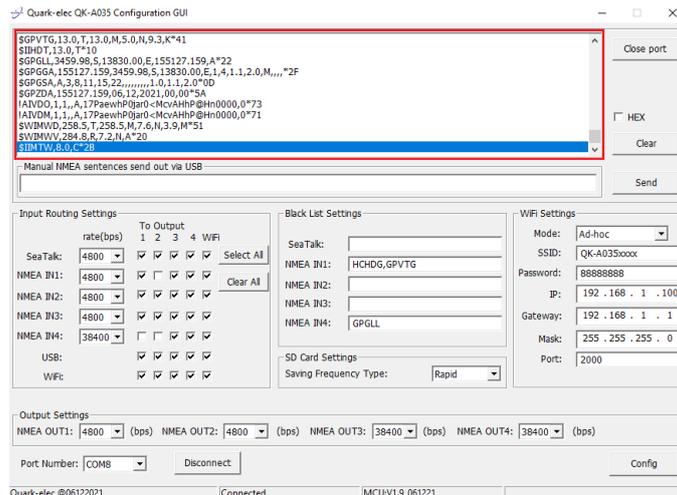


Figure 11 Monitor via USB

### 5.7 USB communication with autopilots

The communication speed of the USB interface is up to 100 times faster than a standard NMEA 0183 output. With a waypoint activated, a navigation application can send multiple sentences at a time to the multiplexer to control an autopilot. This will cause the host buffer in the multiplexer to fill up quickly. Eventually, sentences will be lost if no data flow control is applied.



The A035 has a large buffer to decrease the possibility of overflow, however, it is strongly recommended the user to apply flow control (CTS/RTS) in their navigation application. Monitoring the overflow LED indicator is another very helpful way to check the status of the communication.

## 6. Upgrading firmware

The current firmware version can be verified through the configuration tool (When connected, the firmware version will be displayed at the bottom of the configuration software window).

To upgrade the firmware, you will need a FAT32 formatted 8GB (or smaller) USB flash drive and a USB programming cable (the blue Type-B plug to Type-A receptable USB cable which came with your device).

1. Download the new firmware file from the Quark-elec website.
2. Unzip the firmware file and rename it to a035.bin.
3. Copy the a035.bin firmware file to the USB flash drive's root directory.
4. Connect the USB flash drive to your QK-A035 using the blue USB programming cable and connect the QK-A035 to its power supply.
5. Wait for a few seconds until all LEDs on the front panel light up (it can take between 5 to 10 seconds).
6. After the LEDs on the front panel go off (only the Power LED will stay on), disconnect your QK-A035 from the power supply and disconnect the USB cable and USB flash drive from the QK-A035's USB port.

7. Power up your QK-A035 and connect it to your computer using a USB Type-B plug to Type-A plug cable. Open the configuration tool on your windows computer and connect it to your QK-A035. In case of successful firmware update, the configuration tool should display the new firmware version.

The upgrading process is complete.

## 7. Specification

Item	Specification
DC supply	10-30V(+/-0.2V)
Average supply current	135mA
Maximum supply current	260mA
NMEA data format	ITU 0183 format
NMEA input data rate	4.8k to 38.4kbps, RS-422 galvanically isolated
NMEA output data rate	4.8k to 38.4kbps, RS-422 galvanically isolated
Seatalk1 data rate	Default 4.8kbps, can be set up to 38.4kbps.
WiFi mode	Ad-hoc, Station modes on 802.11 b/g
Security	WPA/WPA2
Network Protocols	TCP
Operating Temperature	-20°C to +55°C
Storage Temperature	-30°C to +70°C
Recommended Humidity	0 - 93% RH

## 8. Limited warranty and notices

Quark-elec warrants this product to be free from defects in materials and manufacture for two years from the date of purchase. Quark-elec will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour. The customer is, however, responsible for any transportation costs incurred in returning the unit to Quark-elec. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs. A returns number must be given before any unit is sent back for repair.

The above does not affect the statutory rights of the consumer.

### Disclaimer

This product is designed to aid navigation and should be used to augment normal navigational procedures and practices. It is the user's responsibility to use this product prudently. Neither Quark-elec, nor their distributors or dealers accept responsibility or liability either to the products user or their estate for any accident, loss, injury, or damage whatsoever arising out of the use or of liability to use this product.

Quark-elec products may be upgraded from time to time and future versions may therefore not correspond exactly with this manual. 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.

## Document history

Issue	Date	Changes / Comments
1.0	02-12-2021	Initial release
	20-12-2021	

## 9. Glossary

- **Ad-hoc WiFi, also known as ‘peer-to-peer’:** devices communicate directly with each other without a router.
- **IP:** internet protocol (ipv4, ipv6)- explains which version
- **IP Address:** is a numerical label assigned to each device connected to a computer network.
- **NMEA 0183:** is a serial data interface operating at 4.8 Kbit/second utilizing standard asynchronous communications. It is an electrical and data standard for communication between marine electronics.
- **NMEA2000 / N2K:** is a serial data network operating at 250 Kbit/second utilizing the Controller Area Network (CAN). The CAN bus was originally developed for the automotive industry but is now used in numerous industrial applications. It is a communications standard used for connecting marine sensors and display units within ships and boats and is generally plug-and-play.
- **NMEA2000 / N2K backbone:** Used with NMEA 2000, the backbone is the main BUS supplying data and power to all the devices on the boat.
- **Router:** A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet.
- **Sentences:** Used in NMEA 0183 protocol to transfer data between marine equipment.
- **Station mode WiFi:** devices communicate by going through an Access Point (AP) or router. This allows the user to view data while accessing other router functions such as other devices or internet.
- **USB:** cable for communication and power supply between devices.

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