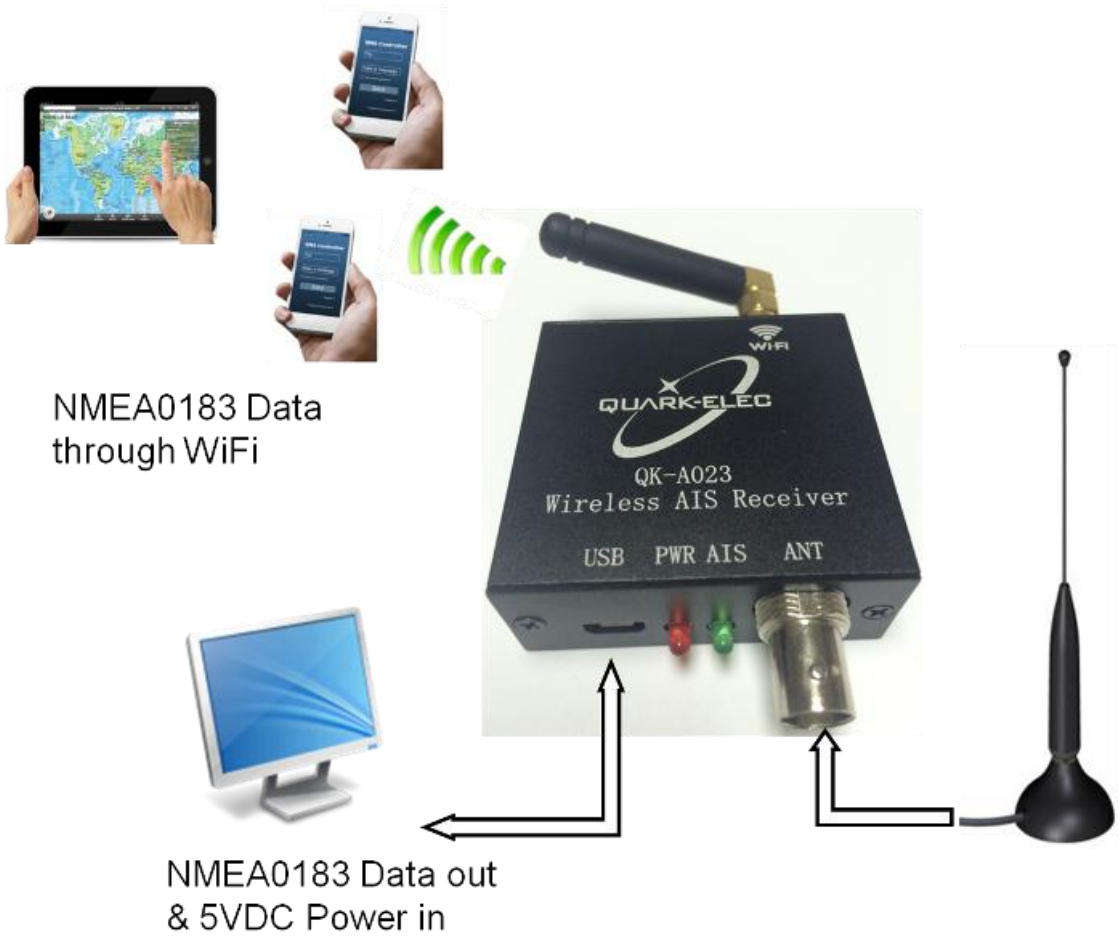
QK-A023 AIS Wireless Receiver(Auto-hopping V1.0)

Features

- Receiving on dual channels (161.975 MHzand162.025 MHz) alternately
- Auto-hop channel algorithm improves 4% of captured message rate
- Sensitivity down to -106 dBm@30% PER
- Up to 45 nautical miles receiving range
- USB 2.0 powered (<32mA@5.0V)
- 38400 bps baud serial over USB
- Integrated TCP/IP protocol stack supports up to 4 simultaneous TCP clients
- Message output in industry NMEA-0183 format
- Supports interworking with NMEA-0183 GPS receiver
- NMEA messages output through USB or WiFi
- BNC connector for 50 Ohm VHF antenna
- Compatible with Windows XP,7,8,10,Mac OS X, Linux systems
- Plug & Play connectivity with chart plotters and PCs




Wi-Fi
QUARK-ELEC
QK-A023
Wireless AIS Receiver
USB PWR AIS ANT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Contents

1 HARDWARE

The QK-A023 is a single channel AIS receive-only unit, designed to be installed in a protected indoor environment for the small-commercial, leisure, fishing boat and vessel monitoring markets in order to listen to other vessel's AIS information. Patented Auto-hop Channel Algorithm(ACA) improves the captured message rate by 4%. Connected to an on board PC running compatible software, or a chart plotter, AIS data transmitted from ships within range can be displayed on the screen enabling the skipper or navigator to visualize the traffic within VHF range. Using QK-A023 can enhance safety at sea by providing proximity, size and directional information from other vessels, improve safety and efficiency in navigation and help protect the marine environment. Although QK-A023 comes with an extruded aluminum enclosure to shield it from external RF interference, it should not be fitted close to generators or compressors (e.g. refrigerators) as they can generate substantial RF noise. Generally a suitable placement of QK-A023 is with other types of navigation equipment and the PC or chart plotter that will be used to display the AIS data.

The following figure shows an overview of the QK-A023. Two LEDs indicate the power status and signal traffic. Power for QK-A023 is provided via USB cable which also outputs NMEA messages in the absence of a connected WiFi device. If no USB data output is required this USB port can be connected to any 5V 0.3Amp power supply.

Figure 1

2 QUICK START

2.1. Setup USB connection

2.1.1. Connect antenna

Connect the module to a suitable VHF antenna. SMA or N type adaptors can be used to connect QK-A023 with different types of external VHF antenna.

Figure 2

Figure 3

2.1.2. Install driver

To enable the USB data connection of QK-A023 to other devices, related hardware drivers may be needed dependent on system requirements.

For Windows 8, 7, Vista and XP, the driver can be found on the CD in the packing box or can be downloaded from the Quark-elec website at:
http://www.quark-elec.com/drivers

No drivers are required on Windows 10, QK-A023registers itself to the computer as a virtual serial port on Windows. A new COM port will automatically show up in the device manager after plug in.

For Mac OS X, QK-A023 will be recognized and shown as a USB modem. The ID can be checked with the following steps:

--- After plugging QK-A023 into a USB port, launch Terminal.app.
--- Type ls /dev/*usb*

--- Mac systems will return a list of USB devices.QK-A023 will display as - “/dev/tty.usbmodemXYZ” where XYZis a number. Nothing further needs to be done if it is listed.

No driver is required for Linux. When plugged into the computer, QK-A023 will show up as a USB CDCdevice on /dev/ttyACM0.

The USB connection status can always be checked with a terminal application like Putty or HyperTerminal. Ensure that the COM port is set at 38400bps, 8, N and 1, as shown below using HyperTerminal on Windows as an example to illustrate this process.

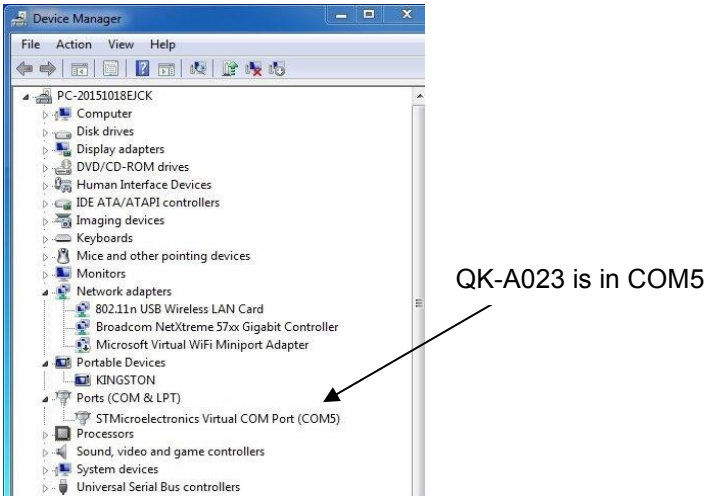

Figure 4

Run HyperTerminal to check the setting. Ensure that the COM port is set at 38400bps, 8, N and 1.

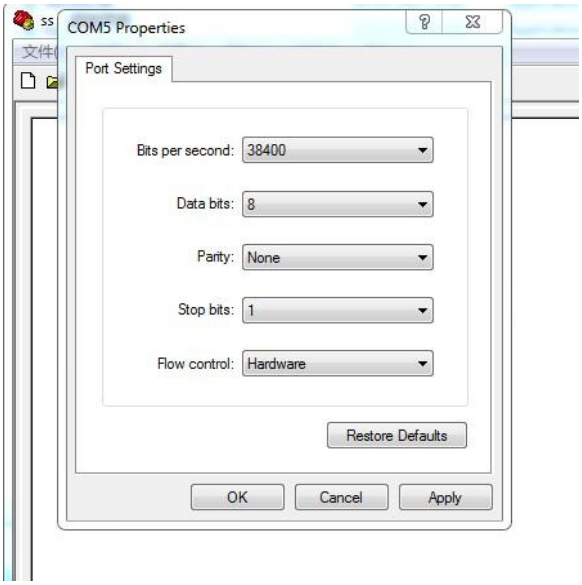

Figure 5

If all the above is set up correctly, users will see the following information:

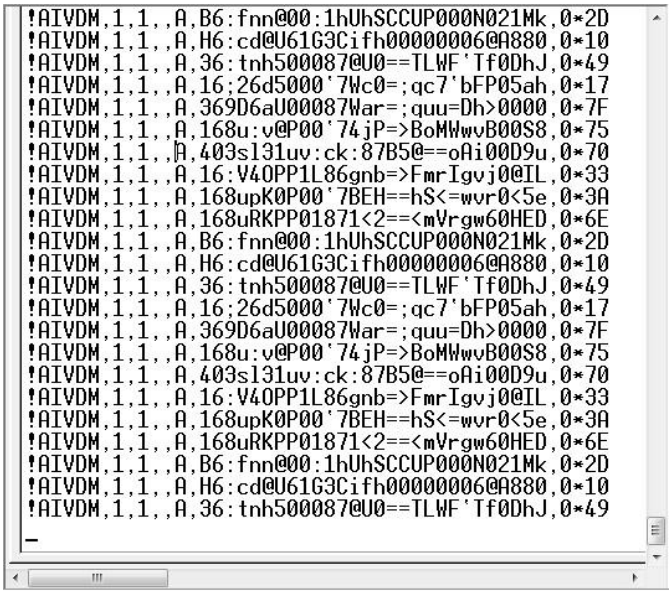

Figure 6

2.1.3. Run application

Run any AIS NMEA-183 compatible chart software (such as OpenCPN http://opencpn.org/ocpn/downloador SeaClearhttp://www.sping.com/seaclear/)

and then start to view the displayed AIS information.

2.2. Setup WiFi connection

2.2.1. Connection

Connect QK-A023 to a suitable VHF antenna and power up it through the USB connector. The power source can be any 5V supply greater than 300mA.

2.2.2. WiFi Setup

About15 seconds after QK-A023 been powered up, the operator should be able to scan and find a WiFi network (SSID) similar to ‘QK-A023xxxx’ using WiFi enabled devices such as computers, mobile phones or tablets.

Connect the device/s to ‘QKA023xxxx’ with ‘88888888’ as the default password. Set the protocol as ‘TCP’, IP address as ‘192.168.1.100’ and the port number as ‘2000’ in the chart software.

Item	Setting
SSID	Similar to ‘QKA023xxxx’
Protocol	TCP
IP address	192.168.1.100
Port	2000

Wireless connection is now complete and the operator will be able to receive the AIS messages through the chart software. Please note if the USB port is being used as data output then WiFi connection won’t be available for data output.

3 USING QK-A023 WITH OPENCPN

OpenCPN is free software that can be used to view concise chart plotter and navigation information. It is available for use on both PCs and the MAC OSX system. The following is a sample setting for the OpenCPN plotter. COM2 was set as the QK-A023 input and COM1 is used for a standard serial port GPS input.

There are other programs available such as SeaClear, PolarNavy, PolarView. They all have similar settings.

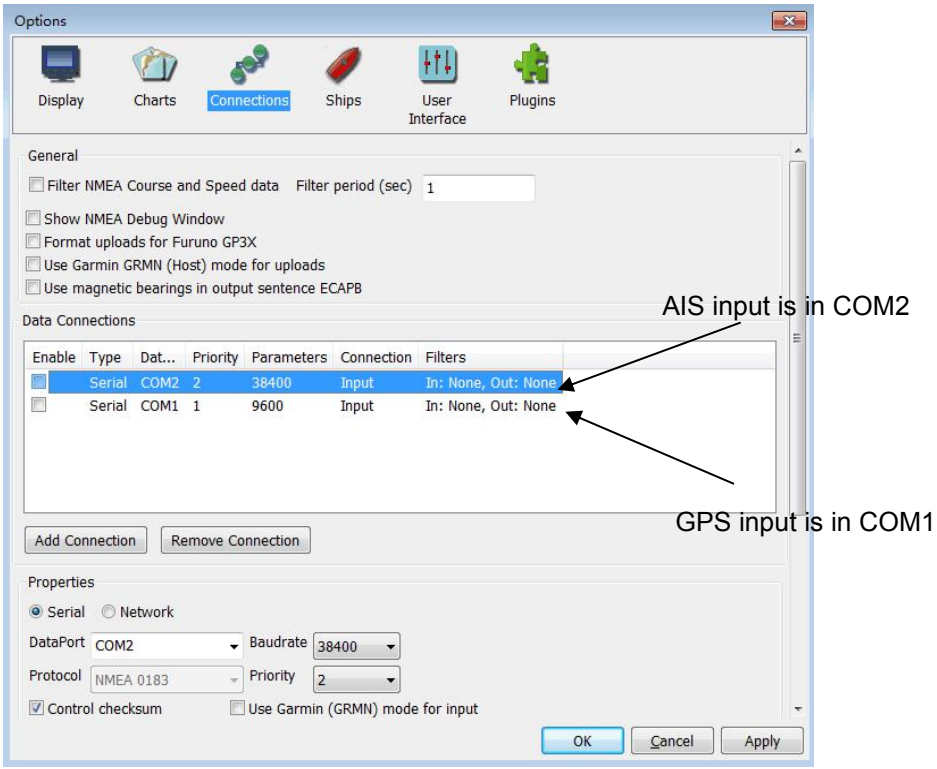

Figure 7

For Wifi connection, 'Network' rather than 'Serial' needs to be selected in 'Connections->Properties' and the following settings need to be input.

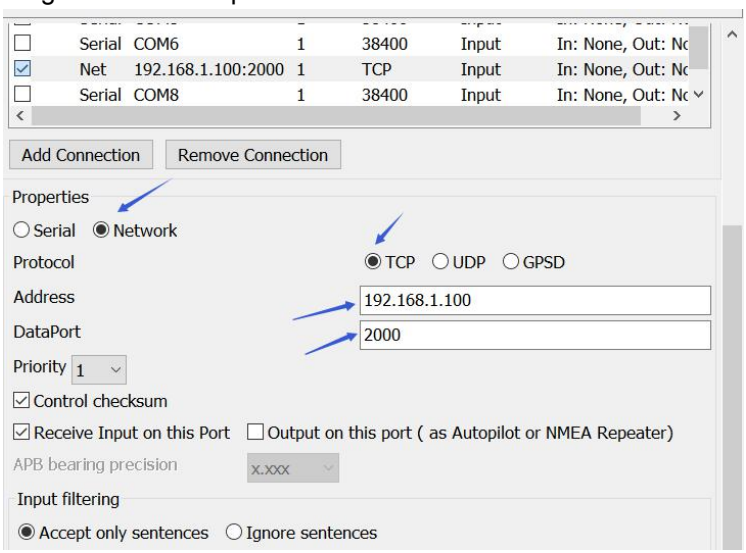

Figure 8

4 ANTENNA INSTALLATION

AIS communication systems use frequencies in the maritime VHF band, which is considered to be 'line of sight' radio. This means that if the QK-A023 antenna cannot 'see' the antennas of other vessels, the AIS signals from vessels will not reach QK-A023.In practice, this is not a strict requirement, a few buildings and trees between them will still be fine. Large obstacles such as hills and mountains, on the other hand, will significantly degrade the AIS signal.

To have the best possible receiving range, the AIS antenna should be placed as high as possible with a relatively clear view of the horizon. Large obstructions might shade the AIS radio communication from certain directions, giving uneven coverage.

The AIS antenna should be separated as much as possible (theoretically at least 3.0 meters) from the voice communication VHF antenna to avoid unnecessary adjacent channel interference. Best separation is achieved by installing the antennas over each other or on separate sides of the mast. If an existing VHF transmitting antenna is used to receive the AIS signal, proper separation equipment (e.g., an active VHF antenna splitter) should be applied.

For more technical information and other enquiries, please go to the Quark-elec forum at:

http://quark-elec.com/forum/

For sales and purchasing information, please email us:info@quark-elec.com

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