

## QK-A022 Dual Channel AIS Receiver

### Features

- Two AIS receivers monitoring both AIS channels(161.975 MHz and 162.025 MHz) at the same time and decoding both channels simultaneously.
- Sensitivity down to -107 dBm@30% PER
- Up to 45 nautical miles receiving range
- USB 2.0 powered (<26mA@5.0V)
- 38400 bps baud serial over USB
- Message output in industry NMEA-0183 format
- Supports interworking with NMEA-0183 GPS receiver
- SMA connector for 50 Ohm VHF antenna
- SMA to BNC coaxial adaptor included
- Compatible with Windows, iOS and Linux systems
- Plug & play connectivity with chart plotters and PCs



Designed in UK





## Document history

Issue	Date	Changes / Comments
1.0	09-04-2016	Initial release
1.1	07-10-2016	Driver details reviewed

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## Quark-elec application note

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### 1 HARDWARE

The QK-A022 is a dual 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.

Although QK-A022 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. So generally a suitable placement of QK-A022 is together 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-A022. The receiver has two LEDs which indicate the power and signal status .



### 2 QUICK START

#### 2.1. Connection

Connect the module to a suitable VHF antenna. BNC or N type adaptors can be used to connect QK-A022 to different types of external VHF antennas.

QK-A022 is powered through the micro USB port. AIS messages are also output through this port.

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SMA cable



BNC connector with cable



## 2.2. Install driver

To enable the USB data connection of QK-A022 to other devices, related hardware drivers might be needed dependent on the different 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-A022 registers itself to the computer as a virtual serial port on Windows. A new COM port will automatically show up in the device manager after plugging in.

For Mac OS X, QK-A022 will be recognized and shown as a USB modem. The ID can be checked with the following steps:

--- After plugging QK-A022 into a USB port, launch Terminal.app.

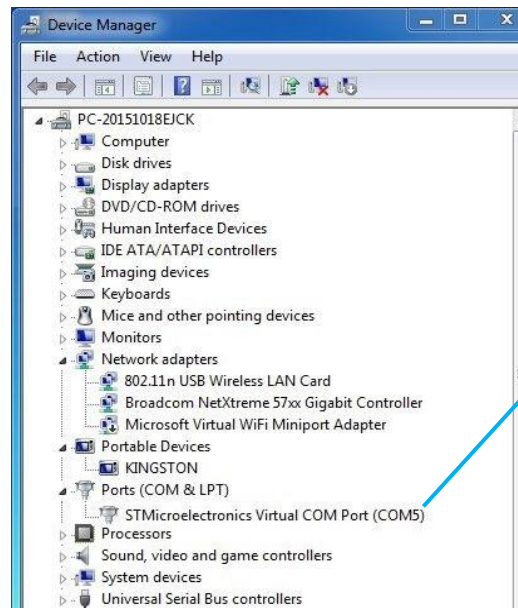
--- Type `ls /dev/*usb*`

--- Mac system will return a list of USB devices. Within that list there is a name like `"/dev/tty.usbmodemXYZ"` where XYZ is a number. That's it.

No driver is required for Linux. When plugged into the computer, QK-A022 will show up as a USB CDC device on `/dev/ttyACM0`.

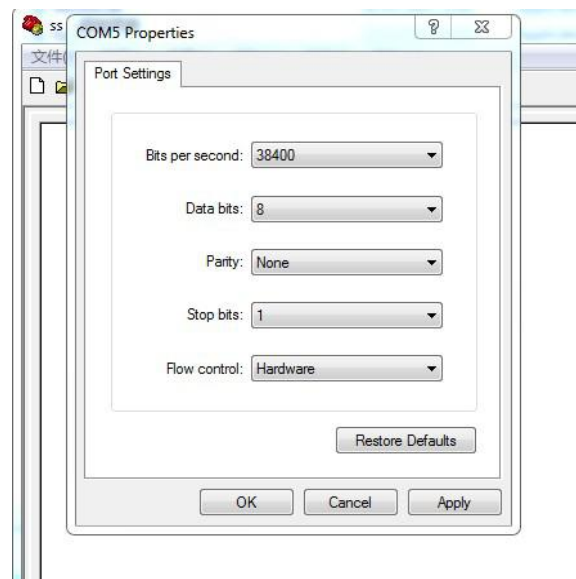
The USB connection status can always be checked by terminal monitor applications like Putty or HyperTerminal. Ensure that the COM port is set at 38400bps, 8, N and 1. HyperTerminal on Windows is shown as an example to illustrate this process below:

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QK-A022 is in COM5

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



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

```

!AIVDM,1,1,,A,B6:fnn@00:1hUhSCCUP000N021Mk,0*2D
!AIVDM,1,1,,A,H6:cd@U61G3Cifh00000006@A880,0*10
!AIVDM,1,1,,A,36:tnh500087@U0==TLWF'Tf0DhJ,0*49
!AIVDM,1,1,,A,16:26d5000'7Wc0=;qc7'bFP05ah,0*17
!AIVDM,1,1,,A,369D6aU00087War=;quu=Dh>0000,0*7F
!AIVDM,1,1,,A,168u:v@P00'74jP=>BoMwvB00S8,0*75
!AIVDM,1,1,,A,403s131uv:ck:87B5@==oAi00D9u,0*70
!AIVDM,1,1,,A,16:V40PP1L86gnb=>FmrIgvj0@IL,0*33
!AIVDM,1,1,,A,168upK0P00'7BEH==hS<=wvr0<5e,0*3A
!AIVDM,1,1,,A,168uRKPP01871<2==<mVrgw60HED,0*6E
!AIVDM,1,1,,A,B6:fnn@00:1hUhSCCUP000N021Mk,0*2D
!AIVDM,1,1,,A,H6:cd@U61G3Cifh00000006@A880,0*10
!AIVDM,1,1,,A,36:tnh500087@U0==TLWF'Tf0DhJ,0*49
!AIVDM,1,1,,A,16:26d5000'7Wc0=;qc7'bFP05ah,0*17
!AIVDM,1,1,,A,369D6aU00087War=;quu=Dh>0000,0*7F
!AIVDM,1,1,,A,168u:v@P00'74jP=>BoMwvB00S8,0*75
!AIVDM,1,1,,A,403s131uv:ck:87B5@==oAi00D9u,0*70
!AIVDM,1,1,,A,16:V40PP1L86gnb=>FmrIgvj0@IL,0*33
!AIVDM,1,1,,A,168upK0P00'7BEH==hS<=wvr0<5e,0*3A
!AIVDM,1,1,,A,168uRKPP01871<2==<mVrgw60HED,0*6E
!AIVDM,1,1,,A,B6:fnn@00:1hUhSCCUP000N021Mk,0*2D
!AIVDM,1,1,,A,H6:cd@U61G3Cifh00000006@A880,0*10
!AIVDM,1,1,,A,36:tnh500087@U0==TLWF'Tf0DhJ,0*49

```

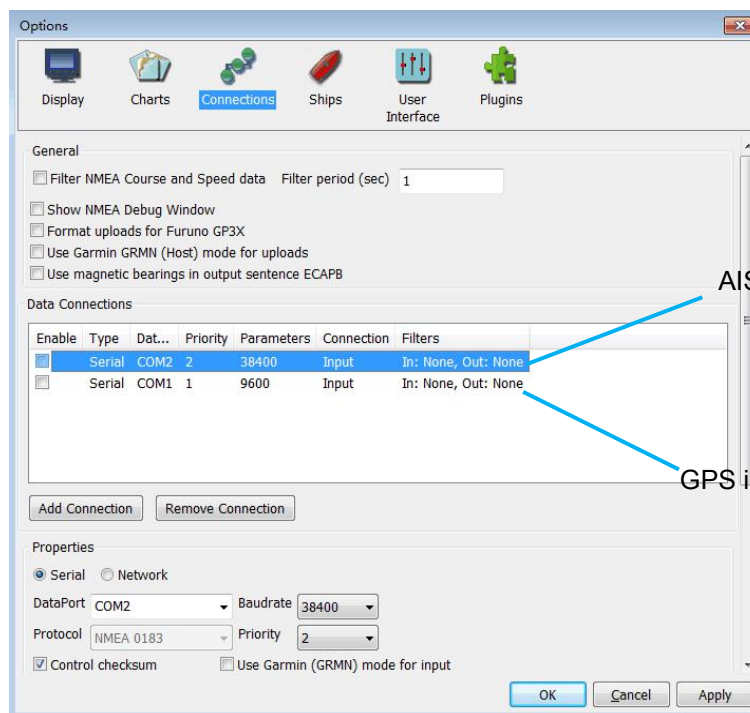
2.3. Run application

Run any AIS NMEA-183 compatible chart software (such as OpenCPN or SeaClear) and then start to view the displayed AIS information.

**3 USING QK-A022 WITH OPENCNP**

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 OS X system. The following is a sample setting for the OpenCPN plotter. COM2 was set as the QK-A022 input and COM1 is used for a standard serial port GPS input.

Other software is available such as SeaClear, PolarNavy, PolarView. They all have similar set up processes.



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### 4 ANTENNA INSTALLATION

AIS communication system uses frequencies in the maritime VHF band, which is considered to be 'line of sight' radio. What this means is that if the QK-A022 antenna cannot 'see' the antennas of the vessels the AIS signals from vessels will not reach QK-A022. Practically, this is not a strict requirement, a few buildings and trees between them will 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 in certain directions, giving uneven coverage.

AIS communication system frequencies are close to the duplex channels used for marine communication, so the 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 AIS signal, proper separation equipment (e.g., 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](mailto:info@quark-elec.com)



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