Guideline on installing and connecting NmeaRouter on a Windows computer with OpenCPN or any other program only accepting Serial Data

OpenCpn now accepts both UDP and TCP input, so you no longer require to use the technique described below. This information is left for legacy reasons.

I'm extremely grateful to Wim van der Heijden for preparing the tutorial explaining how to connect

AisDecoder and OpenCPN simultaneously to a Serial AIS receiver using NmeaRouter

Explanation
You have a problem if you are receiving serial (or USB) data and you wish to output this data to two programs simultaneously, if one of the programs will **only** accept serial data.
You cannot connect two programs to the same port at the same time on the same PC. When you try and connect the second program the PC will tell you the "port is in use".

If you are receiving AIS or GPS data from a device which has a serial or USP output this must be connected to a program that will open the port allocated by the PC to this device (for example COM23). NmeaRouter or OpenCPN can open COM23 but not both at the same time. If you connect NmeaRouter first, when you try and connect OpenCPN you will receive the "port in use" error and vise versa. This will occur irrespective of the two programs you are trying to use at the same time.

If the first program receiving the serial (or USB) data can output network data (TCP or UDP), and the second program accepts network data the problem goes away. It is only an issue if the first program can only communicate with the second program using serial (or USB) data.

Unfortunately OpenCPN, which is a widely used open source plotting program, only accepts networked data in two different formats. These are Garmin and Json neither of which are commonly used as an output format by other programs. NmeaRouter will output the data simultaneously to both programs but does not output either of these formats, it will only output the received format (NMEA). NmeaRouter will not convert NMEA into Garmin or Json hence it must communicate with OpenCPN using a serial port.

There is a solution, which is by creating what is called a Virtual Com Port (VCP) Pair. A VCP Pair is in fact a device driver, it is not a user program. It is similar to a USB driver. A USB driver connects (internally) a physical USB port (you plug the USB device into) to a Virtual Com Port (VCP). The incoming data on the physical USB port is sent to the Output of the VCP (eg COM23). When you connect a program (eg OpenCPN) to the USB device, you specify in OpenCPN, COM23 as the Input connection.

When you create a VCP Pair (described later), two Com ports will be created (eg COM11 & COM12), the driver internally will connect the Output of COM11 to the Input of COM12 and vise versa. Neither port physically exists, but it allows the Output of the first program to be Input into the second program. In effect both programs can now share the same port as long as the Output of one program is the Input of the other.

The Input of Program 1 is COM23   NmeaRouter
The Output of Program 1 is COM11 NmeaRouter
The Input of Program 2 is COM12   OpenCPN

Program 1 (NmeaRouter) and Program 2 (OpenCPN) are now using the same serial data.

NmeaRouter can simultaneously output the data to other programs running on the same PC (for example AisDecoder), via either a Network Connection or another VCP.

You do not need to create a VCP when sending data to a physical port (serial or USB) because the port will only have one device connected to the physical port.

Tutorial

The **NmeaRouter** program is designed to connect an AIS station or an AIS receiver to the **AisDecoder** program and any other AIS application like an electronic chart system at the same time on the same computer. This guideline describes the installation on a Windows XP, Vista or Windows 7 computer only.

The input is a receiving unit for AIS Messages, further called the **AIS receiver**, with an NMEA output. The interface can be a serial (also called RS232 or COM) port or an USB output. There are three options now:

1.   In case you have a serial input connector and a serial input port on your computer you have just to connect the AIS receiver to your computer. The computer will assign a COM port number automatically.

2.   If you have a serial output connector and just an USB input on your computer you need to connect a hardware serial to USB interface and to install the software supplied with it. Normally the software will assign a COM port number to the connection. If not, you need to install an USB to serial converter as described in the next step.

3.   If the AIS receiver has an USB output you need to connect it directly to the USB input on the computer and install an USB to serial converter. The software will be supplied with your AIS receiver or can be downloaded for free from the internet. An example is http://www.ftdichip.com/Drivers/VCP.htm but there are several others. Some equipment has the converter already incorporated and may install it automatically.

After installing the converter and connecting the AIS receiver you can check the Device Manager of your operating system to control the installation and to note the assigned COM port number for further use. COM23 is assigned in this example.
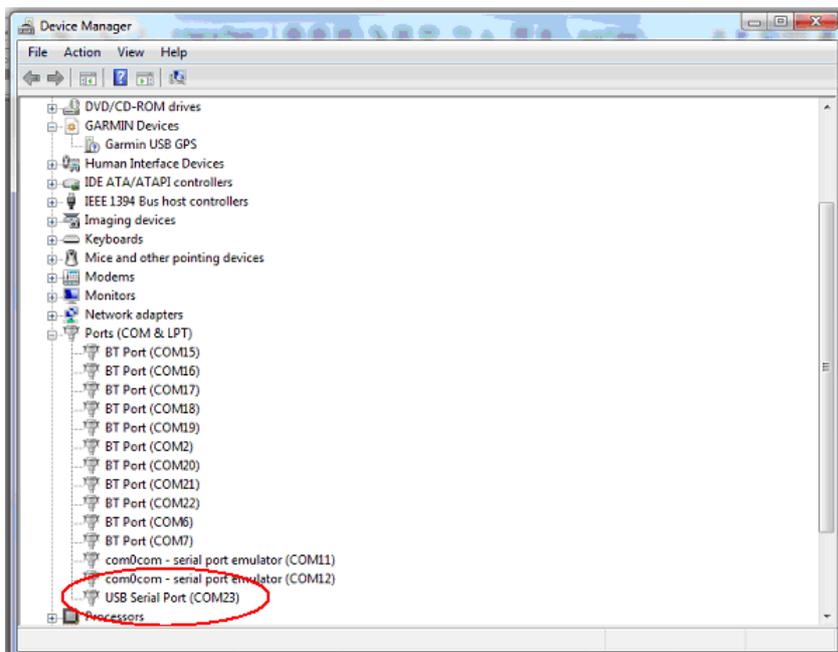
For connecting two applications on the one and only input device it is needed to make a sort of internal splitter to route the AIS data to both applications. For that you need to download the serial port emulator **com0com** on http://sourceforge.net/projects/com0com/. Take edition 3.0.0.0-i386-and-x64-unsigned for Windows XP and Vista. Take edition 2.2.2.0-x64-fre-signed for Windows 7 (because of the acceptation during installation). In the installation you see one of the following pictures (left for XP and Vista, right for Windows 7):
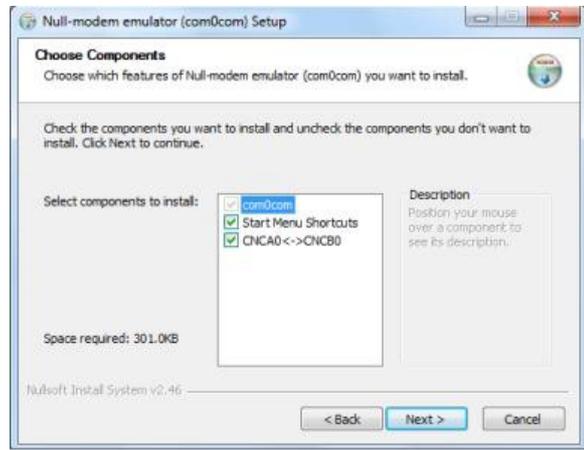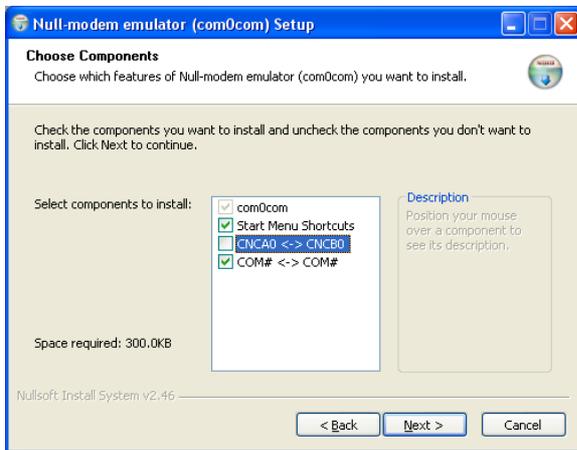
In Windows XP and Vista uncheck the box CNCA0<->CNCB0 because you do not need this!
In Windows 7 launch the Setup Command Prompt shortcut. Enter the change commands:
Command> change CNCA0 PortName=COM11
Command> change CNCA0 PortName=COM12

Check the installation with the Device Manager again.
It should show ↓ for Windows XP and Vista   and ↓ in Windows 7.
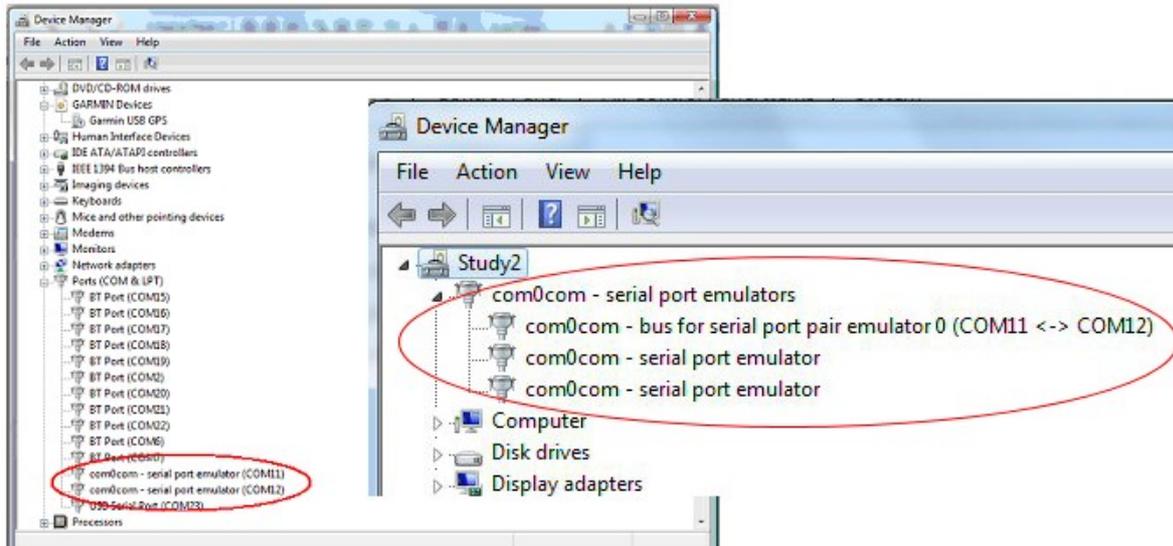
COM 11 and COM 12 in this example are assigned for the serial port emulator. Make a note of the COM ports for the further installation of the NmeaRouter.

Of course you installed the NmeaRouter on your computer but be aware that it should be version 1.1.42 or higher. Also the AisDecoder (latest edition is 3.1.0.108) should be installed.
Now the NmeaRouter will be *Configured* in the following steps:
1.   Make a *New Connection* for the AIS receiver and give it a name, AIS receiver in this case but it can be any other name as well.

The AIS receiver is connected on the Serial port COM 23 as described before so it should be set as:
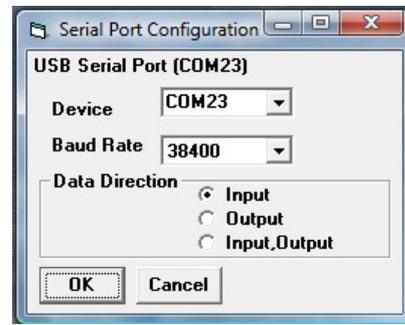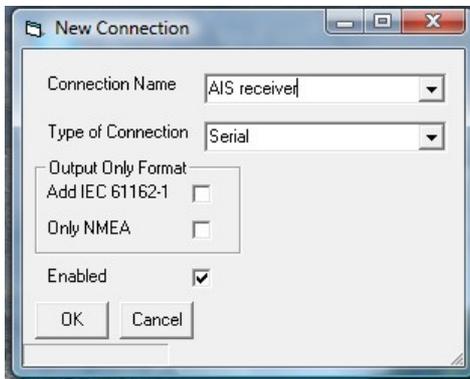
Set the Baud Rate on 38400 (should be specified by the supplier of your AIS receiver and set the AIS receiver as Input.

2.   Make a *New Connection* for the AisDecoder program on the same way. However this should be an UDP connection. It is Output, the Remote Host (your computer) is addressed by 127.0.0.1 and the Remote Port for the AisDecoder is 29421.
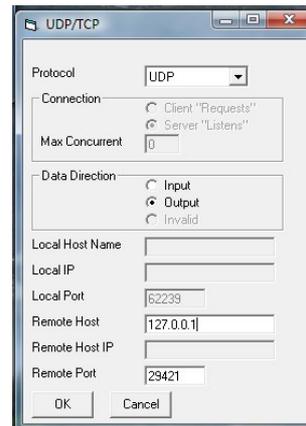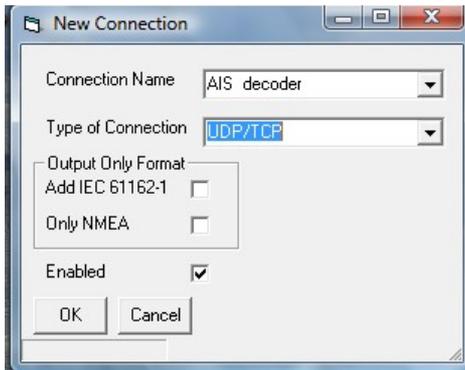
3.   For the real connection we need to make a *New Route* between the AIS receiver and the AisDecoder. This is done by:
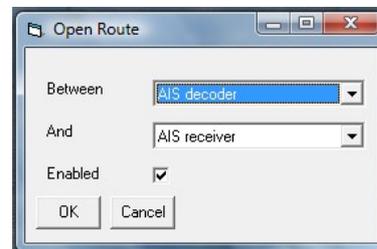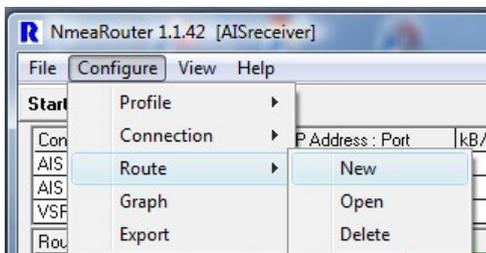
4.   To check the connections so far press the *Start* button and you should see the following picture now:
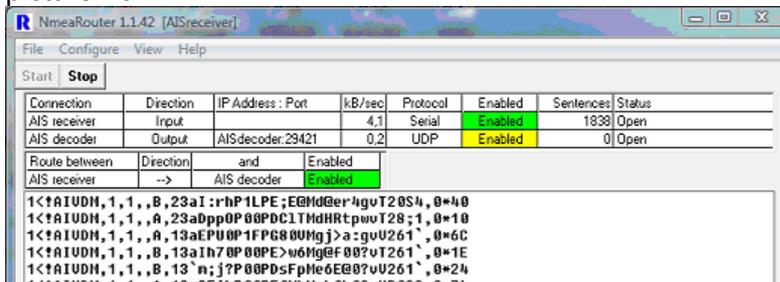
The incoming NMEA sentences of the AIS receiver are shown now in the lower window of the NmeaRouter program. Start the AisDecoder now (in Windows 7 *Run as Administrator* during the installation procedure, otherwise you are not able to set the proper settings). As soon as the AisDecoder is running, the following picture should be added on your screen:
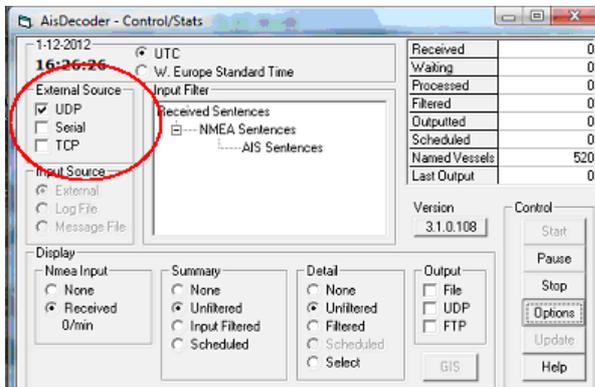
Be sure that you choose UDP as External Source. If you *Start* the AisDecoder you should see
the AIS receptions as chosen on the screen above (Summary and Detail windows Unfiltered in
this example. See the instructions for AisDecoder to filter and display AIS receptions).

We have one application connected to the AIS receiver now.

5.   The next step is to connect a second application on the same computer and on the
same time using the NMEA sentences from the AIS receiver. In this document we connect the
program OpenCPN to display AIS ships on the electronic chart while AisDecoder is running as
well. Because OpenCPN will only accept a serial port as input
we need to define a Virtual Serial Port (VSP) to share the data between both applications. We
make a *New Connection*, here called VSP. It is Serial, the port number is the first one from the
com0com configuration, COM 11 in this example, the Baud Rate should be 38400 and it is
Input, Output.
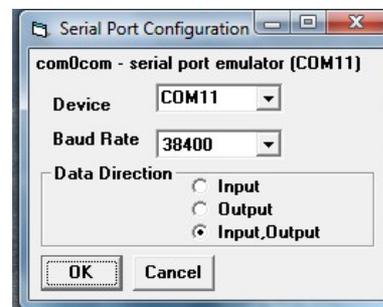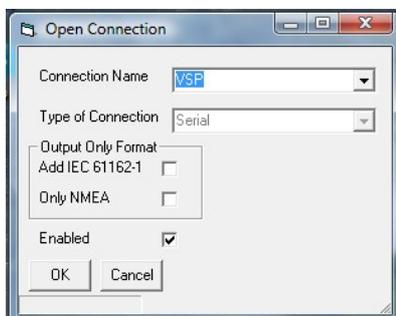
6.   Finally we need a *New Route* between the VSP and the AIS receiver.
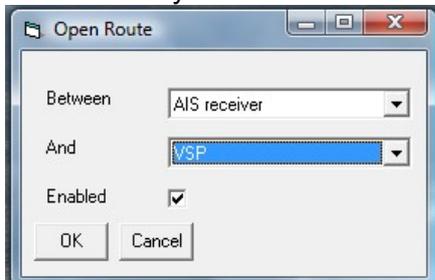
Now we have a virtual connection from the AIS receiver to COM 11 and via the VSP to COM 12.
Now OpenCPN is started. Via its Toolbox the AIS input (here called AIS Data Port) is set to
COM 12, the other end of the virtual connection.
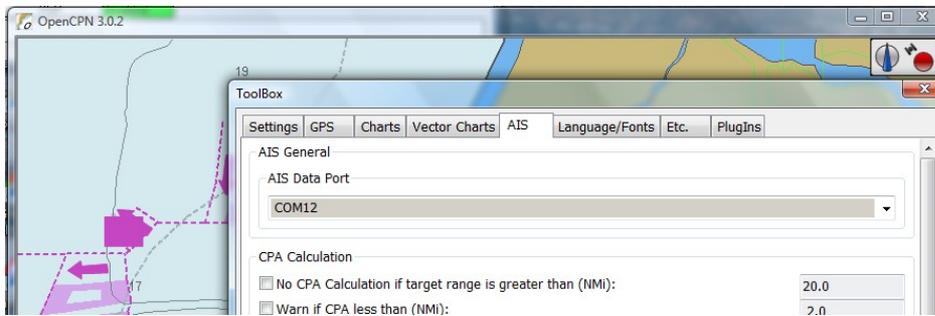
Now the installation is complete! Don't forget to *Save* your settings (*Profile*) of the NmeaRouter:
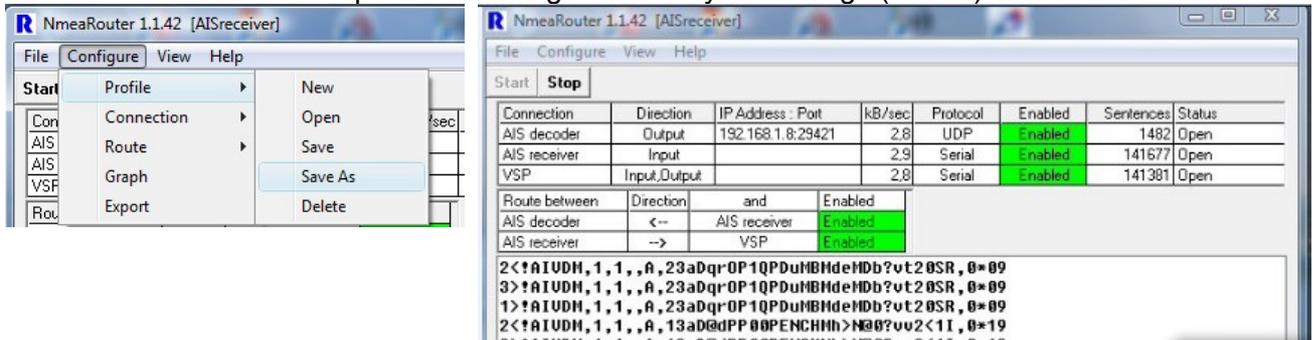
The final picture of the NmeaRouter should be similar as shown here on the right above.

The two applications together, AisDecoder and OpenCPN, can be seen on a screenshot of the total picture below. On the left-top the NmeaRouter with the NMEA sentences received, the right-top the AisDecoder main window with a summary of the received AIS messages below and on the left-bottom OpenCPN with a number of AIS ships on it. Once running, the NmeaRouter can be minimized of course (but don't press Stop otherwise the AisDecoder and OpenCPN do not get input) in order to create space on the screen e.g. for specific information of one particular AIS ship.