



USER GUIDE

SEANEXX

Models: RX100/RX110/RX200/RX210, Mobile AIS

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Change history:

Date	Revision	Responsible	Reason for change
12/21/2015	1.0	POT	Creation This user guide is based on the German version v1.2.
02/08/2016	1.1	POT	Updated warning notices. Added IP parameters for UDP/TCP.

Validity:

This revision of the user guide has been created for the following firmware, software and hardware versions (models RX100/RX110/RX200/RX210), and more up-to-date versions, provided nothing else is specified on www.seanexx.com.

Date	Firmware
4/30/2015	1.1.0

Date	Configuration tool
5/5/2015	1.1.4

Date	Hardware
9/30/2014	5400015A01 (RX100/RX110) 5400016A01 (RX200) 5400020A02 (RX200/RX210)

SEANEXX:

SEANEXX refers to a product family from FT-TEC Electronics GmbH comprising a wide range of AIS transponder and receiver systems for maritime applications. Model variants differentiate the respective products. When term SEANEXX is used in this manual without any further addition, models RX100, RX110, RX200 and RX210 are meant.

Mobile AIS:

Mobile AIS is the combination of a SEANEXX receiver, a rechargeable battery and an AIS WiFi module, which enables the visualization of AIS data via an app on a tablet or smartphone.

Subject to technical changes. Typographical and printing errors excepted.

All figures are symbolic photos.



FCC WARNING: CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.



This device¹ complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

¹ CE certified: RX100/RX110 (5400015A01), RX200 (5400016A01), RX200/RX210 (5400020A02)
FCC certified: RX110 (5400015A01), RX200/RX210 (5400020A02)

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1 About these instructions

Read the safety instructions carefully before start-up. Observe the warnings in the operating instructions.

Always keep the operating instructions to hand. If you sell or pass on the device, ensure the instructions stay with the device.

Symbols used in this document:



This symbol makes reference to potential risks of injury or harm to health.



This symbol makes reference to important information.



This symbol makes reference to actions that may entail damage to the product itself or other objects.

2 Safety instructions



THE SEANEXX RX100/RX110/RX200/RX210 HAS NO LIGHTNING PROTECTION. BEAR IN MIND THAT A HIGH ENOUGH ENERGY EVENT AT THE ANTENNA INPUT (ESPECIALLY WHEN CONNECTING A FIXED SHIP ANTENNA OUTSIDE) CAN DAMAGE BEYOND REPAIR THE PC OR LAPTOP CONNECTED. INJURY TO THE USER CANNOT BE ELIMINATED IN SUCH CASES EITHER.



The device has no approval to IEC 60945. Performance can vary accordingly. Please note that the SEANEXX is subject to other standards.

A transponder certified to IEC 60945 for example can receive on both AIS channels simultaneously. Unlike the SEANEXX RX200/RX210, the RX100/RX110 can only receive on one channel, i.e. even when alternating mode is enabled (frequency hopping between AIS channels 1 and 2), lost messages must be expected on the disabled channel.



THE SEANEXX RX100/RX110/RX200/RX210 IS ONLY INTENDED FOR HOBBY USERS. NEVER USE IT ON A CENTRAL CONTROL COMPUTER ON YOUR SHIP. THE DEVICE IS INTENDED SOLELY FOR INFORMATION AND VISUALIZATION, NOT FOR PROFESSIONAL NAVIGATION.



THE DISTANCE BETWEEN THE ANTENNAS OF THE SEANEXX AND YOUR RADIO EQUIPMENT/TRANSPONDER MUST BE AT LEAST 4 METERS. THE HIGH TRANSMITTER POWER OF THE RADIO MIGHT DAMAGE THE SEANEXX.



The device satisfies Protection Class IP50 and so must be protected from water of all kinds.



Do not use the pigtail adapter in combination with the bar antenna as this considerably reduces reception performance.

3 Scope of delivery

Before installing the SEANEXX, check the contents of the delivery, which should contain the following depending on your order number:



	SEANEXX USB AIS receiver	Angled adapter	Bar antenna	BNC pigtail adapter	UHF pigtail adapter	Clip antenna	Magnetic base antenna	5V rechargeable battery (incl. micro-USB cable)	AIS WiFi module	5V cigarette lighter adapter	Micro-USB cable	Quick start guide (German/English)
RX100-STA*	RX100	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>
RX110-STA*	RX110	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>
RX200-STA*	RX200	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>
RX100-UHF/BNC	RX100			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>
RX110-UHF/BNC	RX110			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>
RX200-UHF/BNC	RX200			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>
RX210-UHF/BNC	RX210			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>
RX110-UHF/BNC/CPA	RX110			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>
RX200-UHF/BNC/CPA	RX200			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>
RX210-UHF/BNC/CPA	RX210			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>
RX110-UHF/BNC/MBA	RX110			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
RX200-UHF/BNC/MBA	RX200			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
RX210-UHF/BNC/MBA	RX210			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
RX200-UHF/BNC/WIFI**	RX200			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RX210-UHF/BNC/WIFI**	RX210			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RX200-UHF/BNC/MBA/WIFI**	RX200			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RX210-UHF/BNC/MBA/WIFI**	RX210			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RX200-UHF/BNC/CPA/WIFI**	RX200			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RX210-UHF/BNC/CPA/WIFI**	RX210			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* These models are obsolete and not available anymore

** These variants are referred to as **Mobile AIS** (see section 9.4)

SEANEXX USB receiver	Angled adapter	Bar antenna	UHF pigtail adapter	BNC pigtail adapter	Quick start guide																						
					 <p>KURZANLEITUNG SEANEXX 1. Lieferumfang</p> <table border="1"> <thead> <tr> <th>SEANEXX USB AIS Receiver</th> <th>UHF Pigtail Adapter</th> <th>BNC Pigtail Adapter</th> <th>Angled Adapter</th> <th>Bar Antenna</th> <th>Clip Antenna</th> <th>Magnetic Base Antenna</th> <th>5V Rechargeable Battery</th> <th>AIS WiFi Module</th> <th>5V Cigarette Lighter Adapter</th> <th>Micro-USB Cable</th> </tr> </thead> <tbody> <tr> <td>SEANEXX USB AIS Receiver</td> <td>UHF Pigtail Adapter</td> <td>BNC Pigtail Adapter</td> <td>Angled Adapter</td> <td>Bar Antenna</td> <td>Clip Antenna</td> <td>Magnetic Base Antenna</td> <td>5V Rechargeable Battery</td> <td>AIS WiFi Module</td> <td>5V Cigarette Lighter Adapter</td> <td>Micro-USB Cable</td> </tr> </tbody> </table> <p><small>* Diese Modulevarianten sind nur nach Auf Anfrage erhältlich * Diese Varianten haben unter der Bezeichnung Mobile AIS</small></p>	SEANEXX USB AIS Receiver	UHF Pigtail Adapter	BNC Pigtail Adapter	Angled Adapter	Bar Antenna	Clip Antenna	Magnetic Base Antenna	5V Rechargeable Battery	AIS WiFi Module	5V Cigarette Lighter Adapter	Micro-USB Cable	SEANEXX USB AIS Receiver	UHF Pigtail Adapter	BNC Pigtail Adapter	Angled Adapter	Bar Antenna	Clip Antenna	Magnetic Base Antenna	5V Rechargeable Battery	AIS WiFi Module	5V Cigarette Lighter Adapter	Micro-USB Cable
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SEANEXX USB AIS Receiver	UHF Pigtail Adapter	BNC Pigtail Adapter	Angled Adapter	Bar Antenna	Clip Antenna	Magnetic Base Antenna	5V Rechargeable Battery	AIS WiFi Module	5V Cigarette Lighter Adapter	Micro-USB Cable																	

Clip antenna	Magnetic base antenna	5V rechargeable battery	AIS WiFi module	5V cigarette lighter adapter	Micro-USB cable
					

* Figures are symbolic photos



The required software including the USB driver is not part of the delivery. It can be downloaded from www.seanexx.com.

4 Overview of the FT-TEC AIS SEANEXX

4.1 Introduction

The SEANEXX RX100/RX110/RX200/RX210 is a state-of-the-art USB AIS receiver with the size of a conventional USB stick. It enables easy and quick reception of AIS² information (such as positioning information of ships) in maritime applications using VHF³, and visualization on a PC or laptop. Just four steps are required (see figure 1).



- 1** Install the USB driver / software (download at www.seanexx.com)
- 2** Fit the angled adapter to the SEANEXX (to use with the bar antenna for test purposes)
- 3** Fit the antenna to the angled adapter⁴
Please read the hint in the footnote if using a different antenna.
- 4** Connect the SEANEXX to a free USB port on the PC or laptop

Figure 1: SEANEXX with angled adapter and bar antenna

² "Automatic Identification System"

³ "Very High Frequency", 161.975 MHz to 162.025 MHz

⁴ Only use the angled adapter for the associated bar antenna. Please note that the bar antenna is only suitable for test purposes. The reception range possible with it is very limited and so only works satisfactorily when AIS targets are in close proximity. Please use dedicated AIS antennas for this to attain longer ranges.

An antenna with SMA jack can be directly connected to the SEANEXX without the angled adapter. Commonly used jacks for maritime antennas are BNC and PL-295. Use the appropriate pigtail adapter to connect these types of antennas.

4.2 The key features at a glance



The SEANEXX is available as four model variants:

- RX100: Single channel AIS receiver
- RX110: Single channel AIS receiver with integrated GNSS which provides your ship's own position.
- RX200: Dedicated two-channel receiver for simultaneous reception of both AIS channels
- RX210: Dedicated two-channel receiver with integrated GNSS



Do you already know *Mobile AIS*? Mobile AIS is the combination of a SEANEXX receiver, a rechargeable battery and an AIS WiFi module, which enables the visualization of AIS data via an app on a tablet or smartphone. More information on this is available in section 9.4 and on www.seanexx.com.

RX100	RX110	RX200	RX210	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	supports AIS channels 1 and 2 (161.975 MHz/162.025 MHz)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			fixed channel select or frequency hopping in selectable seconds interval
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	simultaneous reception of both AIS channels
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	SMA antenna connector
	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	GPS, QZSS, GLONASS and BeiDou, 72 channels
	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	integrated GNSS antenna
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	small form factor (LxWxH 64.5x20.3x10.8 mm including antenna and USB connection)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	status LED
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	USB 2.0 Full Speed port
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	voltage supply directly from USB port
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	virtual COM port (baud rate 115200), compatible with all AIS plotter software tools with COM port
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	display of NMEA 0183 VDM messages
	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	display of NMEA 0183 RMC and GSA messages
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	various configuration options (such as channel select, enable/disable GNSS and frequency hopping)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	can run on Windows®, Linux and Mac OS X

4.3 Comparison of different SEANEXX models

The four models available from FT-TEC Electronics GmbH (RX100, RX110, RX200 and RX210) differ with regard to their functional scope. The models look the same and only their device details on the back tell them apart (refer to section 6). All models are used in the same applications. The SEANEXX is primarily intended to receive AIS information in maritime applications, and so represents the interface between radio and AIS software (such as OpenCPN) which displays information graphically.

Because your preference is also to know the position of your own ship for the graphical display, you should have a GPS mouse in addition when using the RX100 or RX200.



GPS is working properly only if your device has clear view to the satellites. Do not use the SEANEXX models with integrated GPS under deck or besides your radio communication unit.

Table 1: Differences between SEANEXX models

	RX100	RX110	RX200	RX210
Channels receivable	1	1	2	2
Frequency hopping	yes	yes	not required	not required
Max. power consumption [mA]	60	80	65	85
GNSS	no	yes	no	yes
Sensitivity [dBm]	-109	-109	-106	-106
Status LEDs	red	red	red/blue	red/blue
Weight [g]	12	13	12	13

5 Brief description of AIS

5.1 What is AIS?

AIS stands for *Automatic Identification System* and is a communication system that operates over registered channels within the maritime mobile VHF band as a self-organizing time slot method (161.975 MHz and 162.025 MHz). It is based upon an open, unencrypted protocol with which information is transmitted and received autonomously with no interaction from ship or operating personnel. In addition to this autonomous mode, capabilities are also provided for the transmission of short, safety-related messages when there is human interaction.

The information generated autonomously and transmitted to other ships or to shore via a broadcast is dynamic information such as position, speed and course, but also static and cruise-related information such as draft and ship type. Transmission is at regular intervals, and the transmission interval depends on the speed and any course changes of the ship in question. This information is processed by the receiver and can be visualized on a display, generally an *Electronic Chart Display and Information System (ECDIS)*. Current position information is referenced geographically with the respective ship identification of the AIS stations received, and displayed on a digital map.

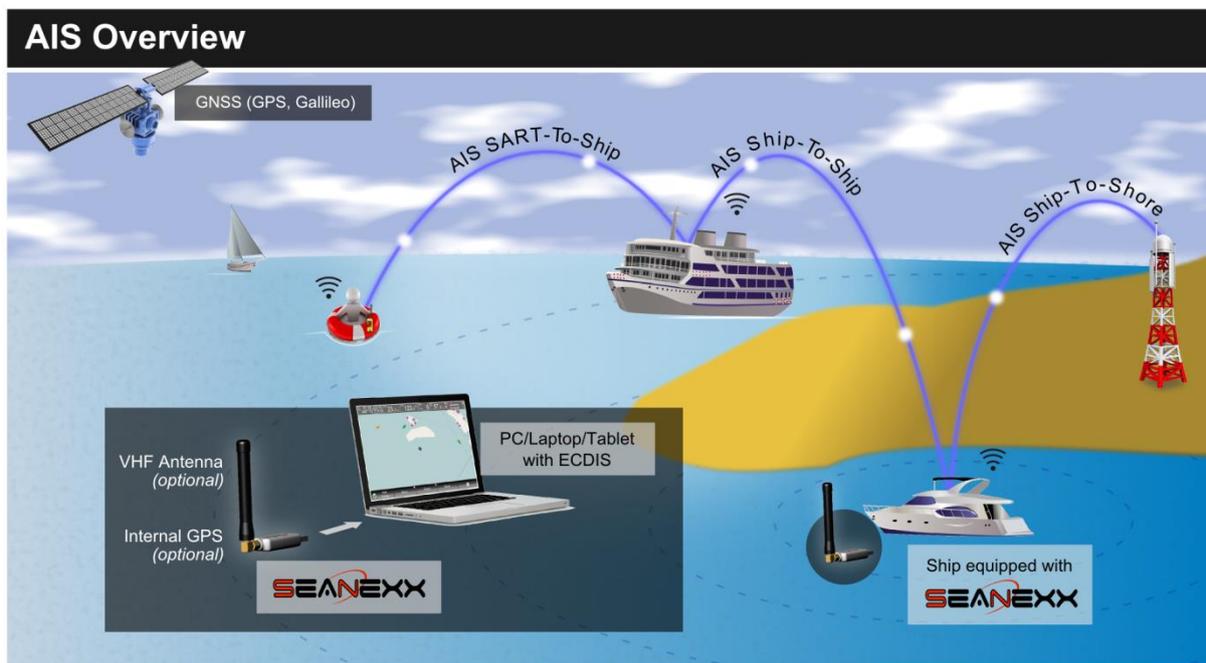


Figure2: Overview of the AIS network

The aims of AIS are to make navigation at sea safer and to preserve the environment by preventing accidents by means of targeted assistance in navigation tasks. In the year 2000 AIS was accepted as a binding standard by the *International Maritime Organization* (IMO). Since 2002, an equipment upgrade obligation has been in place for all ships fulfilling the following criteria:

- Ships with a gross cubic content of over 300 GRT⁵ on international voyages
- Ships with a gross cubic content of over 500 GRT on national voyages
- Ships with a length over 20 m
- Ships with over 50 passengers on board

5.2 What transmission modes are supported?

5.2.1 Ship-to-Ship

In this mode, information is transmitted between ships completely autonomously.

5.2.2 Ship-to-Shore

In this mode, a ship communicates with a base station on land. This mode is used primarily for the coordination and controlling of maritime traffic.

5.2.3 SART-to-Ship

SART⁶ devices are transmitters and information is always sent in one direction only.

5.3 What is an AIS transponder?

AIS information is transmitted and received by an "AIS transponder". This essentially comprises the following components:

- GNSS receiver (to determine the position of your own ship)
- Processor and data memory (transponder intelligence)
- Voltage supply
- Antenna (GNSS and VHF)
- 2-channel VHF transmitter/receiver (for transmitting and receiving AIS messages via radio)

⁵ Short for gross register ton. 1 GRT = 100 cubic feet = 2.8316846592 m³.

⁶ Search And Rescue Transmitter. This is a special mobile AIS device which is attached to a life jacket or life raft, and which sends when required its positioning information to all nearby ships fitted with an AIS receiver.

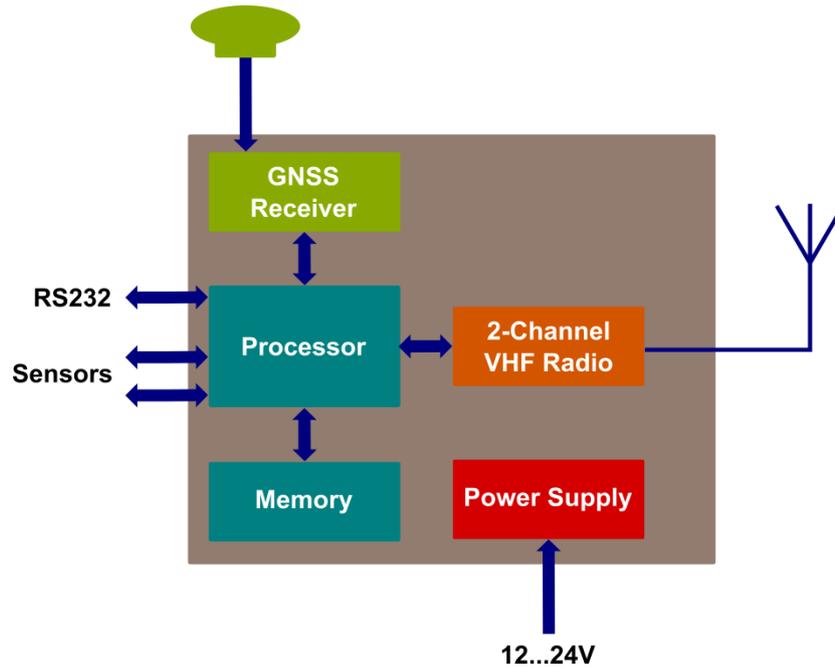


Figure3: Schematic diagram of an AIS transponder

5.4 What transponder classes are there?

A differentiation is made between two classes⁷:

- Class A: Use for commercial shipping
- Class B: Use for recreational shipping

Put very simply, these two classes use different access methods to the AIS network. Class B can only transmit when sufficient free time slots are available. This means messages from Class A devices take priority over Class B. Up to 27 message types are supported depending on class. For more information, refer to Rec. ITU-R M.1371-4 (04/2010)⁸.



Did you know that FT-TEC Electronics GmbH also offers AIS and AIS SART devices which can be integrated into the AIS network and are able to save your life needed?

More information is available from www.seaangel.at.



MOB⁹
seamlessly
when

⁷ Other AIS system components include Aids to Navigation (AtoN) transponders, search and rescue (SAR) aircraft, AIS base stations (on shore) and AIS simplex/duplex repeaters.

⁸ <http://www.itu.int/rec/R-REC-M.1371>

⁹ Man over Board. This is a special mobile AIS device which is attached to a life jacket, and which sends when required its positioning information to all nearby ships fitted with an AIS receiver.

5.5 Which functions does the SEANEXX support?

The SEANEXX has no VHF transmitter and so cannot be assigned to either of the two transponder classes. It is used solely to receive message types defined in Rec. ITU-R M.1371-4 (04/2010), and for their display via a virtual COM port (VCP) on a PC or laptop. If you have the FT-TEC AIS WiFi module you can visualize the data on a tablet or smartphone as well.

Appropriate PC software (such as HTerm or OpenCPN) enables the information received to be shown in a text-based or graphical format.

The SEANEXX is available as four models - the RX100 (VHF receiver only), the RX110 (VHF and GNSS receiver), the RX200 (dedicated 2-channel receiver) and the RX210 (dedicated 2-channel receiver with GNSS).

6 SEANEXX components



Figure 4: SEANEXX components

6.1 Supported antennas

The SEANEXX can be used with any VHF/AIS antenna. Ensure that the antenna comply with the following:

- 50 Ohm impedance
- SMA jack for direct connection to the SEANEXX SMA connector and BNC or PL-295 jack for use with the pigtail adapters respectively
- Frequency range: 161.95 MHz to 162.05 MHz
- RG 58 coaxial cable or better

The SEANEXX may be used directly on the VHF antenna of the radio communication unit using a suitable splitter.



Figure 5: Different connector types used with antenna systems

Tested antenna systems and appropriate field reports can be found in the online shop at www.seaangel.at/shop:

- Clip antenna used for tool-free installation on the railing
- Magnetic base antenna for mounting on a metal surface



The magnetic base antenna can be fixed on a flat metal surface with the size of at least 50 cm x 50 cm. For best performance do not mount on pipes, the railing or a nonconductive surface.



Figure 6: Clip (left) and magnetic base antenna (right)

7 Product characteristics

7.1 Technical characteristics

Product name:	SEANEXX
Model name:	RX100 (VHF receiver) RX110 (VHF + GNSS receiver) RX200 (VHF 2-channel receiver) RX210 (VHF 2-channel receiver + GNSS)
Dimensions (LxWxH):	64.5 x 20.3 x 10.8 mm
Weight (without antenna/pigtail):	RX100: 12 g RX110: 13 g RX200: 12 g RX210: 13 g
Power supply:	5 VDC from USB port of PC/laptop
Power consumption:	RX100: max. 60 mA RX110: max. 80 mA RX200: max. 65 mA RX210: max. 85 mA
Interfaces:	USB 2.0 Full Speed (type A connector), NMEA 0183
VHF receiver:	<p><i>All models:</i></p> <ul style="list-style-type: none"> - Frequencies: Channel AIS1 (161.975 MHz) Channel AIS2 (162.025 MHz) <p><i>Only RX100/RX110:</i></p> <ul style="list-style-type: none"> - Fixed frequency (default setting) or - alternating between channels AIS1 and AIS2 with adjustable frequency hopping interval - Sensitivity: -109 dBm at 20% PER <p><i>Only RX200/RX210:</i></p> <ul style="list-style-type: none"> - Simultaneous reception of both AIS channels - Sensitivity: -106 dBm at 20% PER
Integrated GNSS receiver:	<p><i>Only RX110/RX210</i></p> <ul style="list-style-type: none"> - GPS, QZSS, GLONASS and BeiDou (simultaneous reception possible) - Navigation sensitivity: -167 dBm - Integrated antenna

	<ul style="list-style-type: none"> - Cold start ≤ 3 min - 72 channels - 1 Hz update rate
Protection class:	IP50 ¹⁰
Storage/operating temperatures:	-30°C to +75°C
Humidity (storage/operation):	20% to 85% relative humidity
Status LED:	<i>Only RX100/RX110:</i> <ul style="list-style-type: none"> - Red <i>Only RX200/RX210:</i> <ul style="list-style-type: none"> - Red and blue
Housing:	Material: PC/ABS Color: translucent white

7.2 Standards and norms

The product satisfies the following requirements:

- IEC 61108-1:2003:
Maritime navigation and radio communication equipment and systems – Global navigation satellite systems (GNSS) – Part 1: Global positioning system (GPS) - Receiver equipment - Performance standards, methods of testing and required test results
- IEC 60945:2002¹¹:
Maritime navigation and radio communication equipment and systems - General requirements - Methods of testing and required test results (EMC / emissions)
- ETSI EN 301 489-1:2011:
Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
- ETSI EN 301 489-3:2013:
Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for short-range devices (SRD) operating on frequencies between 9 kHz and 246 GHz

The SEANEXX¹² complies to CE and FCC regulations.

¹⁰ Please note that your device is protected from dust but not water.

¹¹ The SEANEXX complies with the relevant parts for EMC emissions. All other requirements of the standard are not applicable.

¹² CE certified: RX100/RX110 (5400015A01), RX200 (5400016A01), RX200/RX210 (5400020A02)
 FCC certified: RX110 (5400015A01), RX200/RX210 (5400020A02)

8 Installation

8.1 System requirements

SEANEXX and the associated configuration tool (*SEANEXX Connect*) run on the popular Microsoft Windows®, Linux and Mac OS X operating systems. The minimum system requirements recommended:



Microsoft Windows® XP or later
Ubuntu 14.x / Debian 8.x or higher
Mac OS X Yosemite Version 10.x or higher (only 64-bit)
Screen resolution 1024 x 768 or higher
1 GHz processor or faster
Minimum 1 GB RAM
1 free USB 2.0 port
Serial terminal program (such as HTerm ¹³ , PuTTY ¹⁴ , SerialTools ¹⁵) or AIS visualization software (such as OpenCPN ¹⁶)

The configuration tool (see also section 9.2) for SEANEXX is optional, but is required to enable/disable and configure the additional functions of your device.



The software is available for download (as a ZIP file) from www.seanexx.com.

¹³ <http://www.der-hammer.info/terminal/>

¹⁴ <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>

¹⁵ Available in the Mac App Store

¹⁶ <http://opencpn.de/>

8.2 Installation of the USB driver and configuration tool

For SEANEXX, you need an USB driver for Windows on your PC or laptop. The driver is part of the installation package for the *SEANEXX Connect* tool, which is required for application-specific configuration of SEANEXX. This enables you to set the frequency hopping interval for example, and to enable and disable GPS on the RX110/RX210.



Make sure you install the software before connecting the SEANEXX to a free USB port.

Driver installation is not required under Linux and Mac OS X because SEANEXX uses the standard driver of the operating system.

The first step, irrespective of operating system, is to download the latest software (as a ZIP file) from the download area of www.seanexx.com, and to extract it to your local hard drive. Below, the local path is abbreviated to `<SW_PATH>`. The ZIP file contains all files necessary for Windows, Linux and Mac OS X.

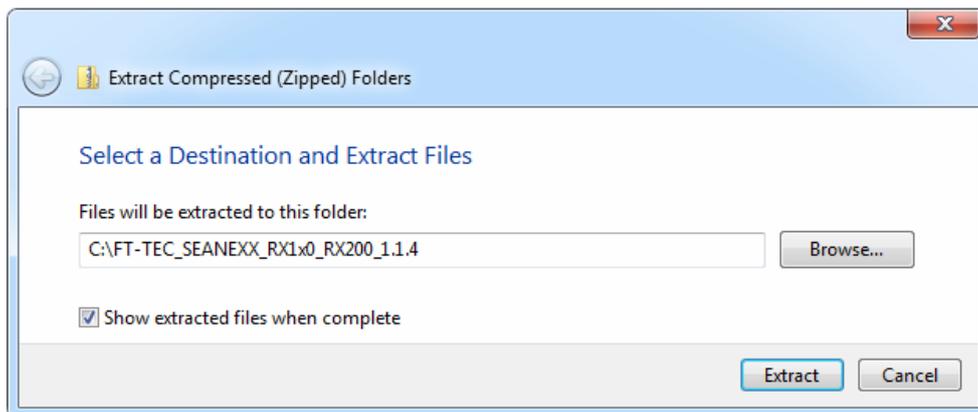


Figure 7: Extracting the SEANEXX software under Windows

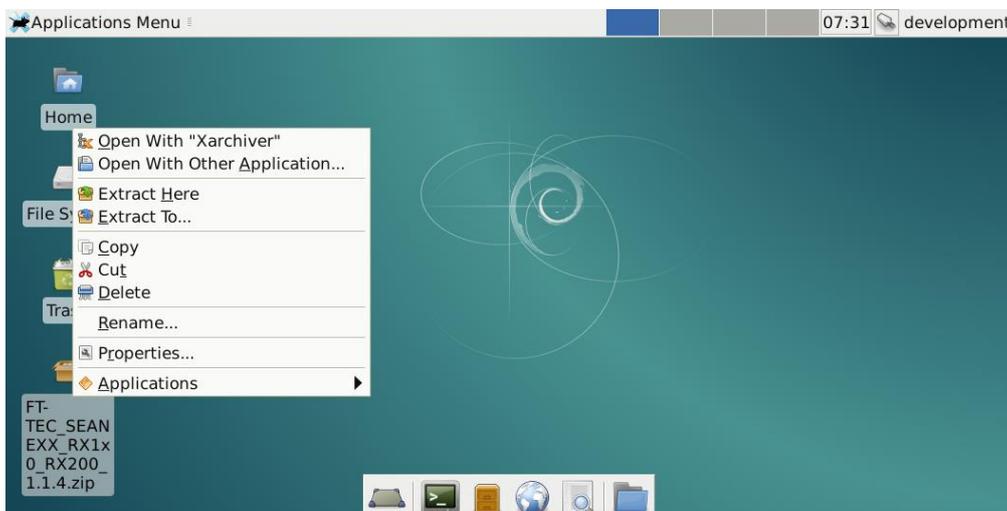


Figure 8: Extracting the SEANEXX software under Linux/Debian



You don't need to extract the downloaded ZIP file using Mac OS X. Simply double click on the file and install the configuration tool directly.

In the following sections you'll find descriptions for the installation process under various operating systems. Skip those sections that are not applicable for your operating system.

8.2.1 Software installation and determination of COM port created under Windows

1. Switch to the `<SW_PATH>/Windows/Tools/SEANEXXConnect` directory and start the installation of the *SEANEXX Connect* configuration tool by double-clicking on the executable file with the extension *.exe.

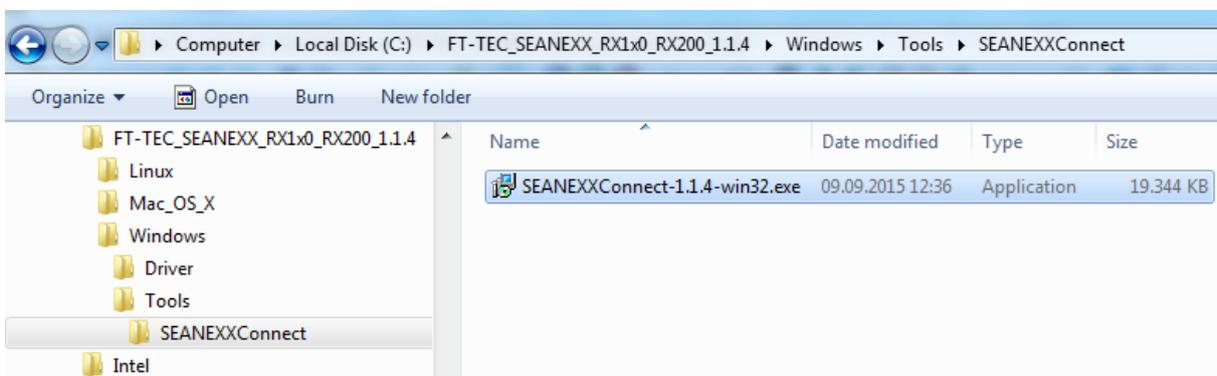


Figure 9: Directory path in the Windows Explorer

2. The Wizard accompanies you through the entire installation process. Please make sure you also install the VCP (USB) driver because otherwise your SEANEXX will not be detected by your operating system.

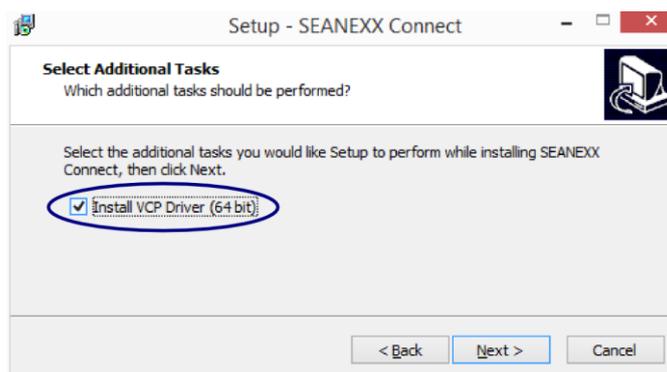


Figure 10: SEANEXX installation Wizard for VCP driver

3. Connect the SEANEXX to a free USB port.



Figure 11: Connecting the SEANEXX to an USB port

The driver installed previously is assigned to your device, and a new COM port named *STMicroelectronics Virtual COM Port* is listed in the device manager. The SEANEXX is accessible over COM22 as in the example in figure 12. In Appendices 13.1 to 13.2 are descriptions on how you can open the device manager.

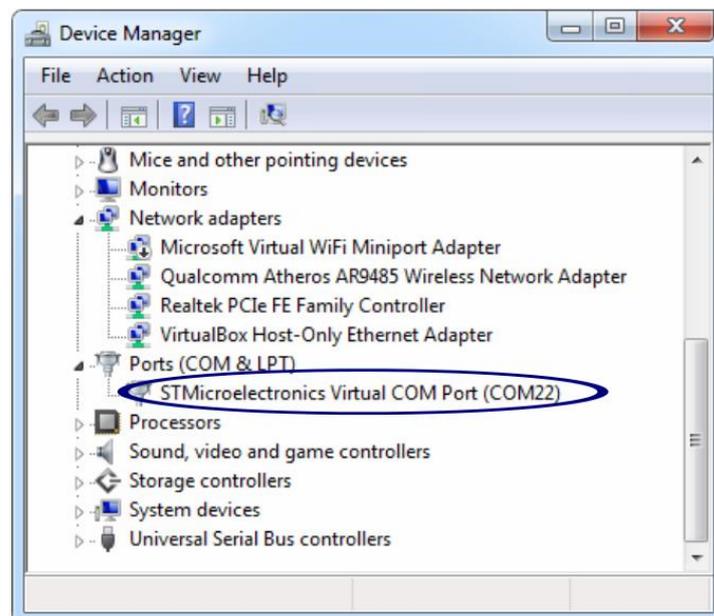


Figure 12: Windows device manager

8.2.2 Software installation and determination of COM port created under Linux

1. Switch to the `<SW_PATH>/Linux/Tools/SEANEXXConnect` directory, which contains package files (*.deb) for different Linux systems. Now select the package

corresponding to your system. Ensure here that the 32-bit (*i386*) and 64-bit (*amd64*) variants are available.

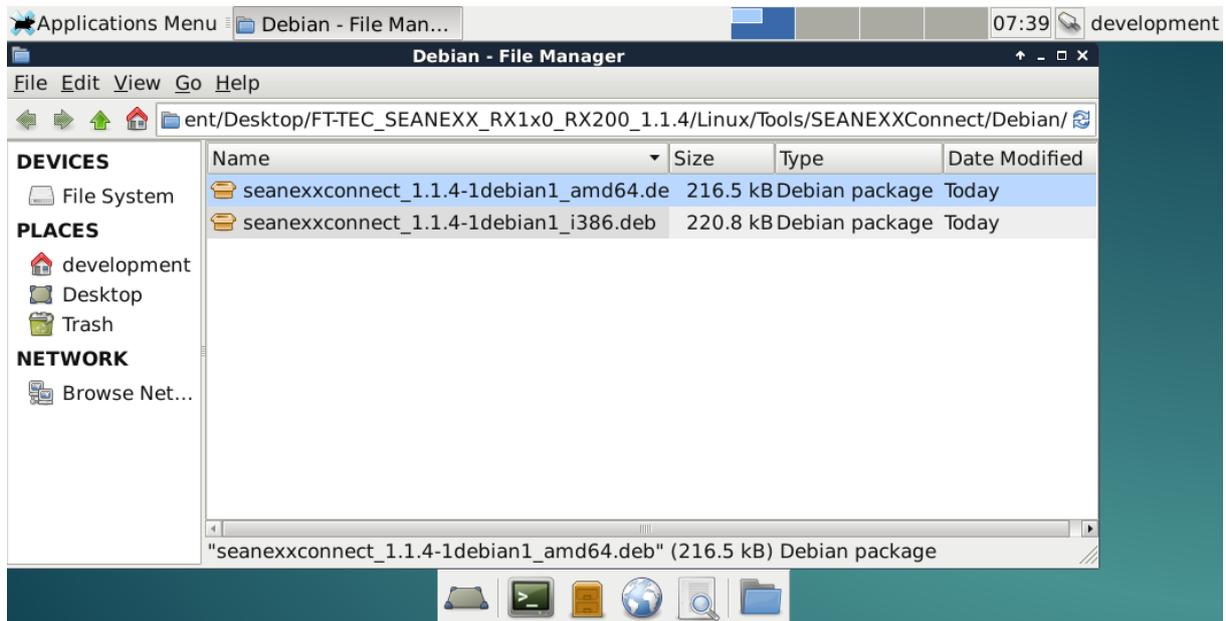


Figure 13: Directory path in Linux/Debian File Manager

2. Open a shell/terminal (e.g. *bash*) and install the right package. This is abbreviated to `<PACKAGE_NAME>` below.

```
sudo dpkg -i <PACKAGE_NAME>.deb
```

3. Connect the SEANEXX to a free USB port.



Figure 14: Connecting the SEANEXX to an USB port

No separate driver installation is required under Linux if the Linux distributions recommended previously are used (see section 8.1). You can use the shell/terminal to check whether the device has been detected. Enter the following command to do this:

```
shell> lsusb | grep 0483
```

The response should look something like this:

```
shell> Bus 001 Device 002: ID 0483:5740 SGS Thomson Microelectronics
```

4. Determine the virtual COM port assigned to this device and run the following command in the shell/terminal:

```
shell> dmesg | grep ttyACM
```

The SEANEXX is recognized as *ttyACMx* (x is any digit). At least one line should be displayed (depending on the number of times you have plugged in and unplugged the USB device) which shows a specific port. If multiple, different TTY devices are listed, remove the device from the USB port again, then plug it back in and immediately run the above command. The last line contains the interface required.

8.2.3 Software installation and determination of COM port created under Mac OS X

1. Switch to the `<SW_PATH>/Mac_OS_X/Tools/SEANEXXConnect` directory, which contains a disc image. The image will be mounted/attached by double clicking on tile with the extension `*.dmg`. There is no further installation step required to use SEANEXX Connect on Mac OS X. You can use the tool by clicking on *seanexxconnect*, but this will be explained in chapter 9.2.

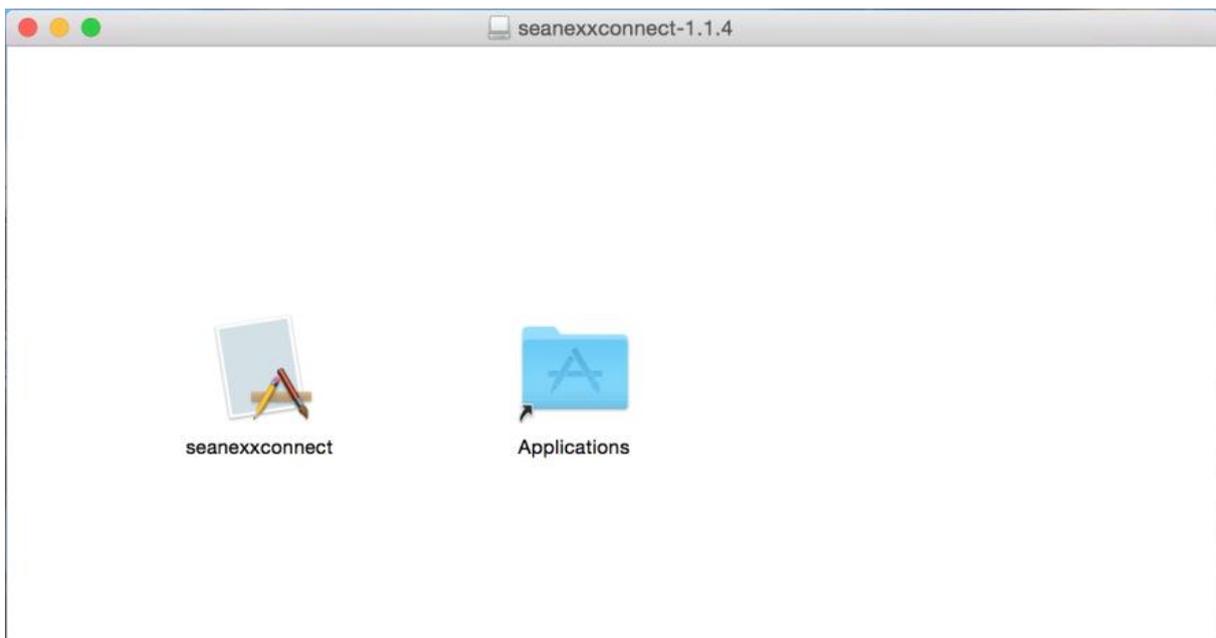


Figure 15: Content of the disc image under Mac OS X.

2. Open a shell/terminal by entering *terminal* in the finder/spotlight.
3. Connect the SEANEXX to a free USB port.



Figure 16: Connecting the SEANEXX to an USB port

No separate driver installation is required under Mac OS X. You can use the shell/terminal to check whether the device has been detected. Enter the following command to do this:

```
shell> ls /dev | grep tty.usbmodem
```

Use the hot key ALT+7 for the | char.

The response should look something like this:

```
MacBook:~ user$ ls /dev | grep tty.usbmodem
tty.usbmodem002B0051
MacBook:~ user$
```

Figure 17: Terminal output under Mac OS X

In the given example, the SEANEXX can be accessed using `/dev/tty.usbmodem002B0051`. `002B0051` is the unique serial number of your SEANEXX, which may be used to distinguish the devices if multiple SEANEXX sticks are connect to your laptop/PC.

8.2.4 Functional test under Windows and Linux



Remember that the SEANEXX can only receive AIS messages with the antenna connected. Another prerequisite is that there is an AIS transponder/transmitter in reception range.

To test the functionality, open any serial terminal program (such as HTerm or PuTTY) or AIS software (such as OpenCPN) with the following settings:

- COM port: COM22 (example for Windows) or /dev/ttyACM0 (example for Linux)
- Baud rate: 115200 (also supported: 4800, 9600, 38400, 57600)
- Coding: 8 data bits, 1 stop bit, no parity
- Newline character: CR + LF

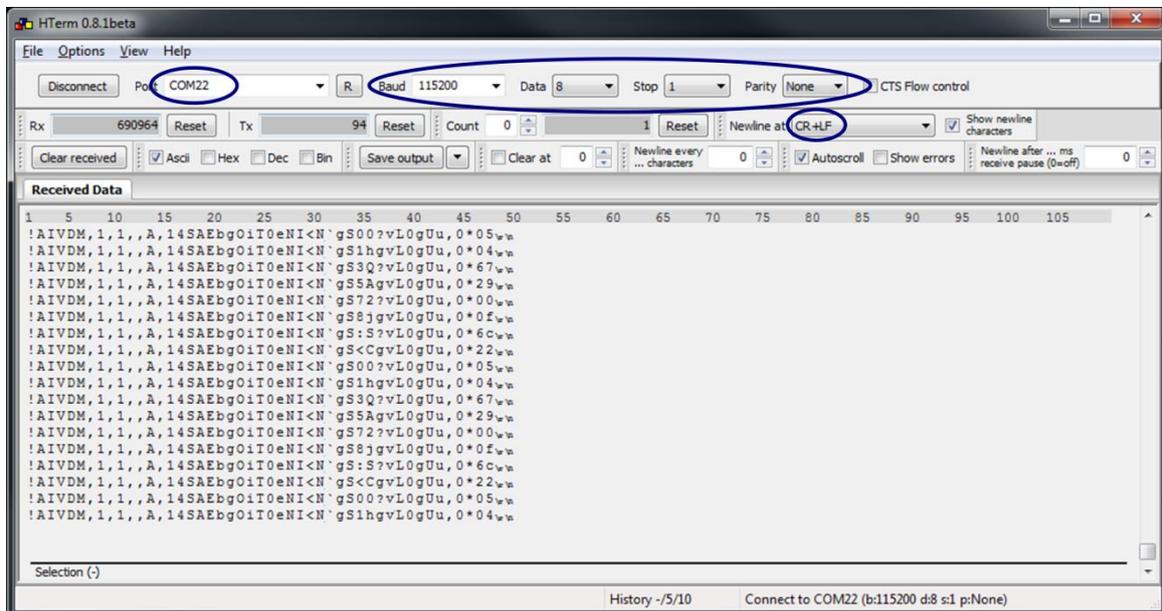


Figure 18: Display of AIVDM messages in HTerm terminal program (Windows/Linux)

If valid information is received over VHF, it is shown as AIVDM messages in the serial terminal. Also, RMC and GSA¹⁷ messages are displayed on the RX110/RX210 (provided GNSS is enabled by the configuration tool).

If there is no AIS transponder within reception range, you can also test the functionality by sending the following command to the SEANEXX from the terminal program¹⁸:

```
$PTFTWR, INF*7E
```

¹⁷ Since firmware version 1.6.x GSA messages will not be shown anymore.

¹⁸ All SEANEXX commands must be confirmed with CR+LF. In HTerm, you must set the value to CR-LF in the *Input Control* window under *Send on enter*.

The response contains the product ID, the model, the hardware and software versions, and the serial number:

```
$PTFTRD,INF,SEANEXX,RX100,5400015,A01,1.2.0,001F0026,A*51
```

8.2.5 Functional test under Mac OS X



Remember that the SEANEXX can only receive AIS messages with the antenna connected. A prerequisite also here is that there is an AIS transponder/transmitter in reception range.

To test the functionality, open any serial terminal program (such as SerialTools) or AIS software (such as OpenCPN) with the following settings:

- COM port: usbmodem002B0051 (example)
- Baud rate: 115200 (also supported: 4800, 9600, 38400, 57600)
- Coding: 8 data bits, 1 stop bit, no parity
- Newline character: CR + LF

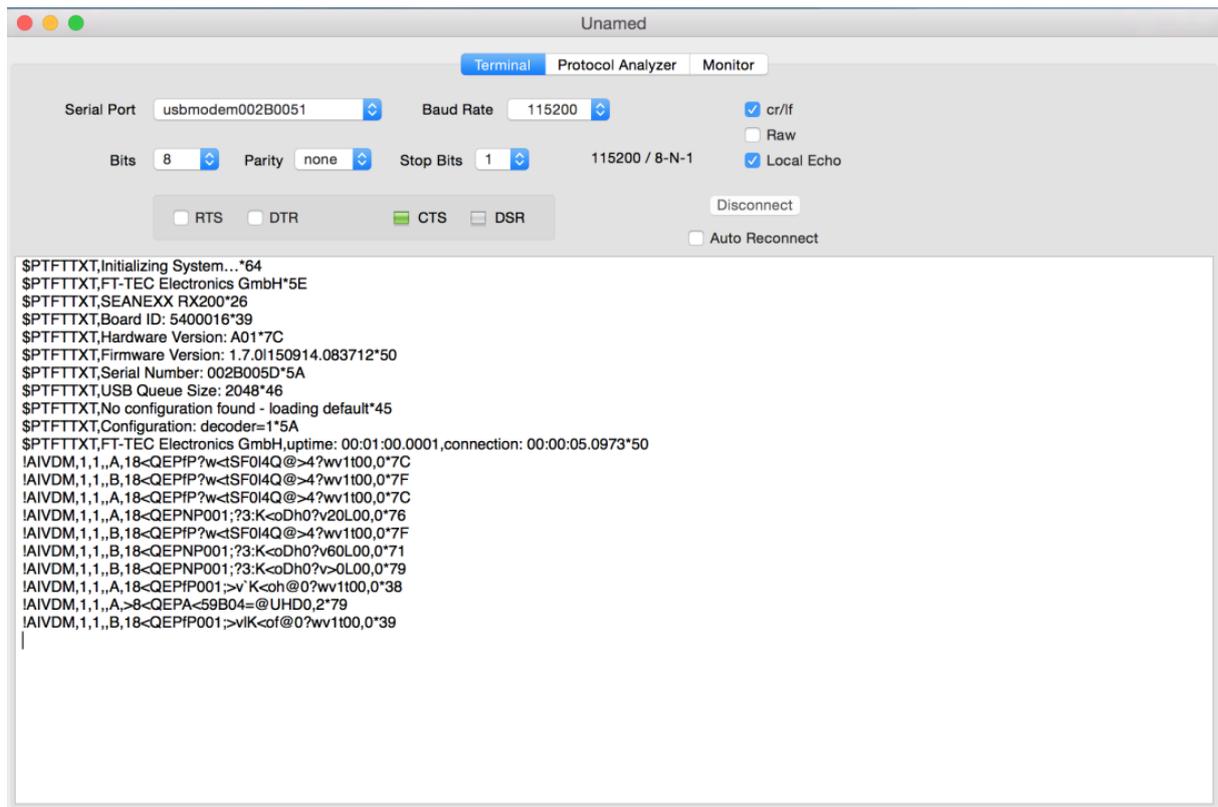


Figure 19: Display of AIVDM messages in SerialTools (Mac OS X)

If valid information is received over VHF, it is shown as AIVDM messages in the serial terminal. Also, RMC and GSA¹⁹ messages are displayed on the RX110/RX210 (provided GNSS is enabled by the configuration tool).

If there is no AIS transponder within reception range, you can also test the functionality by sending the following command to the SEANEXX from the terminal program²⁰:

```
$PTFTWR, INF*7E
```

The response contains the product ID, the model, the hardware and software versions, and the serial number:

```
$PTFTRD, INF, SEANEXX, RX100, 5400015, A01, 1.2.0, 001F0026, A*51
```

¹⁹ Since firmware version 1.6.x GSA messages will not be shown.

²⁰ All SEANEXX commands must be confirmed with CR+LF.

9 Using the USB AIS receiver



THE SEANEXX MAY ONLY BE USED AS AN AID AND NOT SOLELY FOR THE PURPOSES OF NAVIGATION. IT IS NOT A PROFESSIONAL CLASS A OR B AIS TRANSPONDER.



The SEANEXX is not intended to be used outside. When using this device, ensure it is not exposed to the weather (such as rain and direct sunshine).



The device is only intended to be used on ships. Emissions and immunity are regulated by EMC standards (dependent on application). If the device is operated outside the intended environment, it may interfere with other electronic devices (such as broadcasting systems) and may be degraded due to exposure to interference - this is where other standards are applicable.



GPS is working properly only if your device has clear view to the satellites. Do not use the SEANEXX models with integrated GPS under deck or besides your radio communication unit.

9.1 Status display on the receiver

On the RX100/RX110 models, the SEANEXX has a red status LED, and on the RX200/RX210 an additional blue status LED, which shows the status of the VHF interface. Because the housing is made of translucent PC/ABS, the LEDs are only evident when the device is switched on. The dashed area in figure 20 illustrates the position of these LEDs. When the LEDs are permanently ON, the device is active and ready to receive (although no AIS information is being received). If messages can be decoded, the LEDs flash with the interval determined by the channel utilization. On the RX200/RX210, the red LED indicates active data reception on channel AIS1, and the blue LED reception on channel AIS2.



Figure 20: Status LED on the SEANEXX receiver



Status LED flashing: AIS information being received over VHF

LED permanently ON: No data being received

9.2 Using the configuration tool

To start the configuration tool in Windows, use entry *Programs*→*FT-TEC*→*SEANEXX Connect* in the Start menu. In Linux, the link is in the *Application Menu* under *Other*→*SEANEXX Connect*²¹. If you use Mac OS X, you can start the configuration tool after mounting the disc image (see section 8.2.3).

The tool searches for the SEANEXX on your system and connects to it automatically. The status is shown in the status bar and in the dynamic Info Box. Note that this automatic mode does not work if more than one SEANEXX is connected to your PC or laptop. If this is the case, the tool connects to the SEANEXX detected first. You can also use the *Select Port* menu to select the COM port to open.

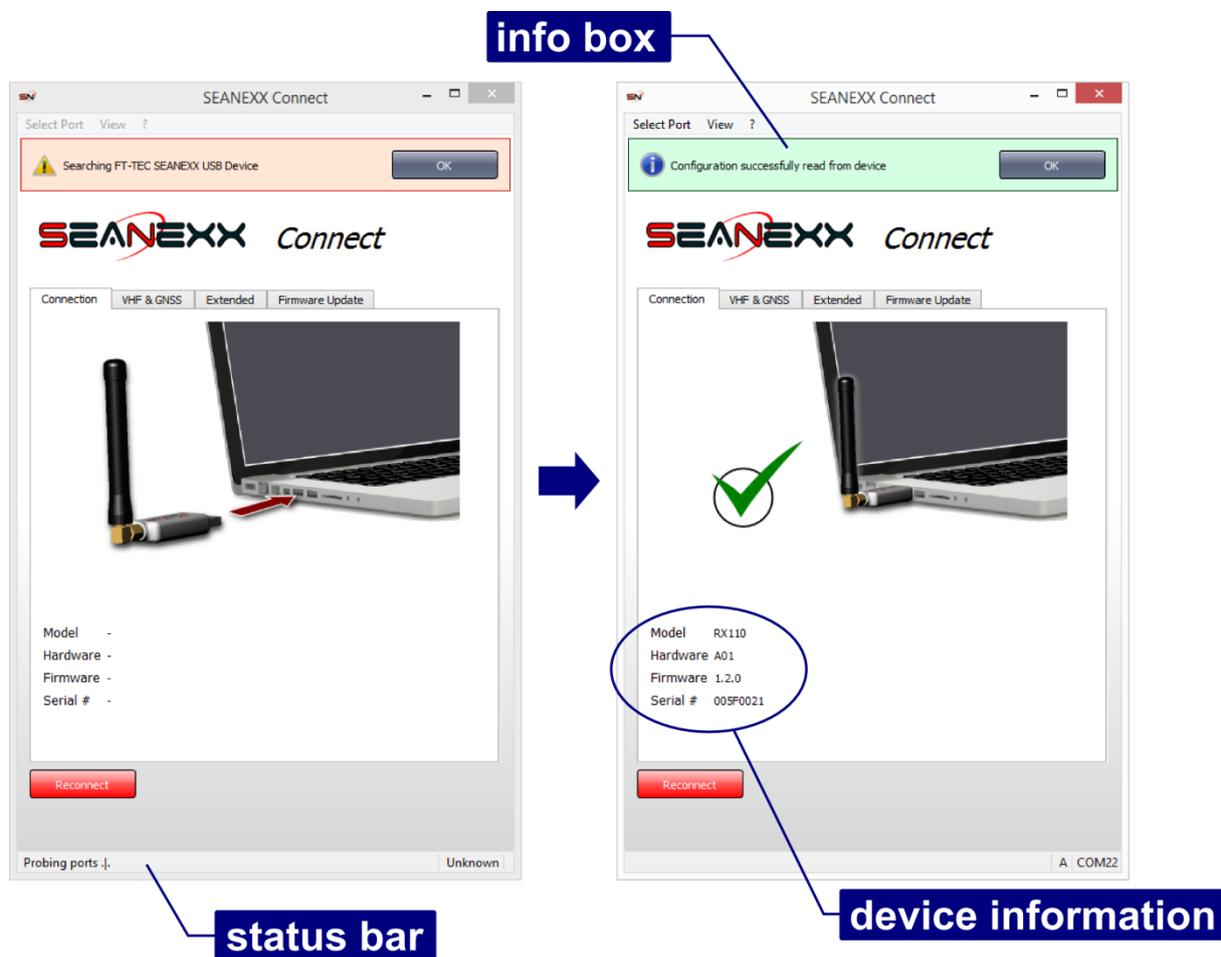


Figure 21: Configuration tool, connection status and device information

²¹ In Linux, the link may also be in a category different to *Other*, and depends mainly on your Linux distribution and its language settings.

If you want to restart the automatic search, use the *Reconnect* button. The tool does not detect when you unplug the SEANEXX from your computer system. The status is also updated accordingly when a new connection is established.

You can only configure the settings of the VHF and GNSS receiver once a connection to the SEANEXX has been established. Tabs *Connection*, *VHF & GNSS*, *Extended* and *Firmware Update* are available for this. A description of the firmware update process is mentioned in section 9.2.1. The following configuration settings are available (dependent on SEANEXX model):

- Channel select:
 - Fixed frequency, either AIS1 (161.975 MHz) or AIS2 (162.025 MHz)
 - Channel hopping, for when you want to automatically switch between the two AIS frequencies within the hopping interval defined
- Hopping interval, can be set between 1 and 60 seconds. Practical values are between 5 and 15 seconds. Please remember that your stick receive data only on the active channel.
- GNSS enabled or disabled
- Decoder type:
 - *Preamble Triggered*: Lower receive sensitivity, but more susceptible as regards interference and noise.
 - *Flag Triggered*: More robust as regards interference and noise, but higher receive sensitivity. Tests in real-world conditions have shown that this decoder type delivers the best results for most scenarios.

The configuration tool generally supports all SEANEXX products with integrated configuration memory. But because the models differ with regard to their functional scope, the setting options not supported by a particular model are automatically disabled. This is highlighted in red in the configuration tool (as shown in figure 22). The model name is on the back of your device and in the *Device information* area in *SEANEXX Connect*.



For queries and support issues, always quote the fault description, the operating system used and the version of *SEANEXX Connect* - in addition to all device information.

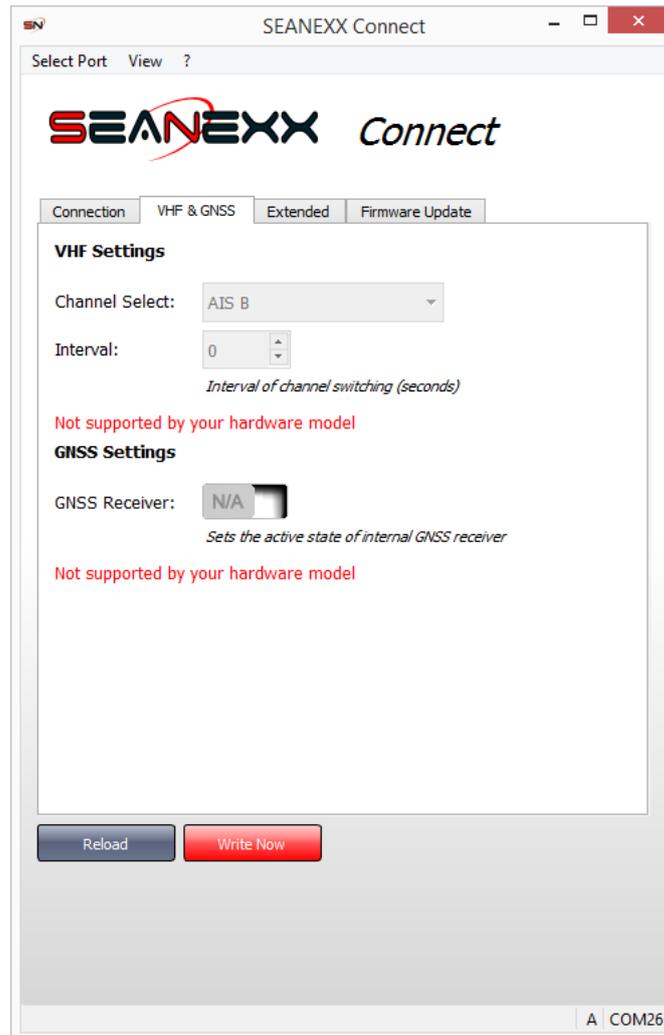


Figure 22: Disabled setting options in the configuration tool

9.2.1 Firmware updates



Updates are only possible for firmware version 1.3.0 and higher. Check this beforehand in the device information displayed in SEANEXX Connect to avoid breaking the device. Please contact Customer Service if you have any questions or require clarification.



Please note that there are different firmware files for the different SEANEXX models. Never use an update intended for a different model. This would make your SEANEXX unusable. The file name of the update always includes the model name.

SEANEXX firmware is the subject of continual optimization and development. Once new firmware becomes available, you can download it (as a ZIP file) from the download area on www.seanexx.com. Firmware is updated from the *Firmware Update* tab.

Unzip the ZIP archive, open the firmware file (*.sff) and start the update process by pressing the *Update* button. A progress bar shows the current status. The process is complete when

this is at 100% (see figure 23). To restart the SEANEXX, close SEANEXX Connect, unplug your device from the USB port and plug it in again. If you reopen SEANEXX Connect, it will display the new firmware version.

Changing to every update made available is not necessary for every user. Read the revision history for the firmware and decide whether it is relevant for you.



When loading a new firmware update, follow these instructions closely because otherwise you could make your SEANEXX unusable. Never interrupt the update process.



Ensure not to load by accident old firmware, or firmware intended for a different model, to your device.

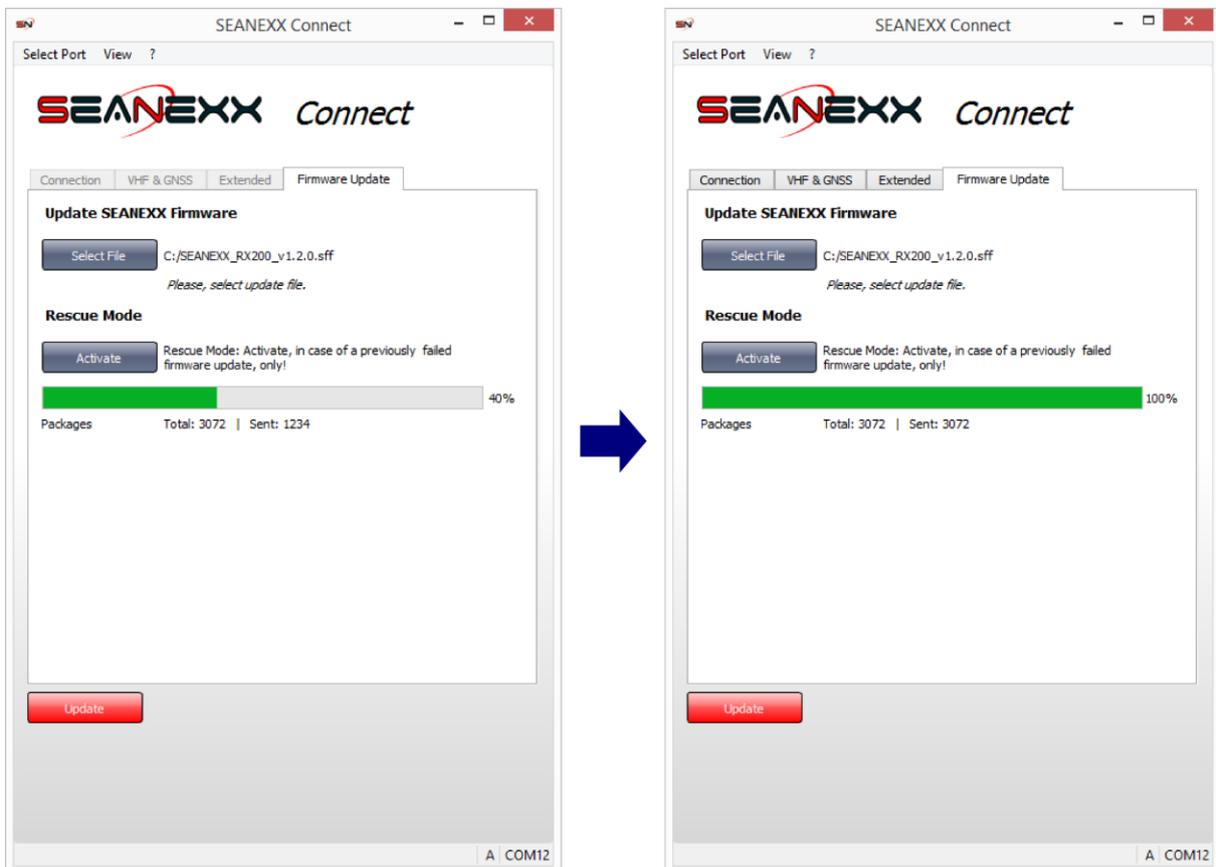


Figure 23: Firmware update

9.3 Using OpenCPN

"OpenCPN is a free software project (GPL) to create a concise chart plotter and navigation software, for use underway or as a planning tool." (<http://opencpn.org>)



You can download OpenCPN from <http://opencpn.de/downloads/opencpn>. Windows, Linux and Mac OS X are supported. You will find the relevant installation instructions on the web page of OpenCPN, therefore it is not further mentioned in this user guide. Free chart material from OpenSeaMap is available from <http://openseamap.org/index.php?id=kartendownload>.

Perform the following steps to use SEANEXX with OpenCPN.

Step 1:

Start OpenCPN and open the *Options* window (see figure 24)

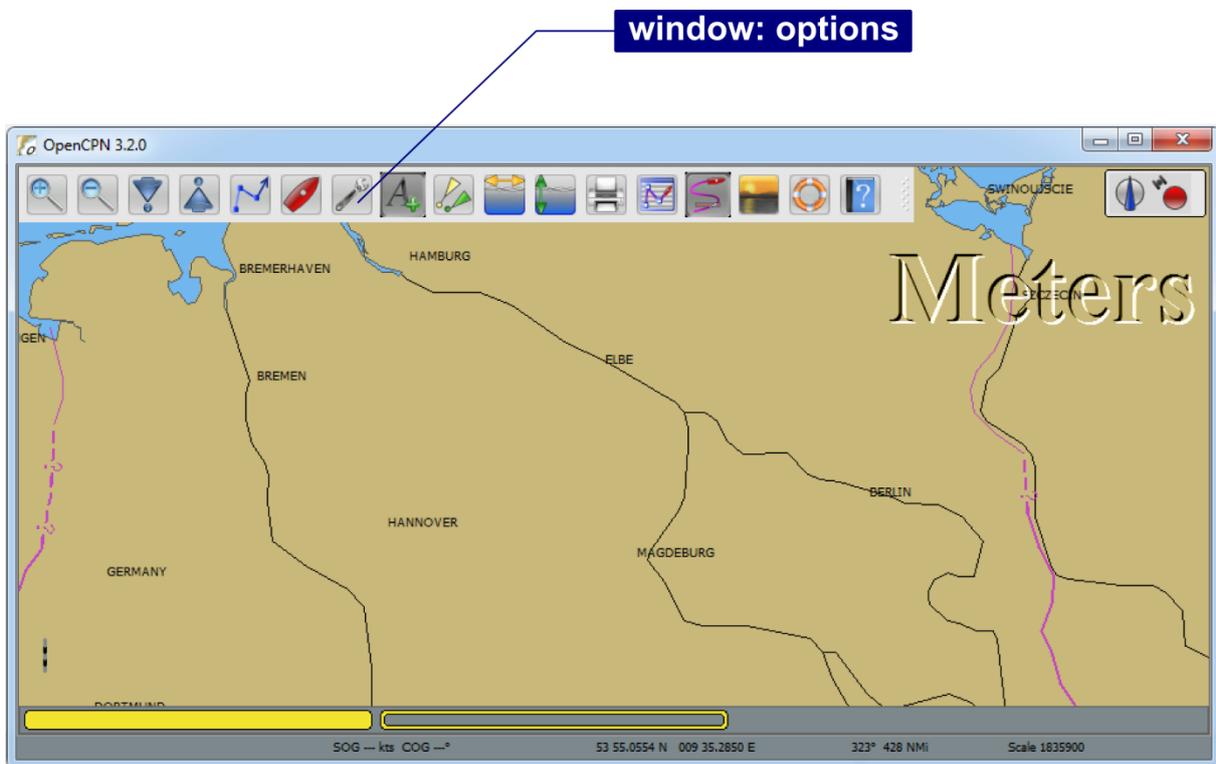


Figure 24: OpenCPN main window

Step 2:

In the *Options* window (see figure 25), add a new connection with the virtual COM port assigned to your SEANEXX (see section 8.2).

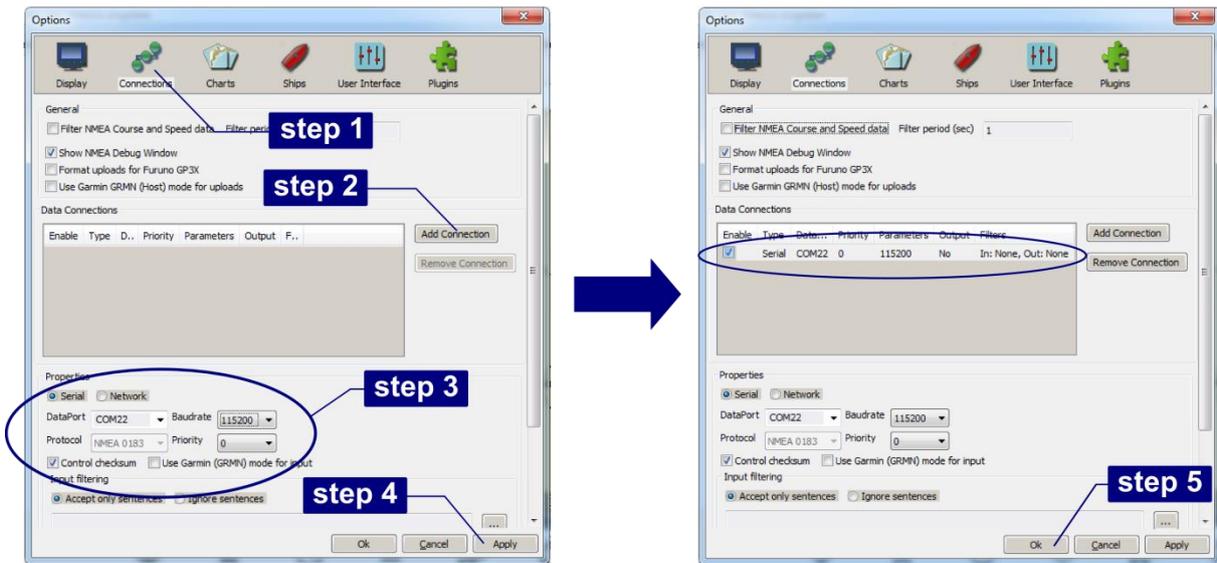


Figure 25: OpenCPN - configuration of the COM interface

Step 3:

Information received is shown in the main window.

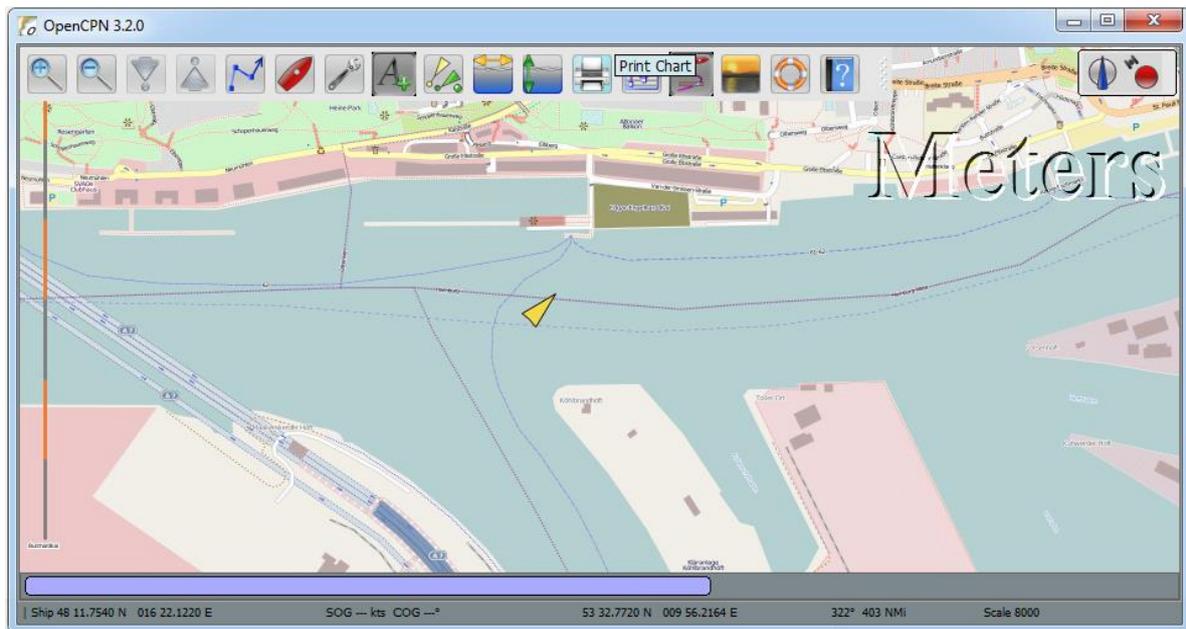


Figure 26: OpenCPN – main window with chart material (OpenSeaMap) of the port of Hamburg



OpenCPN supports many plugins to extend the functionality of this software. A comprehensive user guide with more detailed information is available from <http://opencpn.de/handbuecher>.

9.3.1 Free chart material

You can download free chart material for OpenCPN from <http://map.openseamap.org>. Proceed as follows to do this:

Step 1:

Open the link to OpenSeaMap²² (<http://map.openseamap.org>) in your browser and select *Download chart (Karte Herunterladen)* from the toolbar. A popup opens. Orange denotes the areas for which chart material is available.

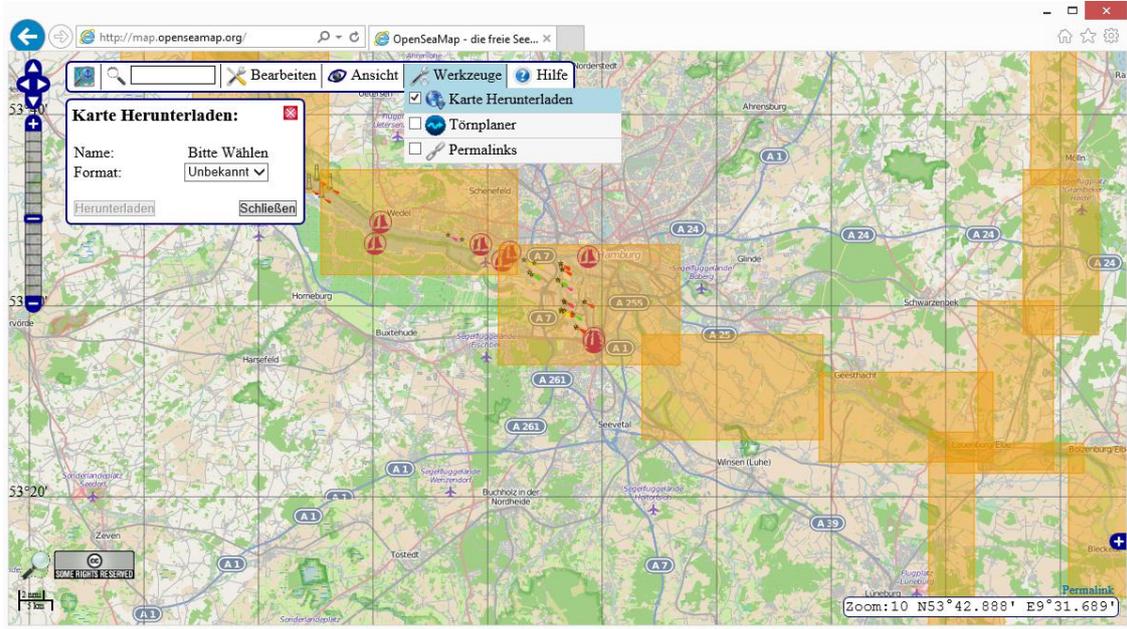


Figure 27: OpenSeaMap – download chart

Step 2:

Select the chart area required. It turns blue and the chart name is displayed in the popup. Select *kap* as the download format, and start the process with the *Download (Herunterladen)* button.

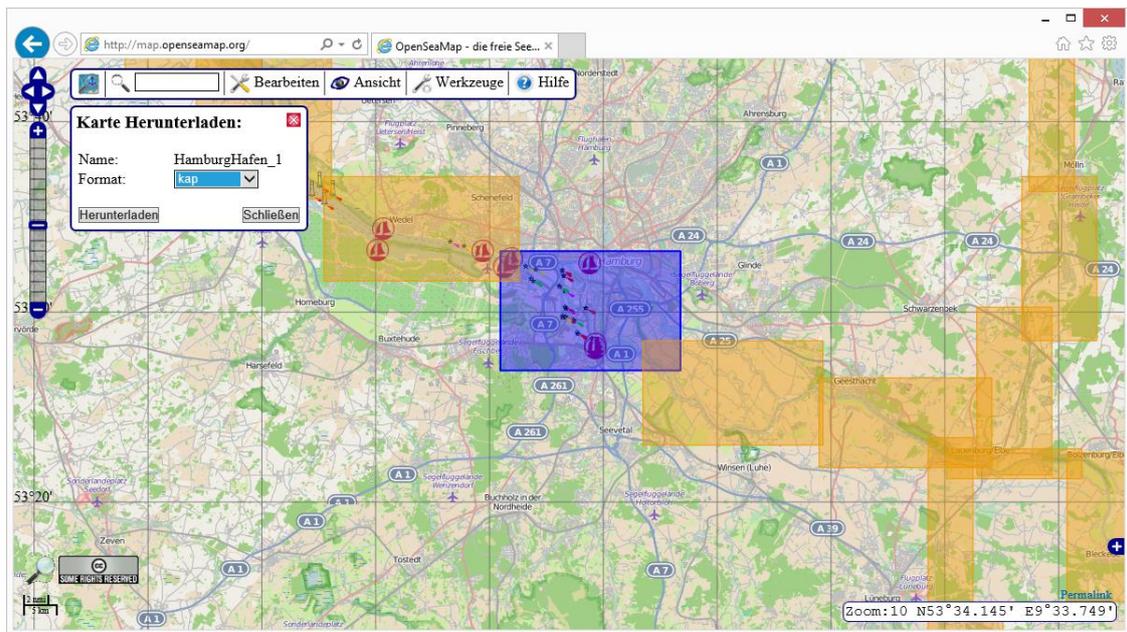


Figure 28: OpenSeaMap – select chart area and format

²² Please note that this web page is only available in German.

Step 3:

In OpenCPN, open the *Options* window and select *Charts*. Use the *Add Directory...* button to open the directory containing the chart material (*.kap). The chart is now displayed in OpenCPN.

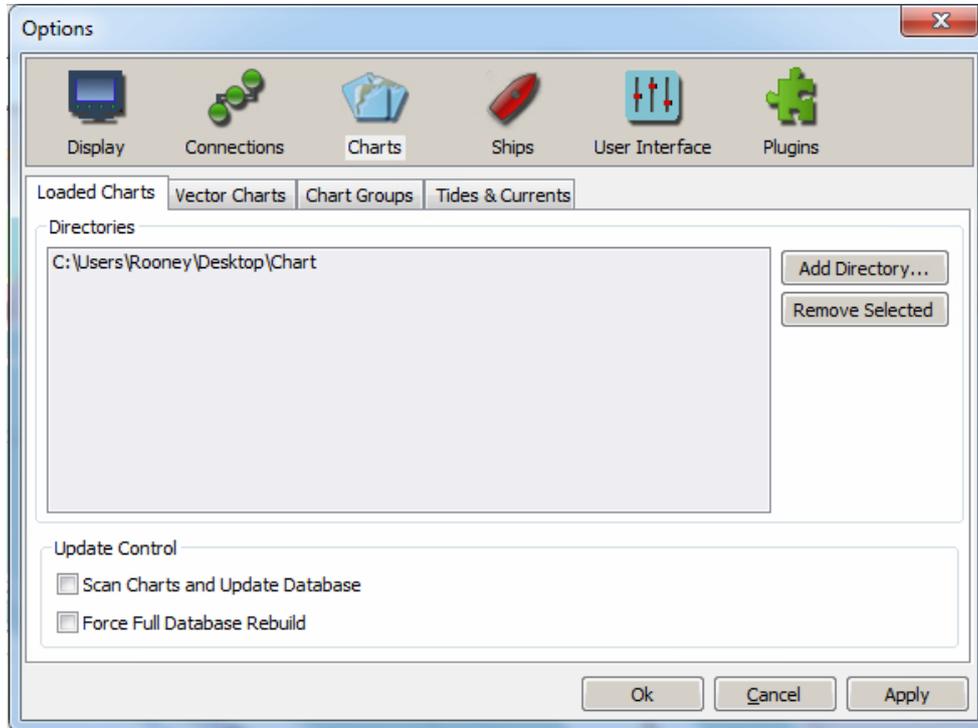


Figure 29: OpenCPN - add chart material

Please note that the chart material is not displayed for every zoom level. When the scale is high, red rectangular borders show there is chart material at these places.

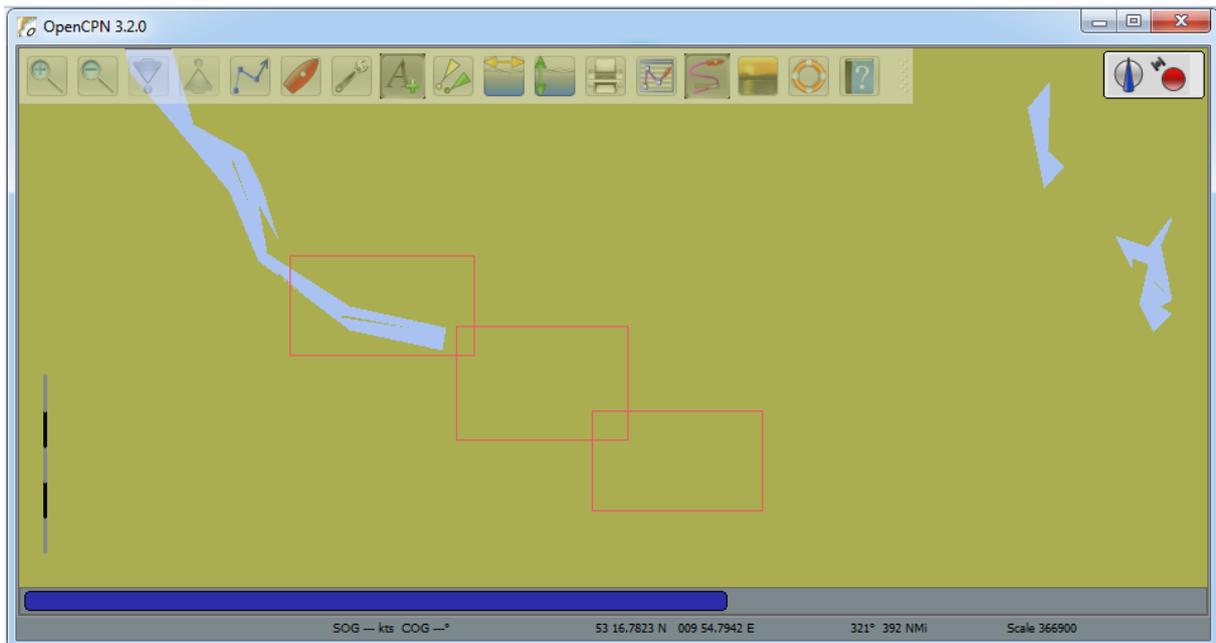


Figure 30: OpenCPN – depiction of chart material for large scale

9.4 Using the AIS WiFi module

Mobile AIS is a special bundle including a SEANEXX receiver, a high-capacity rechargeable battery and an AIS WiFi module, which enables visualization of AIS data on a tablet or smartphone. Wi-Fi²³ is a standardized interface and therefore no special drivers are required and can be used on any operating.

But to be able to see the information, you require an app which supports Wi-Fi NMEA (using TCP²⁴ or UDP²⁵). Some of the Apps tested:

- SailTracker
- NV Charts
- BoatBeacon
- AISView
- SeaWi
- iNavX
- SEAiq

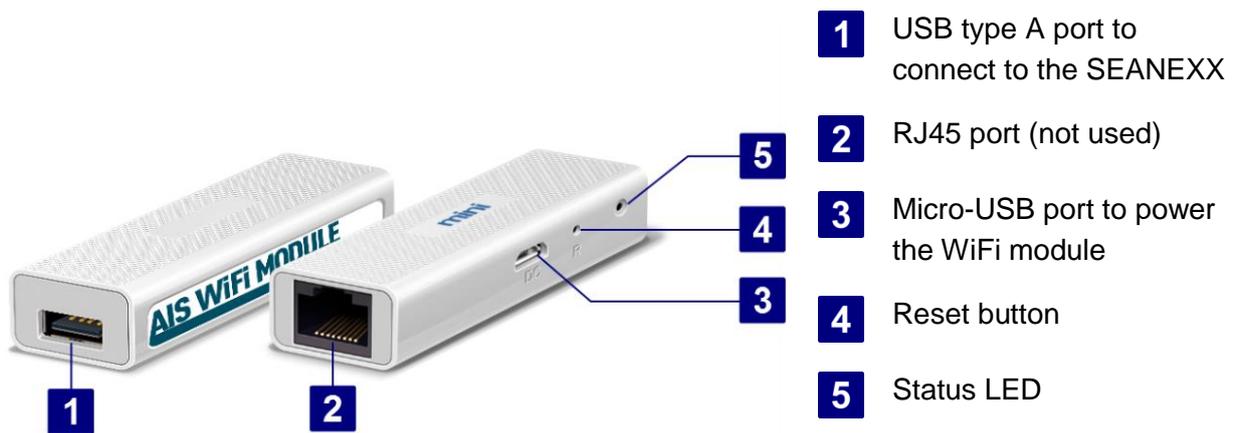


Figure 31: Components of the AIS WiFi module

²³ Synonym for WLAN denoting a wireless local network.

²⁴ Transmission Control Protocol. Understood by this is a reliable, connection-oriented, packet switched transport protocol.

²⁵ User Datagram Protocol. Understood by this is a connectionless network protocol. It is a popular solution for sending data to multiple recipients in a network.

9.4.1 The key features of Mobile AIS at a glance

supports the WLAN 802.11 b/g/n standard with data rates up to 150 Mbps
TCP (1 remote station) or UDP (up to 10 remote stations) protocol
adjustable WLAN transmission power
WLAN channel selectable (14 available channels)
integrated DHCP server
switchable between access point or client mode
firmware updates of the AIS WiFi module easily done via USB memory stick
WiFi NMEA output
high-capacity rechargeable battery providing an operation time of up to 20 hours
battery rechargeable via cigarette lighter adapter or a standard smartphone charger
WiFi uses a standardized protocol and can be used on nearly every operating system
numerously WiFi AIS apps available (not included in Mobile AIS)
Mobile AIS supports all SEANEXX receivers

9.4.2 Charging the battery

The rechargeable battery included in Mobile AIS enables an operation time of up to 20 hours. The battery can be fully charged with the cigarette lighter adapter in approximately 8 hours. Alternatively, you can also use a standard smartphone micro-USB charger. Please ensure that the charger has a minimum output of 1A (preferably 2A). The battery pack has two USB ports: the smaller USB port is used for charging.



Figure 32: EasyAcc battery pack, charging port

9.4.3 How to connect the individual components

1. Connect the larger end of the micro-USB cable **2** to the rechargeable battery pack (power output) **1**.
2. Connect the smaller end of the micro-USB cable to the AIS WiFi module **4**.
3. Connect the SEANEXX **3** with the AIS WiFi module.
4. Connect an AIS antenna to the SEANEXX.
5. Activate the battery pack by pressing the ON/OFF button **6**.

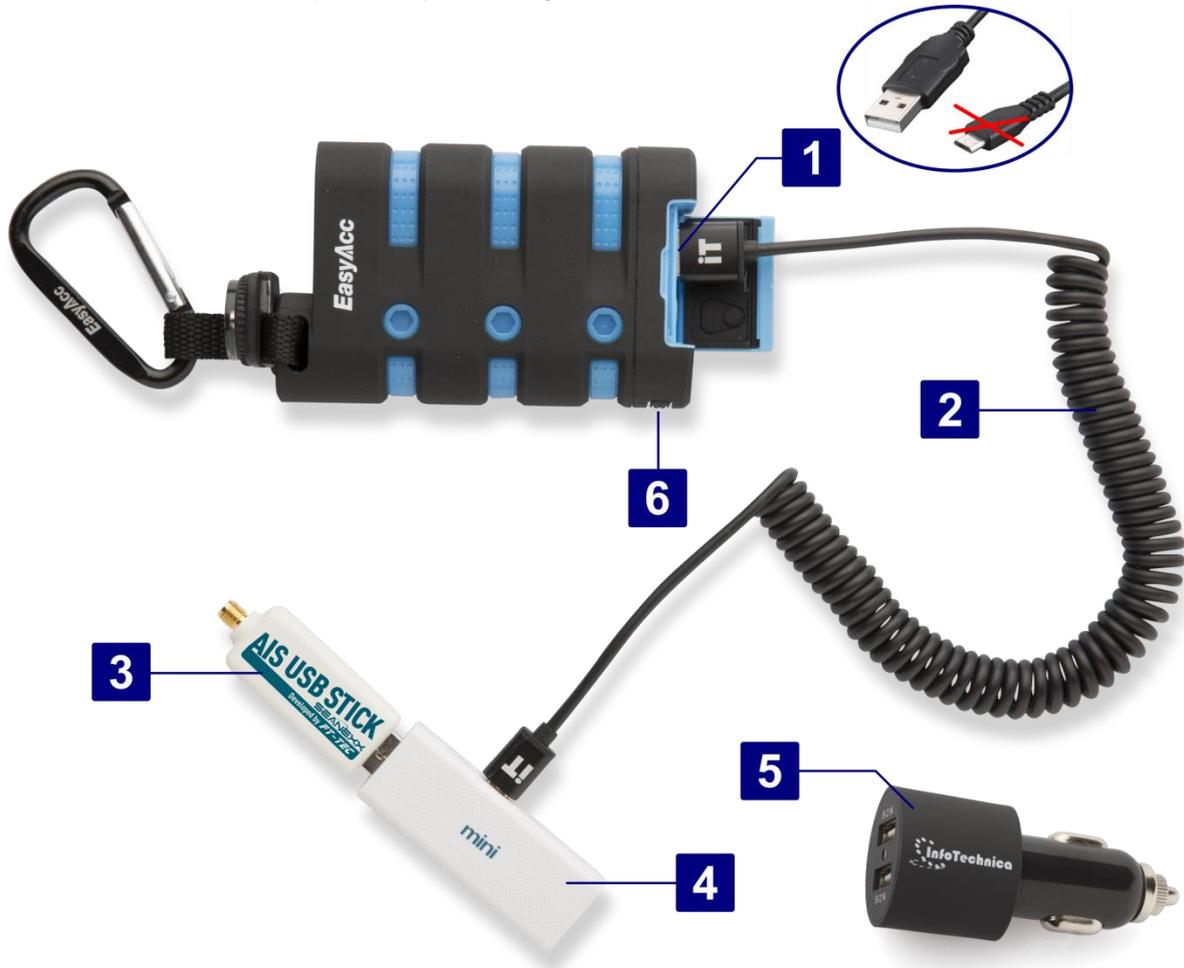


Figure 33: Mobile AIS



Use the USB type A port of the AIS WiFi module exclusively with the SEANEXX. In no case connect it to an USB port of your PC/laptop or the power output of the rechargeable battery. This would damage your device.

9.4.4 Communicating with the AIS WiFi module

If the previous steps have been followed, the SSID *SEANEXX-AIS-WIFI-xx* will be displayed in the available wireless networks on your tablet/smartphone after approximately 30 seconds. The xx code can be used as an identifier for a number/letter combination. Use the wireless network password on the back of the router (usually 123456789 as standard) to connect to the AIS WiFi module.

The standard configuration uses the UDP transfer protocol. Your App has to support this protocol in order to communicate with the AIS WiFi module. The information in section 9.4.5 shows how you can change the wireless network parameters as well as transfer protocol. Using the App *AISView* as an example, the required steps are provided to display the SEANEXX data. These steps are similar for iOS and other Apps. Read the manual of the appropriate app for further information.

Once you have connected to the AIS WiFi module with your tablet/smartphone using the SSID, open the *AISView* settings and select *UDP: Live* as transfer protocol in the *Local AIS* option. Set the *Local AIS port* to 5000. If your app requires an IP address of the AIS source, use 192.168.10.255 (UDP broadcast address, see section 9.4.6).



Figure 34: UDP settings in AISView

If there is a connection to the AIS WiFi module and AIS data is received, the status LED in *AISView* is green. You should now see AIS information in your App.



Please note that the AIS WiFi module **does not establish any Internet access**. Your App should either support offline chart material or source it from the Internet service of your mobile provider. Enable the *Internet via 3G* option to do this.



Use UDP when you want to display/process the received AIS data of the SEANEXX on multiple devices (such as on a laptop and tablet at the same time). TCP on the other hand enables just one connection to a single device. The benefit here however is that this is a bidirectional communication channel which is more reliable. Changing the transfer protocol is described in section 9.4.5.



Keep in mind that you have to use different IP parameters in your navigation software/app depending on the configured communication protocol. See section 9.4.6.

9.4.5 AIS WiFi module configuration

The AIS WiFi module can be configured using the web interface. It is not generally required to make configuration changes, the device can be used straight away with the standard settings.



Changes to the AIS WiFi module's configuration should only be made by an experienced user. The device may not function properly if set up incorrectly.

Changes are needed if

- another SSID and password are required,
- TCP needs to be used as the transfer protocol,
- another port or subnet is needed or
- if the access details to the AIS WiFi module need to be changed.

To access the web interface, open a browser window on your tablet/smartphone and enter the AIS WiFi module's IP address (192.168.10.1 as standard). Log into the web interface using the following access details:

- User name: admin
- Password: admin

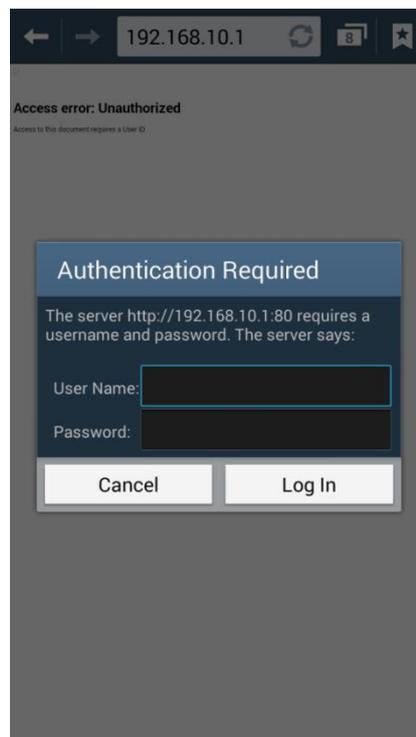


Figure 35: : AIS WiFi module web interface login

SEANEXX
Developed by **FT-TEC**

Status | Serial | LAN | Wireless | Routing | Remote Access | Web Terminal | Admin

Summary - System Info - System Log

Welcome to the SEANEXX AIS WiFi Module!

The AIS WiFi Module settings can be changed on this website to do the following:

- Change the IP Address Range used by the Module DHCP Server (go to LAN tab)
- Disable the DHCP Server, and configure static IP addressing on the adaptor (go to LAN tab)
- Configure Wireless Encryption, Change the SSID, modify radio layer settings (go to Wireless tab)
- Configure Static routes for the adaptor - make the serial port available from other subnets (go to Routing tab)
- Configure Remote Access or Machine-to-Machine (Back to back) mode
- Upgrade AIS WiFi Module Firmware or perform factory reset (go to Admin tab)

AIS WiFi Module Details

Firmware Version :	2.70 (2015-08-13 build 702)
Hardware Version :	B-02
Host Name :	SEANEXX-AIS-WIFI-E8
Operating Mode :	Bridge
Bridge IP :	192.168.10.1
DNS Servers :	
M2M Status :	Listening on UDP port 5000

Help!
For the user manual visit [here](#)

This page also summarises the AIS WiFi Module Software and Hardware version and the DHCP Mode the AIS WiFi Module is operating in.

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For support please contact us at: support@ft-tec.com

Figure 36: AIS WiFi module – web interface, welcome screen

The wireless network settings (e.g. SSID, channel etc.) are accessible from the *Wireless* → *Basic* menu.

Status | Serial | LAN | Wireless | Routing

Basic - Security - Advanced - AP Client

Wireless Radio is currently: ON

Internal Access Point is currently: ON

Basic WLAN Settings

Network Mode	11b/g/n mixed mode
SSID	SEANEXX-AIS-WIFI-E8
Broadcast SSID	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
AP Isolation	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
BSSID	9C:41:7C:85:5C:E8
Channel	2412MHz (Channel 1)

Figure 37: AIS WiFi module – wireless network settings

The encryption process and wireless network key can be changed in the *Wireless* → *Security* menu.

Status | Serial | LAN | Wireless | Routing | Remote Access |
 Basic - Security - Advanced - AP Client

Wireless Security

Security Mode: WPA2-PSK

WPA Settings

WPA Algorithms: TKIP AES TKIPAES

Pass Phrase: 123456789

Key Renewal Interval: 3600 seconds (0 ~ 4194303)

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Figure 38: AIS WiFi module – wireless network security settings

The network settings can be changed in the *LAN* → *Setup* menu. If you have selected UDP as the transfer protocol, you need to change the *Remote Hostname* in the *Remote Access* → *Machine to Machine* menu accordingly.

Status | Serial | LAN | Wireless | Routing | Remote Access |
 Setup - DHCP Leases

LAN Settings

Address Configuration: Static Assignment

MAC Address: 9C:41:7C:85:5C:E0

IP Address: 192.168.10.1

Netmask: 255.255.255.0

Def. Gateway: 192.168.10.1

DNS Server 1:

DNS Server 2:

DHCP Server

Enable DHCP Server

Starting IP Address: 192.168.10.2

Ending IP Address: 192.168.10.100

Lease Time: 1440 minutes(s)

No default route

Enable DNS Proxy

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Figure 39: AIS WiFi module – network settings

The TCP port settings are accessible from the *Serial*→*Advanced* menu. Pay attention when selecting the port to ensure the selected one is not blocked by a firewall or being used already for something else. The *Enabled Raw Serial* check box must always be ticked, even if using UDP.

Status | Serial | LAN | Wireless | Routing | Remote

Defaults - Port Settings - Advanced

Advanced Serial Settings

Com Port Control (NVT)

Enable Com Port Control (NVT)

Port Number :

Force binary mode

Raw Serial

Enable Raw Serial

Port Number :

WebSocket Proxy

Enable WebSocket Proxy

Port Number :

SSH to Serial

Enable SSH to serial port

Port Number :

Bluetooth Support

Enable Bluetooth Support

Figure 40: AIS WiFi module – TCP port settings

You can change the UDP port settings in the *Remote Access*→*Machine to Machine* menu. If you are using TCP as the transfer protocol, then you cannot tick the *Enabled* box. The relevant TCP settings are accessible from *Serial*→*Advanced*. Please remember to change the *Remote Hostname's* IP address if you make changes to the network settings in *LAN*→*Setup*. As UDP is a connectionless network protocol, data is always transferred via the broadcast hostname. The last three digits must always be 225.

Status | Serial | LAN | Wireless | Routing | Remote

Private Server - Machine to Machine (Beta) - Packet Capture

Machine to Machine Settings

Enabled :

Protocol :

Remote Hostname :

Remote Port :

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Figure 41: AIS WiFi module – UDP port settings

You can change the web interface password by going to *Admin*→*Authentication*→*Change Password*.

Time Settings - SNMP - Syslog - Restart - Firmware - Factory Reset -

Web Password

Username: admin

New Password: [masked]

Verify New Password: [masked]

Note: Passwords are case sensitive.

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Figure 42: AIS WiFi module – web interface password



Changes are saved by clicking *Apply*. Please note that the settings are applied immediately and you will have to connect to the AIS WiFi module with any new login details/network parameters.

9.4.6 Reset to Factory Settings

The AIS WiFi module is delivered with standard settings. If you change these as described in section 9.4.5, then you can restore the standard settings by going to *Admin*→*Factory Reset*. If you are unable to log into the web interface, you can restore the standard settings by pressing the reset button on the AIS WiFi module.

Please use a paper clip to keep the reset button pressed for 3 seconds. As soon as you release the button, the status LED will be blue for a few seconds. The AIS WiFi module then restarts (the status LED turns red, following by flashing blue). You can now log on to the AIS WiFi module with standard settings.



Figure 43: Reset button of the AIS WiFi module

Table 2: Standard configuration of the AIS WiFi module

AIS WiFi module/web interface IP address	192.168.10.1
Transfer protocol [port], IP address	UDP [5000], 192.168.10.255
SSID	SEANEXX-AIS-WIFI-xx
WLAN password	123456789
WLAN channel	1
Web interface user name	User name: admin Password: admin
Mode	Access point with activated DHCP server



You can find the access details to connect to the AIS WiFi module and to log into the web interface on the underside and at the side of the device.



The AIS WiFi module can be either used for TCP or UDP. The simultaneous use of those communication protocols is not supported. Reconfigure the module for the required protocol.



Keep in mind that you have to use different IP parameters in your navigation software/app depending on the configured communication protocol:

- UDP protocol: IP address 192.168.10.255, port 5000
- TCP protocol: IP address 192.168.10.1, port 5001
- Web interface: IP address 192.168.10.1, port 80 (will be automatically used by your web browser), the web interface is irrespective of the communication protocol and therefore always accessible with this IP address

10 Maintenance

There are no components in the SEANEXX which require maintenance by the customer. Should any problems occur with your device, please contact your dealer or the support team at FT-TEC.



Please bear in mind that all guarantee and warranty claims are forfeited should the SEANEXX be opened up without authorization.



Do not subject the USB connector or SMA socket (VHF antenna connector) to any mechanical stress. Do not apply generally high forces to the device or expose it to direct sunshine.



Only use a dry cloth to clean the device. Do not use any solvents and protect the device from moisture.

11 Contact and support information

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E-mail: office@ft-tec.com
support@ft-tec.com (support requests only)

Web: www.seanexx.com

The following information as a minimum is required for support queries:

- Number to call back on (if required)
- Purchase date including invoice number if known
- Detailed fault description
- Serial number
- Hardware number (540xxxx)
- Model (RX100, RX110, RX200 or RX210)
- Firmware version
- Software version of *SEANEXX Connect* configuration tool
- Antenna used (if relevant)
- Operating system used
- Navigation software used (if relevant)

You can access the device information for the SEANEXX directly from *SEANEXX Connect* or by using any serial terminal (such as HTerm) with the following command:

```
$PTFTWR, INF*7E
```

Please note that CR+LF must follow the command.

12 FAQs

Why is my COM port not detected?

Install the driver necessary for the virtual COM port. This can be downloaded from www.seanexx.com.

The device is listed in the Windows device manager, but I cannot open the assigned COM port.

Check whether the same COM port is already opened in another program, and close this program.

Once you have opened the COM port and removed the device from the USB port, you must close the COM port before connecting the device to your PC or laptop again (otherwise the operating system blocks this COM port, meaning no data can be received).

Can I receive on both AIS channels at the same time?

This functionality is not supported by the RX100 or RX110. You can however switch the channels automatically at a defined interval. Use the configuration tool to configure this function.

The RX200/RX210 support simultaneous reception on both AIS channels.

Are erroneously received messages sent when receive conditions are poor?

No - because AIS messages contain a checksum (CRC). The information is discarded if the checksums received and calculated in the receiver do not match.

Which antennas can be used with the SEANEXX?

Essentially any antenna which can be used for 162 MHz, i.e. ship antennas for AIS Class A and B transponders, and all antenna types available from FT-TEC.

What needs to be taken into account when a magnet base antenna is used?

Magnetic base antennas must be fitted on a conducting metal surface with at least 50 x 50 cm in size. The magnetic foot must be positioned in the center. Receive power is reduced considerably if a smaller area or no conductive base is used.

Why do I need the angled adapter?

You can also connect the optional bar antenna directly to the device - although this considerably reduces reception because vertical polarization is required. So only use the bar antenna for the SEANEXX with the angled adapter.

What do I need the pigtail adapter for? Can I connect my external antenna directly to the device?

Exclusively use the bar antenna provided by FT-TEC. Other antennas can result in higher mechanical loading and may cause damage to the device. The bar antenna must be used with the angled adapter. Please keep in mind that you'll not reach the same reception quality compared to using a fixed mounted ship antenna.

The pigtail adapter are necessary for antennas that provide either BNC or UHF connector. Antennas with SMA plug can be directly connected to the SEANEXX.

I am not receiving any GPS/GNSS data - what do I need to do?

Make sure your SEANEXX supports GNSS (only models RX110/RX210). Enable GNSS from the configuration tool and save the settings so they are loaded automatically the next time the device is used. GNSS is working properly only if your device has clear view to the satellites. Do not use the SEANEXX models with integrated GPS under deck or besides your radio communication unit.

When I compare the SEANEXX with my AIS Class B transponder, I can receive ships further away with the transponder. Can you explain why?

There can be several reasons for this.

1. You are using the bar antenna which has a generally poorer antenna gain than a permanently fixed ship antenna. The ship antenna is usually at a greater height, which can considerably improve reception.
2. You have selected a channel on which no data is currently being sent.
3. The requirements of AIS Class A and Class B transponders/receivers are far more stringent. These devices are usually several times the size and cost. So limitations are reached physically with a compromise needed between performance and size. Class A and B have as a result better sensitivity, meaning also that the reception of objects further away is possible.

Why can no connection be established in SEANEXX Connect?

Ensure that the *SEANEXX Connect* version being used is compatible with the firmware version of your device. Information on this is available from www.seanexx.com.

Ensure that a virtual COM port is assigned to your SEANEXX. See section 8.2 for further information.

Only one application can access the COM port. Check whether applications other than *SEANEXX Connect* want to access your device (such as OpenCPN).

Exit *SEANEXX Connect* and unplug your device. Then reconnect your SEANEXX to your computer system and restart the software.

How can I tell which model I have?

The model variant is on the back of your device. You can also query the model with serial command:

```
$PTFTWR, INF*7E
```

The easiest way to access all of the information for your device (software version, serial number, etc.) is from the *SEANEXX Connect* configuration tool. Please specify this information every time you open a support request.

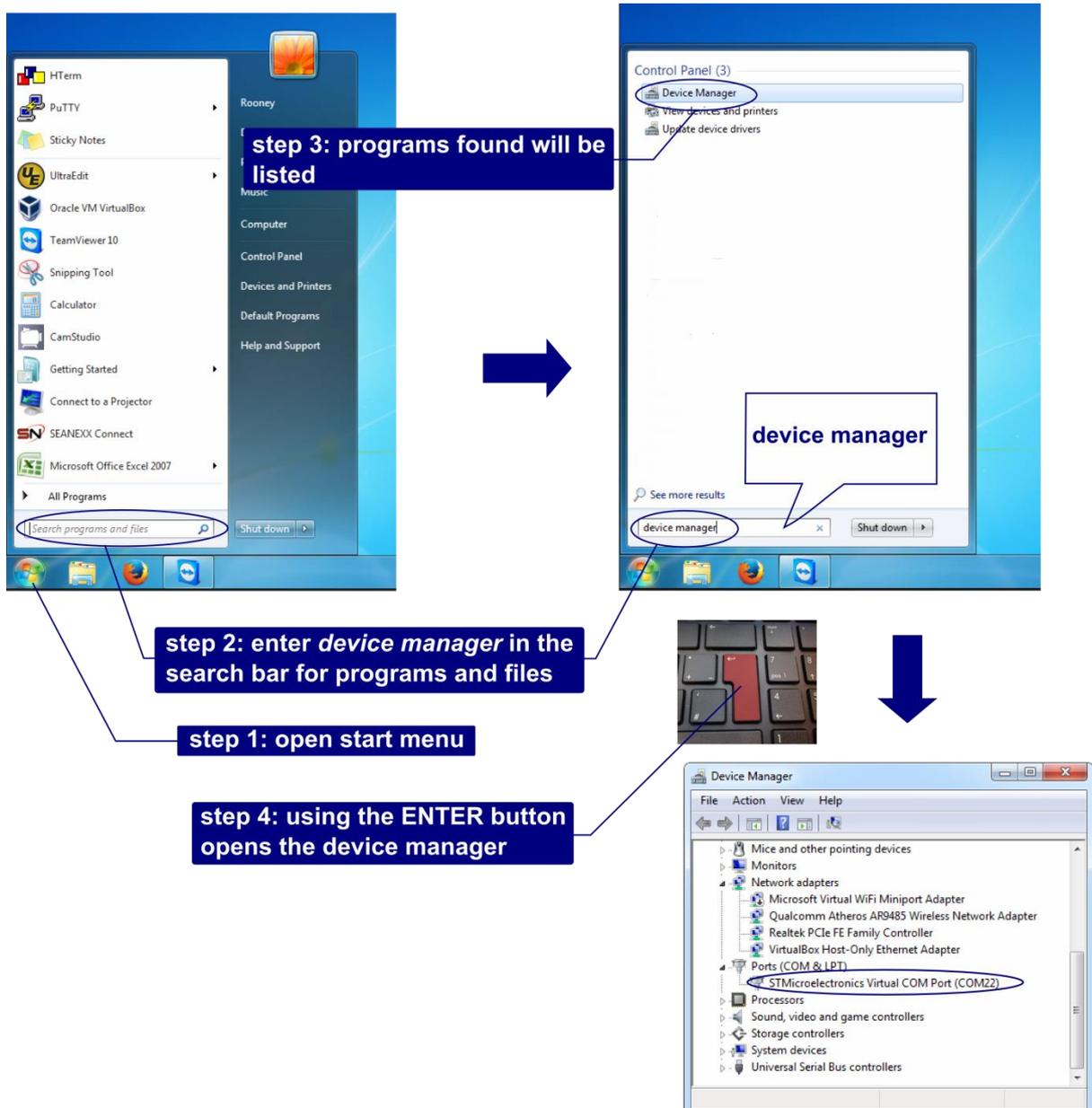
13 Appendix

13.1 Opening the device manager under Windows 7

Proceed as follows to open the device manager under Windows 7:

- Open the start menu from the Windows *Start* button.
- The start menu has a search bar for locating programs and files. Type *device manager* into this.
- The programs found are listed. If what you have typed in is correct, the device manager is listed on its own and automatically pre-selected.
- Once the device manager is pre-selected (blue background), you can open it by pressing *ENTER*.

The device manager is opened and you can see the COM port created for the SEANEXX.



13.2 Opening the device manager under Windows XP

Proceed as follows to open the device manager under Windows XP:

- Open the control panel from the start menu.
- Double-click *System* to show the system properties.
- Switch to the *Hardware* tab and click *Device Manager*.
- The device manager is opened and you can see the COM port created for the SEANEXX.

13.3 Command list

The commands mentioned below can be executed in a serial terminal program if you don't want to use the *SEANEXX Connect* configuration tool. Please keep in mind, that a command sequence must use CR+LF at the end.

\$PTFTWR,CON,0,0,0*61	AIS channel 0, frequency hopping disabled, GPS disabled
\$PTFTWR,CON,1,0,0*60	AIS channel 1, frequency hopping disabled, GPS disabled
\$PTFTWR,CON,0,0,1*60	AIS channel 0, frequency hopping disabled, GPS enabled
\$PTFTWR,CON,1,0,1*61	AIS channel 1, frequency hopping disabled, GPS enabled
\$PTFTWR,CON,0,1,0*60	Frequency hopping every 1 s, GPS disabled
\$PTFTWR,CON,0,1,1*61	Frequency hopping every 1 s, GPS enabled
\$PTFTWR,CON,0,2,0*63	Frequency hopping every 2 s, GPS disabled
\$PTFTWR,CON,0,2,1*62	Frequency hopping every 2 s, GPS enabled
\$PTFTWR,CON,0,5,0*64	Frequency hopping every 5 s, GPS disabled
\$PTFTWR,CON,0,5,1*65	Frequency hopping every 5 s, GPS enabled
\$PTFTWR,CON,0,10,0*50	Frequency hopping every 10 s, GPS disabled
\$PTFTWR,CON,0,10,1*51	Frequency hopping every 10 s, GPS enabled
\$PTFTWR,CON,0,30,0*52	Frequency hopping every 30 s, GPS disabled
\$PTFTWR,CON,0,30,0*53	Frequency hopping every 30 s, GPS enabled
\$PTFTWR,FLA,1*69	Delete configuration
\$PTFTWR,FLA,0*68	Save current configuration
\$PTFTWR,CON*7D	Read configuration
\$PTFTWR,INF*7E	Read device information
\$PTFTWR,DEC*7D	Query decoder type
\$PTFTWR,DEC,0*61	Select Preamble triggered decoder
\$PTFTWR,DEC,1*60	Select Flag triggered decoder