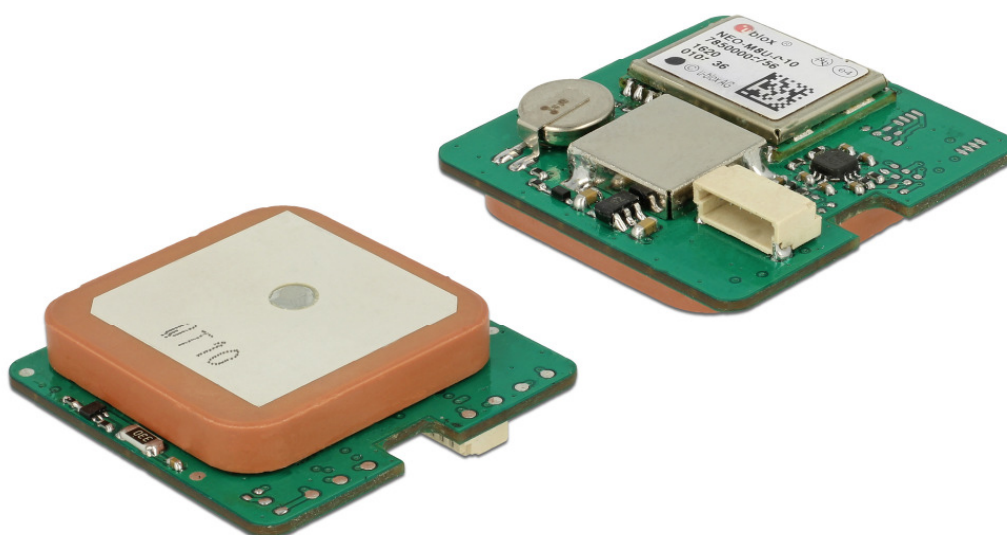**Engine module u-blox NEO-M8U UDR GNSS receiver**
NL-82052RS, NL-82052USB und NL-82052TLL
manual (62764, 62763, 62745)

1. Introduction

The engine modules are serial, USB and TTL GNSS receiver with an internal active antenna.
The GNSS receiving is realized using the u-blox NEO-M8U module. In this module, high-sensitivity sensors such as a 3D accelerometer and a 3D gyroscope are also integrated. These sensors enable the acquisition of dynamic three-dimensional motion data. These include speed, acceleration, direction and inclination. From this data, the engine modules acquires position data that complements the current GNSS position data. They allow reliable position determination even when the GNSS signal is interrupted in the case of four-wheeled vehicles.

In order to be able to fully utilize the UDR functionality, the receiver must be firmly and unchangeably connected to the chassis of the vehicle. At the first commissioning after reaching the 3D Satfix, an approximately 20 minute trip with a speed of more than 30 km/h has to be completed. The journey can be completed in normal road traffic with curves and acceleration periods. During this travel, the above-mentioned sensors values are calibrated fully automatic. During this time, the receiver supplies the normal GNSS position data. From the time of the successful sensor calibration, the UDR position data is added to the GNSS position data in the NMEA 4.1 protocol. The UDR data is determined and delivered with an updating rate of 20 Hz.

Due to the additional UDR position data, the receiver reliably delivers its position immediately after switching on even in the car park or garage.

If your vehicle is moved without its own force after calibration (towing, ferrying, etc.), the receiver automatically discards its calibration data. At the next trip meeting the above criteria it will be automatically recalibrated.

1.1. Contents*

    1 x Navilock engine module
    1 x 8 cm CD ROM including operation manual

* Before using the device, please make sure that all the parts are included in the package. If any parts are missing or damaged, please contact your dealer immediately.

• Important health and safety information

When using this product, take the following precautions in order to avoid possible damages and legal consequences. Always follow all safety and operation manuals exactly and keep them for future reference. Observe all warnings in the operation manual and on the product. In order to avoid injuries, electrocution, fire and damages to the product, observe the following precautions:

• Electric security

This product is designed for operation with power supply via the USB port. Any other operation mode can be dangerous and may void the warranty claims for this product. This unit contains an internal back-up battery.

NOTE: RECYCLE OR DISPOSE OF USED BATTERIES OR RECHARGEABLE BATTERIES IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS AND THE INSTRUCTIONS INCLUDED WITH THE PRODUCT.

• Precautions regarding direct sunlight

Make sure the unit is not exposed to very high humidity and temperatures. Never leave the unit, the battery or the rechargeable battery for an extended period in a vehicle or plate, where the temperature can increase to over 60°C (140°F), for example on the dashboard of a car, the window sill or behind a pane of glass, which is directly exposed to the sun or very strong UV light. Otherwise the unit or the vehicle may be damaged, and the battery or the rechargeable battery may overheat.

• Damages requiring repairs

Disconnect the unit from the AC supply in the following cases; also disconnect the rechargeable battery and contact an authorized repair man or your dealer.
• Liquid or an object has entered the product.
• The product has fallen down or was damaged.
• There are visible signs of overheating.
• When operated normally, the product does not function flawlessly.

• Avoid using the unit directly after strong temperature changes.

If the unit is exposed to strong temperature and humidity fluctuations, condensation can form in the unit. In order to avoid damage to the unit, please wait until the condensation has dried off before using the unit.

NOTE: If you bring the unit from a cold to a warm environment, or vice versa, first let it get accustomed to the new temperature before turning it on.

2. General information

2.1 NL-82052RS = Item 62764
On the serial engine module, a USB to serial bridge is built. The u-blox chipset incorporates a USB standard output. It must be converted from USB to serial.
PIN1 is at the level of the shield plate and PIN6 at the cut edge of the module.
To connect the cable 95909 will need, which has a plug Aces 87214-0600.

2.2 NL-82052US = Item 62763
Engine module on the USB, a USB bridge is built. The chipset includes u-blox standard USB output. You need the special u-blox USB driver to include that item in your operating system. It is installed under Windows Vista/7/8 with the u-center testing tool. There is also a Linux driver available.
PIN1 is at the level of the shield plate and PIN6 at the cut edge of the module.
To connect the cable 95909 will need, which has a plug Aces 87214-0600.

2.3 NL-82052ETTL = Item 62745
On the TTL engine module, the output signal directly from the chipset ublox is processed. The ublox chipset includes default the TTL output.
PIN1 is at the level of the shield plate and PIN6 at the cut edge of the module.
To connect the cable 95909 will need, which has a plug Aces 87214-0600.
Link to the manufacture website: **http://www.acesconn.com/**

3. Commissioning
The commissioning of the engine module requires technical expertise that is unsupported solutions. You need knowledge of the matter GNSS to know what protocols you need for your application and the data from it.
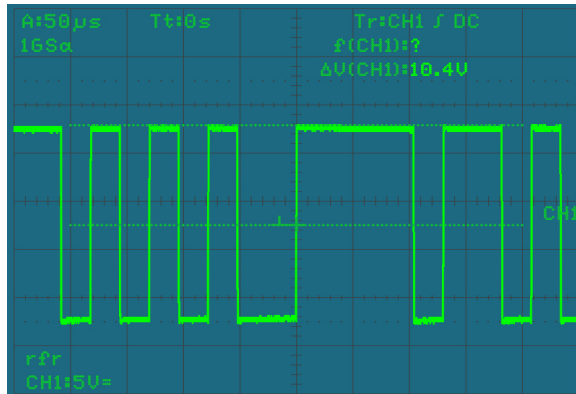
4. Type of connection
4.1. Pinout

	NL-82052RS	NL-82052USB	NL-82052TTL
1	VCC	VCC	VCC
2	GND	GND	GND
3	shield	shield	shield
4	RS232 TXD	D+	3.3V TTL TX
5	RS232 RXD	D-	3.3V TTL RX
6	PPS 3.3V TTL	PPS 3.3V TTL	PPS 3.3V TTL
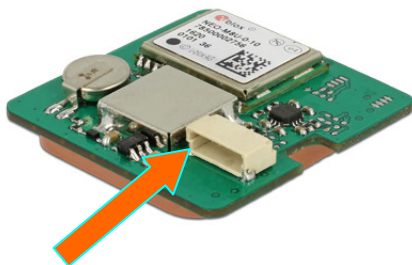
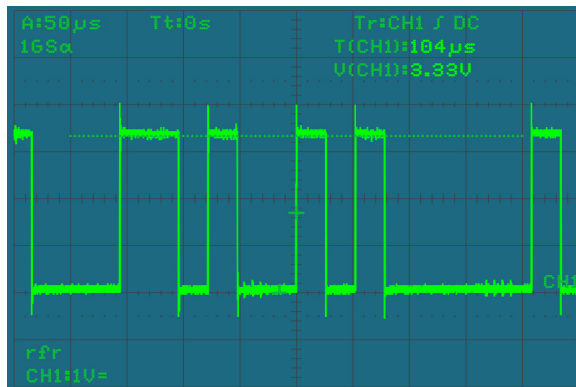
Pin 1

4.1 NL-82052RS serial

Serial signal level which is necessary for the operation of the NL-83052RS.
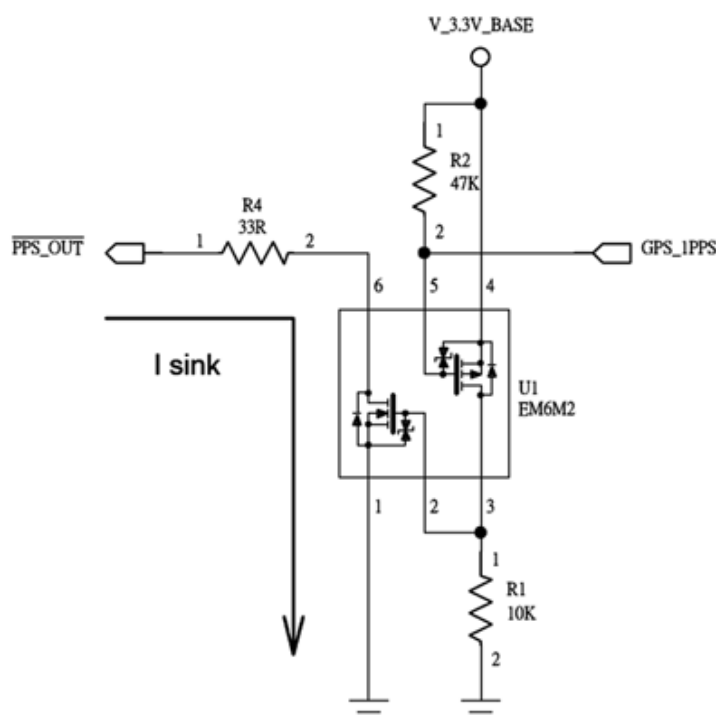
4.2 NL-82052USB USB 1.1

A standard USB 1.1 port is required to operate the NL-82052USB necessary.

4.3 NL-82052TTL TTL

TTL signal levels to operate the NL-82052TTL needed.
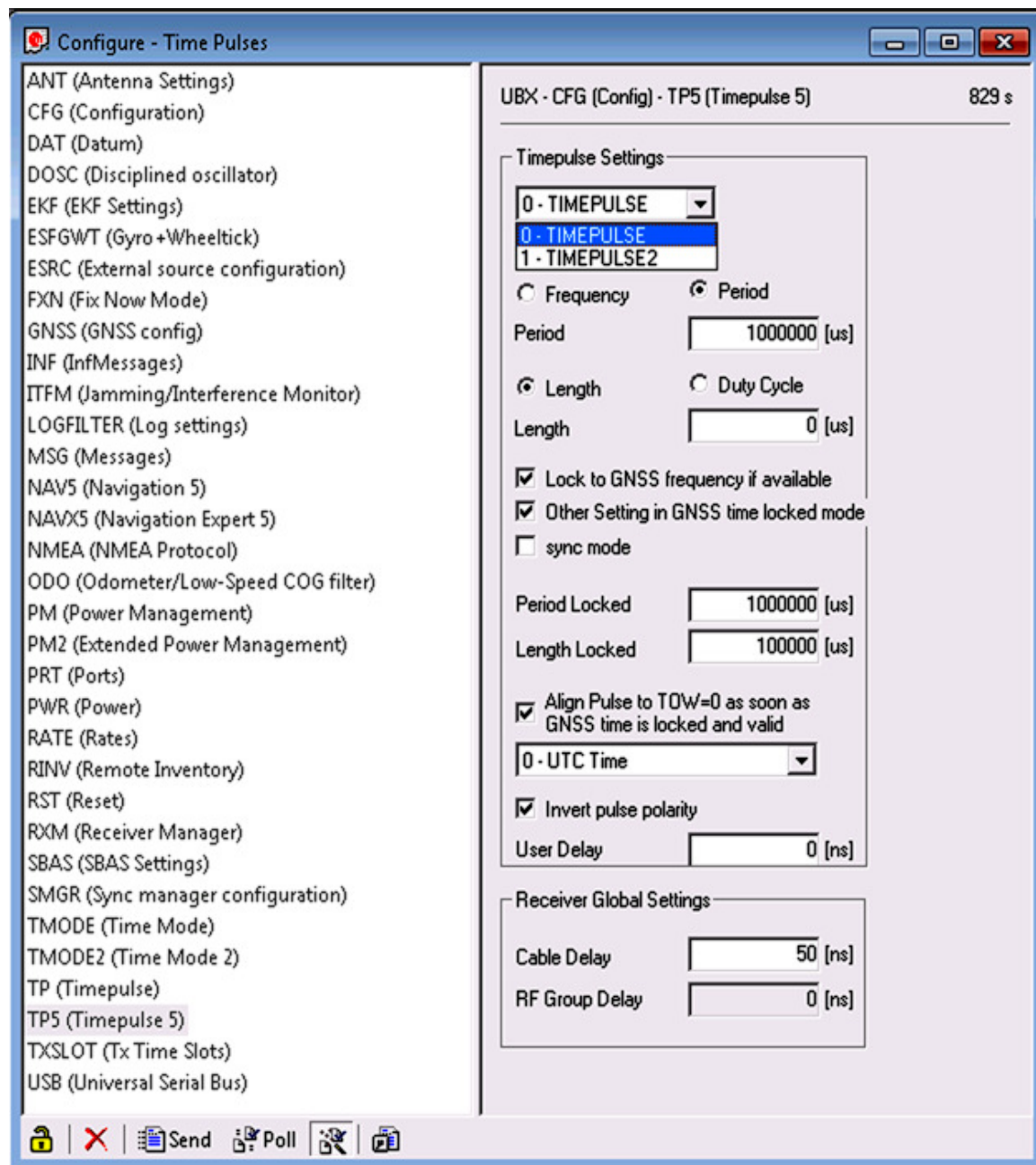
4.4 PPS Pin 6

From GPS_1PPS signal control PPS_OUT Pull Low

WARNING: Please make sure the "I sink" current is less than 100mA, more than 100mA will be cause circuit damage.

The u-center can set the output mode of action, such as 1Hz to 10Hz and other. As below

Please noted the TIMEPULS settings have two item
0-TIMEPULS is for PPS_OUT
1-TIMEPULS2 is for LED

5. Application environment

The USB Engine module can be installed on Windows 7/8.1/10, CE and Linux operating a GNSS receiver. But it is not suitable for WINDOWS 98/98SE/Me or MAC OS. No drivers are available for this purpose. The serial and TTL version can be used without dependencies to the OS. There's only concerning the restriction of u-center testing tools, it is available only for Windows 7/8.1/10 and CE.

6. Functional test with u-Center 8.xx

6.1. Install the u-Center software on your unit. Select the version suitable for your system. U-center is a pure test program and cannot be used for navigation or orientation. It must always be closed after the test. It blocks the COM port and does not allow any access of the navigation or route software to the COM port. It also serves for updating the Assist GNSS data and switching to EGNOS.

If the NMEA protocol is displayed in u-Center, but you cannot find a receiver in the application software, the connection problem is not with the receiver, but with the selected software setting. In this case, the software manufacturer support center may be able to help you.
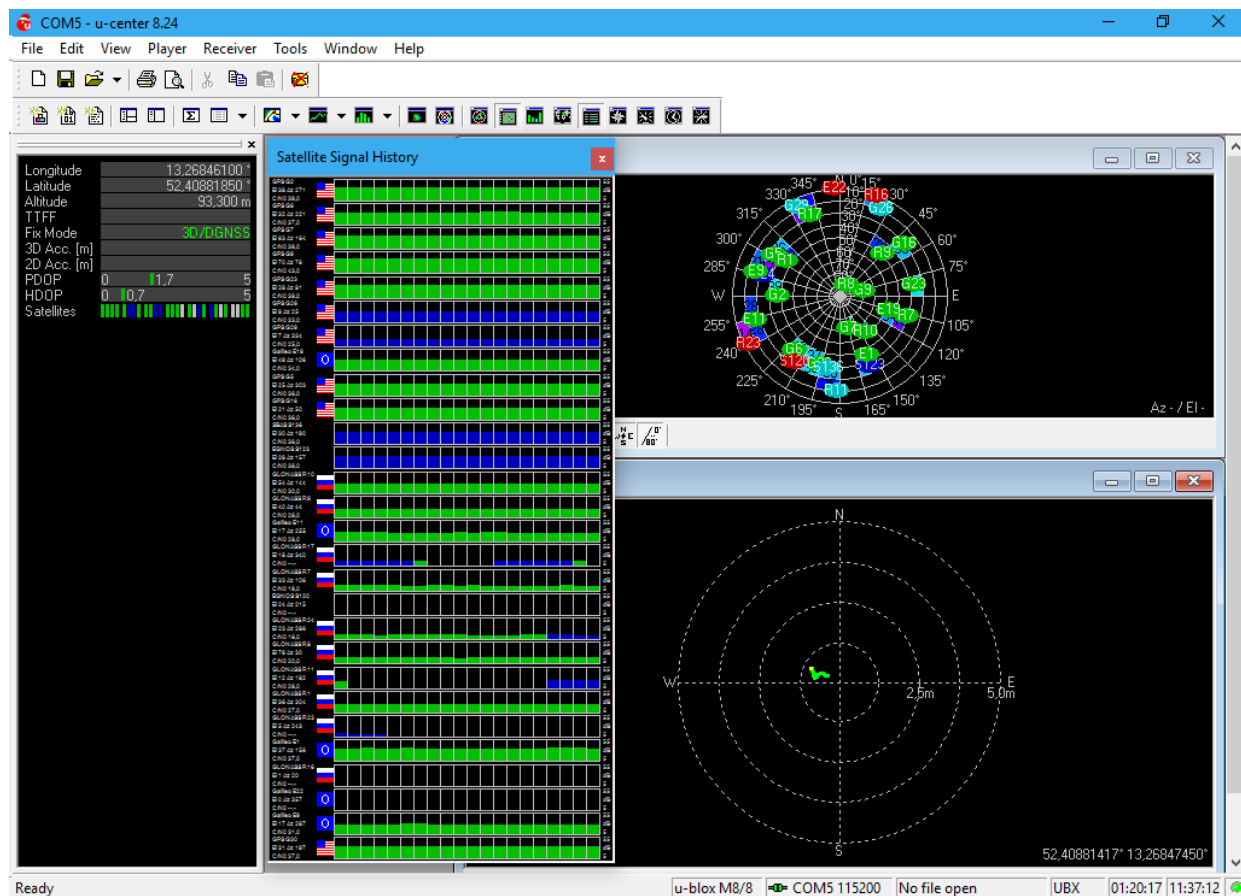
As seen below, you can set up your u-center by yourself. Everything important can be connected and displayed immediately. The green bars at the bottom of the picture show the reception quality at your position. If no bars are displayed, please change your position. The engine module cannot receive anything in a closed building. If the blue bars are displayed, the receiver is still acquiring the data and verifying the receipt data.

6. 2. The choice of which GNSS want to use, take as follows:
*View\Configuration View*
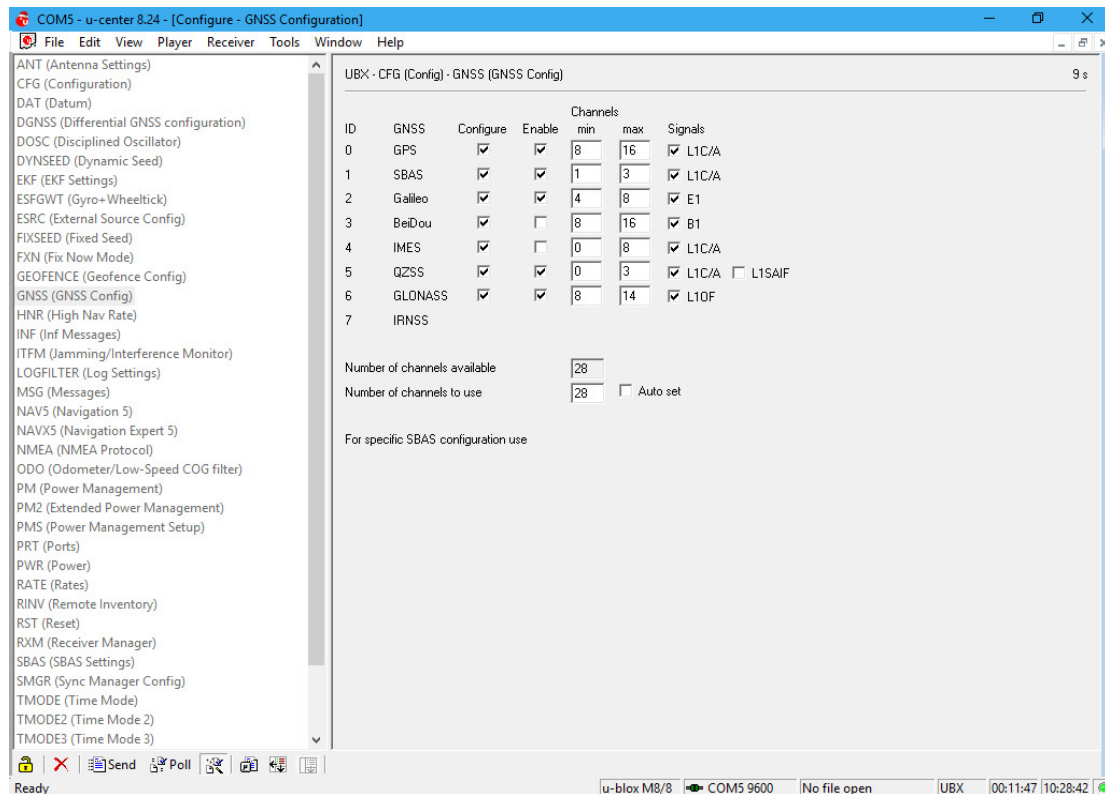
You can select your GNSS system and the combination of several systems on the right side. The following combinations are available:

V	GNSS					SBAS						RTCM 2.3
	Galileo (EU)*	GPS (USA)	GLONASS (RUS)	BeiDou (CHN)	QZSS (J)	EGNOS (EU)	WAAS (USA)	MSAS (J)	GAGAN (IND)	SDCM (RUS)*	SNAS (CHN)	GPS
I		X	X		X	X	X	X	X	(x)		X
II		X		X	X	X	X	X	X	(x)		X
III			X	X								
IV		X	X			X	X	X	X	(x)		X
V		X		X		X	X	X	X	(x)		X
VI	X	X	X		X	X	X	X	X	(x)		X
VII	X	X		X	X	X	X	X	X	(x)		X
VIII	X		X			X	X	X	X	(x)		
IX	X			X		X	X	X	X	(x)		

7. EGNOS configuration with u-center 8.24
View\Configuration View
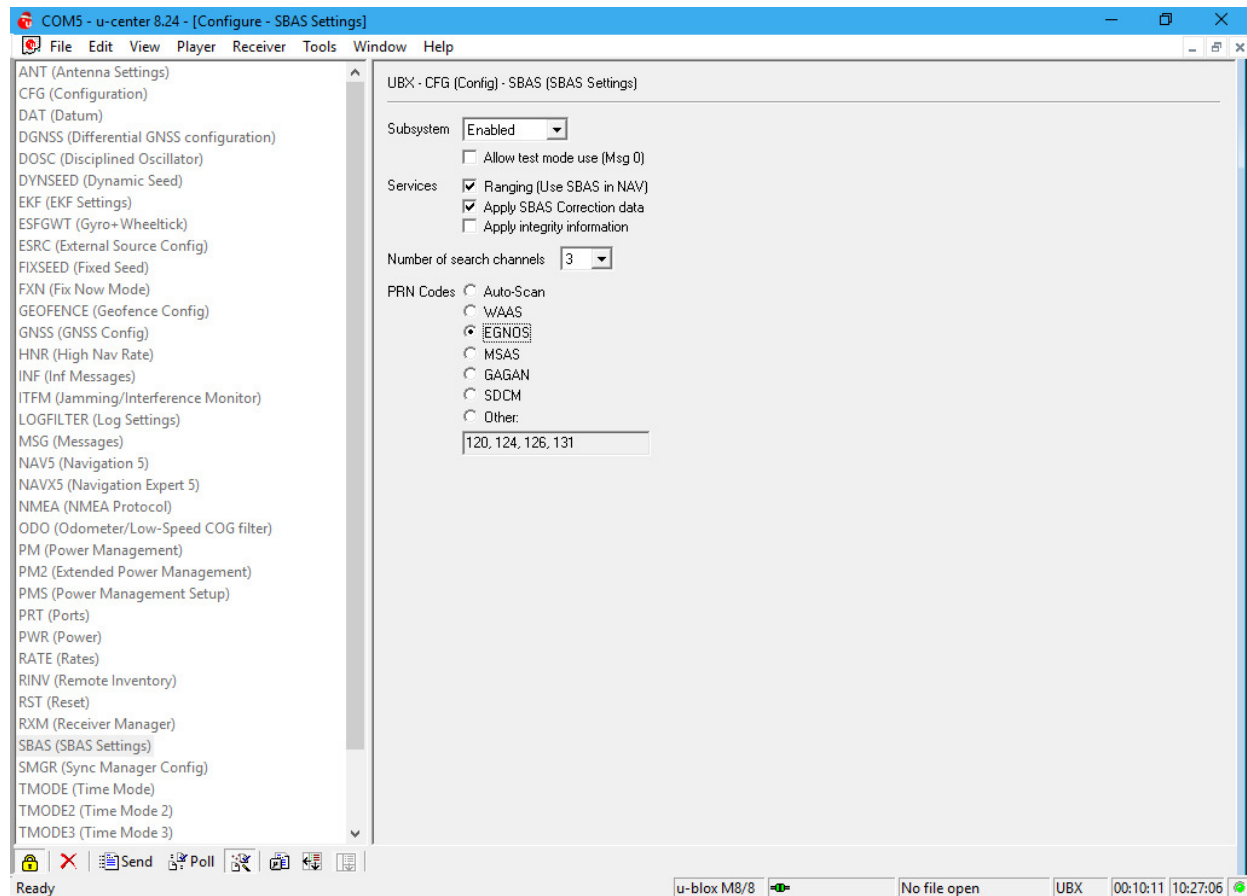
The engine module use EGNOS as default. In the configuration menu you can check these options. For detailed information please use the documentation from u-blox http://www.u-blox.com/images/downloads/Product_Docs/u-Center_User_Guide_(UBX-13005250).pdf.

Further information to the u-center can be found in the u-blox documentation under http://www.u-blox.com/products/u_center.html. If you have any questions, please contact u- blox directly.

8. AssistNow configuration with u-center 8.xx

The engine module supports AssistNow!
AssistNow is a standard A-GNSS service, which increases the performance of the GNSS receiver, by calculating a position almost immediately, even under difficult reception conditions. A-GNSS improves all GNSS capable applications, especially those that require a continuous state of readiness, for example applications for fleet management or GNSS capable hand-held devices, whose users would like to access local services immediately, independently of the reception conditions.
Without A-GNSS, a GNSS receiver must localize at least 4 satellites in direct line of vision, and then download their location data. This process takes 30 seconds under optimal reception conditions, but under less favourable conditions it may take much longer, e.g. in an urban environment or in a building, where the GNSS reception is weaker. AssistNow sends the data directly to the GNSS receiver, thus enabling a quick calculation of the position. AssistNow sends the data directly to the GNSS receiver, thus enabling a quick calculation of the position.
The offline service provides support data, which are valid up to 35 days. The user can thus profit for longer periods from the increased satellite acquisition performance, and they need an internet connection only occasionally, in order to update the support data.
The call-up and data transmission functions can be found in the menu bar of the u-center.
Click on the AGNSS function in the menu bar to update AssistNow and to load the engine module. Please use the following server token in the configuration menu:

<center>**8cLxZxp_10Wya9h1eU_gBA**</center>

Further information to the u-center can be found in the u-blox documentation under **https://www.u-blox.com/en/product/u-center-windows.** If you have any questions, please contact u-blox directly.

9. Possible sources of error and their elimination

9.1 The white LED doesn't light up after the first connection to the port. Make sure that the PC or notebook is turned on, and test the port, possibly with another device. If this other device works fine, please contact the support centre.

9.2 The engine module needs up to 20 minutes for its first satfix on another continent. To get a satfix the view to the sky must be unobstructed. Move the engine module as far as possible from the wall. A house wall reflects the signal strongly and contributes to the satfix time delay.

9.3. The engine module came in touch with jet water (water jet from a shower head or strong rain (when it was mounted on a car roof). Do not connect the receiver with the notebook etc. under any circumstances, because it will otherwise be completely and irreparably destroyed. Return the receiver to our support centre, mentioning "water damage". The support centre will disassemble the module, dry it and check its functionality.

The Navilock repair centre tries to be as obliging as possible, so please tell us the real reason for the defect. During the error analysis, we can generally detect if the cause for the defect was an external cause, water damage, fall, over-voltage or the wrong handling of the unit.

Failures are often the result of little causes. It is not always necessary to exchange the product immediately, because this will not solve the cause of the failure if it is not a GNSS hardware problem.

Before visiting your dealer, please contact the Navilock support centre. They will try to help you quickly and without further ado, so that the circumstances of an exchange, which might in any case be unnecessary, are avoided.

In this case, please write down a detailed description of the error, add this information to your end device and the software used in this device, as well as the operation environment (operating system, service pack version, CUP size and type, storage size, hard disk drive and interface etc.), and send an e-mail to support@navilock.de.

A support member will look into your problem and work out a solution.

We hope your Navilock product brings you fun and enjoyment!

10. Technical specifications

Chip set manufacturer/type: ublox-8 NEO-M8U

Channels: 72
Sensitivity: -160 dBm
Frequency: GPS: L1, 1575.4200 MHz
                             BEIDOU COMPASS: B1, 1561.0980 MHz
                             GALILEO: E1, 1575.4200 MHz
                             GLONASS: G1, 1602.5625 - 1615.5000 MHz

Target precisions:
Position horizontal: GPS/SBAS/QZSS+GLONASS: 2.0 m CEP
Time: 1 microsecond synchronized with GPS time
Speed: 0.1m/s

Date: WGS-84

Protocol: NMEA-0183 V4.1 GGA, GSA, GSV, RMC, VTG

Detection rates:
Cold start: 26 s average
Hot start: 1 s average
Re acquisition: 1 s average

Update rate: 20 Hz

Dynamic prerequisites:
Acceleration limit: smaller than 4g
Height limit: 50000 m
Speed limit: 500 m/s

Performance:
Power supply: 5 - 48 V DC

Connection: WTB

Operation temperature: -20°C ~ 60°C

Dimensions (LxWxH):   ca. 30 x 30 x 8 mm

11. Certifications
CE

12. Warranty period

Your GNSS receiver will be repaired free of charge within the legal warranty period, unless it was damaged due to external cases, humidity dropping or other damages due to improper usage. Your dealer is always ready to help you. Please send your unit for repairs directly to:

Navilock Repair Centre
Beeskowdamm 13/15
D-14167 Berlin-Zehlendorf

Postage must always be paid by the client.
Please add a proof of purchase and a detailed error description. "Doesn't work" or "defective" is not a detailed error description. Time-based error, meaning how often an error occurs, must be expressly mentioned.
For logistic reasons, we cannot accept returned packages without the postage being paid by the client.

13. Support

For additional support questions, please contact our support centre:
support@navilock.de / www.navilock.com or by telephone: +49 30 84716503*.
You can also call the Service Hotline at the following hours: Mo – Fr.: 9:00 – 16:30.
* You will be charged a connection fee for a telephone call to Germany/Berlin, in accordance with the connection fee overview of your telephone service provider.
You can also find current product information on our homepage. www.navilock.com.

14. Final provision

The information and data contained in this manual may be changed without prior notice. Errors and misprints reserved.

15. Copyright

No part of this instruction manual may be duplicated or transmitted for any purpose and by any means, be they electronic or mechanical, without the express written authorization from Navilock. The brand Navilock is a registered trademark and may not be used without the written authorization of the trademark owner. In no case may it be altered or completed by additions.

16. Brands of third parties

Brands, trade names, product names and logos of third parties mentioned in this documentation may be trademarks or registered trademarks of the respective owners.

WEEE note

The WEEE (Waste Electrical and Electronic Equipment) directive, which came into force on 13 February 2003, lead to a comprehensive change in the disposal of used electric products. It is the main purpose of this directive to avoid electric waste products (WEEE), while simultaneously promoting the re-usage, recycling and other forms of reconditioning in order to reduce the amount of waste. The WEEE logo on the product and the package shows that the product should not be disposed of with regular garbage. You are responsible for disposing all used electric and electronic devices at the corresponding collection sites. The separate collection and meaningful re-usage of electronic waste helps to deal with natural resources more economically. In addition, re-using electronic waste contributes to the preservation of the environment and human health. Additional information regarding the disposal of electric and electronic devices, their re-usage and the collection sites can be found at your local authorities, disposal companies, specialist shops and the manufacturer of the product.

RoHS conformity

This product meets the requirements of directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003, concerning the limited usage of dangerous substances in electric and electronic devices (RoHS) and its amendments. This product complies with the directive 2011/65/EU from January 3rd 2013.

EU Import:

Tragant Handels- und Beteiligungs GmbH Beeskowdamm 13/15, 14167 Berlin, Germany

Version 01/2017