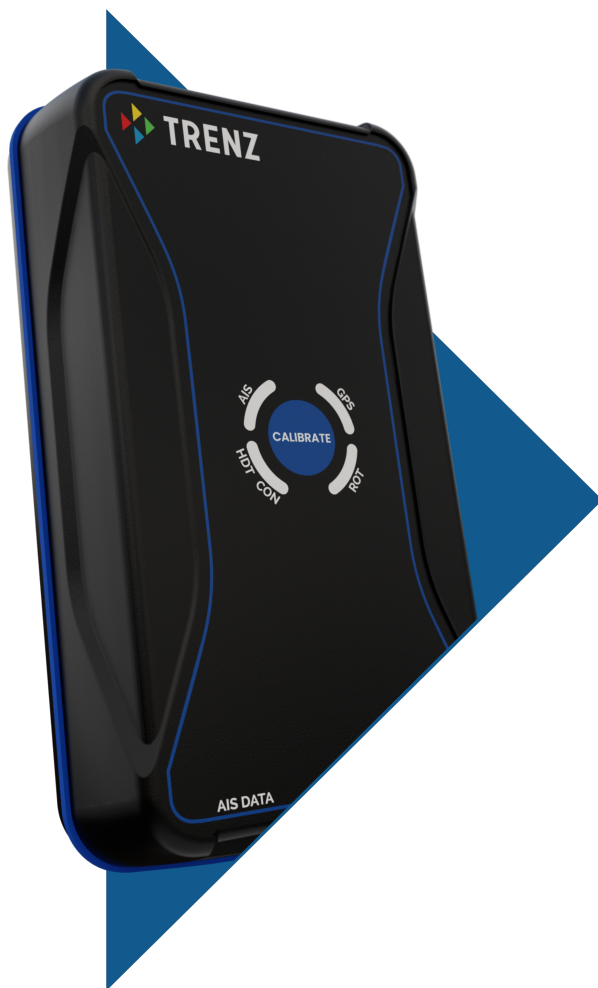


TRENZ SIRIUS - Portable Pilot Unit

User Manual



July 17, 2024
Version 2.0

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1 Introduction

1.1 Scope Of Document

The purpose of this manual is to provide comprehensive guidance on the operation, configuration, and maintenance of the **TRENZ SIRIUS Portable Pilot Unit** (PPU) designed for use by marine pilots. It aims to assist pilots in effectively utilizing the PPU to enhance navigational safety and efficiency.

A (portable) pilot unit can be generally described as a portable system that a pilot brings aboard a vessel to use as a decision-making aid for navigation in confined waters. It serves as a bridge between the vessel and the pilot's charting or navigation software. The **TRENZ SIRIUS Portable Pilot Unit** is furthermore specifically equipped with its own sensor technology in order to be able to act autonomously within a certain limit.

Inclusions

This user manual provides comprehensive guidance on using the **TRENZ SIRIUS Portable Pilot Unit**, covering the following key aspects:

- Introduction to the **SIRIUS Pilot Unit** including its technical specifications and features
- Setup and operating instructions
- Configuration and customization options tailored for pilot use
- Basic troubleshooting and maintenance guidelines

Exclusions

This manual does not cover the following:

- Detailed technical specifications of individual hardware components
- Advanced troubleshooting beyond basic operational issues
- Integration with specific vessel systems not directly related to PPU functionality

Assumptions and Prerequisites

Readers of this manual are assumed to have:

- Familiarity with the utilized electronic charting software
- Basic proficiency in operating the end devices connected to the PPU
- Access to necessary vessel infrastructure to support PPU operation

Limitations

The **TRENZ SIRIUS Portable Pilot Unit** is designed to enhance situational awareness and aid in navigation decision-making. However, it is not a substitute for standard navigational practices and should only be used in conjunction with and as an addition to other onboard navigational tools and procedures.

1.2 Contents Of Delivery

The delivery of your **TRENZ SIRIUS Portable Pilot Unit** includes the following:

- Pilot unit
- USB Type-C cable for data transfer and charging (1a)
- 20W USB PD Power Supply (1b)
- AIS connection cable (USB Type-C to AMP connector) (1c)
- Sirius Quick Start Guide
- Waterproof transport bag

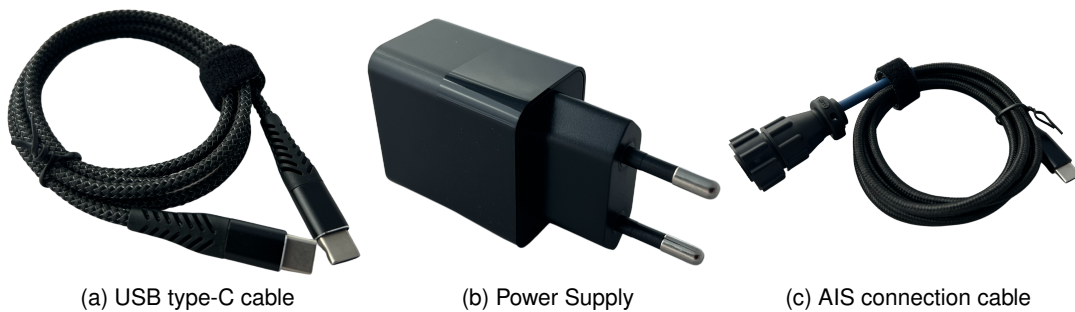


Figure 1: Included accessories

TRENZ PPU Manager

In addition, the *TRENZ PPU Manager* application is available for download from an app store of your choice (see 'TRENZ PPU Manager').

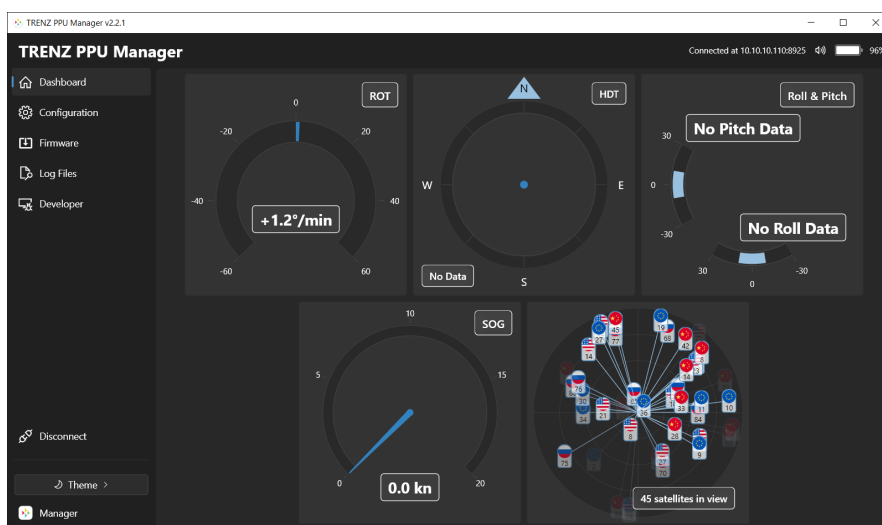


Figure 2: TRENZ PPU Manager

1.3 Technical Specifications

Physical	Dimensions:	130mm x 75mm x 28mm
	Weight:	216g
	Protection:	IP65
GNSS	Accuracy:	2.0m CEP
	Position standards:	• GPS + SBAS (WAAS, EGNOS, MSAS, QZSS) • GLONASS • Galileo • Beidou
	Concurrent GNSS:	4
	Features:	• Jamming and spoofing detection algorithm
Rate Of Turn	Time to calibrate:	~20s at boot
	Accuracy:	±0.5°
Roll & Pitch	Accuracy:	±0.5°
Sensors (ROT/R&P)	Type:	Dual Gyroscope & Accelerometer
	Features:	• <i>TRENT Sensor Fusion</i> algorithm • Higher precision at slow turns
Battery & Power Supply	Charging technology:	USB Power Delivery (USB PD)
	Charging time:	2.5h max. to full capacity
	Charging connector:	USB Type-C
	Battery capacity:	2000mAh / 14.8Wh LiPo Battery
	Operating time:	~17h on average / up to 24h max.
	Features:	• Rechargeable during operation
AIS	Features:	• AIS/RS485 input circuit protection • Polarity protection & correction • AIS check for consistency and checksum • AIS decoding of heading, ROT and vessel name
Wireless Connectivity	WiFi Standard:	Wi-Fi 802.11b/g/n
	WiFi Signal Strength:	18dBm
	WiFi Security:	WPA/WPA2
	Bluetooth Standard:	v4.2 (not compatible with iOS/iPadOS)
	Features:	• Up to 3 clients simultaneously • Simultaneous use of mobile data connection • Simultaneous use of WiFi and Bluetooth
Miscellaneous	Features:	• System readiness in less than 30s • Firmware upgradable via <i>TRENT PPU Manager</i> • 2 years warranty

1.4 Key Features

- **Independent Rate Of Turn (ROT):** The *TRENZ SIRIUS Portable Pilot Unit* uses advanced sensor technology and a dual sensor configuration with the *TRENZ Sensor Fusion algorithm* to provide highly accurate rate of turn (ROT) measurements, even at low turn rates.
- **Independent GNSS Module:** The *TRENZ SIRIUS Portable Pilot Unit* features an integrated GNSS receiver with a built-in antenna, enabling independent position determination. The GNSS receiver supports the following standards: GPS + QZSS/SBAS, GLONASS, Galileo, and Beidou.
- **Extended Battery Runtime:** The *TRENZ SIRIUS Portable Pilot Unit* can achieve battery runtimes of up to 24 hours, depending significantly on the configured settings. Under typical conditions, the average runtime is approximately 15 to 17 hours.
- **Charging via USB Power Delivery (USB PD):** The *TRENZ SIRIUS Portable Pilot Unit* supports USB Power Delivery (USB PD) for fast and intelligent charging at higher wattages, ensuring safe, high-speed charging without battery damage. It adapts to various USB PD power sources, like laptop and cell phone adapters (e.g., Apple), providing optimal power for efficient charging.
- **Leave Behind Alarm:** The *TRENZ SIRIUS Portable Pilot Unit* includes a leave behind alarm feature to prevent accidental misplacement. When activated, it emits an audible alarm if the connected device loses connection, alerting the user promptly and enhancing security to minimize the risk of loss.
- **Firmware Updates:** The *TRENZ SIRIUS Portable Pilot Unit* supports firmware updates via WiFi or USB. This allows for seamless updates to the latest features and security enhancements. Users can update the firmware wirelessly through a WiFi connection or by connecting the unit to a computer using a USB cable.
- **Low Weight and Compact Dimensions:** The *TRENZ SIRIUS Portable Pilot Unit* is designed to be compact and lightweight, fitting easily into a pilot's pocket. With dimensions of 125x72x27mm (LxWxH) and a weight below 180 grams, the *SIRIUS Pilot Unit* meets this requirement effectively.
- **Fast Readiness:** The *TRENZ SIRIUS Portable Pilot Unit* is designed for quick deployment, featuring a fast readiness time with no long waiting periods. This ensures that the unit is operational almost immediately after powering on, allowing pilots to perform their tasks efficiently without delays.

2 User Guide

2.1 Overview

2.1.1 Device

The **TRENZ SIRIUS Portable Pilot Unit** offers two USB Type-C interfaces on the front side as well as an on/off button with an integrated LED:



Figure 3: Front view

- | | | |
|----------|-------------------|---|
| 1 | AIS DATA | This is the connector from the TRENZ SIRIUS Portable Pilot Unit to the vessel to which the AIS data cable is connected.
Please note: This socket is exclusively used for the transmission of AIS data. |
| 2 | CHARGE/USB | The USB data and charging cable is connected to this socket.
Please note: This socket can only be used to charge the TRENZ SIRIUS Portable Pilot Unit or to transfer data between the unit and a user device. |
| 3 | ON/OFF | The TRENZ SIRIUS Portable Pilot Unit can be switched on or off with this button. An LED in the button is used to indicate the charging process. |

2.1.2 Button & LEDs

The **TRENZ SIRIUS Portable Pilot Unit** has four LEDs arranged in a ring to indicate the current status and a button in the middle:

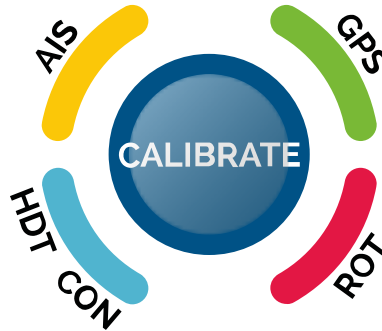


Figure 4: LED ring and CALIBRATE button

Button

The '**CALIBRATE**' button has two functions during normal operation:

- | | |
|--|---|
| Deactivating the leave-behind alarm | Press and hold the button for at least 1 second to deactivate the leave-behind alarm sound. |
| Manual calibration | Press and hold the button for at least 3 seconds to trigger a manual ROT sensor calibration. Please note that the calibration process is indicated by four yellow LEDs and will take about 20 seconds (see ' <i>ROT Calibration</i> '). |

LEDs

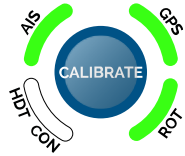
During normal operation, the LEDs will display the following information:

- | | |
|----------------|--|
| AIS | The AIS LED indicates the status of AIS communication. It will flash yellow on incoming AIS messages. |
| GPS | The GPS LED indicates the status of the internal GNSS module. The LED will be flashing green when the module is active but does not yet have a satellite fix. The LED will be solid green LED once the module has an active satellite fix. |
| ROT | The ROT LED will display the status of the internal rate of turn module. A permanently lit red LED means that the module is active. |
| HDT CON | The HDT CON LED is user configurable. By default, a solid blue LED will indicate that the wireless communication of the device is active. It may be configured so that a solid blue LED will display that a heading has been obtained from the vessel. (see ' <i>Advanced Configuration</i> ') |

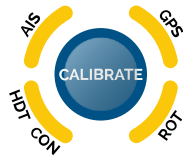
The LEDs are also used to display other various system statuses:



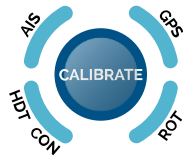
Startup A circular animation of multicolored LEDs indicates the startup process of the **TRENT SIRIUS Portable Pilot Unit**.



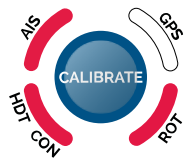
Battery Green LEDs show the battery's charge level. Each fully green LED represents 25% charge. A half-lit LED means less than 25% charge.



Calibration Four permanently lit yellow LEDs indicate that a calibration has been triggered (see '*ROT Calibration*' for details on the calibration process).



Bootloader Four permanently lit blue LEDs indicate that the device is in bootloader mode.



Error If an error occurs during start-up of the device, it is indicated by a specific combination of red LEDs (The possible error codes are explained in the chapter '*Error Codes*').

2.2 Device Usage

2.2.1 Charging

Using the included charger

The **TRENZ SIRIUS Portable Pilot Unit** can be charged with the included charger and the accompanying USB Type-C cable. A typical charge takes about 2 hours and 30 minutes and will draw about 10 Watts of power at peak.

Please note that the *TRENZ SIRIUS Portable Pilot Unit* can only be charged through the righthand USB Type-C port.

During the charging process, the LED in the on/off button lights up continuously. As soon as the charging process is completed, the LED turns off. If there are any issues during the charging process, the LED will start flashing once per second. Please note that battery conditioning may occur; especially at the beginning of the charging process. In this case, the LED may blink for a short period of time.

Using an alternative USB PD charger

The **TRENZ SIRIUS Portable Pilot Unit** is compatible with all USB Type-C chargers that support the USB Power Delivery (USB PD) standard, including various laptop chargers and the 20W Apple USB-C power adapter. When using a cable other than the included one, ensure it is suitable for USB PD charging. The alternative power adapter should provide at least 10 Watts of output power. If the adapter provides less than 10 Watts, a full charge will take longer than 2 hours and 30 minutes.

Using a standard USB charger

The **TRENZ SIRIUS Portable Pilot Unit** can also be charged using standard Non-PD USB chargers. However, the charging power with these adapters is often limited which significantly extends the charging time. Additionally, Non-PD USB chargers may not have sufficient output power to handle the initial power surge when the unit is plugged in, potentially failing to initiate the charging mode of the **SIRIUS Pilot Unit**.

For efficient charging, it is recommended to use chargers that meet the outlined specifications. If issues arise, refer to the troubleshooting section or contact technical support for assistance.

2.2.2 Device Startup

Startup procedure

When switched on, the **TRENZ SIRIUS Portable Pilot Unit** will run through a short program to ensure correct operation and detect possible errors:

1. The firmware and the configuration of the device are checked. This is indicated by a circular animation of the LEDs.
2. The current charge level of the battery is indicated visually by the LEDs. For each 25% charge level, one of the LEDs will light up fully green. An LED that is only half illuminated means less than 25% of charge.
3. An on-site calibration of the sensors is performed. This is indicated by four yellow LEDs. The calibration process takes about 20 seconds, during which the device must not be moved.
4. The startup melody is played and the device switches to normal operation. Now the associated information is output via the LED ring (see '*Button & LEDs*').

Error detection during startup

If errors or unforeseen events occur during device initialization, the **TRENZ SIRIUS Portable Pilot Unit** will emit a 3-second warning tone and display the respective error code using red LEDs. For an explanation of the possible errors, see '*Button & LEDs*'.

The error output is non-blocking, allowing the device to continue initializing after the error condition is displayed. However, depending on the error, the functionality of the device may be limited. If an error occurs during startup, the **SIRIUS Pilot Unit** should first be restarted. If the error still persists, please contact customer service.

2.2.3 Connecting to a Vessel

To ensure proper operation, follow these steps to establish a connection between the **TRENZ SIRIUS Portable Pilot Unit** and a vessel:

1. Connect the included AIS data cable to the vessel's pilot plug port.
2. Attach the USB Type-C end of the cable to the left-hand port of the **SIRIUS Pilot Unit**.
3. Power on the device.
4. Wait for the startup sequence to complete (refer to '*Device Startup*').
5. Connect your end device to the **SIRIUS Pilot Unit** (see '*Connecting to the Pilot Unit*').
6. Launch your navigation or charting software.
7. The AIS data can now be displayed.

Please note that the reception of AIS data from the pilot plug connector of the vessel is only supported through the *lefthand* USB Type-C port.

For communication between the **TRENZ SIRIUS Portable Pilot Unit** and the software on the end device, the latter has to be configured properly. Please refer to the manual of the respective navigation/charting software (also see '*Connecting to the Pilot Unit*').

2.2.4 Connecting to the Pilot Unit

To establish a connection between the **TRENZ SIRIUS Portable Pilot Unit** and a user device (e.g., an iPad or a laptop), ensure that the PPU is powered on and that the connecting device is within the range of the PPU's wireless network.

Connecting on Apple iOS/iPadOS

1. Open the settings and navigate to the WiFi configuration submenu.
2. Select the TRENZ-**xxxx** network, where '**xxxx**' is referring to the last four digits of the device's serial number as can be seen on the back of the device.
3. Connect to the network using the password '**12345678**'.
4. If necessary, configure your navigation/charting software with the following parameters:
 - IP address: **10.10.10.100**
 - Port: **8919**
 - Protocol: **TCP**

Please note that if your device has a separate connection to the internet (e.g. through an LTE/5G modem), iOS may suggest that you either continue to use the WiFi network or obtain data through the mobile data connection. If you choose the latter, the connection to the **TRENZ SIRIUS Portable Pilot Unit** will be kept active, but you will still have access to the internet.

Connecting on Microsoft Windows

1. Open the Windows Action Center or click on the WiFi icon in the Windows Task Bar. It is recommended to enable the 'Connect automatically' feature when establishing the connection.
2. Select the TRENZ-**xxxx** network, where '**xxxx**' is referring to the last four digits of the device's serial number as can be seen on the back of the device.
3. Connect to the network using the password '**12345678**'.
4. If necessary, configure your navigation/charting software with the following parameters:
 - IP address: **10.10.10.100**
 - Port: **8919**
 - Protocol: **TCP**

Connecting via USB Interface

It is also possible to connect the **TRENZ SIRIUS Portable Pilot Unit** to user devices that provide a USB host interface; these are usually laptops running Microsoft Windows or Apple MacOS. This type of connection is especially recommended when updating the firmware.

Please note that the unit can only be connected to a host device through the *righthand* USB Type-C port.

2.3 Additional Information

2.3.1 GNSS

The **TRENZ SIRIUS Portable Pilot Unit** features an integrated GNSS receiver with a built-in antenna, enabling independent position determination. The receiver supports the following L1 GNSS standards: GPS + QZSS/SBAS, GLONASS, Galileo, and Beidou.

Operational Considerations

While the device offers GNSS functionality, certain conditions must be met for accurate position acquisition:

- **Sky Visibility:** Ensure an unobstructed view of the sky. Weather conditions can also affect signal reception.
- **Interference:** Avoid coated windows and proximity to excessive metal above the device, which can interfere with signal accuracy.

Please note that due to the common challenges posed by these conditions on a ship's bridge, this GNSS feature should primarily be reserved for emergency use. Its accuracy is highly dependent on external factors and cannot be consistently guaranteed.

2.3.2 ROT Calibration

Understanding the calibration of the **TRENZ SIRIUS Portable Pilot Unit** is crucial to ensure reliable and optimal performance. Two critical calibration steps are carried out for each pilot unit before shipping:

- **Temperature calibration:** Each device undergoes testing to measure how its output responds to temperature variations. Using this data, a characteristic mathematical model that describes how temperature affects the gyroscope's output is calculated. This model helps establishing a correction factor to minimize errors caused by temperature, ensuring precise gyroscope readings.
- **Zero-rate calibration:** MEMS gyroscopes can experience drift in their bias values over time due to aging of internal components, mechanical stresses and so on. To mitigate effects of drift, a zero-rate calibration is performed every time the **TRENZ SIRIUS Portable Pilot Unit** is started to compensate for an offset (bias) in the gyroscope's output when it should be stationary. The user can also perform this calibration manually.

Autonomous Calibration at Startup

During startup, the **TRENZ SIRIUS Portable Pilot Unit** initiates an autonomous calibration procedure. The gyroscope readings are sampled continuously for approximately 20 seconds. The average of these readings is then compared with the calibrated bias value stored in the device's memory.

- If the newly calculated average deviates from the stored bias value by more than 5 degrees per minute, it indicates that the device experienced movement during the startup phase, and the calculated average is discarded.
- If the deviation is within the tolerance of 5 degrees per minute, the stored bias value is updated with the newly calculated average, ensuring optimal calibration for subsequent operations.

Manual Bias Calibration

The bias calibration process can also be initiated manually by pressing the '**CALIBRATE**' button. This process differs from the autonomous calibration at startup, as it does not compare the current bias value with the stored one. Instead, the stored bias value is always overwritten with the newly calculated average during manual calibration.

Optimal Conditions for Manual Calibration:

- **Level Surface:** Perform calibration on a level surface for best results.
- **Minimize Vibrations:** Ensure minimal vibrations during calibration. Avoid calibrating on board a ship due to environmental motion affecting precision.
- **Stationary Vessel:** Calibration on board is feasible if the vessel is stationary, but it may yield less precise results compared to calibration on land.

When to Perform a Manual Calibration

Recalibrating the bias before each trip is generally not necessary, but it should be performed periodically. This is especially necessary if the unit exhibits a constant drift, even when stationary. Additionally, if the unit is to be operated in stand-alone mode (i.e., not connected to the ship's pilot plug), it is recommended to calibrate the device beforehand.

2.3.3 Continuous ROT Correction via Vessel Heading

When the **TRENZ SIRIUS Portable Pilot Unit** is connected to a ship via the pilot plug and receives heading information from the vessel, it periodically adjusts its calculated rotational speed in recurring cycles.

The correction cycle intervals are timed as follows:

- The first correction occurs after one minute.
- The second correction occurs after two minutes.
- The third correction occurs after three minutes.
- Subsequent corrections occur every four minutes from the fourth cycle onwards.

Conditions for Completing a Correction Cycle

- The rotational speed (ROT) determined by the gyroscope in the pilot unit must not exceed an absolute value of 30° per minute.
- The average correction value determined in a cycle must not exceed 25° per minute.

Correction Process

The **TRENZ SIRIUS Portable Pilot Unit** compares the ROT measured by the gyroscope with the change in the ship's heading over time. If a deviation is detected, half of the difference is integrated into the ROT output by the pilot unit.

3 TRENZ PPU Manager

3.1 Overview

To change the configuration of your **TRENZ SIRIUS Portable Pilot Unit** (e.g. to switch certain functions on or off) or to update the device's firmware, please use the *TRENZ PPU Manager* application.

The application is available for [Android](#), [iOS/iPadOS/macOS](#) and [Windows](#). To download the application, please visit the corresponding app store. Alternatively, you can use the QR code below to obtain the respective version via the [TRENZ PPU Website](#).

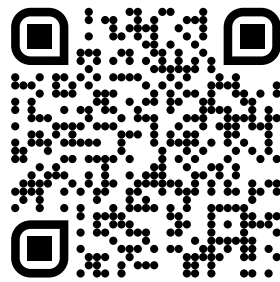


Figure 5: Link to app download

Once you have installed the application and connected to the device via WiFi or USB, you can proceed to use the *TRENZ PPU Manager*. If connected correctly, the application automatically finds the device and is able to communicate with it as soon as you click '**Connect**' in the main screen of the application (see figure 6).

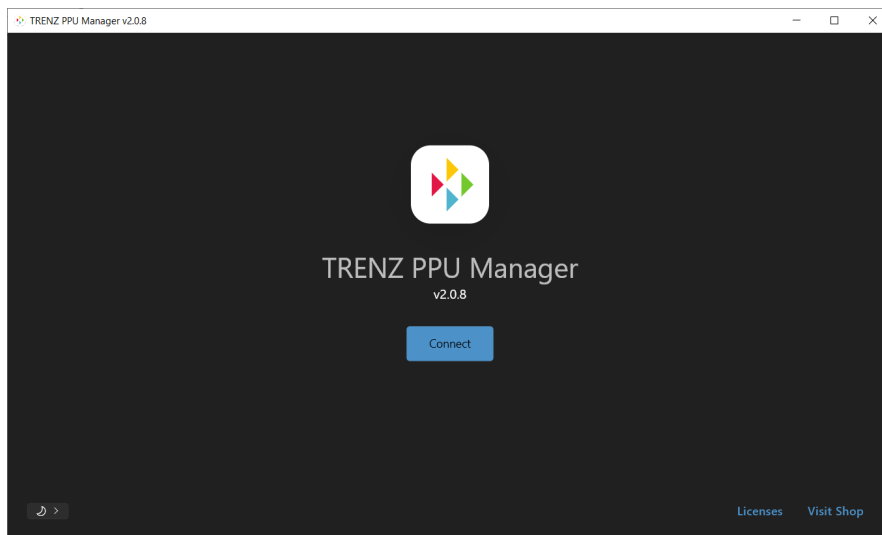


Figure 6: *TRENZ PPU Manager* Main Screen

3.2 Dashboard

After successfully establishing a connection, the *TRENZ PPU Manager* dashboard will appear. This dashboard displays various virtual instruments with measurement data. In the top right corner you will find an indicator showing the recent battery status, expressed as a percentage of the remaining capacity (see figure 7).

On the left side of the *TRENZ PPU Manager* dashboard, you will find several tabs. These tabs allow you to configure your device, update the firmware and so on.

To prevent the false triggering of the leave-behind alarm, please make sure to always disconnect the *SIRIUS Pilot Unit* from the *TRENZ PPU Manager* using the 'Disconnect' button located at the bottom right corner.

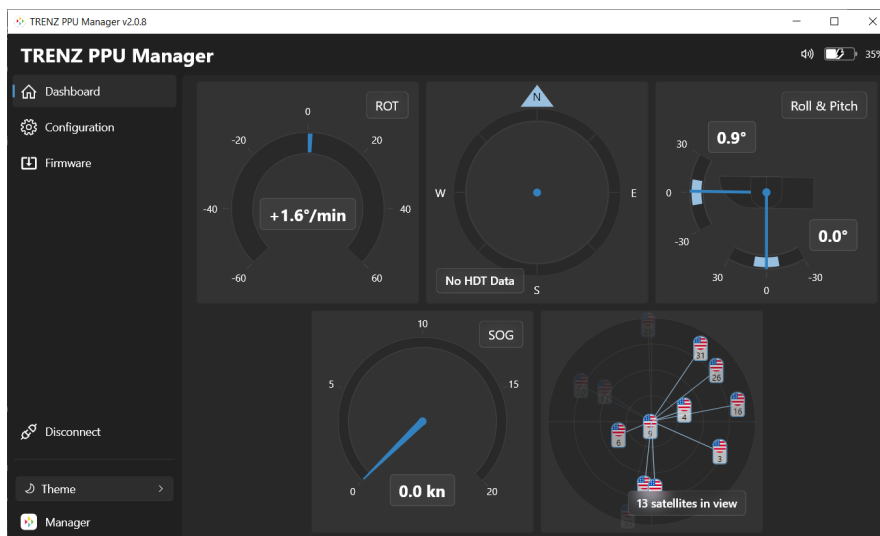


Figure 7: *TRENZ PPU Manager* Dashboard

If you scroll down, you will find extended data on the status of the *TRENZ SIRIUS Portable Pilot Unit* (see figure 8).

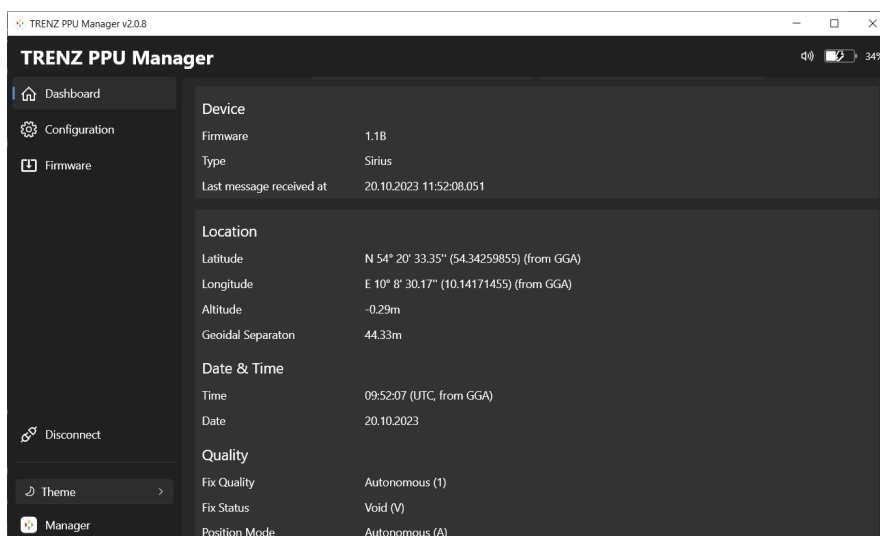


Figure 8: *TRENZ PPU Manager* Dashboard

3.3 PPU Configuration

3.3.1 Standard Configuration

The configuration of the unit is done with the *TRENZ PPU Manager*. To do this, you will find a cogwheel icon on the top left side under the application dashboard and (if expanded) the label '**Configuration**', which will take you to the tab for configuring the **TRENZ SIRIUS Portable Pilot Unit** with a click (see figure 9).

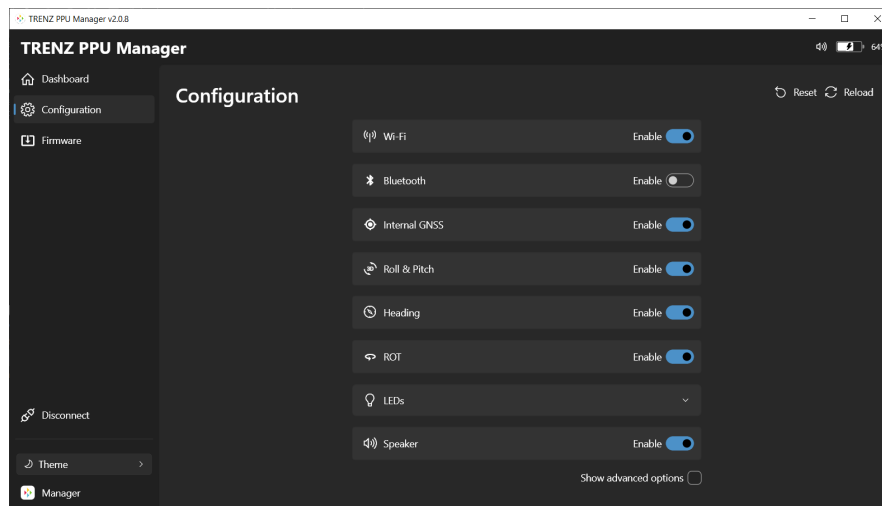


Figure 9: *TRENZ PPU Manager* Configuration Menu

In the upper right corner you will find the following buttons:

- Reset** This button will reset the current configuration to its default values and upload it to your device. Please note that a reboot of the device will be triggered after the configuration has been uploaded.
- Reload** This button will reload the current configuration from the device. Unsaved changes to the configuration will be discarded.
- Save** This button is displayed as soon as you have made changes to the configuration. These are written to the device when the button is pressed. Some changes may require a reboot of the device.

Configuration Options

The standard configuration allows you to enable or disable individual functions of the **TRENZ SIRIUS Portable Pilot Unit**:

- WiFi
- Bluetooth
- Internal GNSS
- Roll & Pitch
- Heading
- Rate of Turn
- LEDs
- Speaker

3.3.2 Advanced Configuration

The **TRENZ SIRIUS Portable Pilot Unit** offers extended configuration options for some of its features. For this, the checkbox '**Show advanced options**' at the bottom right must be activated (see figure 9). Please read the tooltips associated with the respective configuration item to avoid undesired behavior of the device.

WiFi	SSID	Here you can change the WiFi identifier (SSID). The default setting is TRENZ- xxxx , where ' xxxx ' is referring to the last four digits of the device's serial number as can be seen on the back of the device.
	Password	Here you can change the WiFi password associated with the SSID. The default password setting is ' 12345678 '.
	TCP Port	This setting can be used to change the default TCP port for data transfer. The default TCP port is ' 8919 '.
Heading	Enhanced	The advanced heading setting uses a combination of the vessel's heading and the internal ROT sensor of the TRENZ SIRIUS Portable Pilot Unit to add a decimal place to the output heading. This feature is enabled by default.
ROT	Smoothed	This feature is utilized to average the rotational velocity over a brief time period, resulting in reduced fluctuations in the ROT output. This feature is enabled by default. Warning: The following ROT settings should only be changed under special conditions and with extreme caution!
	Bias	This value will be added to the calculated rate of turn (ROT).
	Factor	The current rate of turn (ROT) is multiplied by this value.
	Dampening	This value describes the rate of change of two consecutive ROT values. The lower the value is set, the lower (or more dampened) the displayed change in ROT will be.
Speaker	HDT tick	Enabling this feature will provide an audible indication every-time the HDT changes by 1°. This feature is disabled by default.
	Jamming alert	Enabling this feature will trigger an alarm as soon as a GNSS jamming attack is detected. Please note that the internal GNSS module will be activated for this. This feature is disabled by default.
	Spoofing alert	Enabling this feature will trigger an alarm as soon as a GNSS spoofing attack is detected. Please note that the internal GNSS module will be activated for this. This feature is disabled by default.
	Leave-behind alert	If the WiFi connection to the device is lost and not reconnected within 30 seconds, this feature will activate an alarm. This feature is enabled by default.

3.4 Firmware Updates

The *TRENZ PPU Manager* can be used to update the firmware of the device. For this you will find a container icon on the left-hand side and (if expanded) the label '**Firmware**'. In this tab you can upload a new firmware to the device. Within the firmware menu, the firmwares available for your ***TRENZ SIRIUS Portable Pilot Unit*** are displayed in a list and can be loaded onto the device by clicking on '**Install**' (see figure 10).

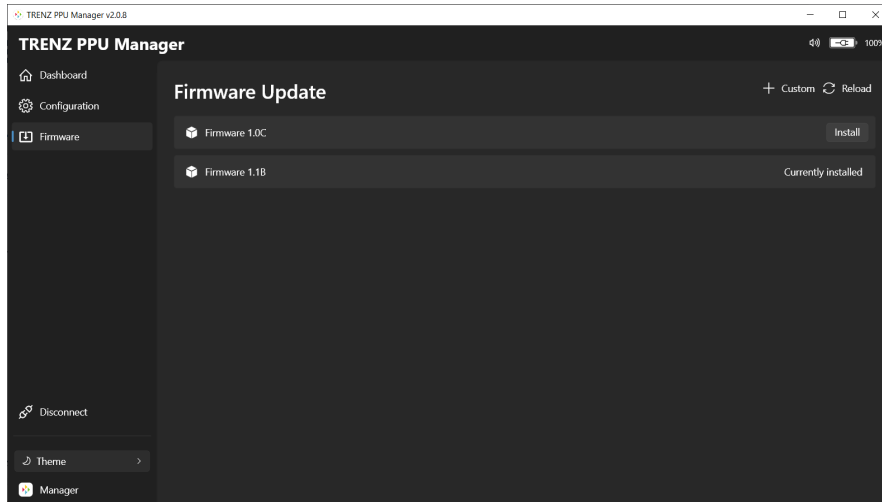


Figure 10: *TRENZ PPU Manager* Firmware Menu

In the upper right corner you will find the following buttons:

Custom This button allows you to install a custom firmware file.

Reload This button will reload the available firmwares for your device.

Update process

1. After the firmware update is confirmed, the device is put into bootloader mode. The connection to the device is interrupted for a brief moment.
2. After the bootloader mode is active, the connection to the device is automatically re-established and the new firmware is uploaded to the device.
3. After the new firmware has been successfully uploaded, a message is displayed and the device reboots.
4. If necessary, you will have to connect to the device manually again after the reboot. After that, you can work with the device as usual.

Please note that an update via WiFi connection is possible, but we recommend to upload new firmware to the device via USB connection. Not only does the upload via WiFi take considerably more time, but you also have to manually reconnect to the device and restart the update process if the connection is lost during the upload.

4 Support

4.1 FAQ & Troubleshooting

4.1.1 Device Related

The device does not start.

If the device does not start, this may be due to an empty battery. Please charge the device (see 'Charging'). If charging does not work, please first try an alternative power supply and/or cable to be able to rule them out as a source of error.

4.1.2 GNSS Related

The SIRIUS Pilot Unit does not receive any GNSS satellite position data

If the unit does not receive any GNSS positioning data please make sure that the GNSS feature has been activated (see 'PPU Configuration'). Also please refer to the 'GNSS' paragraph in the user guide chapter for more information about the reception of GNSS signals.

4.1.3 ROT Related

ROT keeps drifting with a constant value.

To compensate for a constant drift, please start the manual ROT calibration routine of the device. To do this, press and hold the '**CALIBRATE**' button for at least 3 seconds. The calibration process is indicated by four yellow LEDs and will take about 20 seconds. The device should lie on a flat surface and must not be moved (see 'ROT Calibration').

4.1.4 AIS Related

No AIS data is received and the yellow AIS LED is not blinking.

If no AIS data can be received, please make sure that the connection between the vessel and the **TRENZ SIRIUS Portable Pilot Unit** has been established correctly. To do this, please follow the steps described under 'Connecting to a Vessel'. When the connection with the vessel is successfully established, the yellow AIS LED will flash on incoming AIS sentences. If this is not the case, check (if available) if an alternative AIS cable can solve the issue.

No AIS data is received but the yellow AIS LED is blinking.

If the yellow AIS LED is flashing but you are not receiving any data, this can have two causes. First, you should make sure that you have connected to the device correctly (WiFi, USB, etc.). Second, the navigation/charting software may need to be configured. Please refer to 'Connecting to the Pilot Unit'.

The AIS cable seems to be not working.

If you have previously purchased a **TRENZ** product, make sure that you use the AIS cable supplied with the Sirius PPU (see figure 1c), as the cables of the previous models are not compatible with the new generation of the **TRENZ SIRIUS Portable Pilot Unit** devices.

4.1.5 PPU Manager Related

The TRENZ PPU Manager does not connect to the pilot unit on iOS.

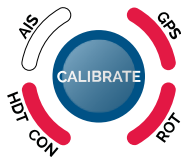
If the *TRENZ PPU Manager* does not connect to the pilot unit on Apple's iOS, please check whether the authorizations for accessing the local network have been assigned correctly. To do this, search for "Trenz Manager" in the iPhone settings and check if the access to the local network is active.

The firmware update has failed.

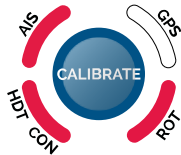
In case a firmware update failed and/or the device is without function after an update, the update process can be restarted as often as required. To do this, the device must be switched to boot-loader mode by holding down the '**CALIBRATE**' button during power-up. In this mode, the *TRENZ PPU Manager* will be able to find the device and upload firmware again. If the update is done via WiFi (not recommended), it may be necessary to manually connect to the unit's wireless network beforehand.

4.1.6 Error Codes

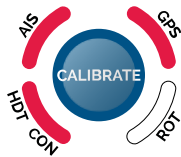
If an error condition occurs during the **SIRIUS Pilot Unit** startup, it will be indicated by a specific combination of red LEDs. The meaning of each error code is as follows:



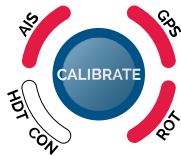
Battery Error This error code indicates that there is a problem with the battery and/or the charging electronics.



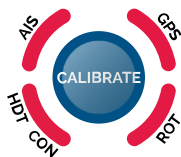
GNSS Error This error code indicates that there is a problem communicating with the GNSS module.



IMU Error This error code indicates that there is a problem communicating with either one or both of the inertial measurement units.



WiFi Error This error code indicates that there is a problem communicating with the WiFi module.



Storage Error This error code indicates that there is a problem reading the internal memory.

4.2 Service

4.2.1 Warranty

Warranty coverage The warranty covers defects of the TRENZ Pilot Unit and its accessories within the given warranty period. The battery is also covered by the warranty, although it is a wearing part.

Warranty period The device has a warranty period of two years. Warranty extensions are also available. For more information, please contact our sales department at sales@trenz-ppu.com.

Warranty exclusion The warranty does not cover defects and damage caused by improper use, negligence, accident or carelessness (bumps, breaks, etc.). Also excluded are defects and damage due to loss, theft, fire and water (exceeding the IP65 protection class).

4.2.2 Customer Support

Before contacting support, please try to turn off the device for about 5 minutes and then restart it. Furthermore, please refer to '*FAQ & Troubleshooting*'. If the error persists please contact our technical support team via support@trenz-ppu.com.

In case you need to return the device to us, please use the address below. Please remember to include a description of the error with the device.

TRENZ GmbH
PPU Support
Neidenburger Straße 14
28207 Bremen
Germany

Please note that if you need to return your device to us, please make sure that the carton is sturdy and durable. Choose the size of the carton according to the size and weight of the goods. Always use filler material for empty spaces to avoid possible damage.

5 Annex

5.1 EU Declaration Of Conformity



EU-Konformitätserklärung Certificate of Conformity

TRENZ GmbH
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Germany

Tel: +49 421 595890

www.trenz.de

erklärt hiermit, dass die nachfolgend aufgeführten Produkte bei bestimmungsgemäßer Verwendung den grundlegenden Anforderungen folgender Richtlinien entsprechen:

declares herewith, that the products designated below comply with the relevant fundamental requirements of the following directive:

2014/53/EU Funkanlagenrichtlinie / *Radio Equipment Directive*

2011/65/EU RoHS-Richtlinie / *RoHS Directive*

Gerät / Product: TRENZ PilotPlug (PPU) Sirius V1.0 - 2023

Folgende Normen wurden angewendet:

Following Standards are used:

EN 300 328 V2.1.1, EN 301 489-1 V2.1.1, EN 301 489-17 V3.1.1, EN 60950-1:2006, EN 50581:2012

Bremen, 01.08.2023

A handwritten signature in blue ink that reads "Frank Diegel".

Frank Diegel
Managing Director
TRENZ GmbH

5.2 Contact

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support@trenz-ppu.com (PPU Support)

5.3 Document Revision History

<i>Version</i>	<i>Changenote</i>
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v1.0	Initial release of the Sirius manual.
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v1.1	Updated battery capacity.
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v1.2	Updated FAQ.
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v1.3	Minor updates.
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v1.4	Minor updates.
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v2.0	Restructured; important notes on ROT (incl. calibration), continuous ROT correction and GNSS have been added.
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