



HiPer HR

Multi-Purpose GNSS Receiver

Operator Manual



HiPer HR

Part Number 1010117-01
Revision F

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Manual Conventions

This manual uses the following conventions:

Convention	Description	Example
Bold	Menu, or drop-down menu selection	File ► Exit (Select the File menu and select Exit)
	Name of a dialog box or screen	From the Connection screen...
	Button or key commands	Select Finish .
Mono	User supplied text or variable	Type <code>guest</code> , and select Enter .
<i>Italic</i>	Reference to another manual or help document	Refer to the <i>Topcon Reference Manual</i> .



TIP

Notification that one or more steps may be taken to reduce effort, time, and/or expense.



NOTE

Further information to note about system configuration, maintenance, or setup.



NOTICE

Supplementary information that if disregarded can have an adverse effect on system operation, system performance, data integrity, or measurements.



CAUTION

Notification that an action has the potential to result in minor personal injury, system damage, loss of data, or loss of warranty.



WARNING

Notification that an action has the potential to result in personal injury or property damage.



DANGER

Notification that an action has the potential to result in severe personal injury or death.

Introduction

Topcon's HiPer HR receiver is a compact and high-performing integrated GNSS receiver for static and kinematic land surveying applications. The receiver design includes 452 GNSS channel Vanguard Technology™ with Universal Tracking Channels, and advanced integrated Fence Antenna™ technology. These technologies deliver world class positioning and navigation capability to your application by tracking signals with multiple frequencies and multi-constellation satellite systems such as GPS, GLONASS, BeiDou, QZSS, Galileo, NavIC, and SBAS.

To create a future proof, efficient positioning system appropriate for any survey needs, the receiver combines GNSS tracking capabilities, multiple-frequency RTK, DGPS and PPP solutions, extensive communication capabilities, built-in 8 GB memory, integrated batteries, and hot swappable batteries.

Several unique features, including advanced multipath mitigation, adjustable Phase Locked Loop (PLL) and Delay Locked Loop (DLL), offer a reliable and versatile reception of weak signals even in degraded signal environments. The receiver also supports Quartz Locked Loop™ (QLL) for superior GNSS tracking in high-vibration environments.

The HiPer HR receiver contains an internal HIMU (Hybrid Inertial Measurement Unit) module. This module measures tilt angles of the rover receiver. The angle values are used by the software application MAGNET Field for calculating the true projection of the rover antenna phase center on the ground.

The HiPer HR offers complete IP67 protection against dust and water ingress, in addition to superior vibration and shock resistance. The Topcon communication interface allows you to quickly integrate Topcon's premium GNSS performance within new systems, and quickly deliver world class positioning and navigation support to your applications.



Figure 1-1: HiPer HR Receiver

HiPer HR Features

The HiPer HR receiver's advanced design allows a simplified setup and premium performance. The HiPer HR receiver features the following:

- 452 GNSS channel Vanguard Technology™ with Universal Tracking Channels for multi-frequency tracking of multiple satellite constellations such as GPS, GLONASS, BeiDou, QZSS, Galileo, NavIC, and SBAS.
- Industry leading full-wave Fence Antenna™ technology
- An internal battery and a removable external battery
- An internal UHF or FH915 radio modem
- Integrated Bluetooth®, multi-channel LongLink™, and Wi-Fi wireless and radio technology
- Wi-Fi as an access point and as a client



NOTE

Bluetooth, LongLink, Cellular, and Wi-Fi wireless radio technologies are available in all configurations of the receiver. Local radio restrictions apply for operation of these radio technologies.

- Web interface for receiver monitoring and configuration
- Interface for controlling and viewing data logging through the LED display
- Topcon Integrated Leveling Technology (TILT™)
- External power, USB, and serial-data ports
- External GNSS antenna connector for HiPer HR series receivers with internal 3.5G cellular module, or without an internal cellular module
- External cellular module antenna connector for HiPer HR series receivers with an internal cellular 4G cellular module
- Internal 8 GB SDHC memory card
- Virtual serial port via USB
- Data access using USB.

The HiPer HR comes in one of the following configurations:

- R2 Lite UHF radio module
- R2 Lite FH915 radio module
- No UHF/FH915 radio
- Alinco UHF radio (available in Japan)

Unpacking Your Receiver Kit

This section describes the documentation, standard kit components, and accessories (depending on your purchase) that accompany your receiver. When you unpack your receiver kit, verify that you received the items listed in this section. If any items are missing or damaged, contact your local Topcon dealer. See “Getting Technical Support” on page 1-4.



NOTE

Components in the standard kits may differ based on your region. Contact your local Topcon dealer to inquire about items included in your regional standard kit, and accessories that are available with the receiver.

Standard Kit Components

Table 1-1 lists the standard kit components for the HiPer HR. For more information about the included cables, see “Cables” on page 1-7.

Table 1-1: HiPer HR Standard Kit Components

HiPer HR Receiver	Power Cable
Power Adapter	Wall Charger Cable
Micro USB Cable	Serial Cable
Additional Removable Battery Pack	Battery Charger with Cradle
Battery Charger Cable	myTopcon Registration Card
LED Card – Describes the LED behavior and technical content	

Accessories

Topcon offers a wide variety of accessories specially designed to improve system flexibility and job site efficiency. For more details on the optional accessories available for HiPer HR, contact your Topcon dealer.

Table 1-2 lists the accessories available for the HiPer HR. For more information about accessories, see “Accessories” on page 2-3.

Table 1-2: HiPer HR Accessories

Radio Antenna	Rover Pole
External Antenna Cable	Fixed Height Heavy Duty Tripod
Rover Pole Offset Adapters	Economy Tripod
Tribach with Plug Adapter	Tape Measure
Horizontal Measuring Bar	Prism
Hand-Held Controller and Brackets	Prism Adapter

Technical Documents

The following documents will help you set up and use your new receiver.

- HiPer HR Operator's Manual (this document) – Contains detailed information on how to use your new receiver. You can download the document from the myTopcon support and training site (<https://www.topconpositioning.com/support>).
- HiPer HR LED Card – Contains basic hardware and LED descriptions, along with safety and regulatory statements. This guide is available in your standard kit package.
- Topcon Receiver Utility (TRU) Help – An on-screen help document embedded in the software that contains detailed information on how to use the TRU software. For more information about the TRU software, see “Using Topcon Software With Your Receiver”.

Using Topcon Software With Your Receiver

Use the HiPer HR receiver in conjunction with the Topcon Receiver Utility (TRU) and MAGNET Field™ or Pocket 3D applications for a precision positioning solution. Topcon software enables you to configure the receiver and other external devices, manage files, collect data, and perform survey and construction work flows.

The Topcon Receiver Utility (TRU) is a hardware configuration software for receivers and peripheral devices. You can install it on desktop computers, and data controllers. You can download this program from the myTopcon website (<https://www.topconpositioning.com/support>). The help document for TRU is embedded in the software.

Topcon's MAGNET Field™ software for data controllers provides real-time communication, cloud storage, data collection and exchange, and field solutions, such as topo, staking, roads, calculations, and more.

Pocket 3D is a field application for survey and construction markets. The software runs on data controllers with Windows CE® and mobile platforms. Pocket 3D simplifies data collection, allowing you to check cuts and fills, layout points and survey all or part of the job site quickly and efficiently.

Contact your Topcon dealer for more information about Topcon field data collection software for the surveying and construction markets.

Getting Technical Support

Before contacting a Topcon support representative about any problems with the receiver, see “Troubleshooting” on page 8-1.

Contact your local Topcon dealer or visit myTopcon (<https://www.topconpositioning.com/support>) for technical support.

When contacting Topcon for technical assistance, provide the following information for better and faster service:

- A general description of the problem you experienced
Include:
 - The field operation being performed when the problem occurred

- The details of the unexpected behavior, symptoms, and any error messages that preceded or followed the problem
- The frequency of occurrence or patterns associated with the problem occurrences
- Receiver information and configuration settings
See “Obtaining the Receiver Information” on page 1-5, for instructions on how to save the receiver information to a receiver info file.
- Specifications of the mobile devices and computers used in the field or office exhibiting the problem
Include:
 - Model information
 - Version number
 - Operating system information
 - Memory and storage capacity
- Information about the field software Include:
 - Version number
 - Steps to reproduce the problem
- Description of the field environment and/or observation of conditions when the problem occurred

Obtaining the Receiver Information

To obtain the receiver information:

1. Install TRU on the hard drive of the field controller or personal computer.
2. Open TRU.
3. Power ON the receiver.
4. Select **Device►Application Mode►Receiver Managing**.

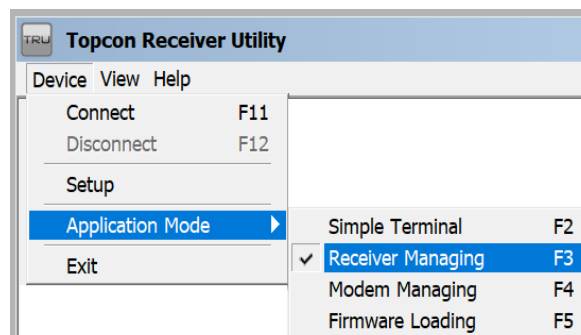


Figure 1-2: Select Receiver Managing Application Mode

Receiver Managing Mode is selected.

5. Select **Device►Connect**.

The **Connection Parameters** screen opens (Figure 1-3).

6. Use one of the following two ways to connect the receiver to the field controller or personal computer:

To connect using Bluetooth:

- a. Select Bluetooth from the **Connect Using** drop-down list.
- b. Select .

The **My Bluetooth devices** screen opens.

- c. Select the appropriate HiPer HR device name and select **OK**.

The **Connection Parameters** screen shows the selected device (Figure 1-3).

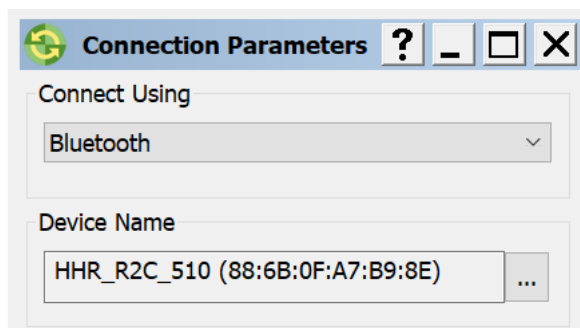


Figure 1-3: TRU Connection Parameters-Bluetooth

To connect using a Micro USB cable (see more information on “Drivers” on page 2-4):

- a. Select Serial Port from the **Connect Using** drop-down list.
- b. Select .

The **Select Device** screen opens.

- c. Select the Topcon Receiver (COM_N) port and select **OK**.

The **Connection Parameters** screen shows the selected device (Figure 1-4).

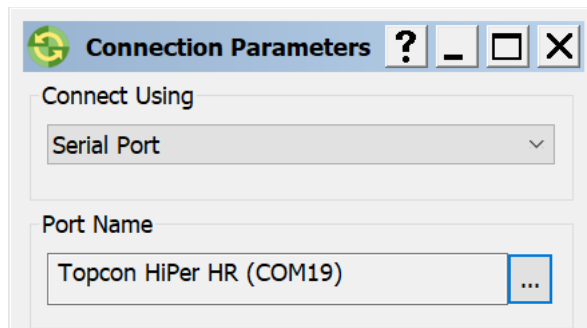


Figure 1-4: TRU Connection Parameter - USB cable

To connect using a serial cable:

- a. Select **Serial Port** from the **Connect Using** drop-down list.

- b. Select .
- c. Select the Serial Port (COM_N) port and select **OK**.

The **Connection Parameters** screen shows the selected device (Figure 1-5).

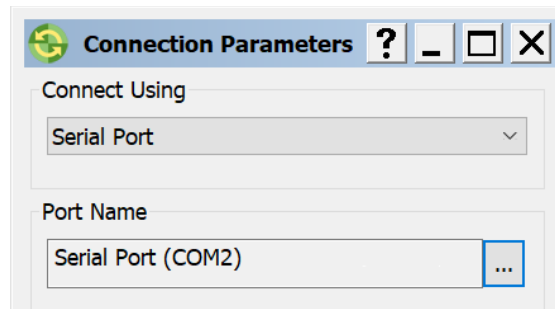


Figure 1-5: TRU Connection Parameter - Serial cable

7. Select **Connect** on the **Connection Parameters** screen.

The **Connection Parameters** screen closes. TRU connects to the HiPer HR receiver. The tools on the screen are active.

8. Select  **Information** on the main screen.

The **Receiver Info** screen opens (Figure 1-6). It shows receiver information, such as hardware and firmware versions, RAM size, receiver ID and serial number, and etc.

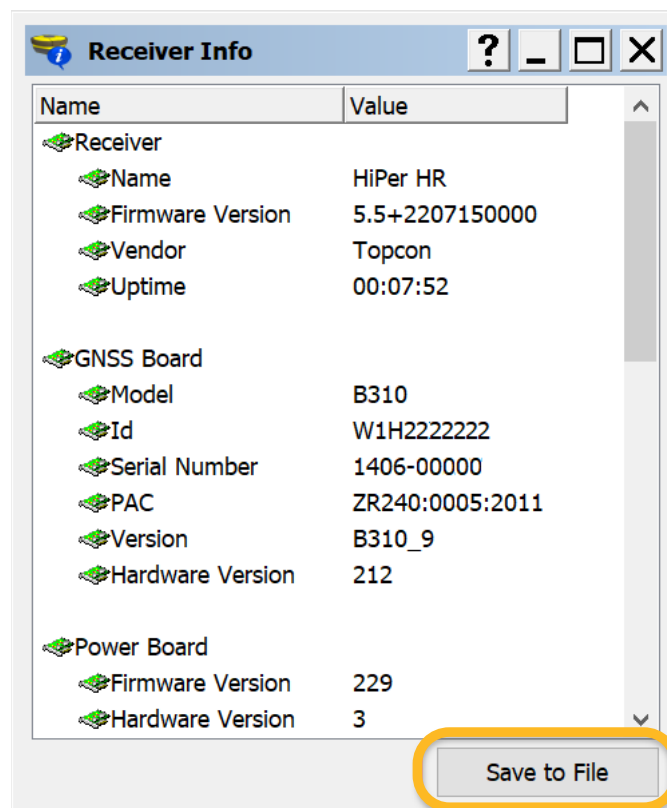


Figure 1-6: TRU Receiver Info-Save to File

9. Select **Save to File** (Figure 1-6).

The **Save As** screen opens (Figure 1-7).

10. In the **Save As** screen (Figure 1-7):

- a. Select a location on the field controller or computer.
- b. Enter a **File name**.
- c. Select **Save**.

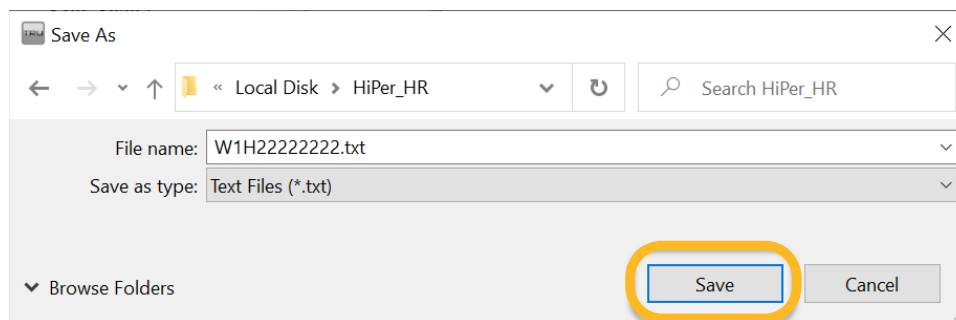


Figure 1-7: TRU-Save Receiver Info File

Getting Acquainted

The HiPer HR receiver enclosure is fully sealed and incorporates the GNSS receiver board, antenna, batteries, memory storage, and a wireless communication modules in rugged housing.

Receiver Overview

The upper part of the receiver includes GNSS, Bluetooth and Cellular antennas. It is covered by the radome, and securely surrounded by a shock-absorbing rubber bumper. The radio modem antenna connector is mounted on the top point of the radome.

The magnesium alloy lower enclosure features an easy-to-operate display panel, one internal battery, one removable battery, data ports, an external GNSS antenna connector, power connector and SIM card slot.

The receiver has a highly-visible display panel with single-button operation. The display panel enables you to view the receiver’s operational status. For more information, see “Display Panel” on page 3-1.

You can locate regulatory and product identification information on the two receiver labels, which are located on the bottom of the product and inside the battery compartment. The product identification label contains the serial number and part number.

Cables

The HiPer HR package includes a power supply cable, a USB cable, and a power adapter. Table 2-1 describes the cables included with your receiver, depending on your regional standard kit configuration. Make sure to contact your local Topcon dealer to inquire about standard items included in your receiver kit.

 NOTE	Components in the standard kit may differ based on your region. Contact your local Topcon dealer to inquire about items included in your regional standard kit, and accessories that are available with the receiver.
 NOTE	Align the keyways when connecting the power/serial cable to the receiver port. To disconnect the cable, push the cable in, and then gently remove the cable.

Table 2-1. Receiver Cables

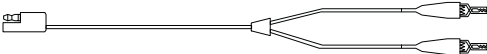
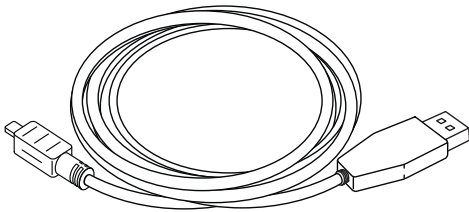
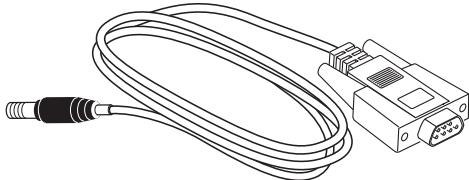
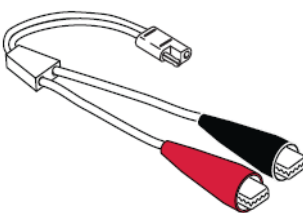
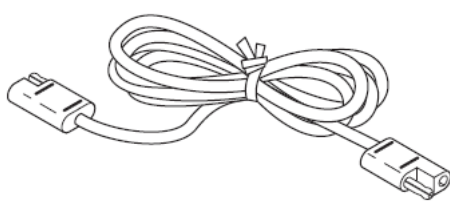
Cable Description	Cable Illustration
Receiver Power/Charging Cable Connects the receiver and the power supply unit via SAE connectors for battery charging. P/N 14-008016-04LF	
Alligator Clips-to-SAE Cable Connect the receiver power cable to an external 12V battery.	

Table 2-1. Receiver Cables (Continued)

Cable Description	Cable Illustration
Power Charger Cable(s) Connects the power adapter to a grounded outlet. Different options are available for the power charger cable based on your country. To purchase this cable, contact your Topcon dealer. Refer to this part number P/N 1005793-01 - Cable, Power Charger (US) P/N 1005794-01 - Cable, Power Charger (EUR)	
Micro USB Cable Connects the receiver to an external device (controller or computer) for data transfer and receiver configuration. P/N 1013602-01	
Serial Cable Connects the receiver to an external device (controller or computer) for data transfer and receiver configuration. P/N 14-008005-03	
External Antenna Cable (Optional) Connects the receiver to an external Topcon GNSS antenna. P/N 1006447-01 Only available for use with HiPer HR variants without integrated 4G cellular module.	
Alligator Clips Cable (Optional) Connects any 12 - volt DC power source to the receiver via the SAE cable. P/N 14-008025-01	
SAE-to- SAE extension cable (Optional) Connects SAE connectors over longer distances. P/N 14-008022-01	

Accessories

Topcon offers a wide variety of accessories specially designed to improve system flexibility and job site efficiency. For more details about the available accessories, contact your Topcon dealer.



NOTE

Some accessories may be included in the standard kit for your region. Contact your dealer for details.

- **Power Supply Unit** (P/N 1005555-01): This item charges the external (removable) and internal batteries when connected to a grounded outlet. This unit converts the Alternating Current (AC), normally supplied from an electrical outlet, to Direct Current (DC) for charging the batteries, and/or powering the receiver.
- **Battery Pack** (P/N 1006555-01): External (removable) battery for the receiver.
- **Modem Antenna:** The Spread Spectrum (FH915+) antenna is a reverse polarity TNC RF connection (P/N 30-030012-01) and the UHF antenna is a BNC connection (P/N 30050501-01 UHF 435-470 or P/N 30050502-01 UHF 400-435).
- **Universal Tribrach and Tribrach Adapter** (P/N 22-006008-01 and P/N 22-006009-011): These items level the tripod, and secure the receiver or antenna to the tripod.
- **External Cellular Antenna:** (1030630-02 ANT EXT 4G LTE CELL HINGED SMA) (only applicable to those variants with integrated 4G cellular modem).



NOTE

The universal tribrach and tribrach adapter are not needed when using the heavy duty tripod.

- **Precision Tribrach Adapter:** This item precisely centers, aligns, and levels the tripod over a point. The horizontal spacer (P/N 51842) inserts into the precision tribrach, and allows the receiver to sit securely on the precision tribrach.
- **Wooden Tripod** (P/N 59010)
- **Heavy Duty Tripod** (P/N 22-05050101)
- **2 Meter Fixed Height Rover Pole** (P/N 22-050908-01)
- **Hand-held Controller:** This item allows the HiPer HR Base and Rover systems to be configured and monitored directly in the field. Use the Topcon Receiver Utility (TRU) to configure the receiver, and any Topcon field data collection software.
- **MAGNET Field and Pocket 3D Software:** These items can be used to operate the receiver. See the TRU Help (embedded in the software) or the help files in the field collection software for more information.
- **HiPer HR External GNSS Antenna Cable** (P/N 1006447-01): External GNSS antenna connector for HiPer HR series receivers without an internal 4G cellular module.
- **Battery Charger w/Adapter** (P/N 1010975-02): Dual charger for the external (removable) batteries.
- **Hybrid Positioning Adapter** (P/N 1003241-01)
- **100 mm Prism Spacer** (P/N 51949)
- **Tape Measure** (P/N 22-050902-01): HV1034DM 3/4 x 12 ft./3.7 m PWR Tape 10ths.

A USB cable can be used to establish a serial connection between the field controller or computer and HiPer HR receiver. A USB driver is required for this type of connection, if the operating system of your field controller or PC is older than Windows 10. This driver is installed with Topcon Receiver Utility (TRU) software when you select the **Receivers Drivers** check box in the TRU Installer (Figure 2-1).

Drivers

A USB cable can be used to establish a serial connection between the field controller or computer and HiPer HR receiver. A USB driver is required for this type of connection, if the operating system of your field controller or PC is older than Windows 10. This driver is installed with Topcon Receiver Utility (TRU) software when you select the **Receivers Drivers** check box in the TRU Installer (Figure 2-1).

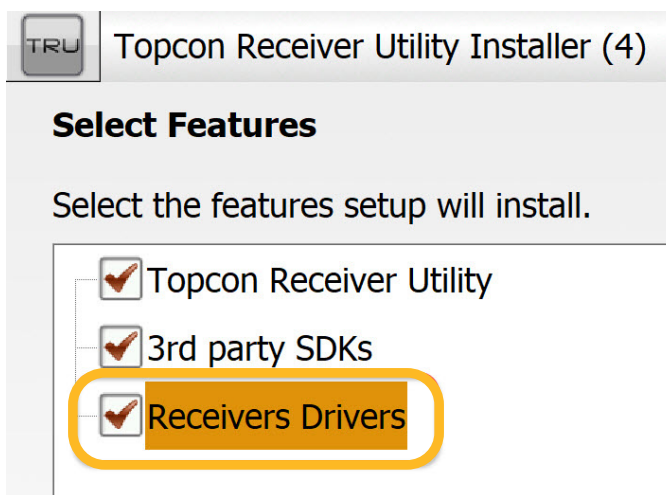


Figure 2-1: TRU Installer - Receivers Drivers

After connecting the field controller or computer and HiPer HR receiver with USB cable, a new virtual COM port - “*Topcon HiPer HR (COMN)*” is automatically added to the controller or computer:

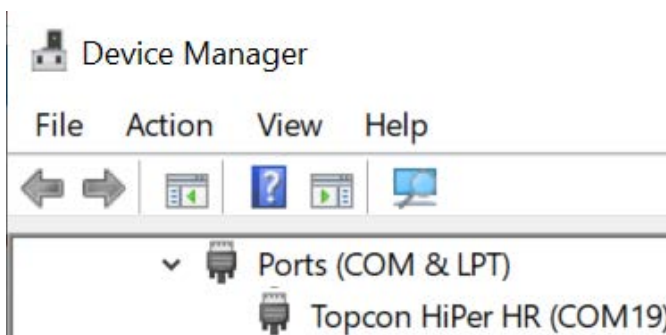


Figure 2-2: Device Manager displays Virtual COM Port After Driver Installation

This virtual com port will be automatically added to the drop-down list of available serial communication ports in TRU and MAGNET Field. Select this new COM port in the drop-down list to connect TRU or MAGNET Field to the GNSS receiver via USB cable.

If operating system of your field controller or computer is Windows 10, it is not necessary to install the USB Topcon driver. After connecting the controller or computer and HiPer HR receiver with USB cable, a new virtual COM port - “*USB Serial Device (COMN)*” is automatically added to the controller or computer:

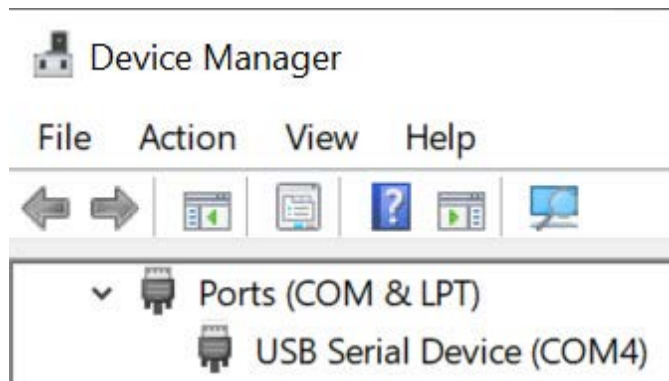


Figure 2-3: Device Manager displays Virtual COM Port on Windows 10 Device

Also this virtual com port will be automatically added to the drop-down list of available serial communication ports in TRU and MAGNET Field.

Batteries

The receiver has an internal battery and removable battery, both rechargeable, for powering the receiver. For more information about using the batteries, see “Managing Power” on page 4-1.

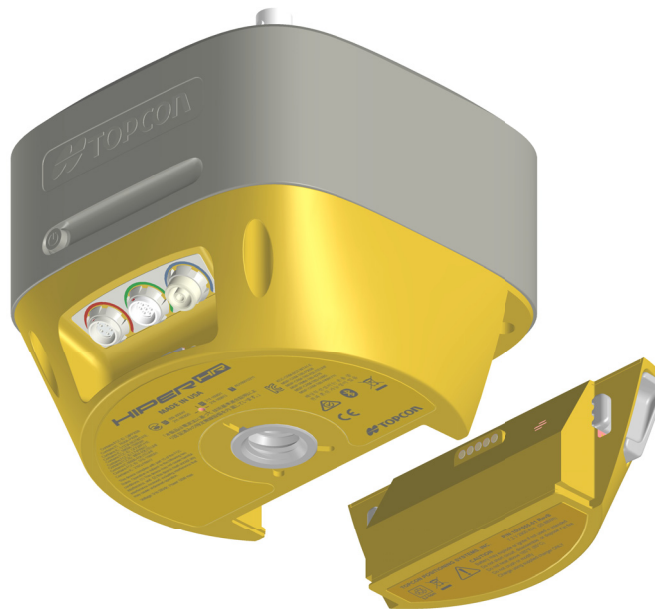


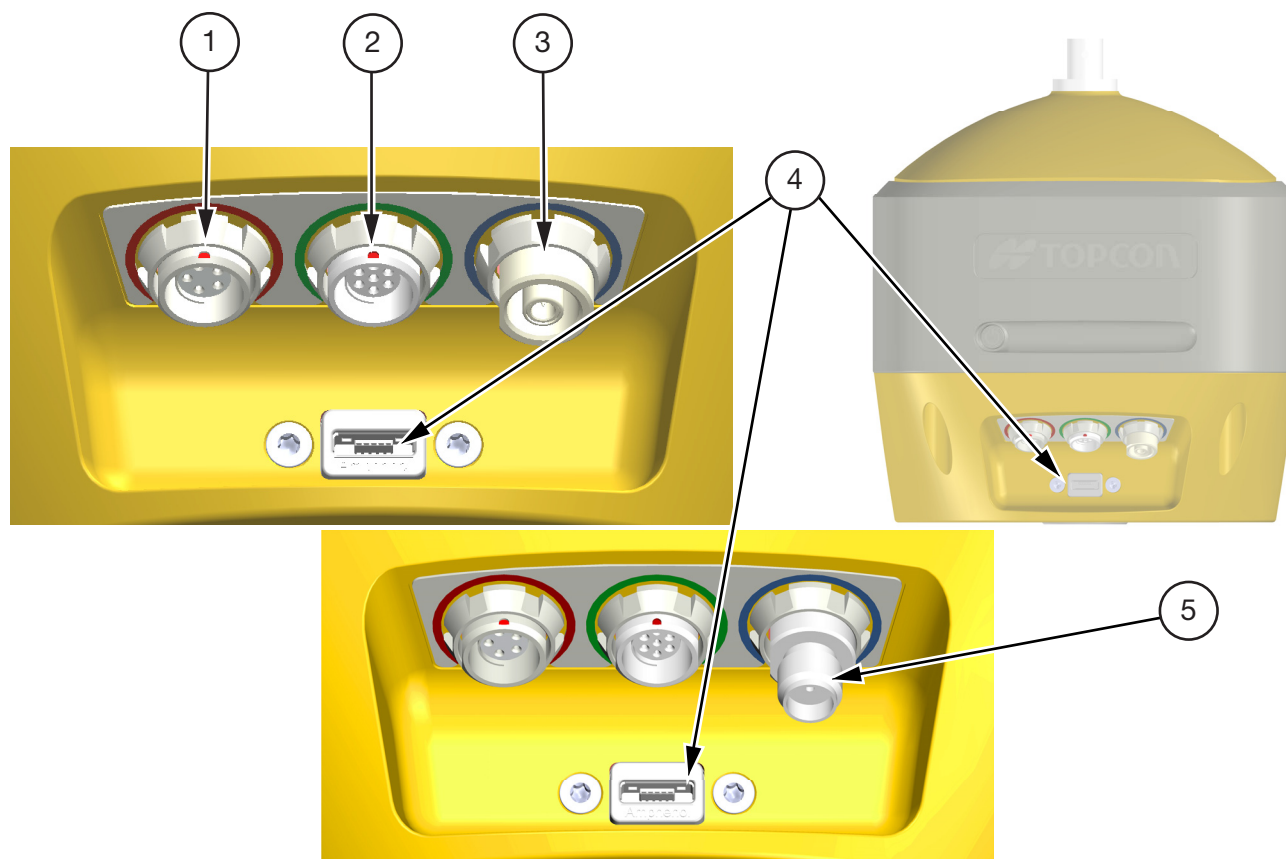
Figure 2-4: HiPer HR Removable Battery

Data and Power Ports

The HiPer HR has the following four ports (shown in Figure 2-5):

- **Power** – rimmed in red; used to connect the receiver to an external power source. This port can also be used to charge the batteries. The body of the connector on the corresponding cable is red.
- **Serial Port** – rimmed in green; used for communication between the receiver and an external device.

- **External GNSS Antenna** – SMB connector rimmed in blue; used for connecting the receiver to an external GNSS antenna for use in base station and rover station setups.
- **USB** – Micro USB connector; used for high-speed data transfer and communication between the receiver and an external device.



- | | |
|--------------------------------|--|
| 1 Power (red) | 4 Micro USB |
| 2 Serial (green) | 5 External cellular antenna connector for units with integrated 4G cellular module |
| 3 External GNSS Antenna (blue) | |

Figure 2-5: HiPer HR Ports

External Radio Antenna Connector

The antenna of the FH915 or UHF radio modems plug into the external antenna connector on the radome (Figure 2-6). The radio antenna uses a reverse polarity TNC or BNC connection depending on the installed radio modem. The reverse polarity TNC connector is used for FH915, and the BNC connector is used for UHF.



1 External Radio Connector

Figure 2-6: HiPer HR Radome and External Antenna Connector

Internal Cellular Antenna

Internal Cellular Antenna for 3.5 G cell modem. If using only the internal 3.5 G cell modem for your survey, do not insert the antenna into the external antenna connector. In this case, the receiver will use only the internal cell modem antenna, mounted under the radome, as shown in Figure 2-7.

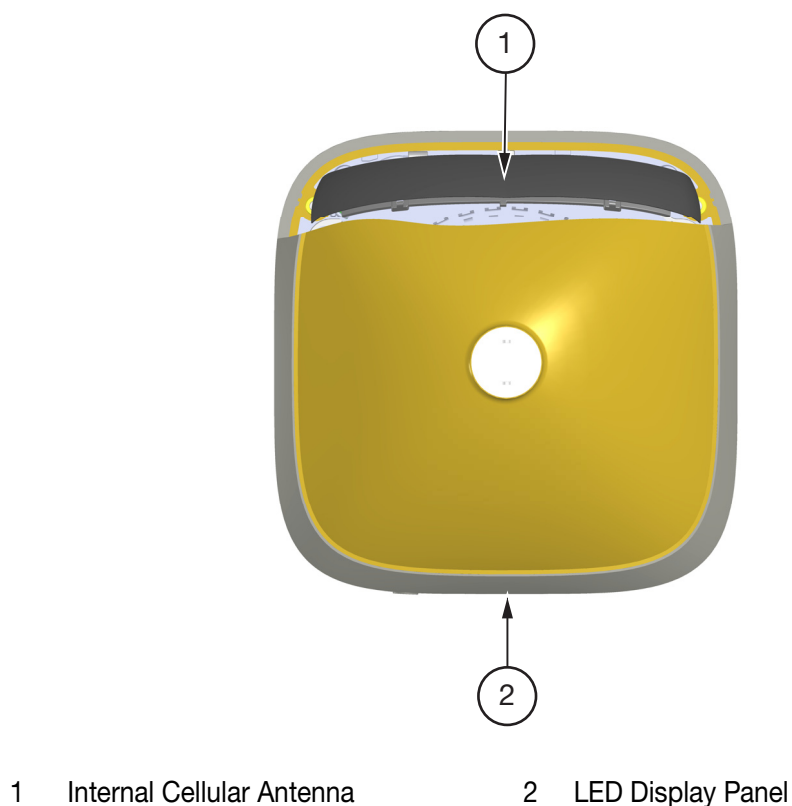


Figure 2-7: Internal Cell Modem Antenna

Applicable for the following assembly variants:

Part Number	Description
1006276-03	ASSY, HIPER HR GNSS RECEIVER W/O MODEM
1006276-01	ASSY, HIPER HR, R2Lite UHF GNSS RECEIVER
1006276-02	ASSY, HIPER HR GNSS RECEIVER W/FH915
1006276-04	ASSY, HIPER-HR RECEIVER W/ALINCO RADIO

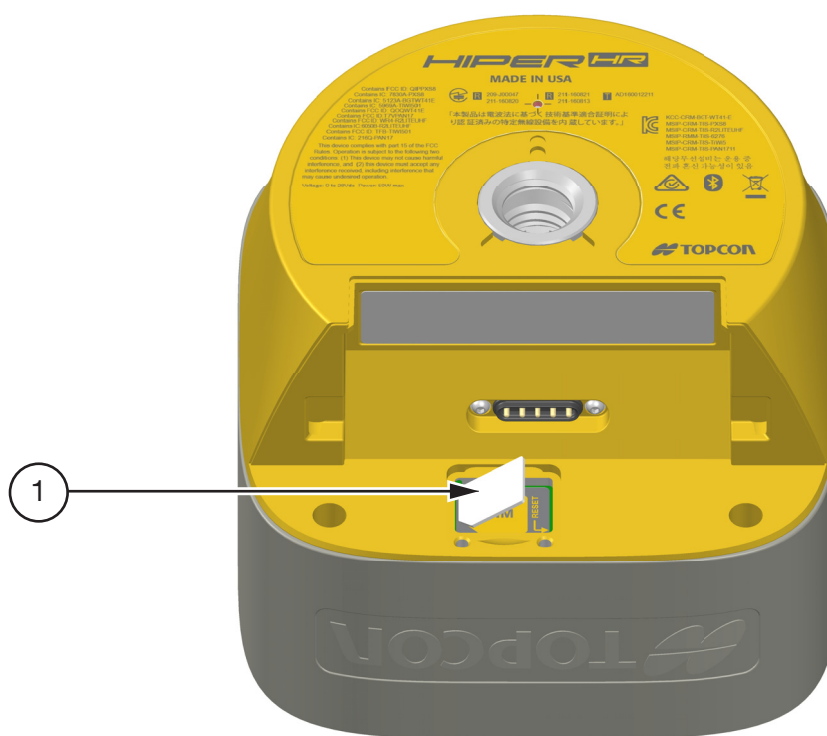
SIM Card Location

The HiPer HR can use a Micro-SIM card. The SIM card is located under the door on the upper surface of the removable battery slot (Figure 2-8). To install a SIM card, do the following:

1. Remove the external battery.
2. Remove the SIM card door using a TORX T6 screwdriver.
3. Insert the SIM card, and attach the external battery.

Once installed, the SIM card provides a unique identification for the receiver's cell module and enables functionality based on the subscribed services. The receiver board accesses the cell module, which accesses the SIM card. The SIM card can remain inside the receiver.

To configure the module, use MAGNET Field or TRU.



1 SIM Card

Figure 2-8: SIM Card Location

Hardware Reset Button

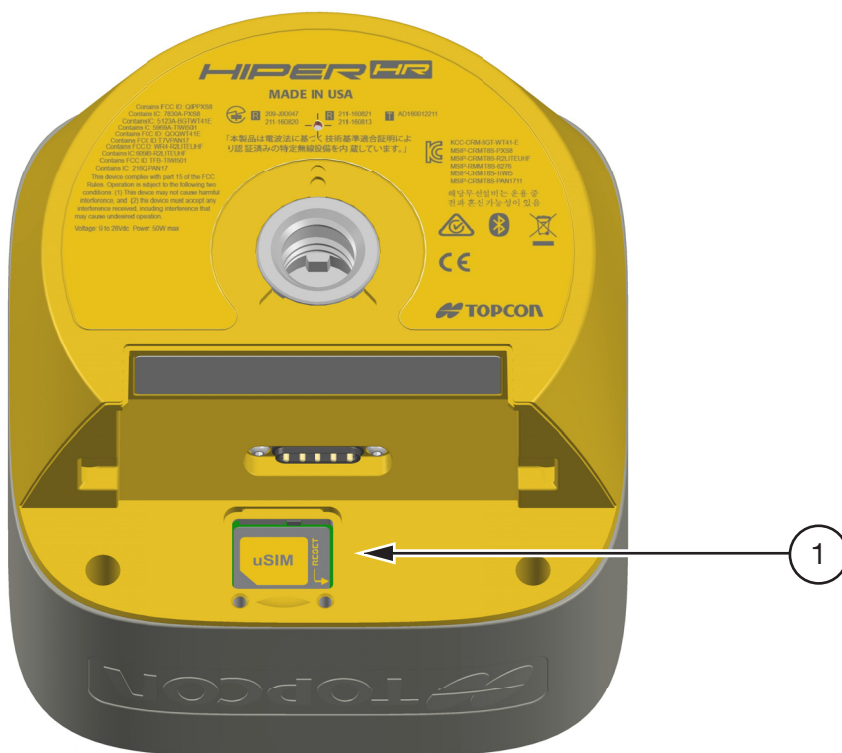


WARNING

Use the Hardware Reset button only when the unit will not power on from the Power button. Follow the guidelines in Chapter 8, “Troubleshooting,” on page 8-1 before using the Hardware Reset button.

To perform a hardware reset, press the Reset button located under the removable battery compartment.

1. Remove the external battery.
2. Remove the SIM card door using the TORX T6 screwdriver.
3. Press the Reset button using the screwdriver.
4. Close the SIM card door using the TORX T6 screwdriver
5. Attach the external battery.

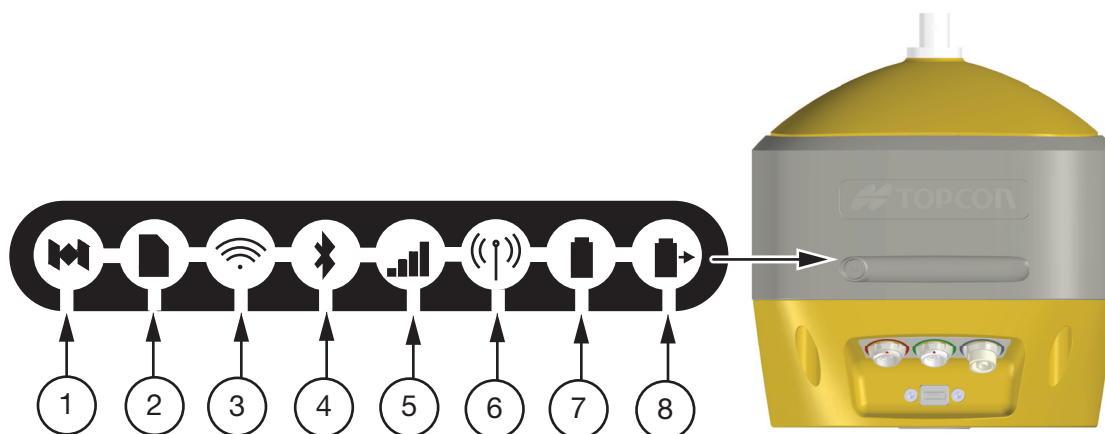


1 Reset Button

Figure 2-9: Reset Button Location

Display Panel

The receiver has a highly-visible display panel with single-button operation. The LED display panel (Figure 3-1) allows for control of receiver power and data recording. The LEDs display the status of the satellite tracking, recording/memory capacity, Wi-Fi and Bluetooth connections, cell modem status, and batteries. This chapter describes the different LED blink patterns and what they mean.



- | | | | |
|---|---|---|---|
| 1 | STAT: Satellite Tracking Status | 5 | Cellular: Internal Cellular Modem Status
(Only applicable to those variants with
internal cellular modem) |
| 2 | REC: Recording Status | 6 | Radio: UHF of FH915+ Modem Status |
| 3 | Wi-Fi: WiFi Activity Status | 7 | Battery Internal: Remaining Charge of the
Internal Battery |
| 4 | Bluetooth: Bluetooth Communication Status | 8 | Battery External: Remaining Charge of the
Removable Battery |

Figure 3-1: LED Display Panel

Power Button

The power button performs multiple functions. The duration in which the button is pressed and held determines how the receiver will perform. While pressing the button, the LED panel indicates the selected operation using particular LEDs. Figure 3-1 describes how to use the power button.

Table 3-1: Power Button Functions and Descriptions

Function	Press Button	LED Description
Power ON	Press and hold for 2+ seconds	Initial receiver state - receiver off. Release the Power button when the STAT LED turns solid green. The Power LED blinks until startup completes. After that the LED light is solid green, if the external power source is connected to the receiver. If the external power source is not connected to the receiver, the LED is OFF.
Power OFF	Press and hold for 3-10 seconds	Initial receiver state - receiver on. Release the Power button when the STAT LED turns solid yellow. The Power LED blinks until startup completes. After that the LED light is solid green, if the external power source is connected to the receiver. If the external power source is not connected to the receiver, the LED is OFF.
Open file (start data logging)	Press three times in a row within 2 second	Initial receiver state - receiver on, data logging is not started (REC LED is solid green). After pressing the Power button, data logging started (REC LED started blinking green).
Close file (stop data logging)	Press three times in a row within 2 seconds	Initial receiver state - receiver on, data logging is on (REC LED blinks green). After pressing the Power button, data logging stopped (REC LED turned solid green).
Toggling between Static and Kinematic post-processing modes	Press two times in a row within 1 second	Initial receiver state - receiver on, data logging is on (REC LED blinks green). This function is available for "Occupation mode switch" only. See Topcon Receiver Utility (TRU) Help.
Reset Parameters	Press and hold for 10-15 seconds	Initial receiver state - receiver on. Release the Power button when STAT LED turns solid magenta.
Factory Reset	Press and hold for 30-35 seconds	Initial receiver state - receiver on. Release the Power button when STAT LED turns solid red.
Emergency Power OFF	Press and hold for 55-70 seconds	Initial receiver state - receiver on. Release the Power button when STAT LED turns solid green but all other LEDs are OFF.



NOTE

A delay of several seconds occurs between the last clicking of the Power button and first blinking/last blinking of the REC LED.



NOTE

When using external power, the Power LED is solid green except for startup and shutdown procedures.

Power Button Mode Switching

The Power button operates in two modes: LED blink mode switch and Occupation mode switch. In Occupation mode switch, you can switch the receiver between Static and Kinematic survey modes while recording a file.

Select these modes in the Topcon Receiver Utility (TRU). To do so:

1. Connect the receiver to a computer and open TRU.
2. To establish the connection of TRU to the receiver, perform the steps 3 - 7 in the “Obtaining the Receiver Information” on page 1-5.

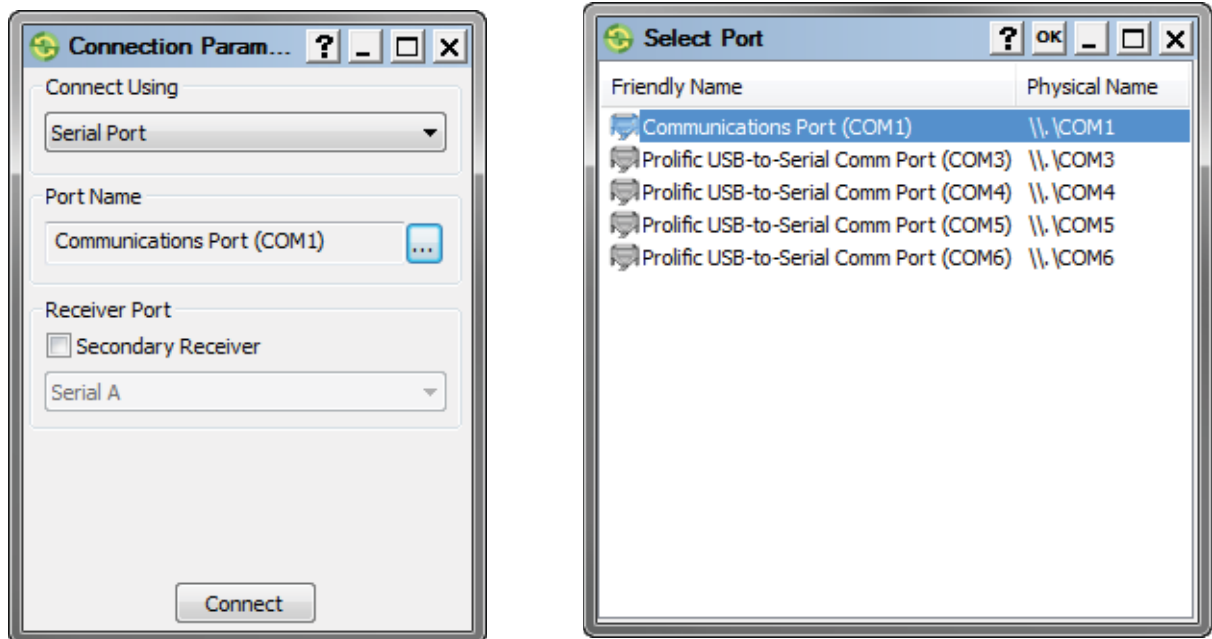


Figure 3-2: TRU — Connection Parameters

3. In the TRU main screen, select the **File Explorer** icon. The **Logs** tab appears (Figure 3-3).

Log	File Name	File Size, B	Current Logging Period, s	Elevation Mask, °	Prefix	MINTER & AFRM Logging Period, s	AFRM Rotation Period, s	Use for MINTER & AFRM	Message Set	Drive	Path	Quota, Size	Quota, Files	Quota, Time, hrs
File A				5	lga	1	3 600	Yes	def2	Current		None	None	None
File B				5	lgb	1	3 600	No	def2	Current		None	None	None
File C				5	lgc	1	3 600	No	def2	Current		None	None	None
File D				5	lfd	1	3 600	No	def2	Current		None	None	None

Figure 3-3: TRU — File Explorer Logs Tab

- In the **Logs** tab, right-click any place to open the context menu and select **Advanced MINTER Settings**. The **MINTER** screen appears (Figure 3-4).

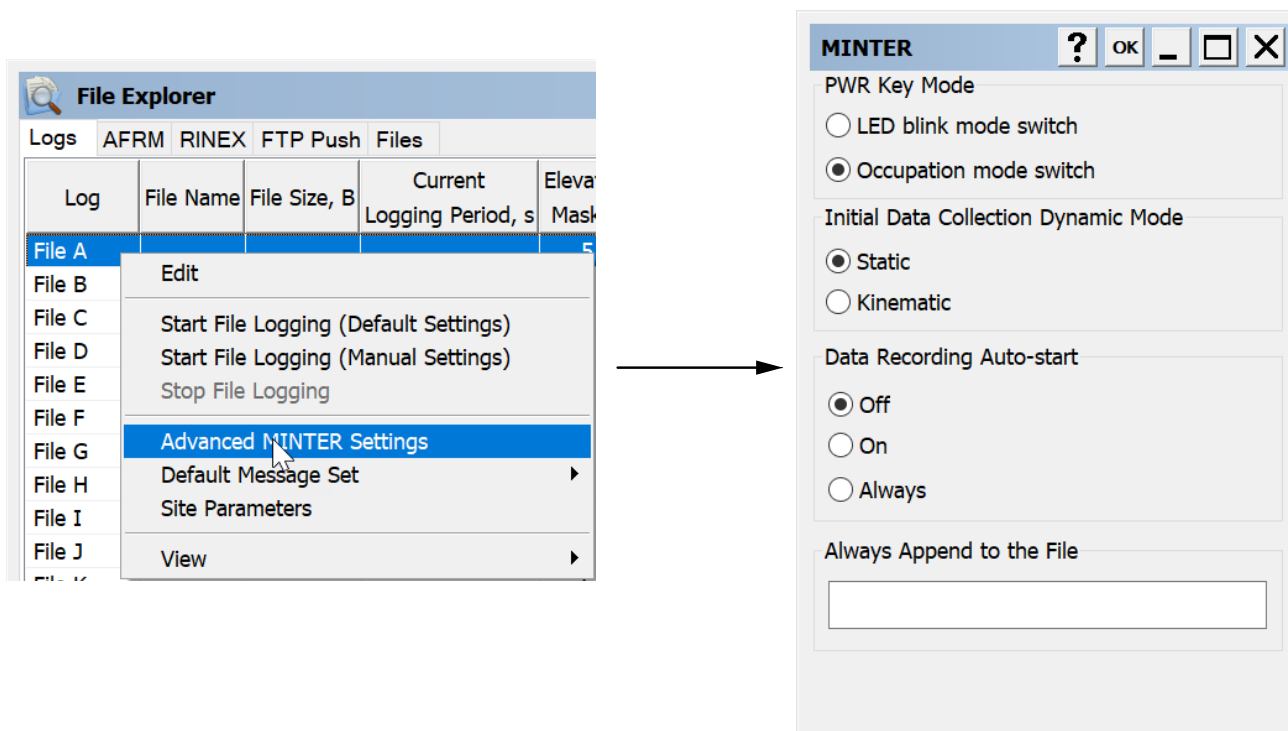


Figure 3-4: Context Menu of Logs — MINTER

- Select the **Occupation Mode Switch** in the **PWR Key Mode** group box.
- Select the type of first occupation in the **Initial Data Collection Dynamic Mode** group box.
- Select **OK**. The **File Explorer** window appears.
- Select **OK**.



NOTE

OK must be clicked in both **MINTER** and **File Explorer** windows; otherwise, settings will not be applied.

- Select **Device►Disconnect**.

Receiver Status LEDs

There are eight status LEDs to provide information about satellite tracking, memory capacity, Wi-Fi, Bluetooth, radio, and internal and removable battery life. This section describes the color and behavior of each LED.

Status LED



The tracking status LED displays the status of tracked satellites when the receiver is on.

Table 3-2: Status LED Descriptions

Display	LED Color	Description
	Green Blink	One blink per tracked GPS satellite.
	Yellow Blink	One blink per tracked GLONASS satellite.
	Cyan Blink	One blink per tracked Galileo satellite.
	Magenta Blink	One blink per tracked BeiDou satellite.
	Blue Blink	One blink per tracked QZSS satellite.
	White Blink	One blink per tracked L-band Satellite.
	Red Blink	One blink per second when there are no tracked satellites or solutions. Two blinks per second when the receiver is in exception mode. Otherwise, LED is dark.
	Red-Green-Yellow	OAF is expired.

Recording LED



The recording LED indicates if memory storage is being used, and displays the current survey mode (static or kinematic) when the Occupation mode switch is selected.

Table 3-3: Recording LED Descriptions

Display	LED Color	Description
	Blue Blink	Files deleting is in progress.
	Magenta Blink (two blinks per second)	Format of memory storage is progress.
	Magenta Blink (one blink per second)	File system checking is in progress.
	Magenta Blink (one blink per two seconds)	File system mounting is in progress.
	Green Blink	The Occupation Mode switch is selected. File logging is in progress. The static occupation is a current occupation for post-processing. There is one green blink per second.
	Yellow Blink	The Occupation Mode switch is selected. File logging is in progress. The kinematic occupation is a current occupation for post-processing. There is one yellow blink per second.
	Red Solid	File logging problem. No free memory, or hardware problem with data recording. LED is off when file is not logging data.

Communication LEDs

The communication LEDs display the status of the wireless activity. The following tables describe the communication activity for four use cases: Bluetooth, Wi-Fi and radio (UHF).

Bluetooth LED



The Bluetooth LED displays the status of the Bluetooth activity. Table 3-4 describes the activity.

Table 3-4: Bluetooth LED Description

Display	LED Color	Description
	Blue Blink	Bluetooth is on and waiting for a connection.
	Blue Solid	A single Bluetooth connection has been established.
	Blue Solid + Blue Blink * N every 10 seconds	Multiple (N) valid Bluetooth connections have been established.

Cellular LED



The Cellular LED displays the status of the internal cellular modem. Table 3-5 describes the activity.

Table 3-5: Cellular LED Descriptions

Display	LED Color	Description
	No Light	The internal cell modem is switched off.
	Green Solid	Cell modem is on and waiting for a connection.
	Green Blink	The connection has been established.

Wifi LED



The Wi-Fi LED displays the status of Wi-Fi activity. Table 3-6 describes the activity.

Table 3-6: Wi-Fi LED Descriptions

Display	LED Color	Description
	Green Solid	The internal Wi-Fi modem is starting up.
	Green Blink	The internal Wi-Fi modem is transmitting or receiving data.

Radio LED



The Radio LED displays the status of the UHF or FH915+ modem. Table 3-7 describes the LED colors and patterns for the UHF modem.

Table 3-7: Recording LED Descriptions

Display	LED Color	Description
Command mode (Rover and Base)		
	Red Blink - Green Blink - No Light	MAGNET Field or TRU sends commands to configure the modem.
Receiver mode (Rover)		
	Green Solid	Modem is not receiving correction data.
	Yellow Solid	Modem is receiving correction data from a base.
Transmitter mode (Base)		
	Green Solid	Modem is not transmitting correction data.
	Red Solid	Modem is transmitting correction data.
Retranslator mode (Base)		
	Yellow Blink - Red Blink	Modem is receiving and transmitting correction data.

Table 3-8 describes the LED colors and patterns for the FH915+ modem.

Table 3-8: FH915+ Modem LED Descriptions

Display	LED Color	Description
Command mode (Rover and Base)		
	Red Blink - Green Blink - No Light	MAGNET Field or TRU sends commands to configure the modem.
Receiver mode and Retranslator mode (Rover)		
	Green Blink	Modem is not synchronized with a base.
	Green Solid	Modem is synchronized with a base and ready to receive correction data.
	Yellow Solid	Modem receives correction data from a base.
Transmitter mode (Base)		
	Red Solid	Modem is transmitting correction data.

Battery LEDs

Internal Battery LED



The internal battery LED indicates the remaining charge of the internal battery. See Table 3-9 for more information.

Table 3-9: Internal Battery LED Descriptions

Display	LED Color	Description
The receiver is on; external power source is not connected		
	Green Solid	The charge is greater than 50%.
	Yellow Solid	The charge is between 10% and 50%.
	Red Solid	The charge is less than 10%.
	No Light	The internal battery is fully discharged.
The receiver is on; external power source is connected		
	Green Solid	The internal battery is fully charged.
	Green Blink	The battery is charging. The internal battery is at greater than 50% capacity.
	Yellow Blink	The battery is charging. The internal battery is at greater than 10% capacity.
	Red Blink	The battery is charging. The internal battery is at less than 10% capacity.

Table 3-9: Internal Battery LED Descriptions (Continued)

Display	LED Color	Description
The receiver is off; external power source is connected		
	Green Solid	The battery is fully charged.
	Green Blink	The internal battery is charging. The internal battery charge is greater than 50%.
	Yellow Blink	The internal battery is charging. The internal battery charge is between 10 and 50%.
	Red Blink	The internal battery is charging. The internal battery charge is less than 10%.

External Battery LED



The external (removable) battery LED indicates the remaining charge of the external battery. This LED indication depends on the Power Battery Charge settings (see See Topcon Receiver Utility (TRU) Help). Table 3-10 lists the possible indications of the external (removable) battery LED for the Auto mode (default settings).

Table 3-10: External Battery LED Descriptions

Display	LED Color	Description
The receiver is on; the external battery is attached		
	Green Solid	The charge is greater than 50%.
	Yellow Solid	The charge is between 10% and 50%.
	Red Solid	The charge is less than 10%.
	Red Blink (one blink per five seconds)	The external battery is discharged and is not used. The internal battery is used only.
	No Light	The external battery is fully discharged.
The receiver is on; the external battery is disconnected from the receiver		
	No Light	HiPer HR is using the internal battery only.
The receiver is off; the external battery is attached; external power is connected		
	Green Solid	The external battery is fully charged.
	Green Blink	The external battery is charging. The external battery charge is greater than 50%.
	Yellow Blink	The external battery is charging. The external battery charge is between 10 and 50%.
	Red Blink	The external battery is charging. The external battery charge is less than 10%.

Managing Power

This chapter describes how to power the receiver, charge the batteries, and use an external power source.

Turning the Receiver On/Off

To turn on the receiver, press and hold the power button until the STAT LED turns solid green. The receiver is turning on when: the Power LED blinks green, the receiver channels initialize and start tracking all visible satellites at any time and location, and the serial port is available. When the startup is complete, the Power LED is solid green only when external power is used; otherwise the Power LED is off. After startup, the integrated wireless devices in the receiver are ready to use, and the receiver is available to start recording data to the internal memory.

To turn off the receiver, press and hold the power button for more than 3 (but less than 10) seconds. Release the power button when the STAT LED turns solid yellow. This delay prevents the receiver from being turned off by mistake. Allow the receiver to complete the power off cycle, which is approximately 30 seconds.



NOTE

The receiver will draw a small amount of power from the removable battery when it is turned off. If the receiver is placed in storage for a long period, 3-6 months, the battery may become fully discharged. Use an external power supply or recharge the battery before use.

Powering the Receiver

The receiver is powered by an internal battery, a removable external battery, or an external valid power source connected to the power port. If an external power source is connected, the receiver draws power from it instead of the batteries. You can connect the receiver to an external power source, such as a vehicle battery, with 9 to 28 VDC to operate the receiver. See “Specifications” on page 66 for more information.

When the receiver is in use, the external battery will be discharged first, and then the internal battery. When a valid external power supply is available, the receiver draws power from the external power supply.

See “Charging the Batteries” on page 4-3 for more information.



WARNING

Power input greater than 28 VDC could damage the receiver.

Removable External Battery

The receiver first draws power from a connected external power source. When there is no valid external power source connected, or if the source has discharged lower than 6.5V, the receiver will draw its power from the high-capacity external removable battery.



NOTE

The external battery is shipped from the factory with a partial discharge. For maximum operating time, fully charge the battery before using the receiver.

Internal Battery

The receiver draws power from the internal (non-removable) battery once the external battery is discharged. If there is no valid external power source connected, or if the source has discharged lower than 6.5V, or the external battery is discharged, the receiver will draw power from the internal battery.

You can replace a discharged external battery with a charged one without interrupting receiver's operation.



NOTE

The internal battery is shipped from the factory with a partial discharge. For maximum operating time, fully charge the battery before using the receiver.

Operating Hours

Table 4-1 describes the use conditions and the operating hours of the receiver. The first values in the **Approx. Hour of Operation** column are obtained while using both batteries (internal and removable external). The second values are obtained while using the external removable battery only (internal battery is discharged).

Table 4-1: Operating Hours

Use Condition	Description	Approx. Hours of Operation
Static Survey	Static setup logging raw GNSS data at 1 Hz.	5 hours / 2 hours 30 min
LongLink RTK Base	Base transmitting RTCM3 differential corrections to one or multiple rovers at XX output power.	5 hours / 2 hours 30 min
LongLink RTK Rover	Rover receiving RTCM3 differential corrections over LongLink connected through Bluetooth to a data collector.	5 hours / 2 hours 30 min
Network RTK Rover	Rover receiving RTCM3 differential corrections from a Network correction service, and connected through Bluetooth to a data collector.	4 hours 30 min / 2 hours 15 min
UHF Receive Only Mode	Rover receiving RTCM3 differential corrections over UHF radio connected through Bluetooth to a data collector.	4 hours 15 min / 2 hours
UHF Transmitting at 0.5 W	Base transmitting RTCM3 differential corrections at 0.5 W.	3 hours 45 min / 2 hours
UHF Transmitting at 1 W	Base transmitting RTCM3 differential corrections at 1 W.	3 hours 30 min / 1 hours 45 min

Table 4-1: Operating Hours (Continued)

Use Condition	Description	Approx. Hours of Operation
UHF Repeater at 1 W	Receiving RTCM3 corrections, and transmitting RTCM3 differential corrections at 1 W.	3 hours 30 min / 1 hours 45 min
FH915+ Receive Only Mode	Rover receiving RTCM3 differential corrections over FH915+ radio connected through Bluetooth to a data collector.	4 hours 30 min / 2 hours 15 min
FH915+ Transmitting at 0.25 W	Base transmitting RTCM3 differential corrections at 0.5 W.	3 hours 15 min / 1 hours 30 min
FH915+ Transmitting at 1 W	Base transmitting RTCM3 differential corrections at 1 W.	2 hours 30 min / 1 hours 15 min
FH915+ Repeater	Receiving RTCM3 corrections, and transmit RTCM3 differential corrections at 1 W.	2 hours 30 min / 1 hours 15 min
UHF Receiver + LongLink Base	Receiving RTCM3 corrections over UHF radio, and transmitting RTCM3 differential corrections over LongLink.	4 hours 15 min / 2 hours
FH915+ Receiver + LongLink Base	Receiving RTCM3 corrections over FH915+ radio, and transmitting RTCM3 differential corrections over LongLink.	4 hours 30 min / 2 hours 15 min

Charging the Batteries

When the internal or removable battery loses charge, the corresponding BAT LED changes from solid green, to yellow and then red, depending on the remaining charge (“Battery LEDs” on page 3-11).

When the receiver is connected to an external power source, the internal battery is charging, regardless of the receiver state. The external battery is charging only when the receiver is off. You can detach the external battery and charge it with a separate battery charger.

To charge the internal battery:

1. Connect the supplied power cable to the receiver’s power port.
2. Connect the SAE connector of the power cable to the SAE connector of the power adapter.
3. Plug the power adapter into an available outlet for approximately five hours to fully charge the battery.

Overcharging the battery will not happen; the battery stops charging when it reaches full charge. During charging, the BAT LED will blink (Table 3-9 on page 3-11).



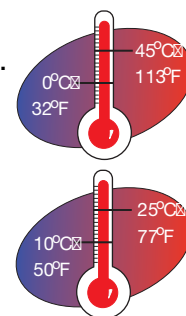
WARNING

Notification that an action has the potential to result in personal injury or property damage.

Battery Charging Temperatures

Charge the batteries only in temperatures between 32°F (0°C) and 104°F (40°C).

An optimal charging temperature is between 50°F (10°C) and 77°F (25°C).
If possible, charge the batteries within this temperature range.



WARNING

The charge terminates automatically if battery temperature rises above 113°F (45°C) or falls below 32°F (0°C).

Attaching the External Battery

To attach the external battery:

1. With the battery slightly tipped, place the bottom of the battery into the bottom of the battery compartment (Figure 4-1).

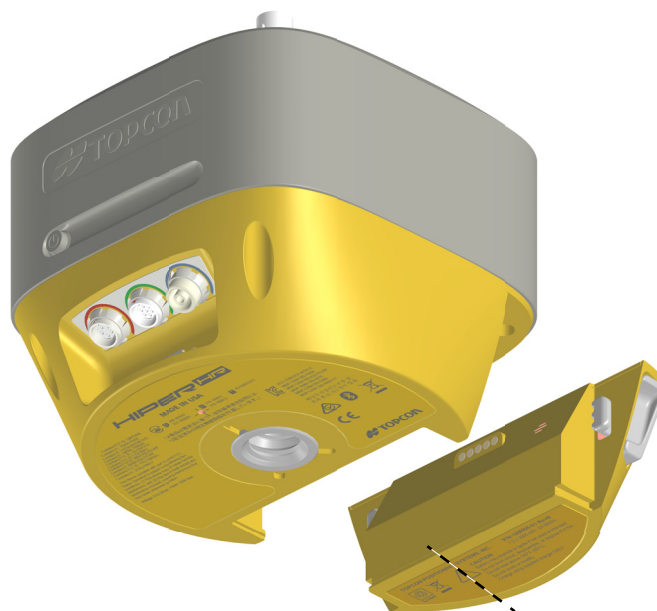


Figure 4-1: Attach HiPer HR Battery

2. Gently push the top of the battery into the battery compartment until it snaps into place, ensuring that the clip at the top of the battery completely snaps into place.

Detaching the External Battery

To detach the external battery, use the clip at the top of the battery to gently pull down and out. The battery will detach from the receiver (Figure 4-2).



Figure 4-2: Detach HiPer HR Battery

Surveying While Charging

The receiver can perform any kind of surveying while charging the internal battery without degrading performance.



CAUTION

While charging, make sure that the air temperature is between 32°F (0°C) and 104°F (40°C). This is important to prevent serious damage to the external power supply adapter, battery, and the receiver or injury to persons.



WARNING

The charge terminates automatically if battery temperature rises above 113°F (45°C) or falls below 32°F (0°C).

Changing the Batteries While Surveying

It is safe to change a depleted removable external battery with a fully charged one while surveying (i.e., on the fly) without turning off the receiver. Before doing this, make sure the internal battery has enough charge to power the receiver while changing the depleted battery; surveying will not be disrupted.

Using an External Power Source

In addition to the removable battery, you can connect the receiver to an external power source (such as a vehicle battery with 9 to 28 VDC) to operate the receiver, and for continuous use of the receiver if the removable batteries become discharged.

**WARNING**

Power input greater than 28 VDC could damage the receiver.

To connect the receiver to an external battery:

1. Combine the ODU-to-SAE cable (P/N 14-008016-04LF) and SAE-to-alligator clips cable (P/N 14-008025-01) provided in your kit. This composite cable allows for charging the receiver Base station from an external battery.
2. Connect the alligator clips to the external 12-V battery.
3. Insert the 5-pin ODU connector into the power port of the receiver.
4. Turn on the receiver.

Insufficient Power

If the batteries become fully discharged and an external power supply is not connected, the receiver will shut down and automatically save recorded files. To avoid disruptions, check the BAT LED on the display panel for the battery charge status. See “Battery LEDs” on page 22 for more information. If the receiver shuts down due to insufficient power, the receiver and all communication ports become deactivated.

To restore power to the receiver do one or all of the following:

- Recharge the batteries, or connect to an external power source.
- Make sure the power cable is correctly connected to the power port of the receiver.
 - a. Align the keyways when connecting the power cable to the power port of the receiver.
 - b. The cable will click when it is secured in the port.
 - c. To remove the cable, push the cable in, then gently remove it from the power port.
 - d. Connect the receiver to a different power source.

**WARNING**

Recharge the batteries or connect to an external power source using the charging cables and power adapter shipped with the receiver.

Configuration

The receiver is primarily used for surveying land and construction job sites, and to support static and RTK applications. You can also log data internally to a non-removable SD card. These logs can be downloaded from the receiver for static or kinematic surveying, mapping, monitoring, and positioning applications. The receiver uses different built-in communication technologies to transmit or receive RTK corrections, and to achieve RTK solutions using field applications like MAGNET Field or Pocket 3D.

The receiver can be configured in a variety of ways, depending on your project requirements. Typically, the receiver supports the following operation modes:

- Static and kinematic post-processing
- NTRIP server and NTRIP caster functionality
- Network RTK rover as NTRIP client or TCP/IP client
- UHF base and rover in RTK or DGPS configuration
- LongLink base and rover in RTK or DGPS configuration
- DGPS or RTK repeater
- Precise Point Positioning (PPP) over L- band or Internet and Skybridge Pro that combines RTK and PPP modes.
- SBAS rover

The sections in this chapter describe receiver configuration, receiver options, loading a new Option Authorization File (OAF), updating firmware, and performing a factory reset. To do this, download the Topcon Receiver Utility (TRU) software from the [myTopcon](https://www.topconpositioning.com/support) website at <https://www.topconpositioning.com/support>. For information about installing the software, see the Topcon Receiver Utility (TRU) Online Help, available in the software (see Drivers paragraph).

Loading New Firmware

This section describes how to update firmware on the HiPer HR with a USB connection. To connect the receiver to your computer, use a micro USB cable (p/n 1013602-01) and USB drivers installed on the computer.

After plugging the receiver into to the computer, the operating system will report a new external device has been found. It will be assigned to a virtual COM port. You may check its number in the Windows Device Manager (Figure 5-1).

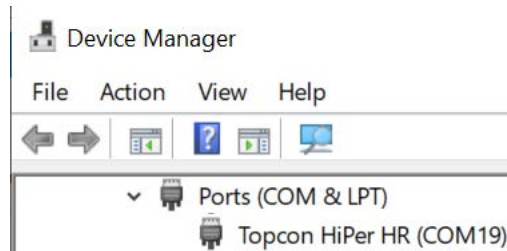


Figure 5-1: Device Manager

This virtual port is used for loading new firmware. You can also update the firmware using a physical COM port or high speed wireless connection via Wi-Fi or Bluetooth. Loading firmware using a physical COM port takes longer than using TRU. Therefore, Topcon does not recommend using physical a COM port.

Receiver board firmware is released as a file with “*.tfl” extension. Topcon Receiver Utility supports loading of files with “*.ldr”, “*.ldp”, “*.tar”, “*.tfl” extensions.

To upload firmware files to the HiPer HR receiver with firmware 5.5 and higher using TRU version 3.6.1 and higher, do the following:

1. Connect the receiver to a computer using a Micro USB cable.



Figure 5-2: Micro - USB Cable Connection

2. In the Windows **Device Manager**, check the number of the virtual COM port (Figure 5-1).
3. Start TRU on your computer.
4. Use the **Safely Remove Hardware and Eject Media** feature in Windows and mount the receiver in TRU. For details, see “Ejecting the Receiver from Windows and Mounting in TRU” on page 7-9.

5. Select **Device►Application Mode►Firmware Loading**, to set TRU to the firmware loading mode.
6. Select **Device►Connect**. The **Connection Parameters** screen opens (Figure 5-3).
7. Select **Serial Port** from the **Connect Using** drop down list (Figure 5-3).
8. Select the  button. The **Select Device** screen opens (Figure 5-3).
9. Select the specified **COMX** port for USB communication, and select **OK**. The **Connection Parameters** screen opens.

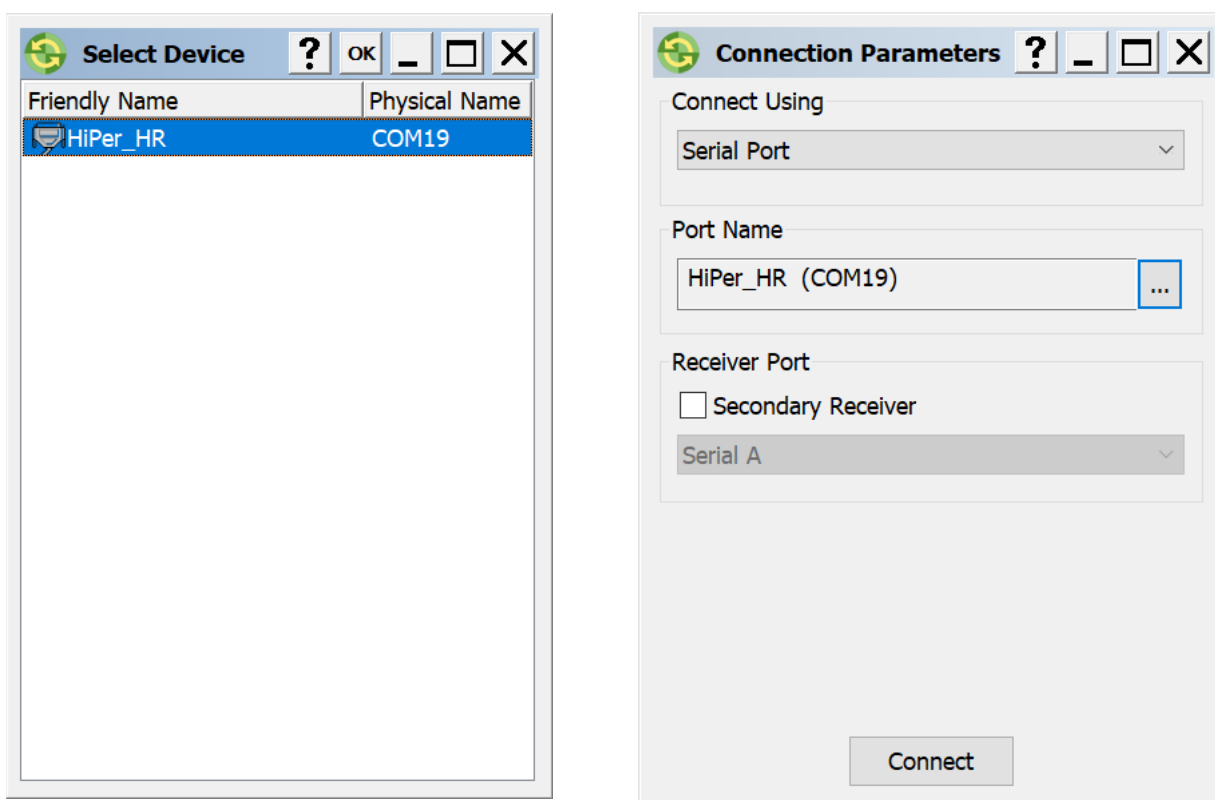


Figure 5-3: Select Device/Connection Parameters

10. Select **Connect**. The **Connection Parameters** screen closes. TRU establishes a connection to the HiPer HR receiver. The *Firmware Loading* icon on the TRU screen becomes active.
11. Select the **Firmware Loading** icon: 

Firmware Loading
12. Select **Receiver** from the **Target** drop--down list.

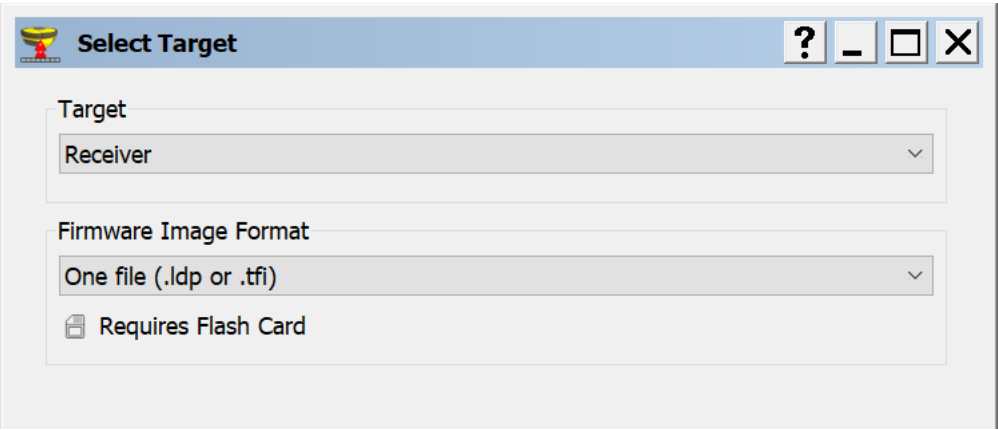


Figure 5-4: Select Target Screen

13. Select **Next**. The **Information** screen opens (Figure 5-5).

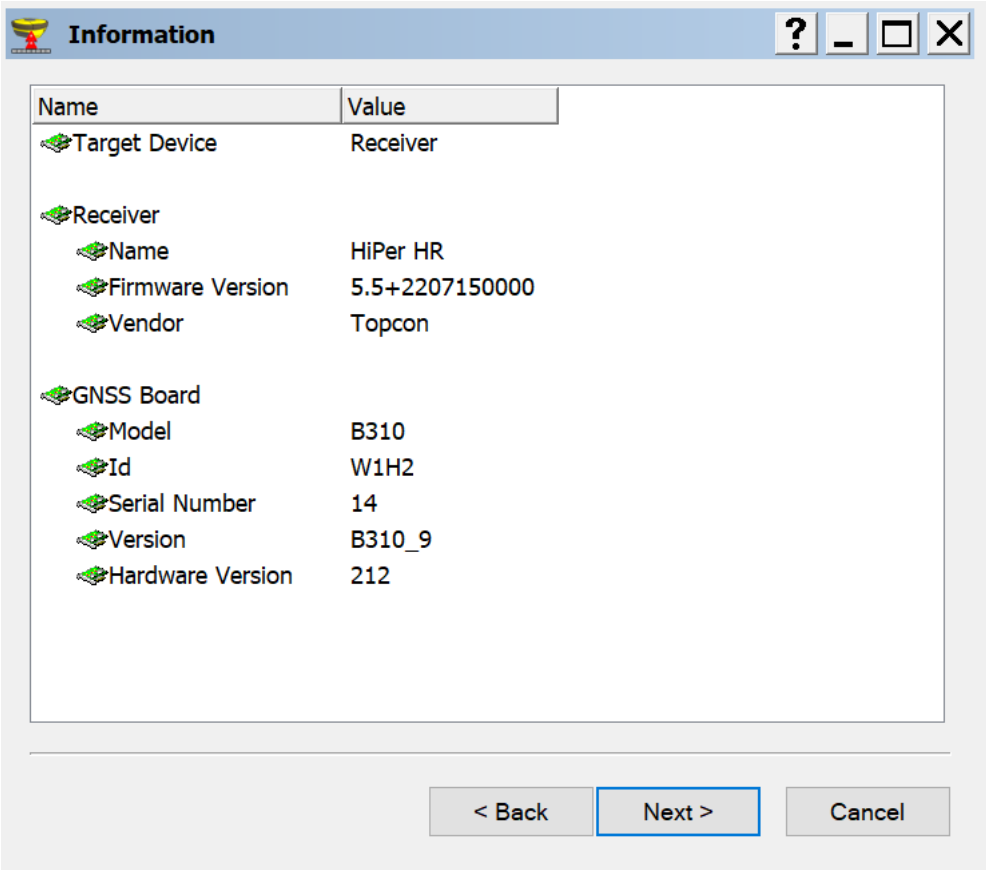


Figure 5-5: Information Screen

14. The **Select Settings** screen opens (Figure 5-6). Topcon recommends settings the **Data Packet Size** to 2048 bytes.



Figure 5-6: Select Settings

15. Select **Next**. The **Select Files** screen opens (Figure 5-7). Select the  button, browse to, and select the receiver's "*.tfl" file.

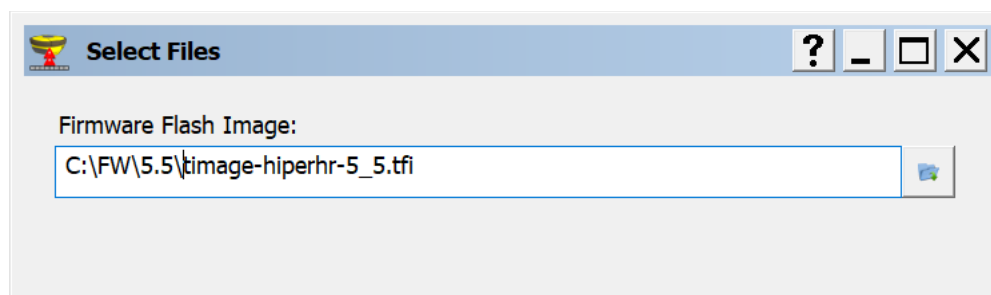


Figure 5-7: Select Files

16. Select **Next**. The **Installation** screen opens and the firmware begins uploading. When the firmware completes uploading, a dialog window opens (Figure 5-8). It warns not to turn off the receiver while the firmware is updating.
17. Select **OK** in the dialog. TRU automatically disconnects from the receiver. The receiver reboots a few times during the firmware update. The firmware update may take up to 10 minutes. After the firmware update completes, the receiver returns to the normal operation mode.

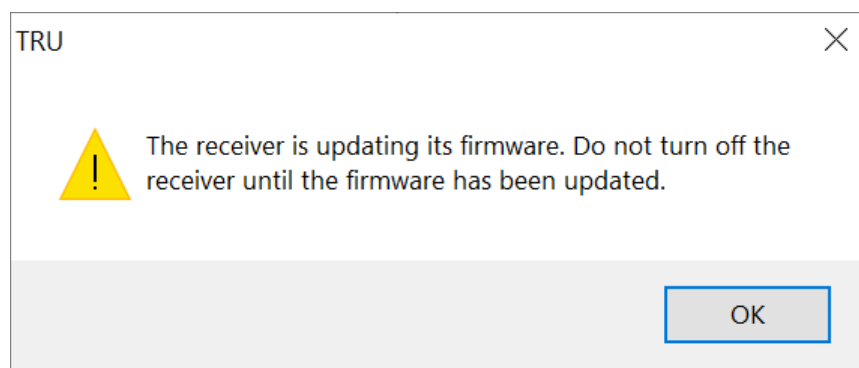


Figure 5-8: Firmware Updating Window

Option Authorization Files

Topcon issues an Option Authorization File (OAF) to enable the specific options that you purchased. Topcon's OAF system allows you to customize and configure the receiver according to your particular requirements, therefore purchasing only the options you need.

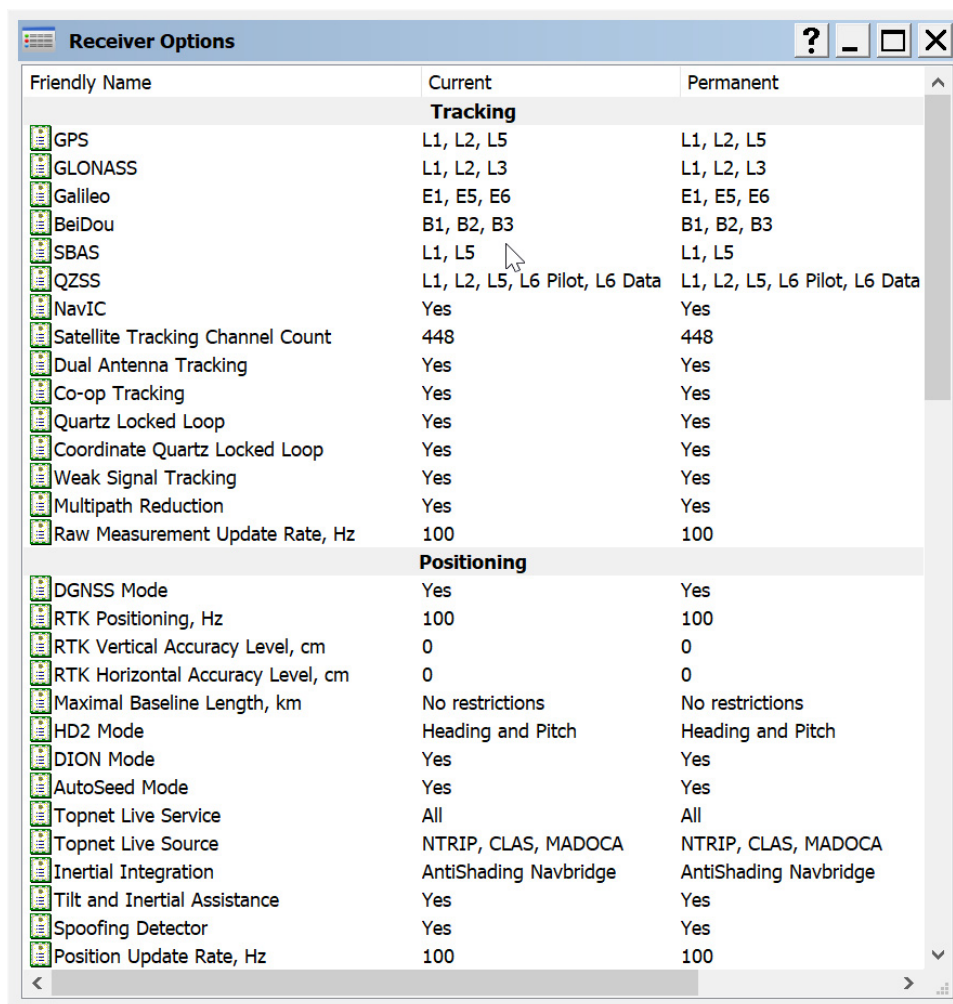
The HiPer HR receiver is typically shipped with an OAF as per initial purchase of the receiver kit configuration. There are several upgrade options available with the receiver that can extend the receiver's functionality to better suit your job requirement. Examples of upgrade options are listed below:

- GPS L1, L2, L5 signal tracking
- GLONASS L1, L2, L3 signal tracking
- BeiDou B1, B2, B3 signal tracking
- QZSS L1, L2, L5, L6 signal tracking
- SBAS L1, L5 signal tracking
- Galileo E1, E5, E6 signal tracking
- RTK and update rate 20 Hz (10 Hz standard)
- Topnet Live Services

Contact your Topcon dealer or a customer representative for a complete listing of available options and pricing information.

Checking the Receiver's OAF

1. Connect the receiver to a computer and open TRU. See the Topcon Receiver Utility (TRU) Online Help for more information about connecting the receiver to a computer.
2. In TRU, connect to the receiver.
3. Select the **Options** icon  in the main screen. The Receiver Options window (Figure 5-9) displays, so you can view the current authorization options and upload new ones.



Friendly Name	Current	Permanent
Tracking		
GPS	L1, L2, L5	L1, L2, L5
GLONASS	L1, L2, L3	L1, L2, L3
Galileo	E1, E5, E6	E1, E5, E6
BeiDou	B1, B2, B3	B1, B2, B3
SBAS	L1, L5	L1, L5
QZSS	L1, L2, L5, L6 Pilot, L6 Data	L1, L2, L5, L6 Pilot, L6 Data
NavIC	Yes	Yes
Satellite Tracking Channel Count	448	448
Dual Antenna Tracking	Yes	Yes
Co-op Tracking	Yes	Yes
Quartz Locked Loop	Yes	Yes
Coordinate Quartz Locked Loop	Yes	Yes
Weak Signal Tracking	Yes	Yes
Multipath Reduction	Yes	Yes
Raw Measurement Update Rate, Hz	100	100
Positioning		
DGNSS Mode	Yes	Yes
RTK Positioning, Hz	100	100
RTK Vertical Accuracy Level, cm	0	0
RTK Horizontal Accuracy Level, cm	0	0
Maximal Baseline Length, km	No restrictions	No restrictions
HD2 Mode	Heading and Pitch	Heading and Pitch
DION Mode	Yes	Yes
AutoSeed Mode	Yes	Yes
Topnet Live Service	All	All
Topnet Live Source	NTRIP, CLAS, MADOCA	NTRIP, CLAS, MADOCA
Inertial Integration	AntiShading Navbridge	AntiShading Navbridge
Tilt and Inertial Assistance	Yes	Yes
Spoofing Detector	Yes	Yes
Position Update Rate, Hz	100	100

Figure 5-9: Receiver Options

Loading an OAF

Topcon dealers provide customers with OAF files. For any OAF related questions, e-mail Topcon at options@topcon.com and include the receiver's ID and serial number. To obtain these numbers, see "Viewing Receiver Information" on page 31.

1. Follow the steps in See "Checking the Receiver's OAF" on page 5-7. above.
2. Right-click on the **Receiver Options** window, and select **Upload OAF** (Figure 5-10).

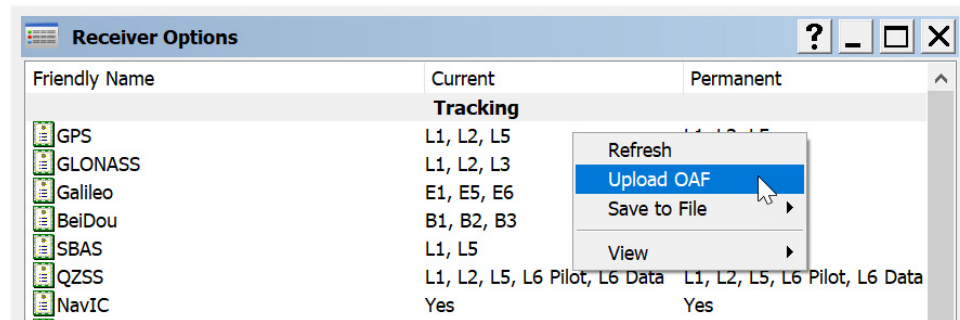


Figure 5-10: Right-click and Select Upload OAF

3. Navigate to the location of the new **Option Authorization File**.
4. Select the appropriate file, and select **Open** (Figure 5-11).

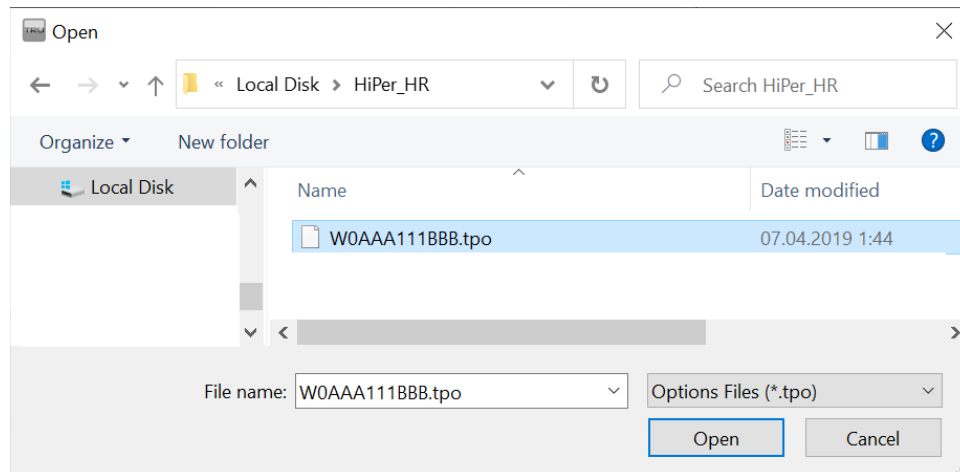


Figure 5-11: Load OAF

TRU initially checks to see if the selected file is compatible with the currently connected receiver. If you chose a file not intended for this receiver, the **Upload OAF** window displays an error icon next to the **Receiver ID**, and disables the **Upload the File to the Receiver** button.

5. Select **Upload the File to the Receiver** to start loading the file (Figure 5-12).

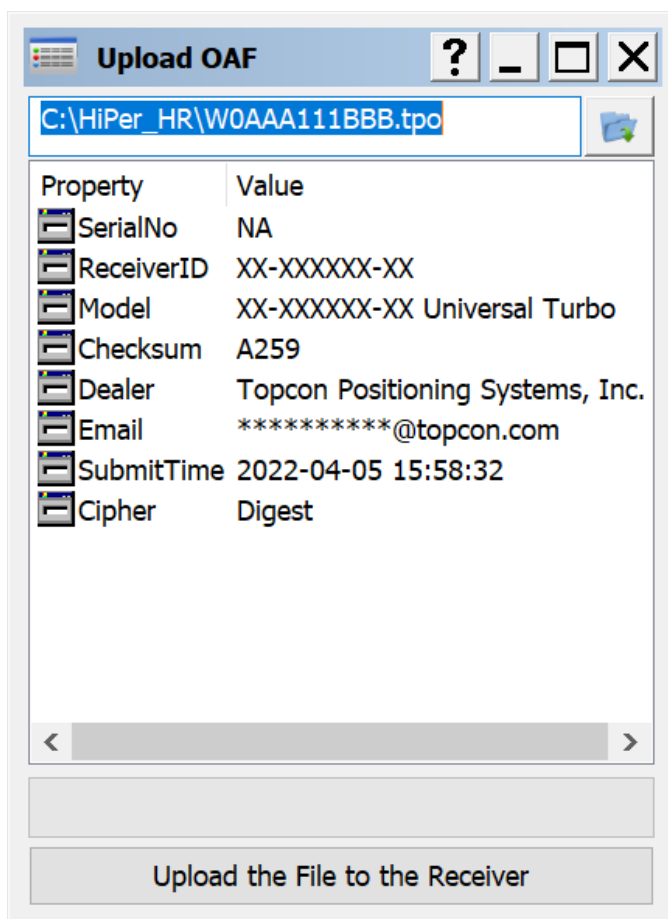


Figure 5-12: Upload OAF to the Receiver

6. Select **Yes** at the prompt to reset the receiver (Figure 5-13). The **Connection Parameters** screen appears.

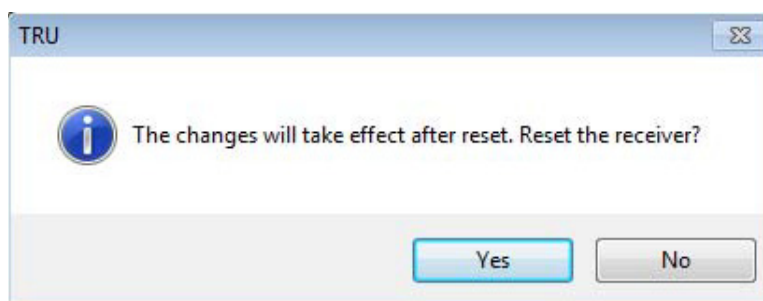


Figure 5-13: Reset Receiver

7. Select **Connect**. The TRU main screen opens.
8. Select the **Options** icon . The **Receiver Options** screen opens.
9. Check the following conditions:
 - If you uploaded a universal OAF, make sure the expiration date is still valid.
 - If you uploaded a customer OAF, make sure the correct customer file is loaded.

10. To view additional OAF details, right-click in the **Receiver Options** window and select **View►Detailed** (Figure 5-14).

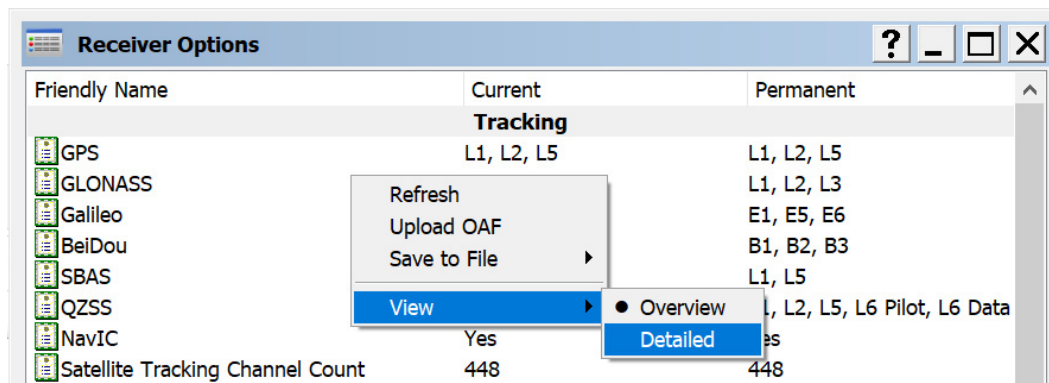


Figure 5-14: Additional OAF Details

Performing a Factory Reset

The receiver's Non-Volatile Random Access Memory (NVRAM) holds data required for satellite tracking, such as ephemeris data and receiver position. The NVRAM also keeps the current receiver's settings, such as active antenna input, elevation masks and recording interval, and information about the receiver's internal file system. A factory reset clears the receiver's NVRAM and restores the receiver's factory default settings. Factory reset takes about 1-2 minutes to perform.

Although a factory reset or clearing the NVRAM is not recommended as a common practice, there are times when it can eliminate communication or tracking problems.

After a factory reset, the receiver requires time to collect new ephemerids and almanacs (around 15 minutes).

A factory reset will not delete any files already recorded in the receiver's memory, and the NVRAM keeps information about the receiver file system. The process takes approximately two minutes.

There are two ways you can perform a factory reset: using TRU and using the LED display panel.

Perform a Factory Reset Using TRU

1. Connect the receiver to a computer, and open TRU. See the *Topcon Receiver Utility (TRU) Online Help* for more information about connecting the receiver to a computer.
2. In TRU, connect to the receiver.
3. Select the **Tools** icon in the main screen. The **Tools** window appears, enabling you to reset the receiver and clear the NVRAM (Figure 5-15).

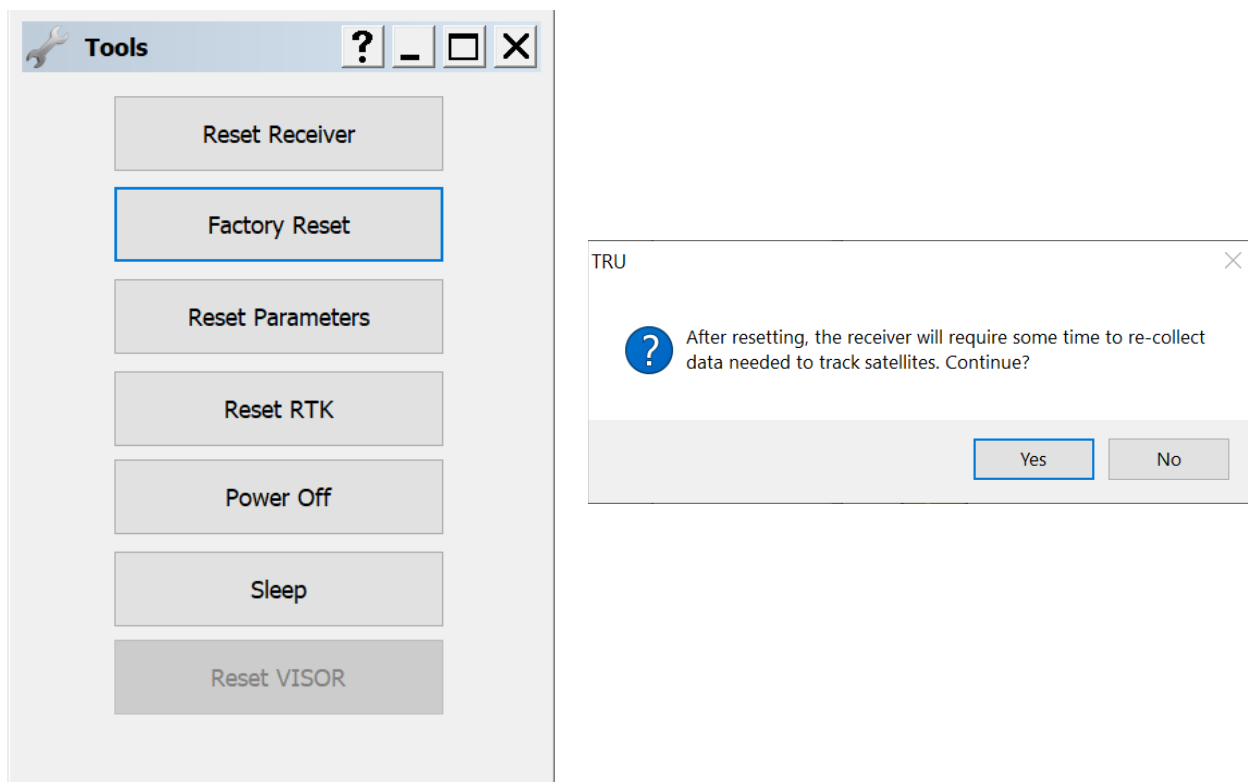


Figure 5-15: Tools Window

4. Select **Factory Reset**, then select **Yes** at the prompt.

Perform a Factory Reset Using the LED Display

1. Press and hold the Power button for 30-35 seconds. Release the Power button when STAT LED turns red.
2. Wait until the STAT LED blinks yellow. The receiver automatically powers off.
3. Wait until the Power LED stops blinking green. The receiver automatically powers on.

Using the Web Interface

The HiPer HR receiver includes a built-in Web server that allows you to configure and monitor the receiver with a Web browser. Topcon recommends the following Web browsers:

- Internet Explorer 6.0 or later
- Opera 9.0 or later
- Google Chrome
- Mozilla Firefox 2.0 or later

Configuring Network Parameters

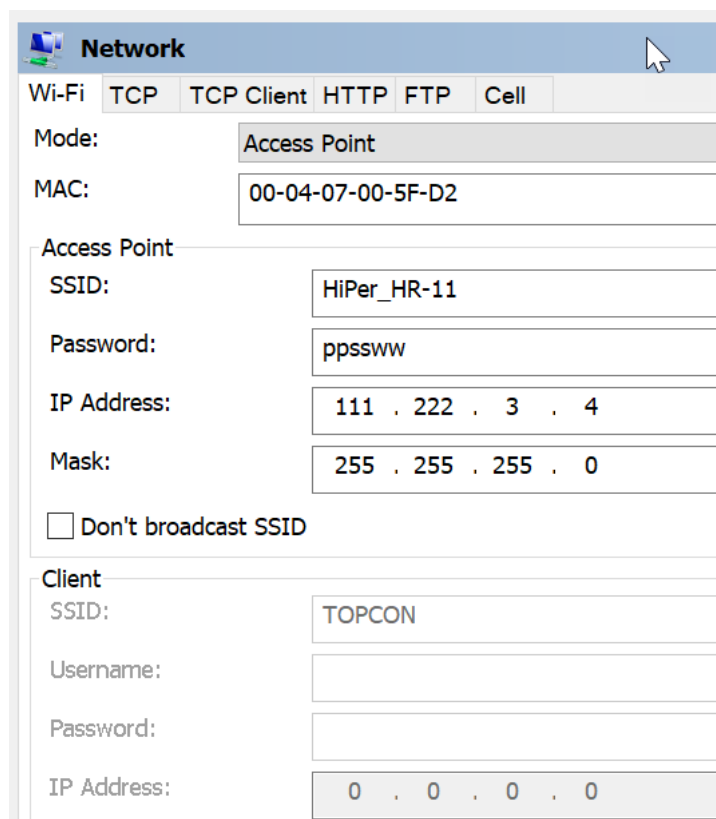
To access HiPer HR Web interface, configure the receiver as a Wi-Fi access point and connect to it, or connect the receiver and your computer to the same Wi-Fi network. This section describes how to configure the network parameters of the receiver.

1. Connect the receiver to a computer and open TRU.
2. Select **Device►Application Mode►Receiver Managing**.
3. Select **Device►Connect**. The **Connection Parameters** screen opens (Figure 5-16).

Figure 5-16: Connection Parameters

4. Select **Connect** to establish a connection with the receiver. The TRU main screen opens.
5. In the TRU main screen, select the **Receiver Settings** icon . The TRU receiver settings screen opens.

6. In the TRU receiver settings screen, select the **Network** icon . The **Network** window opens. (Figure 5-17).



Network	
Wi-Fi	TCP TCP Client HTTP FTP Cell
Mode:	Access Point
MAC:	00-04-07-00-5F-D2
Access Point	
SSID:	HiPer_HR-11
Password:	ppssww
IP Address:	111 . 222 . 3 . 4
Mask:	255 . 255 . 255 . 0
☐ Don't broadcast SSID	
Client	
SSID:	TOPCON
Username:	
Password:	
IP Address:	0 . 0 . 0 . 0

Figure 5-17: TRU – Receiver Network Parameters, Wi-Fi Tab

7. In the **Network** window, open the **Wi-Fi** tab.
8. Make the required configurations for the mode you need. See the sections below for details.

Configuring Receiver as an Access Point

This section describes how to configure the receiver as a Wi-Fi access point. Before you begin, complete all steps described in “Configuring Network Parameters” on page 5-12.

1. Select **Access Point** from the **Mode** drop down list. Fields in the **Access Points** group box are active.
2. Specify the network name in the **SSID** edit box. Enter a meaningful name.
3. Specify the password for the network in the **Password** edit box.
4. Specify the IP address of the receiver’s access point in the **IP address** edit box. This IP address is used to access receiver’s Web interface.
5. If needed, specify the network mask of the access point in the **Mask** edit box.
6. If needed, select the **Do not broadcast SSID** check box. In that case, specify the network name manually to connect to it.
7. Select **OK**.

Configuring Receiver as a Client

This section describes how to configure HiPer HR receiver as a client. Before you begin, complete all steps, described in “Configuring Network Parameters” on page 5-12.

1. Select **Client** from the **Mode** drop down list. Fields in the **Client** group box are active.
2. Specify the name of the required network in the **SSID** edit box.
3. Specify the password of the network in the **Password** edit box.
4. Select **OK**.
5. In the TRU receiver settings screen, select the **Network** icon. The **Network** screen appears. (Figure 5-17).
6. Open the **Wi-Fi** tab.
7. Write down the IP address of the receiver from the **IP Address** field of the **Client** group box. This IP address is used to access receiver’s Web interface.

Accessing the Receiver Though the Web Browser

Before accessing the receiver using the Web browser, make sure the network parameters (SSID, IP address, and so on) are specified in the receiver, as described in “Configuring Network Parameters” on page 5-12.

To open the Web interface:

1. Connect to the receiver, working in the access point mode; or connect to the same Wi-Fi network as the receiver.
2. Open the Web browser.
3. In the address or location bar of the Web browser, type the following address: `http://ipaddress`, where `ipaddress` is the IP address of the receiver for the connection type in use. The select **Enter**. The login page displays (Figure 5-18).

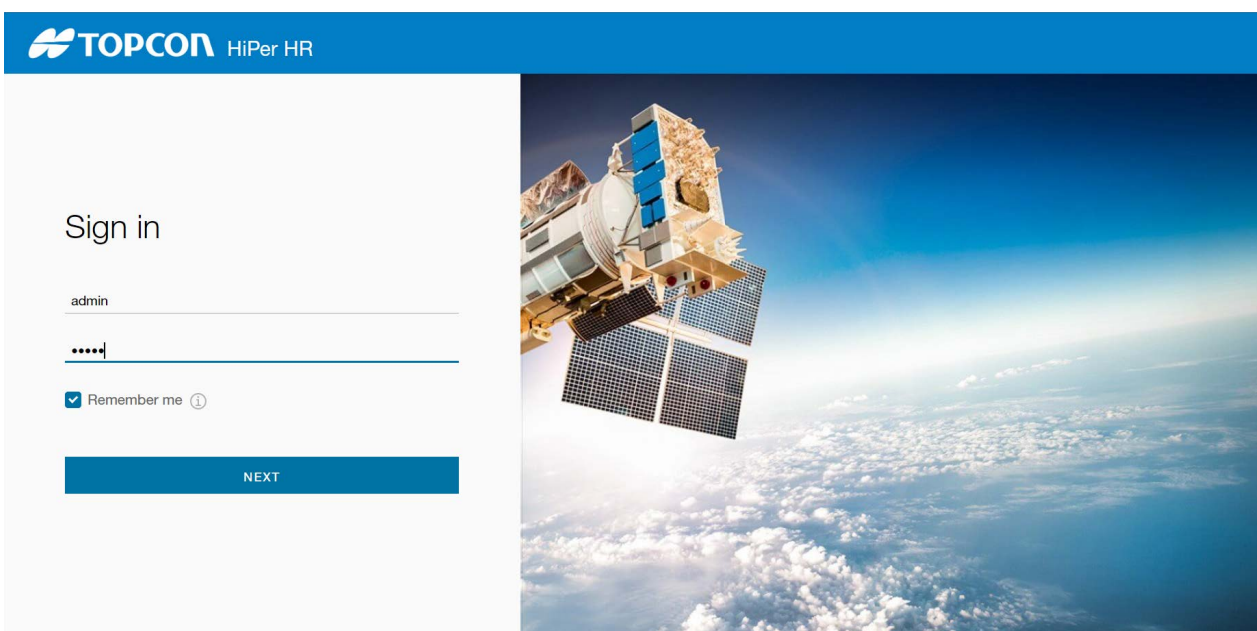


Figure 5-18: Main Page of the HiPer HR Web Interface

4. Enter the login and password to access the Web interface. The default user name and password are **admin**. User name and password are case sensitive.
5. Select **LOGIN**.



NOTE

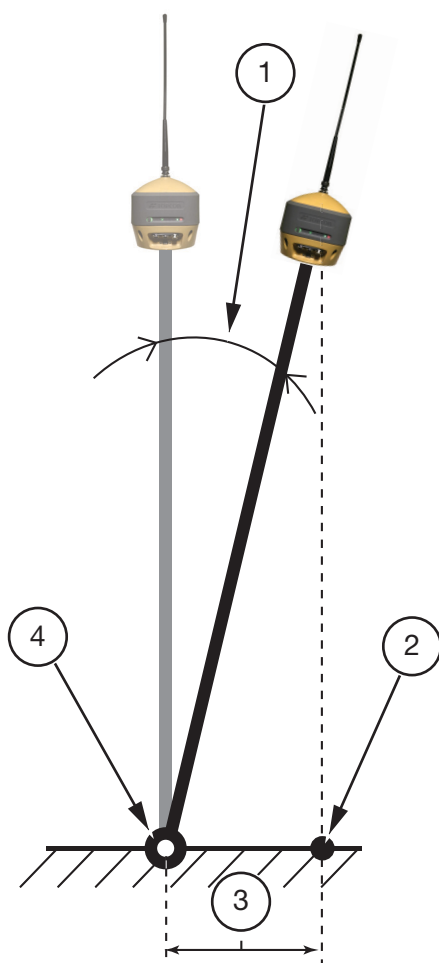
You can access the receiver without entering the user name and password by clicking **GUEST LOGIN**; however, you are restricted to view-only access.

Calibration - Using Tilt™ Corrections Technology

The receiver contains the internal HIMU (Hybrid Inertial Measurement Unit) module. The module includes 3D gyroscope, 3D accelerometer and 3D magnetometer.

GNSS firmware of the HiPer HR contains the ELC (Electronic Level and Compass) program module. This module uses the measured parameters from the HIMU, receiver navigation coordinates from the GNSS firmware and magnetic field map for calculation tilt angles in the horizontal plane, true (not magnetic) azimuth and magnetic field value. Using these data, HiPer HR solves the following tasks:

1. It calculates the tilt angle of the pole and transmit the value to the field software (Numbered 1). The software will calculate the true coordinate of the measured ground point. This mode can be activated using MAGNET Field (version 5.1 and higher). For the **Topo**, **Autotopo**, and **Stake** survey, MAGNET Field uses the tilt angle of the pole from the ELC module to calculate the offset of the GNSS antenna phase center in the horizontal plane, for each GNSS epoch. These offset values are used for obtaining the true coordinates of the measured ground point. This mode will work if the current tilt angle does not exceed the threshold value. A user can specify this value in the range from 1 to 15 degrees (Intended).



- | | | | |
|---|--------------------------------------|---|-------------------------------------|
| 1 | Tilt Pole Angle | 3 | Offset dN/dE |
| 2 | False Projection of the Phase Center | 4 | True Projection of the Phase Center |

Figure 5-19: Tilt Correction Mode

2. It automatically starts the measuring of a point if the pole tilt value is less than 1 degree during the time interval longer than the specified value.
3. It shows/hides a graphic view of the bubble level. MAGNET Field shows the bubble level in the **Topo**, **Autotopo**, and **Stake** dialogs for GNSS configuration only.



4. Show/hide the value of the external magnetic field in the graphic and text view in the **Topo**, **Autotopo**, and **Stake** mode.

HIMU Calibration

The internal HIMU provides 3-axis monitoring of the earth's magnetic field to deliver azimuth data. Due to e-compass parameters used in this technology, a simple field calibration procedure is required. Using MAGNET Field or TRU, you can perform the electronic level and the compass calibration procedure.

The calibration procedure consists of the following steps:

- Electronic level calibration (“Level Calibration” on page 5-18).
- Magnetic compass calibration in 3D (“3D Compass Calibration” on page 34).
- Magnetic compass calibration in the horizontal plane (“Horizontal Plane Compass Calibration” on page 5-20).

Perform each calibration step independently and sequentially. When all three calibrations are finished, the HIMU is ready to use.

Follow these general recommendations when performing the ELC calibration:

1. Perform the calibration in the field, after that the receiver tracks the satellites and determines a position.
2. Establish the connection with a controller via Bluetooth or Wi-Fi.
3. Turn on and/or connect all equipment that will be used for the survey, before calibrating:
 - a. If UHF or FH modems are used, connect the radio antenna and turn on the radio modem;
 - b. If both batteries for the survey are used, attach the removable battery.
4. For RTK survey, use your choice of modem to receive the corrections data and obtain the Fixed solution.
5. Do not use an external power source.

MAGNET Field or TRU can be used for calibration of the ELC module of the HiPer HR receiver.

Level Calibration

To take an accurate level and compass reading, first you need to perform the electronic level calibration procedure.

Perform the following:

1. Set up a tripod with a universal tribrach and tribrach adapter:
 - a. Set the receiver on a tribrach adapter with a 100 mm aluminum prism spacer (see Figure 5-20).
 - b. Level the tribrach.
 - c. Eliminate any vibrations during the calibration.

The receiver tracks satellites and determines a position.



- | | | | |
|---|--------------------|---|---------------------------|
| 1 | Hiper HR | 3 | Rotation Tribrach Adapter |
| 2 | 100mm Prism Spacer | 4 | Tribrach |

Figure 5-20: Electronic Level Calibration

2. In MAGNET Field / TRU, select the **Calibrate** button in the **Level** field. The calibration process starts. It takes about 30 seconds to complete.
 - If the calibration succeeds, the **Level** field shows the date and time for the new calibration.

- If the calibration fails, the **Level** field shows the date and time for the previous successful calibration with the  icon.

3D Compass Calibration

To take an accurate compass reading, first you need to perform the compass calibration procedure for each location in 3D, before starting a survey.



NOTICE

Be sure to calibrate the level (“Level Calibration” on page 5-18), before calibrating the compass.

Perform the following:

1. Hold the receiver flat with the GNSS antenna randomly pointed up.
2. In MAGNET Field or TRU, select the **Calibrate** button in the **Compass** field.
3. Rotate the receiver 360 degrees in multiple planes and directions. The position of the receiver antenna phase center should fill an entire sphere around the receiver.

MAGNET Field and TRU shows a progress bar reflecting your progress with filling the sphere around the receiver. It shows, “Compass is being calibrated,” (see Figure 5-21).

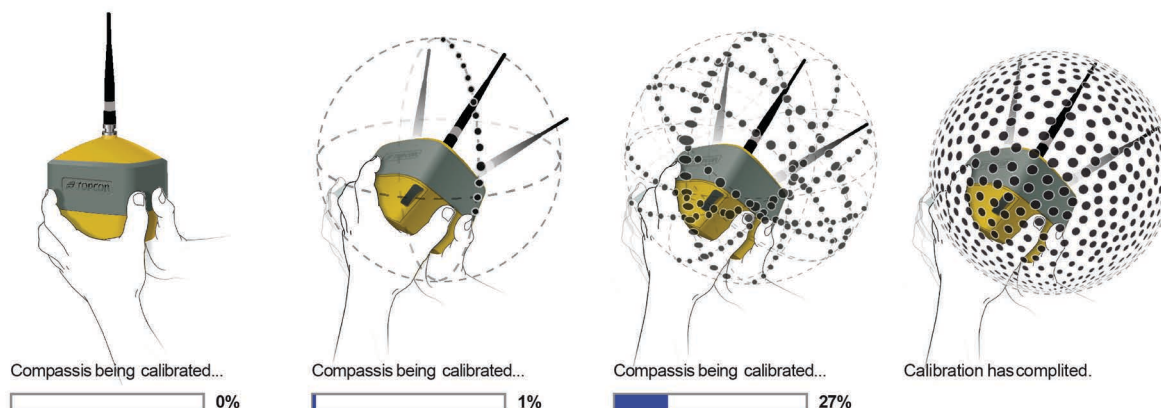


Figure 5-21: Calibrating the Compass in 3D

4. If the entire sphere has been successfully been filled, MAGNET Field / TRU shows, “Calibration has completed,” (see Figure 5-21).
5. The calibration parameters are saved. The receiver compass is ready to use.
6. If the receiver rotating has been stopped before the calibration procedure is complete, after two minutes of leaving the receiver still, without movement, MAGNET Field/TRU shows “Calibration has failed.”
7. Perform the procedure again until the entire sphere has successfully been filled.

Horizontal Plane Compass Calibration

To take accurate compass reading, you need to perform the compass calibration procedure in the horizontal plane for each location, before starting the survey.



NOTICE

Be sure to calibrate the level first (“Level Calibration” on page 5-18), then calibrate the compass in 3D next (“3D Compass Calibration” on page 5-19), before calibrating the compass in the horizontal plane.

Perform the following:

1. Set up a tripod with a universal tribrach and tribrach adapter:
 - a. Set the receiver on a tribrach adapter with a 100 mm aluminum prism spacer (Figure 5-22).
 - b. Level the tribrach.
 - c. Eliminate any vibrations during the calibration.



Figure 5-22: Calibrate the Compass in Horizontal Plane

2. In MAGNET Field, select the Calibrate button in the Compass Alignment field; In TRU, select the Alignment button in the Compass field.
3. Turn the receiver clockwise in the horizontal plane.
MAGNET Field / TRU shows a progress bar reflecting how many turns are left to complete the calibration.

4. If you do not make any turns for two minutes, the calibration routine automatically stops. Perform the procedure again.
5. If you successfully complete all of the turns, MAGNET Field/TRU shows, "Calibration has completed."
The calibration parameters are saved. The receiver is ready to use.
6. If you do not successfully complete all of the turns, MAGNET Field/TRU shows, "Calibration has failed."
Perform the procedure again.

**NOTICE**

The calibration is saved when you turn the receiver power off. The saved calibration is used the next time you turn the receiver power on.

When Compass Recalibration is Required

During operation, the receiver evaluates the local magnetic environment and alerts a user if a re-calibration is required. These alerts appear in the field software. Make sure to re-calibrate the receiver when the field software indicates. Also recalibrate the receiver under the following conditions:

- If the receiver has been off for an extended period of time
- If the receiver is used for the first time
- If the survey location changes frequently
- If the receiver took a shock, such as being dropped
- If ambient temperature changes are 10 degrees or more
- If the receiver was transported by a car or airplane
- If the receiver was near a strong magnetic object or material, such as a permanent magnet, electromagnet, electric transformer, AC power supply, and so forth
- After loading new firmware
- After clearing the NVRAM

System Setup

The base receiver transmits RTK corrections to the rover receiver using either LongLink™ wireless technology, or UHF or FM modem.

The internal cell module of the rover receiver obtains correction data from reference GNSS networks.

This chapter describes the field setup for base and RTK rover usage.

Setting Up the Base Receiver

1. Install a heavy-duty tripod (P/N 22-050501-01) over a known point. You do not need a universal tribrach and tribrach adapter when working with this tripod.
2. Position the base receiver over a point with a known coordinate in the current coordinate system.
3. Attach the antenna to the UHF or FH modem antenna connector.
4. Level the tripod and tighten the screws.
5. If needed, attach any other accessories, such as a back-up power supply.
6. Measure the height of the receiver from the ground using the tape measure. See “Measuring Antenna Height” on page 54.
7. Press the Power button to turn on the receiver. The integrated wireless device in the receiver turns on when the receiver is powered.
8. Run MAGNET Field software on the field controller and connect the base receiver to the controller via Serial Port or Bluetooth. Select the following parameters:
 - Elevation mask.
 - The RTK output format.
 - Radio modem parameters (for UHF modem - Power, Protocol, Modulation, Spacing, Scrambling and FEC; for FH modem - Power, Channel, Protocol and Location).
 - Raw data logging, if it is required.
9. Use MAGNET Field software:
 - Type in the name of the point where the Base receiver is located.
 - Enter the coordinates of this point.
 - Select the Start Base button to start the receiver as the Base transmitting the correction data.



10. View the LED display panel for the receiver's current status. See "Display Panel" on page 3-1 for more information about LEDs.

**NOTE**

Select the RTCM 3.x MSM3 format in the RTK output protocol to create the correction data with measurements for GPS, GLONASS, BeiDou, QZSS, Galileo, and NavIC satellite systems

Setting Up the Rover Receiver

1. Attach the receiver to the pole. Make sure the receiver locks into place.
2. If you are not using a fixed height rover pole, measure the height of the receiver from the ground. See "Measuring Antenna Height" on page 6-5.
3. If using a radio modem, attach the antenna to the UHF or FH modem antenna connector.
4. If you are using a cellular modem insert the SIM card into SIM card slot ("SIM Card Location" on page 2-9).
5. Press the Power button to turn on the receiver. The integrated wireless device in the receiver turns on when the receiver is powered.
6. Run MAGNET Field software on the field controller, and connect the Rover receiver to the controller using a serial Port or Bluetooth.
7. Configure the UHF/FH or cell modems.
 - a. Select for the receiver with the UHF or FH modems:
 - An elevation mask
 - The RTK input format
 - The radio modem parameters (for UHF modem: Modulation, Protocol, Scrambling, FEC; for FH modem: Channel, Protocol, Location)
 - The parameters of raw data logging, if it is required
 - b. Select for the receiver with the cell module:
 - The type of correction data that will be used for survey (VRS or Single Base or MAGNET Relay)
 - The protocol of the input correction data: TCP/IP or NTRIP 2.0/1.0 or NTRIP 1.0
 - An elevation mask
 - The RTK output format
 - The Internet address and TCP port number of the remote server, a password and user ID to login to the selected server and configure parameters for a dial-up Internet connection
 - The parameters of raw data logging, if it is required
8. Select the Connect icon on the MAGNET Field main screen and select the Connect button in the Connections screen to establish connection with base receiver or remote server.
9. View the LED display panel for the receiver's current status. See "Display Panel" on page 13 for more information about LEDs.



Using the Receiver with an External Antenna

The Hiper HR can be used with an external antenna. Topcon recommends using a Topcon active (with LNA) external antenna.



WARNING

Topcon cannot guarantee the correct performance with other brands of GNSS antenna. Do not use passive GNSS antenna with the receiver.

When an external antenna is used, the receiver supplies a voltage from +4.5 V to +5.5 V to the central pin of the SMB antenna connector. Maximum antenna current is equal to 120 mA.

To use an external antenna, use MAGNET Field or TRU to set up the external antenna.

Setting Up The External Antenna in MAGNET Field

1. Open MAGNET Field, and select **Configure►Survey** and select the **Edit** button in the *GNSS Configuration*.
2. Proceed to the **Base Receiver/Rover Receiver** dialog (Figure 6-1). The default antenna is set to **HiPer HR**.

Config: Base Receiver

☒ External Receiver

Receiver Model: HiPer HR

Serial Number:

Elevation Mask: 13 deg

RTK Format: RTCM 3.x MSM3

Antenna: HiPer HR

Figure 6-1: MAGNET Field – Default Antenna

3. Select the desired external antenna from the Antenna drop-down list (Figure 6-2).

Config: Base Receiver

☒ External Receiver

Receiver Model: HiPer HR

Serial Number:

Elevation Mask: 13 deg

RTK Format: RTCM 3.x MSM3

Antenna: PG-A1

Figure 6-2: MAGNET Field – External Antenna Selected

4. Select to save the settings.

5. Connect the external antenna to the receiver using the external antenna cable (P/N 1006447-01).

**NOTE**

Once the external antenna is connected, the receiver will only track GNSS signals.

Setting Up the External Antenna in TRU

1. Connect to the receiver
2. Select **Receiver Settings** ► **Tracking & Positioning**.
3. In the **Antenna** tab, the internal antenna of HiPer HR is set for this receiver by default.

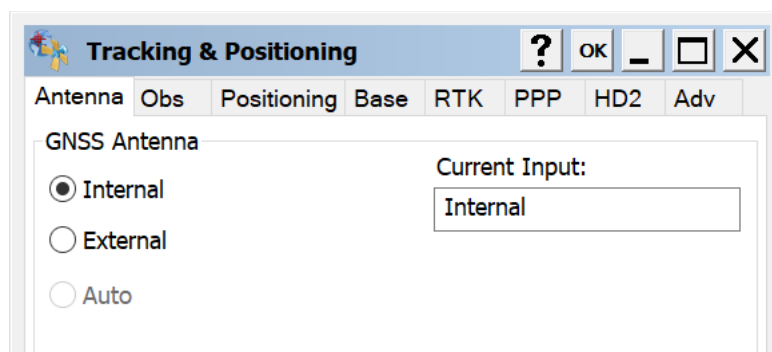


Figure 6-3: Configuration HiPer HR with Internal Antenna in TRU

4. Select the **External** radio button to activate an external type for HiPer HR receiver. Select **OK** button to sent this change to the receiver.
5. Connect the external antenna to the receiver using the external antenna cable (P/N 1006447-01).

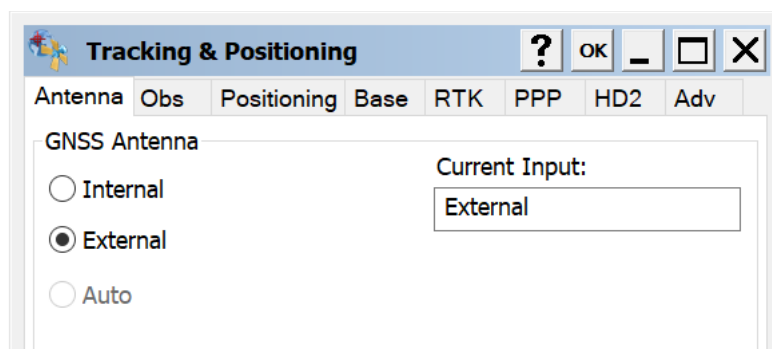


Figure 6-4: Configuration HiPer HR with External Antenna in TRU

**NOTE**

After this change the HiPer HR receiver will track GNSS signals only with external antenna.

Measuring Antenna Height

The receiver calculates the coordinates of the antenna's phase center. To determine the coordinates of the station marker, specify the following:

- Measured height of the antenna above the station marker
- Method of measuring the antenna height
- Model of the antenna/receiver used

Any necessary antenna phase center adjustments, based on the antenna model, are automatically applied. These adjustments, when combined with accurately measured height and measurement methods, allow for correctly computed reference marker coordinates.

To accurately measure the antenna height, do the following:

1. Orient the receiver with the display panel facing north.
2. Measure the antenna height above the control point or marker, either the slant height or the vertical height. You may either:
 - a. Measure the vertical height to the Antenna Reference Point (ARP) located at the bottom of the receiver at the base of the mounting threads.
 - b. Measure the slant height to the Slant Height Measurement Mark (SHMM) on the side of the receiver.
3. Record the antenna height, points name, and start time in the field notes.

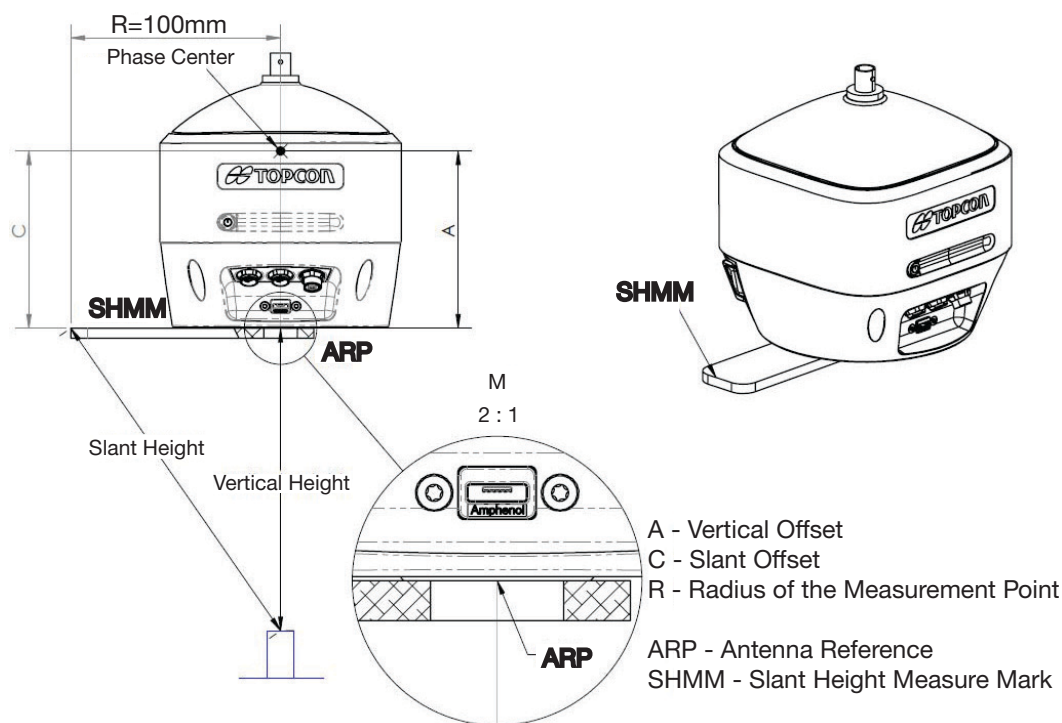


Figure 6-5: Antenna Height Measurement Points

Collecting Data

This chapter provides general information about memory, recording data, downloading data, and removing files to free up memory space.

Memory

The HiPer HR is equipped with an internal SD/SDHC memory card. The 8 GB card is formatted as FAT32. As data is logged to the card, the REC LED displays the memory capacity status. To access the raw data files on the memory card, see “Managing Files” on page 7-7.

Setting Recording Parameters

One of the following ways can be used to set logging parameters, such as logging rate, types of messages, etc.

- Receiver Web interface
- Topcon Receiver Utility (TRU) software
- MAGNET Field software

Logging Rates

Memory usage for data logging depends on the logging rate. For more information about setting logging rate parameters, see the TRU Online Help.

Recording Data

You can log GNSS Raw data to the receiver’s SD/SDHC card, and use the Topcon Receiver Utility (TRU) or MAGNET Office™ software to download the files to a computer.

Recording Data via the LED Display Panel

To start recording data, using the LED display panel:

1. Press the Power button to turn on the receiver.
2. Wait for the Power LED to become solid green. The receiver is now available to log the raw data.



NOTE

The receiver is not available to log the raw data until the startup procedure is completed.

3. Press the Power button three times in a row within 2 seconds to start recording. By default, only one file (File A) can be logged. You can select the **Use for MINTER & AFRM** check box for any number of files (see page ###). In this case, selecting the Power button will simultaneously start those files for which the **Use for MINTER & AFRM** check box is enabled.
4. Make sure the REC light blinks green, which indicates a “*.tps” file has opened and data collection has started. The REC LED blinks each time data is saved to the SD/SDHC memory

card. If the REC light blinks red, the receiver has either a hardware problem, or an improper OAF. See ““Option Authorization Files” on page 5-6 for more information.

To stop recording press the Power button three times in a row within 2 seconds, and make sure that the REC LED is dark.

Recording Data via the Receiver Web Interface

To start recording data using the receiver Web interface:

1. Press the Power button to turn on the receiver.
2. Wait for the Power LED to become solid green.
3. Login to the receiver Web interface. See “Using the Web Interface” on page 5-12 for details.
4. Open the **File►Data Logging** page. Up to 16 raw data files can be simultaneously started with the different recording parameters and the Automatic File Rotation Mode (AFRM) option.

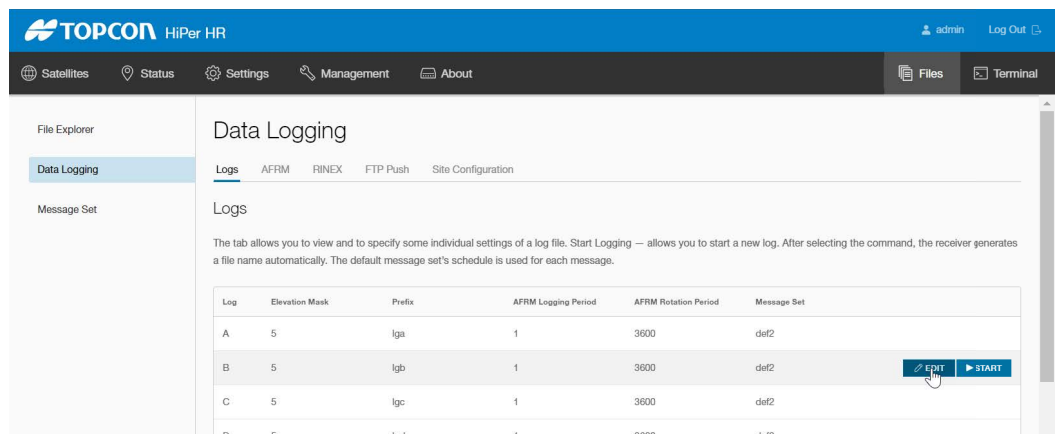


Figure 7-1: Web Interface - Data Logging Page

5. Select the desired file and select the **Edit** button to configure the logging parameters.
6. To disable file logging when AFRM is on or started via the Minter, disable the **Use for MINTER&AFRM** check box.

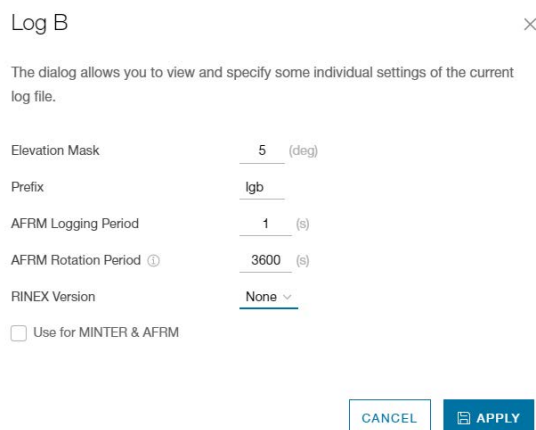


Figure 7-2: Web Interface - Edit Logging Parameters

7. Select the **Start** button, enter a file name in the **File Name** field, specify the **Logging Period**. For the *Custom* period, enter the value manually. Select the **Start** button for logging data to this file.

Start Logging

The dialog allows you to start recording to the current log file with the following parameters.

Current Log: B

Message Set: def2

File Name: Test_File_B

Logging Period:

☐ Default Message Set's Schedule

☐ Default Period for MINTER & AFRM

☒ Custom

10 (s)

CANCEL START

Figure 7-3: Web Interface - Start Logging

8. The information line below displays the log file status and the button to **Stop** logging.

Data Logging

Logs AFRM RINEX FTP Push Site Configuration

Logs

The tab allows you to view and to specify some individual settings of a log file. Start Logging — allows you to start a new log. After selecting the command, the receiver generates a file name automatically. The default message set's schedule is used for each message.

Log	Elevation Mask	Prefix	AFRM Logging Period	AFRM Rotation Period	Message Set
A	5	lga	1	3600	def2
B	5	lgb	1	3600	def2
File Name		/log/Test_File_B	File Size	14.32 KB	Current Logging Period 15 s
C	5	lgc	1	3600	def2

STOP

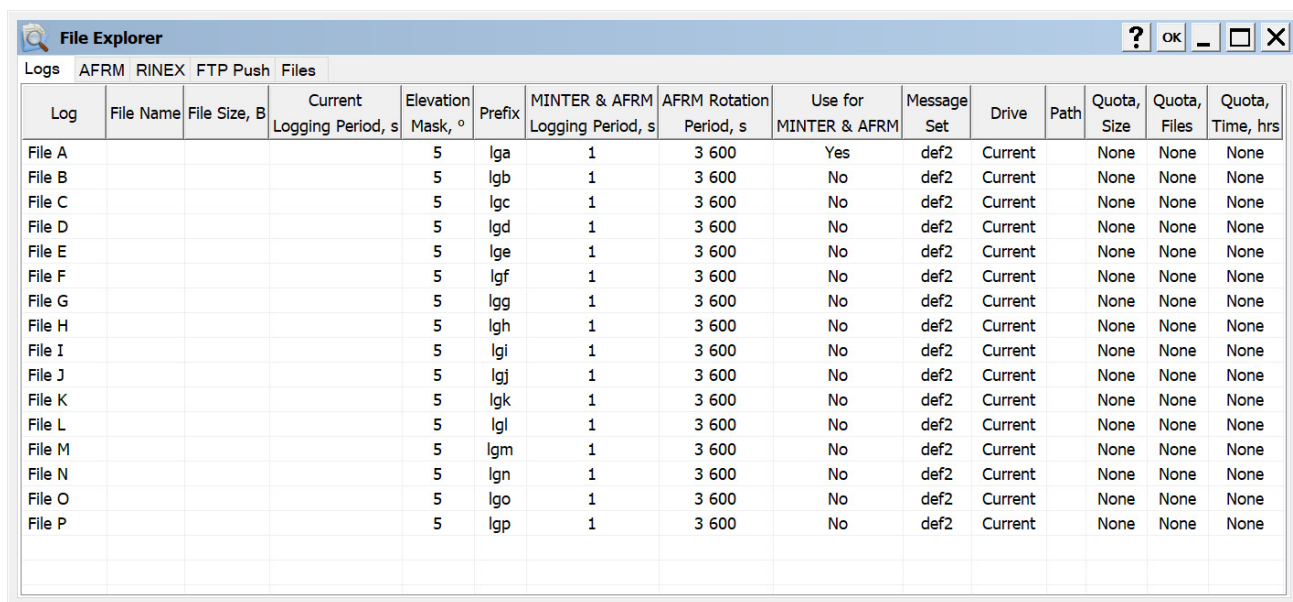
Figure 7-4: Web Interface - Data Logging Status

9. Make sure the REC LED blinks green.
10. To stop recording, press the **Stop** button in the required file slot.

Recording Data Using Topcon Receiver Utility

To start recording data using TRU:

1. Press the Power button to turn on the receiver.
2. Wait for the Power LED to become solid green.
3. If the receiver is connected by a USB connection, use the Safely Remove Hardware and Eject Media feature in Windows and mount the receiver file system in TRU. For details, see “Ejecting the Receiver from Windows and Mounting in TRU” on page 7-9. If the receiver is connected by a Serial/COM connection, continue to Step 4.
4. Launch TRU, and establish the connection with the receiver in the Receiver Managing mode. See the TRU Help for more information.
5. Select the **File Explorer** icon . The **File Explorer** screen open (Figure 7-5).
6. Open the Logs tab. You can record up to 16 raw data files simultaneously, from A to P. For each file you can use the its own default settings for logging.



Log	File Name	File Size, B	Current Logging Period, s	Elevation Mask, °	Prefix	MINTER & AFRM Logging Period, s	AFRM Rotation Period, s	Use for MINTER & AFRM	Message Set	Drive	Path	Quota, Size	Quota, Files	Quota, Time, hrs
File A				5	lga	1	3 600	Yes	def2	Current		None	None	None
File B				5	lgb	1	3 600	No	def2	Current		None	None	None
File C				5	lgc	1	3 600	No	def2	Current		None	None	None
File D				5	lgd	1	3 600	No	def2	Current		None	None	None
File E				5	lge	1	3 600	No	def2	Current		None	None	None
File F				5	lge	1	3 600	No	def2	Current		None	None	None
File G				5	lge	1	3 600	No	def2	Current		None	None	None
File H				5	lgh	1	3 600	No	def2	Current		None	None	None
File I				5	lgi	1	3 600	No	def2	Current		None	None	None
File J				5	lgj	1	3 600	No	def2	Current		None	None	None
File K				5	lgk	1	3 600	No	def2	Current		None	None	None
File L				5	lgl	1	3 600	No	def2	Current		None	None	None
File M				5	lgm	1	3 600	No	def2	Current		None	None	None
File N				5	lgn	1	3 600	No	def2	Current		None	None	None
File O				5	lgo	1	3 600	No	def2	Current		None	None	None
File P				5	lgo	1	3 600	No	def2	Current		None	None	None

Figure 7-5: Logs Tab of the File Explorer Screen

7. Right-click on the desired file it to open the context menu.
8. Select **Edit** to open the **Log** screen, and specify individual settings such as **Elevation Mask**, **Prefix** and **Rotation Period**. The RINEX version of the current file from the **RINEX Version** drop-down list can also be selected. If **None** is selected, the RINEX conversion will not be enabled.



NOTE

The Hiper HR receiver starts conversion of the log file to the RINEX file format immediately after the log file is closed. Since firmware 5.4 or later, created RINEX files are saved to remote FTP servers only and cannot be saved in the receiver's internal memory.

9. To use these log parameters after pressing the MINTER, select **Use** for **MINTER & AFRM** (Figure 7-6).

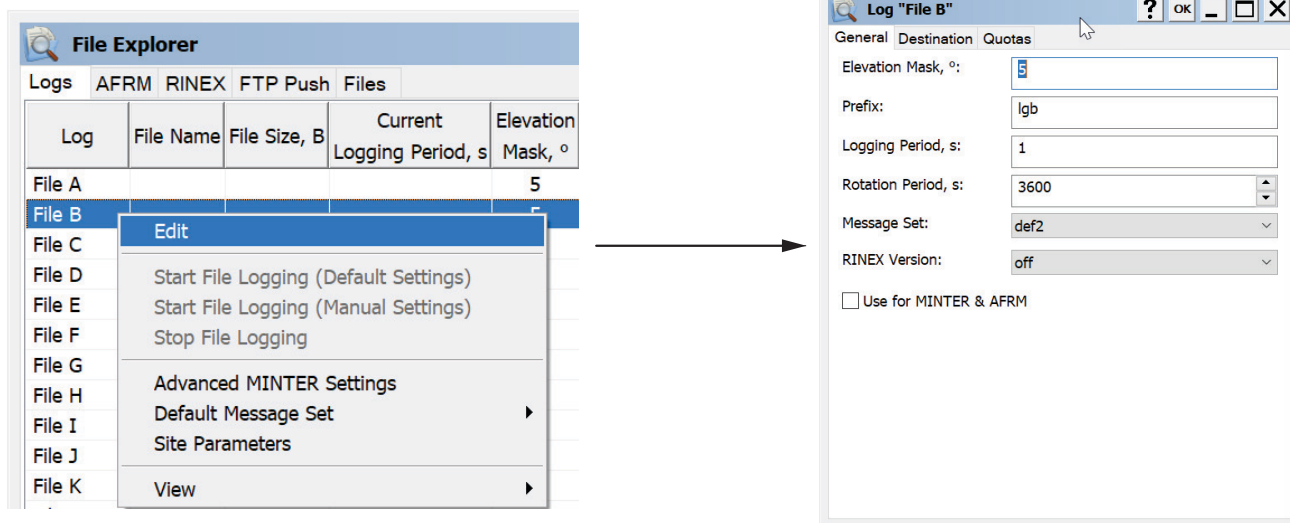


Figure 7-6: Context Menu of Logs Tab

10. Select **OK** to save all changes.

11. Using the MINTER, you can start logging one or more files:

- By default, clicking the **Power** button three times in a row within two seconds will log a file. This file is called File A (Figure 7-7).
- By default, the **Use for MINTER & AFRM** check box is enabled only for File A. You can select this check box for any number of files. In this case, clicking the Power button will simultaneously start those files for which the **Use for MINTER & AFRM** check box is enabled.

The current logging files are displayed on the Logs tab (Figure 7-7).

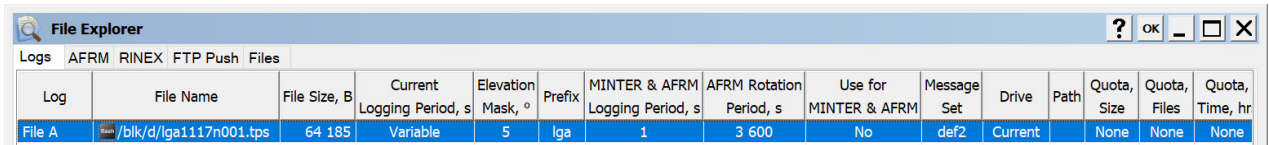
Log	File Name	File Size, B	Current Logging Period, s	Elevation Mask, °	Prefix	MINTER & AFRM Logging Period, s	AFRM Rotation Period, s	Use for MINTER & AFRM	Message Set	Drive	Path	Quota, Size	Quota, Files	Quota, Time, hrs
File A	/blk/d/lga1117n.tps	71 159	1	5	lga	1	3 600	Yes	def2	Current		None	None	None
File B	/blk/d/lgb1117n.tps	16 828	9	5	lgb	1	3 600	No	def2	Current		None	None	None
File C	/blk/d/lgc1117n.tps	16 828	11	5	lgc	9	3 600	Yes	def2	Current		None	None	None
File D	/blk/d/lgd1117n.tps	16 828	11	5	lge	11	3 600	No	def2	Current		None	None	None
File E	/blk/d/lge1117n.tps	16 828	11	5	lge	11	3 600	Yes	def2	Current		None	None	None
File F				5	lgf	1	3 600	No	def2	Current		None	None	None
File G				5	lga	1	3 600	No	def2	Current		None	None	None

Figure 7-7: Logs Tab

Recording Data with Default Settings

To start recording data to the selected file with default settings do the following.

1. Right-click on the desired file to open the context menu.
2. Select **Start File Logging (Default Settings)**.
The currently logging file shows in the **Logs** tab (Figure 7-8).



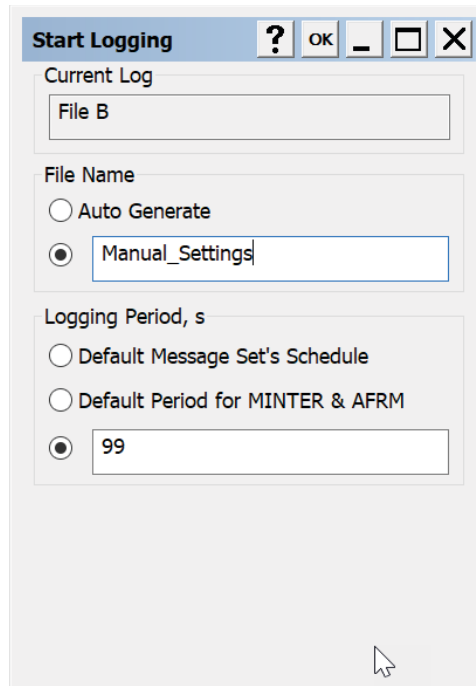
Log	File Name	File Size, B	Current Logging Period, s	Elevation Mask, °	Prefix	MINTER & AFRM Logging Period, s	AFRM Rotation Period, s	Use for MINTER & AFRM	Message Set	Drive	Path	Quota, Size	Quota, Files	Quota, Time, hr
File A	/blk/d/lga1117n001.tps	64 185	Variable	5	lga	1	3 600	No	def2	Current		None	None	None

Figure 7-8: Start File Logging With Default Settings

Recording Data with Manual Settings

The logging parameters can be specified manually. To start recording data to the selected file with arbitrary settings, do the following:

1. Right-click on the desired file to open the context menu.
2. Select **Start File Logging (Manual Settings)**. The **Start Logging** dialog is opened.
3. Specify the file name and logging period.



Start Logging ? OK _ □ X

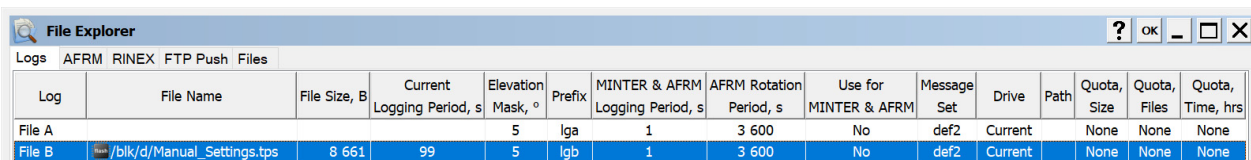
Current Log
File B

File Name
☐ Auto Generate
☒ Manual_Settings

Logging Period, s
☐ Default Message Set's Schedule
☐ Default Period for MINTER & AFRM
☒ 99

Figure 7-9: Manual Settings

4. Select **OK** to start logging the file using the entered parameters. The current logging file is displaying in the **Logs** tab (Figure 7-10).



Log	File Name	File Size, B	Current Logging Period, s	Elevation Mask, °	Prefix	MINTER & AFRM Logging Period, s	AFRM Rotation Period, s	Use for MINTER & AFRM	Message Set	Drive	Path	Quota, Size	Quota, Files	Quota, Time, hrs
File A				5	lga	1	3 600	No	def2	Current		None	None	None
File B	/blk/d/Manual_Settings.tps	8 661	99	5	lgb	1	3 600	No	def2	Current		None	None	None

Figure 7-10: Start File Logging With Manual Settings

Stopping Data Recording

To stop recording data, perform the following:

1. Right-click the desired file to open the context menu.
2. Select **Stop File Logging**. The **Files** tab of **File Explorer** screen displays the list of raw data files stored in the receiver memory.



NOTE

You can also log data using MAGNET Field software. With MAGNET Field, you can record only one raw data file at time.

Managing Files

The receiver records TPS data to a storage medium with a FAT32 file system. The files and folders are organized in a hierarchical structure. A total of 4000 files can be recorded and stored on the storage medium.

You can program the receiver to:

- Record “*.tps” data to up to a maximum of 16 simultaneous files. Each file can be logged with its own parameters.
- Close the current log file and open a new one according to a user-defined schedule. This option is called Automatic File Rotation Mode (AFRM).
- Automatically remove the oldest files to make room for the new files, using storage quotas on the existing files.
- Automatically convert the current log file to a *RINEX* file and save it to a remote FTP server.
- Automatically upload files to an FTP server.

USB Connection Specifics

After establishing connection of HiPer HR and controller or personal computer via USB cable:

- The HiPer HR receiver is ready to upload and download files between the receiver's memory and controller or computer's storage. Windows Explorer shows the receiver storage memory as a USB Drive with the HiPer HR folder:

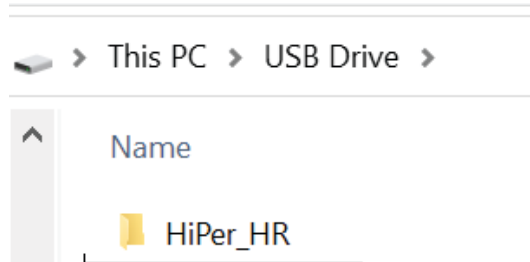


Figure 7-11: Windows Explorer displays the HiPer HR folder

- The HiPer HR receiver is not ready to record “*.tps” data to memory storage.
 - Unable to start logging a “*.tps” data file:

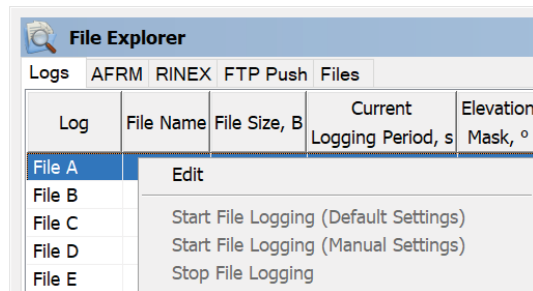


Figure 7-12: TRU File Explorer- Start File Unavailable

- The list of TPS data in the receiver memory is not available:

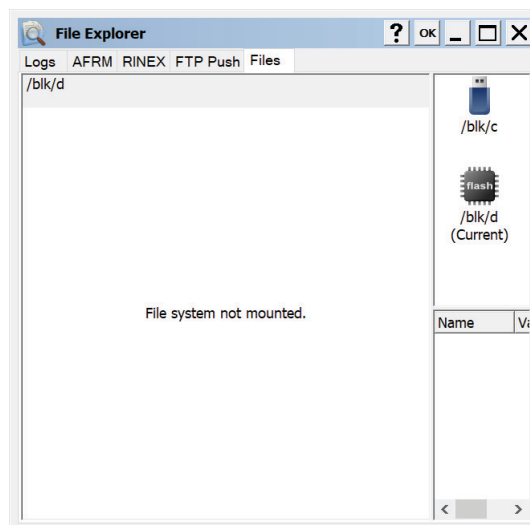


Figure 7-13: TRU File Explorer- File System Not Mounted

- The HiPer HR receiver is ready for configuration of other receiver settings.

Ejecting the Receiver from Windows and Mounting in TRU

When the HiPer HR receiver is connected by USB, use the Safely Remove Hardware and Eject Media feature in Windows to prepare the receiver for any of the following tasks:

- Recording “*.tps” data files to memory storage
- Accessing the memory storage using TRU

Perform the following on the controller or computer.

1. Use one of the following two procedures:

- From the Windows taskbar:
 - a. Right-click the **Safely Remove Hardware** and **Eject Media** feature in the notification area on the lower right of the screen.
 - b. Select **Eject USB Drive** for the HiPer HR from the menu.

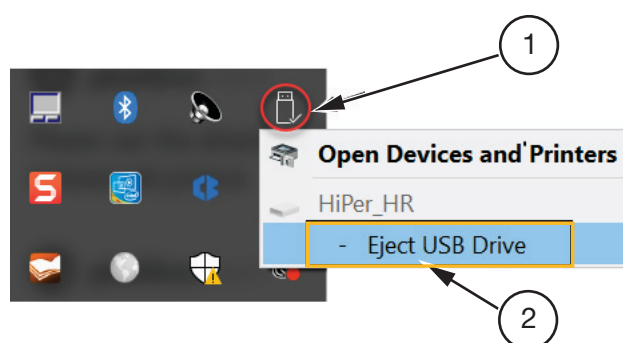


Figure 7-14: Safely Remove Hardware—Eject USB Drive

2. The **Safe To Remove Hardware** window opens (Figure 7-15). Do not disconnect the USB cable from the receiver and the controller or computer.

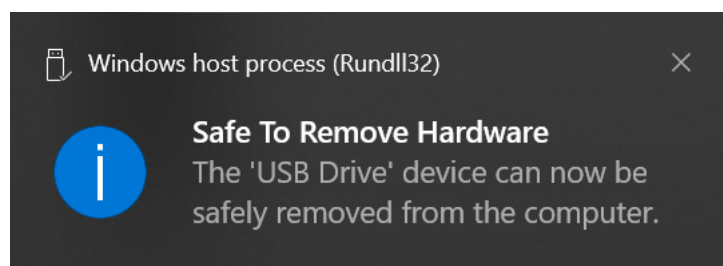


Figure 7-15: Safe To Remove Hardware

From Windows File Explorer:

- a. Right-click the device name of the receiver. This may appear as the receiver’s serial number.
- b. Select **Eject** from the menu.

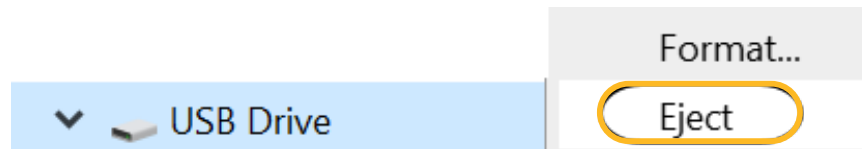


Figure 7-16: Eject Device

The device name of the receiver is removed from Windows File Explorer. The computer or controller is no longer using the USB connection to the receiver.

3. In TRU, select **Device►Application Mode►Receiver Managing**.
Receiver Managing Mode is selected.
4. Select **Device►Connect**.
The **Initializing Connection** window shows briefly.
5. Select **File Explorer**.
The TRU **File Explorer** screen opens.
6. Select **Files**.
The **Files** tab window opens. It shows, *"File system not mounted."*
7. Right-click  to select the internal memory.
8. Select **Mount►Mount** from the menu and select **OK**.

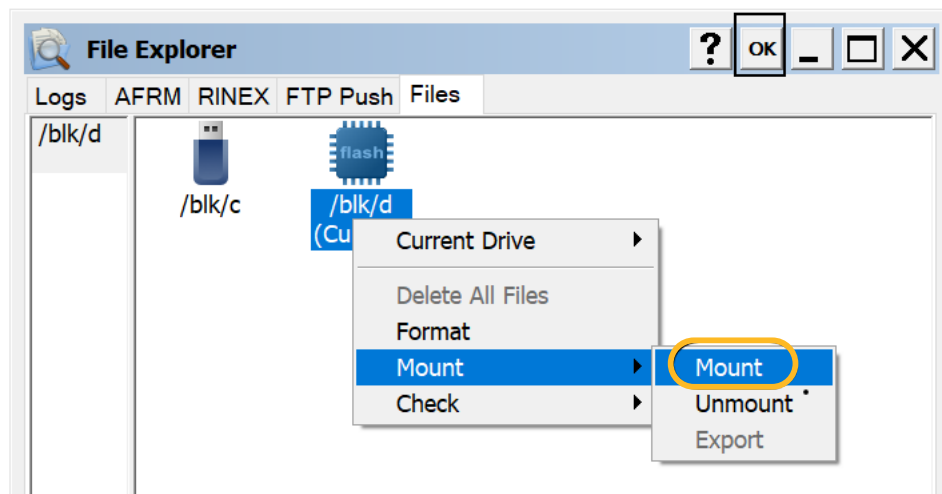


Figure 7-17: Mount Flash Memory

The **Files** tab window shows "Initializing," then populates the internal memory information (**File System Info**). The HiPer HR is ready to record "*.tps" data files to memory storage.

Downloading Data File Using TRU

When a survey is completed, you can download “*.tps” data files to a computer for storage, post-processing, or backup. To download “*.tps” data files from the receiver to a computer, do the following.

1. Select the **Files** tab in the **File Explorer** screen (Figure 46). The **Files** tab displays the list of raw data files stored in the receiver memory.
2. Right-click on the desired file(s) to open the context menu and select **Download** (Figure 7-18).
3. Select the folder where the “*.tps” file(s) will be saved (Figure 7-18).
4. Select **OK**. TRU downloads the selected file(s) to the folder (Figure 7-18).

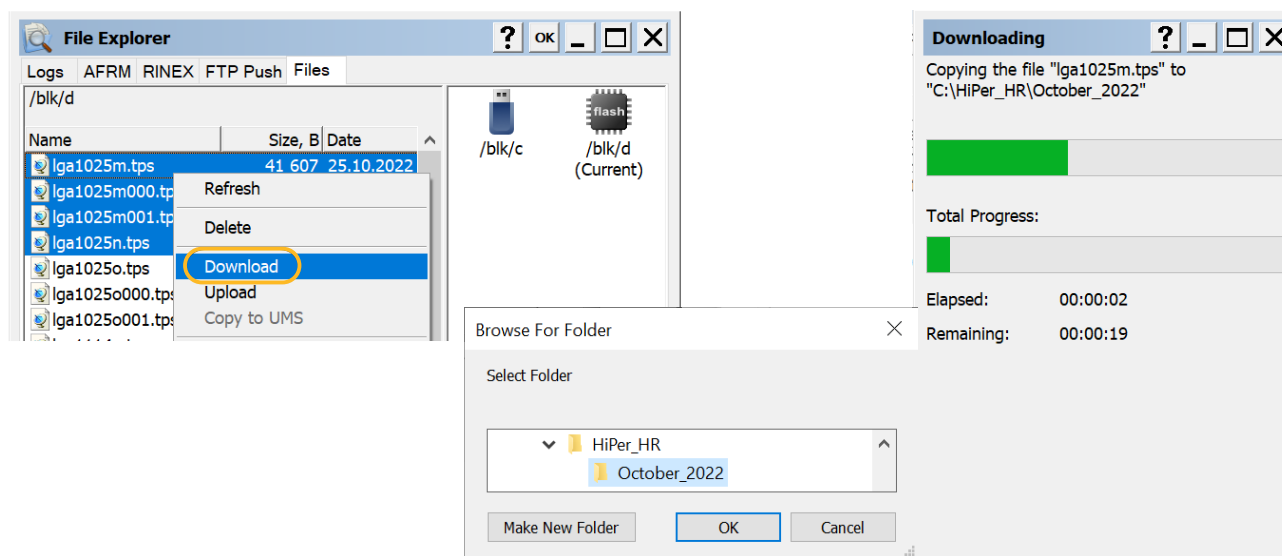


Figure 7-18: Downloading “*.tps” data files to Computer

Deleting Data Files from the Receiver Memory Using TRU

When the internal memory is full, the receiver stops logging data, and the REC LED turns off, indicating an error condition. Existing data are not overwritten.

To delete raw data files, do the following.

1. Right-click on the desired file(s) to open the context menu and select **Delete**.
2. Select **Yes** to confirm, then select **OK**. TRU starts deleting the file(s) from the receiver memory.

Troubleshooting

This chapter will help you diagnose and solve some common problems that may occur with the receiver.



WARNING

Do not attempt to repair equipment yourself. Doing so will void the warranty and may damage the hardware.

Check This First

Before contacting your local dealer or Topcon Technical Support, check the following:

- Check all external receiver connections carefully to ensure correct and secure connections. Double check for worn or defective cables.
- Check the receiver's internal batteries for a full charge.
- Check the power source for incorrectly connected cables, and ensure the power source is valid. See "Specifications" on page 9-1 for external power requirements.
- Check the software. Make sure the most current software version is downloaded onto the computer and the most current firmware is loaded into the receiver. Check the Topcon website for the latest updates.
- Check Topcon Technical Support (www.topconsupport.com) or Topcon Support (<https://www.topconpositioning.com/support>) for the latest updates.

Then, try the following:

- Power on and off the receiver by pressing the Power button or by using TRU (**Tools►Reset receiver**).
- Restore default settings by clearing the NVRAM. See "Performing a Factory Reset" on page 5-10. This restores the receiver's parameters to the factory default settings and erases the almanac and ephemeris files. This action does not delete data files from the receiver memory.

If the problem persists, see the following sections for other solutions.

Powering Problems

The following are some of the most commonly encountered power problems.

The Receiver Does Not Power Up

The battery may be discharged.

- Charge the battery overnight. See "Charging the Batteries" on page 4-3.
 - If you are using an external power source, the cable may be disconnected or damaged.
- Make sure the cable is securely connected and undamaged.
- The receiver may have a defective charger or defective battery.

- If, after changing the battery or connecting an external power source, the receiver still does not power up, contact your local dealer or Topcon Technical Support for advice.

If the batteries are charged, reset the hardware using the Hardware Reset button. See “Hardware Reset Button” on page 2-10.

Receiver Problems

The following are some of the most commonly encountered receiver problems.

The Receiver Cannot Establish a Connection to a Computer or External Controller

Cable specific problems:

- The cable is not properly plugged in.
 - Unplug the cable, then securely and properly reconnect it to the receiver.
- The cable is damaged.
 - Use an undamaged cable. Contact a dealer to replace the cable.
- The USB driver is not installed.
 - If you are using a USB cable connection with a computer running Windows 7, make sure the USB driver is installed on the computer. You can download the driver from myTopcon at: https://www.topconpositioning.com/support/updates/HIPER_HR.

Generic problems:

- The receiver port used for connection is not in Command mode.
 - a. Connect the receiver to a computer and open TRU (see “Connection” in the *Topcon Receiver Utility (TRU) Help* embedded in the software).
 - b. Select **Receiver Settings►Ports**.
 - c. Change the Input Mode for the port used for connection to cmd.

The receiver does not lock on to satellites for a long period of time

- The corresponding receiver options may be disabled or expired (L1/L2, GPS/GLONASS must be on to track satellites).
 - Order a new OAF with the desired options activated to enable or extend validity of the corresponding receiver options. Contact a dealer or visit the Topcon website for details.
 - Refer to the “Receiver Managing” chapter of the *Topcon Receiver Utility (TRU) Help* for a detailed description of options.

The receiver tracks too few satellites

- If the survey is conducted near obstructions (tree canopy, tall buildings, and so forth).
 - Make sure the Multipath Reduction boxes have been enabled in the field data collection software.
- a. Connect the receiver to a computer and open TRU (see “Connection” in the *Topcon Receiver Utility (TRU) Help* embedded in the software).
- b. In TRU, connect to the receiver.
- c. On the TRU main screen, choose **Receiver Settings►Tracking►Adv** tab. Make sure the **C/A code multipath reduction** check box is selected.
- Move to an area free of obstructions, if possible.

The receiver cannot obtain Code Differential and/or RTK solutions

- Incorrect Base coordinates entered.
 - Specify the correct coordinates for the Base station using TRU or another suitable field data collection software.
 - There could be some obstruction to the connection.
 - Clear all possible obstructions or relocate the Base so there is a “line-of-sight” path to the Rover.
- The corresponding receiver options may be disabled or expired.
 - Order a new OAF with the required options activated to enable or extend validity of the corresponding receiver options.
 - Refer to the Topcon Receiver Utility (TRU) Help for a detailed description of options.
- There are not enough common satellites. In order to obtain a fixed solution, the Base and Rover should track at least five common satellites.
 - Check the elevation masks of the Rover and Base receivers; they should be the same. To do this, on the TRU main window, choose **Receiver Settings►Tracking►Obs.**
 - Verify there is a clear view of the sky to allow sufficient satellite tracking.
- A discrepancy exists between the differential standards used at the Base and Rover receivers.
 - Ensure the Base and Rover receivers use the same corrections input/output format:
- a. Connect the receiver to a computer and open TRU (see “Connection” in the *Topcon Receiver Utility (TRU) Help* embedded in the software).
- b. In TRU, connect to the receiver.
- c. On the TRU main window, select **Receiver Settings►Ports.**
- d. Double-click on the port to be configured and make sure the input mode of the Rover matches the format of the Base output mode (i.e. RTCM3).
- Poor satellite geometry (PDOP/GDOP values are too high).
 - Conduct the survey where satellite visibility is better (low PDOP value).
 - Ensure the elevation mask is less than 10 degrees.

- Increase the PDOP threshold. To do this, on the TRU main window, choose **Receiver Settings►Tracking►Obs.**
- The elevation mask is above 10 degrees.
 - Lower the elevation mask. To do this, on the TRU main window, choose **Receiver Settings►Tracking►Obs.**
 - Verify there is a clear view of the sky to allow sufficient satellite tracking.
- The modem battery is low.
- The specified baud rate is incompatible with the baud rates the modem supports. The baud rate is the rate at which the receiver transmits differential messages to the modem and vice versa.
 - Change the modem's baud rate.
- The Base and Rover modems use different radio link parameters.
 - Configure the Base and Rover radio modems according to the procedures listed in the *TRU Help*.
- The distance between the Base and Rover is too far.
 - Close the distance between the Base and Rover.
 - Use repeaters to increase radio coverage.
- There may be a source of radio interference that disrupts radio communications.
 - Change the RF channel (if possible).
 - Removing the source of the jamming signal or relocate the radio antennas (if possible).

The receiver does not start logging data

- The receiver's memory is disabled or expired.
 - Make sure the memory option is enabled. For details, see the *Topcon Receiver Utility (TRU) Help*.
- The memory card does not have free space.
 - Download and/or delete data files to free up space for new files. See “Downloading Data File Using TRU” on page 7-11.
 - The file system is not initialized. Initialize the File System on the SD card using TRU. To do this, on the TRU main screen, choose **File Explorer►Initialize File System**.

Bluetooth Problems

The following are some of the most commonly encountered error messages and other problems.

TRU error message: Cannot find receiver

- The receiver is turned off.
 - Ensure the receiver has power and is turned on.
- Bluetooth is not turned on; the BT LED is off.
 - Reset the receiver to the factory default settings by pressing the Power button for 10 to 15 seconds.
 - You can also turn on power to Bluetooth using TRU. To do this, on the TRU main window, choose **Receiver Settings►Bluetooth**.
- There is interference.
 - Move the receiver, controller, or computer to an unobstructed location.
- The receiver is too far away.
 - Move the devices closer together.
- The receiver is already connected via Bluetooth to another device.
 - Disconnect the receiver from the other controller or computer.
- The receiver port used for connection is not in Command mode.
 - a. Connect the receiver to a computer and open TRU (see “Connection” in the *Topcon Receiver Utility (TRU) Help* embedded in the software).
 - b. Select **Configuration►Receiver►Ports**.
 - c. Change the Input Mode for the Bluetooth serial port used for connection to cmd.



NOTE

This is the most common cause for this error message. Use TRU to double check the settings for the connection port.

TRU error message: Open COM# port failed: Access is denied

- Another application uses the computer port dedicated for connection.
 - Close the application, and then re-connect.
 - Connect the receiver via another, unused computer port.

After searching for available devices, none are discovered

- The receiver is not receiving power.
 - Check that the receiver is getting power and is turned on.
 - Check that the power cable is correctly attached to the port if one is being used.
 - Unplug the cable, then securely and properly reconnect it to the receiver.
 - If the power cable is damaged, contact a Dealer to purchase a new cable.

Can see the icon for the receiver's Bluetooth module on the computer screen, but cannot connect to it

- Device security settings probably differ.
 - Make sure the Bluetooth enabled devices use the same security settings.
- Bluetooth module settings may have changed.
 - a. If the settings are changed for the Bluetooth module, remove it from the list of discovered Bluetooth devices using the Bluetooth manager program (supplied with the device used to manage the receiver).
 - b. Repeat the search.

TRU Problems

The following is the most commonly encountered TRU problem.

TRU cannot connect to the receiver

- The receiver is turned off.
 - Ensure the receiver has power and is turned on.
- If using a cable, the cable's connectors are improperly attached.
 - Check that the cable connector is attached to the correct serial port.
 - Unplug the cable, then securely and properly reconnect it to the receiver.
- If using a cable, the cable is damaged.
 - Use an undamaged cable.
 - Contact a dealer to purchase a new cable.
- If using Bluetooth wireless technology, the incorrect port is selected.
 - Use a computer or receiver that has Bluetooth wireless technology enabled/installed.
 - Make sure the computer and receiver use the correct ports for communication. For the HiPer HR receiver, this is Bluetooth serial port A (btsp\A).

Cleaning and Storing the Receiver

- Use a clean cloth moistened with neutral detergent or water.
- Never use an abrasive cleaner, ether, thinner benzene, or other solvents.
- Always make sure the receiver is completely dry before storing it. Dry any moisture with a soft, clean cloth.

Getting Customer Support

If the troubleshooting hints and tips in this operator's manual fail to remedy the problem, contact your local Topcon dealer or visit the Topcon Support Website (<https://www.topconpositioning.com/support>) for technical support. For contact information, see "Getting Technical Support" on page 1-4.

Specifications

This chapter provides specifications for the HiPer HR and its internal components.

General Details

Table 9-1 lists the receiver's general specifications.

Table 9-1. General Receiver Specifications

Physical	
Enclosure	Magnesium Alloy housing
Color	Topcon Yellow / Gray bumper
Dimensions (mm)	115 (w) x 132 (h) x 115 (d)
Weight	1,172 g with batteries, 1,032 g without batteries
GNSS Antenna	Internal/External integrated full wave Fence Antenna™ Technology with internal ground plane
Battery	Internal and removable external (with support of run charge and hot swappable features)
Seals	Silicon (molding in color)
Status display/panel	MINTER (Minimum Interface): 1 power button 8 status LEDs: • Stat – Satellite Tracking Status • REC – Recording Status • Wi-Fi – Wi-Fi Activity Status • Bluetooth – Bluetooth Communication Status • Cellular – Internal Cellular Modem Status • Radio – UHF or FH915+ Modem Status • Battery Internal – Remaining Charge of the Internal Battery • Battery External – Remaining Charge of the Removable Battery
Ports	5 Ports: • Power • Serial • USB • External GNSS antenna • External Radio antenna
SIM Card	Secured and User accessible (inside removable battery compartment)
Bluetooth antenna	Fully integrated, high sensitivity

Table 9-1. General Receiver Specifications (Continued)

Cellular antenna	Internal	Internal cellular antenna for HiPer HR variants with 3.5G cellular modem.
Cellular antenna	External	External cellular antenna for HiPer HR variants with 4G cellular modem
Wi-Fi antenna	Internal	
Environment		
Operating temperature	Data logging and logging with external power • -20° C to +50° C (Battery power/Non-charging) • 0° C to +45° C (External power supply/Battery charging) • -40° C to +65° C per MIL-STD 810G	
Storage temperature	-20° C to +85° C	
Humidity	100%	
Ingress Protection	Dust and water ingress protected (IPX7 and IP6X)	
Vibration	Random: Compliance with MIL-STD 810G - 514.6 - Cat.24 Mechanical: Compliance with MIL-STD 810G - 516.6	
Drop	Survive 2m pole drop onto concrete surface Survive 1m handle drop	
Power		
Batteries	Internal: Li-ion, 5200 mAh, 3.7 V; External: Li-ion 2900 mAh, 7.2 V	
Removable Battery Size	110 x 40 x 40 (mm)	
Removable Battery Weight	150 g	
Operating Time Average with modem “on” and 20 SVs tracked. Using new, fully-charged batteries, operating at room temperature and transmitting at 1 Hz rate.	For the HiPer HR with R2 Lite FH915 Modem: • Receive-only mode – 4 hours 30 min • Transmitting at 250 mW – 3 hours 15 min • Transmitting at 1 W – 2 hours 30 min • GSM/GPRS in urban areas – 4hours 30 min For the HiPer HR with R2 Lite UHF Modem: • Receive-only mode – 4 hours 15 min • Transmitting at 0.5 W – 3 hours 45 min • Transmitting at 1 W – 3 hours 30 min • GSM/HSPA in urban areas – 4 hours 15 min For the HiPer HR with Any Modem: Modem off – 5 hours	
External Power	ODU-5	

Table 9-1. General Receiver Specifications (Continued)

Input Voltage	9 to 28 VDC Internal Battery (3.7 V, 5200 mAh) External Battery (7.2 V, 2900 mAh)
Battery Operating Time	• Standalone: 5 hours • UHF Rover: 4 hours 15 min • UHF Base: 3 hours 30 min
Battery Charge	Connect the AC adapter to charge the internal battery. The internal battery is charging, regardless of the receiver state. The removable battery is charging only when the receiver is off. You can detach the battery and charge it with a separate battery charger.
Charging Time	Approx. 4 hours for full charge using manufacturer-supplied battery charging cradle (p/n 1010975-02) and adapter (p/n 1005556-01).
On-board	Backup battery for timekeeping and almanac data storage; minimum 10 years of operation.
GNSS Receiver Board Details	
Number of channels	448 GNSS channels Vanguard Technology™ with Universal Tracking Channels 4 dedicated channels for L-Band signal tracking
Tracking Signals	GPS: L1 C/A, L1C, L1P(Y), L2P(Y), L2C, L5 GLONASS: L1 C/A, L1P, L2P, L2C/A, L3 Galileo: E1b, E5a, E5b, E5AltBOC, E6b BeiDou: Phase 2 - B1I, B2I, B3I Phase 3 - B1I, B1C, B2a, B2b, B3I NavIC: L5A SBAS: L1 C/A, L5 QZSS: L1 C/A, L1 C/B, L1C, L2C, L5, L6 L-band
Tracking	
Multipath Reduction	Yes, code and carrier
PLL/DLL Settings	Bandwidth, order, adjustable
SBAS	WAAS/EGNOS/MSAS
Quartz Lock Loop (QLL)	Protection against vibrations
Data	
USB	• USB Micro-A/B • Host Mode – USB flash drive • Device Mode – Mass storage, virtual serial

Table 9-1. General Receiver Specifications (Continued)

Input Format	• TPS proprietary • RTCM SC104 ver. 2.X, RTCM 3.X • Encrypted RTK • CMR/CMR+
Output Format	• TPS proprietary • RTCM SC104 ver. 2.X, RTCM 3.X (including MSM) • CMR/CMR+ • BINEX • NMEA 0183 versions 2.1, 2.2, 2.3, 3.0, 3.01, 4.0, 4.10, 4.11
Features	Up to 20 Hz update rate for real time position and raw data
Data Logging	Support for sixteen simultaneous sessions Advanced file/folder system
RINEX	Onboard RINEX conversion and upload of generated RINEX files to an external FTP server
I/O Signals	1 PPS (combined with Serial A connector)
Communication	
Optional Radio Type	Integrated UHF (410-470 MHz), 12.5 kHz spacing (Satel, PDL, TrimTalk protocols) UHF Radio Range: 5-7 km typical; 15 km in optimal conditions ^a Integrated Spread Spectrum (915 MHz), FH915 & FH915+ protocols
Memory	
Type of Memory	SD (Secure Digital) non-removable card
Capacity	8 GB pre-installed
Number of Files	Up to 4000
Logging Files	6.0 MB per hour (32 SVs, 1 sec, L1/L2, default message set)
Logging Interval	0.01 to 86400 seconds, depending on purchased options
Output	
Communication Ports	• High-speed RS-232 serial port (rimmed in green) • USB 2.0 up to 480 Mbps – USB device with mass storage and virtual serial port functionality • Internal Cellular Modem
Bluetooth	Internal Bluetooth LongLink

Table 9-1. General Receiver Specifications (Continued)

Serial Port Specifications	RS-232 Serial Port: • Baud rate: 460800, 230400, 115200 (default), 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300 • Flow control: RTS/CTS • Length: 7 or 8 (default) • Stop bit: 1 (default), 2 • Parity: None (default), Odd, Even
Connections	• UHF or FH915 Modem Antenna (BNC or reverse polarity TNC depending on modem type) • PWR • RS-232 Serial • USB 2.0 Micro-A/B • External GNSS antenna
MINTER (LED Display)	• 8 external LEDs • ON/OFF control input (power button)
NMEA	
NMEA 0183 Output	Versions 2.1, 2.2, 2.3, 3.0, 3.01, 4.0, 4.10, 4.11
Messages	GGA, GLL, GMP, GNS, GRS, GSA, GST, GSV, HDT, RMS, ROT, VTG, UID, and ZDA
Output Interval	1Hz standard; 5Hz, 10Hz and 20Hz optional
DGPS	
Correction Format	RTCM SC104 Ver 2.x and 3.x
RTCM Message Type	1, 3, 9, 31, 32, 34; user selectable
Process Interval	1Hz standard; 10Hz and 20Hz optional
Output Interval for RTCM Correction Data	1Hz standard; 10Hz and 20Hz optional
Elevation Mask	0 to 90 degrees
Real Time Kinematic Mode	
Correction Format ^b	RTCM SC104 Version 2.x, RTCM 3.x, RTCM 3.X MSM3, CMR/CMR+ (Trimble compatible), TPS proprietary
Supported RTK Network Solutions	VRS, MAC, FKP
Ambiguity Initialization	On-The-Fly (OTF): L1, L1/L2, L1/L2/L5
Baseline Length	Up to 50km, depending on atmospheric and multipath conditions
Initialize Time	from 1 second depending on the baseline length (D) and multipath conditions
Output Interval for CMR/RTCM	1Hz standard; 10Hz and 20Hz optional

Table 9-1. General Receiver Specifications (Continued)

Elevation	0 to 90 degrees
Solution Mode	Delay (synchronization) mode Extrapolation (not synchronized) mode
Process Interval	1Hz standard; 10Hz and 20Hz optional
Positioning Modes	
Base or Rover	Autonomous (standalone) DGPS (w/ user base) DGPS (w/ SBAS) Static Kinematic (continuous, stop and go) RTK (delay, extrapolation) Starpoint Pro (PPP) Skybridge Pro Realpoint (RTK)
Positioning Accuracy^c	
Static / Fast Static	Horizontal: 3 mm + 0.5ppm (x baseline length) Vertical: 5 mm + 0.8ppm (x baseline length)
RTK / Stop&Go	Horizontal: 5 mm + 0.5ppm (x baseline length) Vertical: 10 mm + 0.8ppm (x baseline length)
RTK, TILT Compensated ^d	RTK accuracy, and additionally: Horizontal: 1.3mm/°Tilt; Tilt ≤ 10° Horizontal: 1.8mm/° Tilt, Tilt > 10°
RTCM based DGPS	Horizontal: 0.3 m Vertical: 0.5 m
SBAS	Horizontal: 0.8 m Vertical: 1.2 m
Standalone	Horizontal: 1.2 m Vertical: 1.8 m
Cold Start Warm Start Reacquisition	<40 sec. <20 sec. <1 sec.
RTK Time-to-First-Fix (TTFF)	<20 sec.

Table 9-1. General Receiver Specifications (Continued)

Topnet Live Correction Services			
Supported services	Starpoint Pro (PPP)	Realpoint (RTK)	Skybridge Pro
Service Delivery Method ^e	• NTRIP via External Cellular Modem • NTRIP via On-board Ethernet • L- Band	• NTRIP via External Cellular Modem • NTRIP via On-board Ethernet	• NTRIP via External Cellular Modem • NTRIP via On-board Ethernet • L- Band
Supported Constellation	GPS, GLONASS, GALILEO, BeiDou		
Coverage	Global	Regional	
Convergence Time	< 18 min	N/A	Seconds
Accuracy	Horizontal 3 cm (95%) Vertical 6 cm (95%)	Horizontal 5 mm + 0.5 ppm (x baseline length) Vertical 10 mm + 0.8 ppm (x baseline length)?	Realpoint (RTK) accuracy without RTK corrections up to 20 min ^f for L-band correction and up to 8 min for NTRIP correction.

- a. Varies with terrain and operating conditions.
- b. CMR/CMR+ is a third-party proprietary format. Use of this format is not recommended and performance cannot be guaranteed. Use of industry standard RTCM 3.x is always recommended for optimal performance.
- c. These specifications will vary depending on the number of satellites used, obstructions, satellite geometry (PDOP), occupation time, multipath effects, and atmospheric conditions. Performance may be degraded in conditions with high ionospheric activity, extreme multipath, or under dense foliage. For maximum system accuracy, always follow best practices for GNSS data collections.
- d. Subject to successful TILT calibration, and an operating environment free of magnetic disturbances.
- e. For NTRIP via External Cell Modem, a user-supplied communication option is required to connect the HiPer HR receiver to a Topcon Live Server broadcasting PPP corrections. Usually, a cellular modem with a SIM - card and data plan can be used as a communication option for wireless connection to the Topcon Live Server.
- f. A 20 minutes infill time is subject to change in future firmware version.

R2 Lite UHF Internal Modem Board Details (Optional)

Table 9-2 lists the HiPer HR's optional R2 Lite UHF modem specifications.

Table 9-2. R2 Lite UHF Internal Modem Board Specifications

Operating Frequency Range	406MHz – 470MHz for Rover and Base
Channel Spacing	6.25 KHz / 12.5 KHz / 20KHz / 25KHz user-selectable
Signal Modulation	• 4FSK • GMSK
Communication Mode	Time division duplex
Supported Protocol(s)	TPS, PDL, Trimble, Satel 3AS
Transmitter Carrier Power	10, 20, 50, 100, 200, 500 and 1000 mW, user selectable
Receiver Sensitivity	• GMSK: -115 dBm at 10^{-5} BER and 12.5 KHz spacing • 4FSK: -106 dBm at 10^{-5} BER and 12.5 KHz spacing
Receiver Dynamic Range	-110 to -10 dBm
Serial Data Rate	115200 bps
Radio Data Rate	• 25KHz: 9600 bps for GFSK and 19200 pbs for 4FSK • 12.5KHz: 4800 bps for GMSK and 9600 pbs for 4FSK
Antenna Type	Whip antenna
Antenna Connector	BNC
Error Connector	FEC on/off

R2 Lite FH915 Internal Modem Board Details (Optional)

Table 9-3 lists the HiPer HR's optional R2 Lite FH915 modem specifications.

Table 9-3. R2 Lite FH915 Internal Modem Board Specifications

Frequency Range Country/Region/Purpose Dependent	• 902.2 MHz – 927.8 MHz (128 channels), USA • 915.2 MHz – 927.8 MHz (63 channels), AUS • 920.8 MHz – 927.8 MHz (36 channels), NZL
Signal Structuring	Frequency-hopping spread spectrum
Hopping Pattern	5 per band, user-selectable
Hopping Channels	128 Channels
Occupied Bandwidth	± 100 KHz
Frequency Modulation Technique	FSK, 64 Kbps
Network Topology	Point-to-point, Point-to-multipoint
System Gain	135dB

Table 9-3. R2 Lite FH915 Internal Modem Board Specifications (Continued)

Operation Mode	Transmitter, receiver, repeater
Protocol	FH915, FH915+
Transmitter Carrier Power	250mW (24 dBm)/1 W (30 dBm), user selectable
Receiver Sensitivity	-105 dBm at 10^{-4} BER
Receiver Dynamic Range	105 dB
Serial Interface	RS232
Serial Data Rate	115200 bps
Effective Radio Link Rate	9600, 10200, 17000, 51000 bps, user selectable for FH915 3600, 4800, 6600, 19200 for FH915+
Error Correction	FEC (15.7), majority decoding
Antenna Type	1/2 wave articulating whip
Antenna Connector	Reverse polarity TNC
Antenna Gain	2.5 dBi

Wi-Fi Module Details

Table 9-4 list the HiPer HR's Wi-Fi module specifications.

Table 9-4. Wi-Fi Module Specifications

Type	IEEE 802.11b,g,n compliant
Mode	Access point, Client
Power	20.0 dBm, 11 Mbps, CCK(b) 14.5 dBm, 54 Mbps, OFDM(g) 12.5 dBm, 65 Mbps, OFDM (n)

Bluetooth Module Details

Table 9-5 list the HiPer HR's Bluetooth module specifications.

Table 9-5. Bluetooth Module Specifications

Type	IEEE 802.11b,g,n compliant
Mode	Access point, Client
Power	20.0 dBm, 11 Mbps, CCK(b) 14.5 dBm, 54 Mbps, OFDM(g) 12.5 dBm, 65 Mbps, OFDM (n)

Connector Specifications

The HiPer HR has one antenna connector for radio transmission/reception, and four port connectors for power, data communication, and the external GNSS antenna. Cellular, LongLink, Bluetooth, and Wi-Fi antennas are internal.

Radio (Modem) RF Connector

The modem connector (Table 9-6) is a reverse TNC connector for 915+ radio, and a BNC connector for UHF radio.

Table 9-6. Modem Connector Specifications

Modem	Type	Signal Type	Dir	Details
915+	Reverse TNC	Modem I/O	I/O	RF output from modem antenna
UHF	BNC	Modem I/O	I/O	RF output from modem antenna

Power Connector

The power connector (Figure 9-1) is a sealed receptacle, 5 pin, ODU part number G80F1C-T05QF00-0000.

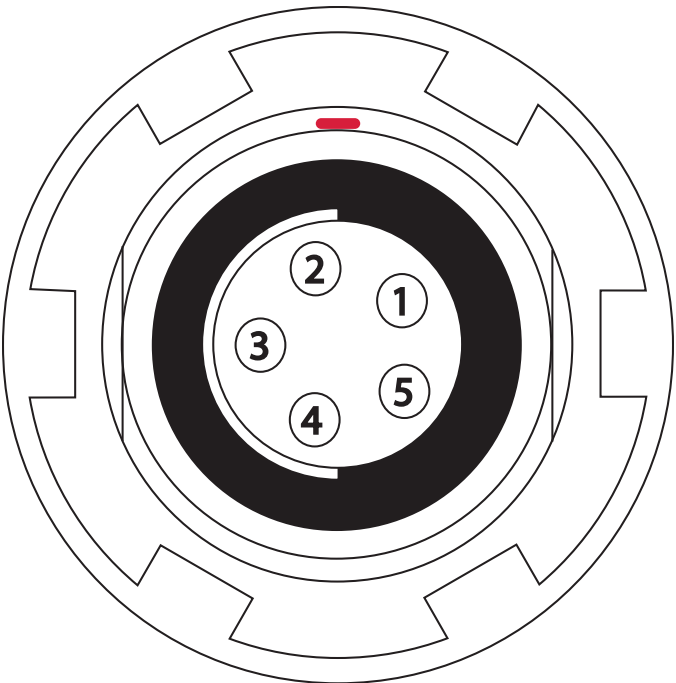


Figure 9-1: Power Connector

Table 9-7 describes power connector specifications.

Table 9-7. Power Connector Specifications

Number	Signal Name	Dir	Details
1	Power_INP	P	9 to 28 volts DC input
2	Power_INP	P	9 to 28 volts DC input
3	Power_GND	P	Ground, power return
4	Power_GND	P	Ground, power return
5	Aux_Power	P	9 to 28 volts DC input

Serial A RS232 Connector

The serial RS232 connector (Figure 9-2) is a sealed receptacle, 7 pin, ODU part number G80F1C-T07QC00-0000.

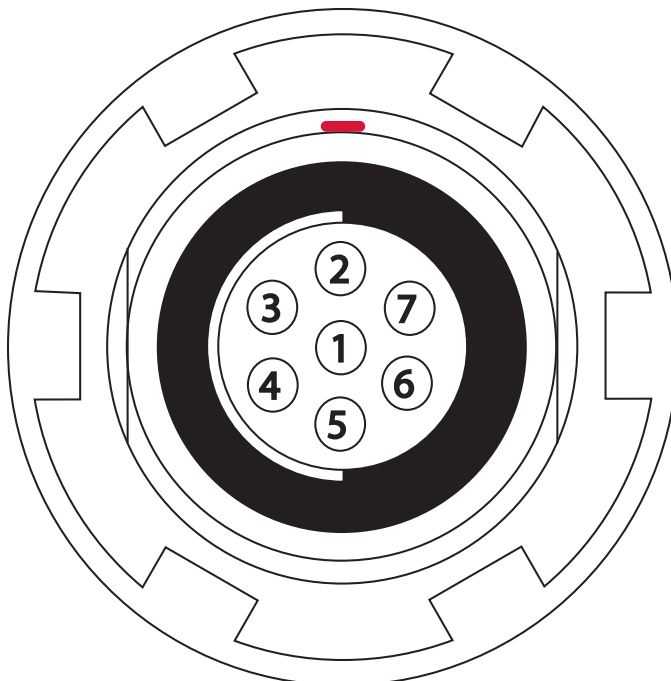


Figure 9-2: Serial RS232 Connector

Table 9-8. RS232 Connector Specifications

Number	Signal Name	Dir	Details
1			Not used
2	GND	-	Signal ground
3	CTS	I	Clear to send
4	RTS	O	Request to send
5	RXD	I	Receive data
6	TXD	O	Transmit data
7	PPS	O	1PPS

Micro USB Connector

The Micro USB connector is a standard 5-pin micro USB A/B connector (Figure 9-3).

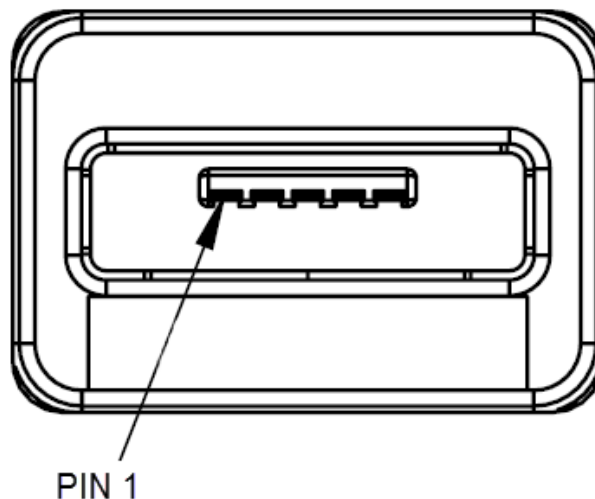


Figure 9-3: USB Connector for GGD Options

Table 9-9 gives the Micro USB connector specifications.

Table 9-9. USB Specifications

Number	Signal Name	Dir	Details
1	USB_PWR	P	Bus power input
2	USB D-	I/O	Data minus
3	USB D+	I/O	Data plus
4	ID	I	USB ID
5	GND	P	Ground

Product Identification

The HiPer HR receiver, featuring Vanguard™ Technology, supports 452 channels, which are listed in Table 10-1 by serial number range.

Table 10-1. Product Serial Number Ranges

Part Number	Description	Serial Number
1006276-03	ASSY, HIPER HR GNSS RECEIVER W/O MODEM	1405
1006276-01	ASSY, HIPER HR, R2Lite UHF GNSS RECEIVER	1407
1006276-02	ASSY, HIPER HR GNSS RECEIVER W/FH915	1406
1006276-04	ASSY, HIPER-HR RECEIVER W/ALINCO RADIO	1457
1006276-06	ASSY, HIPER HR GNSS (PLS63W) NO RADIO	1612
1006276-11	ASSY, HIPER HR GNSS (PLS63W) W/UHF	1611
1006276-07	ASSY, HIPER HR GNSS (PLS63W) W/ALINCO	1615
1006276-08	ASSY, HIPER HR GNSS (NO CELL) W/UHF	1614
1006276-09	ASSY, HIPER HR GNSS (NO CELL) W/FH915	1613

Regulatory and Safety Warnings

General Warnings

To comply with RF exposure requirements, maintain at least 25 cm between the user and the receiver when operating LongLink Bluetooth technology.



WARNING

To comply with RF exposure requirements, maintain at least 32cm between the user and the radio modem.



WARNING

Hiper HR receivers are designed for survey and survey related uses (that is, surveying coordinates, distances, angles and depths, and recording such measurements). This product should never be used:

- Without the user thoroughly understanding this manual.
 - After disabling safety systems or altering the product.
 - With unauthorized accessories.
 - Without proper safeguards at the survey site.
 - Contrary to applicable laws, rules, and regulations.
-



WARNING

Hiper HR receivers should never be used in dangerous environments. Use in rain or snow for a limited period is permitted.

Battery Pack Warnings



WARNING

Never attempt to open the casing of the removable batteries. Lithium-Ion batteries can be dangerous if mishandled.



WARNING

Do not incinerate or heat battery pack above 185 °F (85 °C). Excessive heat can cause serious damage and possible explosion.



WARNING

Tampering with the batteries by end users or non-factory authorized technicians will void the battery's warranty.

- Do not attempt to open the battery pack or replace it.
 - Do not disassemble the battery pack.
 - Do not charge in conditions different than specified.
 - Do not use other than the specified battery charger.
 - Do not short circuit.
 - Do not crush or modify.
-



WARNING

Dispose of batteries in accordance with your local regulations.

Receiver Warnings



WARNING

Tampering with the Hiper HR by the end users or non-factory authorized technicians will void the receiver's warranty:

- Do not attempt to open the receiver and modify any of its internal components.
- Do not charge in conditions different than specified.
- Do not short circuit.

Usage Warnings



WARNING

If this product has been dropped, altered, transported or shipped without proper packaging, or otherwise treated without care, erroneous measurements may occur.

The surface of the unit may overheat under maximum operating temperature conditions. Use caution when operating under this condition. No impact on functionality will occur if operating within the temperature limit. See Chapter 9, "Specifications," on page 9-1 for operating temperatures.

The owner should periodically test this product to ensure it provides accurate measurements.

Inform TPS immediately if this product does not function properly.

Regulatory Information

The following sections describe the FCC and ISED Canada statements.

FCC Compliance

FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET65. This equipment has very low levels of RF energy that it deemed to comply without maximum permissive exposure evaluation (MPE). But it is desirable that it should be installed and operated with at least 32cm and more between the radiator and person's body (excluding extremities: hands, wrists, feet and ankles).

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

If this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Move the equipment away from the receiver.
- Plug the equipment into an outlet on a circuit different from that to which the receiver is powered.
- Consult the dealer or an experienced radio/television technician for additional suggestions



WARNING

To maintain modular approval of R2Lite FH915 modem in United States, only the antenna types that have been tested shall be used. It is permissible to use different antenna manufacturer provided the same antenna type and antenna gain (equal to or less than) is used.

Antenna Type: 1/4 wave antenna

Gain: 4.0 dBi max



WARNING

Any changes or modifications to the equipment not expressly approved by the party responsible for compliance could void your authority to operate such equipment.

ISED Canada Statements

This Class A digital apparatus complies with Canadian ICES-003.

The term "IC:" before the radio certification number only signifies that ISED Canada technical specifications were met.

Under ISED Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by ISED Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that necessary for successful communication.

This device complies with ISED Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. Under ISED Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by ISED Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that necessary for successful communication.

Déclaration de conformité ISED Canada

CAN ICES-3(A)/NMB-3(A)

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Conformément à la réglementation d'ISED Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par ISED Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Ce matériel respecte les standards RSS exempt de licence d'ISED Canada. Son utilisation est soumise aux deux conditions suivantes: (1) l'appareil ne doit causer aucune interférence, et (2) l'appareil doit accepter toute interférence, quelle qu'elle soit, y compris les interférences susceptibles d'entraîner un fonctionnement non requis de l'appareil. Selon la réglementation d'ISED Canada, ce radio transmetteur ne peut utiliser qu'un seul type d'antenne et ne doit pas dépasser la limite de gain autorisée par ISED Canada pour les transmetteurs. Afin de réduire les interférences potentielles avec d'autres utilisateurs, le type d'antenne et son gain devront être définis de telle façon que la puissance isotrope rayonnante équivalente (PIRE) soit juste suffisante pour permettre une bonne communication.

Product Conformity

Hereby, Topcon declares that the Hiper HR is in compliance with the essential requirements (electromagnetic compatibility and other relevant provisions described in Radio Equipment Directive 2014/53/EU. The full text of the EU declaration is available in the myTopconNOW! app/website (<https://mytopconnow.topconpositioning.com/>) (requires login and search for "Compliance Documents").

Therefore, the equipment is labeled with the CE-marking.

EU Declaration of Conformity (Radio Equipment Directive 2014/53/EU)

esky [Czech]	(Topcon) prohlašuje, že (Hiper HR) jsou v souladu s požadavky a dalšími příslušnými ustanoveními směrnice 2014/53/EU/ES.
Dansk [Danish]	(Topcon) erklærer hermed, at (Hiper HR) er i overensstemmelse med kravene og andre relevante bestemmelser i direktiv 2014/53/EU/EF.
Deutsch [German]	(Topcon) erklärt hiermit, dass (Hiper HR) mit den Anforderungen und anderen einschlägigen Bestimmungen der Richtlinie 2014/53/EU/EG im Einklang stehen.
Eesti [Estonian]	(Topcon) deklareerib käesolevaga, et (Hiper HR) on kooskõlas direktiivi 2014/53/EU/EÜ nõuete ja muude asjakohaste sätetega.
English	(Topcon) hereby declares that (Hiper HR) are in accordance with requirements and other relevant provisions of Directive 2014/53/EU/EC.
Español [Spanish]	(Topcon) declara que (Hiper HR) están de acuerdo con los requisitos y otras disposiciones pertinentes de la Directiva 2014/53/EU/CE.
Ελληνικά [Greek]	(Topcon) δια του παρούσα δηλώνει ότι (Hiper HR) είναι σύμφωνα με τις απαιτήσεις και άλλες σχετικές διατάξεις της οδηγίας 2014/53/EU/EK.
Français [French]	(Topcon) déclare par la présente que (Hiper HR) sont conformes aux exigences et autres dispositions pertinentes de la directive 2014/53/EU/EC.
Italiano [Italian]	(Topcon) dichiara che (Hiper HR) sono conformi ai requisiti e ad altre disposizioni pertinenti del direttivo 2014/53/EU/CE.
Latviski [Latvian]	(Topcon) ar šo deklarē, ka (Hiper HR) ir saskaņā ar prasībām un citiem attiecīgiem direktīvas 2014/53/EU/EK noteikumiem.
Lietuvi [Lithuanian]	(Topcon) pareiškia, kad (Hiper HR) atitinka Direktyvos 2014/53/EU/EB reikalavimus ir kitas atitinkamas nuostatas.
Nederlands [Dutch]	(Topcon) verklaart hierbij dat (Hiper HR) in overeenstemming zijn met de eisen en andere relevante bepalingen van Richtlijn 2014/53/EU/EG.
Malti [Maltese]	(Topcon) b' dan tiddikjara li (Hiper HR) huma skont ir-rekwi żiti u dispożizzjonijiet rilevanti oħra tad-Direttiva 2014/53/EU/KE.
Magyar [Hungarian]	(Topcon) kijelenti, hogy (a Hiper HR) összhangban van a 2014/53/EU/EK irányelv követelményeivel és egyéb vonatkozó rendelkezéseivel.
Polski [Polish]	(Topcon) niniejszym oświadczam, że (Hiper HR) są zgodne z wymogami i innymi odpowiednimi przepisami dyrektywy 2014/53/EU/WE.
Português [Portuguese]	(Topcon) declara que (Hiper HR) estão de acordo com os requisitos e outras disposições pertinentes da Diretiva 2014/53/EU/CE.
Slovensko [Slovenian]	(Topcon) izjavlja, da so (Hiper HR) v skladu z zahtevami in drugimi ustreznimi določbami Direktive 2014/53/EU/ES.
Slovensy [Slovak]	(TOPCON) týmto vyhlasuje, že (Hiper HR) sú v súlade s požiadavkami a inými relevantnými ustanoveniami smernice 2014/53/EU/ES.
Suomi [Finnish]	(Topcon) vakuuttaa, että (Hiper HR) ovat direktiivin 2014/53/EU/EY vaatimusten ja muiden asiaa koskevien säännösten mukaisia.

Svenska [Swedish]	(Topcon) förklarar härmed att (Hiper HR) är i enlighet med krav och andra relevanta bestämmelser i direktiv 2014/53/EU/EG.
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WEEE Directive

Following information is for EU-member states only:

The use of the symbol below indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, to help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about the take-back and recycling of this product, please contact a supplier where you purchased the product or consult.

Bluetooth Transmission Statements/Compliance

This Bluetooth device is compliant to the following profiles of the core spec version 2.1/2.1+EDR:

- Baseband
- HCI
- Link Manager
- Radio

The radio has been tested using the maximum antenna gain of 2.3 dBi and the Bluetooth qualification is valid for any antenna with the same or less gain.

Korean KC-RF Compliance

인증정보 (Product Id Code): MSIP-RMM-T8S-6276

Applicant: Topcon Positioning Systems, Inc.

Type of equipment: GPS surveying device with Bluetooth, Wi-Fi, UHF radio, and Cellular modem.

Model Name: HiPer HR

Year of manufacture: 2016

Manufacturer and country of origin: Topcon Positioning Systems, Inc. U.S.A.

Applicant Code: T8S

Korean KC-EMC Class A Statement

이 기기는 업무용 (A 급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다

This optional integrated cellular modem (PXS8) reference application complies with the requirements of the Korean Communications Commission (KCC). The certificate granted in accordance with KCC has the identifier: MSIP-CRM-T8S-PXS8.

Japan Radio/Telecommunications Law Compliance

It is verified that Bluetooth Longlink, BLE, Wi-Fi, and UHF modules have been certified under clause 2, Article 58-2 of the radio Waves Act.

Japan Bluetooth and Wi-Fi Module Compliance

The integrated Bluetooth LongLink, BLE, and Wi-Fi module reference application described on page 73 complies in accordance with the provisions of Article 38-24 paragraph 1 of Japan Radio Law. The certificate granted in accordance with Japan Radio Law has the identifier R 209-J00231 (Bluetooth LongLink), R 211-160821 (BLE), and R 211-160820 (Wi-Fi).

Cellular Module Compliance

The optional integrated cellular modem (PXS8) reference application complies with the requirements of the Japanese Telecommunications Business Law and Ordinance Concerning Conformity Certification of Specified Radio as well as with the requirements of the Japanese “Radio Law” and “Ordinance Concerning Technical Conditions Compliance Approval and Certification Type for terminal Equipment.”

The certificate granted in accordance with the Telecommunications Business Law has the identifier R 211-160813.

The certificate granted in accordance with the “Radio Law” has the identifier T AD160012211.

Warranty

Topcon laser and electronic positioning equipment are guaranteed against defective material and workmanship under normal use and application consistent with this Manual. The equipment is guaranteed for the period indicated, on the warranty card accompanying the product, starting from the date that the product is sold to the original purchaser by Topcon's Authorized Dealers.¹

During the warranty period, Topcon will, at its option, repair or replace this product at no additional charge. Repair parts and replacement products will be furnished on an exchange basis and will be either reconditioned or new. This limited warranty does not include service to repair damage to the product resulting from an accident, disaster, misuses, abuse or modification of the product.

Warranty service may be obtained from an authorized Topcon warranty service dealer. If this product is delivered by mail, purchaser agrees to insure the product or assume the risk of loss or damage in transit, to prepay shipping charges to the warranty service location and to use the original shipping container or equivalent. A letter should accompany the package furnishing a description of the problem and/or defect.

The purchaser's sole remedy shall be replacement as provided above. In no event shall Topcon be liable for any damages or other claim including any claim for lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, the product.



www.topconpositioning.com

