GR-5

GNSS Receiver

Quick Start Guide

TOPCON

TOPCON
POSITIONING SYSTEMS

GR-5
Quick Start Guide

Part Number 7010-1022

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This quick start guide tells you how to
get started using the GR-5 receiver.

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Table of Contents

i

iii

Introduction

This quick start guide focuses on how to get your GR-5 up and running quickly without overwhelming you with technical details.

Chapter Descriptions

- **Chapter 1: Introduction** (this chapter)

  Understand the GR-5 parts and features, default configuration, and accessories available for your GR-5 receiver.

- **Chapter 2: Getting Started**

  Explore preliminary steps to get your GR-5 ready for surveying.

- **Chapter 3: Survey**

  Learn the basic survey procedures.

- **Chapter 4: Downloading Files**

  Transfer field data to your post-processing software.

- **Chapter 5: Maintenance**

  Help you use the GR-5 productively and safely.

1

- **Chapter 5: Troubleshooting**

  Provide tips and solutions for potential problems during GR-5 operation.

Where to Find More Information

- For detailed information regarding features, capabilities, and software introduced with this receiver, refer to the *GR-5 Operator's Manual* (7010-1004).

- For the quick guide about GR-5 cellular modem, refer to the *GR-5 Cellular Modem Quick Start Card* (7010-1013).

- Visit Topcon University at www.topconuniversity.com for webinars and training opportunities. The TU website also provides you with access to software and firmware, manuals, and more to help you maximize your technical and industry knowledge and skills.

2

Getting to Know Your GR-5

MINTER

The MINTER is the receiver's minimum interface used to display and control data input and output.
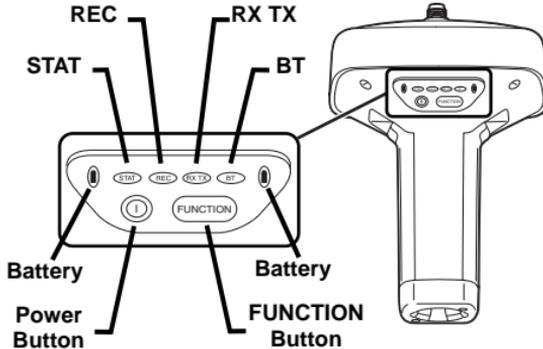
The battery LEDs display the power status for each battery:

- Green – indicates greater than 85% charge.
- Orange – indicates an intermediate charge.
- Red – indicates less than 15% charge.

The STAT LED displays the status of tracked satellites.

- Red blink – receiver is on, but no satellites being tracked.

3

- Green blink – receiver is on and tracking satellites; one blink per tracked GPS satellite.

- Orange blink – receiver is on and tracking satellites; one blink per tracked GLONASS satellite.

The REC LED displays the data recording status.

- Green blinks – each blink indicates that data is being written to the SDHC card.

- Solid Orange – the receiver is changing modes.

- Orange blinks – the receiver is checking its internal file system. During this operation, the file system is not accessible for CDU (control display unit) applications or for data recording. This operation may require from fractions of a second to several minutes, depending on the circumstances and the amount of internal memory.

- Solid Red – a fault condition with the receiver (no more memory, no SDHC card inserted, a hardware problem, or an improper OAF).

4

The RX TX LED displays the status of the modem. Table 1-1 describes the LED colors and patterns for the different modems available for the GR-5 receiver.

Table 1-1. RX TX LED Indications

FH915 Plus/ Digital/Satel Modems	• No light – modem is turned off. • Green flashes – modem is in receiver mode. • Solid Green – a radio link has been established; modem is ready to receive data. • Solid Green plus Red flashes – modem is receiving data. • Solid Red – modem is in transmitter mode. • Red flashes – a fault condition has been detected. Check the condition of the radio modem's antenna to ensure it is undamaged, and is connected properly and securely. Also make sure nothing interrupts the signal. • Red flashes plus Green flashes – modem is in command mode.
GSM/GPRS	• Solid Orange (Red and Green) – the modem is initializing. • Green flashes – the modem is on, registered on the network, and is waiting for incoming calls (Slave mode). • Solid Red – a connection has been established. • Green flashes – the modem is in direct control mode (Daisy Chain). • Orange flashes – an error has occurred (initialization error, wrong PIN code, and so forth).

5

The BT LED indicates the level of activity at the Bluetooth wireless technology communication link:

- Blue flashes – the Bluetooth module is on but no connection is established.
- Solid blue light – the Bluetooth module is on and a connection has been established.
- No light – the Bluetooth module is off.

The power button turns the receiver on and off.

The FUNCTION button switches the receiver between information modes and post-processing modes, starts/stops data recording, and changes the baud rate of the serial port A to 9600. Table 1-2 on page 7 describes the REC LED status when using the FUNCTION button.

6

Table 1-2. FUNCTION Button Operations and REC LED Status

FUNCTION Key	REC LED	Status
When data recording is off, and the FUNCTION key is...		
Not pressed	No light	No data recording.
	Orange blink	Internal file system test in progress.
	Red	No free memory; hardware problem with data recording. No SDHC card.
Pressed for < 1 second	If FUNCTION key mode is "LED blink mode switch"	
	Orange	Release to change information mode.
	If FUNCTION key mode is "Occupation mode switch"	
	Orange	No function.
Pressed for 1–5 seconds	If FUNCTION key mode is "LED blink mode switch"	
	Green	Release to start data recording (post-processing occupation mode undefined).
	If FUNCTION key mode is "Occupation mode switch"	
	Green	Release to start recording (Kinematic or Static post-processing occupation mode).

7

Table 1-2. FUNCTION Button Operations and REC LED Status

FUNCTION Key	REC LED	Status
Pressed for 5–8 seconds	Red	Release to turn serial port A baud rate to 9600 bps.
Pressed for > 8 seconds	No light	No function.
When data recording is on, and the FUNCTION key is...		
Not pressed	Red	No free memory; hardware problem with data recording.
	If FUNCTION key mode is "LED blink mode switch"	
	Green	Data recording started (post-processing occupation mode undefined).
	If FUNCTION key mode is "Occupation mode switch"	
	Green	Data recording started (Kinematic post-processing occupation mode).
	Orange	Data recording started (Static post-processing occupation mode).

8

Table 1-2. FUNCTION Button Operations and REC LED Status

FUNCTION Key	REC LED	Status
Pressed for < 1 second	If FUNCTION key mode is "LED blink mode switch"	
	Orange	Release to change information mode.
	If FUNCTION key mode is "Occupation mode switch"	
	Orange	Release to toggle between Static and Kinematic post-processing modes.
Pressed for 1–5 seconds	No light	Release to stop data recording.
Pressed for 5–8 seconds	Red	Release to turn serial port A baud rate to 9600 bps.
Pressed for > 8 seconds	No light	No function (data recording still on).

Data and Power Ports

The GR-5 has the following three ports:

• USB – rimmed in yellow; used for high-speed data transfer and communication between the receiver and an external device.

9

- Serial Port A – rimmed in black; used for communication between the receiver and an external device.

- Power – rimmed in red; used to connect the receiver to an external power source. This port can also be used to charge the batteries.
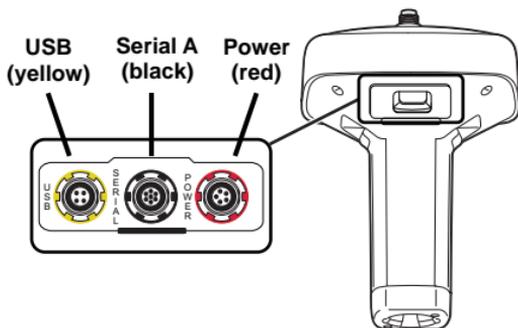
The following ports are used internally:

- Serial Port B – left free in the current release.

- Serial Port C – connect the modem and receiver boards. Note that the GSM/GPRS/CDMA modem is located on the RF modem board.

- Serial Port D – connect the receiver board and Bluetooth module. Note that the Bluetooth module is located on the RF modem board.

10

Radio Antenna and Pole Connectors

The SS antenna connects to the external antenna connector on the GR-5 radome. The radio antenna uses a reverse polarity TNC connection or BNC connection depending on the installed radio modem.

The bottom connector connects the receiver to either a standard 5/8" thread pole/adapter or the quick disconnect.

External Antenna Connector

Bottom Connector for Standard Setups
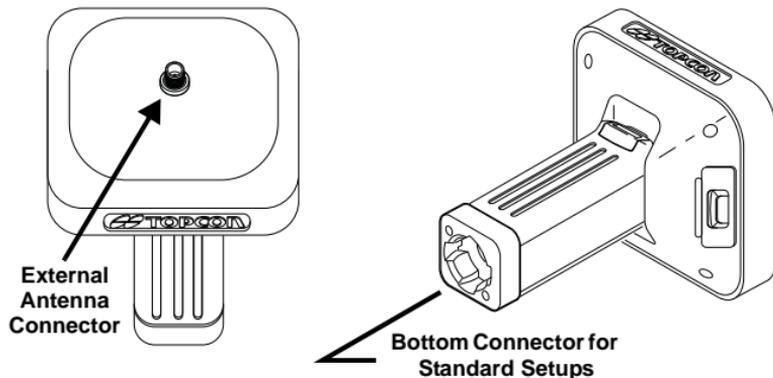
SDHC and SIM Card Slots

The SDHC and SIM card slots reside under the batteries near the base of the dome.

The SDHC card slot is located to the left of the MINTER inside the battery pocket and connects an optional SDHC card to the receiver board to provide memory. The data that resides on the SDHC card can be accessed via the USB or

11

serial port, or Bluetooth. The following industrial-grade cards were tested in the temperature range -30°C to 60°C (-22°F to 140°F).

• Transcend® Ultra Industrial 2 GB

• APRO® Industrial 4GB

• SanDisk® Ultra II

• Swissbit® Industrial 2GB

Before using any other SDHC cards, consult with TPS technical support about compatibility.

The SIM card slot is located to the right of the MINTER inside the battery pocket and allows a standard SIM card to be installed in the receiver. Once installed, the SIM card provides a unique identification for the receiver's GSM module and enables the receiver's GSM functionality based on the subscribed services. The GSM module with the SIM card installed can be configured via TRU. A SIM card can be purchased from a local cellular provider.

12

Battery

SIM Card

SDHC Card

Battery
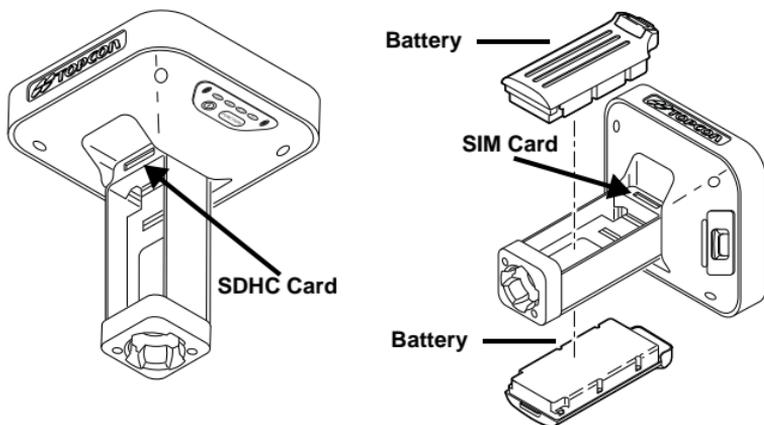
Default Configuration

The GR-5 is shipped from the factory with the default configuration. The following table shows the major default settings for the GNSS board.

Parameter	Default Setting
MINTER:	
Recording interval	1 second
Elevation mask	5 degrees
Filename prefix	log

13

Parameter	Default Setting
Tracking:	
Elevation mask	5 degrees
GPS tracking	enabled[*]
GLONASS tracking	enabled[*]
SBAS tracking	disabled[*]
Positioning:	
Mode	standalone
Elevation mask	5 degrees
PDOP mask	30
GPS usage	enabled[*]
GLONASS usage	enabled[*]
Multipath reduction	enabled[*]
Raw measurement update rate	100[*] ms
Position update rate	100[*] ms
Datum	W84

14

Parameter	Default Setting
RTK:	
Position output mode	Delay
Ambiguity fixing level	Medium
Max number of SVs in RTK	20
Minimum C/A SNR	31 dB*Hz
Min number of SVs for fixing ambiguities	5
Max extrapolation time	30 seconds
Serial Ports (A, B, C, D)[*]:	
Input mode	Command
Baud rate	115200
Hardware handshaking	Disabled
Stop bits	1
Parity	No parity
Data bits	8

*. Some of the default settings depend on the options available in the OAF for your GR-5 and may differ from the published values.

15

The modem default settings vary greatly depending on the modem type, country of usage, etc. Consult the Operator's Manual for details.

Accessories

The following accessories are available for the GR-5 receiver.

Accessory	Part Number	Description
Cables		
Power cable	U.S. 14-008052-01 Europe 14-008054-01 Australia 14-008053-01	Connects the power supply unit to a grounded outlet.
Receiver power/ charging cable	14-008016-03	Connects the receiver and the power supply unit via SAE connectors for battery charging.
USB cable	14-008070-01	Connects the receiver to an external device (controller or computer) for high-speed data transfer and receiver configuration.

16

Accessory	Part Number	Description
Serial cable	14-008005-02	Connects the receiver to an external device (controller or computer) for data transfer and receiver configuration.
ODU-to-alligator clips cable	14-008097-01LF	Connects the charging cradle or receiver to an auxiliary battery for powering the receiver during survey operations.
Cradle-to-receiver charging cable	14-008072-01 (1.5m long) 14-008072-02 (0.5 m long)	Connects the receiver to the charging cradle for external power.
Chargers		
Power supply unit	22-034101-01	Charges the batteries.
Charging Cradle	01-050911-01	Charges the batteries.
Antennas		
SS/GSM antenna	30-030012-01	The Spread Spectrum and GSM antenna.

17

Accessory	Part Number	Description
UHF/GSM antenna	30-070003-01 UHF 410-440 30-050503-01 UHF 450-470	The UHF and GSM antenna.
Tripods, Poles, Adapters		
Tripod	22-050501-01	The heavy duty tripod.
Pole	22-050908-01	
Universal tribrach and tribrach adapter	22-006008-01 22-006009-011	Used to level the tripod and secure the receiver or antenna to the tripod.
Precision tribrach adapter		Used to precisely center, align, and level the tripod over a point.
Quick disconnect adapter	02-850905-01	Connects to the range pole for the receiver to slip into the top.

18

Accessory	Part Number	Description
Miscellaneous		
AA battery pack		Holds four AA batteries to provide a portable backup power source for the receiver

19

Notes:

Getting Started

This chapter describes the activities you normally need to take when you start using the GR-5 for the first time or before beginning to survey with the GR-5 receiver, specifically:

- installing configuration software
- turning the receiver on and off
- inserting SDHC and SIM cards
- charging and attaching batteries to the receiver
- connecting the receiver and an external control device

Installing Software

The Topcon GPS+ CD includes the following software programs used for configuring and maintaining the receiver. This software is also available on the TPS website to registered users.

If installing the program(s) from the GPS+ CD, insert the CD into the computer's CD-ROM drive. If downloading the program(s) from the website, extract the program's files into a folder on the hard drive.

21

Installing PC-CDU

1. Create a PC-CDU folder on the hard drive and place the compressed PC-CDU zip file (retrieved from either the website or the GPS+ CD) in this folder.
2. Navigate to the PC-CDU folder and double-click the PCCDU_MS zip file.
3. Extract the **PCCDU.EXE** and associated *.dll file to the PC-CDU folder.
4. Create a shortcut on the computer's desktop for quick access to PC-CDU.

To uninstall PC-CDU, navigate to the location of the *.exe file. Select the file and press **Delete**.

Installing TRU

1. Navigate to the TRU folder, and double-click **TRU.zip**.
2. Extract **TRU.exe** to the TRU folder.
3. Double-click **TRU.exe** to run the installer, and then follow the on-screen instructions.

After installation, shortcuts appear on the desktop and in the TRU menu.

To uninstall TRU, use **Add or Remove Programs** in Windows' Control Panel. navigate to the location of the *.exe file.

22

Turning On/Off the Receiver

To turn ON the receiver, press and hold the power button until the LEDs briefly flash.

To turn OFF the receiver, press and hold the power button for more than one and less than four seconds (until both the STAT and the REC LEDs are off).

Installing the SDHC Card

The SDHC card provides memory space in which to save logged data. Although you may install an SDHC card of any size, the receiver will recognize only up to 2 GB of memory.

Always initialize the file system on the installed SDHC card before the first use. Initialization procedure is described in "Initializing File System" on page 51.

1. Ensure the receiver is turned off.
2. Remove the battery to the left of the MINTER.
3. Carefully insert the SDHC card, label side down, into the SDHC card slot located at the top of the battery compartment.

23
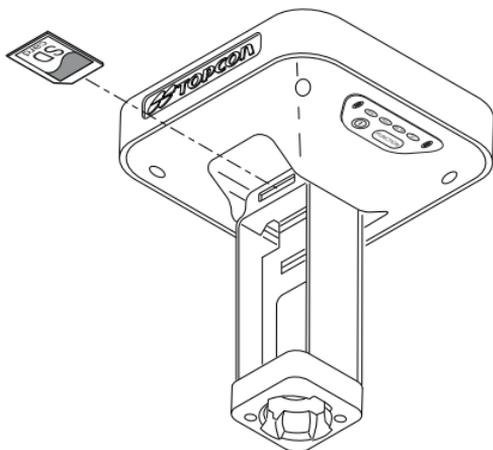
Once the receiver is turned on, the receiver board will detect the SDHC card and it will be ready to use as needed.

Installing the SIM Card

The SIM card provides access to communication over GSM, GPRS, or CDMA services. The SIM card must support Circuit Switched Data to communicate directly between receivers. The SIM card must have GPRS support to communicate over a TCP/IP network.

1. Ensure the receiver is turned off.
2. Remove the battery to the right of the MINTER.

24

3. Carefully insert the SIM card, label side up, into the SIM card slot located at the top of the battery compartment.
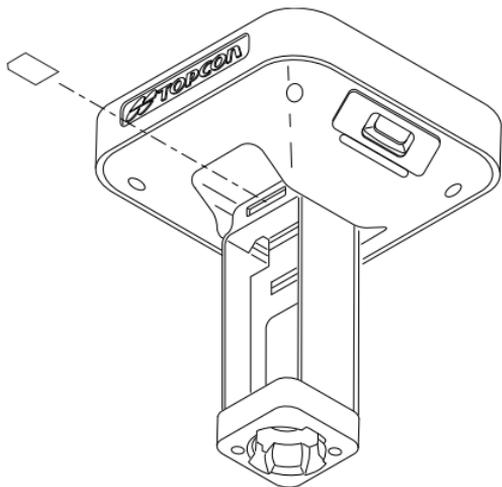
Once the receiver is turned on, the receiver board will detect the SIM card and it will be ready to use as needed.

Installing the Batteries

Attaching the Batteries

To attach the batteries to the GR-5:

1. With the battery slightly tipped, place the bottom of the battery into the bottom of the battery compartment.

25

2. Gently push the top of the battery into the battery compartment until it snaps into place. Make sure that the clip at the top of the battery completely snaps into place.
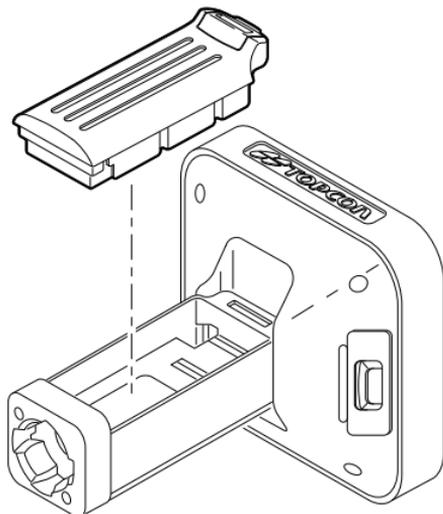
Detaching the Batteries

To detach the batteries from the GR-5, so that they can be charged or replaced:

Using the clip at the top of the battery, gently pull down and out to detach the battery from the receiver.
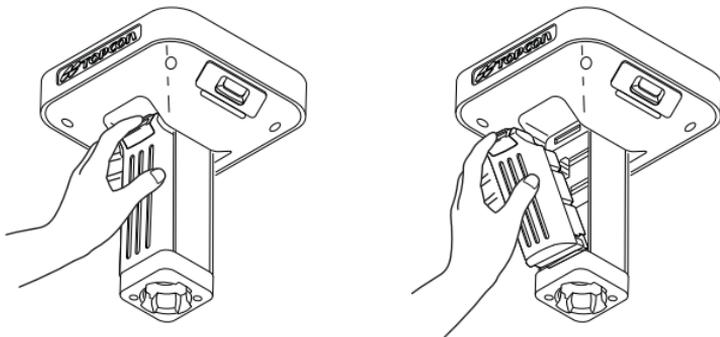
Charging the Batteries

You can charge the batteries using the power supply unit or the battery charging cradle.

A 6-hour charge cycle will fully charge the batteries; the batteries charge simultaneously.

The Li-Ion batteries used in the battery packs should run at no less than 80% capacity after 500 charging cycles. These batteries do not need to be drained before recharging.

27

Charging with the Power Supply Unit

⚠ CAUTION

The power supply unit is designed for indoor use only. Do not use it in damp or wet environment. Do not expose the power supply to rain or snow. It should only be used for charging the batteries. Do not use as a power source during surveying.

The power supply unit can be connected to the charging cradle or directly to the GR-5. The power supply has the following specifications:

- input voltage – between 100 and 240 V AC
- frequency of input power – between 50 Hz and 60 Hz
- output voltage – 12 V DC@2.5 A (30 W)

To charge the attached batteries using the power supply unit:

1. Plug the receiver-to-SAE power cable into the receiver's power input port.
2. Connect the receiver-to-SAE power cable and the power-to-outlet cable to the AC adapter.
3. Plug the power supply-to-outlet cable into an available outlet.

28

Charging with the Battery Charging Cradle

1. Remove the batteries from the receiver and insert them into the charging cradle.
2. Connect the power cable to the power supply unit.
3. Connect the SAE connectors on the power adapter cable and power supply unit.
4. Connect the power adapter cable to one of the ports on the charging cradle (either port will charge both/either battery).
5. Plug the power supply to an available outlet.

To grounded outlet
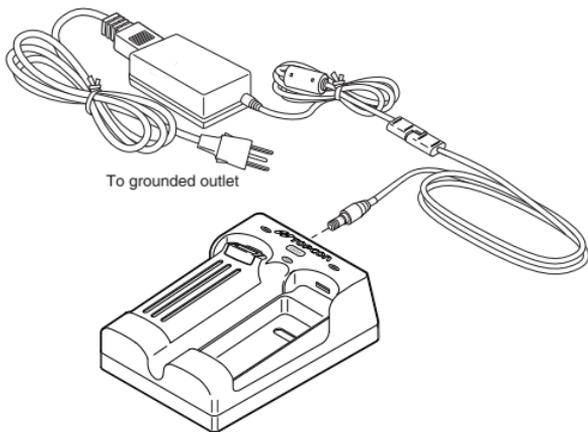
Charging Temperatures

Charge the batteries only in temperatures between $32^{o}F$ ($0^{o}C$) and $113^{o}F$ ($45^{o}C$). This is important to prevent

29

serious damage to the batteries, the receiver or injury to persons.

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

Estimated Operating Times

Common Conditions: Bluetooth = on; 10-12 SV tracked; using the detachable batteries; room temperature	
For the GR-5 with FH915+ Modem	
Receive only mode	14 hours
250mW transmission mode	12 hours[*]
1W transmission mode	10 hours[*]
GSM/GPRS in urban areas	13 hours
For the GR-5 with Digital Modem	
Receive only mode	14 hours
0.5W transmission mode	12 hours[*]
1W transmission mode	9 hours[*]
GSM/GPRS in urban areas	12 hours
For the GR-5 with Satel Modem	
Receive only mode	14 hours
0.5W transmission mode	12 hours[*]

1W transmission mode	11 hours[*]
GSM/GPRS in urban areas	12 hours
Common Conditions: 10–12 SV tracked; using the detachable batteries; room temperature	
For the GR-5 with Any Modem	
Modem off	20 hours
Common Conditions: 10–12 SV tracked; using the battery shells and AA batteries; room temperature	
For the GR-5 with Any Modem	
Modem off	2.5 hours

*. At 1 Hz correction rate, charger off.

Connecting the GR-5 with a Control Device

You can connect the GR-5 with a computer or hand-held controller to configure, manage files, or maintain the receiver.

Topcon's TRU and PC-CDU software products provide an interface for various configuration, monitoring, and management functions for the receiver.

TopSURV field software is used for surveying, common layout, and GIS purposes and is available for hand-held controllers.

The following connection methods are available:

- an RS232 cable and a computer/controller
- a Bluetooth-enabled external device (computer/ controller)
- a USB cable and a computer/controller with the TPS USB driver installed (for PC-CDU only)

Establishing an RS232 Cable Connection

This section shows you how to connect the GR-5 and a computer/controller running TRU. See for TopSURV connection details.

1. Using the RS232 cable, connect the serial port of the computer/controller to the receiver's serial port.
2. Press the **power** buttons on the receiver and computer/ controller to turn them on.
3. Start TRU on your computer/controller.
4. Select **Device ▶ Application Mode ▶ Receiver Managing.**
5. Click **Device ▶ Connect**.
6. On the *Connection Parameters* dialog box, select the following parameters:
    - *Connect Using* – select Serial Port
    - *Port name* – shows physical and friendly name for the port. The Application remembers the last used

transport, and the last successful port/device name for every transport, so it is easy to connect to the same device.

- If necessary, use the list button on the right of the *Port name* field to choose a port from the Select a Port dialog.

7. Click **Connect**.

8. Once a TRU connection with the receiver has been established, the Tools become active and you can continue with configuration activities.

To quit TRU, click **Device ▶ Disconnect**, then **Device ▶ Exit**.

33

Notes:

Surveying

This chapter describes how to start surveying using a pair of GR-5 receivers for post-processing and RTK.

Post-Processing Survey

Step 1: Set up the GR-5 Base

1. Install a heavy duty tripod (PN: 22-050501-01) over a known point. You do not need universal tribrach and tribrach adapter when working with this tripod.

2. Attach the antenna to the modem antenna connector. This step ensures the safety for the modem board, even if you does not use it for transmitting data.

TIP

You can extend the receiver operating time for post-processing survey by turning

35

off the modem board. Connect to the GR-5 via TRU, click Receiver Settings -> Power, and set 2 to n in the Slots area. Note that this will also turn off Bluetooth.

3. Carefully level the tripod and tighten the screws.
4. Attach any other accessories as needed (for example, a backup power supply).
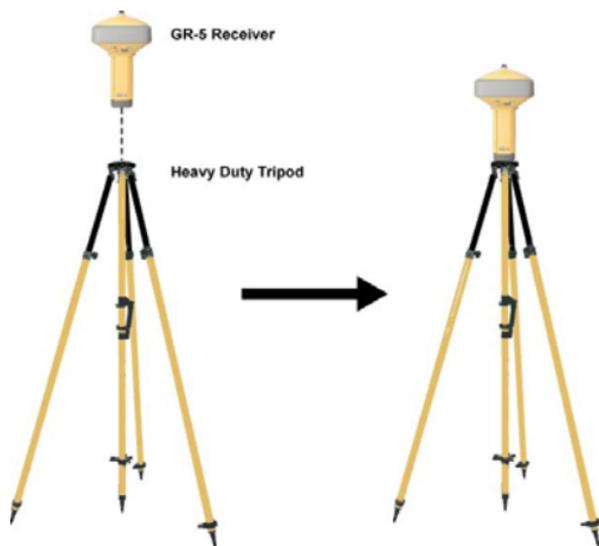
Step 2: Set up the GR-5 Rover

1. If needed, attach the quick disconnect to the bipod/
   range pole.

NOTICE *NOTICE*

*Use a bipod during post-process surveys to
ensure the antenna/receiver does not move
during data logging.*

2. Attach the GR-5 receiver to the quick disconnect.
   Make sure the receiver locks into place.

3. Attach the antenna to the modem antenna
   connector. This step ensures the safety for the
   modem board, even if you does not use it for
   receiving data.

37
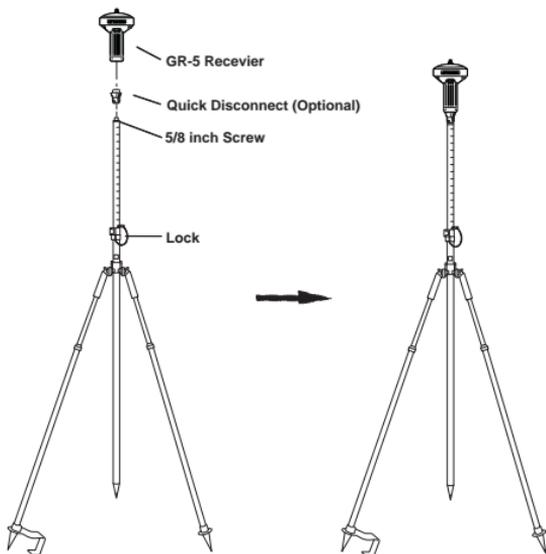
Step 3: Measure Antenna Height (for Base and Rover)

1. Measure the antenna height above the control point or marker, either the slant height or the vertical height. You may either measure the vertical height to the Antenna Reference Point (ARP) located at the bottom of the GR-5, or measure the slant height

to the Slant Height Measurement Mark (SHMM) on the side of the enclosure.

85.0mm

253.0mm

168mm

A = ARP to edge = 79.0
B = ARP to corner = 97.5

Slant Height to Base of Corner on Gray Bumper

Vertical Height to ARP

Station Marker or Tip of RTK Pole
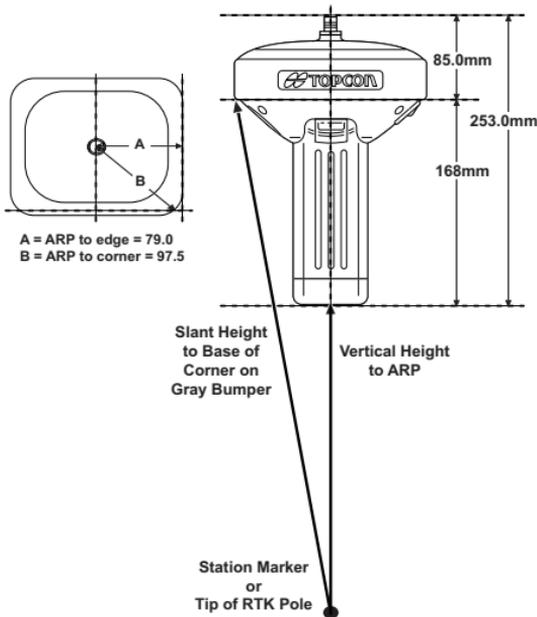
2. Record the antenna height, points name, and start time in the field notes.

Step 4: Collect Data (for Base and Rover)

1. Turn on the receiver. The STAT (status) light (LED) initially blinks red.

39

2. Once the receiver has locked on to one or more satellites, the STAT light blinks green for GPS satellites and orange for GLONASS satellites. A short red blink indicates that the receiver has not solved a position.

3. Once the short red blink is gone, the receiver has a position and surveying can begin; wait for green and orange lights before beginning data collection. This ensures that the receiver has the correct date and time, and is locked on to enough satellites to ensure good quality data.

   The process of locking on to satellites normally takes less than one minute. In a new area, under heavy tree canopy, or after resetting the receiver, it may take several minutes.

4. To begin collecting data, press and hold the **FUNCTION** key (for more than one second and less than five seconds).

5. Release the **FUNCTION** key when the REC (recording) LED turns green. This indicates that a file has opened and data collection has started. The REC LED blinks each time data is saved to the internal memory.

6. When finished, press and hold the **FUNCTION** key until the REC LED light goes out.

7. To turn off the receiver, press and hold the power key until all lights go out, then release.

Amount of Memory Required to Store a One Hour File

#SVs	Recording Interval (seconds)				
	0.1	1	5	15	30
Single-frequency dual-system receiver Memory needed to record data					
6	11 MB	1.1 MB	221 KB	74 KB	37 KB
10	14 MB	1.4 MB	283 KB	94 KB	47 KB
14	17 MB	1.7 MB	345 KB	115 KB	57.5 KB
18	20 MB	2 MB	407 KB	136 KB	68 KB
Dual-frequency dual-system receiver Memory needed to record data					
6	17 MB	1.7 MB	347 KB	116 KB	58 KB
10	23 MB	2.3 MB	471 KB	157 KB	78.5 KB
14	29 MB	2.9 MB	595 KB	198 KB	99 KB
18	35 MB	3.5 MB	720 KB	240 KB	120 KB

41

RTK Survey

Step 1: Repeat Steps 1 through 3 in "Post-Processing Survey" on page 35

NOTICE *NOTICE*

Do not turn off the modem board.

Step 2: Connect a Hand-Held Controller

You can connect the controller to the receiver with a serial cable.

If the controller is Bluetooth® enabled, you can connect it to the receiver wirelessly using TopSURV.

• Set the Instrument type to GPS and check the Bluetooth option in the *Connections* screen of TopSURV.

• To change the Bluetooth device that the controller is connected to, click the Connection icon in the upper-right corner of the main screen in TopSURV.

Step 3: Start Surveying with TopSURV

1. Create a GPS+ job. A user-friendly Wizard will guide you through the steps to create a job configuration.

42

2. After creating a job with the desired configuration in TopSURV, you can begin the survey.

   Job configuration settings will be applied to the Base receiver only after starting the Base and to the Rover receiver only after selecting a survey option.

NOTICE *NOTICE*

For more details about how to create and configure a job, start the GR-5 as a base or rover receiver in RTK and other survey methods, see the TopSURV User's Manual.

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44

Downloading Files

This chapter describes downloading GNSS data files to a computer.

After completing a survey, download data files to a computer for storage, post-processing, or backup. TRU and Topcon Link both provide file managers to download files from the receiver to a computer.

Downloading Files via Topcon Link

Topcon Link provides two options for downloading files from a receiver: via Windows® Explorer or via the Topcon Link interface.

...Using Windows Explorer

1. Connect your receiver and computer.
2. Open Windows Explorer and click the Topcon GNSS Receivers folder. Right click the folder and select Explore. The right panel of the window displays the automatic start of searching for Topcon receivers connected to any of the computer ports (COM and USB).

45

When finished, all receivers connected to the computer ports display.

3. To view information about the receiver, right-click the receiver, and select the *Properties* option.

46
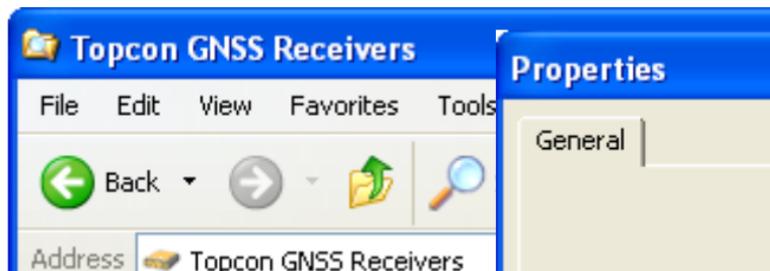
4. To view the raw file, double click on the receiver.

To import the file(s) from the receiver to a folder, select the file(s), and copy to the folder using drag-and-drop method.
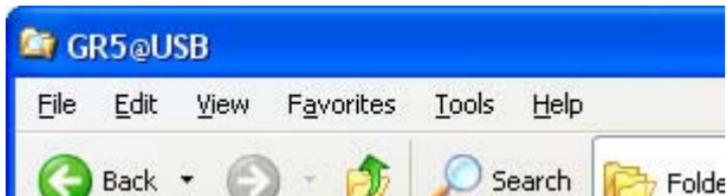
...Using Topcon Link

1. Connect your receiver and computer.
2. To start Topcon Link, click the **Import from Device** button on the Toolbar.
3. From the left panel of the *Import from Device* dialog box, double-click *Topcon Receivers*.
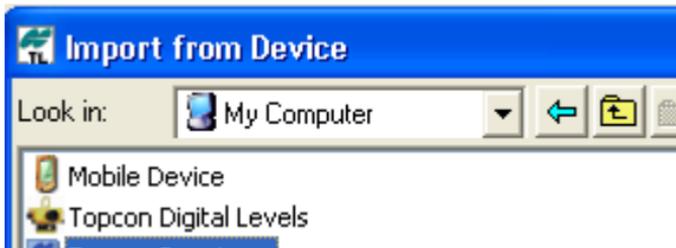
The program automatically searches for Topcon receivers connected to the computer ports (COM and USB). When finished all receivers connected to the computer ports display.

4. In the right panel of the *Import From Device* window, navigate to and select, or create, a folder to save the files.
5. To view the collected raw file, double click (or click *Select* in the pop-up menu) the receiver. To import the file(s) from the receiver to the computer and to save in the selected folder, highlight the file(s) and click the double arrows.
6. The import in progress displays.
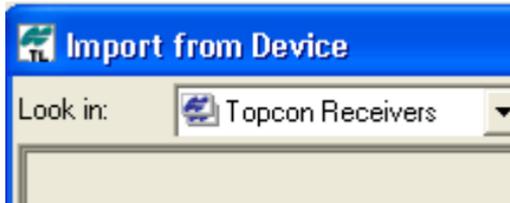
Downloading Files Using TRU

1. Connect the receiver to a computer and run TRU.
2. Click the *File Explorer* icon in the main window. The *File Explorer* dialog box displays all logged raw data files.
3. To save a file to the computer, highlight the desired file, right click and select *Download* from the pop up menu. In the *Save As* dialog box navigate to or create a folder in which to download and store the file. Click the **Save** button to download and save the file.

48

Maintenance

Restoring Default Settings

Most of the settings in the GR-5 have default values, which you may change as needed for your particular application. You can always return the receiver to a known operating condition by restoring its default configuration.

To restore default settings, run TRU and select **Tools ▶ Factory Reset**.

Performing Hardware Reset

You can reset the GR-5 without returning any configured settings to their default values. It may become necessary to reset the GR-5 to apply certain settings which require a hardware reset or as part of troubleshooting.

To reset the receiver, run TRU and select **Tools ▶ Reset Receiver**.

49

Clearing the NVRAM

The receiver's Non-Volatile Random Access Memory (NVRAM) holds ephemeris data, position, the current board's settings, such as data recording interval, elevation masks, etc.

After clearing the NVRAM, your receiver will require some time to collect new ephemerides and almanacs (around 15 minutes).

Clearing the NVRAM will also reset the receiver to factory default settings.

To clear the NVRAM using the MINTER, take the following steps:

1. Press the power key to turn off the receiver.
2. Press and hold the **FUNCTION** key.
3. Press and hold the power key for about one second. Release the power key while continuing to hold the **FUNCTION** key.
4. Wait until the STAT and REC LEDs are green
5. Wait until the STAT and REC LEDs blink orange.
6. Release the **FUNCTION** key while the STAT and REC LEDs blink orange.

To clear the NVRAM using TRU, select **Tools ▶ Clear NVRAM**.

50

Initializing File System

The memory card in the GR-5 must be initialized before its first use. Initializing your memory card while in the receiver will ensure the card is formatted to the TPS proprietary file system (TPFS). This file system allows the receiver to create, store, retrieve, delete, and restore the raw data files.

It is also advisable to reinitialized the memory card periodically (e.g., quarterly). This will erase any data on the card, check for bad blocks, and set it up afresh.

To initialize the file system, run TRU, select **File Explorer**, right-click (on a computer) or click and hold (on a controller) within the file list on the *Files* tab and select **Initialize File System**.

Initializing the file system of a connected receiver will erase all of the receiver's data files.

Managing Receiver Options

The Option Authorization File enables certain functions, features, and options in the receiver, such as the following:

- the type of signal (L1, L1/L2, and so on) the receiver processes
- the amount of data the receiver stores in the memory
- multipath reduction technology

For a complete list of available options and details, consult with a TPS dealer.

51

Checking the Receiver's OAF using TRU

1. Connect the receiver to a computer/controller and run TRU.

2. Click the **Options** icon in the main window. The *Receiver Options* dialog box displays that allows the user to view the current authorization options and upload new ones.

Loading an OAF using TRU

1. Connect the receiver to a computer/controller, run TRU, and select **Options**.

2. Click **Upload OAF** at the bottom of the *Receiver Options* dialog box.

3. Navigate to the location of the new Option Authorization File. OAFs have .jpo or .tpo extensions and are unique to each receiver.

4. Select the appropriate file and click **Upload to the Receiver**. The new receiver option loads onto the receiver and the Option Manager table updates.

5. When finished, click **Save Profile** on the *Receiver Options* dialog box, then click **File ▶ Disconnect** to prevent conflicts with serial port management.

52

Deleting Files from the Internal Memory Card

A memory card holds a finite amount of collected data. To free up space for more or new data, delete old data.

1. Connect the receiver to a computer/controller and run TRU.

2. Click the **File Explorer** icon in the main window.

3. Highlight a desired file in the *File Explorer* dialog box, right-click (on a computer) or click and hold (on a controller) and select **Delete** from the pop-up menu. Click **Yes** to confirm the deletion.

Recovering Deleted Files

The TPS file system is designed to allow you to recover deleted files. The operation is easy, fast, and secure without the need for a data recovery software.

1. Connect the receiver to a computer/controller and run TRU.

2. Click the **File Explorer** icon in the main window.

3. Right-click (on a computer) or click and hold (on a controller) within the file list on the *Files* tab and select **Mode of operation ▶ Deleted Files Recovery**.

    The receiver starts remounting the file system for displaying deleted files. During this process the REC

53

LED blinks orange. Once the file system is successfully remounted, the REC LED stops blinking and the deleted files will appear in the list of existing files.

NOTICE *NOTICE*

In this mode, only the deleted file(s) will display.

To restore the file system to its normal state, select **Mode of operation ▸ Normal**.

Activating Sleep Mode

You can put the GR-5 into a dormant state to minimize power consumption without turning off the receiver completely. In sleep mode, the power board and Bluetooth module continue to draw a small amount of power from the batteries, causing the batteries to slowly drain over time.

1. Turn on the receiver.
2. Press the receiver's **power** key for more than four seconds and less than eight seconds. The STAT LED will be orange. The receiver enters Sleep Mode.

You can awaken the receiver by turning it on manually or by sending any number of characters on one of the receiver's serial ports.

54

Loading New Firmware

Receiver GNSS firmware is released as a compressed file that the user download and decompress. This file contains the following three files:

- ramimage.ldr – the Receiver board RAM file
- main.ldp – the Receiver board Flash file
- powbrd.ldr – the Power board RAM file

To upload firmware files to GR-5 receiver, follow the steps below:

1. Connect the receiver to a computer and run TRU.
2. Click the **Firmware Loader** icon in the main window.
3. Select "Receiver/Modem" in the *Device* field of the *Upload Firmware* window.
4. Set the **Capture Method** to "Soft Break" (recommended). Browse for and select the receiver board's RAM file and Flash file.
5. Click **Start** to upload the selected files.
6. Click **OK** to complete uploading new firmware to the receiver.

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Troubleshooting

This chapter provides general tips for diagnosing and solving some common problems you may encounter while using the GR-5. For more in-depth troubleshooting, see the *GR-5 Operator's Manual*.

Check This First!

Before contacting 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 all power sources for drained batteries or incorrectly connected batteries/cables.
- Check that the most current software is downloaded onto the computer/controller and that the most current firmware is loaded into the receiver. Check the TPS website for the latest updates.
- If connecting via Bluetooth, check that the receiver port used for connection is in Command mode.

65

Then, try the following:

- Reset the receiver ("Performing Hardware Reset" on page 49).
- Restore default settings ("Restoring Default Settings" on page 49).
- Clear the NVRAM ("Clearing the NVRAM" on page 50).
- Initialize the file system ("Initializing File System" on page 51). This will erase all files inside the receiver.

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

TX RX LED Blink Pattern on Error Conditions

For internal FH915+/UHF modems: the TX RX LED flashes red.

- A fault condition has been detected.
  - Check that the radio modem's antenna is undamaged.
  - Contact a dealer to replace the antenna.
  - Check that the radio modem's antenna is securely and properly connected to the antenna connector.
  - Move the antenna/receiver away from conducting objects (such as, large metal objects).

66

- The cable is damaged.
    - Use an undamaged cable.
    - Contact a Dealer to replace the cable.

For internal GSM/GPRS modems: the TX RX LED flashes orange.

- The Rover uses the wrong PIN code, or no PIN code was selected.
    1. In TopSURV, click **Job ▶ Config ▶ Survey**.
    2. Click the "**...**" (continue) button and press **Next** to navigate to the *Rover Radio* configuration screen.
    3. Press **Configure GSM**.
    4. Select the PIN of the Base Station and press **OK**.
- An initialization error has occurred.
    - Check that the radio modem's antenna is undamaged.
    - Check that the radio modem's antenna is securely and properly connected to the antenna connector on the radome.
    - Contact a Topcon dealer to replace the antenna.

67

Obtaining Technical Support

End-users

The U.S., Canada, and international TPS equipment users are encouraged to contact your local Topcon dealer.

Your dealer is the focal point of contact for all post-sales technical questions and issues.

Dealers (in the U.S., Canada, Australia)

Topcon dealers can contact Topcon Technical Support via the password-protected Help Desk, phone, and email.

Help Desk

To contact Topcon Technical Support via the Help Desk, visit TechnicalSupport.Topcon.com/User.

Phone

To contact Topcon Technical Support by phone, call:

866-4Topcon or 1-866-486-7266

68

Email

To contact Topcon Technical Support via email, use the following electronic mail address:

support@topconsokkia.com

Dealers (International)

Visit http://www.topcon.co.jp/en/positioning/network/ for contact details in your region.

Dealers in Europe must contact Topcon Technical Support via http://support.topcon-positioning.eu/.

69

Notes:

TOPCON

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