G1-m1™ GNSS Mobile System Quick Guide

Figure 1: G1-m1™ Receiver

WWW.GEOMATICS.US

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Purpose: This document is for the G1 GNSS receiver users. It shows how to operate the G1-m1™ receiver and acquire GNSS data with it. The end result is a file(s) of raw binary ranges between the receiver and the tracked satellites. For instructions on how to process the acquired data, refer to the Horus™ software guide.

Requirements: This document presumes that you have at least one G1 GNSS receiver (the rover). Optionally, users can collect correction data on a known base station (the base). Or, you can request to download the correction data from the closest Continuously Operating Reference Station (CORS), as described in the Horus™ software guide.

Note: By GNSS data, we mean raw ranges between the G1 receiver and the respective GPS/GLONASS satellites in the form of C/A code and carrier phase observations. The raw ranges are readily available on a uSD card in the form of a binary data file after a successful data acquisition mission using the G1 receive.

G1-m1™ Receiver

The G1-m1™ receiver is housed in a 3”x2”x1” anodized aluminum enclosure, as shown in Figure 1. It has two ends, the front and the back panels. The front panel provides the controls, while the back panel provides the connections. Both ends have status LEDs for display purposes, as shown in Figures 2&3 and described in the sequel.

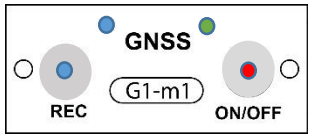
Figure 2: G1-m1™ Receiver CDU and PC Panels

Control and Display Unit (CDU): The enclosed version of the G1-m1™ receiver is controlled by two push buttons with built-in status LEDs, a red one to switch power on/off and a blue button to enable/disable data recording. The two standalone LEDs indicate satellite fix status (green), and data recording status (blue), respectively.

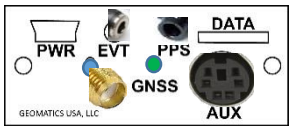
Note: *The REC button can be disabled via jumper setting. In this case, recording is controlled through the receiver power ON/OFF button (i.e. recording automatically starts/stops upon powering on/off)*

Peripheral Connections (PC): The receiver provides two primary connections, one to the satellite antenna and the other is to external power source, an SMA RF antenna connector and a mini-USB-B port, respectively. On the top-right corner is a uSD card slot for removable data storage. The 2.5 mm female jack and 0.65 mm male jack in the middle are for 1PPS output and EVT mark input, respectively. On the bottom-right is a 6 pin mini-DIN circular auxiliary port for interfacing with external devices for real-time operation such as a data link.

Note: *When connected to a computer, the mini-USB port can be used to power, control, and configure the receiver and also stream the data*



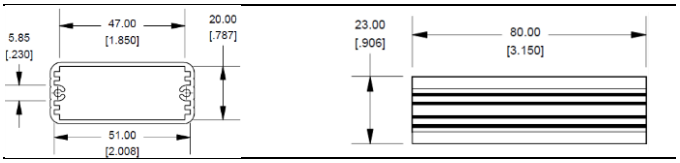
FRONT Panel
(CDU)



BACK Panel
(PC)

	Blue record status hole LED
	Green satellite PV hole LED
	Power button on/off with red LED
	Data recording button on/off with blue LED
PWR	Mini-USB-B port (power and data)
	Earphone plug EVT (mark input)
	Earphone jack, 1pps output
DATA	uSD card slot
	SMA female jack connector for satellite antenna
	Auxiliary port

G1-m1™ CDU and PC



G1-m1™ Enclosure Dimensions

Figure 3: G1-m1™ Receiver Details

G1-A311™ Antenna

The G1-A311™ antenna is a single frequency GNSS antenna capable of tracking GPS and GLONASS C/A code and L1 carrier phase. The antenna is housed in a 3 ¾" x 3 ¾" wolmanized pressure treated plastic enclosure and ground-planed with a 0.05" aluminum sheet metal. The housing is fitted with a ½" opaque off-white high density polyethylene base for protection and support. In addition to the antenna connector and the rod/tripod ¼" mount, the base also provides two clipping compartments, one for the receiver and the other for the battery, as shown in Figure 4 below.

Figure 4: G1-A311™ Antenna and base mount on a mini tripod

The antenna phase center is *approximately* at the center of the Antenna Reference Point (ARP), see Figure 5, and has a vertical offset of approximately +20 mm (~0.8").

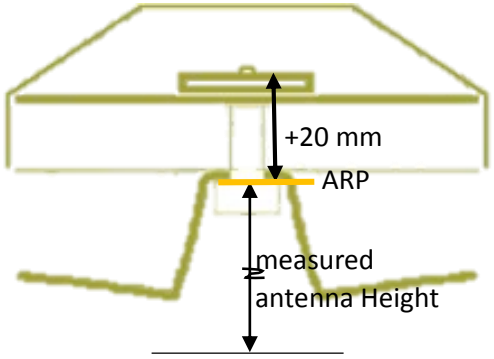


Figure 5: G1-A311™ Antenna Phase Center Offset

Note: *add '20 mm' more to the ARP offset if the 1/4"-20 to 5/8"-11 adapter is used; i.e. total offset becomes 40 mm*

Operational Procedure

Typical operation of the G1-m1™ system includes:

SETUP:

1. Fix the antenna to either the tripod (for a base station) or to the rod (for a rover); center and level as needed
2. Insert the uSD card in the G1-m1 receiver uSD slot; make sure it is secure by hearing a spring click
3. Slide the G1-m1 receiver into its holder clip and secure it
4. Secure the battery in its compartment
5. Connect the receiver to the antenna and to the battery using the SMA and USB cables, respectively

INITIALIZATION:

1. Power the receiver on by pushing the on/off button; the button light will glow solid red
2. Wait 30-60 seconds until the satellite status LED glows solid green to indicate position fix is valid
3. Push the record button to save the data to the uSD card; the button will glow solid blue while the record status LED should blink blue continuously
4. Collect 60-120 seconds of static data to initialize the survey; do not move the antenna
5. You can move the antenna now, if needed

Notes:

- *The REC status LED three consecutive blinks repeatedly means uSD card error (card missing or malfunctioning)*
- *The initialization site should be clear of obstructions to satellite. In case the PV green status LED goes off for more than 5 seconds, repeat the static initialization or extend it.*

CHECK LIST:

Before leaving the office on a G1 survey mission, make sure you have the following:

- ☐ G1-m1™ receiver
- ☐ G1-A311™ or equivalent antenna
- ☐ 5 VDC Batteries
- ☐ Receiver and battery holders
- ☐ uSD card(s)
- ☐ G1 EVT marker
- ☐ Rover rod with bubble level
- ☐ Tape measure

Optional Items:

- ☐ G1-m1™ base receiver, batteries, and antenna
- ☐ base tripod with spirit level

Stationary Data Acquisition

In this case, you will allow the receiver to record the static data on the uSD until the whole session is over, as shown in Figure 6. Stop the recording by pushing the record button; the button light and the record status LED lights will go off. To end the survey, you can switch the receiver off by pushing the on/off power button. You can then move the receiver to another location to collect another static data session. Alternatively, you can leave the receiver power on the ON position (to maintain satellite lock) while moving to a new station. When you setup on the new station, you do not need to re-initialize. Simply, switch recording on to start a new session.

Figure 6: G1-m1™ System over a monument pillar in a static data acquisition session

Mobile Data Acquisition

This case is similar to the static data acquisition case discussed earlier except that the receiver does not go off between survey points. In other words, after static initialization, rove between the survey points with the antenna centered over each of them, as shown in Figure 7. You can mark the point event using the EVT marker. Make sure that the click happens when the antenna is completely centered over the point and that it is completely stable for a few seconds, be patient!

Figure 7: G1-m1™ System on a survey rod in a mobile data acquisition session

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