GV620MG User Manual

EGPRS/LTE Cat-M1/LTE NB2/GNSS Tracker

QSZTRACGV620MGUM0100

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0. Revision History

Version	Date	Author	Description of Change
1.00	2021-08-17	Arry Wang	Initial

1. Introduction

GV620MG is a waterproof GPS tracker designed for a wide variety of vehicle tracking applications. They have multiple I/O interfaces that can be used for monitoring or controlling external devices, including a 1-wire interface used for temperature monitoring. Bluetooth 4.2 is supported. Virtual ignition detection and i-Button function are also supported. Its built-in GPS receiver has superior sensitivity and fast initial positioning. The GV620MG's location can be monitored in real time or periodically tracked by a backend server and mobile devices. System integration is straightforward as complete documentation is provided for the full featured @Track protocol. The @Track protocol supports a wide variety of reports such as emergency, Geo-fence boundary crossings, and external power supply monitoring and scheduled GPS position reports.

1.1. GV620MG Product

Table 1. GV620MG Product

Model No.	Region	Technology	Operating Band (MHz)
GV620MG	Worldwide	GSM eMTC NB-IoT	Cat M1/Cat NB2: **Cat M1:** B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85 **Cat NB2:** B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85 **EGPRS:** 850/900/1800/1900MHz

1.2. Reference

Table 2. GV620MG Protocol Reference

SN	Document Name	Remark
[1]	GV620MG @Track Air Interface Protocol	The air protocol interface between GV620MG and backend server.

1.3. Terms and Abbreviations

Table 3. Terms and Abbreviations

Abbreviation	Description
AGND	Analogue Ground
AIN	Analogue Input
DIN	Digital Input
DOUT	Digital Output
GND	Ground
RXD	Receive Data
TXD	Transmit Data

2. Product Overview

2.1. Product Appearance

Figure 1. GV620MG Products View

2.2. LED Description

Figure 2. GV620MG LEDs

There are three LEDs on GV800. For details, please see the table below.

Table 4. GV620MG LED Description

LED	Device Status	LED Status
CELL (Note 1)	Device is searching CELL network.	Fast flashing (Note 3)
	Device has registered to CELL network.	Slow flashing (Note 4)
	Device goes into sleep mode.	OFF
	SIM card needs pin code to unlock.	ON
GPS (Note 2)	GPS chip is powered off.	OFF
	GPS sends no data or data format error occurs.	Slow flashing
	GPS chip is searching GPS info.	Fast flashing
	GPS chip has gotten GPS info.	ON
PWR (Note 2)	No external power and internal battery voltage is lower than 3.46V.	OFF
	No external power and internal battery voltage is below 3.6V.	Slow flashing
	External power in and internal battery is charging.	Fast flashing
	External power in and internal battery is fully charged.	ON

Note:

1. CELL LED cannot be configured
2. GPS LED and PWR LED are configurable to be turn off
3. Fast flashing: about 100ms ON/200ms OFF
4. Slow flashing: about 200ms ON/1000ms OFF

2.3. Parts List

Table 5. GV620MG Parts List

Name	Picture	Description
GV620MG Locator		EGPRS/LTE Cat-M1/LTE NB1/GNSS Tracker 135*62*38 mm
User Cable		GV620MG standard cable
USB Configure Cable		USB to TTL serial port (optional accessory)
Power & GND Cable		Optional accessory
Temperature Sensor		Optional accessory
Fuel level sensor		Optional accessory

3. Interface Definition

The GV620MG has an 18-pin interface connector which contains the connections for power, I/O, TTL, etc. The sequence and definition of the 18-pin connector are shown in the following figure:

Figure 3. The 18-pin Connector on the GV620MG

Table 6. Description of 18-pin Connections

Index	Description	Comment
1	PWR1	Primary Power 8-32V
2	PWR2	Secondary Power 8-32V
3	AGND	Primary Analogue Ground
4	AGND	Secondary Analogue Ground
5	IGN	Ignition Detection Input, Positive Trigger
6	ADIN1	Analogue Input 0-32V
7	OUT_3V3	External Accessory Power 400mA Max
8	GND	External Accessory Ground
9	1_WIRE	Temperature Sensor Input
10	NC	NC
11	OUT/IN1	Negative trigger input1 for normal use or Open drain output1 150mA max drive current
12	OUT/IN2	Negative trigger input2 for normal use or Open drain output2 150mA max drive current
13	OUT/IN3	Negative trigger input3 for normal use or Open drain output3 150mA max drive current
14	OUT/IN4	Negative trigger input4 for normal use or Open drain output4 150mA max drive current
15	EX_RX	UART RXD RS232
16	EX_TX	UART TXD RS232
17	RXD	UART RXD TTL
18	TXD	UART TXD TTL

4. GV620MG Device Cable Color

Table 7. GV620MG Device Cable Color Definition

Definition	Color	Pin No.	Connector	Pin No.	Color	Definition
PWR1	Red	1		2	Red/Green	RWR2
AGNG	Black	3		4	Black	AGNG
IGN	White	5		6	Green	ADIN1
OUT-3V3	Red/White	7		8	Black/White	GND
1-WIRE	Gray	9		10	NC	NC
OUT/IN1	Blue	11		12	Yellow	OUT/IN2
OUT/IN3	Brown	13		14	Orange	OUT/IN4
EX_RX	Purple	15		16	Purple/White	EX_TX
RXD	Pink	17		18	White/Black	TXD

Note:

The main color of the dual color cable is the first color, for example, Black/White means black is the main color, and white is the secondary color.

5. Getting Started

5.1. Opening and Closing the Case

Figure 4. Open the Case

To open: Use a cross screwdriver to loosen the screws and then lift the top case gently.
To close: Align the top case with the bottom case and then tighten the screws.

5.2. Installing a SIM Card

Open the case and ensure the unit is powered off (unplug the 18-pin cable and switch the internal battery to the OFF position). Insert the SIM card into the holder. Take care to align the cut mark and ensure the SIM card is pushed into the SIM holder completely. Close the case.

Figure 5. SIM Card Installation

5.3. Installing the Internal Backup Battery

GV620MG has an internal backup Li-ion battery (5800mAh, standby time: 120 days without reporting).

Figure 6. Backup Battery Installation

5.4. Power Supply Connection

PWR (pin 1 or pin 2)/GND (pin 3 or pin 4) are the power input pins. The input voltage range is from 8V to 32V. The device is designed to be installed in vehicles that operate on 12V or 24V systems without the need of external transformers.

Figure 7. External Power Supply Connection

5.5. Ignition Detection

Table 8. Electrical Characteristics of Ignition Detection

Logical Status	Electrical Characteristics
Active	5.0V to 32V
Inactive	0V to 3V or open loop

Figure 8. Typical Ignition Detection

IGN (pin 5) is used for ignition detection. It is recommended to connect this pin to the “RUN” position of the vehicle ignition switch as shown above.

An alternative to connect to the ignition switch is to find a non-permanent power source that is only available when the vehicle is running, for example, the power source for the FM radio.

IGN signal can be configured to transmit information to the backend server when ignition is on and enter the power saving mode when ignition is off.

5.6. Digital Inputs

There are four general purpose digital inputs on GV620MG. They all are negative triggers.

Table 9. Electrical Characteristics of the Digital Inputs

Logical Status	Electrical Characteristics
Active	0V to 0.8V
Inactive	Open loop

The following picture shows the recommended connection of a digital input.

Figure 9. Typical Digital Input Connection

5.7. Analog Input

There is one analogue input on GV620MG, and the analog input voltage range is from 0 to 32V. The following picture shows the recommended connection.

Figure 10. Typical Analogue Input Connection

Note:

Pin 6 is a multifunction pin: it can be configured as an analogue input.

5.8. Digital Outputs

There are four digital outputs on GV620MG. All are of open drain type and the maximum drain current is 150 mA. Each output has a built-in over current PTC resettable fuse.

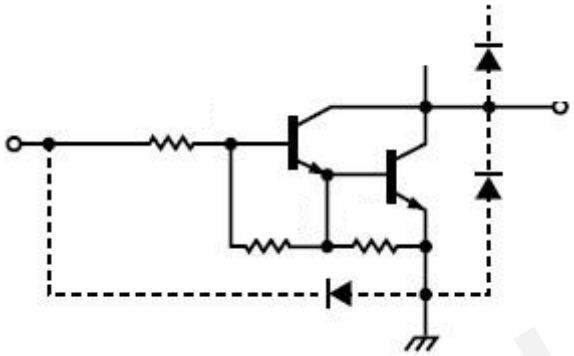


Figure 11. Digital Output Internal Drive Circuit

Table 10. Electrical Characteristics of Digital Outputs

Logical Status	Electrical Characteristics
Enable	<1.5V @150 mA
Disable	Open drain

Figure 12. Typical Connection with a Relay

Figure 13. Typical Connection with a LED

Figure 14. Typical Connection with a Buzzer

Figure 15. Typical Connection with Other Devices

Note:

Pay attention to the polarity of the relay if it is pre-installed with an internal flyback diode during connection. Install an additional diode externally if there is no pre-installed internal diode. A common diode such as a 1N4004 one will work in most circumstances.

5.9. Temperature Sensor Interface

- If the cable of temperature sensor has three wires, connect the temperature sensor to GV620MG following the diagram and table as below:

GV620MG	18-pin Cable Color	Description	Temp Sensor DS18B20
OUT_3V3	Red/White (pin 7)	Connect the red wire of temperature sensor to pin 7 of GV620MG	1-Wire power (RED)
GND	Black/White (pin 8)	Connect the green wire of temperature sensor to pin 8 of GV620MG	1-Wire ground (GREEN)
1_WIRE	Gray (pin 9)	Connect the yellow wire of temperature sensor to pin 9 of GV620MG	1-Wire data (YELLOW)

Note:

Please make sure to enable the "3.3V Output Enable" first in the Global Configuration in Manage Tool of GV620MG device (refer to the image captured below), then this pin (pin 7) can output the corresponding voltage.

- If the cable of temperature sensor has two wires, connect the temperature sensor to GV620MG following the diagram and table as below:

Figure 16. Typical Connection with a Temperature Sensor

GV620	18-Pin Cable Color	Description	Temp Sensor
GND	Black/White (pin 8)	Connect the ground wire of temp sensor to pin 8 of GV620MG	1-Wire ground (Green)
1_WIRE	Gray (pin 9)	Connect the data wire of temp sensor to pin 9 of GV620MG	1-Wire data (Yellow)

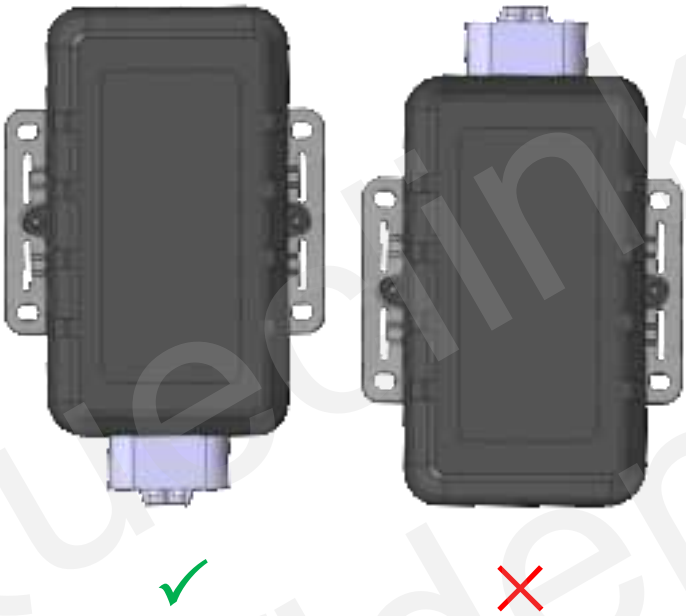
5.10. Serial Port/UART Interface

There are two lines dedicated to the Serial Port/UART interface (TXD and RXD). TXD and RXD are standard TTL signal.

Figure 17. Typical Connection with USB to TTL Serial Port

6. Installation Precautions

- Firmly install the device to a reliable surface to prevent falling off.
- Make the side with antenna face sky to have better signal reception.
- Do not install the device under metal surface or in enclosed environments having difficulty in getting GPS and network signal.
- Install the device in places away from rain water or water may be ponded, otherwise water may seep into the connector to damage the device.
- Installation Direction: Keep the connector downside if the device is installed vertically, otherwise water (dust) will be held up in the connector to damage the device.



- Use an electric screwdriver (torque 4.0kg±0.2kg) to tighten the screws. Please make sure the tightening torque for every screw is enough and even. Otherwise, the waterproof capability of the device will be deteriorated and water may seep inside causing damage. And such failure will not be covered by the warranty.

7. Troubleshooting and Safety Info

7.1. Troubleshooting

Table 11. GV620MG Troubleshooting List

Problem	Possible Reason	Solution
After the device is turned on, the CEL LED always flashes quickly.	The signal is too weak. The device isn't registered to the network.	Move the device to a place with good network coverage.
Messages can't be reported to the backend server by network.	APN is not right.	Ask the network operator for the right APN.
	The IP address or port of the backend server is wrong.	Make sure the IP address for the backend server is an identified address in the internet.
There is no response from UART when the device is configured by using UART.	The port is not ready or the device is not powered on.	Please check the port and the device to ensure they are working properly.
The device can't get GPS fix.	The GPS signal is weak.	Move the device to a place under open sky.
		It is better to make the side with antenna face the sky.

7.2. Safety Info

- Do not disassemble the device by yourself.
- Do not put the device in the overheated or too humid place, and avoid exposure to direct sunlight. Too high temperature will damage the device or even cause battery explosion.
- Do not use the device on the airplane or near medical equipment.

8. Appendix: Supported Accessories

- Temperature Sensor (1-Wire temperature sensor DS18B20)
- Fuel level Sensor (Digital RS232 (DUT-E COM Protocol)/ Ultrasonic fuel level sensor UFS300)
- Bluetooth Sensor (BLE 4.2 protocol supported)
- iButton (Supported (should be used with iButton reader))

This equipment complies with FCC and IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:(1) this device may not cause harmful interference,and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television 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.
- Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help
- This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.