GV310LAU User Manual

GSM/GPRS/WCDMA/LTE Cat4/GNSS Tracker

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Version:1.00



Driving Smarter IoT

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0. Revision History

Revision	Date	Author	Description of change
1.00	2021-07-21	Eden Cao	Initial.

1. Introduction

The GV310LAU is a compact GNSS tracker designed for a wide variety of vehicle tracking applications. It has multiple I/O interfaces that can be used for monitoring or controlling external devices. The GV310LAU supports various bands of LTE CAT4/WCDMA/GSM used by Latin America cellular operators. The built-in GPS receiver has superior sensitivity and fast initial positioning. Its built-in 3-axis accelerometer allows motion detection and sophisticated power management algorithms extend battery life. System integration is straightforward as complete documentation is provided for the full featured @Track protocol. The @Track protocol supports a wide variety of reports including emergency alarm, Geo-fence boundary crossings, external power supply monitoring and position reports.

1.1. GV310LAU Product

Table 1. GV310LAU Product

Model No.	Technology	Operating Band (MHz)
GV310LAU	LTE CAT4/WCDMA /GSM	LTE FDD: B1/B2/B3/B4/B5/B7/B8/B28/B66 LTE TDD: B40 WCDMA: B1/B2/B5/B8 GSM: 850/900/1800/1900 MHz

1.2. Reference

Table 2. GV310LAU Protocol Reference

SN	Document Name	Remark
[1]	GV310LAU @Track Air Interface Protocol	The air interface protocol between GV310LAU and backend server.

1.3. Terms and Abbreviations

Table 3. GV310LAU Terms and Abbreviations

Abbreviation	Description
AGND	Analog Ground
AIN	Analog Input
DIN	Digital Input
DOUT	Digital Output
GND	Ground
MIC	Microphone
RXD	Receive Data
TXD	Transmit Data
EARN	Speaker Negative
EARP	Speaker Positive

2. Product Overview

2.1. Product Appearance



Figure 1. GV310LAU Product View

2.2. LED Description

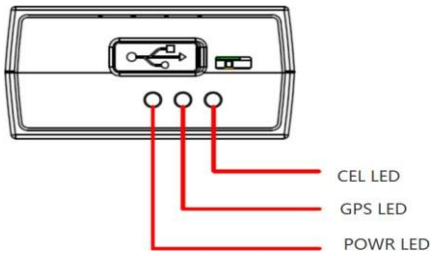


Figure 2. GV310LAU LED

There are three LEDs on GV310LAU. For details, please see the table below.

Table 4. GV310LAU LED Description

LED	Device Status	LED Status
CEL (Note 1)	Device is searching CEL network.	Fast flashing
	Device has registered to CEL network.	Slow flashing
	SIM card needs PIN 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 signal.	Fast flashing
	GPS chip has received GPS signal.	ON
	Upgrading the device firmware over the air	Fast flashing
PWR (Note 2)	No external power and internal battery voltage is not lower than 3.65V.	OFF
	No external power and internal battery voltage is below 3.65V.	Slow flashing
	External power in and internal battery is charging.	Fast flashing
	The external power is connected and the battery is not in the charging state.	ON
	Upgrading the device firmware via Manage Tool.	Fast flashing

Note:

- CEL LED cannot be configured.

- GPS LED and PWR LED can be configured to turn off by using the Manage Tool.
- Fast flashing: About 100ms ON/200ms OFF.
- Slow flashing: About 200ms ON/1000ms OFF.

2.3. Parts List

Before starting, check whether all the following items have been included with your GV310LAU. If anything is missing, please contact your supplier.

Table 5. GV310LAU Parts List

Name	Picture	Description
GV310LAU Locator	 80*49*26 mm	GSM/GPRS/WCDMA/LTE Cat4/GNSS tracker
User Cable		GV310LAU standard cable
GPS Antenna (Optional)		External GPS Antenna
DATA_CABLE_W(Optional)		USB Data Cable, which can be used for firmware upgrade and configuration

3. Interface Definition

The GV310LAU has a 16-pin interface connector which contains the connections for power, I/O, RS232, MIC, etc. The sequence and definition of the 16-pin connector are shown in the following figure:



Figure 3. The 16-pin Connector on the GV310LAU

Table 6. Description of 16-pin Connections

Pin No.	Pin Name	Function Description
1	MICP	MIC positive input
2	AGND	MIC negative input
3	IGN	Ignition detection input, positive trigger
4	RXD	The RXD_RS232
5	TXD	The TXD_RS232
6	GND	Power and digital ground
7	AD3/OUT3	One special I/O can be configured as a 0-16V analog input or an open drain output with 150 mA max drive current
8	OUT2	Open drain output2, 150mA max drive current
9	EARP	Speaker positive output
10	EARN	Speaker negative output
11	PWR	External DC power input, 8-32V
12	IN2	Digital input2, negative trigger
13	IN1	Digital input1, negative trigger
14	OUT1	Open drain output1, 150mA max drive current, with latch circuit
15	AD1/IN3	Analog input1 (0-16V) or digital input 3, negative trigger
16	AD2	Analog input2 (0-16V)

4. GV310LAU Device Cable Color

Table 7. GV310LAU Cable Color Definition

Definition	Color	PIN No.	Cable	PIN No.	Color	Definition
OUT2	Yellow	8		16	Brown/White	AD2
AD3/OUT3	Brown	7		15	Green	AD1/IN3
GND	Black	6		14	Blue	OUT1
TXD	White/Black	5		13	Orange	IN1
RXD	Pink	4		12	Orange/Black	IN2
IGN	White	3		11	Red	PWR
AGND	Gray/Black	2		10	Purple/White	EARN
MICP	Gray	1		9	Purple	EARP

5. Getting Started

5.1. Opening and Closing the Case



Figure 4. Opening and Closing the Case

To open: Insert the opener into the gap of the case as shown above, and push the opener up until the case is unsnapped.
To close: Place the cover on the bottom at the position as shown above. Slide the cover against the direction of the arrow until it snaps.

5.2. Installing a SIM Card

Install the SIM card into the holder when power is off as shown below (unplug the 16-pin cable and switch the internal battery to OFF position). Take care to align the cut mark. Close the card holder and then close the case.



Figure 5. SIM Card Installation

5.3. Installing the Internal Backup Battery

GV310LAU has an internal backup Li-ion battery.



Figure 6. Backup Battery Installation

5.4. Switching on the Backup Battery

To use the GV310LAU backup battery, the switch must be at the ON position. The switch and the ON/OFF position are shown as below.



Figure 7. Switch and ON/OFF Position

Note:

- The switch must be at the “OFF” position when the GV310LAU is shipped on an aircraft.
- When the switch is at the “OFF” position, the battery cannot be charged nor be discharged.

5.5. Installation of the External GPS Antenna (Optional)

There is an SMA GPS antenna connector on GV310LAU. The GV310LAU will automatically detect and use the external antenna when it is connected.

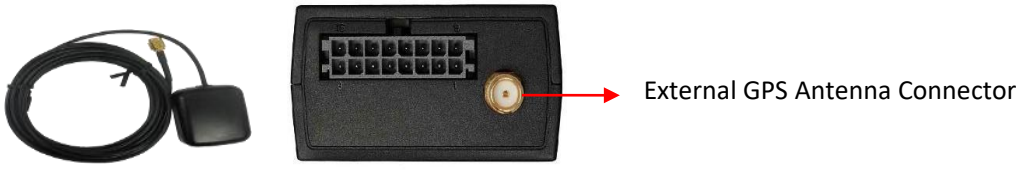


Figure 8. External GPS Antenna of GV310LAU

5.6. Power Supply Connection

PWR (pin 11)/GND (pin 6) are the power input pins. The input voltage range for this device is from 8V to 32V. The device is designed to be installed in vehicles that operate on 12V or 24V systems without the need for external transformers. But it is recommended to use Power Protection Cable Kit if it is installed in a truck with 24V battery.



Figure 9. Typical Power Connection

5.7. Ignition Detection

IGN (pin 3) is used for ignition detection. It is recommended to connect this pin to the "RUN" position of the vehicle ignition switch as shown below.
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.

Table 8. Electrical Characteristics of Ignition Detection

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

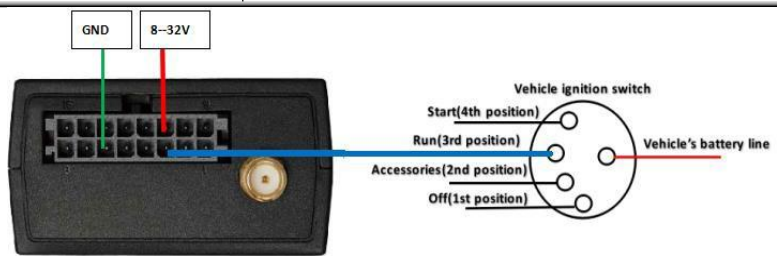


Figure 10. Typical Ignition Detection Connection

5.8. Digital Inputs

There are three general purpose digital inputs on GV310LAU. They all are negative triggers.

Table 9. Electrical Characteristics of the Digital Inputs

Logical State	Electrical Characteristics
Active	0V to 1.2V
Inactive	Open loop

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

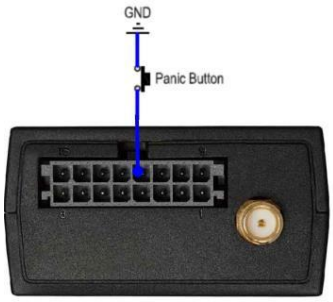


Figure 11. Digital Input Connection

5.9. Analog Input/Digital Output

This is a special I/O can be configured as a 0-16V analog input or an open drain output with 150mA max drive current.

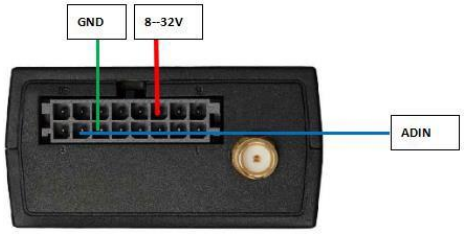


Figure 12. Analog Input or Digital out Connection

5.10. Digital Outputs

There are three digital outputs on GV310LAU. 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.

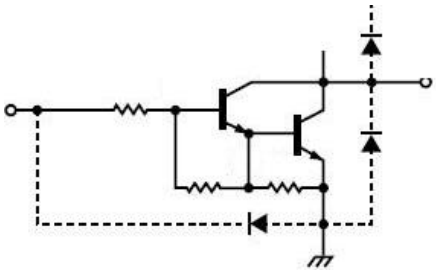


Figure 13. Digital Output Internal Drive Circuit

Table 10. Electrical Characteristics of the Digital Outputs

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

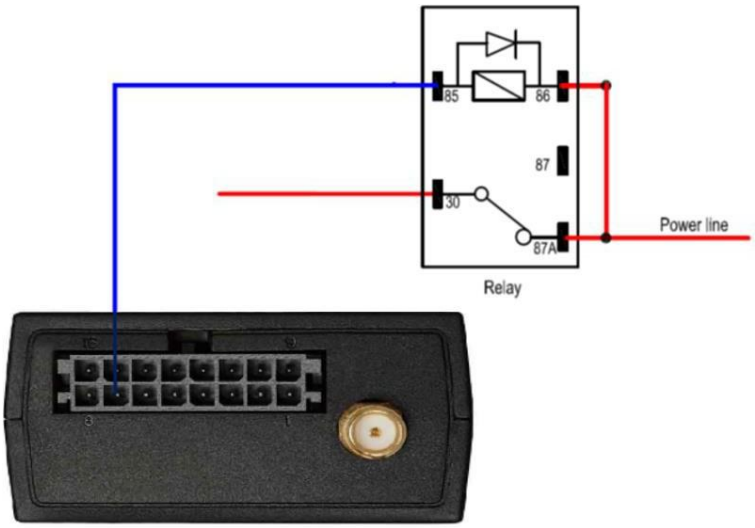


Figure 14. Typical Connection with a Relay

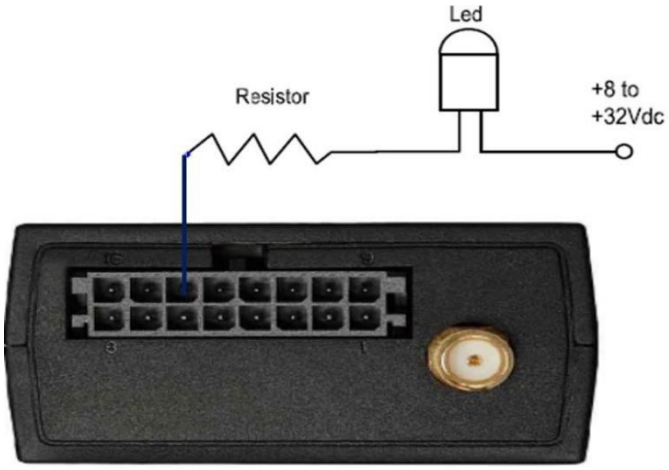


Figure 15. Typical Connection with a LED

Note: OUT1 will latch the output state during reset.
Warning: Many modern relays come with a flyback diode pre-installed internal to the relay itself. If the relay has this diode, insure the relay polarity connected is properly used. If this diode is not internal, it should be added externally. A common diode such as a 1N4004 will work in most circumstances.

5.11. Serial Port/UART Interface

There are two lines dedicated to the Serial Port/UART interface (TXD/RXD). TXD/RXD is standard RS232 signal.

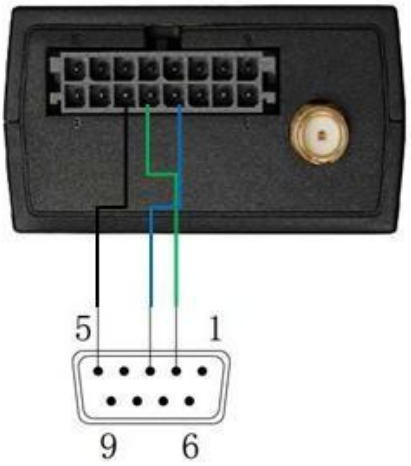
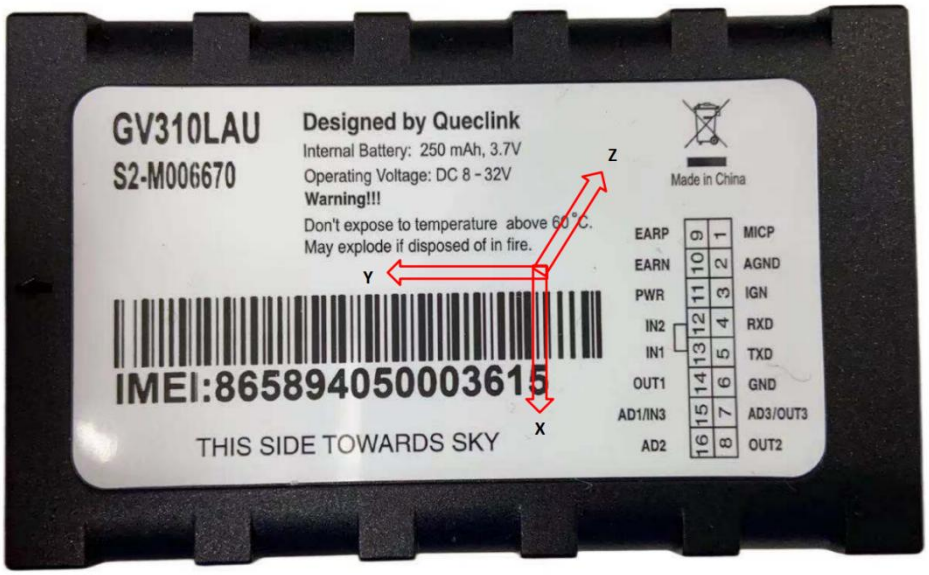


Figure 16. Connection with RS232 Port

5.12. Motion Sensor Direction

GV310LAU has an internal 3-axis accelerometer supporting driving behavior monitoring, crash detection and motion detection. The following shows the directions of the motion sensor.



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.

7. Troubleshooting and Safety Info

7.1. Troubleshooting

Table 11. GV310LAU 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.

Federal Communication Commission Interference Statement
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 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
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This equipment has been tested and found to comply with the limits for a Class B digital device,
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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.
FCC Caution:
Any changes or modifications not expressly approved by the party responsible for compliance
could void the user's authority to operate this equipment.
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.
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm
between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

-
Consult the dealer or an experienced radio/TV technician for help.
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Any changes or modifications not expressly approved by the party responsible for compliance
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