

GV650 User Manual

LTE/WCDMA/GRPS GNSS Tracker

Version: 0.2

International Telematics Solutions Innovator

www.queclink.com

Document Title	GV650 User Manual
Version	0.2
Date	2025-02-21
Status	Draft

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1. Revision History

Version	Date	Author	Description of Change
0.1	2024-08-14	Alan Song	Draft
0.2	2025-02-21	Alan Song	Update new content

2. Introduction

GV650 Series is a IP67 GPS tracker designed for a wide variety of vehicle tracking applications.

GV650 Series planed 3 hardware configuration and 3 network modem models. The full feature version, the standard feature version and the lite feature version. The difference of these 3 types refer to below table 1. The full feature version and standard version support CAN bus interface, it can read vehicle data and upload to the cloud as set.

The GV650 series all support dual band 4 constellation GNSS receiver and provide high precision location tracking ability. Also, this series support 4G 3G and 2G connection, BLE 5.2, WiFi scan wireless features. For the input/output, they all have multiple I/O interface for input trigger or output control. 1-wire interface, analog inputs, serial ports, the rich I/O interfaces can support clients' flexible configuration and multiple working scenarios.

The GV650 series support Queclink 2nd generation message protocol, the @Track protocol Pro. This protocol makes more savings on internet data traffic, and unify the protocol features of all Queclink product which install the @Track protocol Pro.

2.1. GV650 Product

Table 1. GV650 Products Spec Matrix

No.	Category	Versions		
1	Model	GV650 MG Full Feature	GV650 MG Standard	GV650 MG Lite
		GV650 CEU Full Feature	GV650 CEU Standard	GV650 CEU Lite
		GV650 LAU Full Feature	GV650 LAU Standard	GV650 LAU Lite
2	Cellular Band	GV650MG	4G, 2G LTE-FDD Cat M1: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85; LTE-FDD Cat NB2: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85; GSM(GPRS): B2/B3/B5/B8	
		GV650CEU	4G, 2G LTE Cat1 bis: B1/B3/B5/B7/B8/B20/B28; GSM(GPRS): B2/B3/B5/B8	
		GV650LAU	4G, 3G, 2G, LTE Cat1: B1/B2/B3/B4/B5/B7/B8/B28; WCDMA: B1/B2/B5/B8; GSM (GPRS): B2/B3/B5/B8;	
		Internal antenna		
3	GNSS	Dual Frequency, 4 constellations.		
		External antenna	Internal antenna	
4	WiFi Probe	Support WiFi MAC address probe for WiFi positioning.	NA	
		Internal antenna	NA	
5	BLE	BLE 5.2		
		Internal antenna		
6	SIM Card	Nano SIM card by default, support eSim with MOQ.		
7	G-Sensor	Yes		
8	LED Indicator	Power status indicator (Red led); GNSS status indicator(Blue led); Cellular status indicator(Green led); CAN module fault indicator(Yellow led). share same position with Power status indicator.		

9	Flash	32MB	8MB		
10	Cables	2x Cables for all connection	1x Cable for all connection		
	External Interface	1x digital input as ignition detect, max 50V.			
		5x digital inputs/outputs, max 50V. Input with low-level active, output can provide a maximum of 150mA current.	2x digital inputs/outputs, max 50V. Input with low-level active, output can provide a maximum of 150mA current.	5x digital inputs/outputs, max 50V. Input with low-level active, output can provide a maximum of 150mA current.	
		2x analog inputs, measurable range 0V ~ 32V, max absolute voltage 42V.	1x analog inputs, measurable range 0V ~ 32V, max absolute voltage 42V.	2x analog inputs, measurable range 0V ~ 32V, max absolute voltage 42V.	
		1x 1-wire with a maximum of 8 channels. Supports temperature sensors or iButton buttons.			
		2x RS232/RS485 multiplex port, one from main MCU and another from CAN MCU. 1x RS232 for debug and configuration	1x RS232 for peripherals connect and debug. 1x RS485 from CAN MCU.	2x RS232 from main MCU for peripherals and debug.	
		1x 3.3V power output, max 300mA.			
		2x groups CAN bus for vehicle connection.		NA	
		1x power wire for VCC input.			
		2x GNDs for 2 cables	1x GND for single cable		
		1x SMA connector for GNSS	NA		
		11	Power Supply	Internal rechargeable Li-ion battery, 3.7V, 5800mAh.	
External power supply, 8V ~ 90V.					
12	Temperature	Operation temperature -30°C ~ +80°C.			
		Storage temperature -40°C ~ +60°C.			
13	Certification	GV650 MG (In Plan): FCC、PTCRB、ATT、T-Mobile、Verizon			
		GV650 CEU (In Plan): CE			
		GV650 LAU (In Plan): ANATEL、FCC			

2.2. Reference

Table 2. GV650 Protocol Reference

SN	Document Name	Remark
[1]	GV650 @Track Protocol Pro	The air protocol interface between GV650 and backend server.

2.3. 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

3. Product Overview

3.1. Product Appearance



Figure 1. GV650 Products View (Full Feature Version)



Figure 2. GV650 IP67 Connectors (Full Feature Version)

3.2. LED Description

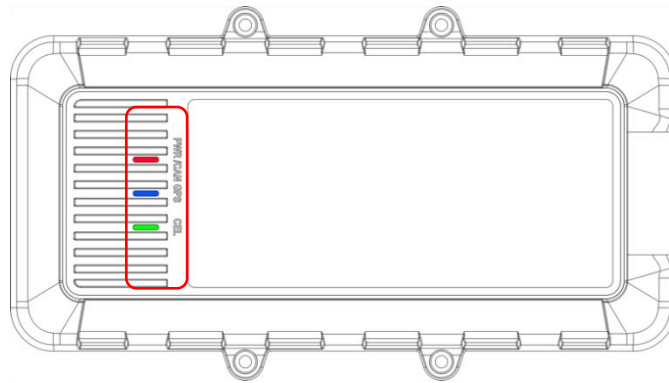


Figure 3. GV650 LEDs

There are three LEDs on GV650. For details, please see the table below.

Table 4. GV650 LED Description

LED	Device Status	LED Status
CELL ^①	Device is searching CELL network.	Fast flashing ^③
	Device has registered to CELL network.	Slow flashing ^④
	Device goes into sleep mode.	OFF
	SIM card needs pin code to unlock.	ON
GPS ^①	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 ^①	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
CAN ^②	CAN module in the device failed, for example MCU firmware crashed or MCU hardware broken.	ON
	CAN module has connection issue with vehicle, like wire broken or connector problem.	Slow flashing
	The CAN software authorized license problem, like device not licensed or license lost or cracked.	Fast flashing
	CAN module works well	Yellow LED will not display

Note:

- ① All LEDs will off after 30 minutes when external power on;
- ② The CAN fault indicating LED share the same LED with PWR, but the color is in yellow. When the CAN fault occurs, the PWR LED and the CAN LED will display alternately with 5s time interval;
- ③ Fast flashing: about 100ms ON/200ms OFF
- ④ Slow flashing: about 200ms ON/1000ms OFF

3.3. Package List

Table 5. GV650 Package List

Name	Picture	Description
GV650 Tracker		Tracker itself and the external cable
User Cable		GV650 extent cable
RS232 Configure Cable		USB to RS232 serial port (optional accessory)

3.4. Accessory List^⑤

Name	Description
GNSS Antenna	Optional external GNSS antenna for Full Feature hardware version.

⑤ Accessory list will update depends.

4. Interface Description

The GV650 comes in 3 different configurations, which are the full feature version, standard version and the lite version. These 3 configurations have different interface pin assignments.

4.1. Full Feature Version

The Full Feature version has a 16pins main connector for main MCU, and a 7pins connector for CAN connection. Also, an external GNSS antenna connector to enhance the GNSS signal received.

Version: FF

1	CAN1_H		
2	CAN1_L	5	485B_232_TX2
3	CAN2_H	6	485A_232_RX2
4	CAN2_L	7	GND

1	ADC_IN1	9	IGN
2	1-WIRE	10	VIN
3	485A_232_RX3	11	3V3_OUT
4	OUT4/IN4	12	485B_232_TX3
5	RS232_RX1	13	ADC_IN2
6	RS232_TX1	14	OUT5/IN5
7	OUT3/IN3	15	OUT2/IN2
8	OUT1/IN1	16	GND

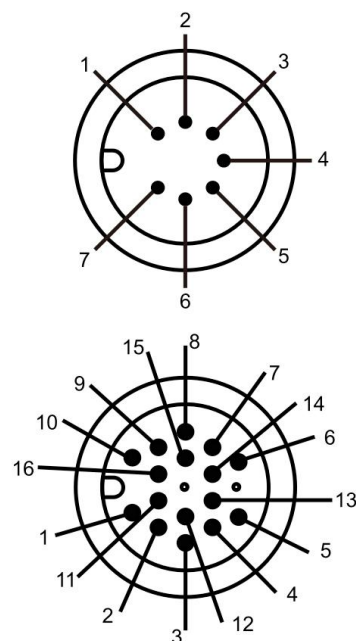


Figure 4. GV650 Full Feature Interface Pin Out

4.2. Standard Version

The Standard version GV650 hardware only have a 16pins cable, the interface of the pin diagram check below figure. The GNSS antenna will be internal antenna.

Version: STD

1	ADC_IN1	9	IGN
2	1-WIRE	10	VIN
3	485A_232_RX3	11	3V3_OUT
4	CAN2_L	12	485B_232_TX3
5	RS232_RX1	13	CAN2_H
6	RS232_TX1	14	CAN1_H
7	CAN1_L	15	OUT2/IN2
8	OUT1/IN1	16	GND

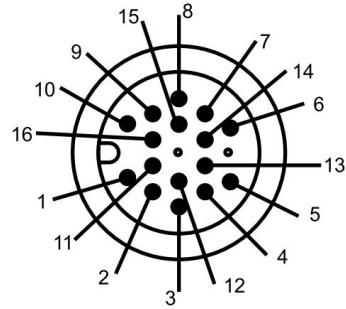


Figure 5. Standard Version Interface Pin Out

4.3. Lite Version

Since the GV650 Lite version cancel the CAN module, so the Lite version can save the CAN interface, and Lite version GNSS antenna is inside the housing.

Version: Lite

1	ADC_IN1	9	IGN
2	1-WIRE	10	VIN
3	485A_232_RX3	11	3V3_OUT
4	OUT4/IN4	12	485B_232_TX3
5	RS232_RX1	13	ADC_IN2
6	RS232_TX1	14	OUT5/IN5
7	OUT3/IN3	15	OUT2/IN2
8	OUT1/IN1	16	GND

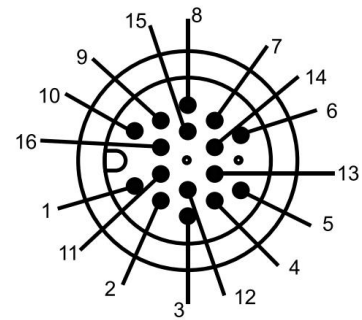


Figure 6. Lite Version Interface Pin Out

4.4. Pins Specifications and Descriptions

Table 6. Description of the GV650 pins*

Index	Description	Comment
1	CAN1_H	Primary CAN BUS high side
2	CAN1_L	Primary CAN BUS low side
3	CAN2_H	Secondary CAN BUS high side
4	CAN2_L	Secondary CAN BUS low side

5	485B_232_TX2	2 nd dual protocol serial port for Tx
6	485A_232_RX2	2 nd dual protocol serial port for Rx
7	GND	Ground pin for power or signal reference
8	ADC_IN1	2 ports for ADC in, range 0V~32V, absolute voltage withstand value 48V
9	ADC_IN2	
10	1-Wire	External port for 1-wire accessories
11	485A_232_RX3	3 rd dual protocol serial port for Rx
12	485B_232_TX3	3 rd dual protocol serial port for Tx
13	485A_232_RX1	1 st dual protocol serial port for Rx
14	485B_232_TX1	1 st dual protocol serial port for Tx
15	OUT1/IN1	Configurable digital input and output IO ports, for input trigger or output control. Maximum driving current 150mA, maximum input voltage 50V
16	OUT2/IN2	
17	OUT3/IN3	
18	OUT4/IN4	
19	OUT5/IN5	
20	IGN	Input for ignition detection
21	VIN	External main power input, support DC 8V~90V
22	3V3_OUT	3.3V power output, maximum driving current 300mA

*Only Full Feature version have 22 pins, Standard version and Lite version have different configuration and less pins.

5. GV650 Extend Cable

The GV650 has 3 types of extend cable, the Full Feature version, the Standard version and the Lite version.

5.1. The Full Feature Version Extend Cable

The Full Feature version extend cable has 2 connectors, a 7 pins connector and a 16 pins connector. Below is the picture of the Full Feature extended cable.

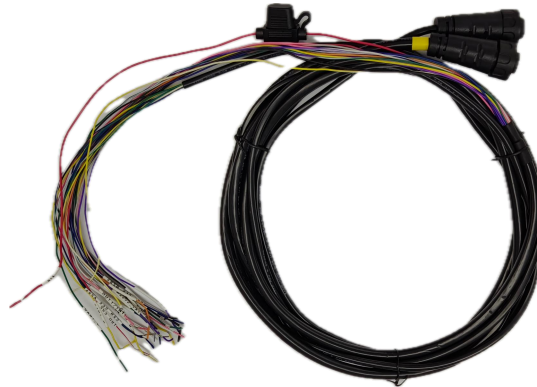


Figure 7. GV650 Full Feature Version Extended cable

Table 7. GV650 Full Feature Version Extended Cable Pins and Color Matrix

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:

Assignment	Color	Pin No.	Pin No.	Color	Assignment
CAN1_H	Yellow	1#1	1#2	Green	CAN1_L
CAN2_H	Yellow/White	1#3	1#4	Green White	CAN2_L
485A/232_RX2	Blue	1#5	1#6	Blue /White	485A/232_TX2
GND	Black	1#7			
ADC_IN1	Orange	2#1	2#2	Gray	1-Wire
485A_232_RX3	Blue	2#3	2#4	Green/White	OUT4/IN4
RX232_RX1	Purple/White	2#5	2#6	Purple	RX232_TX1
OUT3/IN3	Green	2#7	2#8	Pink	OUT1/IN1
IGN	White	2#9	2#10	Red	Vin
3V3_OUT	Red/White	2#11	2#12	Blue/White	485B_232_TX3
ADC_IN2	Yellow/White	2#13	2#14	Yellow	OUT5/IN5
OUT2/IN2	Pink/White	2#15	2#16	Black	GND

Note:

Two-color wire with the first color as the main color. For example, Black/White means black is the main color, and white is the secondary color.

5.2. The Standard Version Extend Cable

The Standard version extend cable has a 16 connector, the cable includes CAN bus wires and reduce the I/O pins.



Figure 8. GV650 Standard Version Extended cable

Table 8. GV650 Standard Version Extended Cable Pins and Color Matrix

Assignment	Color	Pin No.	Pin No.	Color	Assignment
ADC-IN1	Orange	#1	#2	Gray	1-Wire
RS485_A	Blue	#3	#4	Green/White	CAN2_L
RX232_RX1	Purple/White	#5	#6	Purple	RX232_TX1
CAN1_L	Green	#7	#8	Pink	OUT1/IN1
IGN	White	#9	#10	Red	Vin
3V3_OUT	Red/White	#11	#12	Blue/White	RS485_B
CAN2_H	Yellow/White	#13	#14	Yellow	CAN1_H
OUT2/IN2	Pink/White	#15	#16	Black	GND

5.3. The Lite Version Extend Cable

The Lite version extend cable has a 16 pins connector, the cable has the same pins with Full Feature version 16 pins cable, and just remove the 7 pins CAN bus cable.



Figure 9. GV650 Lite Version Extended cable

Table 9. GV650 Lite Version Extended Cable Pins and Color Matrix

Assignment	Color	Pin No.	Pin No.	Color	Assignment
ADC_IN1	Orange	#1	#2	Gray	1-Wire

485A_232_RX3	Blue	#3	#4	Green/White	OUT4/IN4
RX232_RX1	Purple/White	#5	#6	Purple	RX232_TX1
OUT3/IN3	Green	#7	#8	Pink	OUT1/IN1
IGN	White	#9	#10	Red	Vin
3V3_OUT	Red/White	#11	#12	Blue/White	485B_232_TX3
ADC_IN2	Yellow/White	#13	#14	Yellow	OUT5/IN5
OUT2/IN2	Pink/White	#15	#16	Black	GND

6. Getting Started

6.1. Opening and Closing the Case

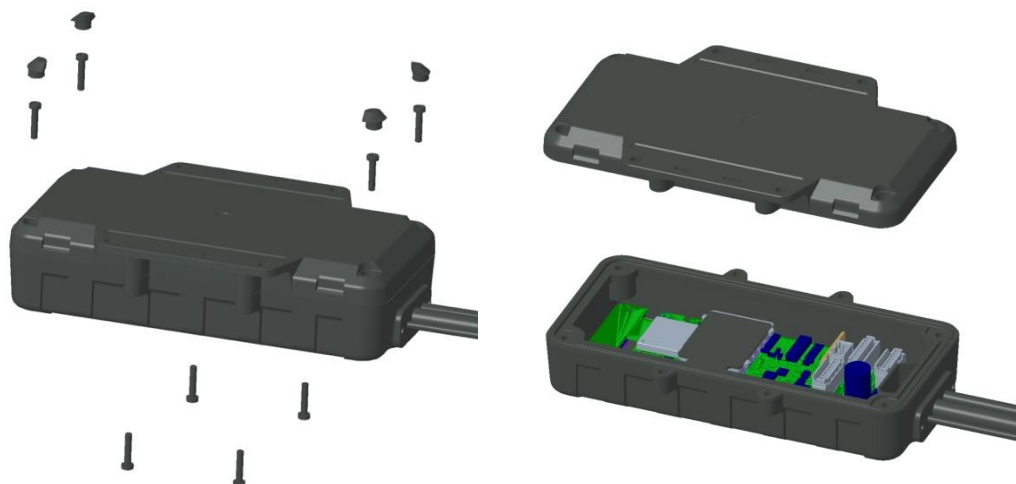


Figure 10. Remove the screws and open the housing

To open: Use a cross screwdriver to loosen the screws and then lift the bottom case.

To close: Align the bottom cover with the top cover, then check for any areas around that are not properly snapped together, and finally secure the device with screws. **Please note that if the upper and lower covers do not properly latch, it will cause the device to fail to achieve the IP69K waterproof and dustproof rating.** Therefore, after snapping and locking the cover, please carefully check for any abnormalities in the snapping.

6.2. Installing The SIM Card

Open the case and ensure the unit is powered off (unplug the cable and disconnect the internal battery). Take the rubber cover of the Sim card and slide the Sim cover follow the mark to open the slot. Insert the Sim card into the holder, then cover the Sim card and slide back the Sim cover.

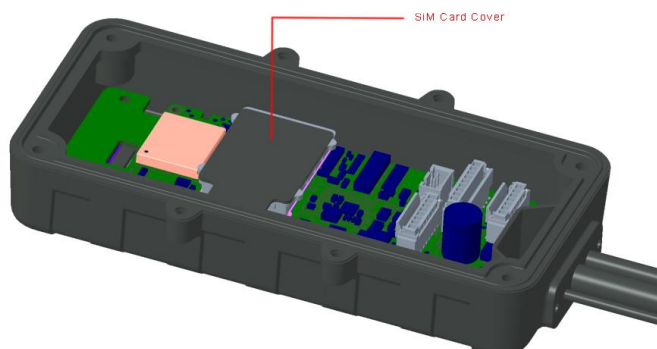


Figure 11. SIM Card Installation

6.3. Installing the Internal Backup Battery

GV650 has an internal backup Li-ion battery (5800mAh, standby time: 120 days with 1 report per day) for power supply when the external power lost. Please make sure the battery connects to the PCBA correctly.



Figure 12. Backup Battery Installation

6.4. Connect the Device Using the Extension Cable

Remove the extension cable from the package. Align the device connector's protrusion with the extension cable's groove, then join the plugs and tighten the plastic nut to secure the cable connection.

Figure 13. Connect the Plugs

6.5. Power On the Device

At the extension wire's end, find the <VIN> and <GND> terminals. Power the device using an external supply or by connecting to the vehicle's power source, ensuring the negative lead is connected to <GND> and the positive lead to <VIN>. The input voltage should be between 8V and 90V. **When the operating voltage exceeds 36V, you must be very careful to avoid electric shock.** Additionally, please note that there is an overcurrent protection fuse on the <VIN> line. When the current exceeds 5A, the fuse will blow to protect the power system. Please repair and test the equipment before replacing the fuse to get the device working again.

Figure 14. External Power Supply Connection

6.6. Ignition Detection

Table 10. Electrical Characteristics of Ignition Detection

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

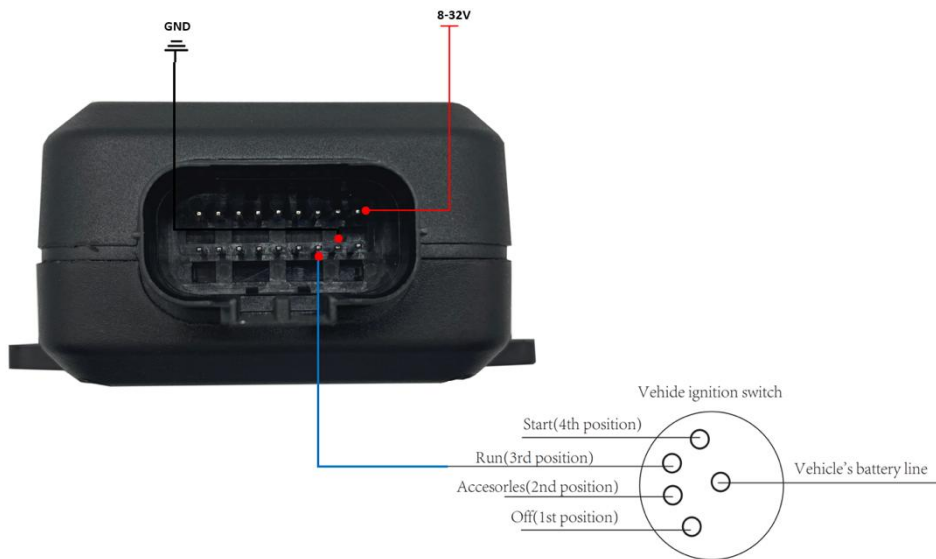


Figure 15. Typical Ignition Detection

The <IGN> pin is for ignition detection. It's advisable to connect this pin to the vehicle's ignition switch in the "RUN" position, as depicted above. Alternatively, you can connect it to a non-permanent power source that's active only when the car is running, such as the FM radio's power source.

The IGN signal can be set to send data to the backend server when the ignition is active and switch to power-saving mode when it's turned off.

6.7. Digital Inputs/Outputs

The digital inputs/outputs on the GV650 have the ability to receive digital signals and drive output signal.

The<OUTx/INx>pin of GV650 is a pin with input-output function. When the<OUTx/INx>pin is configured as an input port, the signal connected to the input port can trigger the relevant actions of IOT. For example, by connecting the vehicle's wiper, door lock circuit, and vehicle lighting circuit to the input port, corresponding actions can be configured in the Tracker to achieve vehicle management or information reporting. The following table shows the circuit parameters when the digital IO port is configured as an input port. Check below parameters for digital inputs.

Table 11. Electrical Characteristics of the Digital Inputs

Logical Status	Electrical Characteristics
Inputs active	0V to 0.8V
Inputs inactive	Open loop
Outputs disable	Open drain
Outputs enable	1.5V @150mA

The image below illustrates the suggested connection for digital inputs.

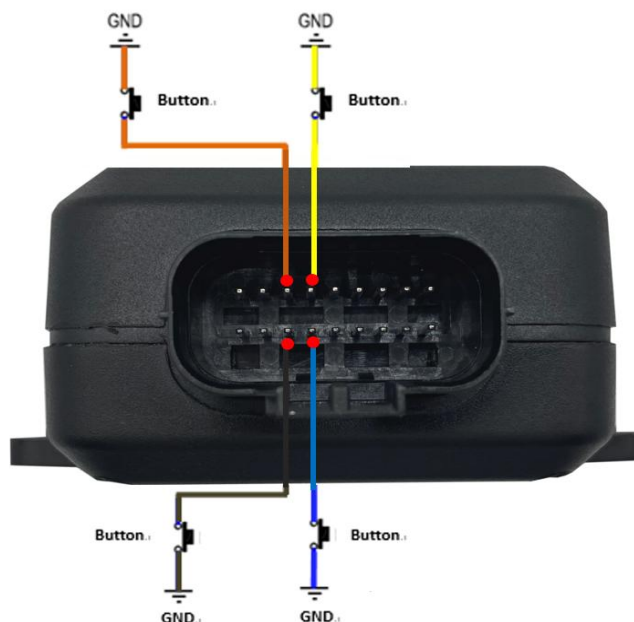


Figure 16. Typical Digital Input Connection

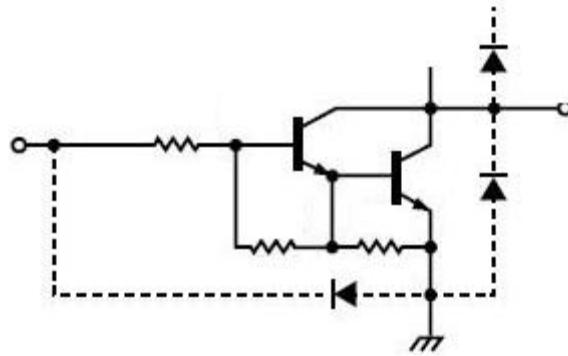


Figure 17. Digital Output Internal Drive Circuit

Table 12. Electrical Characteristics of Digital Outputs

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

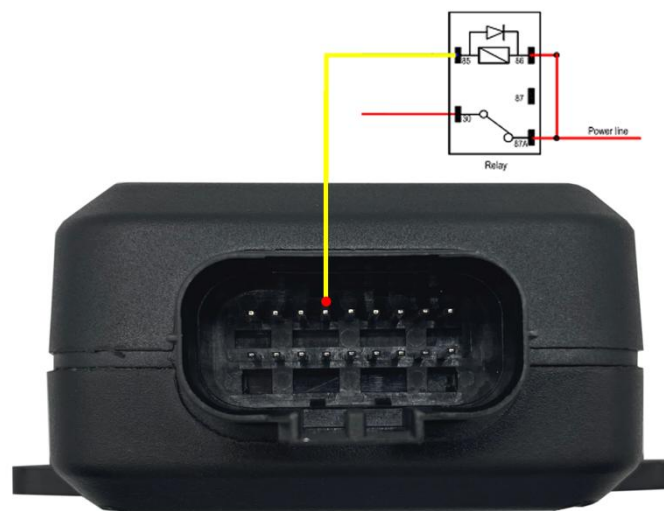


Figure 18. Typical Connection with a Relay

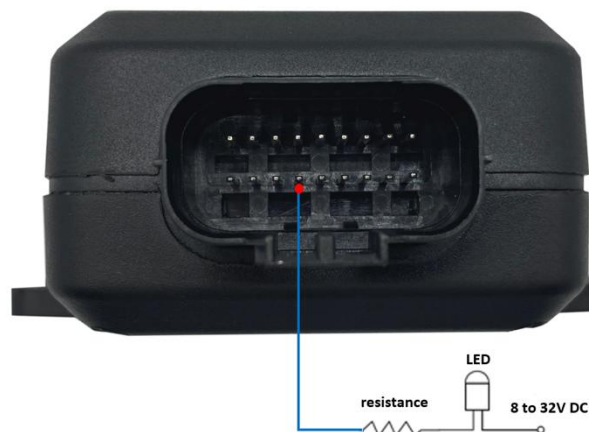


Figure 19. Typical Connection with a LED

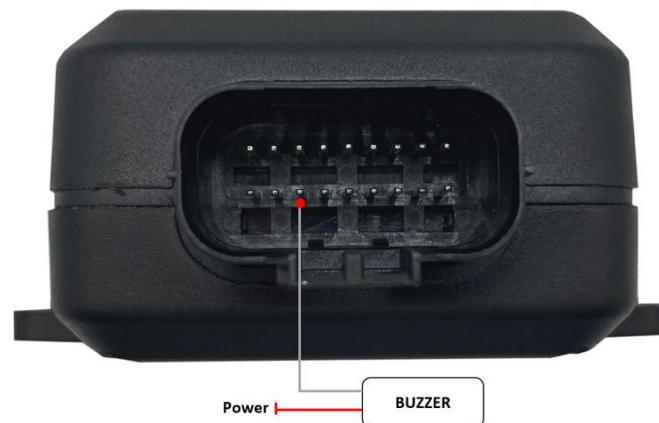


Figure 20. Typical Connection with a Buzzer

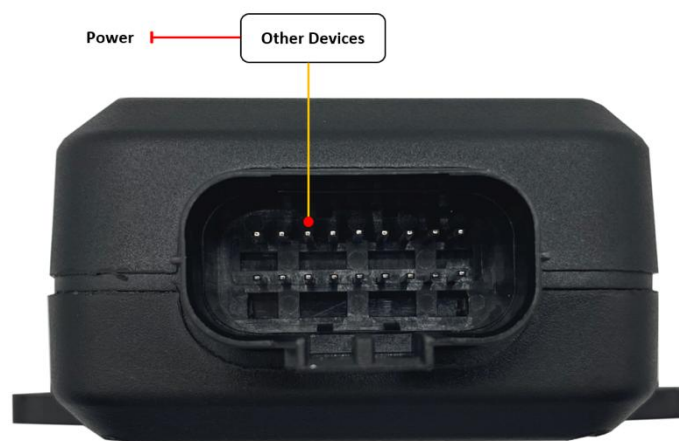


Figure 21. Typical Connection with Other Devices

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.

6.8. Analog Input

The <ADC_INx> on the GV650 are the analog input pins, the voltage range of these pins is from 0 to 32V, the absolute voltage withstand value is 48V. The following picture shows the recommended connection.



Figure 22. Typical Analogue Input Connection

6.9. The 1-Wire Interface

The <1-WIRE> pin on the GV650 is the port can support 1-wire peripherals like iButton or temperature sensor.

Below picture shows how to connect the <1-WIRE> to the iButton device.

Figure 23. iButton Device Connection

If the <1-WIRE> pin need connect to a temperature sensor, please note temperature sensor needs an external power supply.

- If the cable of temperature sensor has three wires and confirmed the sensor needs the 3.3V power supply, then connect the temperature sensor to GV650 with <1-WIRE> pin and also <3V3_OUT> pin.



Figure 24. 3 Wires Temperature Sensor 1-Wire Connection

Note:

Please make sure to enable the <Power Output> first in the Global Configuration in Manage Tool of GV650 device (refer to the image captured below), then this pin (pin 7) can output the corresponding voltage.

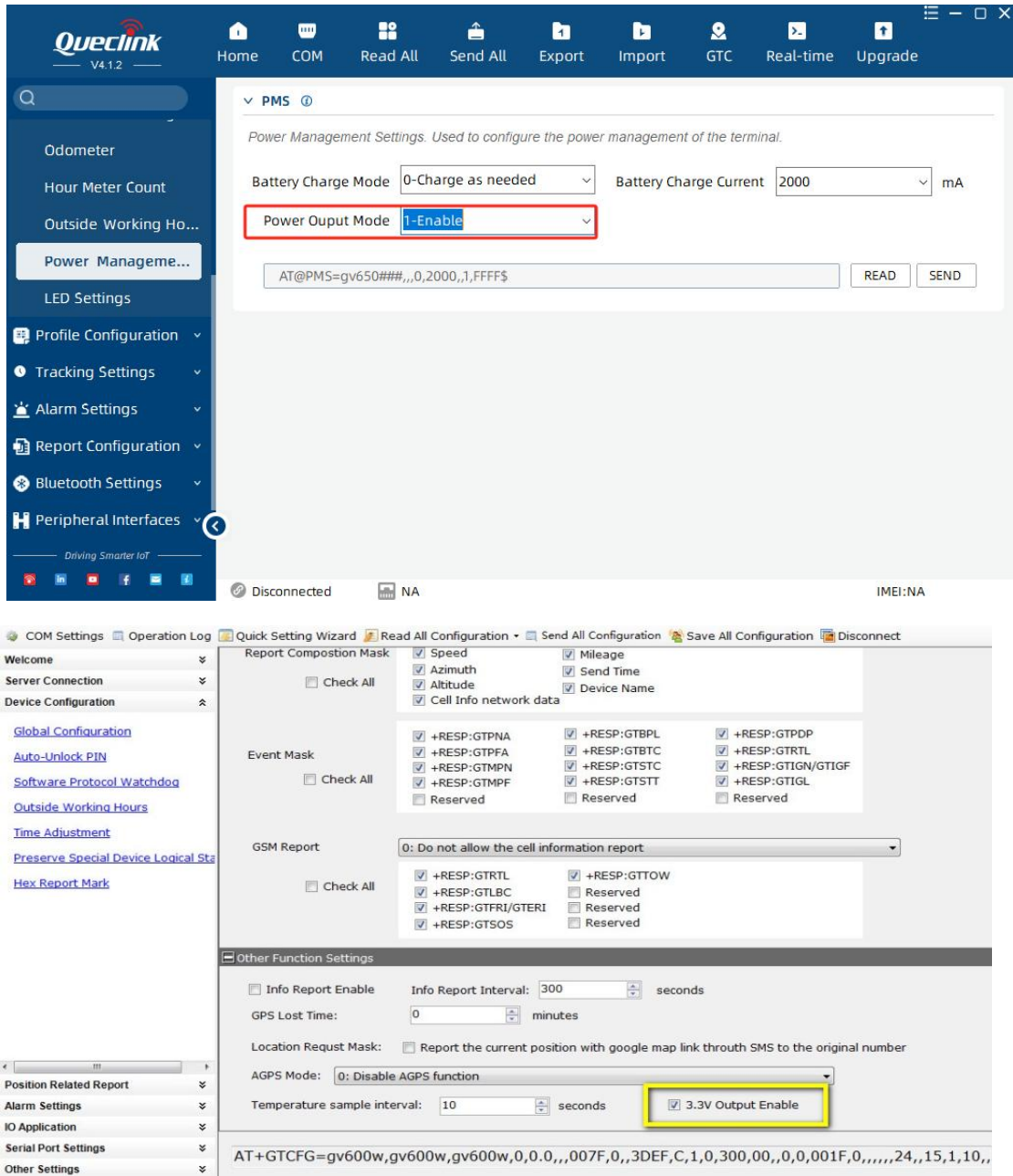


Figure 25. Make Sure the 3.3V Output is Enabled

- If the cable of temperature sensor has two wires, connect the temperature sensor to GV650 following the diagram and table as below

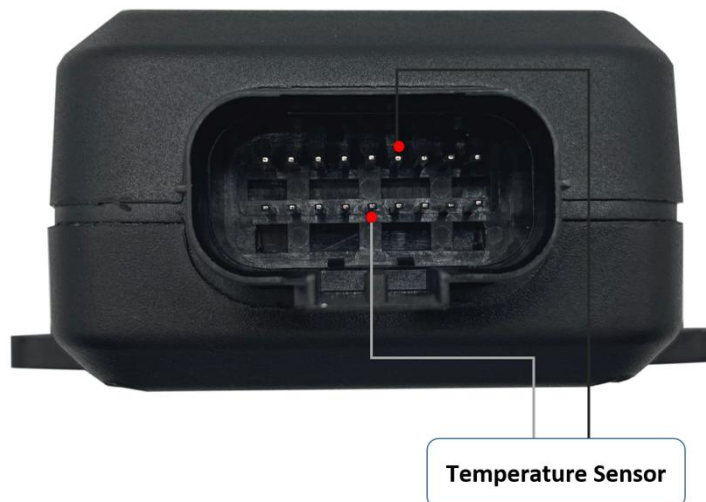


Figure 26. Connect the 2 Wires Temperature Sensor to the <1-WIRE> Interface

6.10. Serial Port Interface

Pin<RS232_TX1> <RS232_RX1> <485B_232_TX2> <485A_232_RX2>
<485A_232_RX3>/<485A>/<RS232_RX3> <485B_232_TX3>/<485B>/<RS232TX3>
are the serial ports interface. RS232 and RS485 all are standard serial port levels.
There are two lines dedicated to the Serial Port/UART interface (TXD and RXD). TXD
and RXD are standard TTL signal.

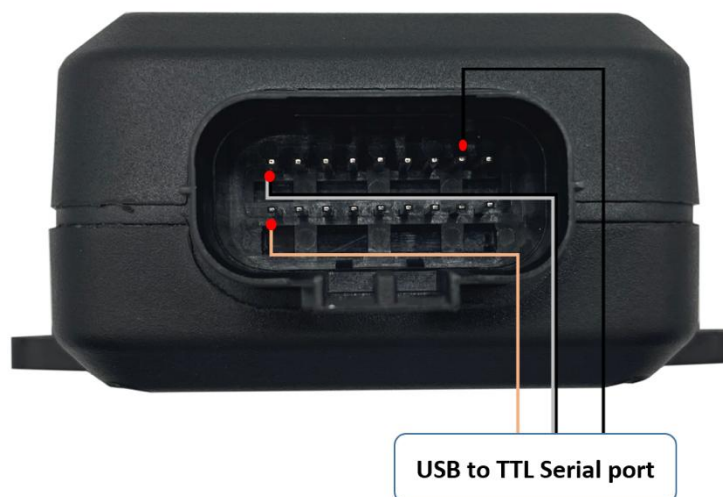


Figure 27. Typical Connection with RS232 Serial Port

6.11. 3.3V Output

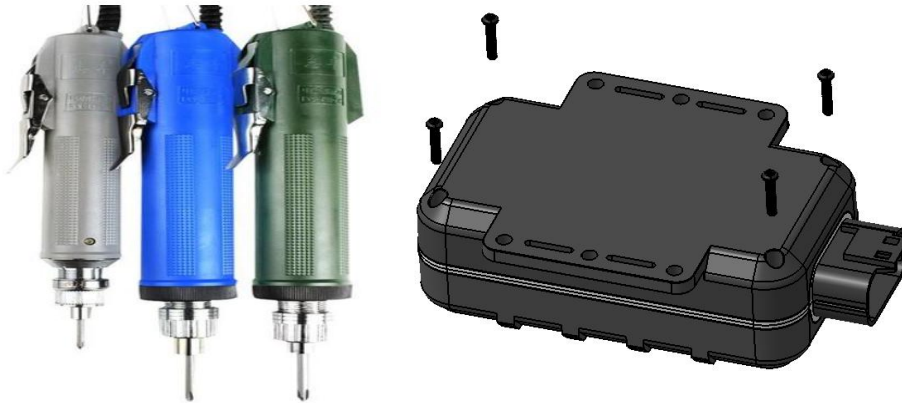
The <3V3_OUT> pin is a power output pin, mainly for peripherals power supply. This pin can output 3.3V voltage and maximum xxxmA current.

6.12. CAN Bus

The Full Feature and Standard versions of GV650 have two sets of CAN bus interfaces that can be used to connect to two different sets of CAN buses in the vehicle. <CAN_1_H><CAN1_L>is the first group CAN,<CAN_2H><CAN_2L>is the second group CAN. These two sets of CANs have separate MCUs in hardware, and the parsing of CAN information can be done using either Queclink's parsing scheme or a customized Open CAN parsing scheme. Users can choose between these two schemes according to their own needs.

7. Installation Precautions

- ◆ Firmly install the device to a reliable surface to prevent falling off.
- ◆ Make sure the side with label face to the sky to have better GNSS signal reception.
- ◆ Do not install the device under metal surface or in enclosed environments having difficulty in receive GNSS and network signal.
- ◆ Install the device in places away from water source, water can corrode the installation screws, and after a long time, the equipment may fall off from the installation position.
- ◆ 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 $4.0\text{kg}\pm 0.2\text{kg}$) 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.



8. Troubleshooting and Safety Info

8.1. Troubleshooting

Table 13. GV650 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.

8.2. Safety Info

- ◆ Do not disassemble the device more than install SIM card.
- ◆ 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.
- ◆ Be careful the electric shock when the operating voltage exceeds 36V.

9. Appendix: Supported Accessories

- ◆ BLE multi-function sensor: WMS301(Tem/Hum/Door), WTH301(Tem/Hum), WID330.
- ◆ Movement-Angle BLE Sensor: WID320G.
- ◆ BLE TPMS sensor: ATP10X.
- ◆ BLE Key Fob: WKF300, WKF310.
- ◆ RS232 RFID Reader: MR2、VD RFID、DR102.
- ◆ 1-Wire: Temperature sensor, i-Button, RFID Reader DR200.

10. FCC Warning Statement

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.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your 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.

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 and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

