SC350M User Manual

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

QSZTRACSC350MUM0101

Version: 1.01

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Contents

0. Revision History

Version	Date	Author	Description of Change
1.00	2023-07-11	Martin Ouyang	Initial
1.01	2023-08-10	Martin Ouyang	Delete Analog Input function on pin 7

1. Introduction

SC350M is a 4G IoT intelligent terminal designed specifically for E-bikes. The terminal is of compact design and is convenient for concealed installation. At the same time, it supports features such as wide-voltage power supply, Bluetooth, and vibration detection. By communicating with vehicle controllers, instruments, and BMS through CAN or UART, ECU (electronic control unit) related information (such as driving mileage, pedal assistance detection, throttle acceleration detection, brake detection, etc.), battery information (such as battery voltage, temperature, charging capacity, battery percentage, charging status, etc.), and other information can be collected. By collecting and remotely controlling E-bike data, operational management efficiency and service capabilities can be improved.

1.1. SC350M Product

Table 1. SC350M Product

Model No.	Region	Technology	Operating Band (MHz)
SC350M	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. SC350M Protocol Reference

SN	Document Name	Remark
[1]	SC350M @Track Air Interface Protocol	The air interface protocol between SC350M and backend server.

1.3. Terms and Abbreviations

Table 3. Terms and Abbreviations

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

2. Product Overview

2.1. Product Appearance

Figure 1. SC350 Product View

2.2. Parts List

Table 4. SC350M Parts List

Name	Picture	Description
SC350M Locator		LTE Cat-M1/ LTE Cat-NB2/ EGPRS/GNSS Tracker 95*45*16.2mm

3. Interface Definition

The SC350M has a 9-pin interface connector which contains the connections for power, CAN, UART, etc. The sequence and definition of the 9-pin connector are shown in the following figure:

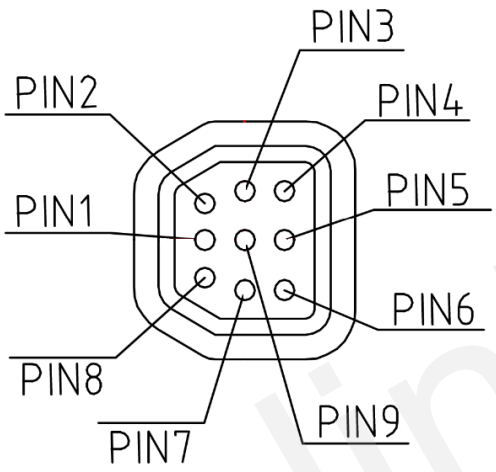


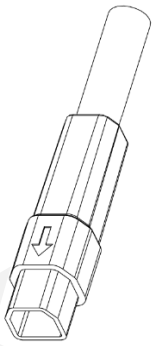
Figure 2. The 9-pin Connector on the SC350M

Table 5. Description of 9-pin Connections

Index	Description	Comment
PIN 1	Output1	Open drain, low-level active
PIN 2	UART-TX/OUT1	Configuration TXD (Compatible 5V and 3.3V TTL Level) or OD output 1
PIN 3	POWER	DC 8~60V
PIN 4	CAN-H	CAN high
PIN 5	UART-RX/OUT2	Configuration RXD (Compatible 5V and 3.3V TTL Level) or OD output 2
PIN 6	CAN-L	CAN low
PIN 7	IGN	Positive trigger for ignition detection (≥15V)
PIN 8	Output2	Open drain, low-level active
PIN 9	GND	Ground

4. SC350M Device Cable Color

Table 6. SC350M Device Cable Color Definition

Definition	Color	PIN No.	Connector
Output1	Purple	1	
UART-TX	Blue	2	
POWER	Red	3	
CAN-H	Yellow	4	
UART-RX	White	5	
CAN-L	Green	6	
IGN	Orange	7	
Output2	Brown	8	
GND	Black	9	

5. Getting Started

5.1. Opening and Closing the Case

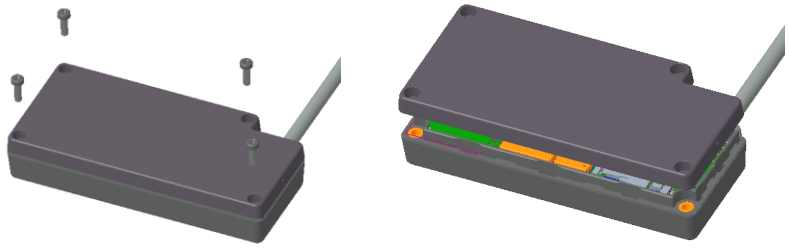


Figure 3. Open the Case

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 9-pin cable). 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.

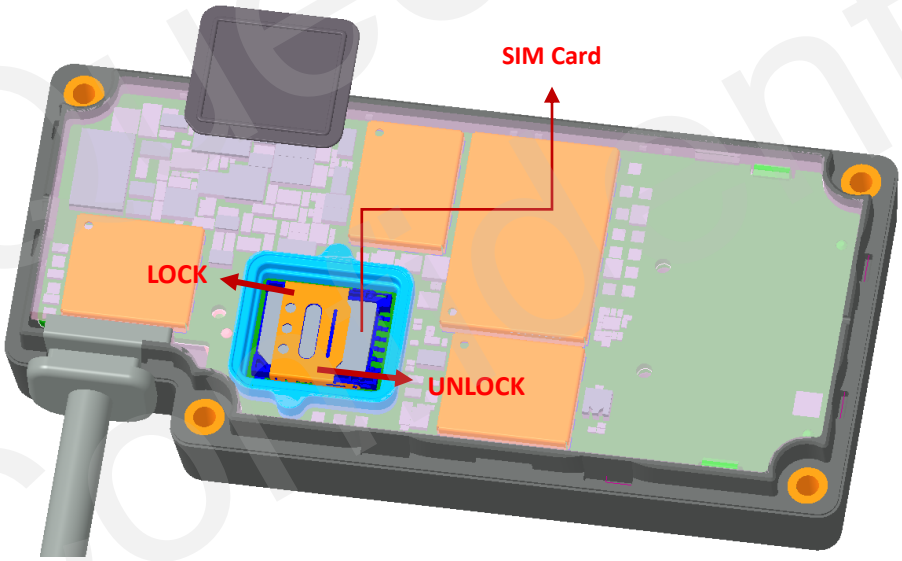


Figure 4. SIM Card Installation

Note:
Please carefully open and close the SIM card holder.

5.3. Power Supply Connection

POWER (pin 3)/GND (pin 9) are the power input pins. The input voltage range is from DC 8V to 60V. The device is designed to be installed in E-bike that operate on DC48V system without the need of external transformers.

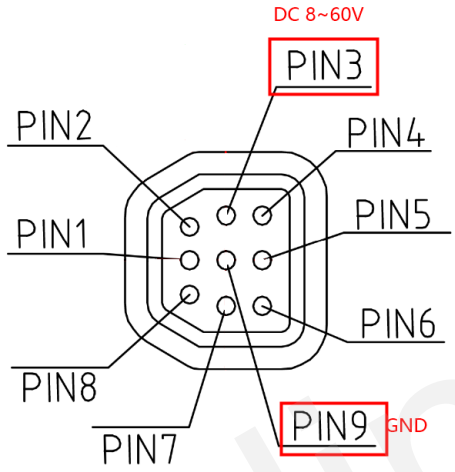


Figure 5. External Power Supply Connection

5.4. Ignition Detection

There is a positive trigger for ignition detection on SC350M, and the input voltage range is from 0 to 60V. The Ignition detection voltage needs to be greater than 15V. The following picture shows the recommended connection.

Table 7. Electrical Characteristics of Ignition Detection

Logical Status	Electrical Characteristics
Active	>15V and <60V
Inactive	0V to 15V or Open drain

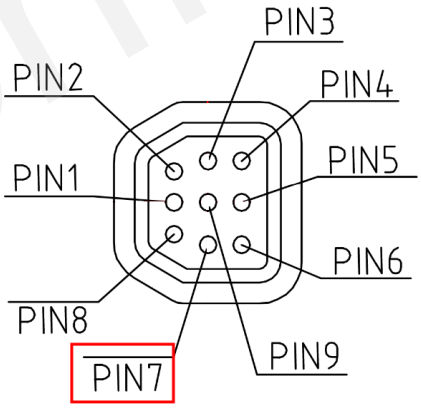


Figure 6. Typical Ignition Connection

Note:

Pin 7 is a multifunctional pin: it can be configured as Analog input detection at future.

5.5. CAN Bus Interface

Pin 4 is CAN-H, and pin 6 is CAN-L.

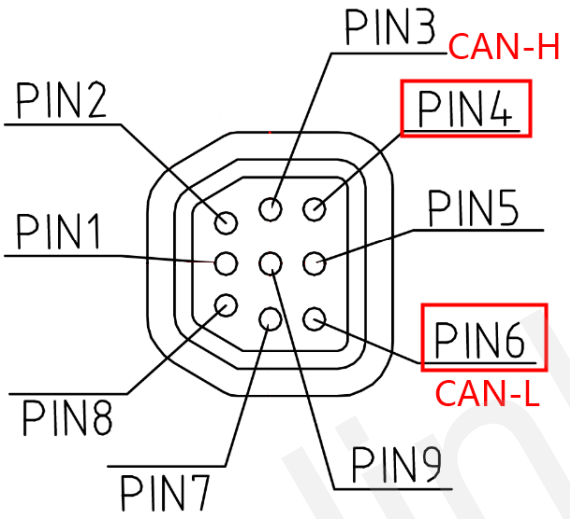


Figure 7. CAN Bus interface

5.6. UART Interface

Pin 2 is UART-TX and Pin 5 is UART-RX.

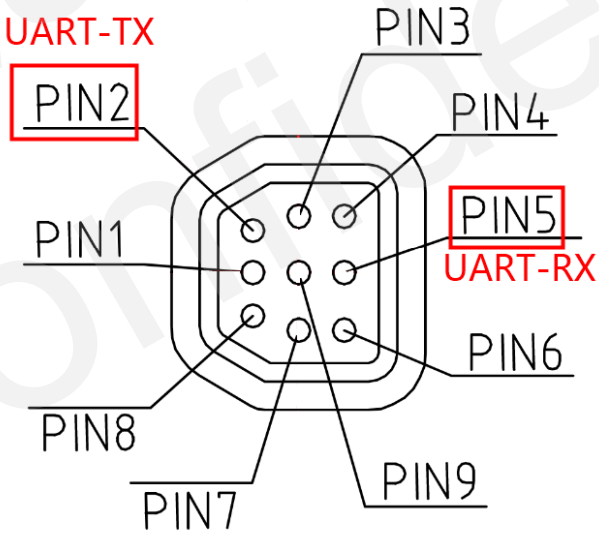


Figure 8. UART TX/RX interface

5.7. Digital Outputs

There are two digital outputs on SC350M. 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.

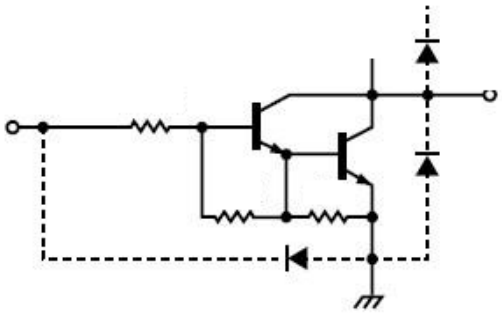


Figure 9. Digital Output Internal Drive Circuit

Table 8. Electrical Characteristics of Digital Outputs

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

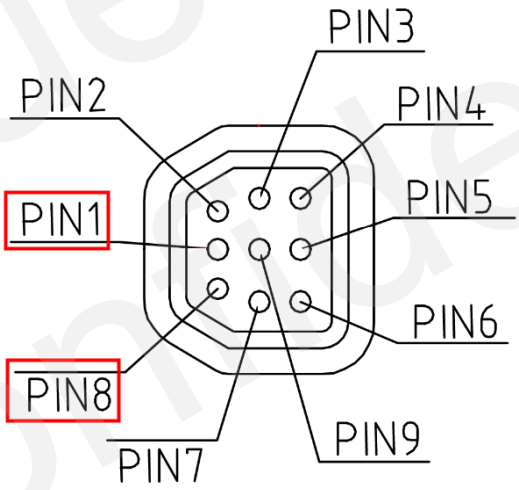


Figure 10. Typical Connection with a Relay/LED/Buzzer/Other Devices

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. 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 5.8kg±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 9. SC350M Troubleshooting List

Problem	Possible Reason	Solution
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

- Transfer cable (9-pin waterproof transfer cable)