L89 I2C Application Notes

GNSS Module Series

Rev. Quectel_L89 _I2C _Application_Note_V1.0

Date: 2020-08-29

Status: Preliminary

Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:

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GENERAL NOTES

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About the Document

Revision History

Version	Date	Author	Description
1.0	2020-08-29	Wise	Initial

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1 Introduction

This document introduces the I2C function of Quectel L89 modules. This module working as a slave provide an I2C interface which outputs NMEA data only when the data is read out by a master (client-side MCU).

In this document, customers will find a detailed introduction on how the master receives NMEA sentences and sends SDK commands via I2C bus.

1.1. Safety Information

The following safety precautions must be observed during all phases of operation, such as usage, service or repair of any cellular terminal or mobile incorporating L89 module. Manufacturers of the cellular terminal should send the following safety information to users and operating personnel, and incorporate these guidelines into all manuals supplied with the product. If not so, Quectel assumes no liability for customers' failure to comply with these precautions.

	Full attention must be given to driving at all times in order to reduce the risk of an accident. Using a mobile while driving (even with a handsfree kit) causes distraction and can lead to an accident. Please comply with laws and regulations restricting the use of wireless devices while driving.
	Switch off the cellular terminal or mobile before boarding an aircraft. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. If the device offers an Airplane Mode, then it should be enabled prior to boarding an aircraft. Please consult the airline staff for more restrictions on the use of wireless devices on boarding the aircraft.
	Wireless devices may cause interference on sensitive medical equipment, so please be aware of the restrictions on the use of wireless devices when in hospitals, clinics or other healthcare facilities.
	Cellular terminals or mobiles operating over radio signals and cellular network cannot be guaranteed to connect in all possible conditions (for example, with unpaid bills or with an invalid (U)SIM card). When emergent help is needed in such conditions, please remember using emergency call. In order to make or receive a call, the cellular terminal or mobile must be switched on in a service area with adequate cellular signal strength.
	The cellular terminal or mobile contains a transmitter and receiver. When it is ON, it receives and transmits radio frequency signals. RF interference can occur if it is used close to TV set, radio, computer or other electric equipment.
	In locations with potentially explosive atmospheres, obey all posted signs to turn off wireless devices such as your phone or other cellular terminals. Areas with potentially explosive atmospheres include fueling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles such as grain, dust or metal powders, etc.

2 Product Concept

The features of L89 modules' I2C interface include:

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- Supports fast mode, with bit rate up to 400kbps (default: 100Kbps)
- Supports 7-bit address
- Works in slave mode
- Default slave address values are: 0x3A (Write: 0x74, Read: 0x75)
- I2C pins: I2C_SDA and I2C_SCL
- I2C_SCL and I2C_SDA have been pulled up to 3.0V internally with 4.7KΩ resistors.

3 Illustration

L89 can use I2C interface to output NMEA to replace UART interface.

3.1. Connection

According to Figure 1 "I2C Connection": connect the I2C interface from I2C master to I2Cslave.

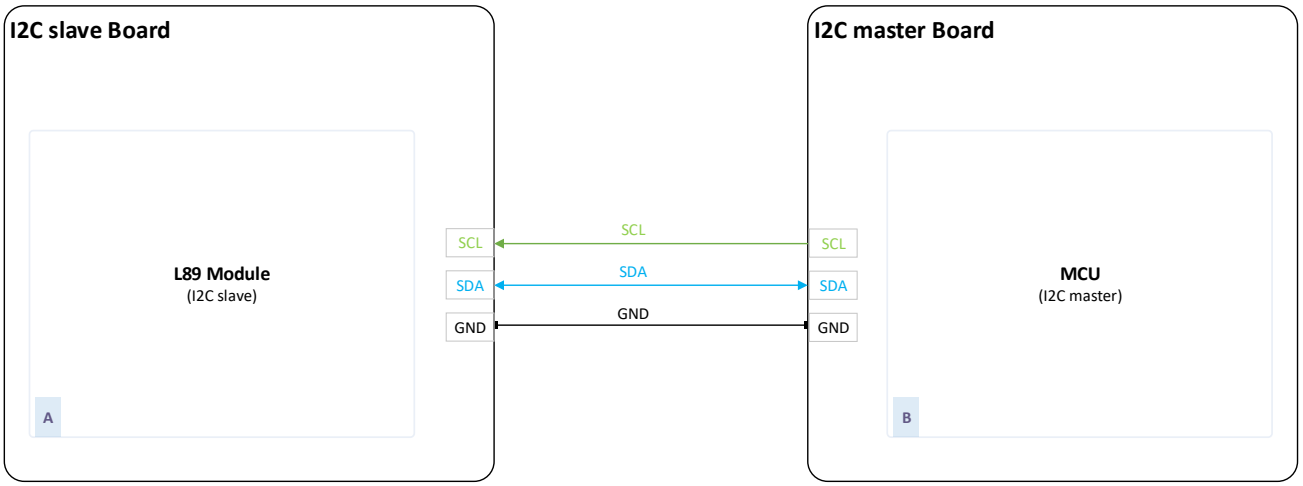

Figure 1: I2C Connection

3.2. Command setting

Usually, the default firmware output NMEA from the UART port, then the following commands need to send from UART to L89 module.

(1) NMEA on Debug Port Message List 0 (LOW)
$PSTMSETPAR,1231,0x00180056
$PSTMSAVEPAR
$PSTMSRR

(2) NMEA on Debug Port Message List 0 (HIGH)
$PSTMSETPAR,1232,0x7ec20010
$PSTMSAVEPAR
$PSTMSRR

(3) NMEA over Serial Configuration
$PSTMSETPAR,1263,0x00000e81
$PSTMSAVEPAR
$PSTMSRR

(4) Set dual NMEA
$PSTMSETPAR,1103,0xF1
$PSTMSAVEPAR
$PSTMSRR

(5) NMEA and Debug Output Redirection
$PSTMSETPAR,1124,0x81
$PSTMSAVEPAR
$PSTMSRR

NOTE

NMEA Sentence will output from I2C interface after power recycle.

3.3. I2C host (master) polling data

For I2C host(master),it need to polling data continuously.

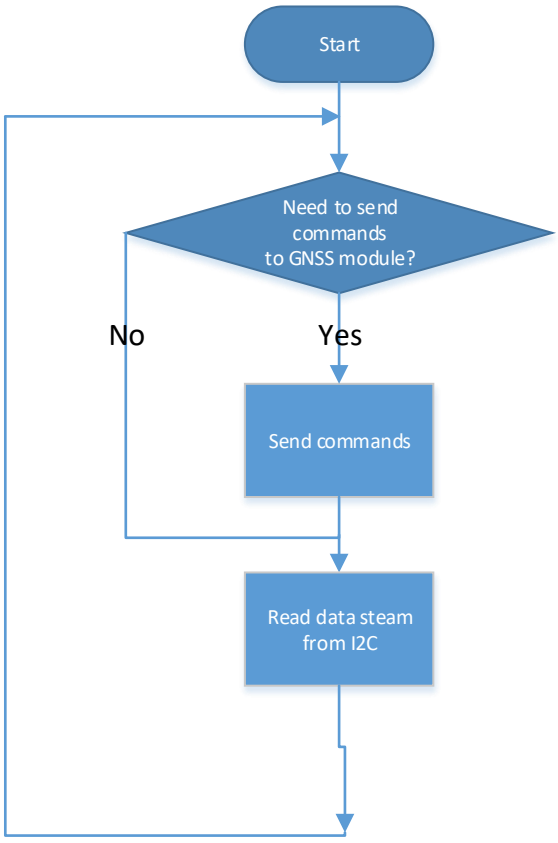

Figure 2: Poll I2C data process

The master read one I2C data stream at a time (For example: size of 255 bytes). In order to get complete NMEA packet of one second, the master needs to read several I2C data packets and then extract valid NMEA data from the packets.

Reading I2C data

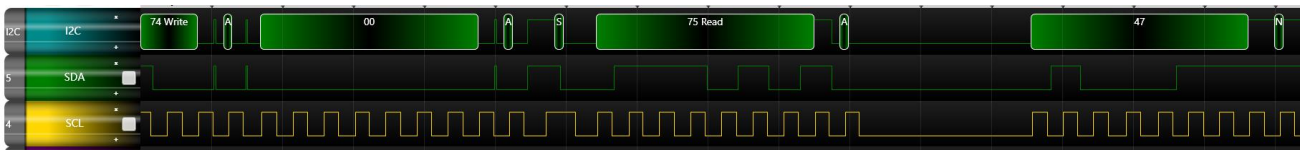

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Figure 4: Reading I2C data (SCL clock signal about 100KHz)

Table 1: Related Documents

SN	Document Name	Remark
[1]	Quectel_L89_Hardware_Design_V1.1.pdf	