

MC20-TE-A Kit

User Guide

GSM/GPRS/GNSS Module Series

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

Quectel Wireless Solutions Co., Ltd.

Office 501, Building 13, No.99, Tianzhou Road, Shanghai, China, 200233

Tel: +86 21 5108 6236

Email: info@quectel.com

Or our local office. For more information, please visit:

<http://www.quectel.com/support/salesupport.aspx>

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<http://www.quectel.com/support/techsupport.aspx>

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About the Document

History

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1 Introduction

In order to help you to develop applications with Quectel MC20 module, Quectel supplies corresponding evaluation board (EVB) Kit and TE-A Kit for you to test the module. This document can help you quickly understand MC20-TE-A interface specifications, electrical and mechanical details and know how to use it.

MC20-TE-A kit is intended to be used in combination with GSM EVB kit for MC20 module testing and evaluation. For detailed description of GSM EVB, please refer to **document [6]**.

1.1. Safety Information

The following safety precautions must be observed during all phases of the operation, such as usage, service or repair of any cellular terminal or mobile incorporating Quectel 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 customer's 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. You must comply with laws and regulations restricting the use of wireless devices while driving.



Switch off the cellular terminal or mobile before boarding an aircraft. Make sure it is switched off. The operation of wireless appliances in an aircraft is forbidden, so as to prevent interference with communication systems. Consult the airline staff about the use of wireless devices on boarding the aircraft, if your device offers a Airplane Mode which must be enabled prior to boarding an aircraft.



Switch off your wireless device when in hospitals, clinics or other health care facilities. These requests are designed to prevent possible interference with sensitive medical equipment.



Cellular terminals or mobiles operating over radio frequency signal and cellular network cannot be guaranteed to connect in all conditions, for example no mobile fee or with an invalid SIM card. While you are in this condition and need emergent help, please remember using emergency call. In order to make or receive a call, the cellular terminal or mobile must be switched on and in a service area with adequate cellular signal strength.



Your cellular terminal or mobile contains a transmitter and receiver. When it is ON , it receives and transmits radio frequency energy. 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 fuelling 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.

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2 Product Concept

2.1. MC20-TE-A Top and Bottom View



Figure 1: MC20-TE-A Top View

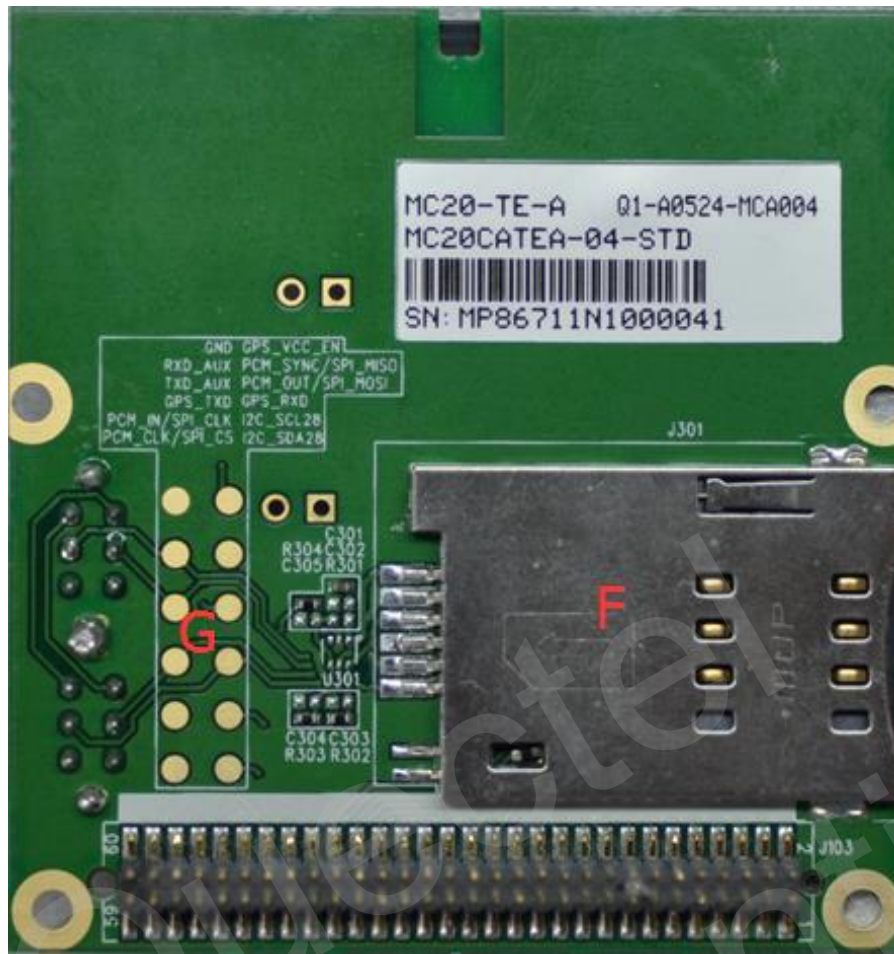


Figure 2: MC20-TE-A Bottom View

- A: Serial selector switch
- B: GSM antenna interface
- C: GNSS antenna interface
- D: BT antenna interface
- E: LED indicator
- F: SIM2 card interface
- G: Test points

NOTES

1. Some interfaces and test pins are reserved only for engineers to debug some functions which are not used for customer.
2. Some functions are only supported in certain software versions.

3 Interface Application of MC20-TE-A

3.1. SIM2 Card Interface



Figure 3: SIM2 Card Interface

Table 1: Pins of SIM2 Card Interface

Pin	Signal	I/O	Description
1	CD1		Connect to Ground
2	CD2		Not connected
3	SIM_DATA	I/O	SIM card data I/O
4	SIM_CLK	O	SIM card clock
5	VPP		Not connected

6	SIM_RST	O	SIM card reset
7	GND		Ground
8	SIM_VDD		Power supply for SIM card
9	GND		Ground
10	GND		Ground

3.2. Test Points

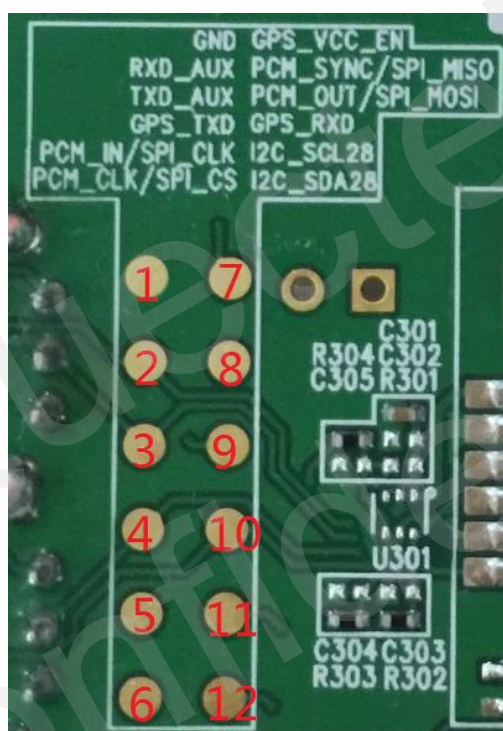


Figure 4: Test Points

Table 2: Pins of Test-point

Pin	Signal	I/O	Description
1	GND		Ground
2	RXD_AUX	I	Receive data
3	TXD_AUX	O	Transmit data

4	GNSS_TXD	O	Transmit data
5	PCM_IN/SPI_CLK		Reserved
6	PCM_CLK/SPI_CS		Reserved
7	GNSS_VCC_EN	O	GNSS power enabled
8	PCM_SYNC/SPI_MISO		Reserved
9	PCM_OUT/SPI_MOSI	I/O	General purpose input/output port
10	GNSS_RXD	I	Receive data
11	I2C_SCL28		Reserved
12	I2C_SDA28		Reserved

4 MC20-TE-A Kit Accessories Assembly



Figure 5: MC20-TE-A Toolkit Accessories

- A: GNSS Antenna
- B: CD
- C: GNSS Antenna Patch Lead

5 Illustration

MC20-TE-A kit is intended to be used in combination with GSM EVB kit for MC20 module testing and evaluation. The connection between MC20-TE-A and GNSS/GSM antenna can refer to the following figure.



Figure 6: Connection between MC20-TE-A and GNSS/GSM Antenna

5.1. Power on

Power on procedure of MC20-TE-A is controlled by GSM EVB. Please refer to **document [6]** for detailed power on procedures.

5.2. Communicate with GSM Part of Module

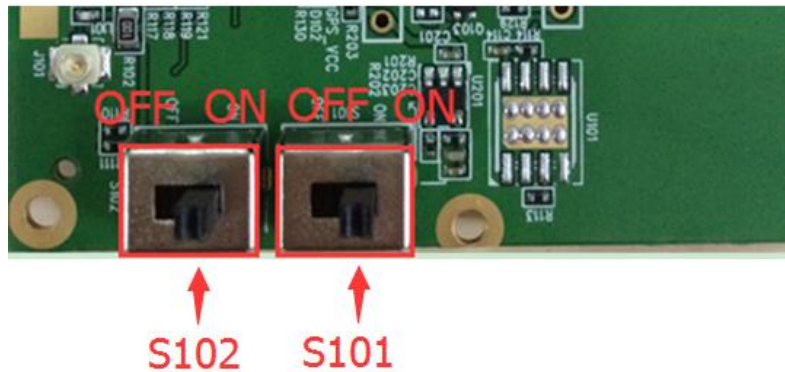


Figure 7: S101/S102 Switch Status

- (1) If the main UART is used for communication with MC20's GSM part, please turn the Switch S101 and S102 to **ON** state on MC20-TE-A, and then connect the main UART of EVB to PC's USB port with the USB to UART converter cable. This is the recommended method. Switch status description is available in the above figure.

If the UART3 is used for communication with the GSM part, please turn the Switch S101 to **OFF** and S102 to **ON** state on MC20-TE-A, and then connect the UART3 of EVB to PC's USB port with the USB to UART converter cable. Currently, the software does not support this method.

- (2) Open the HyperTerminal (AT command window) on PC. The location of the HyperTerminal in Windows XP is: START→Programs→Accessories→Communication→HyperTerminal. Set appropriate Baud Rate (such as 115200 bps) and COM number which can be checked by the Device Manager on PC.
- (3) Connect the antenna to the GSM_ANT on MC20-TE-A with an RF cable.
- (4) Insert SIM card into the SIM card socket.
- (5) Insert earphone or handset into audio interface.
- (6) For power on procedure, please refer to **document [6]**.
- (7) After waiting for 2~3 seconds, customer should first input "AT" or "at" string once or more until receiving "OK" from the module in the HyperTerminal.

The module is set to autobauding mode in default configuration. This operation is to synchronize the baud rate between the computer and the module.

- (8) Input AT command and the module will execute its corresponding function.

Customer can refer to **Chapter 7** in **document [5]** for the details of AT commands. For instance, when input **ATD112**, an emergency call will be established.

5.3. Communicate with GNSS Part of Module

5.3.1. Use Main UART (All-in-one Solution)

- (1) Turn the Switch S101 and S102 to **ON** state on MC20-TE-A, and then connect the main UART of EVB to PC's USB port with the USB to UART converter cable. This is the recommended method.
- (2) Open the HyperTerminal (AT command window) on PC. The location of the HyperTerminal in Windows XP is: START→Programs→Accessories→Communication→HyperTerminal. Set appropriate Baud Rate (such as 115200 bps) and COM number which can be checked by the Device Manager on PC.
- (3) Connect the antenna to the GNSS_ANT on MC20-TE-A with an RF cable.
- (4) For power on procedure, please refer to **document [6]**.
- (5) After waiting for 2~3 seconds, customer should first input "AT" or "at" string once or more until receiving "OK" from the module in the HyperTerminal.
- (6) Send corresponding AT commands to turn on/off the GNSS part. When GNSS is powered on, the LED D102 on MC20-TE-A will be lighted and NMEA data will be output. For details of the corresponding AT commands, please refer to **document [1]**.

5.3.2. Use UART3 (Stand-alone Solution)

- (1) Turn the Switch S101 to **ON** and S102 to **OFF** state on MC20-TE-A, and then connect the UART3 of EVB to PC's USB port with the USB to UART converter cable.
- (2) Using a short circuit cap to connect the J107.

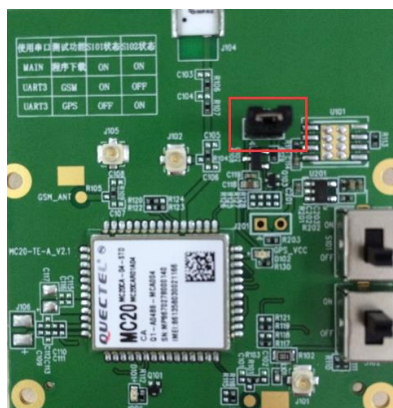


Figure 8: J107 Short Circuit Connection

- (3) Connect the antenna to the GNSS_ANT on MC20-TE-A with an RF cable.
- (4) Insert the plug of the 5V power adapter. Turn the Switch S202 to **ON** state on the EVB. The LED D503 on the EVB and the LED D102 on MC20-TE-A will be lighted.
- (5) The PowerGPS tool can be used to view the status of GPS & GLONASS receiver conveniently. When the tool is opened, the user interface as shown below will be displayed.

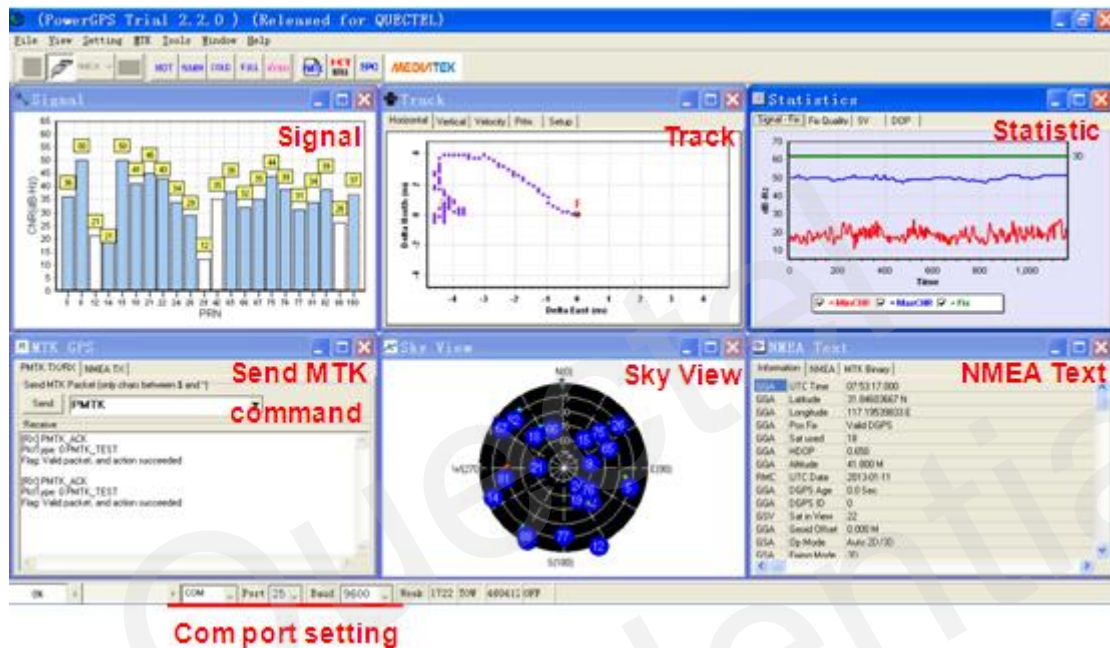


Figure 9: PowerGPS Tool

5.4. Firmware Upgrade through the Main UART Port

- (1) Switch the S101 and S102 on MC20-TE-A to **ON** state.
- (2) Start the Firmware Upgrade Tool in the PC.
- (3) Press the **START** button in the Firmware Upgrade Tool.
- (4) Switch the S201 and S202 on the EVB to **ON** state. For details, please refer to **document [6]**.

After these steps, the firmware upgrading process will be proceeding. For more details, please refer to **Chapter 7** in **document [4]**.

5.5. Compatible Design and Applications

When testing the GNSS function, a passive antenna is recommended to be used. In this case, there is no need to mount Resistor R102 (10 ohm, 0805 package). If an active antenna is used, then R102 should be mounted.



Figure 10: Using a Passive Antenna

When testing the BT function, the built-in Bluetooth antenna of MC20-TE-A is recommended to be used. In this case, Resistor R108 (0 ohm, 0402 package) is mounted, while Resistor R104 (0 ohm, 0402 package) is not mounted. If an external Bluetooth antenna is used, then R104 should be mounted and R108 should not be mounted.

Built-in Bluetooth Antenna

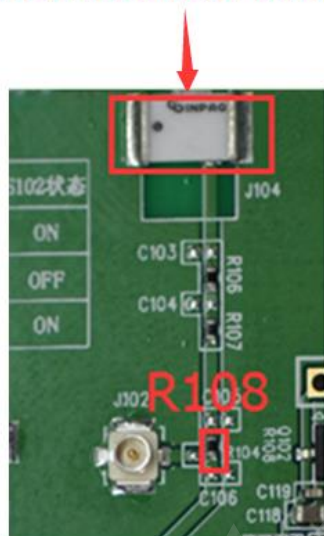


Figure 11: Using the Built-in Bluetooth Antenna



Figure 12: Using an External Bluetooth Antenna

6 60-pin Assignment

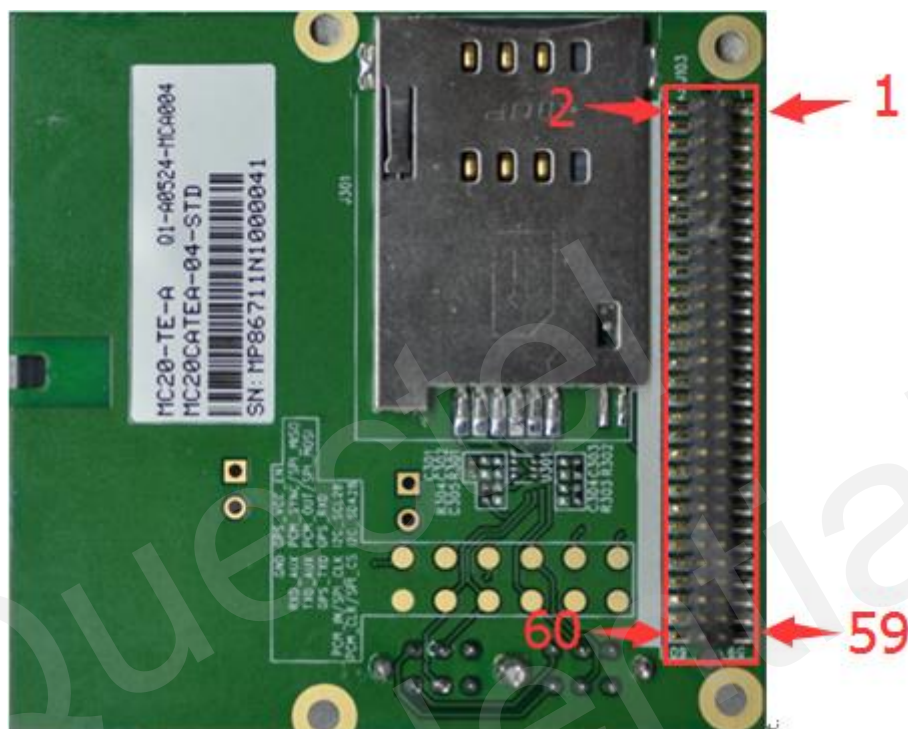


Figure 13: DIP Connector of MC20-TE-A

Table 3: Pin Definition of the 60-pin DIP Connector

Pin NO.	Pin Name	I/O	Pin NO.	Pin Name	I/O
1	VBAT	I	2	GND	
3	VBAT	I	4	GND	
5	VBAT	I	6	GND	
7	VBAT	I	8	GND	
9	VBAT	I	10	GND	
11	/	/	12	ADC0	I
13	/	/	14	VRTC	I/O
15	VDD_EXT	O	16	NETLIGHT	O
17	PWRKEY	I	18	KBR0	O
19	/	/	20	KBR1	O
21	GPIO0	I/O	22	KBR2	O
23	/	/	24	TXD3	O
25	SIM1_VDD	O	26	RXD3	I
27	SIM1_RST	O	28	KBC0	I
29	SIM1_DATA	I/O	30	KBC1	I
31	SIM1_CLK	O	32	/	/
33	SIM1_PRESENCE	I	34	/	/
35	/	/	36	/	/
37	DCD	O	38	SD_CMD	O
39	DTR	I	40	SD_CLK	O
41	RXD	I	42	SD_DATA	I/O
43	TXD	O	44	/	/
45	RTS	I	46	/	/
47	CTS	O	48	DBG_RXD	I
49	RI	O	50	DBG_TXD	O
51	/	/	52	/	/

53	SPK1P	O	54	MICP	I
55	SPK1N	O	56	MICN	I
57	SPK2P	O	58	MICP	I
59	/	/	60	MICN	I

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7 Appendix A References

Table 4: Related Documents

SN	Document Name	Remark
[1]	Quectel_MC20_AT_Commands_Manual	AT commands manual
[2]	Quectel_GSM_UART_Application_Note	Serial port application note
[3]	Quectel_MC20_Hardware_Design	Hardware design
[4]	Quectel_GSM_FW_UPGRADE_AN01	Firmware upgrade application note
[5]	Quectel_GSM_DUAL_UART_Application_Note	GSM DUAL UART application note
[6]	Quectel_GSM_EVB_User_Guide	GSM EVB user guide