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TRM201 Wireless Data Transceiver Module

User Manual

(Version: V1.0)

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Goelectron

Guangzhou Goelectron Science & Technology Company Limited

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1、 Technical specifications

Technical specifications		
Specification name	specification requirements	
Frequency rage	410~470MHz	
Working type	half-duplex	
Channel spacing	6.25KHz / 12.5KHz / 25KHz	
Modulation type	GMSK	
Operating voltage	3.6V \pm 10%(TX state, not more than 4V)	
Power consumption	Transmitted power	5W
	Receive power	0.5W
Frequency stability	$\leq \pm 1.0$ ppm	
Size	57×36×7mm	
Weight	66g	
Operating temperature	-40~+85°C	
Storage temperature	-45~+90°C	
Antenna interface	IPX or MMCX	
Antenna impedance	50ohm	
Data interface	20pin	
Transmitter specification		
Specification name	specification requirements	
RF output power	High power (2.0W)	33±1dBm@DC 3.6V
RF power stability	±0.3dB	
Adjacent channel inhibition	>50dB	
Receiver specification		
Specification name	specification requirements	
Sensitivity	Better than -115dBm@BER 10 ⁻⁵ · 9600bps	
Co-channel inhibition	>-12dB	
Block	>70dB	
Adjacent channel selectivity	>52dB@25KHz	

perturbation resistance stray	>55dB
Modulator	
Specification name	Specification requirements
Air rate	4800bps, 9600bps,19200 bps
Modulation method	GMSK

2、 Definition of interface connector pin

Pin No.	Input/output	definition
1	Input	VCC
2	Input	VCC
3	Input/output	GND
4	Input/output	GND
5	NC	No use
6	Input	Enable
7	Output	RXD
8	NC	No use
9	Input	TXD
10	NC	No use
11	NC	No use
12	NC	No use
13	NC	No use
14	NC	No use
15	NC	No use
16	NC	No use
17	Input	Config
18	NC	No use
19	NC	No use
20	NC	No use

3、Transceiver command instructions

3.1 Serial port configuration in the factory state.

serial port baud rate setting	38400
Data bits	8
Stop bit	1
Check bit	none

3.2 Basic command

- 3.3.1 TX 【parameter】
Function: set the transmission frequency (MHz)
Parameter choice: 410.000 – 470.000
Example: TX 466.125 show: “PROGRAMMED OK”
- 3.3.2 TX
Function: Check the transmission frequency
Example: TX show: “TX 466.12500 MHz”
- 3.3.3 RX 【parameter】
Function : set receive frequency (MHz)
Parameter choice: 410.000 – 470.000
Example: RX 466.125 show: “PROGRAMMED OK”
- 3.3.4 RX
Function: Check the receive frequency
Example: RX show: “RX 466.12500 MHz”
- 3.3.5 BAUD 【parameter】
Function : set air baud rate (bps)
Parameter choice: 9600、19200
Example : BAUD 9600 show: “PROGRAMMED OK”
- 3.3.6 BAUD
Function : check the air baud rate (bps)
Example : BAUD show: “BAUD 9600”
- 3.3.7 PWR 【parameter】
Function: set the transmission power
Parameter choice: H、L
Example: PWR L show “PROGRAMMED OK”
- 3.3.8 PWR
Function: check the transmission power
Example: PWR show “PWR L”
- 3.3.9 CHANNEL 【parameter】
Function: Set the current channel
Parameter choice: 0、1、2、3、4、5、6、7
Example: CHANNEL 0 show “PROGRAMMED OK”
- 3.3.10 CHANNEL
Function: Check the current channel
Example: CHANNEL show “CHANNEL 0”
- 3.3.11 PRT 【parameter】
Function: Set current protocol type
Parameter choice: TRIMTALK、TRIMMK3、SOUTH

- 3.3.12 Example: PRT TRIMTALK show “PROGRAMMED OK”
PRT
Function: Check current protocol type
- 3.3.13 Example: PRT show “PRT TRIMTALK”
SREV
Function: Check current software version
- 3.3.14 Example: SREV show “GA0B11O12D15.09.12”
SER 【parameter】
Function: Set the serial number
Parameter choice: Less than 16 numbers of ASCII
Example: SER TRU201-006 show “PROGRAMMED OK”
note: Serial number is the only remark for the UHF, so it’s forbidden to change the serial number by software.
- 3.3.15 SER
Function: Check the serial number
Example: SER show “SN:TRU201-006”
note: If UHF has never set the SN with no.14 command, so only show the “SN:”
- 3.3.16 FLOW
Function: Check the lower limit of UHF frequency.
Example: FLOW show “FLOW 410”
- 3.3.17 FUPP
Function: Check the upper limit of UHF frequency.
Example: FUPP show “FUPP 470”
- 3.3.18 SBAUD 【parameter】
Function: Set baud rate of Communication interface.
Parameter choice: 9600、19200、38400、57600、115200
Example: SBAUD 38400 show “PROGRAMMED OK”
- 3.3.19 SBAUD
Function: Check baud rate of Communication interface.
Example: SBAUD show “SBAUD 38400”

3.4 Special commands

- 3.4.1 CCA 【parameter】
Function: Check the received signal strength value (dBm) of the specified channel (MHz).
Parameter choice: 410.000 – 470.000
Example: CCA 466.125 show:
1) CCA 【parameter 1】:【parameter 2】, Example “CCA 466.125:-106.125”, indicate the received signal strength value is 466.125MHz in the current channel.
2) “CCA 466.125:ERROR”, indicate the test is failed. But it is not indicated that all the channels to be tested are applicable, but it is only the failure for the test operation without connecting the antenna, or too closer to the emission source, etc. may lead to the test failure.
- 3.4.2 RSSI
Function: Check the received signal strength value.
Example: RSSI show:
1) RSSI indicates it doesn’t receive any data in the protocol, so it can’t show the received signal strength value.
2) RSSI -52.478 -48.063, -52.478 (dBm)

4、 Installation of radio

Figure 1 shown the installation dimension of data transceiver module, firmly fitted the radio modem onto the mounting surface of user system by holes on radio modem 4 corners.

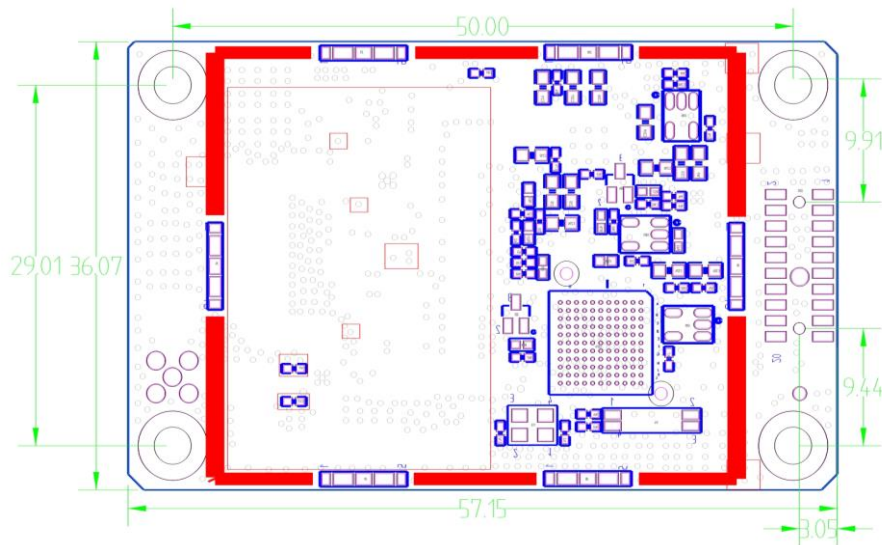


Figure 1 Radio Modem installation dimension

5 Main Power Supply

TRM201 can operate with any 3.6V power supply, which comes from data interface connector with good filtered. The power must supply 1.6A current at least and featured with current-limiting, even if you make radio modem operating on low power mode (0.5W).

6 Warning

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.

7、 FCC radiation exposure statement

This equipment complies with FCC radiation exposure limits set forth for a controlled environment.

This equipment should be installed and operated with minimum distance 50cm between the radiator & your body.

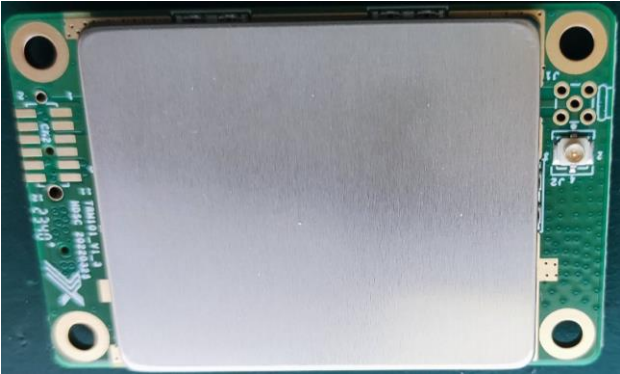
Only service personnel have access to the programming capabilities.

The end users in all these cases must not be able to program the radios.

This Licensed transmitter is approved as a module for installation into the final devices providing the FCC criteria is met:

1. The final device is designed for fixed operation.
2. The maximum antenna gain to allow compliance with RF exposure requirement that is listed on the Grant of Certification must be followed.
3. If the label of the module is not visible on the final device, the final device should contain the following text: "Contains FCC ID: 2ABNA-TRM201"

8、Photo



FCC warning statements:

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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your 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.

The device has been evaluated to meet general RF exposure requirement.

IC warning statements:

-English Warning Statement:

RSS-GEN ISSUE 5, 8.4 User manual notice

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

The digital apparatus complies with Canadian CAN ICES-3 (B)/NMB-3(B).

-French Warning Statement:

RSS - Gen version 5, 8.4 avis du manuel de l'utilisateur

Cet appareil contient un émetteur / récepteur sans licence conforme au RSS sans licence d'innovation, science et développement économique Canada. L'opération doit satisfaire aux deux conditions suivantes:

Cet équipement peut ne pas causer d'interférence.

L'équipement doit accepter toute interférence, y compris toute interférence qui pourrait entraîner un fonctionnement indésirable de l'équipement.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment has very low levels of RF energy that are deemed to comply without testing of specific absorption ratio (SAR). Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles d'exposition aux fréquences radio électriques (RF) CNR-102 de l'IC. Cet équipement émet une énergie RF très faible qui est considérée conforme sans évaluation du débit d'absorption spécifique (DAS).

This equipment should be installed and operated with minimum distance 50cm between the radiator & your body.

Lors de l'installation et du fonctionnement de cet équipement, la distance minimale entre le radiateur et le corps doit être de 50cm.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEMManual v01

Conditions on using Guangzhou Geoelectron Science & Technology Company Ltd. regulatory approvals:

- A. Customer must ensure that its product (The "CUSTOMER Product") is electrically identical to GUANGZHOU GEOELECTRON SCIENCE & TECHNOLOGY COMPANY LTD. reference designs. Customer acknowledges that any modifications to GUANGZHOU GEOELECTRON SCIENCE & TECHNOLOGY COMPANY LTD. reference designs may invalidate regulatory approvals in relation to the CUSTOMER Product, or may necessitate notifications to the relevant regulatory authorities.
- B. Customer is responsible for ensuring that antennas used with the product are of the same type, with same or lower gains as approved and providing antenna reports to GUANGZHOU GEOELECTRON SCIENCE & TECHNOLOGY COMPANY LTD..
- C. Customer is responsible for regression testing to accommodate changes to GUANGZHOU GEOELECTRON SCIENCE & TECHNOLOGY COMPANY LTD. reference designs, new antennas, and portable RF exposure safety testing/approvals.
- D. Appropriate labels must be affixed to the CUSTOMER Product that comply with applicable regulations in all respects.
- E. A user's manual or instruction manual must be included with the customer product that contains the text as required by applicable law. Without limitation of the foregoing, an example (for illustration purposes only) of possible text to include is set forth below:

2.2 List of applicable FCC rules

FCC CFR Title 47 Part 90, FCC CFR Title 47 Part 2

2.3 Specific operational use conditions

Radio Technology: UHF

Operation frequency : 410MHz-470MHz

Conducted Power : 2W(33±1dBm)

Channel spacing : 6.25KHz, 12.5KHz, 25KHz

Modulation type : GMSK

Antenna Type : Rod antenna, Maximum Gain is 4dBi.

The module can be used for mobile applications with a maximum 4 dBi antenna. The host manufacturer installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation. The host manufacturer has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as shown in this manual.

2.4 Limited module procedures

Not applicable. The module is a Single module and complies with the requirement of FCC Part 15.212.

2.5 RF exposure considerations

This module needs to be used on mobile devices located 50cm away from the human body and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

2.6 Antennas

Antenna Specification are as follows:

Antenna Type: Rob antenna

Antenna Gain(Peak):4 dBi (Provided by customer)

This device is intended only for host manufacturers under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna;

The module shall be only used with the External antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a 'unique' antenna coupler.

As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

2.7 Label and compliance information

Host product manufacturers need to provide a physical or e-label stating "Contains FCC ID: 2ABNA-TRM201" With their finished product.

2.8 Information on test modes and additional testing requirements

Radio Technology: UHF

Operation frequency : 410MHz-470MHz

Conducted Power : 2W(33±1dBm)

Channel spacing : 6.25KHz, 12.5KHz, 25KHz

Modulation type : GMSK

Antenna Type : Rod antenna, Maximum Gain is 4dBi.

Host manufacturer can contact with Guangzhou Geoelectron Science & Technology Company Ltd. to get how to implement the above function, and how to reproduce the testing mode during certification, if possible, Guangzhou Geoelectron Science & Technology Company Ltd. can supply the certification sample to host manufacturer.

Host manufacturer must perform test of radiated & conducted emission and spurious emission, etc according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. If no other module used and no change to this module, the product can only to compliance with FCC part 15 B to meet the sale requirement.

Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

2.9 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC CFR Title 47 Part 90, FCC CFR Title 47 Part 2 that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

2.10 How to address changes to conditions, operation and/or restrictions

Please refer to the additional section 2.1 of this manual.