Geoelectron TRM201 Wireless Data Transceiver Module

Geoelectron TRM201 Wireless Data Transceiver Module User Manual

Contents

1 Geoelectron TRM201 Wireless Data Transceiver Module
2 Technical specifications
3 Definition of interface connector pin
4 Transceiver command instructions
4.1 Special commands
5 Installation of radio
6 Main Power Supply
7 FCC radiation exposure statement
8 Photo
9 FCC warning statements
10 IC warning statements
11 Documents / Resources
11.1 References

Geoelectron TRM201 Wireless Data Transceiver Module

File information

File type	UHF	Total 8 pages
Model	TRM201	
Product code		
Product name	Wireless Data Transceiver Module	

Author: Xianrong Yu **Date:** 20231116

reviewer: _____ **Date:** _____

signer: _____ **Date:** _____

approved: _____ **Date:** _____

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 ±10%(TX state, not more than 4V)	
Power consumption	Transmitted power	5W
	Receive power	0.5W
Frequency stability	≤±1.0ppm	
Size	57×36×7mm	
Weight	66g	
Operating temperature	-40~+85℃	
Storage temperature	-45~+90℃	
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

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

Transceiver command instructions

Serial port configuration in the factory state.

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

Basic command

TX [parameter]

- **Function:** set the transmission frequency (MHz)
- **Parameter choice**: 410.000 – 470.000
- **Example:** TX 466.125 shows: “PROGRAMMED OK”

TX

- **Function:** Check the transmission frequency
- **Example:** TX show: “TX 466.12500 MHz” RX [parameter)
- **Function:** set receive frequency (MHz)
- **Parameter choice:** 410.000 – 470.000
- **Example:** RX 466.125 shows: “PROGRAMMED OK”

RX

- **Function:** Check the receive frequency
- **Example:** RX show: “RX 466.12500 MHz” BAUD [parameter]
- **Function:** set air baud rate (bps)
- **Parameter choice**: 9600. 19200
  Example: BAUD 9600 show: “PROGRAMMED OK”

BAUD

- **Function:** check the air baud rate (bps)
- **Example:** BAUD show: “BAUD 9600” PWR (parameter)
- **Function:** set the transmission power
- **Parameter choice**: H. L

Example: PWRL show “PROGRAMMED OK”

PWR

- **Function:** check the transmission power
- **Example:** PWR show “PWRL” CHANNEL [parameter]
- **Function:** Set the current channel

- **Parameter choice**: 0. 1. 2. 3. 4. 5. 6. 7
- **Example:** CHANNELS show “PROGRAMMED OK” CHANNEL
- **Function:** Check the current channel
- **Example:** CHANNEL show “CHANNELS” PRT [parameter
- **Function:** Set current protocol type
- **Parameter choice:** TRIMTALK. TRIMMK3. SOUTH Example PRT TRIMTALK shows how“PROGRAMMED OK OK”

PRT

- **Function:** Check current protocol type
- **Example:** PRT show “PRT TRIMTALK”

SREV

- **Function:** Check the current software version
- **Example:** SREV show “GAOB11012D15.09.12”

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.

SER

- **Function:** Check the serial number
- **Example:** SER shows “SN: TRU201-006”
  note: If UHF has never set the SN with no.14 command, so only show the “SN:”

FLOW

- **Function:** Check the lower limit of UHF frequency.
- **Example:** FLOW show “FLOW 410”

FUPP
Function: Check the upper limit of UHF frequency.
Example: FUPP show “FUPP 470”

SBAUD [parameter

- **Function:** Set the baud rate of the Communication interface.
- **Parameter choice:** 9600. 19200. 38400. 57600. 115200
- **Example:** SBAUD 38400 show “PROGRAMMED OK”

SBAUD
Function: Check the baud rate of the Communication interface.
Example: SBAUD show “SBAUD 38400”

Special commands

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 shows:

1. CCA [parameter 1]: [parameter 2), Example “CCA 466.125:-106.125”, indicates the received signal strength value is 466.125MHz in the current channel. “CCA 466.125:ERROR”, indicates 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 close to the emission source, etc. may lead to the test failure.

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)

Installation of radio

figures 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

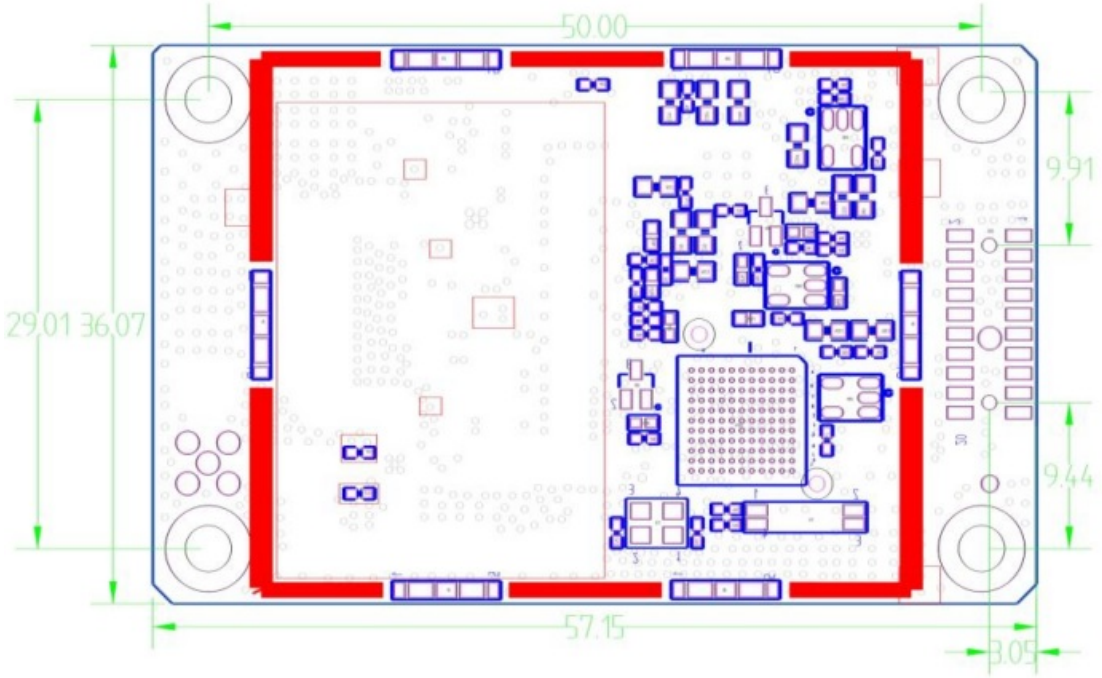

Figure 1 Radio Modem installation dimension

Main Power Supply

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

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.

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 a minimum distance of 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 are 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”

Photo

FCC warning statements

This equipment has been tested and found to comply with the limits for a Class B digital device, under 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 under 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 the receiver.
- Connect the equipment to 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 the 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 requirements.

IC warning statements

RSS-GEN ISSUE 5, 8.4 User manual notice
This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s license-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). 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 specifc absorption ratio (SAR).This equipment should be installed and operated with a minimum distance 50cm between the radiator & your body.

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

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

- 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.
- 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..
- 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.

- Appropriate labels must be affixed to the CUSTOMER Product that comply with applicable regulations in all respects.
- 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:

List of applicable FCC rules
FCC CFR Title 47 Part 90, FCC CFR Title 47 Part 2

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 of 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/warnings as shown in this manual.

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

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 is 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.

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 tests 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.).

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.

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 manufacturers can contact Guangzhou Geoelectron Science & Technology Company Ltd. to learn 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 the host manufacturer. Host manufacturer must perform tests 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 is used and no change to this module, the product can only comply 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 be sold legally.

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 circuity), 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.

Documents / Resources

	Geoelectron TRM201 Wireless Data Transceiver Module [pdf] User Manual TRM201, TRM201 Wireless Data Transceiver Module, Wireless Data Transceiver Module, Data Transceiver Module, Transceiver Module, Module

References

- User Manual