Geoelectron TRM101 Wireless Data Transceiver Module User Manual

Contents

Geoelectron TRM101 Wireless Data Transceiver Module

Technical specifications

Feature:

1. Transmit and receive, support 410~470MHz.

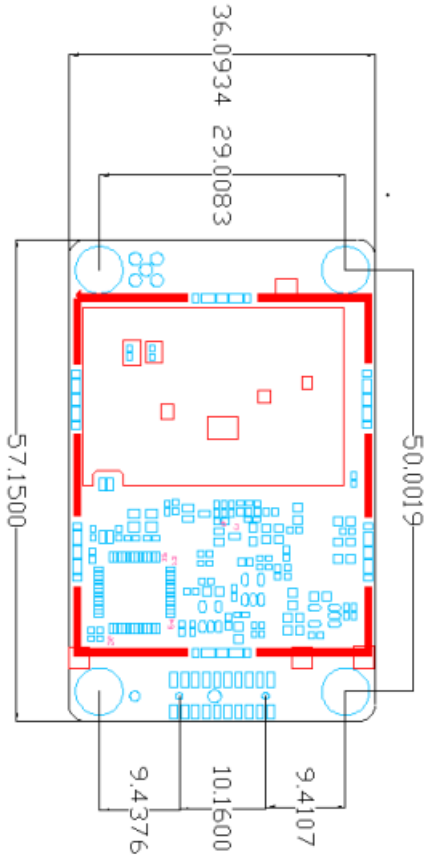
2. High reliability, RF port contact discharge 8KV 200 times continuous discharge point is not damaged, can be used in different complex environments.
3. Optimized design of RF transmission chain PA, 46.5% efficiency.
4. Supported protocols include TRIMTALK, TRIMMK3, SOUTH, TRANSEPT, GEOTALK, GEOMK3, SATEL, TARGET, PCCEOT, PCCFST, SATEL_ADL, PCCFST_ADL and support interoperability protocols of mainstream manufacturers.
5. Harmonic control meets CE requirements; minimizes the impact of the third harmonic on GNSS receivers.
6. Module has passed the certification standard of FCC, CE, KC.

Technical specifications		
Specification name	specification requirements	
Frequency rage	410~470MHz	
Working type	half-duplex	
Channel spacing	6.25KHz / 12.5KHz / 25KHz	
Modulation type	4FSK/GMSK	
Operating voltage	3.3V ±10%(TX state, not more than 4V)	
Power consumption	Transmitted power	3.3W
	Receive power	0.48W
Frequency stability	≤±1.0ppm	
Size	57×36×7mm	
Weight	16g	
Operating temperature	-40~+60℃	
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 1.0W	30±0.3dBm@DC 3.3V
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	4FSK/GMSK

Hardware structure

Dimensions (bottom perspective)

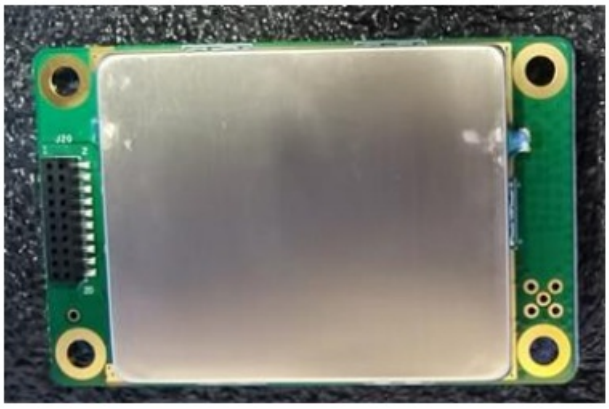


Photos of Product

Front view:

Note: IPX port connect antenna, radio frequency signals are received and transmitted

Back view:



Note: 20PIN-connect to host, input and output data

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	TXD UHF data output
8	NC	No use
9	Input	RXD UHF data input
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 (default as high radio data mode, need to pull low configuration to enter command mode)
18	NC	No use
19	NC	No use
20	NC	No use

Antenna information

Technical parameters	
Frequency range (MHz)	410～470
Bandwidth (MHz)	20
Polarization mode	Vertical
Gain (dBi)	4
Input impedance (Ω)	50
Voltage standing wave ratio	≤2.0
Maximum power (W)	20
Joint type	TNC
Antenna length (mm)	293
Antenna weight (g)	50
Extreme wind speed (km/h)	90

Remark: Antenna structure for elastic whip, and resistance to bending.

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 show:“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 show:“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 4800 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 PWR L show “PROGRAMMED OK”

- **PWR**

  Function: check the transmission power

  Example PWR show “PWR L”

- **CHANNEL parameter**

  Function Set the current channel

  Parameter choice 0~16

  Example CHANNEL 1 show“PROGRAMMED OK”

  Note: Note: After setting CHANNEL, the frequency of transmission and reception will be modified to the frequency of the corresponding channel. After setting CHNANEL and then setting the TX frequency, the transmit frequency will be changed to the frequency set by TX, After setting CHNANEL and then setting the RX frequency, the receiving frequency will be changed to the frequency set by RX. The opposite setting order also works.

- **CHANNEL**

  Function Check the current channel Example CHANNEL show “CHANNEL 1”

- **CHANNELTABLE parameter 1 parameter 2**

  Function Set frequency of channel

  Parameter parameter 1 (channel): 1~16, parameter 2 (frequency): 410.0 – 470.0 902.4 – 9285 Example CHANNELTABLE 1 414.015 show “PROGRAMMED OK”

- **CHANNELTABLE parameter**

  Function Check frequency of channel

  Parameter 1~16

  Example CHANNELTABLE 1 show “CHANNELTABLE 1 414.015000”

- **PRT parameter**

  Function Set current protocol type

  Parameter choice TRIMTALK TRIMMK3 SOUTH TRANSEOT GEOTALK GEOMK3 SATEL HITARGET PCCEOT PCCFST SATEL_ADL PCCFST_ADL

  Example PRT TRIMTALK show“PROGRAMMED OK”

- **PRT**

  Function Check current protocol type

Example PRT show“PRT TRIMTALK”

- **SREV**

  Function Check current software version

  Example SREV show the current software version“G001.02.07”

- **SER**

  Function Check the serial number

  Example SER show“SN:TRM218030242”

  note If UHF has never set the SN with no.14 command, so only show the “SN:”

- **CTIME**

  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.

- **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 baud rate of Communication interface.

  Parameter choice 9600 19200 38400 57600 115200

  Example SBAUD 38400 show“PROGRAMMED OK”

- **SBAUD**

  Function Check baud rate of Communication interface (unit:bps)

  Example SBAUD show“SBAUD 38400”

- **BOOTVER**

  Function Check current BOOT version

  Example BOOTVER show“15.09.23”

- **HWVER**

  Function Check hardware version

  Example HWVER show“V1.0”

- **MODEL**

  Function Check model.

  Example MODEL show“TRM101”

- **PWRL**

  Function Check L-grade power indicator

  Example PWRL show“0.500”

- **PWRH**

  Function Check H-grade power indicator

  Example PWRH show“1.000”

- **SPRT**

  Function Check the supported protocols

Example SPRT show

“TRIMTALK;TRIMMK3;SOUTH;TRANSEOT;GEOTALK;GEOMK3;SATEL; HITARGET; PCCEOT; PCCFST; SATEL_ADL; PCCFST_ADL”

- **SBAUDRATE**

  Function Check air baud rate(unit bps)

  Example SBAUDRATE show“4800; 9600; 19200”

- **TEMP**

  Function Check current temperature(℃)

  Example TEMP show“36.808”

- **U**

  Function Check present supply voltage.

  Example U show“3.288”

- **RPT parameter**

  Function Set relay mode

  Parameter ON/OFF

  Example Enable relay function “RPT ON”, show “PROGRAMMED OK”

- **RPT**

  Function Check relay mode

  Example RPT show “RPT OFF”

- **FEC parameter**

  Function Set FEC function switch

  Parameter ON/OFF

  Example Enable FEC function “FEC ON” show “PROGRAMMED OK”

- **FEC**

  Function Check FEC function state

  Example FEC show “FEC ON”

- **RIP parameter**

  Function Set protocol correction on output (only for TRANSEOT TRIMTALK TRIMMK3) Parameter ON/OFF

  Example Enable RIP function “RIP ON” show “PROGRAMMED OK”

- **RIP**

  Function Check RIP function state

  Example RIP show “RIP ON”

- **CSMA parameter**

  Function Set carrier to sense multiple access

  Parameter ON/OFF

  Example Enable CSMA function “CSMA ON” show “PROGRAMMED OK”

- **CSMA**

  Function Check CSMA function state

  Example CSMA show “CSMA ON”

- **ID parameter**

  Function Set ID number for call sign

  Parameter 16-digit ID number (if less than 16 digits, 0 to16 digits will be added automatically in front of ID)

  Example ID 123 show “PROGRAMMED OK”

- **ID**

Function Check ID of call sign

Example ID show “123”

- **TIMEID parameter**

  Function Set the sending interval of call sign (unit: min) Parameter 0~255

  Example TIMEID 2 show “PROGRAMMED OK”

- **TIMEID**

  Function Check sending interval of call sign Example TIMEID show “2”

Special commands (special commands work only with antenna, so antenna must be connected before testing)

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 (two options):

1. CCA parameter 1 parameter 2 Example “CCA 466.125:-106.125” indicate the received signal strength value is -106.125 dBm in the current 466.125MHz channel.
2. “CCA 466.125:ERROR” indicate the test is failed, but it is not indicated that all the channels to be tested aren’t applicable. It indicates 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 (two options):

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 Refers to the average value of the signal strength received in the last 20 times or less than 20 times in the protocol (because from power-on to the execution of the RSSI command, no more than 20 data packets are received in the protocol); -48.063 (unit: dBm) refers to the received signal strength of the last intra-protocol packet reception of RSSI command execution.

Main Power Supply

TRM101 can operate with any 3.3V power supply, which comes from data interface connector with good filtered. The power must supply 1A current at least and featured with current-limiting, even if you make radio modem operating on low power mode (0.5W).

Warning & Statement

This module meets the requirements of FCC CFR Title 47 Part 90, FCC CFR Title 47 Part 2. Integration is strictly limited to fixed categorized end-products where a separation distance of at least 40 cm between the radiating part and any human body can be assured during normal operating conditions. This module only allows connection antenna in the instruction manual. If other antennas are used, re-evaluation is required. This module is test stand-alone, if more another modules work together with this module, please evaluation the multiple RF exposure. 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. Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment. If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which

the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: 2ABAN-TRM101A or Contains FCC ID: 2ABAN-TRM101A”.

- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment must be installed and operated with minimum distance 40cm between radiator & your body

IMPORTANT NOTE:
Integration is strictly limited to mobile/fixed categorized end-products where a separation distance of at least 40 cm between the radiating part and any human body can be assured during normal operating conditions.
IMPORTANT NOTE:
In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter).then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

IMPORTANT NOTE:
This module is intended for OEM integrator only and the OEM integrators are instructed to ensure that the end user has no manual instructions to remove or install the device. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

LABEL OF THE END PRODUCT:
The final end product must be labeled in a visible area with the following “ Contains FCC ID: 2ABNA-TRM101A” .If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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 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. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.
The end user manual shall include all required regulatory information/warning as shown in this manual, include: This product must be installed and operated with a minimum distance of 40 cm between the radiator and user body.

Warnings:
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 and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
Cet appareil contient un ou des émetteurs/récepteurs exempts de licence conformes aux RSS exempts de licence d’Innovation, Sciences et Développement économique Canada.
Le fonctionnement est soumis aux deux conditions suivantes :

Documents / Resources

	Geoelectron TRM101 Wireless Data Transceiver Module [pdf] User Manual TRM101A, 2ABNA-TRM101A, 2ABNATRM101A, TRM101, Wireless Data Transceiver Module, TRM101 Wireless Data Transceiver Module