Geoelectron TRM501 Wireless Data Transceiver Module User Manual

TRM501 Wireless Data Transceiver Module
User Manual
Version V1.0

Contents

File information

File type	UHF	
Model	TRM501	
Product code		
Product name	Wireless Data Transceiver Module	

Author	Fighting Han	Date	20210908
reviewer		Date	
signer		Date	
approved		Date	

Technical specifications

Technical specifications		
Specification name	specification requirements	
Frequency range	410~470MHz	
Working type	half-duplex	
Channel spacing	12.5KHz / 25KHz	
Modulation type	GMSK	
Operating voltage	7.5V	
Average power consumption (typical)	Transmission (high	7.5W@DC 7.5V
	Transmission (low	4.7W@DC 7.5V
	Receive power	1W
Frequency stability	≤±1.0ppm	
Size	69×43×11mm	
Weight	168g	
Operating temperature	-40~+85℃	
Storage temperature	-45~+90℃	
Antenna interface	MMCX	
Antenna impedance	50ohm	
Data interface	20pin	
Transmitter specification		
Specification name	specification requirements	
RF output power	High power 5.0W	37dBm@DC 7.5V
	Low power (2.0W)	33dBm@DC 7.5V
RF power stability	±0.6dB	
Adjacent channel inhibition	>50dB	
Receiver specification		
Specification name	specification requirements	
Sensitivity	Better than -118dBm@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	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(ENABLE UHF radio module, active at a high level)
7	Output	TXD(UHF data output)
8	NC	No use
9	Input	RDX(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 is high station data mode, need to configure low to enter co mmand mode)
18	NC	No use
19	NC	No use
20	NC	No use

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

3.2Basic command

3.3.1 **TX** parameter
Function set the transmission frequency MHz
Parameter choice 410.000 – 470.000
Example TX 466.125 shows: “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 shows: “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 shows “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 shows “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
Example PRT TRIMTALK show“PROGRAMMED OK”
3.3.12 **PRINT**
Function Check current protocol type
Example PRT show“PRT TRIMTALK”
3.3.13 **PREV**
Function Check current software version
Example SREV show“GA0B11O12D15.09.12”
3.3.14 **SER** parameter
Function Set the serial number
Parameter choice Less than 16 numbers ASCII
Example SER TRU201-006 shows “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 shows "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 shows "FUPP 470"
3.3.18 **SBAUD** parameter
Function Set baud rate of Communication interface.
Parameter choice 9600 19200 38400 57600 115200
Example SBAUD 38400 shows "PROGRAMMED OK"
3.3.19 **SBAUD**
Function Check the baud rate of the Communication interface.
Example SBAUD shows "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" 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. that 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

Installation of radio

Figure 1 shows the installation dimension of the data transceiver module PCB, which firmly fitted the radio modem onto the mounting surface of the user system

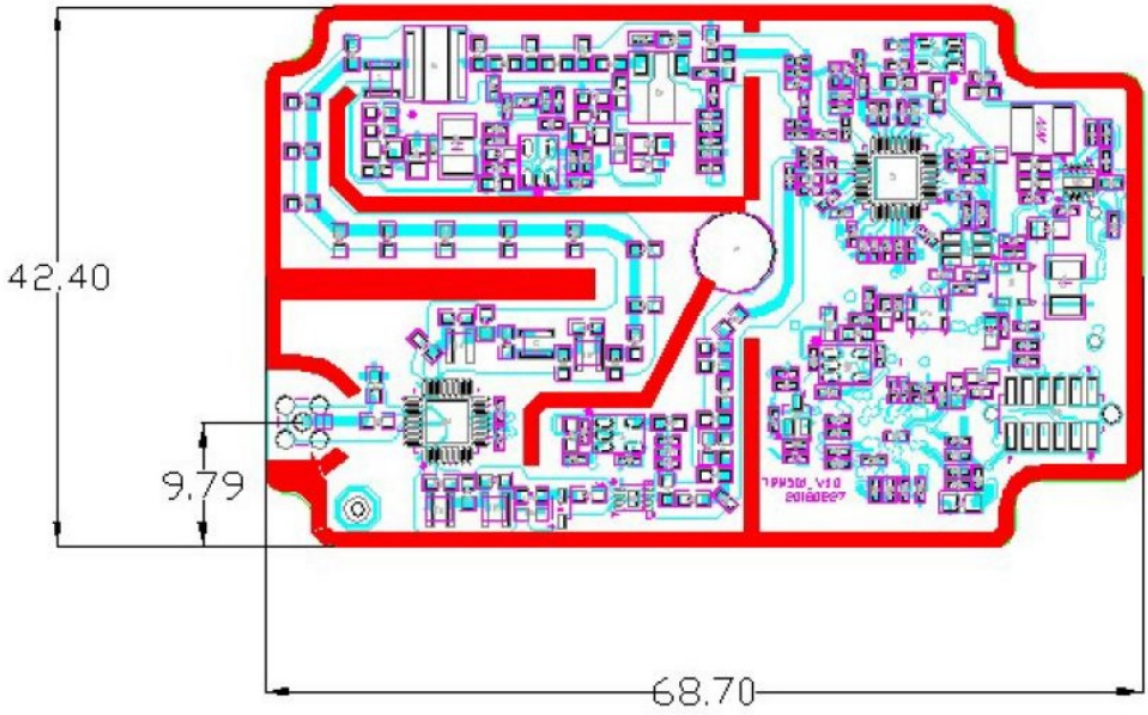

Figure 1 Radio Modem installation dimension

Main Power Supply

TRM501 can operate with any 7.5V power supply, which comes from data interface connector with good filtered. The power must supply 2A current at least and featured with current-limiting, even if you make a radio modem operating on low power mode (2W).

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.

Photo

UHF Antenna specification

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 an elastic whip, and resistance to bending.	

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 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.

  This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

  This equipment should be installed and operated with a minimum distance of 200cm between the radiator & your body.

2.2 List of applicable FCC rules

This module meets the requirements of FCC CFR Title 47 Part 90, FCC CFR Title 47 Part 2.

2.4 Limited module procedures

This module is an approval module.

2.6 RF exposure considerations

Integration is strictly limited to fixed categorized end-products where a separation distance of at least 200 cm between the radiating part and any human body can be assured during normal operating conditions.

2.7 Antennas

This module only allows connection antennas in the instruction manual. If other antennas are used, re-evaluation is required.

2.9 Information on test modes and additional testing requirements5

This module is tested stand-alone, if more other modules work together with this module, please evaluation of the multiple RF exposure.

2.10 Additional testing, Part 15 Subpart B disclaimer

The final end product must be labeled in a visible area with the following Contains TX FCC ID: 2ABNA-TRM501.If the size of the end product is smaller than 8x10cm, then an additional FCC part 15.19 statement is required to be available in the user's 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.

IMPORTANT NOTE:

Integration is strictly limited to mobile/fixed categorized end-products where a separation distance of at least 200 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 integrators 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 TX FCC ID: 2ABNA-TRM501.If the size of the end product is smaller than 8x10cm, then an additional FCC part 15.19 statement is required to be available in the user's 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.

IMPORTANT NOTE:

Integration is strictly limited to mobile/fixed categorized end-products where a separation distance of at least 200 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 IC authorization is no longer considered valid and the IC 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 IC authorization.

IMPORTANT NOTE:

This module is intended for OEM integrators 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 IC 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 TX IC: 11648A-TRM501.If the size of the end product is smaller than 8x10cm, then an additional IC statement is required to be available in the users manual:

Documents / Resources

	**Geoelectron TRM501 Wireless Data Transceiver Module** [pdf] User Manual TRM501, 2ABNA-TRM501, 2ABNATRM501, TRM501 Wireless Data Transceiver Module, Wireless Data Transceiver Module