

MEITRACK T622G-F9 Iridium Protocol

Applicable Model: T622G-F9,T622E-F9

Change History

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1 Protocol

There are two protocols for this model. GPRS protocol and Iridium protocol. When a device uses GPRS to connect to a network, the GPRS protocol is used. When a device connects to the network using an Iridium satellite, the Iridium protocol is used.

2 GPRS Command Format

2.1 GPRS Command Format

The GPRS command format is as follows:

GPRS command sent from the server to the tracker	<code>@@<Data identifier><Data length>,<IMEI>,<Parameter table No.><Command type>,<Command content><*Checksum>\r\n</code>
GPRS command sent from the tracker to the server	<code>\$\$<Data identifier><Data length>,<IMEI>,<Event code>,<Command content/Error code><*Checksum>\r\n</code>
Command description	
● @@: Indicates the packet header sent from the server to the tracker; contains 2 characters. ● Data identifier: Contains 1 byte; hexadecimal; its value ranges from 0x41 to 0x7A. The data identifier in the reply command must be the same as that of the sending command. Otherwise, the command fails. ● A comma (,) is used to separate data characters. The character type is the American Standard Code for Information Interchange (ASCII). (hexadecimal: 0x2C) ● Data length: Indicates the length of characters from the first comma (,) to \r\n. Decimal. Example: <code>\$\$<Data identifier><Data length>,<IMEI>,<Command type>,<Command content><*Checksum>\r\n</code> ● IMEI: Indicates the tracker's IMEI number. ● Parameter table No.: 0 or null: All parameter tables need to be modified; 1: The basic parameter table needs to be modified; 2: Roaming parameter table 1 needs to be modified. ● Command type: Consists of letters and digits. For detail, see Chapter 3 "Command Details." ● Command content: no more than 1,024 bytes. ● *: Separates commands from checksums. Checksum: hexadecimal; 2 bytes; indicates the sum of all data packets (excluding the checksum and ending mark). Example: <code>\$\$<Data identifier><Data length>,<IMEI>,<Command type>,<Command content><*Checksum>\r\n</code> ● \r\n: Contains 2 bytes. The parameter is an ending character. The type is ASCII. (Hexadecimal: 0x0d 0x0a) ● \$\$: Indicates the packet header sent from the tracker to the server; 2 bytes; hexadecimal: 0x24 0x24. Multiple commands are separated by a comma (,). If commands are null, keep commas (,).	

2.2 Tracker Command Format

The data format is as follows:

`$$<Data identifier><Data length>,<IMEI>,<Command type>,<Number of remaining cache records><Number of data packets><Data packet 1><Data packet 2>.....<*Checksum>\r\n`

Parameter		Description	Example
@@		Indicates the GPRS data packet header sent from the server to the tracker. The header type is ASCII. (Hexadecimal is represented as 0x40.)	0x40 0x40
\$\$		Indicates the GPRS data packet header sent from the tracker to the server. The header type is ASCII. (Hexadecimal is represented as 0x24.)	0x24 0x24
Data identifier		Contains 1 byte. The type is the ASCII, and its value ranges from 0x41 to 0x7A.	0x5A
Data length		Indicates the length of characters from the first comma 2C to OA. Decimal. Example: \$\$<Data identifier><Data length>,<IMEI>,<Command type>,<Hexadecimal data packet><*Checksum>\r\n	0x35 0x36 0x33
IMEI		Indicates the tracker's IMEI number. The number type is ASCII. It has 15 digits generally.	0x38 0x36 0x36 0x38 0x35 0x34 0x30 0x33 0x36 0x35 0x31 0x36 0x34 0x35 0x31 ASCII: 866854036516451
Command type		Hexadecimal For details, see chapter 2 and chapter 3.	0x43 0x43 0x45 ASCII: CCE
The following data is hexadecimal:			
Number of remaining cache records		0x03 0x00 0x00 0x00 4 bytes; hexadecimal; little-endian	0x03 0x00 0x00 0x00 The quantity of remaining cache data is 3.
Number of data packets		Indicates the number of data packets that a piece of data includes. 2 bytes; hexadecimal; little-endian	0x03 0x00 There is 3 data packet.
Location data 1 total length: AF 00; The total length of the current location data is 175 bytes.			
Length of a data packet		2 bytes; hexadecimal; little-endian	0xAF 0x00 The length of a data packet is 175 bytes.
ID number of a data packet		2 bytes; hexadecimal; little-endian	0x33 0x00 There are 51 ID numbers in this data packet.
Number of 1-byte parameter ID		Value: 0x00–0xFF A parameter ID corresponds to a value of 1 byte.	0x18 There are 24 parameter ID numbers. 0x00: no parameter ID
Parameter ID: 0x01	Event code	For details, see section “1.3 Event Code” Type: Byte	0x23 Event code 35
Parameter ID: 0x05	GPS positioning status	0x01 : The GPS positioning is valid. 0x00 : The GPS positioning is invalid. Type: Byte	0x01 The GPS positioning is valid.

Parameter ID: 0x06	Number of satellites	Indicates the number of received GPS satellites. Type: Byte	0x0B Number of GPS satellites:11
Parameter ID: 0x07	GSM signal strength	Value: 0x00–0x31 Type: Byte	0x0B The signal strength is 11.
Parameter ID: 0x14	output port status	Status values of eight output ports Bits 0–7 correspond to status of output ports 1–8. Hexadecimal digits need to be converted to binary digits. Type: Byte	0x00 Status: output inactive
Parameter ID: 0x15	Input port status	Status values of eight input ports Bits 0–7 correspond to status of input ports 1–8. Hexadecimal digits need to be converted to binary digits. Type: Byte	0x00 Status: Input inactive
Parameter ID: 0x1B	Geo-fence number	Only available by GPRS event code 20 or 21. Type: Byte	0x00 Indicate no geo-fence number.
Parameter ID: 0x27	Temperature number	Temperature sensor No.(Event 50 & 51) Type: Byte	0x07 Indicates temperature sensor 7.
Parameter ID: 0x93	Clutch switch	01: pedal pressed 00: pedal released Type: Byte	0x00
Parameter ID: 0x94	Tachograph performance	01:Performance analysis 00:Normal performance Type: Byte	0x00
Parameter ID: 0x95	Parking Brake Switch	01:Parking brake set 00:Parking brake not set Type: Byte	0x00
Parameter ID: 0x96	Cruise control	01:switched on 00:switched off Type: Byte	0x00
Parameter ID: 0x97	Accelerator pedal position(%)	Single-byte hexadecimal data Type: Byte	0x14 Accelerator pedal:20%
Parameter ID: 0x9D	CANBus Fuel level(%)	Single-byte hexadecimal data Type: Byte	0x23
Parameter ID: 0x9E	Actual engine torque(%)	Single-byte hexadecimal data Type: SIN8	0x12

Parameter ID: 0xA1	Load at current speed(%)	Single-byte hexadecimal data Type: Byte	0x12
Number of 2-byte parameter ID		Value: 0x00–0xFF A parameter ID corresponds to a value of 2 bytes.	0x10 There are 16 parameter ID numbers.
Parameter ID: 0x08	Speed	Unit: km/h; little-endian Type: WORD	0x00 0x00 The speed is 0 km/h.
Parameter ID: 0x09	Driving direction	The unit is degree. When the value is 0, the direction is north. Value: 0–359; little-endian Type: WORD	0x12 0x01 The driving direction is 274 degrees.
Parameter ID: 0x0A	Horizontal dilution of precision (HDOP)	Value: 5–999; unit: 1/10; little-endian Type: WORD	0x07 0x00 The HDOP is 7.
Parameter ID: 0x0B	Altitude	Unit: meter; little-endian Type: SINT16	0x1C 0x00 The altitude is 28.
Parameter ID: 0x16	AD1	Battery analog <AD1>; little-endian Voltage formula (AD1): AD1/100 Type: WORD	0xA7 0x01 Convert the digits to decimal digits. $423/100=4.23$ The voltage is 4.23V.
Parameter ID: 0x17	AD2	Battery analog <AD2>; little-endian Voltage formula (AD2): AD1/100 Type: WORD	0x00 0x00
Parameter ID: 0x18	AD3	Battery analog <AD3>; little-endian Voltage formula (AD3): AD1/100 Type: WORD	0x00 0x00
Parameter ID: 0x19	AD4	Battery analog <AD4>; little-endian Voltage formula of battery analog (AD4): AD4/100 Formula of battery percentage: $(AD4/100 - 3.4)/0.8 \times 100\%$ Type: WORD	0x9A 0x01 Convert the digits to decimal digits. $410/100=4.10$ The voltage is 4.10V.
Parameter ID: 0x1A	AD5	External power analog <AD5>; little-endian Voltage formula of external power supply (AD5): AD5/100 Type: WORD	0x04 0x05 Convert the digits to decimal digits. $1284/100=12.84$ The voltage is 12.84 V.
Parameter ID: 0x29	Fuel level(%)	little-endian Type: WORD	0x7A 0x0D Convert the digits to decimal digits: 3450 Fuel level :34.50%
Parameter ID: 0x41	AD6	External power analog <AD6>; little-endian Voltage formula of external power supply (AD6):	0x00 0x00

		AD6/100 Type: WORD	
ParameterID: 0X43	SD card status	1st byte: 01 = SD card 02 = Flash 2nd byte: 00 = normal 01 = can't detect 02 = initialization error 03 = r/w error Type: WORD	
ParameterID: 0x91	Vehicle speed (from tachograph)(KM/H)	Double-byte hexadecimal data little-endian Type: WORD	0x15 0x00 Convert the digits to decimal digits: 21 Vehicle speed :21 KM/H
ParameterID: 0x92	Vehicle speed (wheel based)(KM/H)	Double-byte hexadecimal data little-endian Type: WORD	0x15 0x00 Convert the digits to decimal digits: 21 Vehicle speed :21 KM/H
ParameterID: 0x99	Engine speed(rpm)	Double-byte hexadecimal data little-endian Type: WORD	0x12 0x04 Convert the digits to decimal digits: 1042 Engine speed:1042 rpm
ParameterID: 0x9C	Engine coolant temperature(deg C)	Double-byte hexadecimal data little-endian Type: SINT16	0x32 0x00 Convert the digits to decimal digits: 50 Engine coolant temperature :50 °C
ParameterID: 0x9F	Ambient Air Temperature(deg C)	Double-byte hexadecimal data little-endian Type: SINT16	0x28 0x00 Convert the digits to decimal digits: 40 Ambient Air Temperature :40 °C
ParameterID: 0xFE25	A84 input status	Bit0~Bit11 refers to A84 box's IN1~IN12 0 = active 1 = inactive Type: WORD	
ParameterID: 0xFE26	A84 AD1	Type: WORD	
ParameterID: 0xFE27	A84 AD2	Type: WORD	

Parameter ID: 0xFE28	A84 AD3	Type: WORD	
Parameter ID: 0xFE29	A84 AD4	Type: WORD	
Parameter ID: 0xFE2C	Continental tire pressure sensor alarm	1st byte: Tire ID 2nd byte: 01 = Leak 02 = Low battery 04 = Low pressure 08 = High pressure Type: WORD	
Number of 4-byte parameter ID		Value: 0x00–0xFF A parameter ID corresponds to a value of 4 bytes.	0x07 There are 7 parameter ID numbers. 0x00: no parameter ID
Parameter ID: 0x02	Latitude	Unit: millionth of a degree; little-endian Type: SINT32	0xC3 0x87 0x57 0x01 Convert the digits to decimal digits. The latitude is 22.513603degrees.
Parameter ID: 0x03	Longitude	Unit: millionth of a degree; little-endian Type: SINT32	0xCD 0x5F 0xCC 0x06 Convert the digits to decimal digits. The longitude is 114.057165 degrees.
Parameter ID: 0x04	Date and time	4 bytes; little-endian; unit: second Start point: 1 January, 2000, 00:00:00 am. Type: DWORD	0x7F 0xC7 0x61 0x22 The value is 576833407 seconds.
Parameter ID: 0x0C	Mileage	Indicates the total mileage. Unit: meter; little-endian Type: DWORD	0x01 0x00 0x00 0x00 The total mileage is 1 meters.
Parameter ID: 0x0D	Run time	Indicates the total time. Unit: second; little-endian Type: DWORD	0x72 0x0F 0x00 0x00 The run time is 3954 seconds.
Parameter ID: 0x1C	System flag	Bit8: FMS state 0 = Not connected FMS 1 = connected FMS Bit9: Whether support FMS function 0 = not supported FMS 1 = supported FMS	0x00 0x00 0x03 0x00 Binary: 0000 0000 0000 0000 0011 0000 0000

		Type: DWORD	
ParameterID: 0x42	Input Status	Bit0 ~ Bit31 Corresponding to the state of input 1 to input 31 0 = inactivating 1 = activating Type: DWORD	0x00 0x00 0x00 0x04 binary :0000 0000 0000 0000 0000 0000 0000 0100 input 3 is active
ParameterID: 0x98	Total fuel used(L)	little-endian Type: DWORD	0x01 0x02 0x00 0x00 Convert the digits to decimal digits:513 Total fuel used(L):513 L
ParameterID: 0x9A	Total engine hours(h)	After converting to decimal, divide by 10 to get the true value. little-endian Type: DWORD	0x12 0x34 0x00 0x01 Convert the digits to decimal digits:16790546 Total engine hours(h):1679054.6 h
ParameterID: 0x9B	High resolution vehicle distance(m)	little-endian Type: DWORD	0x11 0x22 0x00 0x00 Convert the digits to decimal digits:8712 High resolution vehicle distance(m):8712 m
ParameterID: 0xA0	High Resolution Engine Total Fuel Used(L)	After converting to decimal, divide by 1000 to get the true value. little-endian Type: DWORD	0x12 0x00 0x01 0x00 Convert the digits to decimal digits:65554 High Resolution Engine Total Fuel Used(L):65.554 L
ParameterID: 0xA2	Engine Fuel Rate(L/H)	After converting to decimal, divide by 100 to get the true value. little-endian Type: DWORD	0x12 0x00 0x02 0x00 Convert the digits to decimal digits:131090 Engine Fuel Rate(L/H):1310.90 L/H
ParameterID: 0xA3	Axle weight(kg)	After converting to decimal, divide by 10 to get the true value. little-endian Type: DWORD	0x12 0x34 0x00 0x00 Convert the digits to decimal digits:13330 Axle weight(kg):1333.0 kg
ParameterID: 0xA4	Service distance(km)	little-endian Type: SINT32	0x22 0x30 0x00 0x00 Convert the digits to decimal digits:12322 Service distance(km):12322 km
ParameterID: 0xA5	Instantaneous Fuel Economy	After converting to decimal, divide by 1000 to get the true value. little-endian Type: DWORD	0x12 0x56 0x00 0x00 Convert the digits to decimal digits:22034 Instantaneous Fuel

			Economy :22.034 KM/H
Number of <i>n</i> -byte parameter ID		Value: 0x00–0xFF The following data is not in a fixed order, please view the type according to the parameter ID.	0x04 There are 4 parameter ID numbers. 0x00: no parameter ID
Parameter ID: 0x0E	base station information	Data length: 0x0C Type: STRUCT	0xCC 0x01 0x01 0x00 0x2F 0x25 0xF9 0x3B 0x00 0x00 0x00 0x00 MCC:0x01CC:460, MNC:0x0001:1, LAC:0x252F CELL_ID:0x00003BF9, RX_LEVEL:0
Parameter ID: 0x44	Photo name	32 Type: STRUCT	
*		Separates commands from checksums. 1 byte and ASCII (Hexadecimal is represented as 0x2A)	0x2A
Checksum		2 bytes. The parameter indicates the sum of all data (excluding the checksum and ending mark). It is a hexadecimal character. Example: <u>\$\$<Data identifier><Data length>,<IMEI>,<Command type>,<Hexadecimal data packet><*Checksum>\r\n</u>	0x30 0x36 ASCII:06
\r\n		2 bytes. The parameter is an ending character. The type is ASCII. (Hexadecimal value: 0x0d 0x0a)	0x0D 0x0A

3 Iridium Protocol Format

Depending on the mode selected, the device sends Iridium data at different times:

1. In iridium mode, it will send iridium data immediately when device start;
2. In GSM priority mode, the device will start sending data with the Iridium module when the GSM signal is lost for about 5 minutes, typically when the GSM module is still not available after a reboot.

In gsm mode ,device will send Meitrack CCE protocol, you can find it in another GPRS protocol document.

This document mainly describes the data structure of the Iridium protocol.

Below is a example raw data for reference:

```
01 00 33 01 00 1C 2A 8C EF 83 33 30 30 34 33 34 30 36 37 35 34 38 36 35 30 00 00 17 00 00 64 61 D5 12 02 00 11 23
2F 03 A0 FF F1 C8 5D 06 12 B3 F0 2B 00 00 00 48
```

The green part is the iridium server additional data, include information such as device IMEI, it's fixed 37 bytes package, the protocol details is in section 2.

The red part is the T622G-F9 data package, include the GPS information, it's unfixed data, the protocol details is in section 3.

3.1 Iridium Server Data Procotol

This part of the protocol is only useful for the GPS device T622G-F9 in terms of IMEI, so the other parameters can be ignored.

Descriptions about iridium packet from the iridium server is as follows:

Parameter	Description (length unit: bytes)	Example
Protocol Revision Number	Type: char length:1	0x01 Value 1
Overall Message Length	Type: unsigned short length:2	0x00 0x33 Value 51
MO Header IEI	Type: char length:1	0x01 Value 0x01
MO Header Length	Type: unsigned short length:2	0x00 0x1C Value 28
CDR Reference (Auto ID)	Type: unsigned integer length:4	0x2A 0x8C 0xEF 0x83 Value 713,879,427
IMEI	Type: char length:15	33 30 30 34 33 34 30 36 37 35 34 38 36 35 30 Value: 300434067548650
Session Status	Type:unsigned char length:1	0x00 Value 0(transfer OK)
MOMSN	Type: unsigned short length:2	0x00 0x17 Value 23
MTMSN	Type: unsigned short length:2	0x00 0x00 Value 0
Time of Session	Type: unsigned integer length:4	0x43 0xB5 0x39 0xE1 Value 1135950305 (12/30/05 13:45:05)
MO Payload IEI	Type: char length:1	0x02 Value 0x02
MO Payload Length	Type: unsigned short length:2 Which means the length of T622G-F9 data	0x00 0x11 Value 17

3.2 Iridium Data Procotol

The GPS data parameters uploaded by the device are self-selecting as below picture.

Iridium Upload Information Select

CCA Upload Option
☒ GPRS ☐ Iridium ☐ Upload Head ☐ ACAC ☐ Upload Version 1

ID List

ID	Dynamic	Length	Describe
☒ 01	N	1	Event code
☒ 02	N	4	Latitude
☒ 03	N	4	Longitude
☒ 04	N	4	Date and time
☒ 05	N	1	GPS positioning status
☐ 06	N	1	Number of satellites
☐ 07	N	1	GSM signal strength
☐ 08	N	2	Speed
☐ 09	N	2	Driving direction

ex:event 35 23 57795701 7E5CCC06 D39C102B 01 C6

ex:event 37

Select ID List Predict Size: 15

ID	Dynamic	Length	Describe
01	N	1	Event code
02	N	4	Latitude
03	N	4	Longitude
04	N	4	Date and time
05	N	1	GPS positioning status

Set

So the data structure is unfixed, first of all you need now the select ID list of the device.

All the description of the parameters as below:

Iridium satellite ID	Description	Data Examples	analysis
0X01 Event code	For details, see section "Event Code" Type: Byte	23	35 Event
0X02 Latitude	Unit: millionth of a degree; little-endian Type: SINT32	57 79 57 01	22.509911
0X03 Longitude	Unit: millionth of a degree; little-endian Type: SINT32	7E 5C CC 06	114.056318
0X04 Date and time	4 bytes; little-endian; unit: second Start point: 1 January, 2000, 00:00:00 am. Type: DWORD	D3 9C 10 2B	2022.11.23 08:56:51
0X05 GPS positioning status	0x01: The GPS positioning is valid. 0x00: The GPS positioning is invalid. Type: Byte	1	1
0X06 Number of satellites	Indicates the number of received GPS	4	4

	satellites. Type: Byte		
0X07 GSM signal strength	Value: 0x00– 0x31 Type: Byte	1A	26
0X08 speed	Unit: km/h; little-endian Type: WORD	00 00	0
0X09 Driving direction	The unit is degree. When the value is 0, the direction is north. Value: 0–359; little-endian Type: WORD	5A 00	90°
0X0A HDOP	Value: 5–999; unit: 1/10; little- endian Type: WORD	05 00	0.5
0X0B Altitude	Unit: meter; little-endian Type: SINT16	00 00	0
0X0C Mileage	Indicates the total mileage. Unit: meter; little-endian Type: DWORD	AA 00 00 00	170m
0X0D Run time	Indicates the total time. Unit: second; little-endian Type: DWORD	10 0E 00 00	3600
0X14 Output port status	Bit0 ~ Bit31 Corresponding to the state of output 1 to output 31 0 = inactivating 1 = activating Type: DWORD	01	OUT1 activation

0X15 input port status	Bit0 ~ Bit31 Corresponding to the state of input 1 to input 31 0 = inactivating 1 = activating Type: DWORD	01	IN1 activation
0X19 Battery voltage	Battery analog <AD4>; little- endian Voltage formula of battery analog (AD4): $AD4/100$ Formula of battery percentage: $(AD4/100 - 3.4)/0.8 \times 100\%$ Type: WORD	9A 01	4.1V
0X1A External power supply voltage	External power analog <AD5>; little-endian Voltage formula of external power supply (AD5): $AD5/100$ Type: WORD	78 00	12V
0X1B Geo-fence number	Only available by GPRS event code 20 or 21. Type: Byte	1	1
0x25 RFID Number	This data is uploaded only when the 37 event is generated Data type: DWORD	0A 1A 00 00	6666
0x29 Percentage of oil content	little-endian Type: WORD	2E 0E	Indicates that the remaining oil is 36.30%

0xD8 Iridium signal strength	Value: 0x00– 0x05 Type: Byte	05	5
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for example:

23 D3 9C 10 2B 00 57 79 57 01 7E 5C CC 06 C7 //35 Event Examples

25 D3 9C 10 2B 00 57 79 57 01 7E 5C CC 06 01 00 00 01 25 0A 1A 00 00 00 C7 //37 Event Examples

4 Event Code

Event Code	Event	Default SMS Header (At Most 16 Bytes)
1	SOS Pressed	SOS
2	Input 2 Active	Door Open
3	Input 3 Active	Ignition On
9	Input 1 Inactive	In1 Inactive
10	Input 2 Inactive	Door Close
11	Input 3 Inactive	Ignition Off
17	Low Battery	Low Battery
18	Low External Battery	Low Ext-Battery
19	Speeding	Speeding
20	Enter Geo-fence	Enter Fence N (N means the number of the fence)
21	Exit Geo-fence	Exit Fence N (N means the number of the fence)
22	External Battery On	Ext-Battery On
23	External Battery Cut	Ext-Battery Cut
24	GPS Signal Lost	GPS Signal Lost
25	GPS Signal Recovery	GPS Recovery
26	Enter Sleep	Enter Sleep
27	Exit Sleep	Exit Sleep
28	GPS Antenna Cut	GPS Antenna Cut
29	Device Reboot	Power On
31	Heartbeat	/
32	Cornering	Cornering
33	Track By Distance	Distance
34	Reply Current (Passive)	Now
35	Track By Time Interval	Interval
36	Tow	Tow
39	Photo	(only for GPRS)
40	Power Off	Power Off
41	Stop Moving	Stop moving
42	Start Moving	Start Moving
50	Temperature High	Temp High
51	Temperature Low	Temp Low

52	Full Fuel	Full Fuel
53	Low Fuel	Low Fuel
54	Fuel Theft	Fuel Theft
65	Press Input 1 (SOS) to Call	/
66	Press Input 2 to Call	/
67	Press Input 3 to Call	/
70	Reject Incoming Call	/
93	Mobileye Alert	/
129	Harsh Braking	Harsh Braking
130	Harsh Acceleration	Fast Accelerate

If you have any questions, do not hesitate to email us at info@meitrack.com.