User Manual
Galileosky
Tracking Devices

firmware 0229
Contents

Introduction................................................................................................................................................................ 5
Package.............................................................................................................................................................. 7
Technical Specifications........................................................................................................................................... 8
Physical Specifications.............................................................................................................................................. 9
Safe Operating Rules ............................................................................................................................................... 9
Contacts Description .............................................................................................................................................. 10
Connecting ............................................................................................................................................................. 11
  Connecting GLONASS aerial ....................................................................................................................... 11
  Connecting GSM- aerial ............................................................................................................................... 11
  Inserting SIM-card.......................................................................................................................................... 12
  Connecting power supply to the device ....................................................................................................... 12
  LED indicators ................................................................................................................................................. 12
Performance of Tracking Device Units ................................................................................................................. 13
  Discrete-analog inputs (DAI) ......................................................................................................................... 13
  Pulse count....................................................................................................................................................... 14
  Mean value and discrete event generation.................................................................................................. 14
  Frequency count ............................................................................................................................................. 15
  Frequency count from two synchronously connected sensors................................................................. 15
  Determination of strike and incline ................................................................................................................ 15
  Economical driving "EcoDrive" and determination of the driving style....................................................... 16
  Data archiving to the micro SD card ............................................................................................................. 17
  Autoinformer function ..................................................................................................................................... 17
  Signaling function ........................................................................................................................................... 18
  Monitoring data transmission ........................................................................................................................ 20
  Internal Archive Structure ............................................................................................................................ 20
  Operation in international roaming.................................................................................................................. 21
  GPRS traffic costs optimization .................................................................................................................... 21
  Stels mode and packet transmission ............................................................................................................ 22
  Geofences ....................................................................................................................................................... 23
  Power saving .................................................................................................................................................... 23
  Remote configuration ..................................................................................................................................... 24
Connecting External Peripherals........................................................................................................................... 25
  CAN-interface ................................................................................................................................................ 25
    J1939_SCANER mode ................................................................................................................................... 25
User Manual Galileosky Tracking Devices

FMS mode ................................................................................................................................. 26
J1939_USER_29bit mode ........................................................................................................ 26
J1979_SCANER mode .......................................................................................................... 27
J1979_USER_29bit mode .................................................................................................... 28
Different variants of connection to the CAN-bus ................................................................ 28
Connecting digital fuel sensors using RS232 protocol ...................................................... 29
Connecting Galileosky Photocamera to the Device .............................................................. 30
Connecting RS232-RS485 adapter ....................................................................................... 31
Connecting 1Wire sensors .................................................................................................. 33
Connecting iButton (DS1990, DS1982) identification key .................................................. 33
Connecting DS18S20 (DS1820, DS18B20) thermometers and DS1923 temperature and humidity sensors .................................................................................................................. 34
Connecting Autoinformer speaker ....................................................................................... 34
Transistor outputs (0/1) ....................................................................................................... 35
Connecting audio equipment and push-to-talk Tg V1.x ....................................................... 36
Connecting REP-500 electricity meter ................................................................................ 37
Connecting passenger flow registration LJ2 sensors ........................................................... 37
Connecting Garmin navigators supporting FMI protocol .................................................... 38
Connecting Trimble course detector .................................................................................. 39
Connecting CAN-LOG .......................................................................................................... 40
Connecting CUB5B indicator ............................................................................................. 40
Connecting weight indicator CI5010A ................................................................................ 41
Connecting Tenzo-M weight indicator .............................................................................. 41
Connecting AWT 640 weight indicator ............................................................................. 42
Connecting WIN SCALE weight indicator ........................................................................ 42
Connecting PressurePro tires pressure monitoring system .............................................. 43
Connecting CarrierDataCOLD500, ThermoKing, EurosCan refrigeration units temperature recorders ................................................................................................................................. 44
Configurator .......................................................................................................................... 45
Program installation and running ...................................................................................... 45
Device tab ............................................................................................................................ 46
Troubleshooting tab ............................................................................................................ 48
Command mode tab ............................................................................................................ 51
Graphic interface settings .................................................................................................. 53
Security ................................................................................................................................. 53
Data transmission ............................................................................................................... 53
Protocol ................................................................................................................................. 54
Power saving ....................................................................................................................... 54
Track .................................................................................................................................... 55
Inputs/Outputs ..................................................................................................................... 56
User Manual Galileosky Tracking Devices

Digital inputs ................................................................. 56
Sound ......................................................................... 57
Signaling ..................................................................... 57
CAN ........................................................................... 58
Geofences .................................................................. 58
Data loading and sending to server ......................... 59
Data loading from the tracking device to file ........... 59
Sending data to server ............................................... 59
Routes for Autoinformer ............................................. 60
Trusted iButton keys .................................................. 61
Commands List ............................................................ 62
Settings for SMS control ........................................... 62
Data transmission settings ........................................ 63
Galileosky server exchange protocol settings ........... 67
Track parameters setting ............................................ 70
Geofences settings ..................................................... 73
Information commands ............................................. 75
Service commands ..................................................... 80
Voice communication settings ................................ 84
Analog-discrete inputs setting ................................... 86
Transistor outputs setting .......................................... 88
Autoinformer setting .................................................. 88
Digital inputs settings ............................................... 89
Signaling mode setting .............................................. 94
CAN settings ............................................................. 99
Packet transmission, energy saving, Stels mode settings 100
Photo camera operation settings ............................... 100
Bootloader ................................................................. 103
USB channel download ............................................. 103
GPRS channel download ........................................... 103
Using analog inputs to enter bootloader mode ......... 103
LED operation during the Tracking device reflashing 104
Introduction

RSA “Galileosky”, LLC produces satellite monitoring equipment (hereinafter – tracking devices) for GPS and GLONASS real time vehicles monitoring. The tracking devices determine the mobile object location recording the time and route as points with geographical coordinates and send the data to the server to be further processed and sent to the traffic controller panel.

In addition, a number of other vehicle parameters are recorded: the state of analog and discrete inputs of the tracking device and the state of digital interfaces.

The tracking devices can be used in any vehicle.

Information is sent to the server by means of GPRS and then via the Internet to the operator panel.

To prevent the data from disappearing when there is no GSM signal, each Galileosky tracking device has an internal nonvolatile FLASH memory. The tracking device also has a built-in battery, which allows operation for 8 hours.

The tracking device provides the following opportunities:

- vehicles monitoring in real time;
- a detailed turn by turn track (without any extra points in a straight track);
- voice communication with the traffic dispatcher;
- GSM enabled remote software update;
- continuous troubleshooting of the tracking device through the USB port;
- car alarm and a remote engine start;
- securing facilities against intrusion;
- automatic stops announcement;
- adjusting the tracking device through SMS, GPRS, USB;
- and others (see sections Performance of Tracking Device Units and Connecting external peripheral).
User Manual Galileosky Tracking Devices

The information sent by the tracking device includes:

✓ the exact Greenwich time and date;
✓ vehicle coordinates: latitude, longitude, height;
✓ vehicles speed and direction;
✓ vehicle acceleration;
✓ inside temperature;
✓ inputs (buttons) and analog sensors state;
✓ external digital sensors state (fuel, temperature sensors and etc.);
✓ discrete outputs state;
✓ and others (see details of transmitted data in section Galileosky protocol data)

In addition, the company provides warranty service and technical support on its site.

Before starting the work, study the instruction carefully.
Package

The standard package includes Galileosky tracking device (hereinafter referred to as the Tracking device), Configurator, connector with 6 contacts, SIM-card holder, GLONASS/GPS aerial, GSM aerial, passport, certificate of equipping a vehicle with GLONASS/GPS devices, supply cable (optional), assembly set (optional), certificate of packaging and receiving.

The Tracking device appearance:

1. GSM aerial connector
2. GPS/GLONASS aerial connector
3. SIM holder
4. USB slot
5. SD slot
6. Main connector

The Tracking device has 4 LED indicators, which show its current status: red (external power supply), yellow (microcontroller), green (GPS or GLONASS receiver), blue (GPRS modem). See LED indicators.

You will also need:

1. USB cable 1
2. GPS or GLONASS aerial 1
3. GSM aerial 1
4. Power supply unit 9V-39V (15W) for version 2.3 1
5. Power supply unit 9V-50V (15W) for version 2.4 1
# Technical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Galileosky GLONASS/GPS v2.3</th>
<th>Galileosky GLONASS/GPS v2.4</th>
<th>Galileosky GLONASS/GPS v2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>External supply</td>
<td>9-39 V</td>
<td>10-50 V</td>
<td>protection against spikes in the vehicle electrical system up to 100V</td>
</tr>
<tr>
<td>Analog-discrete and pulse-frequency inputs</td>
<td>4 pcs; voltage range 0-33V; maximum frequency for pulse frequency inputs 4kHz; input resistance of every input is 14 kOhm to the ground;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transistor outputs (output 0/1)</td>
<td>3 pcs; maximum voltage supply 30V; maximum current supply 80mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery type</td>
<td>Li-ion battery 600mA-h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average consumed power</td>
<td>0.696 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADC capacity in bits</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory capacity</td>
<td>with buffer storage of 2 Mb up to 58000 points; with buffer storage of 16 Mb up to 450000 points; up to 2500000 points for each Gb when using microSD card</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-Wire</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CANBUS</td>
<td>J1939, FMS, J1979, OBD II, 29-bit and 11-bit identifiers, in-built function of fuel consumption control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS232</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB 2.0</td>
<td>tracking device setting, troubleshooting and reflashing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>microSD</td>
<td>Maximum capacity of supported card is 32 Gb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speakerphone</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speaker (Autoinformer)</td>
<td>built-in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The number of geofences for voice prompts</td>
<td>limited by the microSD card capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speaker output</td>
<td>analog (line output) 250mW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocol of transmitting data to the server</td>
<td>1. Galileosky protocol (variable length, tag format); 2. EGTS (GOST R 54619-2011, order of RF Ministry of Transportation №285)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accelerometer</td>
<td>built-in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinates determination accuracy, 95% of time, not worse</td>
<td>5 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSM modem</td>
<td>GSM 850/900/1800/1900, GPRS class 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure protection</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Physical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
<td>-40...+85 °C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>0...90% (0...35°C); 0...70% (35...55°C)</td>
</tr>
<tr>
<td>Performance (height above the sea level)</td>
<td>0-2000 m</td>
</tr>
<tr>
<td>Storage</td>
<td>0-10000 m</td>
</tr>
<tr>
<td>Continuous work form battery</td>
<td>depends on the settings, 8hrs on average</td>
</tr>
<tr>
<td>Dimensions</td>
<td>103,0 mm x 65,0 mm x 28,0 mm</td>
</tr>
<tr>
<td></td>
<td>v2.5 - 103,0 mm x 72,0 mm x 27,0 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>not more than 250 g</td>
</tr>
<tr>
<td>Body material</td>
<td>metal</td>
</tr>
<tr>
<td>Warranty</td>
<td>2 years since the purchase date;</td>
</tr>
<tr>
<td>Average service</td>
<td>10 years</td>
</tr>
<tr>
<td>Internal Li-ion battery life</td>
<td>500 charge/discharge cycles, two years maximum</td>
</tr>
</tbody>
</table>

Safe Operating Rules

Before using the Tracking device, study the instructions of GSM/GPRS devices safe maintenance.

Make sure the polarity is correct when connecting to the power supply.

The device should be connected straight to the vehicle battery, not to the vehicle power supply.

**ATTENTION!** To avoid failure:

- Make sure the contacts are connected correctly!
- Unused contacts must be well insulated!

The ground is connected to the device body. In order not to damage the tracking device or the vehicle’s electronics, it is necessary to separate the Tracking device body and the vehicle.
## Contacts Description

<table>
<thead>
<tr>
<th>Contact</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR</td>
<td>Positive supply voltage</td>
</tr>
<tr>
<td>GND</td>
<td>Negative supply voltage</td>
</tr>
<tr>
<td>IN0</td>
<td>Zero analog-discrete input</td>
</tr>
<tr>
<td>IN1</td>
<td>First analog-discrete input</td>
</tr>
<tr>
<td>IN2</td>
<td>Second analog-discrete input</td>
</tr>
<tr>
<td>IN3</td>
<td>Third analog-discrete input</td>
</tr>
<tr>
<td>RXD0</td>
<td>Zero channel RS232 RXD signal</td>
</tr>
<tr>
<td>TXD0</td>
<td>Zero channel RS232 TXD signal</td>
</tr>
<tr>
<td>RXD1</td>
<td>First channel RS232 RXD signal</td>
</tr>
<tr>
<td>TXD1</td>
<td>First channel RS232 TXD signal</td>
</tr>
<tr>
<td>1-Wire</td>
<td>1-Wire interface</td>
</tr>
<tr>
<td>GND</td>
<td>Ground to connect interfaces, which need the ground contact</td>
</tr>
<tr>
<td>Vol0</td>
<td>Zero contact to connect an external speaker for signalling or Autoinformer</td>
</tr>
<tr>
<td>CAN_H</td>
<td>CAN interface CAN_H contact</td>
</tr>
<tr>
<td>Vol1</td>
<td>First contact to connect an external speaker for signalling or Autoinformer</td>
</tr>
<tr>
<td>CAN_L</td>
<td>CAN interface CAN_L contact</td>
</tr>
<tr>
<td>Out0</td>
<td>Zero transistor output (output 0/1)</td>
</tr>
<tr>
<td>Out1</td>
<td>First transistor output (output0/1)</td>
</tr>
<tr>
<td>Out2</td>
<td>Second transistor output (output0/1)</td>
</tr>
<tr>
<td>AGND</td>
<td>Contact for external headset’s shield connection (microphone, speaker)</td>
</tr>
<tr>
<td>Spkr0</td>
<td>External headset’s speaker’s zero contact</td>
</tr>
<tr>
<td>Spkr1</td>
<td>External headset’s speaker’s first contact</td>
</tr>
<tr>
<td>Mic0</td>
<td>External headset’s microphone’s zero contact</td>
</tr>
<tr>
<td>Mic1</td>
<td>External headset’s microphone’s first contact</td>
</tr>
</tbody>
</table>
Connecting

Connecting GLONASS aerial

Carefully screw the aerial to the tracking device, the upper side is above. To have a better view of the sky it is recommended that the aerial should be mounted on the vehicle roof, windscreen or under the dashboard.

If GLONASS aerial is mounted correctly, your coordinates will be found in 1.5 minutes. To be sure see that the green LED indicator is on (see section LED indicators).

Connecting GSM-aerial

Carefully screw the aerial to the tracking device.

The GSM-aerial should be mounted in such a way to prevent the GSM signal from fading because of the vehicle body, for example, under the dashboard or outside the vehicle.

To make sure the GPRS modem is sending data see that the blue LED indicator is on (see section LED indicators).
Inserting SIM-card

Use the card with activated GPRS and SMS services. Insert the card carefully without applying excessive force.

1) To eject SIM holder, press the indicated place with something sharp (needle, toothpick);

2) Insert the card, so that it is completely hidden in the holder cover.

Connecting power supply to the device

Positive supply voltage should be connected to contact PWR, supply voltage minus should be connected to GND (see Contacts description). If the connection is correct, the red LED will be on.

LED indicators

**Red LED** - It is on, when the power unit is connected to the Tracking device.

**Yellow LED** - It is on, when the microcontroller is running (blinks with the frequency of 1 Hz). It is also used to indicate the bootloader mode (see LED indicators during the Tracking device reflashing).

**Green LED** - Shows GPS or GLONASS module status.

<table>
<thead>
<tr>
<th>Blinking frequency, times</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>GPS or GLONASS module is not detected or it is at the initialization state</td>
</tr>
<tr>
<td>2</td>
<td>GPS or GLONASS module is detected, but coordinates are absent</td>
</tr>
<tr>
<td>1</td>
<td>GPS or GLONASS module works properly, coordinates are received and updated once a second</td>
</tr>
</tbody>
</table>

**Blue LED** - Shows GSM module status.

<table>
<thead>
<tr>
<th>Blinking frequency, times</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Stels mode (GSM unit is off and is set to be on according to schedule)</td>
</tr>
<tr>
<td>3</td>
<td>GSM module is not detected, or it is at the initialization stage</td>
</tr>
<tr>
<td>2</td>
<td>GSM module is detected, GPRS-session is set up</td>
</tr>
<tr>
<td>1</td>
<td>GSM module works properly, server is connected</td>
</tr>
</tbody>
</table>
Performance of Tracking Device Units

Discrete-analog inputs (DAI)

To attach external sensors the tracking device has 4 discrete-analog inputs which are pulse-frequency at the same time. Each input’s function is set in the tracking device settings (sections Discrete-analog inputs setting and Inputs/outputs). In section Contacts description inputs are designated as IN0, IN1, IN2, IN3.

Each input saves its values to the nonvolatile memory, i.e. in case if the channel is set to be a pulse one, the pulse number value will be restored after resetting the device.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum measured voltage</td>
<td>33 V</td>
</tr>
<tr>
<td>Analog inputs resolution</td>
<td>33 mV</td>
</tr>
<tr>
<td>Maximum transmitted signal frequency</td>
<td>4 kHz (synchronous measuring at 1 input)</td>
</tr>
<tr>
<td></td>
<td>3.5 kHz (synchronous measuring at 2 inputs)</td>
</tr>
<tr>
<td></td>
<td>1.5 kHz (measuring at 4 inputs)</td>
</tr>
</tbody>
</table>

DAI have the following settings:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter type (input function)</td>
<td>0 - arithmetical average (discrete input state is also generated); 1 - pulse count; 2 - frequency input; 3 - pulse count from two synchronously connected sensors.</td>
</tr>
</tbody>
</table>
| Filter length to calculate the mean value | The greater this parameter, the more slowly the device responds to the input signal change. With filter length equal to 1 - averaging does not happen.  
Set this parameter to 1 for frequency inputs.  
It is necessary to set this parameter to 1 for pulse inputs. If the tracking device counts extra pulses, the filter length should be increased by one and accuracy estimated. |
| Ranges for response/nonresponse areas (logical 1 and 0) | To process discrete signals, discrete signal response/nonresponse range should be set where signals equal to one and zero. Discrete inputs states should be seen in the Status of Inputs field, but not in the Input voltage fields.  
While counting pulses or frequency, it is necessary to put the value equal to half the pulse value into all the fields of the given group (example: the pulses' amplitude is 5000 mV, so all the fields must take the value 2500 mV)  
While counting pulses from 2 synchronously connected sensors, |
### Parameter | Explanation
--- | ---
| | response zone limits must be the same and equal to half of pulse value at response of one of the sensors. Non-response zone limits are equal to half of pulse value at two sensors simultaneous response.

## Pulse count

In case of a renewable counter the maximum pulse number can be 65535, after that the number is reset to zero.

If there is pulse at input, the correspondent bit will be set in the Status of Inputs field, and a point will be recorded. If there is no another pulse for 30 seconds, the bit returns to 0.

## Mean value and discrete event generation

**Example 1.**

Let us consider the example with the following zero input setting (see the left-hand figure):
- Filter type is 0;
- Filter length is 5;
- Logical one zone range is 8-33V;
- Logical zero zone range is 0-3V.

![Example 1](image)

The mean value is calculated continuously and is put into the corresponding field IN0.

At the same time, it is continuously checked whether the calculated value belongs to the given range.

If it is in the range 8-33V, the corresponding bit will find itself in the Status of Inputs field and a point will be recorded.

By value coming into the indifference zone (3V-8V), the former bit value will be saved to the Status of Inputs field.

If the value is in the logical zero zone (0V-3V), the corresponding bit in the Status of Inputs field is reset.

**Example 2**

![Example 2](image)
Thus, we can see that the given bit can change its state only in the logical one/logical zero zones.

Example 2.

In contrast to example 1 (see the right-hand figure) the logical one zone and the logical zero zone have changed places.

In the same way it is possible to set zones of response and non-response for the tracking device’s power supply voltage (POWINCFG command, section Analog-discrete inputs setting). The state of discrete signal for input can be identified according to the 8th bit of the Status of the device field.

**Frequency count**

To measure frequency in some sensors it is necessary to connect the sensor frequency output to the sensor positive power supply via a 1kOhm resistor. Otherwise, frequency count is impossible.

**Frequency count from two synchronously connected sensors**

The tracking device allows connection of 2 pulse sensors on one input, in this case, pulse fronts number is count, i.e. for each sensor response counter value increases by 2. Connection circuit details are given in section Connecting passengers flow registration WJ2 sensors.

**Determination of strike and incline**

All devices can determine the tracking device’s strike and incline.

Accelerometer axis directions:
To determine strike:

1. Install the tracking device so as one of the accelerometer axis looks vertically, it will exclude false detections on road bumps;
2. Turn on strike and incline determination by SHOCK command (section Track parameters setting). For example, if Z axis is vertical: SHOCK 3,90,5,1200.

A strike is an acceleration increase in horizontal plane; the correspondent bit is put in the Device state field and strike coordinates are recorded.

To determine incline:

1. Install the tracking device in vehicle;
2. By SHOCK command set maximum allowable incline angle and allowable time of this angle exceeding. For example, a maximum angle is 20º, allowable exceed time is 5 seconds; SHOCK 3,20,5,1200.

On the tracking device homing position change in a vehicle, SHOCK command should be given to adopt the tracking device to a new position.

**Economical driving "EcoDrive" and determination of the driving style**

The tracking device can detect rapid acceleration, braking, harsh turns and strikes on bumps. For correct operation of this function, the tracking device must detect its orientation in space with respect to the vehicle (the direction to the ground). The driving style data are stored only if dynamic archive is enabled, FLASHARCHIVE 1 command (section Service commands).

The default orientation of the tracking device:

If the tracking device cannot be installed as illustrated by the picture, user-defined installation may be performed with the subsequent calibration of orientation.

To determine the position of the tracking device in respect to the vehicle, perform the following steps:

1. Install the tracking device to ensure its rigid link with the vehicle’s body;
2. Ensure the horizontal position of the vehicle;
3. Execute the shock 0 command, which determines the direction of the tracking device to the ground.
Data on the driving style can be sent using the mainpackbit 174,1 command.

**Data archiving to the micro SD card**

To create a backup on the microSD card it is necessary to insert it into the tracking device. If the need arises, it can be ejected from the tracking device and the data can be read in a file manager or explorer with a card reader. It is also possible to send the archive to the server. CSV-files can be opened both with a text editor and Microsoft Excel. The saved data will be ordered in the following way:

MSD:\Track
20100201.csv
20100202.csv
...
20100331.csv

If there isn’t enough space on the microSD card, the tracking device tries to delete the oldest files from the Track folder.

**Autoinformer function**

Autoinformer function may be used for automatic (without participation of the driver) public transport stops announcement with the use of a satellite navigation system.

The main difference from analogous systems is taking into account vehicle movement direction, thereby excluding false operation at other stops located in the same geographic area.

To use autoinformer:

1. Attach the speaker to the tracking device (section Connecting autoinformer speaker).
2. Set the microSD card:
   a. Place sound files in format: wav, 16 kHz, mono, 16 bit to the card root folder. The file name must not exceed 20 symbols, including the extension, for example, PARKOVIJ.wav. The record length is recommended within 4 minutes (in case of exceeding, by the following file reproduction crackle may appear);
   b. Create folders with routes names in the card root folder. The smallest number of routes is 1.
   c. It is necessary to place the BusLine.txt file to the route folders, where response areas and areas linkage to the sound files are stored.

   The format of each zone is the following:
   - Latitude;
   - Longitude;
   - Direction angle $\alpha$ (the angle between the meridian and a vehicle direction);
   - Spread for the direction angle $\Delta$ (see the diagram below);
   - Outer radius of Rext response zone;
   - Inner radius of Rint response zone;
   - Sound file name corresponding to this zone.
It is convenient to fill in the information for zones from the Device tab of the Configurator while going along the route.

By route forming it is necessary to indicate separate zones for stops in both directions even if the stops are opposite each other.

Latitude and longitude values are entered through the point “.” (For example: 57.9842) where the value after point – is degree fractions. To transfer minutes into degree fractions (Xdegr.Ymin.) use the following expression Xdegr. = Ymin./60. For example: 57 degr. 55.4513min = 57.924188 degr.

3. Activate the Autoinformer function with the Autoinformer command (section Autoinformer setting).
4. Insert a microSD card into the tracking device and reset it with the Reset command. After the tracking device resetting the function will be activated.

In the process of sound files playback there is a 5 seconds pause between adjacent files.

To test sound files:
1) Unscrew GLONASS aerial from the tracking device;
2) Enter into file BusLine.txt the following lines:
   [the following format: LAT,LON,ANGL,DELTA,RAD_EXT,RAD_INT,STRING_STATION]
   0.0;0.0;12.0;180;500;0;TEST.wav
3) Create TEST.wav. file in the microSD card root. This file will be played again and again after the tracking device resetting.

Signaling function

Signaling function allows assigning the response to:
1. analog input state change;
2. strikes and inclines (accelerometer data);
3. location change;
4. speeding;
5. iButton or RFID card connection.

The tracking device can react by inverting outputs state, sending an output pulse, sending SMS, making a preset number(s) telephone call, taking a picture or recording the point.

The settings that users can change are as follows (section Signaling mode setting):

1. the time when input signals are not processed (“green wave”), with signaling enabled;
2. the maximum time of alert mode after which the tracking device will automatically change into an alarm system mode;
3. the time between activation and change to the alert mode individual for each input;
4. an SMS text message when changing to the alert mode individual for each input;
5. the time between enabling the alert mode and state change individual for each input.

Alarm system activation and deactivation can be made by input, SMS or server message, using the iButton key previously programmed in the tracking device (the iButtons command, section Digital inputs setting). Commands prevail over inputs states. Input activation depends on the settings given by the InCfg command (section Analog-discrete inputs setting), the level, outputs are inverted with respect to, is set by the Out command (section Transistor outputs setting).
Monitoring data transmission

Tracking device allows specifying the list of preferred GSM-networks. The main priority is given to the networks from the beginning of the list. Every network is specified with country’s code and network operator’s code. Tracking device supports up to 30 networks (OPS0 command, section Data transmission settings). If it is impossible to connect to one of the preferred networks, the tracking device connects to any network but doesn’t establish connection to the server, thus voice communication and SMS will be available according to a tariff of the installed SIM-card.

The tracking device allows data transmission to the main and backup monitoring servers. If there is only transfer to the main server set, continuous connection will be maintained. If there is transfer to both servers set, the tracking device is connected to the main server and then after the set period of time it breaks the communication and connects to the backup server and etc. The tracking device accounts transmitted data separately for each server, thus both will receive full archive with the track.

Data can be transmitted according to the Galileosky or EGTS protocol (Protocol command, section Data transmission settings).

By using the EGTS protocol the tracking device’ s number parameter (ID command, section Data transmission settings) specifies the object number by the authentication.

By using the Galileosky protocol transmitted data can be coded; XTEA3 algorithm (http://tomstdenis.tripod.com/xtea.pdf) is used for coding. Commands, responses and photos are not coded. The data are archived in the internal flash-memory by default. During long periods without connection the oldest records of the internal flash-memory may be erased by the new ones. In this case, it is recommended to insert a microSD card and to adjust archive transmission from it (Archive command, section Service commands).

Internal Archive Structure

The data archive can be stored on the internal flash memory or a micro-SD card. The internal flash memory card is used by default.

The tracking device stores the data from all the inputs and interfaces, even when they have no connected sensors, in the internal flash memory archive. If it is unnecessary to store all the data, the dynamic archive can be used (FLASHARCHIVE command, section Service commands). In this case, only the data selected in configuration of the head and main packets will be saved (HEADPACK and MAINPACK commands, section Server exchange protocol settings). Any change of configuration of the head and main packets when the dynamic archive is on can cause flash memory formatting and data loss. The use of dynamic archive can considerably increase the maximum number of stored points up to 58000.

By using the internal flash memory, it is possible to choose the order in which points are sent to the server.

By default, the data are saved in the depth of the data store, i.e. current data are saved before older data. Transfer in chronological order can be set by FLASHARCHIVE command. After changing the direction of memorizing data the flash memory will be formatted and all previously stored data will be lost.
By using a micro-SD card, the data are always sent in chronological order. Note that only current data are used for the first packet.

**Operation in international roaming**

The tracking device allows setting special parameters of data transmission in the international and national roaming (Roaming command, section Data transmission settings). After registration in GSM-network the tracking device receives code of the country and code of the operator from base station and compares them with the set ones, if they do not match, the tracking device is in roaming. It is possible to specify only code of country (international roaming) or code of country and code of operator (national roaming). Being in roaming, the tracking device constantly supports registration in GSM-network but initializes GPRS-session only according to the schedule, thus it is always possible to make a call to the tracking device or send SMS with a command and decrease GPRS-traffic costs. For GPRS-session the maximum volume of transmitted data in bytes is determined. Each cellular operator has minimum tariffing interval in roaming, it is recommended to set maximum data volume equal to half of this interval (the second half is for official traffic TCP/IP, the volume of which depends on connection quality). By archive transmission from internal flash-memory, the tracking device always unloads according to the archive settings (FLASHARCHIVE command, section Service commands). By archive transmission from microSD-card it is recommended to set coordinates transmission and sensors indications in the first packet, thus the tracking device sends one point with a current vehicle coordinate and the oldest unloaded archive part. The data from the microSD-card are unloaded in chronological order.

**GPRS traffic costs optimization**

GPRS-traffic costs decrease by online monitoring may be reached by following these advices:

1. Turn off the transmission of unused data, for example, temperature, acceleration, analog and digital inputs values which have no connected sensors. It can be made in the Configurator on Settings/Protocol tab or by MainPack and HeadPack commands (section Server exchange protocol settings).
2. Increase points record period. It can be made in the Configurator on Settings/Track tab or by WrPeriod command (section Track parameters settings).
3. Increase turning angle at which the device records a point, and distance at exceed of which the point is recorded. It can be made in the Configurator on Settings/Tracks tab or by Turning command (section Track parameters settings).
4. Find out the time of disconnection because of the tracking device inactiveness from the server software developers. This parameter should be taken into account by points’ record period setting otherwise the traffic will increase because of costs for restoring connection to the server. Example: points’ record period at a stop is 1200 seconds (20 minutes), the server disconnection because of the tracking device inactiveness is 180 seconds (3 minutes). The tracking device determines that a vehicle has stopped and switches on a timer for the next point record in 20 minutes, in 3 minutes the server disconnects as it hasn’t received the data from the tracking device. The tracking device tries to reconnect the server at once. It happens 6 times, and only in 20 minutes the tracking device sends the next point. As a result, traffic costs considerably exceed savings from points record interval increase.
5. Set filtering of coordinates at a stop so as the tracking device can correctly choose points’ record period. The tracking device can determine a stop according to several elements:

- accelerometer data (AccSens command, section Track parameters settings);
- external supply voltage (MHours command, section Track parameters settings);
- ignition sensor indications (Ignition command, section Track parameters settings)

If continuous online monitoring is not necessary, it is possible to set packet data transmission (section Stels mode and packet data transmission). In this case, the device will periodically contact, send the data from the blackbox and disconnect from the server. Savings are due to decrease of costs for one data packet transmission as when sending data from the archive a packet size may be up to 1000 byte, and by online monitoring usually one point is sent (a few tens of bytes). At the same time, the tracking device operation from the battery increases as during server disconnection periods the device switches off GSM-unit.

**Stels mode and packet transmission**

In this mode the tracking device switches off GSM-unit and contacts only according to a strict schedule, which allows decreasing the Internet traffic and power consumption.

Stels mode settings command: stels pday,phours,minGSMon where

- pday – tracking device contact is enabled once on p days since the beginning of the month, in other words on days, multiple to pday;
- phours – tracking device contact is enabled once at p hours since midnight GMT, in other words at hours, multiple to phours.
- minGSMon – GSM-unit is enabled for minGSMon minutes since the beginning of the hour.

Packet transmission parameters can also be set in the Configurator on Settings/Data transmission tab.

To disable this mode use the stels0,0,0 command.

Settings examples:

1) - contact once a day;
   - contact at 14.00 GMT;
   - staying in network for 15 minutes.
   Setting command: stels 1,14,15
   To enable the tracking device contact once a day phours must be greater than 11, i.e. it can be enabled at 11 and at 22 o’clock. If it is set to contact every 12 hours, the contact will be enabled at 12.00 and the next one must be at 24.00, but this is another day, i.e. it is not realized.
   - contact once a day;

2) – contact every 2 hours GMT;
   – staying in network for 15 minutes.
   Setting command: stels 1,2,15
3) – contact once in three days;
   – contact at 23.00 GMT;
   – staying in network for 15 minutes.
   Setting command: stels 3,23,15
Note.
• contact at 0 o’clock GMT cannot be enabled whatever the tracking device’s settings are;
• remote commands will work only when the tracking device radio silence mode is disabled, i.e. GSM-unit is on;
• do not set the contact time less than five minutes, otherwise the tracking device will not have enough time to establish a link with the server and to report about its location.

Geofences
The tracking device allows setting areas where coordinates are not updated, the GSM-unit is switched off. It is also possible to set periodical camera shooting (PhotoCfg command, section Digital inputs settings). Each area is described by the coordinates of the center and by the radius. Geofences’ setting commands are given in section Track parameters setting.

Power saving
To reduce power consumption of the tracking device in the operating mode, perform the following steps:

1. For RS232 port, execute RS2320 0 or specify “nothing” as the peripheral type in the Configurator.
2. Turn off the integrated CAN-controller if the tracking device is not connected to a CAN-bus. This can be performed by using CANREGIME command with the first parameter set to 0, or by specifying “CAN disabled” as the filter type in the Configurator.
3. Turn off the Autoinformer when it is not in use. This can be done by sending AUTOINFORMER command with the first parameter set to 0, or by unticking the Autoinformer section of the Configurator.
4. Reduce the degree of track details. The lower this degree, the less the power consumption.

To reduce power consumption of the tracking device at a stop, perform the following steps:

1. Set up the shutdown of the GPS/GLONASS unit at a stop, this can be performed by using SLEEPMODE command (section Service commands) or on the Power saving tab in the Configurator.
2. Enable the deep sleep mode at a stop. The deep sleep mode is turned on at the end of a pre-specified time period at a stop. In this mode the tracking device disables the specified modules (GPRS, CAN, RS232, RS485, microSD), reduces the ADC sampling rate, does not sample 1Wire sensors and does not charge the battery. The behaviour in the deep sleep mode can be configured by using SLEEPMODE command (section Service commands) or on the Power saving tab of the Configurator. It is possible to setup a period of connection to a server in the deep sleep mode.
Remote configuration

Remote configuration can be performed through several data transfer channels:

1. SMS. The tracking device has a list of 4 authorized phone numbers, the messages from which are treated as configuration commands. The available commands are described in the section Settings for SMS control. A phone number can be added to the list of authorized numbers either through the Configurator, or by sending a message with AddPhone command (section Settings for SMS control).

2. GPRS. Commands can be sent from the monitoring data processing server. The format of the commands is described in the section Galileosky protocol data.

3. GPRS. Commands can be sent via the Configurator and the remote configuration server of RSA “Galileosky”, LLC. In this case, the tracking device supports two parallel connections: the first – with the monitoring data processing server, and the second – with the remote configuration server. Remote configuration can be enabled using RemoteConfig 1 command (section Service commands). It is possible to send commands to the tracking device, to receive current information from the sensors connected and to receive diagnostic messages, when working with the remote configuration server. Using the Configurator, it is possible to create a command pack to configure the tracking device and to save it on the server. These commands will be sent to the tracking device when it establishes the connection to the server.
Connecting External Peripherals

CAN-interface

The tracking device allows extracting information from the CAN-bus.

The following protocols are supported:

- **J1939 (FMS)**. According to this protocol, the tracking device is not a device transmitting to CAN-bus, the device does not change vehicle operation, it also does not send confirmations to vehicle units packets and there is no electrical noise in the CAN-bus. In some cases, by connection to the troubleshooting socket for correct reading of information from the bus it is necessary to send confirmations to vehicle units packets, for this give ActiveCAN 1 command to the tracking device (section CAN settings).

- **J1979 (OBD II)**. This protocol works according to the question-answer mode, consequently, the tracking device issues requests to the CAN-bus.

Available performance modes:

- **J1939_SCANNER** – the bus scanner sending bus reports to the configurator.
- **FMS** – a standard FMS protocol filter. (see [www.bus-fms-standard.com](http://www.bus-fms-standard.com)).
- **J1939_USER_29bit** – a configurable user filter. Identifier length is 29 bits.
- **J1939_USER_11bit** – a configurable user filter. Identifier length is 11 bits.
- **J19379_SCANNER** – the bus scanner defining bus speed and identifier capacity.

**J1939_SCANNER mode**

This mode is intended to study CAN-bus reports, according to J1939 protocol. 

Bit rates from 10000 bit/s up to 500000 bit/s (typical values: 62500, 12500, 250000, 500000) are supported.

11 and 29 bit identifiers are supported.

The scanning mode works as follows:

1. The **CAN. Start scan.** message is displayed;
2. The CAN-bus reports are displayed with a delay indicated by the CAN Regime command. (section CAN settings).

**29bit identifiers are displayed in the following format:**

ID= 00000009 (8) 06 07 08 09 00 CC DD EE

Where:

- ID - is a 29bit message identifier;
- (8) - is the number of received bus bytes.
- 06 07 08 09 00 CC DD FF - is an 8byte message. (The lower byte is on the left, the higher byte is on the right),

**11bit identifiers are displayed as**

ID=009 (8) 06 07 08 09 00 CC DD EE

Where:

- ID - is an 11bit message identifier;
- (8) - is the number of received bus bytes;
06 07 08 09 00 CC DD EE is an 8byte message. (The lower byte on the left, the higher byte on the right).
3. After all the identifiers have been displayed, you can see the CAN. End scan message.
   To enable this mode:
   1) connect the tracking device to the vehicle CAN-interface;
   2) in the Configurator on Settings/CAN tab select bus rate and delay time (time of message waiting time);
   3) press Start Scanning J1939. Received data are displayed in the right panel.

FMS mode
This mode is activated in all tracking devices by default; it allows retrieving and decoding messages relevant to FMS protocol:

- total fuel consumption: the amount of fuel the vehicle had used since it was made;
- tank fuel level: measured in percent. 0%-empty, 100%-full;
- coolant temperature;
- engine speed;
- total mileage;
- operating hours;
- axis load.

ATTENTION! Many car manufacturers support FMS protocol partially or do not support it at all.
To enable this mode:

1) connect the tracking device to the vehicle’s CAN-interface;
2) give the CanRegime 2,250000,2000 command (section CAN settings) or select FMS filter type in the Configurator on Settings/CAN tab;
3) make sure that the device receives bus data and sends them to Device tab in the Configurator;
4) set data transmission to the server using the MainPack command (section Server exchange protocol settings) or in the Configurator on Settings/Protocol tab.

J1939_USER_29bit mode
This mode enables us to receive 29bit identifiers messages from the vehicle CAN-bus, according to J1939 protocol.
To enable this mode:

1) connect the tracking device to the vehicle’s CAN-interface;
2) select Custom filter (29bit identifiers) type in the Configurator on Settings/CAN tab, set the bus rate and delay time or give CanRegime command with necessary parameters (section CAN settings);
3) set filters for CAN-bus messages.
4) set sending of received data to the server with the help of MainPack command (section Server exchange protocol settings) or in the Configurator on Settings/Protocol tab.

Notes:
1) In protocol of the first and the main packet of the tracking device there are 1-byte, 2-bytes and 4-bytes tags for this mode operation, i.e. if the necessary ID needs only one byte from all data, better choose 1-byte tag.

2) Any of these tags can correspond to the right CAN message ID.

**ATTENTION!** The data should be recorded in the decimal system in the tracking device. The hexadecimal notation is used for convenience only.

By means of shifting it is possible to choose exactly that part of bytes, which should be filled in the tag from the useful information received with this ID.

**Let us consider an example:**

The CAN message identifier is ID=Ox18F00300.

We need only the first byte of all the sent content with this ID.

As we need only one byte, we shall choose the tag CAN_R0 as an example.

The command to set the tag is as follows: CAN8BITRO ID,Shift

1) The tag number ID=Ox18FEEEOO will look as 419360256 in the decimal system.

2) The byte we need is shifted by one byte that is the second parameter is equal to 1.

So we have the following filter settings: CANBITRO 419360256, 1.

Now when this message is passing through the bus, the first effective load byte will automatically be placed to the tag R0 and sent to the server.

These settings are easier to make in the Configurator:

1) Scan the bus;
2) Indicate identifier in the first column;
3) Select the correspondent tag;
4) Visually indicate the shift using a mouse. The number, transmitted to the server, will be displayed in the Value column.

**J1939_USER-11bit** mode is set similarly.

**J1979_SCANER mode**

This mode is used to define data transfer rate and Identifier length according to J1979 protocol. If the parameters of transfer are known, it is recommended to use the **J1979_29bit** and **J1979_11bit** modes, having specified the necessary rate of the bus.

The rate of 250000 bits per second and 500000 bits per second and 11 and 29 bit identifiers are supported.

To enable this mode:

1) connect the tracking device to the vehicle’s CAN-interface;
2) press “Test OBD II”. Received data are displayed in the right panel.
3) if scanning is finished successfully, data transfer rate and Identifier length will be set automatically.

**ATTENTION!** Scanning can cause failures in on-board equipment operation. Galileosky Ltd bears no responsibility for any failures after CAN-bus scanning.
**J1979_USER_29bit mode**

This mode allows extracting and decoding the messages with 29 bit identifiers, transferred according to J1979 protocol automatically:

- tank fuel level: measured in percent. 0%-empty, 100%- full;
- coolant temperature;
- engine rpm speed;
- error codes.

**ATTENTION!** Many car manufacturers support J1979 partially or do not support it at all. To enable this mode:

1) connect the Tracking device to the vehicle’s CAN interface;
2) give the CanRegime command (section CAN settings) or in the Configurator on Settings/CAN tab select OBD II 29bit filter type;
3) make sure the device receives the bus data and sends them to Device tab in the Configurator;
4) set the right data transmission to the server using the MainPack command (section Galileosky data transmission protocol setting) or in the Configurator on Settings/Protocol tab.

**J1979_11bit mode** is set in a similar way.

**ATTENTION!** If a vehicle doesn’t support J1939 protocol, **J1979_29bit** and **J1979_11bit** modes operation can cause failures of board equipment operation. RSA “GALILEOSKY”, LLC. bears no responsibility for failures after activation of these modes.

**Different variants of connection to the CAN-bus**

a. Direct connection.

ATTENTION! If the terminating resistor (is shown with a dotted line in the diagram) is not installed on the vehicle side, it should be installed. Its presence can be checked with the help of a multimeter: it is necessary to measure the resistance between CAN_H and CAN_L when the vehicle electronics is off. If the resistance is about 60 Ohm, there is no need for a terminating resistor. If the resistance is 120 Ohm, it is necessary to connect a standard 120 Ohm resistor between the CAN_H and CAN_L wires.

b. Connection with current-limiting resistors
To plug the tracking device into the troubleshooting socket it is necessary to use the first connection variant.

The second variant is recommended only for use to connect the tracking device directly to the vehicle’s CAN-bus.

**Connecting digital fuel sensors using RS232 protocol**

The order of connection:

1) Connect RXD, TXD and GND sensor contacts to tracking device TXD0, RTD0 and GND contacts (section Contacts description).

**ATTENTION!** The tracking device and sensor grounds must be connected!

The sensor power supply is provided separately.

2) Set for the RS232 tracking device channel an option to receive relative fuel level or frequency from the sensor. It can be done by sending RS2320 command (section Digital inputs settings) or through the Configurator on Settings/Digital inputs tab. RS232 tracking device channel is set to receive relative fuel level by default.

3) If you need to filter bursts of fuel, adjust filter length by DFILTER command (section Digital inputs settings) or in the Configurator on Settings/Digital inputs tab. Temperature is saved only by archive dynamic structure activation (FlashArchive command, section Service commands).

4) Set transfer of received data to the server by MAINPACK command (section Server exchange protocol settings) or in the Configurator on Settings/Protocol tab. These data transmission is on by default.

5) Make sure that the tracking device receives data from the sensor. It may be done in the Configurator on Device tab.

The second sensor can be connected to zero RS232 channel by analogy (RS2320 command is used).
For sensors calibration, use “Device” tab in Configurator.

If the tracking device receives no messages from the sensor for 18 seconds, the RS232 field value will come to zero. In this way, it is possible to detect sensor disconnection or failure.

**Connecting Galileosky Photocamera to the Device**

Galileosky v3.0.0 non-dust-proof-and-moisture-proof  
Galileosky v3.0.3 hermetically-sealed

<table>
<thead>
<tr>
<th>Wires:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Brown: +10/30B</td>
</tr>
<tr>
<td>2. Black: GND</td>
</tr>
<tr>
<td>3. Blue: TXD</td>
</tr>
<tr>
<td>4. White: RXD</td>
</tr>
</tbody>
</table>

Dimensions: 45,0 x 30,0 x 15,0 mm.
Dimensions: 54,0 x 38,0 x 21,0 mm

Camera technical specifications:
- Power supply: 10-30V.
- Average power consumption in standby mode: 0.17W.
- Average power consumption in shooting mode: 0.53W.
- Operating temperature range: -30…+60ºC.
- Body material: plastic.
- Turn on time: less than 2s.
- Camera mode announcement

Optical characteristics:
- Focal distance: 4mm.
- Angle of view: 64 degrees.
- Distortion: 0.38%.
- Infrared filter: yes.
- Matrix diagonal: ¼”.

Picture characteristics:
- Color depth: 24 bits.
- Picture format: JPEG.
- Picture resolution: 640x480 and 320x240.
The order of connection cameras via RS232 interface:

1. The camera RXD, TXD, GND contacts should be connected to the Tracking device TXD1, RXD1, GND ones (section Contacts description).
   ATTENTION! The Tracking device and the photo camera grounds should be connected!
   Camera has separate power supply.
2. Insert a microSD card into the Tracking device slot.
3. Make the right settings of Tracking device RS232[1] channel for operation with camera, you can use RS2321 command (section Digital inputs settings), or it can be done in the Configurator on Settings\Digital inputs tab.
4. Make sure that the Tracking device operates with camera correctly, in the Configurator give makephoto 1 command and, switching to the Troubleshooting tab, tick RS232[1] and RS232[1] detailed. When the tracking device receives a picture from the camera, troubleshooting displays message RS232[1].cam. rx pic. Green LED on the camera shall blink rarely in standby mode, quickly – during picture transmission.
5. Evaluate picture quality or eject microSD card from the Tracking device and connect to computer. Pictures from the camera connected to zero RS232 port are saved in the catalogue Pic\RS0, to the first RS232 port – in Pic\RS1. Separate catalogue is created for each date, files names reflect the time when the shots have been taken.
6. Reinsert the microSD card.

Connecting RS232-RS485 adapter

Using RS232-RS485 adapter allows connecting to single RS232 up to 3 digital fuel level sensors, which operate using RS485 interface.

How to connect an adapter:

1. Connect RXD1, TXD1, GND contacts of the tracking device to adapter TX, RX, GND contacts correspondingly;
2. Adjust the Tracking device’s RS232[1] port to operate with the adapter. It can be done by sending RS23221 9 command or using the tab Settings\Digital inputs in the Configurator;
3. Adjust transferring of received data to the server using MAINPACK command (section Galileosky data transmission protocol setting) or use the Settings\Protocol tab in the Configurator. Transferring of these data is enabled by default. Transmission of data from sensors is off by default. Temperature is saved only by archive dynamic structure activation (FlashArchive command, section Service commands).

The Tracking device supports up to 3 sensors at the same time. The sensors must have addresses 0, 1, 2 correspondingly. If the Tracking device does not receive any message from the sensor for 18 seconds, value of correspondent RS485 field will set to zero. In this way, it is possible to detect sensor disconnection or failure.
Connecting 1Wire sensors

It is possible to connect different sensors working through 1-Wire interface, and they can operate simultaneously.

Connecting iButton (DS1990, DS1982) identification key

There are several identification key applications:

- driver identification;
- trailer detachment identification;
- doors opening identification.

In the same way, it is possible to connect devices emulating iButton, for example, RFID-codes readers.

The tracking device can support up to 8 identification keys with certain identifiers or two identification keys with any identifier. When using a microSD card up to 1000 IK with certain identifier are supported.

By identification key applying to 1-Wire and GND contacts (Contacts description) the key number is entered into the memory, the point is recorded and four lower bytes are sent to the server without checksum. By key disconnection the number turns to zero, the point is recorded and message is sent to the server. Keys having code less than 100000 are stored in iButton[1] field. By iButton detachment from the tracking device, key value is set to zero in the memory cell in 4 seconds, message with the zero code is transmitted to the server. For keys with the code less than 100000, timeout from detachment to setting to zero of the memory cell is 25 minutes. Timeout for setting to zero can be set by IBCFG command (section Digital inputs setting) or in the Configurator on «Settings»

Eight key identifiers can be set using iButtons command (section Digital inputs setting) or in the Configurator on Settings\Digital inputs tab. You should enter 4 lower bytes of iButton key number without checksum, in hexadecimal system.

For example, full key hexadecimal number:

09 91 02 0C 00 00 00 5C, where

09 – type of device (in this case, it is DS1982, for DS1990 – 01),
91 02 0C 00 00 00– unique number,
5C – the checksum.

In this case, 91 02 0C 00 must be entered.

By identification key applying with one of the certain identifiers, a correspondent bit will be set in iButton connection status field. You may control it on the Device tab in the Configurator.

By using a microSD card you may edit a list of trusted keys with the help of the AddKey, DelKey commands (section Digital inputs setting). You can also connect the card to the computer and edit the list in the Configurator on the Trusted iButton keys tab. In case of connection of one of the enlisted IK, a correspondent bit will be set in the Device Status field.

**Connecting DS18S20 (DS1820, DS18B20) thermometers and DS1923 temperature and humidity sensors**

It is possible to connect up to 8 DS18S20 thermometers and 8 DS1923 sensors. To use the sensors connect them to 1-Wire and GND contacts (Contacts description) and activate the corresponding protocol items (Server exchange protocol settings). There is no any linkage between a thermometer or humidity sensor and a certain tag cell in the protocol. All data are stored in memory cells in a definite order: from a lower tag to a higher tag. If the number of cells exceeds the number of thermometers of one type, the extra higher cells will contain the data which correspond to disconnected sensor state.

By temperature sensor turning off the thermometer field shows disconnection (-128ºC).

By humidity sensor turning off the humidity field shows disconnection (0%).

**Connecting Autoinformer speaker**

![Speaker](image)

Speaker
Not less than 8 Ohm
Transistor outputs (0/1)

To operate external devices there are 4 discrete «open collector» outputs (section Contacts description) in the tracking device. The maximum output voltage is +30V, each output current is no more than 80mA.

The tracking device outputs values are stored in the nonvolatile memory, so the device sets these stored values even after being reset.

To operate outputs use Out command (section Transistor outputs settings) or the Settings/Inputs/Outputs tab in the Configurator.

OUT0...OUT3 outputs relay connection circuit

1N5402..1N5408 diode
or an analogous one for 3 A direct current and reverse voltage at least 200 V
Connecting audio equipment and push-to-talk Tg V1.x

Microphone specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min. value</th>
<th>Mean value</th>
<th>Max. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage, V</td>
<td>1.60</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Operating current, uA</td>
<td>70</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Load resistance, kOhm</td>
<td>1.2</td>
<td>2.2</td>
<td></td>
</tr>
</tbody>
</table>

Speaker specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min. value</th>
<th>Mean value</th>
<th>Max. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected speaker resistance, Ohm</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating current, mA</td>
<td>+250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power with a 32Ohm speaker, mW</td>
<td>250</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is an opportunity to connect push-to-talk Tg V1.x. It is produced by RSA “Galileosky”, LLC. and has a special adapter for connecting to the Tracking device.

To connect the adapter:

1. Adjust zero input (IN0) to measure mean value. It can be done on Settings\Inputs\Outputs tab in the Configurator or by using InCfg0 command (section Analog-discrete inputs setting);
2. Disable autoanswer. It can be done on Settings\Sound tab in the Configurator or by using Autoanswer command (section Voice communication settings);
3. Enable push-to-talk support. It can be done on Settings\Sound tab in the Configurator or by using Tangenta command (section Voice communication settings).

By incoming call, the earpiece of the push-to-talk will issue a beep. The handset can be lifted by pressing push-to-talk button once. Further switching between push-to-talk microphone and speaker can be done by pressing push-to-talk button. When the button is pressed, the microphone is enabled when the button is released, the speaker is enabled.
Connecting REP-500 electricity meter

The REP-500 is an electricity meter, which can be connected to the Tracking device via RS232 interface. To connect the REP-500, perform the following steps:

1. Connect the RXD1, GND contacts of the Tracking device to TX, Ground of the REP-500 correspondingly.
2. In the Tracking device, configure the RS232[1] port for operation with the meter. This can be performed using the RS2321 10 command or in the Configurator on Settings\Digital inputs tab.
3. Reset the Tracking device.
4. Set the meter readings transfer to the server with the help of MainPackBit 171,1 command.

It is possible to set the REP-500 connection to the RS232[0] port in the same way. Simultaneous operation of two meters is not supported.

Connecting passenger flow registration Ш2 sensors

The tracking device supports connection of up to 8 Ш2 sensors through 4 discrete-analog inputs (DAI) IN0-IN3 (Contacts description).

Connection order of one Ш2 sensor through resistor to one of DAI of the tracking device.

To connect 2 Ш2 sensors to one of DAI use divisor on two resistors. Calculation principle is realized on voltage level change by sensors triggering.

V – Power supply (battery/ vehicle power supply);
R1, R2 – resistors;
Ш2_1, Ш2_2 – Ш2 passenger flow registration sensors.
Connection order of 2 JJ2 sensors through resistors to one of DAI of the Tracking device.

To set an input to count pulses from two sensors one may in the Configurator or by incfg0 3,2,X,X,Y,Y command (where Y – one sensor triggered; X – two sensors triggered).

Parameter X and Y depending on supply voltage and R1, R2 resistors resistance assumes different values, for example:

- \( U(v)=12, R1=10k, R2=10k, \text{ then } X=3500, Y=7921 \)
- \( U(v)=12, R1=14k, R2=14k, \text{ then } X=3000, Y=7000 \)
- \( U(v)=24, R1=10k, R2=10k, \text{ then } X=7000, Y=15842 \)
- \( U(v)=24, R1=14k, R2=14k, \text{ then } X=6000, Y=14000 \)

It is calculated according to the formula:

\[ X = \left( \frac{7 \times U}{14 + R1 \times 0.001} \right) \times 1000; \quad Y = \left( \frac{14 \times U}{28 + R1 \times 0.001} + \frac{7}{14 + R1 \times 0.001} \right) \times 1000; \]

**ATTENTION**! To avoid false operation by sensors connection and further operation of sensors, use stable voltage power supply.

Tracking device operation result will be pulse fronts count from each sensor, i.e. when one person passes through one door, total pulse number increases by 2. Correspondingly, to count passengers number passed through the sensors divide pulse count result by 2.

**Connecting Garmin navigators supporting FMI protocol**

The tracking device can serve as a gateway for Garmin FMI protocol packets transmission to the server and back. Garmin FMI protocol enables:

- drivers identification by code numbers (driver enters his/her number into a navigator, the number is transmitted to the server);
- driver status transmission to the server (driver selects his/her status on a navigator display);
- text messages exchange between Garmin navigator and the server;
- transmission of route end points from the server to the navigator (in this case, the navigator calculates optimal path to the set points and displays it on the map);
- control for speeding and informing the server about it;
- geofences transmission from the server to the navigator and displaying them.
A description of protocol abilities can be found on http://www8.garmin.com/solutions/pnd

The tracking device only transmits the packets from the navigator to the server and back, so parsing the packets should be done at the server.

To connect Garmin navigator:

1. Purchase an interface Garmin FMI cable (for example, Garmin FMI 10), cable is to be chosen according to the navigator model. The cable has a mini-USB socket to connect to the navigator at one end, and supply and RS232 interface contacts at another end.
2. Connect RS232 interface contacts to the tracking device RS232 zero port; connect RX contact of the cable to the TXD contact of the tracking device; TX contact of the cable to the RXD contact of the tracking device; be sure to connect GND RS232 contact of the cable to the GND contact of the tracking device.
3. Connect cable power supply.
4. Connect the cable to the navigator.
5. Configure RS232 port in the tracking device to work with the navigator. It can be done by RS232 5 command or in the Configurator on Settings\Digital inputs tab.

To make sure that the tracking device and the navigator connection works properly select messages from necessary RS232 port in troubleshooting. If the connection is correct, the following messages will be displayed regularly:

RS2320. Garmin FMI. Enable FMI.

RS2320. Garmin FMI. ACK.

If the connection is right, the navigator interface will change, the left-hand icon will take the form of a truck, it will give an access to messages sending and receiving functions.

Connecting Trimble course detector

How to connect:

1. Adjust a course detector to send NMEA-messages GGA, RMC, VTG at a speed of 57600 bit/s, non-parity, 8 bits in byte;
2. Connect the course detector’s RS232 contacts to Tracking device’s zero RS232 channel contacts: cable’s RX to Tracking device’s TXD0, cable’s TX to Tracking device’s RXD0, be sure to connect RS232 cable’s GND to Tracking device’s GND;
3. Adjust Tracking device’s RS232[0] port to operate with course detector. It can be done by RS232 8 command (section Digital inputs settings) or by using Settings\Digital inputs tab in the Configurator.

There are two operation modes of the Tracking device with course detector:

1. Operation from course detector only, when GPS aerial is screwed off;
2. Simultaneous operation of course detector and an internal GPS unit (GPS aerial must be screwed on the Tracking device). There is a constant analysis of the accuracy of the coordinates obtained from the different systems. The Tracking device chooses the most accurate system immediately.

Connecting two or more course detectors is not supported.
Connecting CAN-LOG

The CAN-LOG device is designed for CAN-bus data reading. It allows getting the data about:

- total time of engine operation;
- total mileage of a vehicle;
- whole fuel consumption since the date of the vehicle’s creation;
- fuel level in % or liters;
- engine speed;
- coolant temperature;
- vehicle speed;
- axis load.

The following prefixes are processed automatically: A, B, C, D, E, F, G, R, H, I, J, K, L, M, N, O, S, P, WA.

If the Tracking device detected one of the familiar prefixes, further processing of this prefix finishes. Thus, its value will not be in the list of user’s prefixes.

The CAN-LOG support was added to secure compatibility with installed board equipment. By initial installation, it is recommended to use the built-in functions for CAN bus operation (section CAN interface). Advantages of using built-in functions of the device:

- no extra costs;
- opportunity to scan the CAN bus;
- opportunity to read all CAN bus data, and not just those listed for the CAN-LOG.

To connect the CAN-LOG you have to:

1. Connect RXD1, TXD1, GND contacts of the Tracking device and RS232 TX, RS232 RX, CAN-LOG’s mass correspondingly.
2. Configure RS232[1] port in the Tracking device for operation with CAN-LOG. It can be done by RS2321 6 command or in the Configurator on Settings\Digital inputs tab.
3. Disconnect the Tracking device built-in functional for operation with CAN bus. It can be done by CANREGIME 0,250000,2000 command or in the Configurator on Settings\CAN tab.
4. Specify the parameters transferred to the server (see Galileosky data transmission protocol setting). The HEADPACK and NAINPACK commands can also be used (section Galileosky data transmission protocol setting) or in the Configurator on Settings/Track tab.

CAN-LOG can be connected to RS232[0] port by analogy. Simultaneous operation of two CAN-LOG devices is not supported.

Connecting CUB5B indicator

The CUB5B indicator is a segment 8-bit indicator, which can be connected to the tracking device using RS232 interface. It can display current sensors data, CAN-bus data, mileage and so on. Information updates every second.

Connection:
1. If the indicator was set to operate with other equipment, it is necessary to reset to factory settings. If the indicator is new, it is unnecessary.

2. Connect RXD, TXD, GND tracking device contacts and TX, RX and Ground contacts of the CUB5B correspondingly.

3. Configure RS232 port in the tracking device for operation with indicator, it can be done by RS232 7 command or in the Configurator on Settings \ Digital inputs tab.

4. Choose the displayed parameter, it can be done by CUB5 command or in the Configurator on Settings \ Digital inputs tab.

CUB5B could be connected to RS232[0] port by analogy. In this case, the Tracking device supports simultaneous operation of 2 indicators.

**Connecting weight indicator CI5010A**

The CI-5010A weight indicator is designed to measure, control and indicate electrical signals produced by weight measuring strain gages sensors. It can be connected to the Tracking device via RS232 interface.

The order of CI-5010A connection:

1. Adjust the indicator to output the measured value constantly.

2. Connect RXD1, TXD1, GND contacts of the Tracking device and TX, RX, Ground of CI-5010A correspondingly.

3. Configure the RS232[1] port in the Tracking device to operate with the indicator. It can be performed by the RS232 12 command or in the Configurator on Settings \ Digital inputs tab.

It is possible to adjust connection of CI-5010A to the RS232[0] port in a similar way. In this case, simultaneous operation of 2 indicators is supported.

The data from the indicator are rounded up to a whole number. Weight within the range from 0 up 65535 kg is transmitted in "RS232 1" tag. Negative weight and weight, exceeding 65535 kg, is transmitted in "RS232 1" tag and "FLS temperature, connected to the first RS232 port". In addition, weight value is calculated according to the following formula: Temperature×65535+"RS232 1". For the indicator, connected to RS232[0] port, weight is transmitted in the same way in "RS232 0" and "FLS temperature, connected to zero RS232 port" tags.

**Connecting Tenzo-M weight indicator**

The Tenzo-M weight indicator is designed to measure, control and indicate electrical signals produced by weight measuring strain gages sensors. It can be connected to the Tracking device via RS232 interface.

The order of Tenzo-M connection:

1. Adjust the indicator to output the measured value constantly. Port speed is 2400 bit/s.

2. Connect RXD, TXD, GND contacts of the Tracking device and TX, RX, Ground of Tenzo-M correspondingly.

3. Configure the RS232[1] port in the Tracking device to operate with the indicator. It can be done by the RS232 16 command or in the Configurator on Settings \ Digital inputs tab.
It is possible to adjust connection of Tenzo-M to the RS232[0] port in a similar way. In this case, simultaneous operation of 2 indicators is supported.

The data from the indicator are rounded up to a whole number. Weight within the range from 0 up 65535 kg is transmitted in «RS232 1» tag. Negative weight and weight, exceeding 65535 kg, is transmitted in «RS232 1» tag and «FLS temperature, connected to the first RS232 port». In addition, weight value is calculated according to the following formula «Temperature»×65535+«RS232 1». For the indicator, connected to RS232[0] port, weight is transmitted in the same way in «RS232 0» and «FLS temperature, connected to zero RS232 port» tags.

**Connecting AWT 640 weight indicator**

The AWT 640 weight indicator is designed to measure, control and indicate electrical signals produced by weight measuring strain gages sensors. It can be connected to the Tracking device via RS232 interface.

The order of AWT 640 connection:

1. Adjust the indicator to output the measured value constantly. Port speed is 9600 bit/s.
2. Connect RXD, TXD, GND contacts of the Tracking device and TX, RX, Ground of AWT 640 correspondingly.
3. Configure the RS232[1] port in the Tracking device to operate with the indicator. It can be done by the RS2321 18 command or in the Configurator on Settings\Digital inputs tab.

It is possible to adjust connection of AWT 640 to the RS232[0] port in a similar way. In this case, simultaneous operation of 2 indicators is supported.

The data from the indicator are rounded up to a whole number. Weight within the range from 0 up 65535 kg is transmitted in «RS232 1» tag. Negative weight and weight, exceeding 65535 kg, is transmitted in «RS232 1» tag and «FLS temperature, connected to the first RS232 port». In addition, weight value is calculated according to the following formula «Temperature»×65535+«RS232 1». For the indicator, connected to RS232[0] port, weight is transmitted in the same way in «RS232 0» and «FLS temperature, connected to zero RS232 port» tags.

**Connecting WIN SCALE weight indicator**

The Dinamica Generale S.p.A. WIN SCALE weight indicator is designed to measure, control and indicate electrical signals produced by weight measuring strain gages sensors. It can be connected to the Tracking device via RS232 interface.

The order of WIN SCALE connection:

1. Adjust the indicator to output the measured value constantly. Port speed is 9600 bit/s.
2. Connect RXD1, TXD1, GND of the Tracking device and TX, RX, Ground of WIN SCALE correspondingly.
3. Configure the RS232[1] port in the Tracking device to operate with the indicator. It can be done by the RS2321 19 command or in the Configurator on Settings\Digital inputs tab.
It is possible to adjust connection of AWT 640 to the RS232[0] port in a similar way. In this case, simultaneous operation of 2 indicators is supported.

The data from the indicator are rounded up to a whole number. Weight within the range from 0 up 65535 kg is transmitted in «RS232 1» tag. Negative weight and weight, exceeding 65535 kg, is transmitted in «RS232 1» tag and «FLS temperature, connected to the first RS232 port». In addition, weight value is calculated according to the following formula «Temperature»×65535+«RS232 1». For the indicator, connected to RS232[0] port, weight is transmitted in the same way in «RS232 0» and «FLS temperature, connected to zero RS232 port» tags.

**Connecting PressurePro tires pressure monitoring system**

PressurePro tires pressure monitoring system enables to carry out continuous control of pressure in tires and tire temperature and warns about critical situations. The system consists of wireless pressure sensors, installed on tires, and monitor receiving data from sensors. The Tracking device is connected to PressurePro monitor via RS232 interface and receives data about sensors state and measured parameters.

Connecting PressurePro:

1. Connect RXD0, TXD0, GND contacts of the Tracking device and TXD (white), RXD (green), GND (black) contacts of monitor correspondingly. Monitor has separate power supply.
2. Configure the RS232[0] port in the Tracking device to operate with PressurePro. It can be performed by the RS2320 13 command or in the Configurator on Settings\Digital inputs tab.
3. Specify PressurePro data in the transmission protocol to the server.
4. Turn on the dynamic structure of the Tracking device`s archive. PressurePro data are not stored in the archive by using the static structure.

By default, PressurePro sensors transmit data once in 5 minutes or by emergency arising (tripping sensors, pressure reduction, etc.). The Tracking device transmits PressurePro data to the server by analogy: once in 5 minutes or by emergency arising, data are not transmitted at passing points to save GPRS-traffic. Operation of up to 34 sensors is supported. It is possible to adjust PressurePro connection to the RS232[1] port in a similar way. Simultaneous operation of 2 monitors is not supported.
Connecting CarrierDataCOLD500, ThermoKing, Euroscan refrigeration units temperature recorders

Temperature recorders allow transmitting the information about the refrigerator state to the Tracking device, which, in its turn, sends the following transformed data to the server:

1. Operation mode of refrigeration unit;
2. Cargo temperature (for one- and multi temperature units);
3. Alarm signals;
4. Total time of engine operation.

Connecting a temperature recorder:

1. Connect RXD0, TXD0, GND contacts of the Tracking device and TXD, RXD, GND contacts of temperature recorder correspondingly. Temperature recorder has separate power supply.
2. Configure the RS232[0] port in the Tracking device to operate with one of temperature recorder types. It can be performed by the RS2320 command (DataCOL500: RS2320 11, ThermoKing: RS2320 14, EuroScan: RS2320 15) or in the Configurator on Settings\Digital inputs tab.
3. Specify temperature recorder data in the transmission protocol to the server.
4. Turn on the dynamic structure of the Tracking device`s archive. Temperature recorder data are not stored in the archive by using the static structure.

It is possible to adjust the RS232[1] port in a similar way. Simultaneous operation of 2 temperature recorders is not supported.
Configurator

Configurator is a PC program, which allows:

- configuring the Tracking device via graphic interface and with the help of commands;
- troubleshooting the Tracking device saving the results to a log-file;
- seeing the Tracking device units state in real time;
- downloading monitoring data from the internal memory and microSD-card;
- sending the downloaded data to the server;
- specifying areas for autoinformer.

32 and 64 bit OS starting with Windows 7 SP1 are supported.

It is possible to configure and troubleshoot the Tracking device connected both, locally by USB and remotely by GPRS. There is no need to reconfigure the Tracking device, which has been connected by GPRS. PC with the installed Configurator does not need to have a static IP-address.

Program installation and running

Download the Configurator software from the site and launch it.

ATTENTION! Program installation may require changes of crucial OS elements. Do not let your antivirus program block the installer operation.

In case of a security system warning, confirm launching the program.
During the installation of the Configurator old drivers will be deleted and new ones will be installed. It is possible to install the major version of the Configurator or a limited one. The latter one allows uploading archive and receiving the current parameters of sensors, but not changing the settings.

Start the Configurator software (from Start menu\Programs\Galileosky\Configurator). Turn on the power of the tracking device and connect it to the computer via a USB-cable.

After the tracking device connecting, the software loads all the tracking device’s settings parameters automatically. If the program identifies the tracking device, all the buttons on the vertical left-hand panel will be active.

Device tab

The tab displays the information about the tracking device state and allows its resetting. This tab contains the tracking device model, oriented in space according to accelerometer indications. The model can be rotated by mouse. Parameter values, which are beyond the limits, wrong coordinates, exceeding of maximum incline angle and responses on inputs are shown in red.

If there is a PIN code in the tracking device, the program will request it to access the settings. By wrong code entering the Tracking device will disconnect from the computer, reset, connect to the Configurator again and wait for the right code enter.

For remote configuration and troubleshooting of the tracking device, click Select device... button. In the window appeared, enter your login and password to get the access to the remote configuration server. You can get the login and the password in RSA “Galileosky”, LLC. department of technical support or by clicking the Register new user button.
After successful authorization on the server, the form of tracking devices list management will become available. When connecting for the first time, the list of the controlled tracking devices will be empty. To add a tracking device to the list, click Register device button. During registration the Configurator will request a password for a particular tracking device, a factory password corresponds to IMEI of the tracking device; this can be later changed in the Configurator by the user. Tracking devices may be grouped.

After selecting a particular tracking device, it can be controlled via the Configurator, the same way as it occurs with the USB-connection.
Troubleshooting tab

This tab allows us to see the current tracking device state through the troubleshooting reports.

The troubleshooting mode has the following buttons:

1) **Start /Stop**
   The time scale displays the information about the server connection, packet recording, updating coordinates etc. and with a 10 sec interval.

2) **Clear troubleshooting window**

3) **Save** the tracking device`s troubleshooting results as a log-file which can be opened by any text editor.

4) **Search** in the troubleshooting history file.

**GSM-unit debug info**

**ATTENTION!** If the service has already been registered by the tracking device, another GPRS connection is only possible through switching off the GSM-modem. It means that no money will be lost due to the minimum chargeable session.

<table>
<thead>
<tr>
<th>Troubleshooting messages</th>
<th>Description</th>
<th>Possible causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSM. Success turn on.</td>
<td>GSM unit is powered.</td>
<td>Turning on is successful.</td>
</tr>
<tr>
<td>GSM. Not success turn on!</td>
<td>GSM unit is powered.</td>
<td>Turning on is denied by the unit.</td>
</tr>
<tr>
<td>GSM. Success init.</td>
<td>GSM unit initialization is successfully performed.</td>
<td></td>
</tr>
<tr>
<td>GSM. Not success init!</td>
<td>GSM unit initialization failed.</td>
<td></td>
</tr>
<tr>
<td>GPRS. Activated.</td>
<td>GPRS initialization is successfully performed.</td>
<td></td>
</tr>
</tbody>
</table>
### Troubleshooting messages

<table>
<thead>
<tr>
<th>Description</th>
<th>Possible causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPRS. Not activate.</td>
<td>GPRS initialization failed.</td>
</tr>
<tr>
<td>GPRS. Success connect to server.</td>
<td>Device server connection is successful.</td>
</tr>
<tr>
<td>GPRS. Not success connect to server.</td>
<td>Device server connection failed.</td>
</tr>
<tr>
<td>GPRS. Reconnect Number=№</td>
<td>Number of server reconnections. Nº - reconnection number.</td>
</tr>
<tr>
<td>GPRS. Firstpack OK.</td>
<td>First packet has been sent to the server.</td>
</tr>
<tr>
<td>GPRS. Firstpack False.[0]</td>
<td>The device has sent the first packet, but there is no confirmation at TCP/IP level.</td>
</tr>
<tr>
<td>GPRS. Firstpack False.[1]</td>
<td>The device has sent the first packet, but there is no confirmation at the application level.</td>
</tr>
</tbody>
</table>

### SMS debug info

<table>
<thead>
<tr>
<th>Troubleshooting message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMS. RX SMS.</td>
<td>A new SMS message is received</td>
</tr>
<tr>
<td>TelNum: +79112299922</td>
<td>received from a given phone number</td>
</tr>
<tr>
<td>Command: ID</td>
<td>ID command is received</td>
</tr>
<tr>
<td>SMS. TX OK.</td>
<td>Message is successfully sent</td>
</tr>
<tr>
<td>SMS delfromslot 1</td>
<td>handled SMS deleting ( from the first SIM card slot)</td>
</tr>
<tr>
<td>Not reply SIM. Slot 1</td>
<td>no SIM card reply (from the first SIM card slot)</td>
</tr>
<tr>
<td>GSM. No SIM-card</td>
<td>no SIM card reply (the card is probably not inserted)</td>
</tr>
</tbody>
</table>

### Internal Flash-memory (tracks memory) debug info

<table>
<thead>
<tr>
<th>Troubleshooting message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEM. Inp-s</td>
<td>Point record reason is the change of inputs state;</td>
</tr>
<tr>
<td>MEM. Turn,dist</td>
<td>Point record reason is the change of distance between previous and new place or angle of driving direction;</td>
</tr>
<tr>
<td>MEM. Time</td>
<td>Record reason is time;</td>
</tr>
<tr>
<td>MEM. Write point - 200</td>
<td>Point with sequence number 200 is recorded.</td>
</tr>
</tbody>
</table>
**GPS-unit debug info**

<table>
<thead>
<tr>
<th>Troubleshooting information</th>
<th>Description</th>
<th>Possible causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT. Coord refresh.</td>
<td>Coordinates for current record have been updated by GPS unit. The vehicle is considered to be moving, packet has not been filtered off.</td>
<td></td>
</tr>
<tr>
<td>SAT. Coord not refresh.</td>
<td>Coordinates for current record have not been updated. Filtering at stops is activated.</td>
<td></td>
</tr>
<tr>
<td>SAT. Temper is low than -40</td>
<td>Device temperature is lower than -40°C. Operation at lower temperatures is impossible.</td>
<td></td>
</tr>
<tr>
<td>SAT. Temper is high than 65</td>
<td>Device temperature is higher than +65°C. Operation at higher temperatures is impossible.</td>
<td></td>
</tr>
<tr>
<td>SAT. Time out. Restart MCU.</td>
<td>No GPS data for 60 seconds. Device reset. GPS unit is out of order. GPS unit failure.</td>
<td></td>
</tr>
<tr>
<td>GLONASS. Message received. Len = 401</td>
<td>Tracking device received information from GLONASS unit. 401 byte is received.</td>
<td></td>
</tr>
<tr>
<td>GPS. Message received. Len = 172</td>
<td>Tracking device received information from GPS unit. 172 byte is received.</td>
<td></td>
</tr>
<tr>
<td>GPS. Change baud rate = 1</td>
<td>Attempt to set GPS unit rate. Attempt № 1.</td>
<td></td>
</tr>
<tr>
<td>SAT. Fix = 1</td>
<td>Current position is fixed (0 – not fixed);</td>
<td></td>
</tr>
<tr>
<td>SAT. SatInUse = 7</td>
<td>7 satellites are used for navigation;</td>
<td></td>
</tr>
<tr>
<td>SAT. Valid = 1</td>
<td>Coordinates are right (they can be used for location determination). This Valid is not related to valid in packet and status.</td>
<td></td>
</tr>
<tr>
<td>Galileo uses GLONASS</td>
<td>Tracking device uses GLONASS system.</td>
<td></td>
</tr>
<tr>
<td>Galileo uses GPS</td>
<td>Tracking device uses GPS system.</td>
<td></td>
</tr>
<tr>
<td>SAT. Incorrect data from GLNS/GPS module</td>
<td>Wrong data are received from the used unit (probably because of processor overload)</td>
<td></td>
</tr>
<tr>
<td>SAT. Time out. Restart MCU.</td>
<td>Tracking device gets no data from receivers (GLNS/GPS)</td>
<td></td>
</tr>
<tr>
<td>SAT. High Speed = 200</td>
<td>Navigation speed data filter turned on (this data will be skipped by the unit).</td>
<td></td>
</tr>
<tr>
<td>SAT. HDOP is high = 6</td>
<td>Navigation HDOP data filter turned on (this data will be skipped by the unit).</td>
<td></td>
</tr>
<tr>
<td>SAT. Jump = 5000</td>
<td>Navigation coordinate data filter turned on (leap to large distance occurred).</td>
<td></td>
</tr>
<tr>
<td>SAT. First start OK. Sat count &gt;= MIN</td>
<td>By the tracking device turning on the unit must get more MIN satellites (only in this case, the data are reliable).</td>
<td></td>
</tr>
</tbody>
</table>
Other troubleshooting messages are not described, but they have intuitive names. If there are any questions, you will find the answer at our forum.

Command mode tab

This tab is intended to message a single command or a set of commands to the tracking device.

The command mode has the following buttons:

1) Run commands;
2) Run single command;
3) Open from file;
4) Save to file.

The commands will be identified whether you use capital or lower-case letters or both in turn.

**ATTENTION!**

There are no spaces in command name!
Spaces between parameters are not allowed!
Commands and parameters are separated by space.
Commands are separated by Enter.

Single command example

An example of a command with a parameter:

Enter **APN** internet.beeline.ru,beeline.beeline as shown in the figure above and press **Run single command** button. The command and a response will be displayed in the Responses window.

Command: **APN** internet.beeline.ru,beeline,beeline

Response: **GPRS**: **APN=INTERNET.BEELINE.RU, user=BEELINE, pass=BEELINE**

**ATTENTION!** To access the parameters in the tracking device memory you should use a command without parameters!
An example of a command without a parameter:

<table>
<thead>
<tr>
<th>APN command</th>
<th>Request: APN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Response: GPRS:APN=INTERNET.BEELINE.RU, user=BEELINE, pass=BEELINE</td>
</tr>
</tbody>
</table>

**Set of commands example**

Enter the necessary commands in Commands window, each beginning a new line, as shown in the figure below and press the **Run commands** button.

*Example:* Serverip 55,34,76,123,30100
ID 6299
HeadPack 1110

The given commands and results will be displayed in the Responses window.

- Command: Serverip 55,34,76,123,30100
  - Response: Serverip=55.34.76.123:30100
- Command: ID 6299
  - Response: ID: 6299
- Command: HeadPack 1110
  - Response: HeadPack = 0000000000000000000000000000000000000000000000000000000000000111 0b

**Example of saving and downloading parameters set**

For quick configuration of several tracking devices with the same set of commands it is recommended to run the commands from a pre-saved file. To do this, enter a list of commands in the Command window. Make sure that they are typed correctly by pressing the **Run commands** button and then press **Save to file**.

The file will be saved in log configurator folder. Then press **Open from file...** button.

To run several commands at the same time press **Run commands** button.

To run only one command it is necessary to go to it in Commands window and press **Run single command** button.
Graphic interface settings
All main settings of the tracking device are placed on tabs in the program upper part.

Security
This tab allows setting SIM-cards PIN code, phone authorization password, list of authorized phone numbers and encryption key for data transfer to the server.

Data transmission
This tab allows setting SIM-card PIN code, APN for the Internet access, monitoring data processing servers, packet data transmission and international roaming.
Protocol
The tracking device has its own data transmission protocol developed by Galileosky Ltd.

During device operating and data sending to the server, the following stages are possible:

1) Initialization of TCP/IP connection (does not need any additional settings);
2) Sending of initialization data described in the Head packet column (the data to be sent to the server are ticked in the first column);
3) If the device has passed the first two stages, it starts sending accumulated packets according to the format described in the Main packet column.

To send the data the modem establishes a server connection and keeps it active even after sending the packet. It is done to save server connection traffic used to establish the connection to the server.

Power saving
This tab allows setting shutdown options of the tracking device units at stop, to reduce power consumption.
Track
This tab allows setting archive storage place and recording periods of coordinates at stops and in motion, details of track and false coordinates filtering.

The device filters coordinates by speed, acceleration, travelled distance, horizontal accuracy, number of satellites.

In addition, the tracking device allows filtering of coordinates crowding during stops by supply voltage at vehicles battery (Mhours command).

Parameters:
- supply voltage at stopped engine;
- supply voltage at started engine;

The first parameter is selected in the following way:
1) stop the engine for 5 minutes;
2) save the Vpit voltage parameter from Device tab.

The second parameter is selected in the following way:
1) start the engine;
2) save the Vpit parameter;
3) parameters of the mhours command are filled in and sent to the tracking device.

When the engine is started, the 9th bit will be set in the device status.

Each tracking device is equipped with an accelerometer which allows filtering coordinates crowding during stops. It is based on vehicles vibration.

Parameters:
- Sensitivity – a standard unit, where the sensitivity of the 600 units corresponds to the acceleration of 1g (gravitational acceleration)
- Time parameter. The tracking device switches on this filter when there is no vibration within a certain time period. The filter operates until the necessary amplitude acceleration is reached.
Inputs/Outputs
For inputs operating principles see section Discrete-analog inputs (DAI).
For discrete outputs description see section Transistor outputs (0/1).

Digital inputs
This option allows choosing the type of peripheral connected to RS232 inputs, setting iButton keys, setting up periodical camera shooting.
Sound
This option allows setting a microphone and sound gain via a GSM channel, the number of calls before autoanswer, as well as parameters of the Autoinformer.

Signaling
This option allows setting the response of the tracking device to inputs state change, speed and coordinate change. You can set telephone numbers for SMS or call in case of signaling activation. Strike and incline determination may also be set here.
CAN
This option allows setting a CAN-filter and scanning the CAN-bus for message identifiers being used.

After clicking Listen CAN the CAN-scanner will be activated and received messages will be displayed in the right-hand panel. When scanning is completed, it is possible to set tags in the protocol, in which the bus data will be sent. To do this: choose CAN-identifier and tag and point transmitted part of the message with a mouse. To delete the filter the corresponding message identifier should be selected and deleted.

Geofences
On this tab it is possible to set the list of Geofences and behavior of the tracking device inside and outside them.
Data loading and sending to server

Data loading from the tracking device to file
This option allows transferring the data from the internal memory or an SD-card to computer files via a USB cable. By data loading from the internal memory one InternalFlash.csv file will be created, in the latter case there will be several files created sorted by the dates in the same way as they are stored on the card.

![Image of Galileosky software interface]

The Data transfer from the internal memory can be stopped and resumed; the data transfer from the SD-card can be stopped only if you disconnect the USB cable.

Sending data to server
This option allows sending the data previously transferred from the tracking device to any server emulating the Galileosky protocol. To send it you should specify the IP-address and the server port and choose a file or a catalogue to be sent. If a catalogue is chosen, the program will send all its data files. The process can be stopped and resumed.
Routes for Autoinformer

This tab contains a graphical Autoinformer zones editor (section Autoinformer function).

The Internet access is required to display the map.

To edit the zones:

1) Insert a micro-SD card into the computer, choose the disk in the drop-down list. The route list and the track list will be loaded automatically.
2) Choose an edited route in the drop-down list or create a new one by clicking “+” on the right side of the route list. All stops will be loaded automatically, the map will move to the first stop.
3) Edit parameters of the zones. It can be done on the right panel as well as visually by moving red points with a mouse.
4) Create new zones. Click “+” on the right side of the stops list. A new zone will appear in the middle of the map, and then it can be edited.
5) Choose an audio file for the zone. It can be done in the Audio file drop-down list or you can load a new file by clicking “+” on the right side of the stops list. The following formats are supported: wav, mp3, flac, ogg, raw, gsm. The Configurator will automatically convert the file in appropriate format for the tracking device and copy it to the micro-SD card.
6) Press Save route to save changes to the micro-SD card.

To make sure all zones are correct, download the track developed after a trip. The Configurator supports the tracks uploaded from the internal memory of the tracking device or stored on the micro-SD card in the csv format.
Trusted iButton keys

This tab contains the editor of a trusted iButton keys list.

The list is stored on a microSD-card; to edit the list, perform the following:

1. Eject the microSD-card from the Tracking device.
2. Insert the microSD-card into the computer and choose the disk in the drop-down list; the list of trusted iButton keys will be loaded automatically.
3. Keys may be entered either in decimal or in hexadecimal form; the corresponding value in another column will be converted automatically.
4. Click Save to disk button to save the changes to the microSD-card.

The list of keys is stored in the keys.bin file; it can be copied and used in microSD-cards of other tracking devices.
**Commands List**

To request current settings you need to issue a command without any parameters.

### Settings for SMS control

**Command format**

`AddPhone xxxx[,n]`

**Parameters**

- `xxxx` - is a four-digit password, 1234 by default
- `n` - slot number (0-3) where a telephone number will be saved.

**Explanation**

When you configure the tracking device from a cell phone, you should first authorize it by using the command. Up to 4 telephone numbers can be authorized.

**Example**

Request: `AddPhone 1234`

Reply: `Phones (0) = 890101243456 (1) = (2) = (3) =`

**Command format**

`ChangePass aaaa, bbbb`

**Parameters**

- `aaaa` - is an initial four-digit password;
- `bbbb` – is newly set numeric four-digit password.

**Explanation**

Changing and viewing the current password.

**Example**

Request: `ChangePass 1234, 5678`

Reply: `CurrentPass ‘5678’`
Command format
Phones

Parameters
Getting the list of authorized phones

Explanation
Getting and setting the list of authorized phones

Example
Request: Phones
Reply: Phones (0)=+790101243456 (1)= (2)= (3)=

Data transmission settings

Command format
APN a,u,p

Parameters
a – access point name
u – user
p – password

Explanation
Access point settings for a SIM-card (SIM0)

Example
Request: APN internet.beeline.ru,beeline,beeline
Reply: GPRS:APN=internet.beeline.ru, user=beeline, pass=beeline

Command format
OPS0 n1,n2,n3,n4,n5,n6,n7,n8,n9,n10,n11,n12,n13,n14,n15

Parameters
n1-n15 – preferred GSM-networks

Explanation
A list of preferred GSM-networks for a SIM-card (SIM0). The network is defined by a mobile country code and a mobile operator code (the list of codes is given in http://www.itu.int/dms_pub/itu-t/opb/sp/T-SP-E.212A-2010-PDF-E.pdf), for example, the Russian Federation code is 250.

Example
Request: OPS0 25001,25099
Reply: OPS0:25001,25099,,,,,,,,,;
Command format

OPS1 n16,n17,n18,n19,n20,n21,n22,n23,n24,n25,n26,n27,n28,n29,n30

Parameters
n16-n30 – preferred GSM-networks

Explanation
Additional list of preferred GSM-networks. The network is defined by a mobile country code and a mobile operator code (the list of codes is given in http://www.itu.int/dms_pub/itu-t/opb/sp/T-SP-E.212A-2010-PDF-E.pdf), for example, the Russian Federation code is 250.

Example
Request: OPS0 25001,25099
Reply: OPS0:25001,25099,,,,,,,,,,,,,;

Command format

ID n

Parameters
n - tracking device number.

Explanation
Changes tracking device number. The same number is used as the device identifier in the EGTS protocol.

Example
Request: ID 123
Reply: ID=123

Command format

Serverip host,port

Parameters
host – domain name of a server or its IP-address;
port – server port.
Old command syntax is also supported for indication of the IP-address:
Serverip ip1,ip2,ip3,ip4,port
ip1, ip2, ip3, ip4 - server IP-address.

Explanation
Main server parameters where the monitoring data will be transmitted to.

Example
Request: Serverip m.7gis.ru,60521
Reply: SERVERIP=m.7gis.ru:60521
Request: Serverip 46.146.233.216,60521
Reply: SERVERIP=46.146.233.216:60521
Command format

**Serverip2 host, port**

**Parameters**
- **host**: domain name of a server or its IP-address;
- **port**: server port.

Old command syntax is also supported for indication of the IP-address:

**Serverip2 ip1,ip2,ip3,ip4,port**

**ip1, ip2, ip3, ip4**: server IP-address.

**Explanation**
Additional server parameters.

**Example**
Request: Serverip2 m.7gis.ru,60521
Reply: Serverip2=m.7gis.ru:60521

Command format

**ServersCfg t**

**Parameters**
- **t**: Time of connection with one server, [sec]. When the value is equal to 0, the data will be transmitted only to the main server.

**Explanation**
Sets the time of server connection session.

**Example**
Request: ServerCfg 120
Reply: SERVERCFG:SeansTime=120;

Command format

**Protocol n**

**Parameters**
- **n**: version of data transmission protocol:
  - 0 – Galileosky protocol;
  - 3 – EGTS;
  - 4 – Galileosky protocol with compression

**Explanation**
Choice of monitoring data transmission to the server.

**Example**
Request: Protocol 0
Reply: PROTOCOL:0;
Command format

**Roaming MCC_MNC,Size,Interval**

**Parameters**
- **MCC_MNC** – a mobile code of the country where the data can be transmitted without any limitations (the list of codes is given in [http://www.itu.int/dms_pub/itu-t/opb/sp/T-SP-E.212A-2010-PDF-E.pdf](http://www.itu.int/dms_pub/itu-t/opb/sp/T-SP-E.212A-2010-PDF-E.pdf)), for example, the Russian Federation code is 250 or it may be a combination of mobile country and mobile operator codes. Zero means that there are no special roaming settings;
- **Size** – maximum number of bytes which can be transmitted during one connection session in roaming. When the value is equal to 0, only the first packet is transmitted;
- **Interval** – connections interval in hours.

**Explanation**
Settings of data transmission in international roaming.

**Example**
Request: Roaming 25099,10000,24
Reply: ROAMING:Home=25099,MaxBytes=10000,Interval=24;

Command format

**Car VIN,N**

**Parameters**
- **VIN** – VIN of the vehicle, is transmitted in EGTS protocol.
- **N** – vehicle’s number plate, is transmitted in EGTS protocol.

**Explanation**
Settings of the vehicle description.

**Example**
Request: car 123456789,A000AA00
Reply: CAR:123456789,A000AA00;
Galileosky server exchange protocol settings

Command format
HeadPack bbbbbbbbbbbbb

Parameters

- bbbbbbbbbbbbb - tag set from 1 to 128.
  - If b is replaced by 1, the tag is on.
  - If b is replaced by 0, the tag is off.
  - Tag numeration order is given in section Galileosky protocol data.

Explanation

Head packet configuring.

Example

Request: HeadPack 1110
Reply: HeadPack= 0000000000000000000000000000000000000000000000001110b ,
This means that tags from the second to the fourth inclusive are on and the first and the rest tags inclusive are off.

Command format
HeadPack2 bbbbbbbbbbbbb

Parameters

- bbbbbbbbbbbbb - tag set from 129 to 256.
  - If b is replaced by 1, the tag is on.
  - If b is replaced by 0, the tag is off.
  - Tag numeration order is given in section Galileosky protocol data.

Explanation

Head packet configuring.

Example

Request: HeadPack2 110000
Reply: HeadPack= 110000b ,
This means that tags 129, 130, 131, 132 are off and tags 133 and 134 are on. All the following tags are off.
Command format

**HeadPackBit** index,value

**Parameters**
- **index** – is tag number, which is on or off for transmission to the server
- **value** – 1 if the tag should be transmitted to the server
  - 0 if tag should not be transmitted to the server

Tag numeration order is given in section Galileosky protocol data.

**Explanation**

Head packet configuring.

**Example**

Initially the second tag is off:

- HeadPack=1100b
- Switch on this tag.
- Request: HeadPackBit 2, 1
- Reply: HeadPack=1100b

---

Command format

**MainPack** bbbbbbbbbbbbbbb

**Parameters**
- **bbbbbbbbbbbbbb** – tag set from 1 to 127.
  - If b is replaced by 1, the tag is on.
  - If b is replaced by 0 the tag is off.

Tag numeration order is given in section Galileosky protocol data

**Explanation**

Main packet configuring.

**Example**

- Request: MainPack 11111111111111111000
- Reply: MainPack= 000000000000000000000111111111111111110000b

This means that tags 1, 2, 3, 4 are off and tags 5-26 inclusive are on. All the following tags are off.
Command format
MainPack2 bbbbbbbbbbbbbbb

Parameters
bbbbbbbbbbbbbbbb – tag set from 128 to 255.
If b is replaced by 1, the tag is on.
If b is replaced by 0 the tag is off.
Tag numeration order is given in section Galileosky protocol data.

Explanation
Main packet configuring.

Example
Request: MainPack2 110000
Reply: MainPack2=110000b
This means that tags 128, 129, 130, 131 are off and tags 132 and 133 are on. All the following tags are off.

Command format
MainPackBit index,value

Parameters
index – tag number, which is on or off for transmission to the server
value – 1 if this tag should be transmitted to the server
0 if this tag should not be transmitted to the server
Tag numeration order is given in section Galileosky protocol data.

Explanation
Main packet configuring.

Example
Initially the second tag is off:
HeadPack=1100b
Switch on this tag.
Request: HeadPackBit 2,1
Reply: HeadPack=1100b

Command format
DataKey key

Parameters
Key – data encryption key in hexadecimal form, if it is equal to 0, data are not encoded.

Explanation
Specifies the key that encrypts the transmitted data.
User Manual Galileosky Tracking Devices

Track parameters setting

Command format
Turning V,A,D,S,dS

Parameters

V – minimum speed that enables drawing of the track at turnings, [km/h];
A – minimum turn angle for the tracking device to record a track point, [º];
D – the distance above which the next packet will be saved to the tracking device memory, [m];
S – the speed above which for dS-multiple value track point will be recorded, [km/h];
dS – speeding interval, [km/h].

Explanation
Configures track detail representation.

Example
Request: Turning 3,10,300,60,20
Reply: TURNING:Speed=3,Angle=10,Distance=300,SpeedEx=60,SpeedDelta=20

Command format
GPS.Correct OnOff,MaxWrong,HDOP,Spd,Acc,Jump,TravelSpeed

Parameters

OnOff – coordinates filtering is on(1) or off(0);
MaxWrong – the number of wrong coordinates to be filtered (the recommended number is 5). This parameter accounts errors of acceleration exceed and jump, for other parameters the coordinates are always filtered;
HDOP – Maximum HDOP above which the coordinates are not updated;
Spd – Maximum speed. When it is exceeded, coordinates are considered false and are not updated, [km/h];
Acc – GPS or GLONASS data based acceleration [m/s²];
Jump – Maximum coordinate jump in the nearest 2 seconds, [m];
TravelSpeed – Minimum speed for coordinates to be updated, [km/h]. This function is not suitable for low speed vehicles (tractors, asphalt placing machines)

Explanation
Allows filtering false coordinates: jumps when the vehicle stops, in or out of tunnels, near high-rise buildings

Example
Request: GPS.CORRECT 1,5,2,150,3,50,3
Reply: GPS.correct: OnOff=1, MaxWrong=5, MaxHDOP=2, MaxSpd=150, MaxAcc=3, MaxJump=50, MaxTravelSpeed=3;
**User Manual Galileosky Tracking Devices**

**Command format**

*WrPeriod x,y*

**Parameters**
- **x** – Period of packet recording in memory in motion, [sec.];
- **y** – Period of packet recording in memory when the vehicle stops, [sec.].

**Explanation**
Period of packets recording when the vehicle is moving or when it stops.

**Example**
Request: *WrPeriod 60,180*
Reply: *WRPERIOD move=60 parking=180*

**Command format**

*GPS.Correct2 MaxNoSatTime,MinSatStart,MinSatWork*

**Parameters**
- **MaxNoSatTime** – maximum time without satellite connection when no disconnection is registered, [sec.];
- **MinSatStart** – minimum number of satellites to be connected to when the tracking device is on;
- **MinSatWork** – minimum number of satellites during operation of the tracking device. If the number is smaller, a disconnection will be registered

**Explanation**
These settings affect coordinates updating, if filtering is on by *GPS.Correct* command.

**Example**
Request: *GPS.CORRECT2 10,5,4*
Reply: *GPS.correct2:MaxNoSatTime=10,MinSatStart=4,MinSatWork=3;*

**Command format**

*AccSens Sens,TO*

**Parameters**
- **Sens** – accelerometer sensitivity.
- **TO** – the time after the vehicle stops, during which coordinates are updated, [sec].

**Explanation**
This function allows avoiding unnecessary outliers after the vehicle stops.
Default value is 40,300.
Sens value equal to 600 is 1g (g – gravitational acceleration)

**Example**
Request: *AccSens 40,300*
Reply: *Accelerometer sensitive: sens = 40, time out=300*
Command format

**Ignition N**

**Parameters**

N – an input used as an ignition sensor:

0 – ignition sensor is not used;
1 – input 0 is used as ignition sensor;
2 – input 1 is used as ignition sensor;
3 – input 2 is used as ignition sensor;
4 – input 3 is used as ignition sensor;

**Explanation**

If there is no response for a given input, vehicle is considered to be not started, and coordinates are not updated. It allows avoiding outliers after the vehicle stops. Triggering on input is determined by the limits set by InCfg command (section Analog- discrete inputs settings).

**Example**

Request: Ignition1
Reply: IGNITION:1;

---

Command format

**Shock Mode, Angle, Timeout, ShockSens**

**Parameters**

**Mode** – strike determination mode:

0 – strike determination is switched off;
1 – strike determination is switched on, X axis is in vertical position;
2 – strike determination is switched on, Y axis is in vertical position;
3 – strike determination is switched on, Z axis is in vertical position;

**Angle** – maximum incline angle \([0°-180°]\), value equal to 180 switches off incline determination;

**Timeout** – maximum allowable time when incline angle is exceeded, [sec.].

**ShockSens** – maximum acceleration by exceed of which a strike is detected. 600 points – gravitational acceleration.

**Explanation**

Switching on strike and incline determination mode.

**Example**

Request: Shock 3,30,5
Reply: Shock: Mode=3,MaxAngle=30,RT=5;
Command format

\[ \text{Mhours LoLevel,HiLevel} \]

**Parameters**

- **LoLevel** – input voltage + supply voltage by stopped engine, [mV];
- **HiLevel** – input voltage + supply voltage by started engine, [mV];

**Explanation**

Allows filtering false coordinates after the vehicle stops

**Example**

Request: \text{mHours 12000,14500}  
Reply: \text{Mclock: lolevel=12000,hilevel=14500};

---

**Geofences settings**

Command format

\[ \text{Dzone Mode} \]

**Parameters**

- **Mode** – operation mode inside a geofence:
  - 0 – geofence processing is switched off;
  - 1 – coordinates updating prohibition inside a geofence;
  - 2 – GSM-unit switching off inside a geofence, 3 – updating prohibition and GSM-unit switching off at the same time.

**Explanation**

Allows setting of tracking device behavior inside a geofence.

**Example**

Request: \text{Dzone 3}  
Reply: \text{Dzone:3};

Command format

\[ \text{DzoneAdd Lat,Lon,R} \]

**Parameters**

- **Lat** – geofence centre latitude;
- **Lon** – geofence centre longitude;
- **R** – geofence radius in meters.

**Explanation**

Allows adding a geofence. Each geofence is a circle with the determined center and radius.

**Example**

Request: \text{DzoneAdd 55.9999,66.123456,100}  
Reply: \text{DzoneAdd:lat=55.9999,lon=66.123456,rad=100};
Command format
DzoneDel Lat, Lon

Parameters
Lat – geofence center latitude;
Lon – geofence center longitude.

Explanation
Allows deleting the geofence, set by its center coordinates.

Example
Request: DzoneDel 55.9999, 66.123456
Reply: DzoneDel:lat-55.9999,lon=66.123456;

Command format
DzoneClear

Explanation
This parameter deletes all geofences.

Example
Request: DzoneClear
Reply: Dead zones are cleared

Command format
DzoneCount

Explanation
This parameter allows getting the number of all geofences set in the tracking device.

Example
Request: DzoneCount
Reply: DZONECOUNT:2;
Command format

**DzoneInfo N**

**Parameters**

N – Ordinal number of geofence beginning with 0.

**Explanation**

This parameter gives an access to the geofence’s data.

**Example**

Request: DzoneInfo 0
Reply: DZONEINFO:Lat=10.000000,Lon=20.000000,Rad=30;

### Information commands

**Command format**

**Status**

**Explanation**

Allows receiving device status at the moment of sending a command.

- Dev – this device number;
- Soft – current firmware version;
- Pack – last recorded packet serial number;
- TmDt – Current time and date;
- Per – Current packet saving period (different when the vehicle is moving and stops);
- Nav – Coordinates determination accuracy. 0 – coordinates are found.
- Lat – Latitude;
- Lon – Longitude;
- Speed – Linear speed (vehicle speed);
- HDOP – Horizontal accuracy (The closer to 1, the better);
- SatCnt – Number of available satellites;
- A – movement directional angle

**Example**

Request: Status
Reply: Dev50 Soft=91 Pack=17230 TmDt=10:58:6 20.6.9 Per=60 Nav=0 Lat=60.4007 Lon=31.0070 Speed=0.0194 HDOP=0.88 SatCnt=10 A=27.55
Command format

dme

Explanation
Allows obtaining a unique GSM-unit identifier, 15-byte and CCID of SIM-microchip, if there is one.

Example
Request: IMEI
Reply: IMEI 123456789012345, 12345678901234567890

Command format

imsi

Explanation
Allows obtaining a unique IMSI identifier of a SIM-card.

Example
Request: IMSI
Reply: IMSI: 123456789012345;

Command format

inall

Explanation
Allows analog input values in0..in3 as well as digital fuel level sensor values and temperature, and accelerometer values with respect to three axes (10 bit for each axis starting with the zero bit) being obtained.

Example
Request: inall
Reply: INALL:in0=0,in1=0,in2=0,in3=0, RS232=10,1,Acc=332943891;

Command format

Insys

Explanation
Allows obtaining external source voltage, internal battery voltage, GPS aerial voltage, the main power bus voltage of the tracking device and also the temperature inside the tracking device.

Example
Request: insys
Reply: INSYS: Pow=12438,Vbat=4196,Vant=2921,Vdc=4115,Temper=37

76
Command format
Temex0

Explanation
Allows finding temperature from the first four external DS18S20 thermometers. Format: the lower byte is the thermometer identifier; the higher byte is the temperature itself. To calculate the temperature the obtained value must be divided by 256 and rounded off to the whole number, with the fractional part deleted.

Example
Request: temex0
Reply: TemEx0: DS0=0,DS1=0,DS2=0,DS3=0

Command format
Temex1

Explanation
Allows finding temperature of the second four external DS18S20 thermometers. Format: the lower byte is the thermometer identifier; the higher byte is the temperature itself. To calculate the temperature the obtained value must be divided by 256 and rounded off to the whole number, with the fractional part deleted.

Example
Request: temex1
Reply: TemEx1: DS4=0,DS5=0,DS6=0,DS7=0

Command format
Hum0

Explanation
Allows finding the temperature of the first four DS1923 humidity sensors.
ID – sensor identifier;
T – temperature in Celsius degrees
H – humidity in %.

Example
Request: Hum0
Reply:ID0=1,T0=20,H0=20.0,ID1=2,T1=30,H1=30.0,ID2=3,T2=25,H2=40.0,|D3=5,
T3=15,H3=50.0
Command format
Hum1

Explanation
Allows finding the temperature of the second four DS1923 humidity sensors.
ID – sensor identifier;
T – temperature in Celsius degrees
H – humidity in %.

Example
Request: Hum1
Reply: ID4=1,T4=20.0,H4=20.0, ID5=2,T5=30.0,H5=30.0, ID6=3,T6=25.0,H6=40.0, ID7=5, T7=15.0,H7=50.0

Command format
Canibut

Explanation
Allows obtaining current CAN-bus state and iButton decimal value

Example
Request: canib
Reply: CAN_Ib: CANA0=0,CANA1=0, CANB0=0, CANB1=0, iBut=0

Command format
statall

Explanation
Allows obtaining device, inputs, outputs decimal status and mileage according to
GPS/GLONASS data.

Example
Request: statall
Reply: StatAll: Dev=1,Ins=2, Outs=7, Mileage=152;
Command format
AccType

Explanation
Allows obtaining accelerometer type. Returns “analog” for analog type and “digital” for digital type.

Example
Request: AccType
Reply: AccType: digital

Command format
LastCmd N

Parameters
N- number of recorded command, beginning from 0

Explanation
Allows overlooking the archive of the last executed commands. Returns the command source, time, date and text of the command.

Example
Request: lastcmd 2
Reply: USB 095659 20140305 ACTIVECAN 1

Service commands

Command format
PIN N

Parameters
N – four-digit PIN-code of SIM-cards.

Explanation
SIM-card PIN-code and password setting for settings access in the Configurator. The default PIN-code is 0. If you enter the wrong code, the tracking device will be blocked for 25 seconds, and then reset. PIN-code is identical for both SIM-cards.

Example
Request: PIN 1234
Reply: PIN:1234;
Command format

**Archive type**

**Parameters**

*type* – data source for sending to the server:
0 – archive from the internal flash-memory;
1 – archive from the microSD card.

**Explanation**

Selection of data source for sending to the server. After command execution it is necessary to reset the tracking device. Before you select a microSD card, delete the archive, created by earlier firmwares, (EraseTrackSD or delete files from Track catalogue through the Card-Reader).

**Example**

Request: ARCHIVE 0
Reply: ARCHIVE:0;

---

Command format

**FLASHARCHIVE Dynamic,SendOrder**

**Parameters**

*Dynamic* – whether the dynamic archive structure is used or not:
0 – the dynamic archive structure is off, all possible data are saved in archive;
1 – the dynamic archive structure is on, only the data selected to be transmitted to the server are saved in archive.

*SendOrder* – order of data transmission from archive to server:
0 – the data are sent deep into the archives; the most current data are sent first, then the oldest ones.
1 – the data are sent in chronological order

**Explanation**

Archive structure setting and the setting of the data transmission order to the server

**Example**

Request: FLASHARCHIVE 1,1
Reply: FLASHARCHIVE: Dynamic=1,StraightSendOrder=1;

---

Command format

**EraseCfg**

**Explanation**

Setting default configuration.

**Example**

Request: EraseCfg
Reply: ERASECFG
**Command format**

**EraseTrack**

<table>
<thead>
<tr>
<th>Explanation</th>
<th>Deleting all tracks from the memory.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>Request: EraseTrack</td>
</tr>
<tr>
<td></td>
<td>Reply: ERASETRACK</td>
</tr>
</tbody>
</table>

**Command format**

**EraseTrackSD**

<table>
<thead>
<tr>
<th>Explanation</th>
<th>Deleting all tracks from the SD memory.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>Request: EraseTrackSD</td>
</tr>
<tr>
<td></td>
<td>Reply: ERASETRACKSD</td>
</tr>
</tbody>
</table>

**Command format**

**ColdStart**

<table>
<thead>
<tr>
<th>Explanation</th>
<th>GLONASS unit cold start.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>Request: ColdStart</td>
</tr>
<tr>
<td></td>
<td>Reply: GLONASS cold start</td>
</tr>
</tbody>
</table>

**Command format**

**Reset**

<table>
<thead>
<tr>
<th>Explanation</th>
<th>Allows resetting the device remotely.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>Request: Reset</td>
</tr>
<tr>
<td></td>
<td>Reply: Reset of device. Please wait 15 seconds...</td>
</tr>
</tbody>
</table>
Command format

**Upgrade N**

**Parameters**
Firmware upgrading up to the specified one. If 0 is specified, the tracking device will upgrade firmware up to the last stable one.

**Explanation**
Firmware upgrading up to the specified one.

**Example**
Request: Upgrade 47  
Reply: UPGRADE SOFT= 47

---

Command format

**SleepMode OffOnStop,DST,GNSS,GPRS,ADC,CAN,RS232,RS485,SD,WakeUp,ST**

**Parameters**
- **OffOnStop** – 0 – do not turn off GPS/GLONASS unit at a stop; 1 – turn off GPS/GLONASS unit at a stop.  
- **DST** – Time spent at a stop, after which the tracking device will switch to the deep sleep mode;  
- **GNSS** – turn off GPS/GLONASS unit in the deep sleep mode;  
- **GPRS** – turn off GSM-unit in the deep sleep mode;  
- **ADC** – reduce ADC sampling rate in the deep sleep mode; the maximum frequency that can be measured at inputs is reduced by 2 and the minimum impulse period that can be registered increases twofold;  
- **CAN** – turn off the CAN in the deep sleep mode;  
- **RS232** – turn off RS232 in the deep sleep mode;  
- **RS485** – turn off RS485 in the deep sleep mode;  
- **microSD** – turn off the microSD card in the deep sleep mode, the reading of trusted iButton keys is supported;  
- **WakeUp** – a period in seconds between connections to a server in deep sleep mode;  
- **ST** – a length of connection to a server in deep sleep mode.

**Explanation**
Power saving mode control. In the deep sleep mode no 1Wire sensors sampling and no battery charging are performed.

**Example**
Request: SLEEPMODE 1,60,1,1,1,1,1,1,1,3600,600  
Reply:SLEEPMODE:OffGNSSOffStop=1,DSTimeout=60, GNSS=1,GPRS=1,ADC=1,CAN=1,RS232=1, RS485=1,SD=1, GSMWakeUp=3600, SessionLen=60;
User Manual Galileosky Tracking Devices

Command format

RemoteConfig OnOff

Parameters
OnOff – turning on the remote configuration function:
  0 – remote configuration is off;
  1 – remote configuration is on.

Explanation
Turns on and off the remote configuration (section Remote configuration).

Example
Request: RemoteConfig 1
Reply: REMOTECONFIG:1;

Voice communication settings

Command format

GSMVolume k,m

Parameters
k – GSM-channel sound gain [1÷100].
m – GSM-channel microphone gain [1÷15].
The greater the parameter, the greater the gain.

Explanation
Allows speakerphone sound gain parameters being customized.

Example
Request: GSMVolume 75,15
Reply: GSMVOLUME=75,15

Command format

AutoAnswer n

Parameters
n – the number of calls before autoanswer. [0÷10]
If the parameter is equal to 0, the function is off.

Explanation
Incoming call results in the tracking device automatic answer.

Example
Request: AutoAnswer 1
Reply: AUTOANSWER=1
Command format
Calls N

Parameters
N – the number of call attempts

Example
Request: Call 3
Reply: CALL:3;

Command format
RingTo N

Parameters
N – a telephone number.

Explanation
Making a call from the Tracking device to the given telephone number.

Example
Request: RingTo 89119988899
Reply: RINGTO=89119988899

Command format
SendSMS Tel, Msg

Parameters
Tel – a telephone number to which SMS is sent
Msg – SMS template. It may contain parameters to insert current data:
%IMEI – tracking device’s IMEI, %LAT – latitude, %LON – longitude.

Explanation
Sending SMS to the given telephone number

Example
Request: SendSMS 89119988899, Test
Reply: SMS sheduled
**Command format**

**Tangenta OnOff**

**Parameters**

- **OnOff** – use a push-to-talk;
- **0** – a speaker and a microphone are connected;
- **1** – a push-to-talk KMC-25 is connected.

**Explanation**

Voice communication setting

**Example**

Request: Tangenta 1  
Reply: TANGENTA:1;

---

**Analog-discrete inputs setting**

**Command format**

**InCfg_num_in ft,fl,up_low,up_hi,down_low,down_hi,imp_null**

**Parameters**

- **num_in** – an input number, beginning from 0;
- **ft** – filter type
  - **0** – mean value computation;
  - **1** – pulse count;
  - **2** – frequency count
  - **3** – pulse count from two synchronously connected sensors.
- **fl** – filter length. It is used for average and discrete signal function;
- **up_low** – lower limit of a discrete signal triggering, [mV];
- **up_hi** – upper limit of a discrete signal triggering, [mV];
- **down_low** – lower limit of a discrete signal failure, [mV];
- **down_hi** – upper limit of a discrete signal failure, [mV];
- **imp_null** – pulses counter behavior: **1** – counter is set to zero, **0** – counter continues increasing.

**Explanation**

Allows one of 4 analog/discrete inputs being configured.

**Example**

Request: InCfg0 0,10,8000,15000,0,3000,0  
Reply: INCFG0:FiltType=0,FiltLen=10,UpLow=8000,UpHi=15000,DownLow=0,DownHi=3000,ImpNull=0;
## Command format

**PowInCfg fl,up_low,up_hi,down_low,down_hi**

### Parameters
- **fl** – average length of the filter [1÷50];
- **up_low** – lower limit of a discrete signal triggering, [mV];
- **up_hi** – upper limit of a discrete signal triggering, [mV];
- **down_low** – lower limit of a discrete signal failure, [mV];
- **down_hi** – upper limit of a discrete signal failure, [mV].

### Explanation
Allows configuring the operating limits for the external power input.

### Example
**Request:**
PowInCfg 10,8000,15000,0,3000
**Reply:** POWINCFG:FiltLen=10,UpLow=8000,UpHi=15000,DownLow=0,DownHi=3000

## Command format

**AccVal**

### Parameters
Obtaining filtered accelerometer mean-square value by three axes. Accelerometer sensitivity:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>min</td>
<td>555mV/g</td>
</tr>
<tr>
<td>average</td>
<td>600mV/g</td>
</tr>
<tr>
<td>max</td>
<td>645mV/g</td>
</tr>
</tbody>
</table>

Where g is gravitational acceleration \( g \approx 9.8m/s^2 \).

### Example
**Request:** AccVal
**Reply:** ACCVAL = 625

AccVal = 0.625. As you can see, the accelerometer is affected only by the gravity force.
Transistor outputs setting

Command format

Out v,s

Parameters

v – output ordinal number (starting with the zero output);
s – desired state (0 – on-state transistor output;
1 – off-state transistor output).

Explanation
Transistor output control.
Transistor outputs are off by default.

Example
Request: Out 1,1
Reply: OUT(1..0) = 10
As you can see, all outputs except 1 are on.

Autoinformer setting

Command format

Autoinformer OnOff,Repeat,Out,FileName

Parameters

OnOff – enable/disable Autoinformer function: 1 – the function is enabled, 0 – the black box function is enabled (the navigation data are duplicated and saved to the external microSD card).
Repeat – determines whether the file should be replayed when the device is in the playback zone. If the value is 0, the file is played only once on entering the zone.
Out – output index, which is inverted during the audio file playing. 0 – no output is inverted, 1 – OUT0, 2 – OUT1, 3 – OUT2, 4 – OUT3, 5 – OUT4.
FileName – a route name. The route is understood as the number of zones to be announced.

Explanation
For more information, see section Autoinformer.

Example
Request: Autoinformer 1,0,0,Marshrut 1,50
Reply: AUTOINFORMER:OnOff=1,Repeat=0,Route=Marshrut 1;.
Digital inputs settings

Command format

RS2320 nf

Parameters

nf – function number

- 0 – no function on RS232;
- 1 – digital fuel level sensor (relative level N);
- 2 – digital fuel level sensor (frequency F);
- 3 – external GLONASS unit;
- 4 – Galileo photo camera
- 5 – Garmin navigator
- 6 – CAN-LOG
- 7 – CUB5 indicator
- 8 – Trimble course detector (only for Galileosky v1.8.5 and v1.9);
- 9 – RS232-RS485 adapter;
- 10 – REP-500 energy meter;
- 11 – Carrier DataCOLD500 temperature recorder;
- 12 – CI-5010A weight indicator;
- 13 – PressurePro;
- 14 – ThermoKing temperature recorder;
- 15 – EuroScan temperature recorder;
- 16 – Tenzo-M weight indicator;
- 17 – test of port performance;
- 18 – AWT 640 weight indicator.

Explanation

RS232 zero port function setting.

Example

Request: RS2320 1
Reply: RS232_0: NumFunc=1;

RS2321 command is analogous to RS2320 command and is intended to set the first RS232 port function.
Command format
DFilter RS2320, RS2321

Parameters
RS2320 – filter length for a fuel level sensor connected to RS232 and RS485 ports, the number of successive sensor indications, which are averaged. If the value is equal to 1, there is no filtration.
RS2321 – filter length for fuel sensor connected to the first RS232 port, the number of successive sensor indications, which are averaged. If the value is equal to 1, there is no filtration;

Explanation
Digital fuel sensors indications filtering.

Example
Request: DFILTER 1,5
Reply: DFILTER:RS2320=1,RS2321=5;

Command format
iButtons ib1,ib2,ib3,ib4,ib5,ib6,ib7,ib8

Parameters
ib1-ib8 – four lower bytes of iButton identification hexadecimal number without the checksum.
For example, full key hexadecimal number:
09 91 02 0C 00 00 00 5C, where
09 – type of device (in this case, it is DS1982, for DS1990 – 01),
91 02 0C 00 00 00 – unique number,
5C – the checksum.
In this case, 91 02 0C 00 must be entered.

Explanation
List of iButton identifiers, the connection state of which is monitored by the tracking device.

Example
Request: iButtons 0091022C,0,0,0,0,0,0,0
Reply: IBUTTONS:0091022C,0,0,0,0,0,0,0
Command format

CUB5 N0,N2

Parameters

**N0** – parameter number displayed on the indicator connected to RS232[0] port.

**N1** – parameter number displayed on the indicator connected to RS232[1] port.

Parameters:

- 0 – speed, accurate within 0.1, [km/h];
- 1 – directional angle accurate within 0.1 [°];
- 2 – external supply voltage [mV];
- 3 – internal accumulator voltage [mV];
- 4 – temperature inside the tracking device [°C];
- 5 – mileage according to the GPS/GLONASS data, accurate within 0.1, [km]
- 6 – input IN0;
- 7 – input IN1;
- 8 – input IN2;
- 9 – input IN3;
- 10 – RS232[0];
- 11 – RS232[1]
- 12 – temperature sensor 0 [°C];
- 13 – temperature sensor 1 [°C];
- 14 – temperature sensor 2 [°C];
- 15 – temperature sensor 3 [°C];
- 16 – temperature sensor 4 [°C];
- 17 – temperature sensor 5 [°C];
- 18 – temperature sensor 6 [°C];
- 19 – temperature sensor 7 [°C];
- 20 – CAN. Total fuel consumption [l]
- 21 – CAN. Tank fuel level, accurate within 0.1 [%]
- 22 – CAN. Coolant temperature [°C];
- 23 – CAN. Engine speed;
- 24 – CAN. mileage, accurate within 0.1 [km]
- 25-39 – CAN8BITR0 - CAN8BITR14;
- 40-44 – CAN16BITR0 – CAN16BITR4;
- 45-49 – CAN32BITR0 – CAN32BITR4;

Explanation

Settings of parameters display on the CUB5 indicator.

Example

Request: CUB5 0,1
Reply: DFILTER:RS2320=0, RS2321=1;
Command format

**AddKey key1,...,key25**

Parameters

- **key** – the lower 4 bytes of the iButton identification number excluding the checksum in hexadecimal form.
  
  For example, full key hexadecimal number:
  
  09 91 02 0C 00 00 00 5C, where
  
  09 – type of device (in this case, it is DS1982, for DS1990 – 01),
  
  91 02 0C 00 00 00 – unique number,
  
  5C – the checksum.
  
  91 02 0C 00 must be entered.
  
  The command can contain a list of up to 25 keys.

Explanation

To add keys to the list of trusted iButton identifiers on a microSD-card.

Example

Request: AddKey 0091022C,0091022D

Reply: Added 2 keys

Command format

**DelKey key1,...,key25**

Parameters

- **key** – the lower 4 bytes of the iButton identification number excluding the checksum in hexadecimal form.
  
  For example, full key hexadecimal number:
  
  09 91 02 0C 00 00 00 5C, where
  
  09 – type of device (in this case, it is DS1982, for DS1990 – 01),
  
  91 02 0C 00 00 00 – unique number,
  
  5C – the checksum.
  
  91 02 0C 00 must be entered.
  
  The command can contain a list of up to 25 keys.

Explanation

To remove keys from the list of trusted iButton identifiers on a microSD-card.

Example

Request: DelKey 0091022C,0091022D

Reply: Deleted 2 keys
### Command format

**KeyCount**

**Explanation**
The number of trusted iButton keys on a microSD card.

**Example**
Request: KeyCount
Reply: KEYCOUNT:12;

### Command format

**ShowKey N**

**Parameters**
- **N** – The order number of an iButton key in the list on a microSD-card. Numbering starting with 1.

**Explanation**
To show an identifier of a trusted iButton key on a microSD-card.

**Example**
Request: ShowKey 1
Reply: SHOWKEY 1:9503276 (0x0091022C)

### Command format

**IBCFG T1,T2**

**Parameters**
- **T1** – timeout from iButton detachment to setting to zero of the key code in the memory cell of the tracking device, for keys with the code of more or equal to 100000;
- **T2** – timeout from iButton detachment to setting to zero of the key code in the tracking device’s memory, for keys with the code of less than 100000.

**Explanation**
Periods settings of iButton keys codes setting to zero.

**Example**
Request: IBCFG 4,1500
Reply: IBCFG:Timeout=4,Timeout100000=1500;
Signaling mode setting

Command format
SIGN GWTime, DropAlarmTimeout, UseIB

Parameters
- **GWTime** – duration of the "green wave" which is the time after the signalling starts, during which no sampling of sensors takes place, [sec];
- **DropAlarmTimeout** – time in the alarm mode, after which an automatic switching to the alarm mode is performed. By zero, the tracking device will stay in the signalling mode until the command is sent or until it is switched off using the input, [sec];
- **UseIB** – should iButton keys be used for arming and disarming:
  - 0 – no;
  - 1 – arming and disarming through the short-time put of one of the trusted iButton keys;
  - 2 – arming only having one of the trusted iButton keys, if no key is put, the tracking device is disarmed;
  - 3 – arming only having any of the iButton keys, if no key is put, the tracking device is disarmed.
  - 4 – disarming only having any of the iButton keys, if no key is put, the tracking device is armed;
  - 5 – arming through the short-time put of one of the trusted iButton keys, no disarming after disconnecting the key.
  - 6 - arming if any iButton key is put. After disconnecting the key, the tracking device is armed.
  - 7 – disarming, only having any of the iButton keys, if no key is put, the tracking device is armed;
  - 8 - disarming through the short-time put of any iButton keys;

Explanation
General configurations of signalling.

Example
Request: SIGN 40, 60, 0
Reply: SIGN: GWTime=40, DropAlarmTimeout=60, UseIB=0;

Command format
S

Explanation
Arming.

Example
Request: S
Reply: Signaling is enabling
### Command format

#### DS

**Explanation**
Disarming.

**Example**
Request: DS
Reply: Signaling is disabling

#### ST

**Explanation**
Signaling state. Possible states:
- Signaling is disabled – signaling is off,
- Signaling is enabled – signaling is on,
- Alarm – alarm mode.

**Example**
Request: ST
Reply: Signaling is disabled.

#### AddSigPhone phone[,n]

**Parameters**
- **phone** – a phone number.
- **n** – an optional parameter, added phone number index.

**Explanation**
Notification phone setting

**Example**
Request: AddSigPhone 123456789
Reply: SignPhones 123456789;;;
User Manual Galileosky Tracking Devices

Command format

**SIN0 type,delay,sms,ring,photo,msg**

### Parameters

- **type** – an input mode:
  - 0 – is not used for signaling;
  - 1 – input activation results in signaling mode on;
  - 2 – input activation results in alert mode on if signaling mode is on;
  - 3 – input activation results in alert mode on even if signaling mode is off.

- **delay** – post-activation delay before switching to alert mode, [sec].

- **sms** – enable SMS notification: 1 – yes, 0 – no

- **ring** – enable phone call notification: 1 – yes, 0 – no

- **photo** – take photo: 1 – yes, 0 – no

- **msg** – alert mode message. The message may contain the parameters, which are replaced by the current data: %IMEI – IMEI of the tracking device, %LAT – latitude, %LON – longitude.

### Explanation

Setting the behavior of an input in signaling mode.

### Example

Request: SIN0 3,0,1,1,Alarm %IMEI
Reply: SIN0:SignType=3,Adelay=0, SMS=1, Ring=1, Photo=0, Msg=Alarm %IMEI;

**sin1, sin2, sin3** commands are similar to sin0.

Command format

**SGPS type,speed,r,t,sms,ring**

### Parameters

- **type** – operating mode:
  - 0 – is not used for signaling;
  - 1 – switching to alert mode when the incline angle is exceeded;
  - 2 – switching to alert mode if the speeding is exceeded (strike);
  - 3 – switching to alert mode when the specified speed is exceeded or if the vehicle is beyond the radius longer than a predetermined time interval.

- **speed** – maximum speed, [km/h].

- **r** – maximum radius, [m].

- **t** – maximum time interval staying beyond the radius, [s]

- **sms** – enables SMS notification: 1 – yes, 0 – no

- **ring** – enables phone call notification: 1 – yes, 0 – no

- **photo** – enables making photos: 1 – yes, 0 – no

### Explanation

Setting of the use of GPS data in signaling mode.

### Example

Request: sgps 1,10,1,10,1,1
Reply: SGPS:SignType=1,Speed=10,R=1,T=10,SMS=0,Ring=0;

Command format
SACC type,sms,ring,photo,msg

Parameters

**type** – operating mode:
- 0 – is not used for signaling;
- 1 – an incline more than the given angle results in Alarm in Signaling mode;
- 2 – acceleration exceeding (strike) results in Alarm in Signaling mode;
- 3 – both an incline and a strike result in Alarm in Signaling mode.

**sms** – enables SMS notification: 1 – yes, 0 – no

**ring** – enables phone call notification: 1 – yes, 0 – no

**photo** – take photo: 1 – yes, 0 – no

**msg** – alert mode message. The message may contain the parameters, which are replaced by the current data: %IMEI – IMEI of the tracking device, %LAT – latitude, %LON – longitude.

Explanation
Setting of the use of accelerometer data in signaling mode. Operation thresholds are set by SHOCK command (section Determination of strike and incline)

Example
Request: SACC 2,1,0,Strike
Reply: SACC:SignType=2,SMS=1,Ring=1,Photo=0,Msg=Strike;
Command format
SOUT0 EMode,ElmpT,ElmpC,DMode,DlmpT,DlmpC,AMode,AlmpT,AlmpC,ADelay

Parameters
EMode – output operating mode by arming:
0 – no reaction,
1 – output is inverted,
2 – output generates pulses,
ElmpT – pulse time during Arming, m/ sec.
ElmpC – number of pulses during Arming
DMode – output operating mode by Disarming
0 – no reaction,
1 – output is inverted,
2 – output generates pulses,
DlmpT – pulse time during Disarming, m/ sec.
DlmpC – number of pulses during Disarming
AMode – output operating mode by Alarm:
0 – no reaction,
1 – output is inverted,
2 – output generates pulses,
AlmpT – pulse time during Alarm, m/ sec.
AlmpC – number of pulses during Alarm.
ADelay – activation delay after Alarm mode is on.
The device rounds off pulse duration to 0.1 sec.

Explanation
Setting the behavior of an output in signaling mode.

Example
Request: SOUT0 2,1,2,2,1,0,1,20
Reply: SOUT0:EMode=2,ElmpT=1,ElmpC=1,DMode=2,DlmpT=2,DlmpC=2,
AMode=1,AlmpT=0,AlmpC=0,ADelay=20

sout1, sout2, sout3 commands are similar to sout0.
CAN settings

Command format

CanRegime Mode, BaudRate, TimeOut, DoNotCleanAfterTimeOut

Parameters

- **Mode** – operating mode:
  - 0 – CAN-interface is off and is not used;
  - 1 – CAN-bus scanner;
  - 2 – standard FMS filter;
  - 3 – J1939 user filter 29 bit;
  - 4 – J1939 user filter 11 bit;

- **BaudRate** – data bus rate. It must be the same as the vehicle data bus rate. It can have the following values: from 10000 up to 500000. Typical values: 62500, 125000, 250000, 500000.

- **TimeOut** – measured in msec. For CAN_SCANNER mode it is response latency. If it is too small, not all bus messages will be received. The recommended time for CAN_SCANNER is 2000 msec. For all the rest modes it is time to receive at least one message, otherwise, the value will be set to zero.

- **DoNotCleanAfterTimeOut** – data should not be set to zero by disconnecting CAN-bus.

Explanation

General CAN-bus control.

Example

Example: switching on scanner for a 250000 b/sec bus with the message (answer) latency, equal to 2 sec.
Request: CanRegime 1, 250000, 2000
Reply: CANREG: Mode=1, BaudRate=250000, TimeOut=2000; DoNotCleanAfterTimeOut=0;

Command format

ActiveCAN OnOff

Parameters

- **OnOff** – operating mode:
  - 0 – passive mode: packets receiving confirmations are not sent to the CAN-bus. It is a safe mode of operation. It does not interfere with the on-board equipment;
  - 1 – active mode: packets receiving confirmations are sent to the CAN-bus.

Explanation

Control of packets confirmation sending to the CAN-bus.
Confirmation sending may be necessary by connection to the troubleshooting socket if the data cannot be read in passive mode.

Example

Request: ActiveCAN 1
Reply: ACTIVECAN: 1;
Command format

CAN8BitR0 ID, Shift, BigEndian

Parameters
ID – captured bus identifier:
Shift – useful data shift in the received packet
BigEndian – byte order, 0 – from the lower byte to the higher, 1 – from the higher to the lower.

Explanation
Single CAN-tag content control.

Example
Request: Can8BitR0 419360256,1,0
Reply: CAN8BITR0: ID=419360256, BigEndian=0;

Commands: CAN8BitR1, ..., CAN8BitR30, CAN16BitR0, ..., CAN16BitR14, CAN32BitR0, ..., CAN32BitR14 are similar to CAN8BitR0 command.

Packet transmission, energy saving, Stels mode settings

Command format: Stels pday, phours, minutesGSMOn. See section Stels mode and packet transmission.

Photo camera operation settings

Command format

GetPhoto d, t, n

Parameters
d – photo date, format DDMMYY, where DD – day, MM – month, YY – year;
t – photo time, format HHMMSS, where HH – hours, MM – minutes, SS – seconds;
n – port number to which the camera taking photos is connected:

Explanation
Request to transmit the nearest to the given time and data photo to the server.

Example
Request: GetPhoto 050511,052030,0
Reply: Send of photo is scheduled
Command format

MakePhoto[n]

Parameters

n – RS232 port number, which the camera is connected to. If the parameter is omitted, a photo will be taken by the camera connected to the RS232[0] port.

Explanation
Take a photo and send it to the server

Example
Request: MakePhoto
Reply: Photo ok

Command format

PhotoCfg t1,t2,mode,res,confirm

Parameters

t1 – periodical shooting interval, [sec]. Photos are saved only to the SD-card, 0 – shooting only by event;
t2 – shooting interval [sec]. Photos are saved to the SD-card and sent to the server, 0 – shooting only by event;
mode – periodical shooting in geofences:
0 – photos are taken regardless of geofences;
1 – photos are taken only inside geofences;
2 – photos are taken only outside geofences.
res – picture resolution:
0 – 640x480 points;
1 – 320x240 points.
confirm – waiting for a confirmation of a picture reception from the server:
0 – do not wait;
1 – wait.

Explanation
Settings of a periodical camera shooting, picture format and image transfer protocol.

Example
Request: PhotoCfg 5,150,0,0,0
Reply: PHOTOCFG:WrPeriod=5,SendPeriod=150,Type=0,Size=0,Confirm=0;
Command format

`CleanPhotoQueue n`

Parameters

- `n` – port number to which the camera taking photos is connected to.

Explanation

Mark all photos as sent ones.

Example

Request: `CleanPhotoQueue 0`
Reply: `Photo queue is cleaned`
Bootloader

The processor program (firmware) is a set of algorithms developed by Galileosky Ltd specialists. Owing to this program, the central processor receives the data from different system units, processes them logically and mathematically and takes decisions for control commands of controller units to be worked out depending on the situation.

Bootloader is a tracking device’s sub-program allowing the main program part (hereinafter referred to as Firmware) being updated. The firmware can be downloaded from the official site www.7gis.com.

The main program can be downloaded via the USB or GPRS channel in the tracking device.

USB channel download

Install Configurator for updating via USB-channel, after connecting the tracking device, select “Upgrade firmware”.

GPRS channel download

1) Connect the tracking device to the external power supply;
2) APN settings must conform to the SIM-card inserted in the tracking device, otherwise, the device flashing will not happen, and the tracking device will return to the operating mode;

Give the following command: UPGRADE firmware№ using any of the available channels (SMS, GPRS, USB), where firmware№ is the necessary firmware version. UPGRADE 0 initiates downloading the latest firmware;
3) You may see if the flashing is in progress by LEDs blinking;
4) In 15-25 minutes (depending on connection conditions and GPRS terms of service by operator) upgrade will be completed, and the tracking device will turn into operation mode automatically.

Using analog inputs to enter bootloader mode

After the device power supply is off, energize all analog-discrete inputs (section Contacts description) by applying the voltage of 7.0V ± 0.2V until the tracking device enters the bootloader mode. This function is used only during an improper device flashing. An improper firmware is the firmware designed for tracking devices with the other functional.
LED operation during the Tracking device reflashing

Depending on the GSM-unit and microcontroller units activation stages, the Tracking device will go through the following stages:

<table>
<thead>
<tr>
<th>Yellow LED blinking, times</th>
<th>GSM-unit activation stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Procedure of GSM unit activation was successful.</td>
</tr>
<tr>
<td>5</td>
<td>GPRS service registration was successful.</td>
</tr>
<tr>
<td>4</td>
<td>Establishing firmware update connection to the server.</td>
</tr>
<tr>
<td>3</td>
<td>The Tracking device switched to downloading mode.</td>
</tr>
<tr>
<td>2</td>
<td>Server connection is not lost, and the Tracking device is in downloading mode.</td>
</tr>
<tr>
<td>1</td>
<td>First request sending was successful.</td>
</tr>
</tbody>
</table>

*Blue LED blinking:* each successfully received and recorded packet is accompanied by a blue LED light change.