RS485. Integration with radio-frequency identification devices “UHF RFID Reader”

User Manual
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**Necessary Tools, Equipment and Materials**

To connect radio-frequency identification device UHF RFID Reader, models DP100 and DP800 produced by Dwell Electronics Co company (hereinafter - reader) to Galileosky tracking device (hereinafter – tracking device) you should have:

1. Electrical-installation tools.
2. A set of connecting wire.
3. A computer with Windows-based operating system and an installed configuration program for Galileosky tracking devices—«Configurator 4.0» or a more advanced version. It is recommended to install the last version from the site https://galileosky.com/podderzhka/programmyi.html
General Information

Radio-frequency identification devices UHF RFID Reader, models DP100 and DP800 (pic.1) are produced for wireless identification of objects by means of RFID tags. Devices allow to carry out identification at distance from 1-3 meters (low-end model) to 6-8 meters (high-end model).

**ATTENTION!** Such functionality is implemented in the tracking devices by means of Easy Logic technology ([https://galileosky.com/products/easylogic.html](https://galileosky.com/products/easylogic.html)). It is needed to use tracking devices with Easy Logic support. You can find out whether the tracking device supports Easy Logic or not in the following ways:

- in tracking device’s specification there should be abbreviation (AI) or sticker on the back of the device should have abbreviation (2) near IMEI (pic.2).
- send Hardversion command to the tracking device, if you receive numbers different from zero after comma in response, algorithms are supported (example of reply: HARDVERSION=21,8243)

Minimum firmware version for tracking devices Galileosky v.4.0, v.5.X is 229. Galileosky Base Block and 7.0 tracking devices can cooperate with UHF RFID Reader with any firmware version installed.
Reader Pre-Setting

The tracking device provides a function of transmitting identifier, received by the reader, in case of RFID tag being in the area of reader’s operation.

The reader should be in “Answer mode”, set by Configurator program (pic.3), otherwise, tags scanning from the tracking device will not be possible. Device address is 0.

RFID tags requirements (pic.4):
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- type of RFID tag is - EPC C1 G2.

Pic. 4
RFID tags
before using, EPC area of each RFID tag via Configurator should be formed by the following principle: first four bytes – marker of tag’s belonging, value \(79626461\) (hexadecimal symbol notation “ybda”), next four bytes – tags identifier (any number up to \(4294967295\)), that shouldn’t be equal to 0, as zero value is defined as “no identifier”. The example is shown in Picture 5.
Connecting Reader to the Tracking Device

Connecting reader to the tracking device is carried out in accordance with the scheme shown in Picture 6.

**ATTENTION!** Grounds (GND) of the tracking device and weight indicator must be connected; power to the devices is served separately.

Tracking device setting for reader’s connection is carried out via Configurator:

1. connect reader to the tracking device;
2. connect the tracking device to PC;
3. run Configurator program on your PC;
4. go to “Setting” page, tab “Track”, select dynamic structure of archive storage (pic. 7);
ATTENTION! For tracking devices Galileosky Base Block and 7.0 versions the setting of dynamic structure mode is not needed.

5. go to tab “Protocol” in Configurator, set the main packet for data transmission to the server, for this tick parameter “User Tag 0” (pic. 8);

6. go to tab “Digital inputs”, select “Photocamera and FLS, dozemeter DBG-S11D” for parameter “RS485 peripheral type” (pic. 9);

7. click “Apply” button;

7. go to tab “Commands” in Configurator and run “script galileosky/rfid_uhf” command (pic. 10);
ATTENTION! Algorithm is downloaded from the server, that is why the tracking device should have an activated SIM-card with GPRS support.

8. wait for confirmation of command by the tracking device, for this run “script” command in a few minutes after the previous command and make sure that response has information on a set algorithm (pic. 11);

9. to check algorithm operating, go to tab “Troubleshooting” in Configurator, tick “Algorithm and script diagnostics” parameter and check troubleshooting messages (pic. 12):
As a result of script operating, lines with “rfreader” prefix will be received:

- “rfreader inventory no tags” means, that device didn’t find RFID tags;
- “rfreader identified tag” means, that valid RFID tag is found.
Monitoring Software Setting

After tracking device’s setting there is setting of monitoring software. If your software doesn’t support receiving information from the reader through Galileosky tracking device, you should individually develop and install software to the monitoring server, processing data in accordance with the protocol of exchange between the tracking device and server. There is protocol description in Appendix №1.

Connecting of “UHF RFID Reader” to Galileosky tracking device is completed, the tracking device is ready for use.

RSA “Galileosky”, LLC produces satellite monitoring equipment 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.
APPENDIX № 1

Instruction on developing monitoring server software for operating with “UHF RFID Reader”

Operating with the reader

Tracking device occasionally sends requests for scanning to the reader. In accordance with the predetermined time, the reader tries to detect RFID tags in operating area and sends a response to the tracking device, including array of detected tags. Then, there is RFID tags belonging filtering. In case of valid tag, received tag’s identifier is sent on the basis of previously sent value.

Sent data:

<table>
<thead>
<tr>
<th>Tag</th>
<th>Tag name</th>
<th>Size in bytes</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xE2</td>
<td>User Tag 0</td>
<td>4</td>
<td>RFID tag identifier. Type unsigned int32. 0 value is defined as no identifier.</td>
</tr>
</tbody>
</table>

Device setting from the tracking device

Tracking device allows to set power and time of reader scanning using Configurator and monitoring server. You can see commands description below.

When command is received, it is sent to the reader and then sent back to the tracking device with status of implementing.

To set the reader to the tracking device monitoring server sends commands in accordance with the following scheme:

- Server sends commands to the tracking device in tag 0xE1 (text):
  - see below “Server commands”;
  - tracking device transmits commands to the device;
- Tracking device sends responses to the server in tag 0xE1 (text):
  - see below responses format.

Server commands

- Setting of reader’s power:

  RFR_SETPWR <power>

  where <power> is a set power value. Changing range is [0; 30].
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As a response, result of operation completion will be received.

- Setting of reader’s scanning time:

\[ \text{RFR\_SETSTIME}<\text{stime}> \]

where \(<\text{stime}>\) is a set scanning time index value. Changing range is [3; 255]. Scanning time is defined by the following formula, ms:

\[ t = \text{stime} \times 100 \text{ ms} \]

**Responses of the tracking device (tag 0xE1)**

- **RFR\_OK** – command is successfully completed.
- **RFR\_ERROR** – command is completed with error.

**Protocol description**

You can read description of server exchange protocol of Galileosky tracking devices in “Galileosky protocol” file, which you can download from our site in the “Support” -> “User Guides” tab in the section “Galileosky Protocol”

https://galileosky.com/podderzhka/dokumentacziya.html