

RS232 Camera

Introduction

RS232 cameras can be used for various surveillance applications, for example to identify the people inside the cabin, to monitor driving conditions, to monitor the cargo, to know what happened in case of emergency, etc.

RS232 cameras can be configured to take pictures at regular intervals, during configured events or on demand via an SMS command. These pictures can then be sent to a server or stored in the SD card of the FM device (optional). Two cameras may be used with the FM device, allowing the user to surveil several parts of the vehicle at the same time.



Compatibility

All RS232 cameras made by [QQZM](#) that use the ZMID protocol are compatible with the following Ruptela FM devices with the latest firmware version:

- FM-Tco4 HCV
- FM-Tco4 LCV
- FM-Pro4

You can get the latest firmware and configurator from our documentation website: doc.ruptela.lt

More information about the cameras themselves can be found on the manufacturer's [website](#).

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Document change log

Date	Version	Change details
2018-08-02	1.0	Initial draft.
2018-09-11	1.1	Compatible models described. Link to the manufacturer's website added.
2019-02-15	1.2	Added description of "Last snapshot info" IO event. Note regarding SD card insertion added.

Camera specifications

- Resolution: 160x120, 320x240, 640x480;
- Configurable compression rate;
- Configurable exposure level (not all cameras may support this feature);
- Capture rate: from 5 to 86400 seconds;
- File format: .jpg.

Principles of operation

The camera takes pictures according to the configuration (described below). If the FM device has an SD card, the pictures will be stored in the card and sent to a server upon request. If the camera folder on the SD card is full, the oldest picture will be overwritten. If the folder is full and there are no pictures on the card, the taken picture will be discarded. After receiving the pictures, the server can then send a request to delete them from the SD card in order to conserve memory. A maximum of 2000 pictures can be stored in the camera folder.

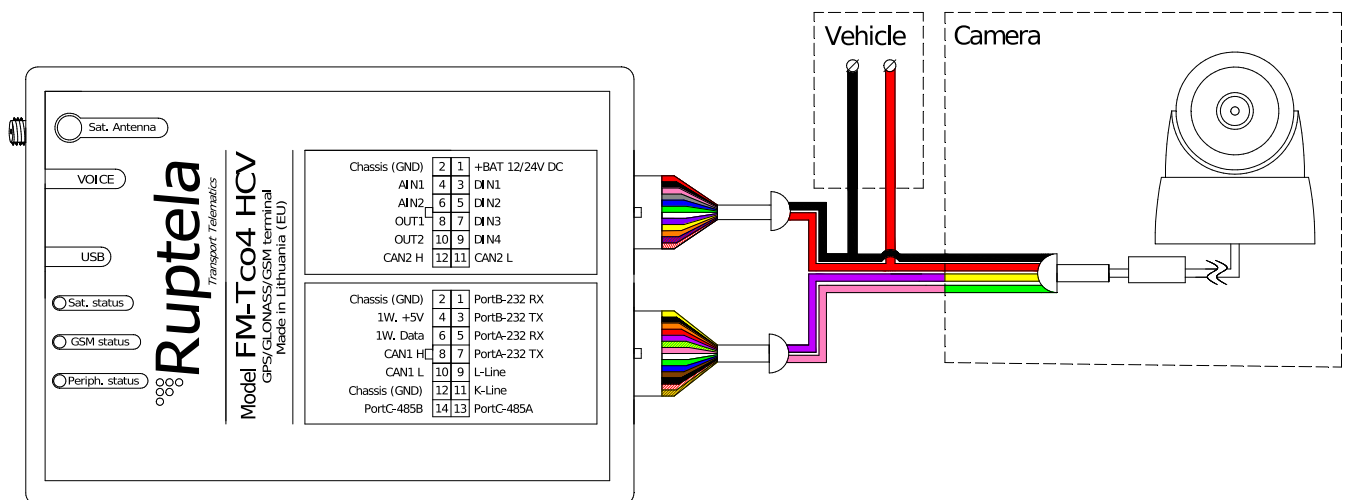
If the FM device does not have an SD card, one picture is stored. No other pictures will be taken until the server sends a request to delete the picture.

Note

If you insert/remove the SD card, the FM device should be restarted to ensure correct operation.

Camera connection to FM device (one camera)

Connect the RS232 camera to your FM device as follows (in this schematic PortA is used):



FM device

Black – Ground
Red – 12/24 V DC
Purple – PortA-232 RX
Pink – PortA-232 TX

Camera (PortA)

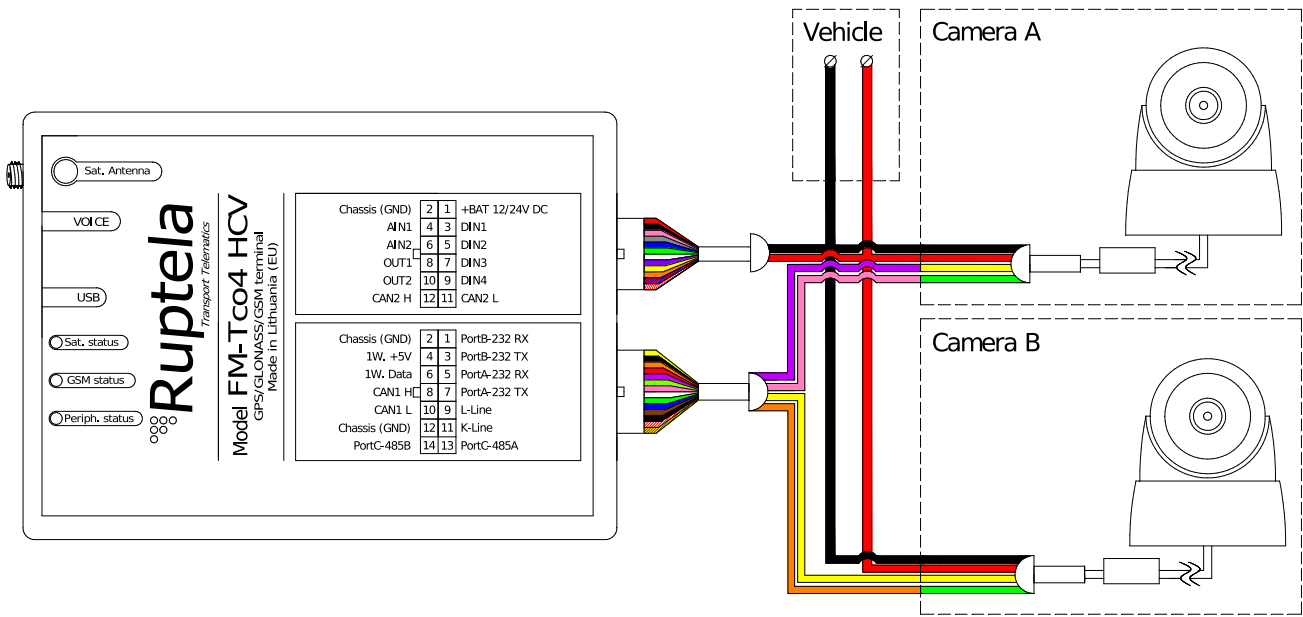
Black – Ground
Red – 12 V DC
Yellow – RX
Green – TX

Alternatively, you can connect the camera to PortB:

FM device	Camera (PortB)
Black – Ground	Black – Ground
Red – 12/24 V DC	Red – 12 V DC
Yellow – PortB-232 RX	Yellow – RX
Orange – PortB-232 TX	Green – TX

Camera connection to FM device (two cameras)

Connect the RS232 cameras to your FM device as follows:



FM device	Camera A
Black – Ground	Black – Ground
Red – 12/24 V DC	Red – 12 V DC
Purple – PortA-232 RX	Yellow – RX
Pink – PortA-232 TX	Green – TX

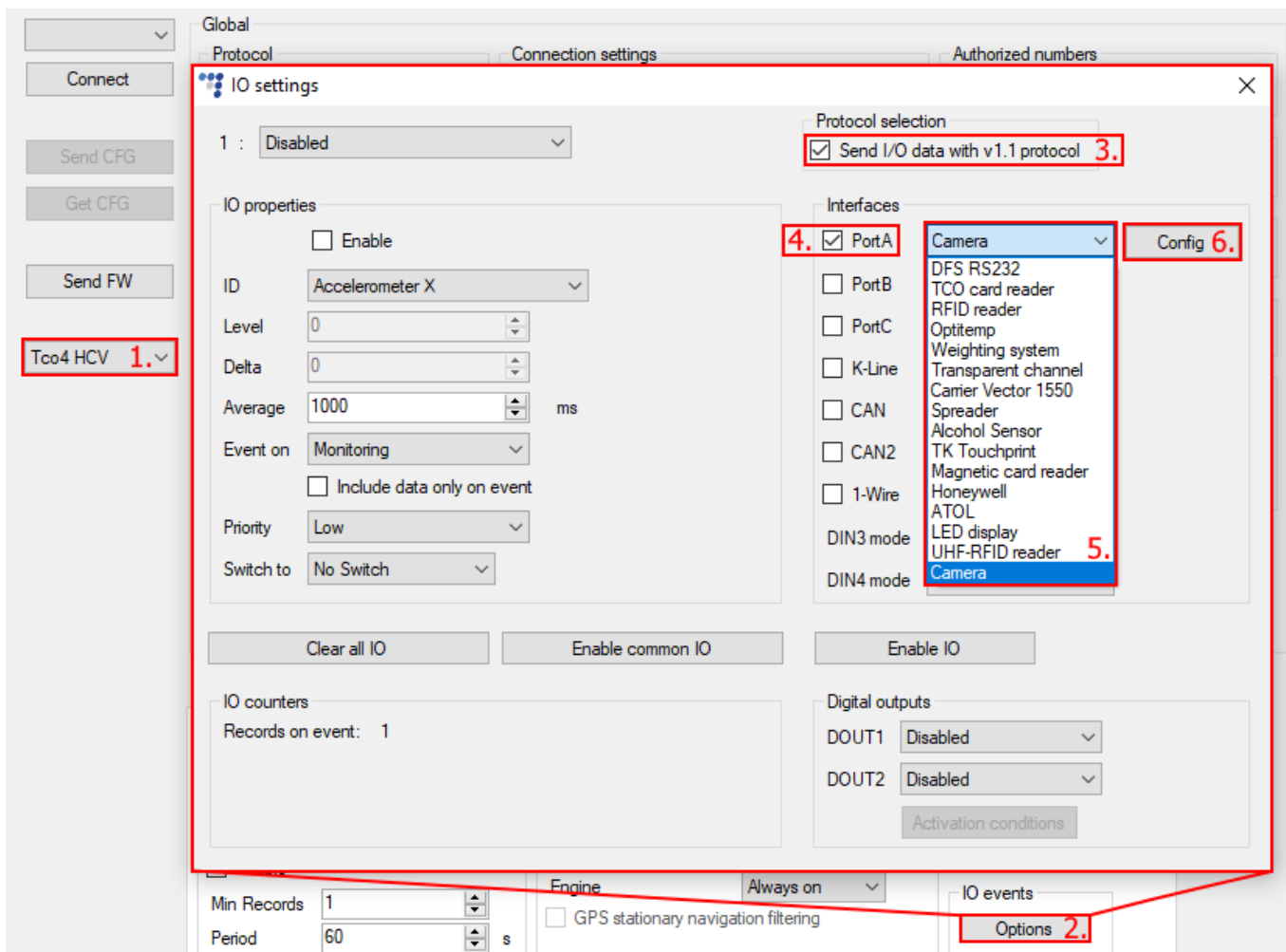
FM device	Camera B
Black – Ground	Black – Ground
Red – 12/24 V DC	Red – 12 V DC
Yellow – PortB-232 RX	Yellow – RX
Orange – PortB-232 TX	Green – TX

Configuration

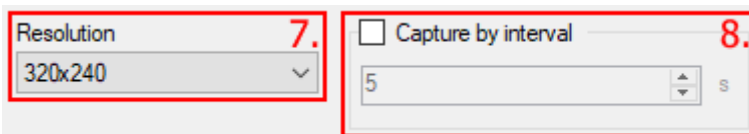
In order for the camera(s) to work with the FM device, follow these steps:

1. Open the FM device configurator and select your device model in the drop-down list.
2. Click on the **Options** button in the **IO events** section. The **IO settings** window will open.
3. Tick the **Send I/O data with v1.1 protocol** checkbox in **Protocol Selection**.
4. In the **Interfaces** section, select the port to which you connected the camera (**PortA** or **PortB**). If you connected two cameras, select both ports.

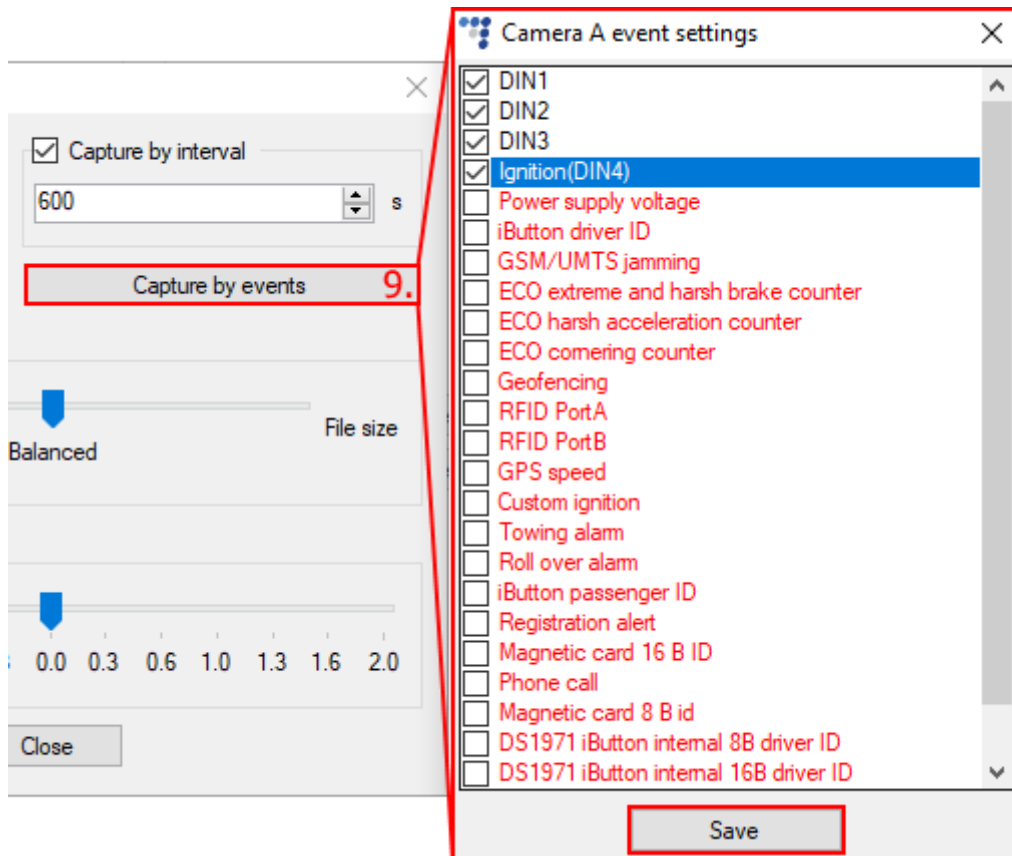
5. A drop-down list will appear next to the selected port. Select *Camera* in the drop-down list.
6. Click the **Config** button. A new window will open where you can change camera settings. The cameras are configured separately and can have different configurations.



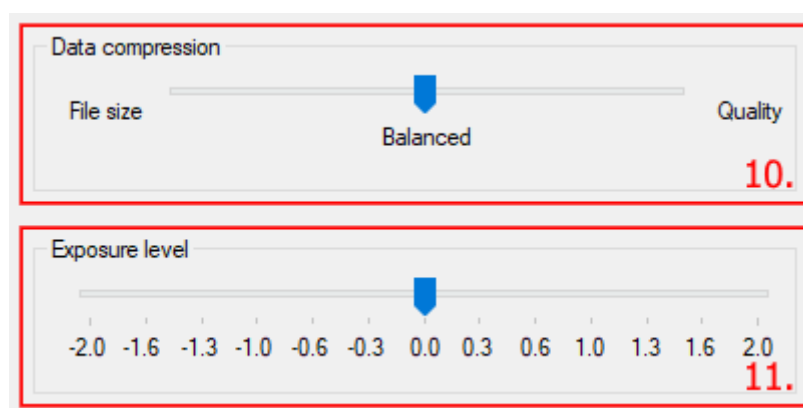
7. Select the resolution at which the pictures will be taken. The default resolution is 320x240.
8. If you want the camera to take pictures at regular intervals, tick the **Capture by interval** checkbox. The default interval is 5 seconds. This functionality is disabled by default.



9. If you want the camera to take pictures when specific IO events are triggered, click the **Capture by events** button. A new window will appear, in which you can select the desired events. **Make sure that the events are enabled and properly configured in the active profile!** Events that are not enabled/configured will be marked in red and trying to select them will cause a pop-up warning message to appear. After selecting the desired events, click the **Save** button. A list of specific events is provided in the next section.



10. Select the picture compression rate with the **Data compression** slider. Moving the slider towards *File size* will decrease picture file size and quality, while moving it towards *Quality* will increase picture quality as well as file size. The slider is set to *Balanced* by default.
11. Select the exposure level with the **Exposure level** slider. The exposure level can be selected in set increments. The slider is set to 0.0 by default.



Close the camera configuration window. Do not forget to configure the second camera (if it is connected). Close the **IO settings** window and send the configuration to the device.

IO events

The camera can be configured to take pictures when the following IO events are triggered:

Event name	On Change	Hysteresis
DIN1	Yes	Yes
DIN2	Yes	Yes
DIN3	Yes	Yes
Ignition(DIN4)	Yes	Yes
Power Supply voltage	No	Yes
iButton driver ID	Yes	Yes
GSM/UMTS jamming	Yes	Yes
ECO extreme and harsh brake counter	Yes	No
ECO harsh acceleration counter	Yes	No
ECO cornering counter	Yes	No
Geofencing	Yes	No
RFID PortA	Yes	Yes
RFID PortB	Yes	Yes
GPS speed	No	Yes
Custom ignition	Yes	Yes
Towing alarm	Yes	Yes
Roll over alarm	Yes	No
iButton passenger ID	Yes	No
Registration alert	Yes	No
Magnetic card 16 B ID	Yes	No
Phone call	Yes	No
Magnetic Card 8 B ID	Yes	Yes
DS1971 iButton internal 8B driver ID	Yes	Yes
DS1971 iButton internal 16B driver ID	Yes	No
DS1971 iButton internal 8B passenger ID	Yes	Yes
DS1971 iButton internal 16B passenger ID	Yes	No

The following IO events must be configured to inform the server, how many pictures were taken since the last record and were stored in the SD card:

Event name	Monitoring	On Change	Hysteresis
PortA camera snapshot on SD card	Yes	Yes	Yes
PortB camera snapshot on SD card	Yes	Yes	Yes

The following IO events must be configured to inform the server when there is a picture in camera memory:

Event name	Monitoring	On Change	Hysteresis
PortA camera snapshot	Yes	Yes	Yes
PortB camera snapshot	Yes	Yes	Yes

The following IO event can be configured to obtain additional information about the last taken picture:

Event name	Monitoring	On Change	Hysteresis
Last snapshot info	Yes	Yes	No

The information includes the filename and the source ID of the picture. The source ID can be one of the following:

- 0 – Camera A folder on SD card;

- 1 – Camera B folder on SD card;
- 2 – PortA camera;
- 3 – PortB camera.

The user can automatically enable the camera snapshot on SD card, camera snapshot and last snapshot info events on a serial port by using the **Enable IO** functionality if *Camera* is configured on that port. The events are then configured as follows:

- Event on – *Change*
- Priority – *High*

Picture request via SMS

The user can take pictures on demand with the *snapshot* SMS command, using the following structure:

password snapshot <camera number>

<camera number> can have the following values:

- 0 – the command applies to all configured cameras;
- 1 – the command applies to the camera configured on PortA;
- 2 – the command applies to the camera configured on PortB.

After sending the SMS command the FM device will send a response, using the following structure:

snapshot <camera number> <answer>, <other camera number> <answer>

<answer> can be one of the following:

- *ok* – indicates that the camera took a picture successfully;
- *busy* – indicates that the camera is busy with a previously taken picture at the moment;
- *n/a* – indicates that the camera is either not configured on the given port, not connected or not responding;
- *fullsd* – indicates that the memory of the SD card is full and the picture will be discarded, as there are no pictures to be overwritten;
- *err* – indicates that there was an error.

Example 1

Request:

password snapshot 1

Response:

snapshot 1 ok

Example 2

Request:

password snapshot 0

Response:

snapshot 1 ok, 2 n/a