

RS232/RS485 Transparent channel and Identification string

Introduction

Identification string feature forces the FM device to send an identification packet to the server. After that, the device waits for an ACK packet from the server. Once the device receives this packet, it begins data transfer.

Transparent channel provides the ability for RS232/RS485 devices to communicate with the server using the FM device as an intermediate.

Feature for different FM devices is available starting with these firmware versions:

- FM-Tco4 HCV – 00.01.03.11 (Dual transparent channel available from version 00.01.04.09. Transparent channel with NMEA string available from 00.02.00.49 version.)
- FM-Tco4 LCV – 00.02.12.04
- FM-Pro4 – 00.01.02.10 (Transparent channel with NMEA string available from 00.02.00.51 version.)

Note

Important information for integrators: transparent channel command has changed. Please use the mentioned or newer firmware versions when integrating the transparent channel functionality!

You can get the latest firmware and configurator from our documentation web site: doc.ruptela.it

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Document change log

Date	Version	Change details
2014-12-23	1.0	Initial draft.
2016-04-22	1.1	Included information on maximum number of messages that can be stored.
2016-08-09	1.2	Send IMEI to RS232/RS485.
2016-12-13	1.3	“Send identification string” check box is no longer hidden.
2017-08-25	1.4	Added a note to the parser settings.
2018-02-20	1.5	Added a note regarding the connection of peripherals.

Functionality description

This functionality consists of two independent parts:

- Identification string
- Transparent channel settings

Only one of them can be used at any single time. To use the identification string, you cannot use the transparent channel and vice versa.

Identification string

The identification string option can be enabled via a checkbox in the main configurator window.

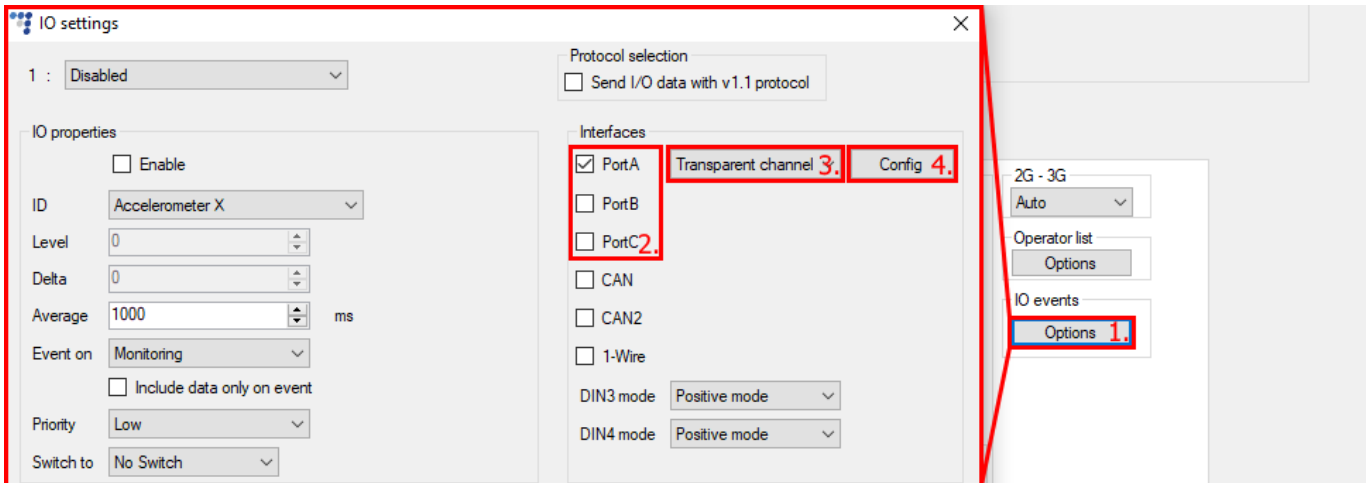
If you check this box, the device will send an identification packet to the server and wait for an ACK packet. After receiving this packet, the device will begin data transfer.

Transparent channel

Transparent channel options are accessible in the IO settings window. Here you can configure all the necessary parameters for the RS232/RS485 device.

To enable the transparent channel:

1. In the **IO events** section click on the "Options" button.
2. In the **Interfaces** section enable the required port(s).
3. In the drop down menu choose *Transparent channel*.
4. Click the "Config" button to display the Transparent channel settings window.



Note

On FM-Pro4 devices, transparent channel can work on Ports A, B or C, but only on one port at a time. Your RS232/RS485 device must be connected and configured on same port to work via transparent channel.

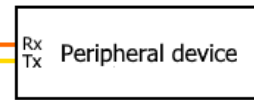
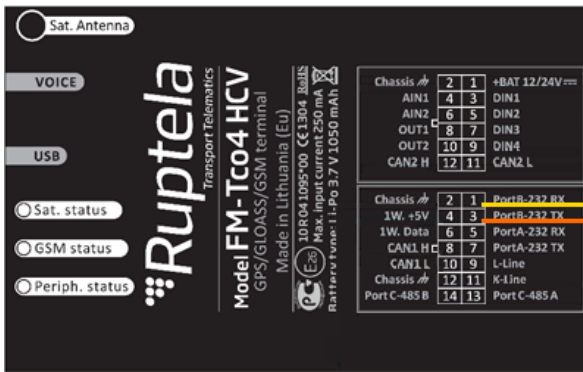
On FM-Tco4 HCV and FM-Tco4 LCV devices two transparent channels can be configured at once at any two ports.

Important!

In order to use the transparent channel functionality, transmitters have to be connected to transmitters (Tx to Tx) and receivers have to be connected to receivers (Rx to Rx). This is different from standard electronics conventions, where transmitters are connected to receivers (Tx to Rx) and receivers are connected to transmitters (Rx to Tx).

A connection example is shown below:



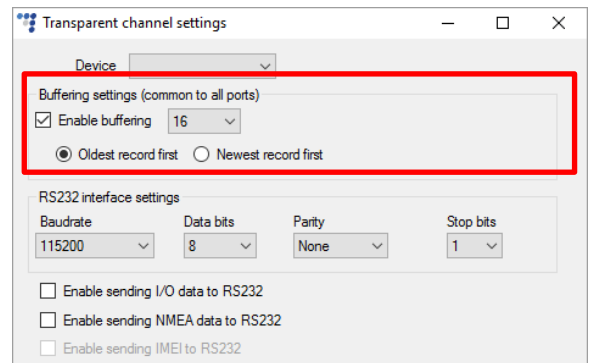


Transparent channel configuration settings

Buffering settings (common to all ports)

Buffering settings are the same for all ports configured as transparent channels. Any changes in this section will apply to all transparent channels.

- **Enable buffering** enables record storage, if direct connection to the server is lost. In this case data is preserved in the FM device's memory. You can select the buffering message count (how many records will be stored). For FM-Tco4 HCV and FM-Tco4 LCV devices, if two ports are configured as transparent channels, the buffering space is shared and is not extended.
 - **Oldest/Newest record first** sets data transfer priority after records were buffered.



Note

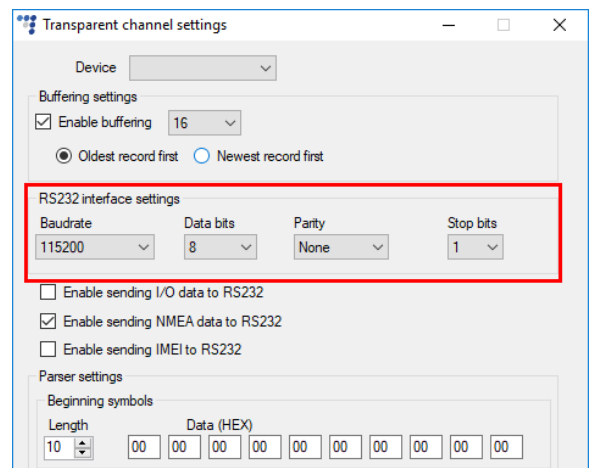
Maximum RS232/RS485 payload length is 1004 bytes for firmware versions FM-Pro4 00.01.03.XX, FM-Tco4 LCV 00.02.12.04, FM-Tco4 00.01.04.XX and newer. We suggest not to use older firmwares.

A maximum of 1024 messages can be stored. (That makes roughly 1 MB of data, if messages are of the maximum size. If the size of a single message is 1 byte, then it would be only 1 KB maximum).

RS232 interface settings

First of all configure the packet structure and baud rate depending on the RS232 device you are connecting to the FM device:

- **Baudrate** – data transfer speed (frequency), e.g. baudrate 115200 will transfer 115200 bits per second.
- **Data bits** – select the packet length (8 bits by default).
- **Parity** – error checking mechanism. Default is none, because it is not reliable. The error checking is left for packet transfer mechanism.
 - *Even* – for example, if the data is 10010010, for even parity, the serial port sets the parity bit as 1 to keep the number of ones even.



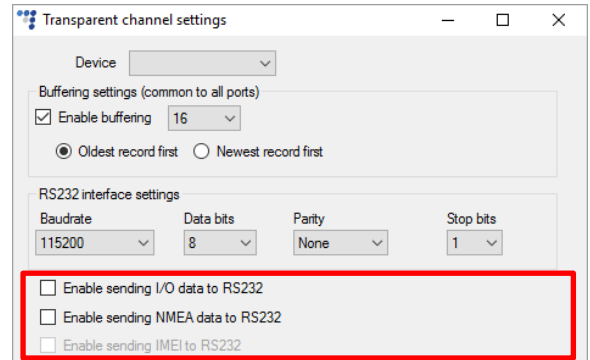
- *Odd* – for odd parity, in the same example the parity bit would be 0 so that the number of ones is odd.
- **Stop bits** – set the stop bit length to a 1 or 2 bit period.

Enable sending IO data to RS232

This checkbox should be checked, if you want IO data to be sent to the RS232 device. This is useful when you need IO data collected by FM device etc. to be displayed in the display of the RS232 device.

Some key points:

- The IO data is sent to the transparent channel as soon as it is generated.
- The IO data is sent in HEX format.
- Packet structure: Length+Record_header+Data+CRC.



Enable sending NMEA data to RS232

This allows the FM device to forward received NMEA strings from the GPS/GLONASS module to the same serial port, which uses the transparent channel feature. The strings contain the following data:

- GGA – essential fix data, which provides 3D location and accuracy data.
- GLL – geographic latitude and longitude.
- GSA – GPS DOP and active satellites.
- GSV – data about satellites, that the device might be able to find based on its viewing mask and almanac data.
- RMC – essential GPS “pvt” (position, velocity, time).
- VTG – velocity.
- TXT – GPS module additional information.

More information about NMEA can be found at: <http://www.gpsinformation.org/dale/nmea.htm>

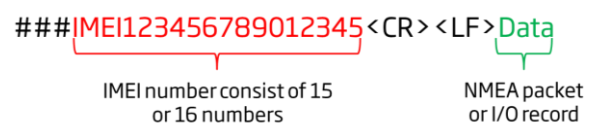
The NMEA log is sent to the transparent channel in ASCII format and the data it contains depends on the GPS module:

- MAX-7 module has GPS and GLONASS support so the packets starts with \$GP or \$GL indicating the mode selected.
- EVA-M8M operates with both navigation systems (GPS and GLONASS) at the same time. So the packets starts with \$GN.

Enable sending IMEI to RS232

This option can be used only if the **Enable sending I/O data to RS232** checkbox, the **Enable sending NMEA data to RS232** checkbox or both of them are enabled. In other cases it will be greyed out.

When the **Enable sending IMEI to RS232** check box is enabled, the FM device adds the IMEI number to the NMEA packet and/or IO record and sends them to the RS232 or RS485 devices via the transparent channel. The data packet structure is shown in the picture on the right.



Remote servers can send data to RS232 or RS485 devices. The FM device forwards this data via the transparent channel. In this case the FM device does not include the IMEI number in the data packets.

Note

Sending IMEI to RS232 feature is available starting with these FW versions:

- FM-Tco4 HCV - 00.02.18.01
- FM-Tco4 LCV - 00.02.18.01
- FM-Pro4 - 00.02.18.01

Parser settings

You can set beginning and ending of packet symbols in order to divide the data stream into packets. The symbols must be entered in HEX format. You can use any online HEX to ASCII converter.

- **Beginning symbols** – the length of beginning symbols can be up to 10 (adjust the length with up and down arrows).
- **Ending symbols** – their length can be up to 5 (adjust the length with up and down arrows).

Parser settings

Beginning symbols

Length: 0 Data (HEX): 00 00 00 00 00 00 00 00 00 00

Ending symbols

Length: 2 Data (HEX): 0D 0A 00 00 00

Communication timeout, ms: 0

Remove identification symbols from payload

Example

WT W (57 54 5E 57 20) are defined as beginning symbols (the number of symbols is 5) and rn (0D 0A) symbols are used as ending symbols (the number of symbols is 2). The symbols must be expressed in HEX.

Note

0x7E is the universal ending symbol, no matter what is configured in the settings, 0x7E will be interpreted as the end of the packet.

0x7D is the escape symbol, which means, that the 0x7D byte itself is ignored, but the next byte coming after it is interpreted as the byte XOR 0x20. Example: *if the following data is sent through the transparent channel: 0x7D 0x11, the result will be 0x31.*

- **Communication timeout** indicates the transfer time interval between adjacent symbols. If data is received after this time period, then the following bytes are stored in a separate packet.
- **Remove identification symbols from payload** checkbox allows you to remove beginning and ending symbols from the payload of the package, which is sent to the server. This way you get only data from the RS232 device and no unnecessary entries.

RS485 port as transparent channel

RS485 can also be configured as transparent channel. An RS485 compatible device must be connected in this case. However only one device at a time can be connected to the RS485 port. When RS485 is working as transparent channel it is configured as RS232, but working on RS485 based communication.