

# GSM jamming detection for 4<sup>th</sup> generation FM devices

## Introduction

GSM jamming detection allows the FM device to not only detect interference or jamming of the GSM signal, but also configure various DOUTs in response to the detected signal jamming. The principles, the process of enabling and configuring the GSM jamming detection as well as enabling and configuration of DOUTs are described in this document.

This feature is can be used on the following devices with the latest firmware installed and using the latest configurator:

- FM-Tco4 HCV
- FM-Tco4 LCV
- FM-Pro4
- FM-Eco4
- FM-Eco4 S

You can get the latest firmware and configurator versions from our documentation web site [doc.ruptela.lt](http://doc.ruptela.lt)

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## Document change log

Date	Version	Change details
2017-05-17	1.0	Initial remake draft.
2017-08-07	1.1	Added special conditions section.
2018-01-12	1.2	GSM jamming detection principles described.
2018-11-05	1.3	Ignition lock schematic updated.

## Principles of GSM jamming detection

Special GSM jammers may be used to disrupt GSM communication, because of this GSM jamming detection is used. GSM jamming detection allows the user to identify active jamming of the GSM network and allows taking immediate action. With the help of peripheral devices, the driver can immediately be notified that the GSM network is being jammed and vehicle ignition can be blocked until the network is no longer jammed.

GSM jamming detection works as follows:

1. Signal strength is measured on each channel and compared to a noise threshold.
2. If the signal strength is greater than or equal to the noise threshold, the channel is considered to be **disturbed**.
3. The number of disturbed channels is compared to a threshold. If there are more disturbed channels than the threshold, **GSM jamming is detected**.

Once GSM jamming is detected, the buzzer and/or ignition blocking are activated, depending on the configuration.

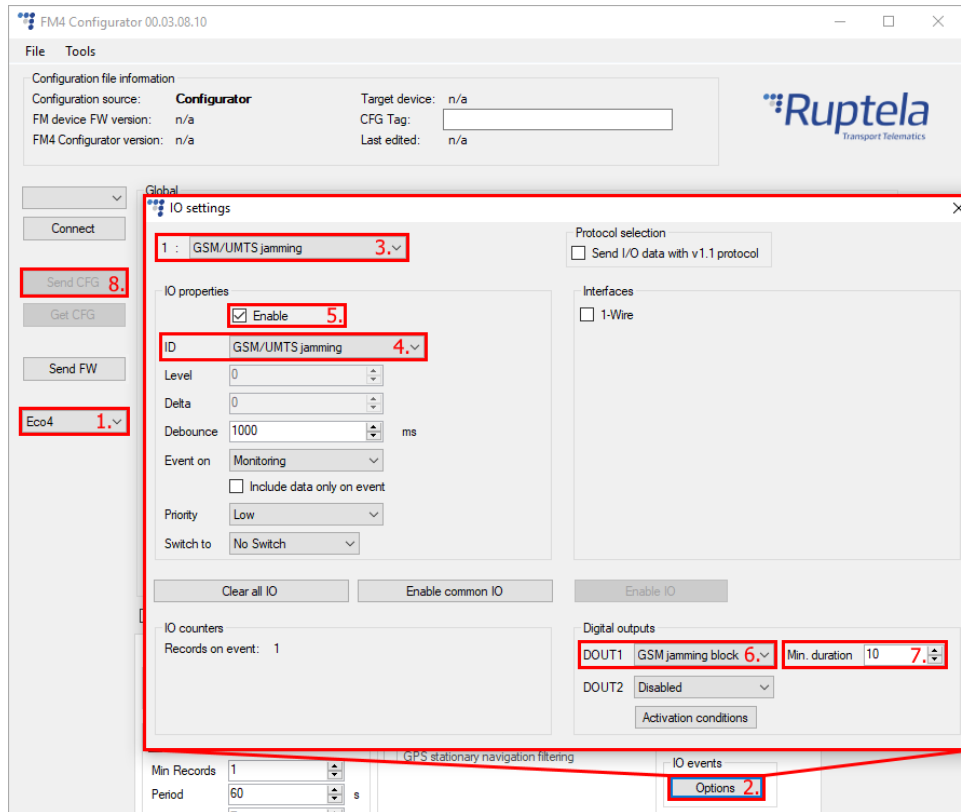
### Note

In certain environmental conditions the module may detect high noise levels on some channels due to interference from external devices, radios, reflected signals, etc. Because of this GSM jamming cannot always be successfully detected and false alarms may occur.

## GSM jamming detection configuration

To **enable GSM jamming detection** the user must follow the steps provided further on:

1. Start up the device configurator. In the main window select the model of the FM device which is being used.
2. In the **IO events** section, click the **Options** button. This will open the **IO settings** window.
3. Select an empty slot labeled **Disabled** in which the new IO parameter will be enabled.
4. In the IO properties section, locate and open the **ID** drop down list. In this list, locate and select **GSM/UMTS jamming**.
5. Tick the **Enable** checkbox to enable the IO parameter. The slot will now display the name of the IO parameter.
6. Afterwards select the **DOUT1** or **DOUT2** dropdown list and select **GSM jamming block** (if GSM jamming block is enabled on one of the DOUTs, it will be unavailable on the other DOUT).
7. After selecting the **GSM jamming block** on a **DOUT**, a **Min. duration** box will appear next to the DOUT, here the user must specify the **time length (in seconds)** of how long the jamming must be detected for, before triggering the DOUT.
8. Configuration is now complete, close the **IO settings** window and send the configuration to the FM device.



FM IO ID and value description is provided:

ID	Name	Name in configurator	Size, B	Value	Description
88	GSM jamming	GSM/UMTS jamming	1	0-1	0 – jamming not detected 1 – jamming detected

## Setting up peripherals to work with GSM jamming detection

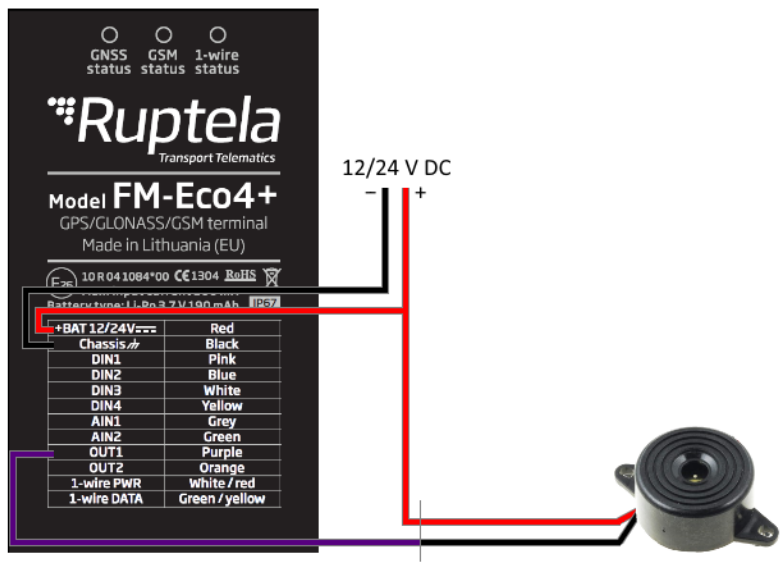
After the configuration part is completed, the user can connect various peripherals or blockers to the DOUT on which **GSM jamming block** was configured. A variety of devices can be connected to the FM device, such as:

- Buzzer;
- LED indicator;
- Relay for ignition blocker;
- Vehicle alarm system activator;
- Other various devices.

The purpose of these devices is to either inform the driver about the GSM signal jamming that is happening, or to block the vehicle from starting while GSM jamming is active. The DOUT min. duration mentioned during the configuration part is necessary to prevent various minor signal interference that can be misinterpreted by the device as GSM signal jamming. This way the DOUT will be triggered only after the jamming was registered for the set amount of time.

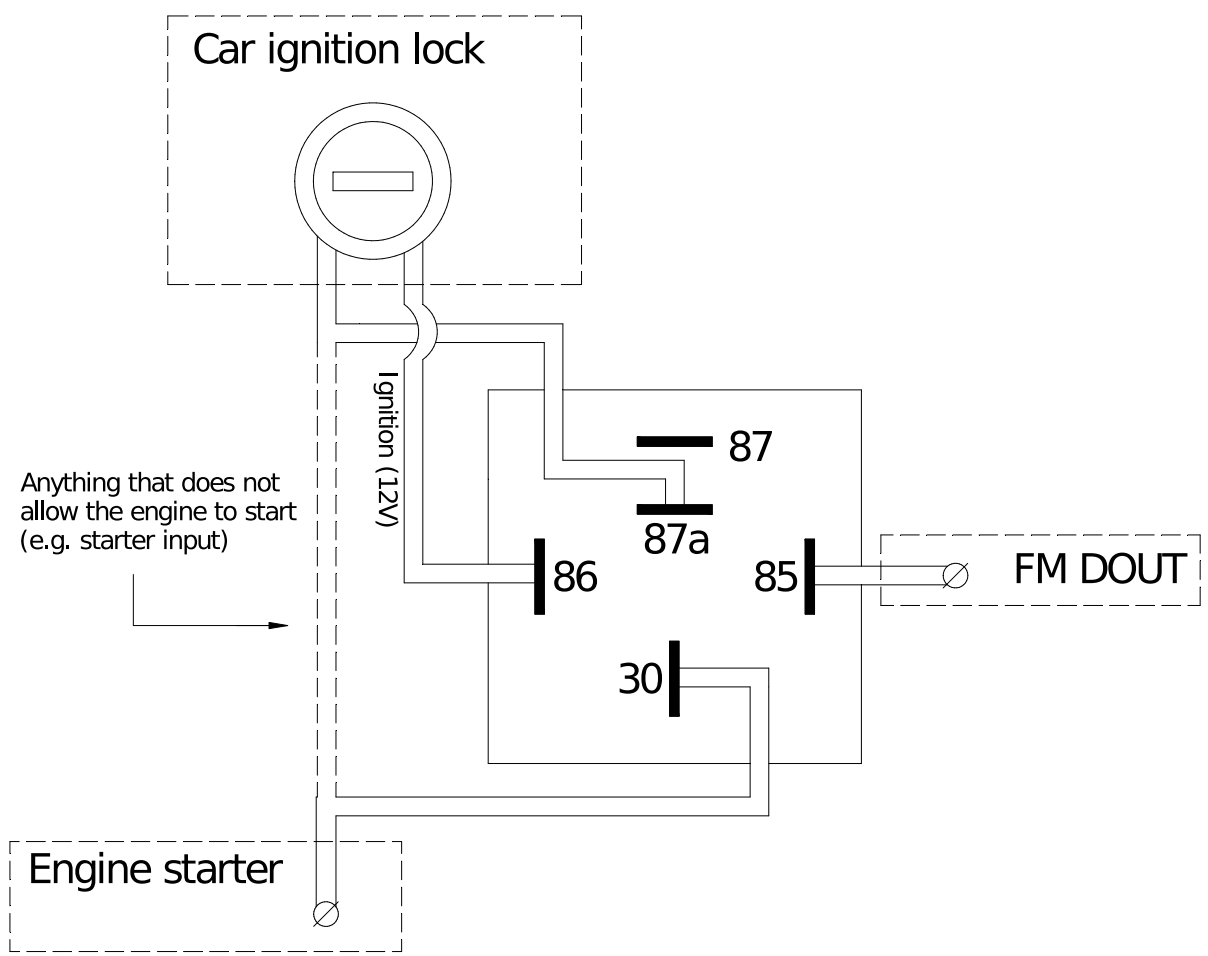
The examples below assume that “GSM signal jamming” was configured on DOUT1.

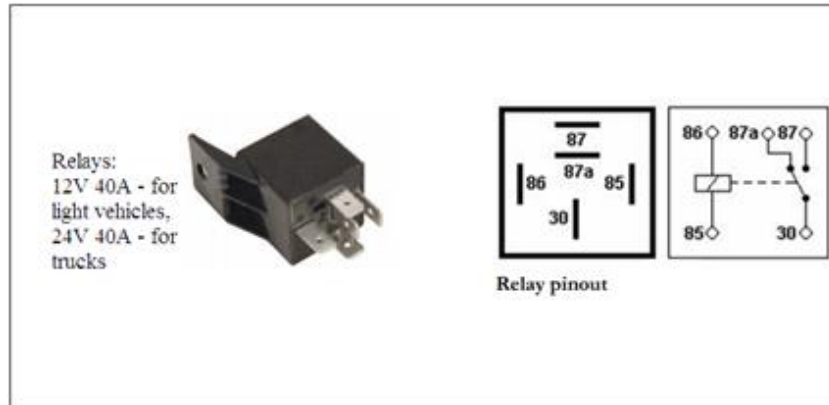
Connection method for a buzzer is provided below:



In this case, the driver will be informed by the buzzer that the GSM signal is being jammed.

Connection method for ignition lock is provided below:





This case fully blocks the ignition while GSM signal jamming is active.

## Note

GSM jamming detection is active all the time in the device even without configuring it. The purpose of the configuration is to set up a method to inform the server (along with packed data) or the driver of the GSM signal jamming in progress.

## Special conditions

If a DOUT is configured to "GSM jamming blocking", the DOUT state can be altered via SMS command *setio*, although the DOUT state change via SMS will be overwritten if GSM jamming detection is triggered (GSM jamming in progress).

For example: GSM jamming is not in progress, DOUT state is 1. The user sets the DOUT state to 0 via *setio* SMS command. In this case the DOUT state will change back to 1, only after the FM device will first detect GSM jamming (change state to "jammed") and afterwards detect that GSM jamming is no longer in progress (change state to "not jammed").