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tsmodem

sim-cards
switching rules

double-sims modem configuration guide
for OpenWrt users
and system administrators

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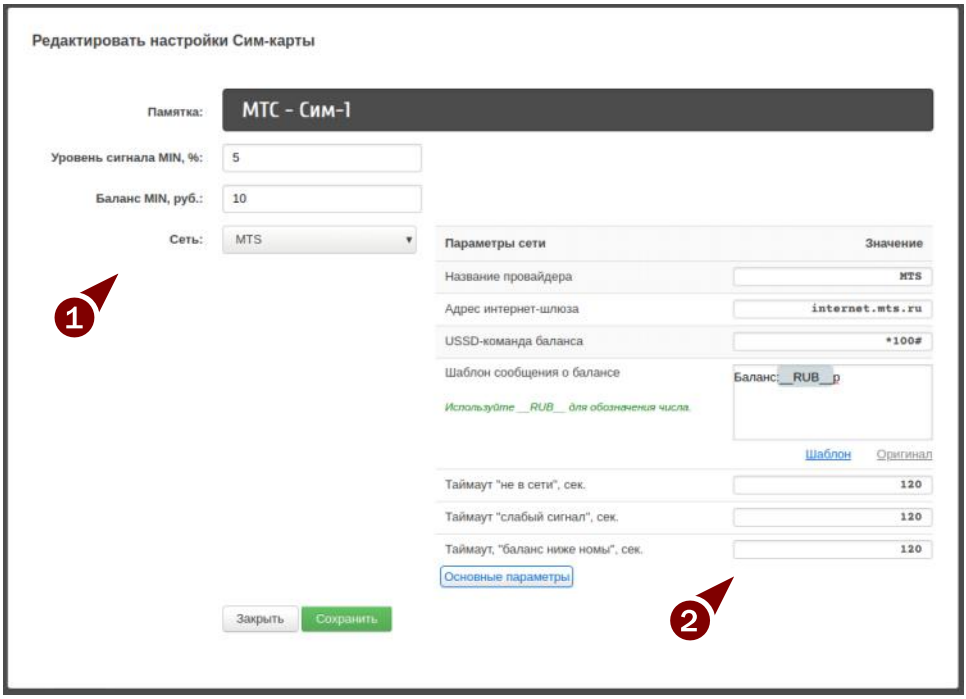
I. User manual

SIM card setting

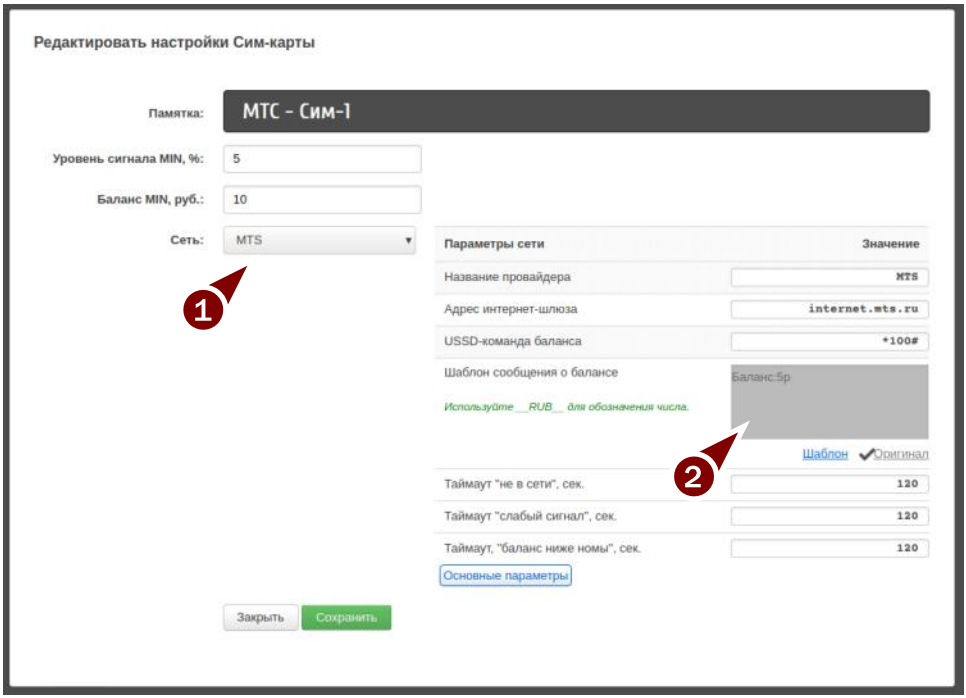


1. Set the minimum signal strength of the network and the minimum balance of funds on the SIM card balance.
    - *When the minimum is reached on this SIM card, then the system will automatically switch to another SIM card.*

2. Set a timeout delay before switching.
    - *Before switching to another SIM card, the system waits for the regulated characteristic backs to its normal value.*

Mobile network operator setting

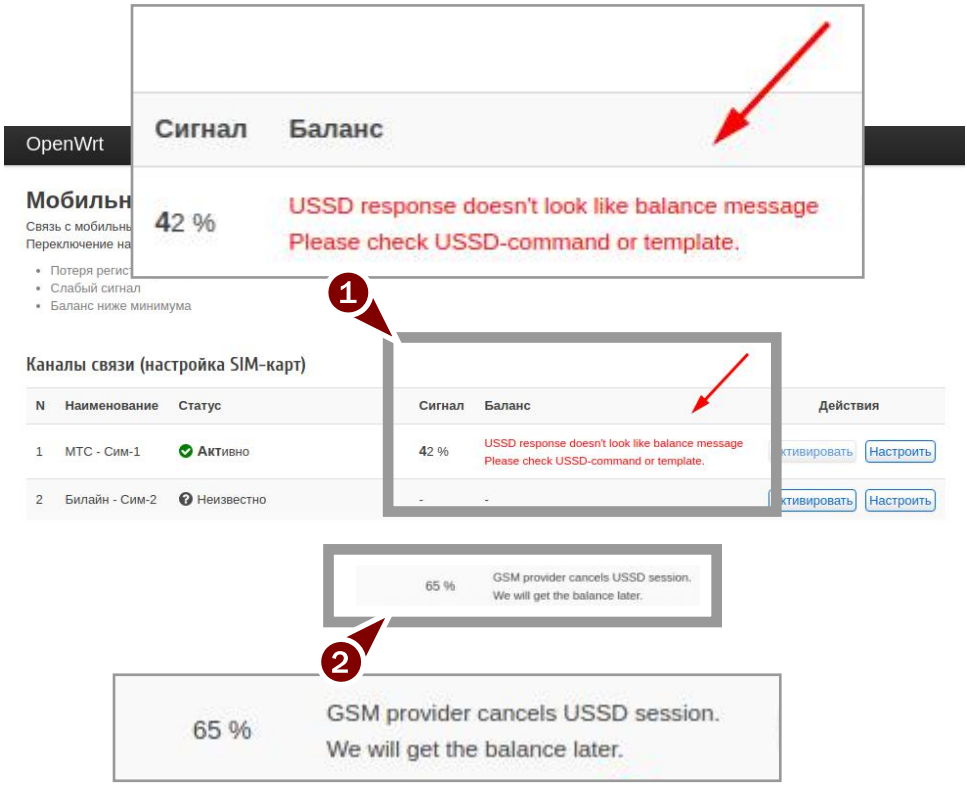
Three mobile operators are pre-installed in the system: Beeline, MTS, Megafon. In addition, Custom 1 and Custom 2 custom operator settings are provided.



1. Select and, if necessary, change the operator settings;
2. If the USSD command was set correctly, then you can see the original response of the mobile network operator. This example will tell you the format of the message template, from which the system will parse the balance money.

Service messages

USSD requests to the mobile network are often accompanied by unexpected responses. If this happens, an explanatory message is displayed in the "Balance" column:



1. **USSD response doesn't look like balance message. Please check USSD-command or template.**
   - *Оператор не может вернуть ответ-сообщение о балансе. Рекомендуется проверить USSD-команду (например, *102#), а также текст шаблона.*

2. **GSM provider cancels USSD session. We will get the balance later.**
   - *Запрос о балансе сделан правильно, но оператор сотовой сети отменил передачу сообщения о балансе. Эта ситуация возникает когда пользователь слишком часто отправляет USSD-команды оператору. Как правило, спустя некоторое время блокировка снимается и система корректно получает сообщения о балансе.*

System events

The list of events registered in the log:

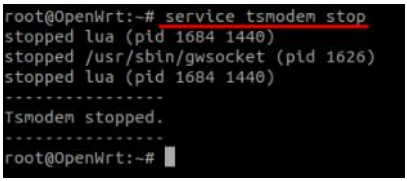
- changing the registration status of the SIM card;
- automatic SIM card switching;
- resetting the modem (to initialize the SIM card);
- connecting/disconnecting the modem from the USB port;
- the event of switching the SIM card by the user.

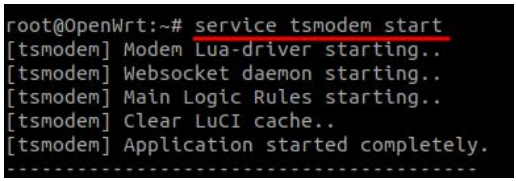
To save the OpenWrt device resources, event log is stored exclusively in the Internet browser.

II. System administrator manual

Tsmodem service start / stop

The system runs under the OpenWRT operating system.
It's an ordinary Linux service that automatically starts when the device is turned on. The following commands are used for manual control:





API of the modem driver

To get modem's characteristics, "ubus" tool of OpenWrt is used:

root@OpenWrt:~# ubus list

in the list of "ubus list" command result you may fine two records:

- **tsmodem.driver**
- **tsmodem.rule**

Ubus-object **tsmodem.driver** contains several methods which allows to get the modem's characteristics. Then its values affect to rules of Main Logic.
Complete list of the modem driver API methods is obtained with the following command:

```
root@OpenWrt:~# ubus -v list tsmodem.driver
```

API of the rules module

The rules module API gives:

- List of active rules
- Ongoing values of the rules' variables.

Comlete list of the API methods is obtained with the command:

```
root@OpenWrt:~# ubus -v list tsmodem.rule
```

How to edit the rules' variables

For version Tsmodem 1.6.0, this operation must be performed by an experienced OpenWRT programmer who knows the Lua scripting language.
For versions older than 2.0, it can be carried out by a system administrator who does not have deep programming knowledge.

Each rule is stored in a separate file located in the directory:

```
/usr/lib/lua/luci/model/tsmodem/rule
```

Rule variables are processed in the same order in which they are written in the rule.

The following actions are provided for variables:

- Loading data into a variable from the specified sources of two types:
  - uci config
  - ubus
- The variable homodifier "Logicfunc" defines the conditions for processing the variable:
  - If **Logicfunc** returns **True,** then the variable is loaded from the source, and a list of specified modifiers is applied to it;
  - If **Logicfunc** returns **False,** the variable is excluded from processing. The source data is not loaded into it, and other modifiers are not applied to it.
- The **Formula** variable modifier processes the data loaded into the variable.
- The **UI-Update** modifier transfers variable data to the browser - for the indication mechanisms provided in the user interface.

In version 3.0 and above, additional modifiers are possible: **Timeout**, **Subscribe**, **Parser**, and others.

How to populate web-interface with rules' data

This option is designed to display the system status in the user interface. Data output to the web interface is carried out by the operation of two mechanisms:

- The modifier of the **UI-Update** variable specified in the rules for the corresponding variable;
- The Websocket protocol, which implements data delivery to the browser without reloading the page.

How to add new rules

The general procedure for creating a new rule assumes the following scenario:

1. One of the existing rules is taken as the basis of the rule;
2. The rule file describes a set of necessary variables and their modifiers;
3. The data source for the variable is set according to the sample (this is either data from uci config or from ubs call);
4. If it is necessary to adjust the display in the user interface, then the “UI-Update” modifier is added to the corresponding variable;
5. In the browser, you need to add a function (JavaScript) that provides visualization of the received sent data.

III. Versions, new functionality

Version 1.6.0, December, 2021 г.

This brochure describes the general features of the functionality of TSmodem version 1.6.0.
Detailed documentation for this version can be requested from BITCORD Technical support.

Version 2.0.0

The list of innovations defined by version 2.0.0 can be found in the official BITCORD repository in the ISSUES section.

Version 3.0.0

The main difference between this version and the previous one, according to the developers' plans, is the improvement of OOD (Object Oriented Design).
The version is intended for system administrators who do not have special knowledge in the field of programming.