IP RECEIVER RL10

User Manual

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The purpose of the document

This document describes the features, operation and configuration of IP receiver RL10.

Contents

Description

IP receiver RL10 is an alarm message receiver for monitoring stations. RL10 receives burglary and fire alarm messages sent by UAB Trikdis communicators via GSM/GPRS/Internet networks. It transmits received messages to the monitoring software. Receiver automatically tracks connection with every registered message transmitter (communicator[1]). Receiver features:

- integrated industrial Linux OS computer;
- 2 network interface controllers;
- integrated GSM modem for receiving messages in SMS format;
- connection to SMPP server of the network service provider;
- 2 serial ports for receiving messages from other devices;
- automatic registration of communicators;
- automatic connection control of every registered communicator using individual schedules;
- message transmission to the monitoring software using either serial port or LAN;
- configuration and operation monitoring of the receiver using a Windows OS computer via LAN;
- multi-site connectivity to the receiver via LAN. Every user is granted individual access to receiver functions;
- message filtering and conversion;
- export of registered objects' list to CSV file;
- search function for a registered object;
- remote configuration of communicators, and remote firmware update;
- remote control of communicators.

Composition and Operation

IP receiver RL10 – is a Linux OS industrial computer with 2 network interface controllers and a software IPcom mounted into a 19" 2U enclosure with a power supply unit. GSM modem is also mounted into the enclosure of the receiver.

IP receiver RL10 can be connected to two computer networks: LAN1 ir LAN2.

Software IPcom receives messages from objects' alarm systems via WAN1 and WAN2 ports and GSM modem of the receiver. It transmits received messages to the monitoring software via serial Output and WAN ports.

Messages received via serial ports In1 and In2 are retransmitted to the monitoring software unprocessed via serial Output and WAN ports.

Configuration, control and operation monitoring of IP receiver RL10 is performed using software IPcomControl 3 which is installed into a Windows OS computer in the same network.

[1] Communicator – is a part of a protected object burglary or fire alarm system that supports a continuous connection with the control panel and continually communicates with the monitoring station receiver. After an event, receiver transmits an encrypted event message.
UAB Trikdis manufactures communicators for receiving signals (messages) from various manufacturers control panels and communicating with monitoring station receiver RL10 via GPRS, SMS or other internet connection channels. It also manufactures control panels whose communicators communicate with receiver RL10 via GPRS or SMS connection channels.

Technical Parameters

1. Two parallel LAN inputs (RJ45) that receive messages sent using TCP/IP and UDP/IP protocols. Messages will be received encrypted in TRK protocols.
2. Integrated GSM modem GM5 for receiving messages encrypted in TRK protocols sent via CSD connection and SMS messages.
3. Two serial ports RS232 (DB9) for receiving messages from other receiving devices. Receiving protocol Surgard MLR2-DG.
4. IP receiver RL10 receives messages sent by UAB Trikdis products:
    - GSM modules - G5, G7, G10, G10T v1, G10T v2, G10C, G10D;
    - GSM control panels - CG2, CG3, SP131, SP133;
    - Ethernet modules - E2, E7, E10, E10T, E10C;
    - Repeaters RR-GSM, RR-IP, R-IP12
5. Messages to the monitoring software are transmitted using one serial port RS232 or Etherner connection via computer network. Transmission protocols Surgard MLR2-DG or Monas3.
6. Operational parameters are set using software IPcomControl 3 on a Windows OS computer operating in the same network as the receiver.
7. Power supply from 50±1 Hz frequency 230 V current AC network. Power consumption under 60 W. Permissible power supply voltage variation limits - from 100 to 240 V.
8. Optimal operation is ensured when air temperature is between 0 and +55 °C, relative humidity is under 90%, and temperature +20 °C.
9. Measurements 450 x 100 x 320 mm (width x height x depth). Mass not exceeding 4,5 kg.

Light Indication and Connections

Front panel of IP receiver RL10.

Table 1. Front Panel Light Indication

Indicator	Description
Power	green ON - power supply is on
Status	green ON – output to monitoring software is connected red ON – no connection to the monitoring software yellow ON – one fo the outputs is disconnected OFF – output is down
Event	blue ON – message is being transmitted to the output

Rear panel of IP receiver RL10.

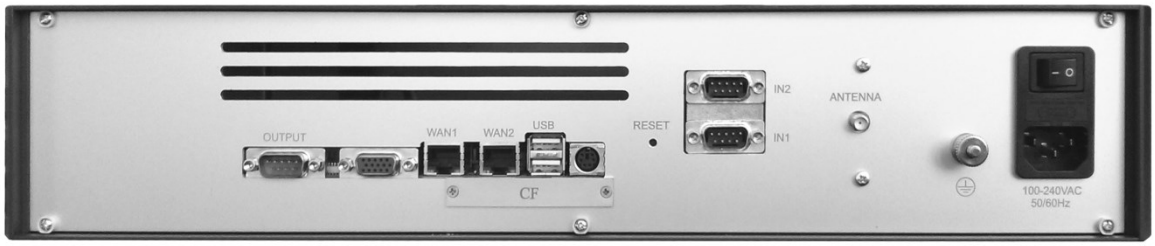


Table 2. Rear Panel Connectors

Connection	Description
WAN1	1st Ethernet port
WAN2	2nd Ethernet port
In1	Serial port RS232 for connecting other receiving devices
In2	Serial port RS232 for connecting other receiving devices
Output	Serial port RS232 for output to the monitoring software
Reset	Reset button to restore to factory settings
Antenna	Connector for GSM receiver antenna
AC input	Power supply connection and ON/OFF button
⏚	Grounding terminal
CF	Cap covered memory drive with OS connected to the socket
PS/2	Keyboard connector
VGA	VGA connector for monitor
USB	For manufacturer needs

Equipment

- IP receiver RL10 - 1 pc.;
- Power supply cable (1.5 m) - 1 pc.;
- RS232 cable (1.8 m) - 1 pc.;
- LAN cable - 1 pc.;
- GSM antenna - 1 pc.;
- CD containing this User Manual and software IPcomControl 3 for setting parameters - 1 pc.

Configuration

Connection

Receiver RL10 is configured with software IPcomControl 3 running on Windows OS computer installed.

1. Install IPcomControl 3 on the computer that will be used for IP receiver RL10 configuration.
2. Set the IP address of the computer that will be used for IP receiver RL10 configuration so that computer and receiver would work in the same subnetwork. Factory settings of receiver RL10 are specified in the Table 3.

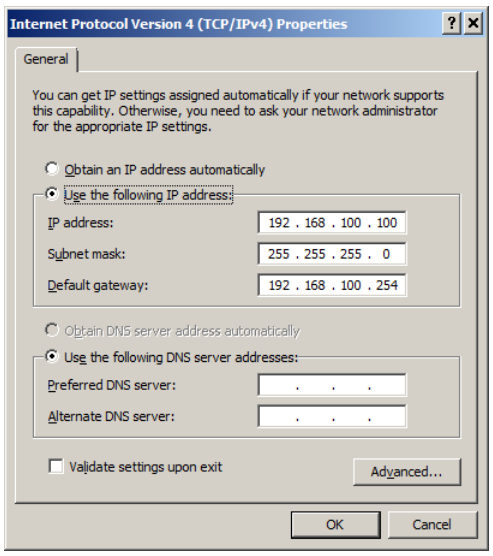


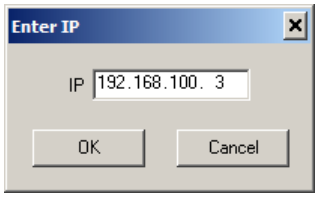
Table 3. Factory Settings of Receiver RL10

	WAN1	WAN2
IP address	192.168.0.2	192.168.100.3
Port	55000	55000
Subnet Mask	255.255.255.0	255.255.255.0
Gateway	192.168.0.254	19168.100.254

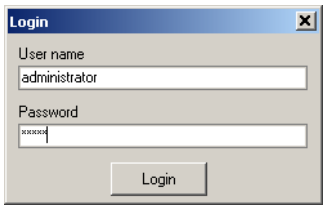
Note:

Press and hold RESET button for 5 seconds (until a sound signal) in order to restore to factory settings.

3. Use LAN cable to connect WAN2 connector of the receiver to the network connector of the computer that will be used to configure the IP receiver.
4. Turn on the power supply of the IP receiver and wait until computer OS loads. Second receiver sound signal will indicate that the receiver has turned on.
5. Run *IPcomControl 3* on Windows OS computer. A box will open. Put in the address of your receiver's interface controller (port WAN2).



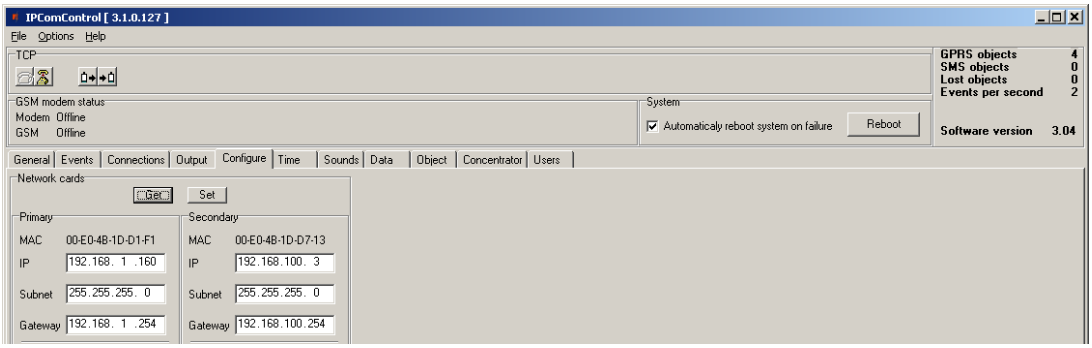
6. Click ***OK***. A box will open. Type in your User Name and the password. Click ***Login***.



Note:

Default User Name – *administrator,* password – *admin.*

7. When software *IPcomControl 3* opens, select tab *Configure* and click ***Get***. Set the internet addresses of receiver's interface controllers *Primary* (port WAN1) and, if planned to use, *Secondary* (port WAN2) in order to allow the receiver to work in designated networks.



8. Click ***Set***. Receiver will reboot automatically.

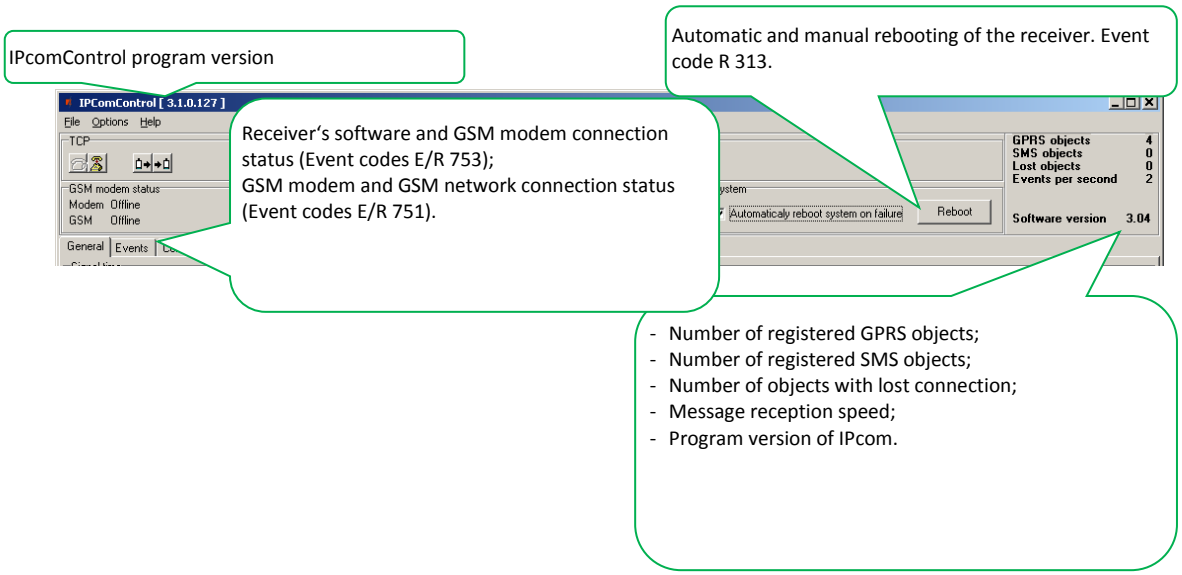
   Note. Log in to the receiver via LAN using new addresses if addresses of network interface controller *Secondary* were edited.

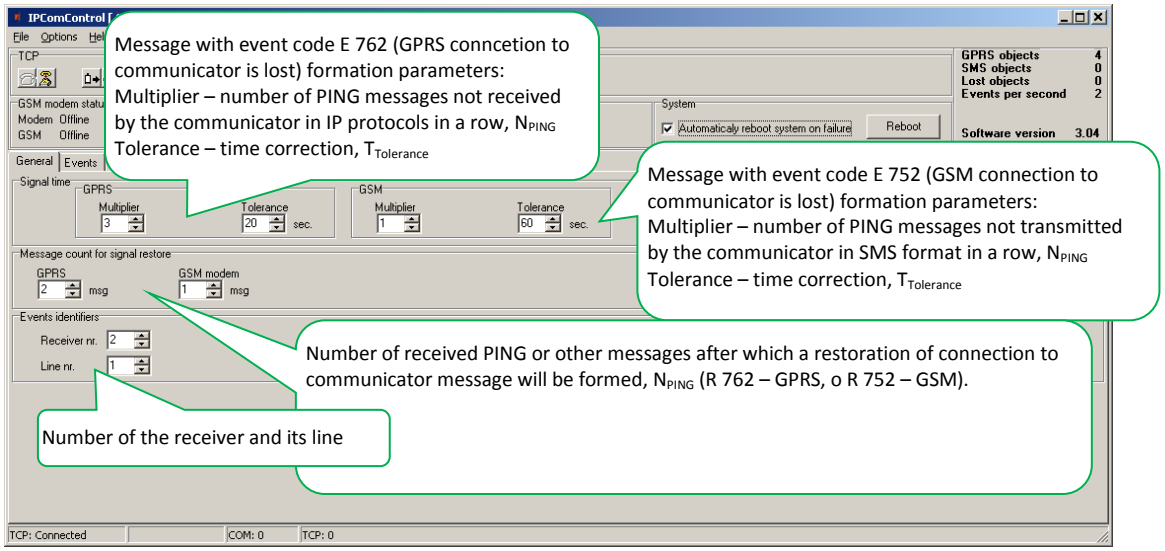
9. Use network cable to connect WAN1 connector to the network that will be used by the receiver to receive messages that communicators will address using the set *Primary* address. Use network cable to connect WAN2 connector to the network that the receiver will use to receive messages that communicators will address using the set *Backup* address.
10. Run IPcomControl 3 on a Windows OS computer in the same network as the receiver in order to connect to the receiver using LAN network. Type in the address of the receiver's network interface controller, the User Name and the password into the prompt boxes to log in.

Configuration

11. A window will open. Click ***Read***  to read the current configuration of the receiver.

Tab ***General***.





Formation time of the message about lost connection with GPRS/Ethernet communicator:

$$T_{message} = T_{PING} \times N_{PING} + T_{Tolerance}$$

T_{PING} – PING message sending period in seconds.

N_{PING} – number of not received PING messages in a row.

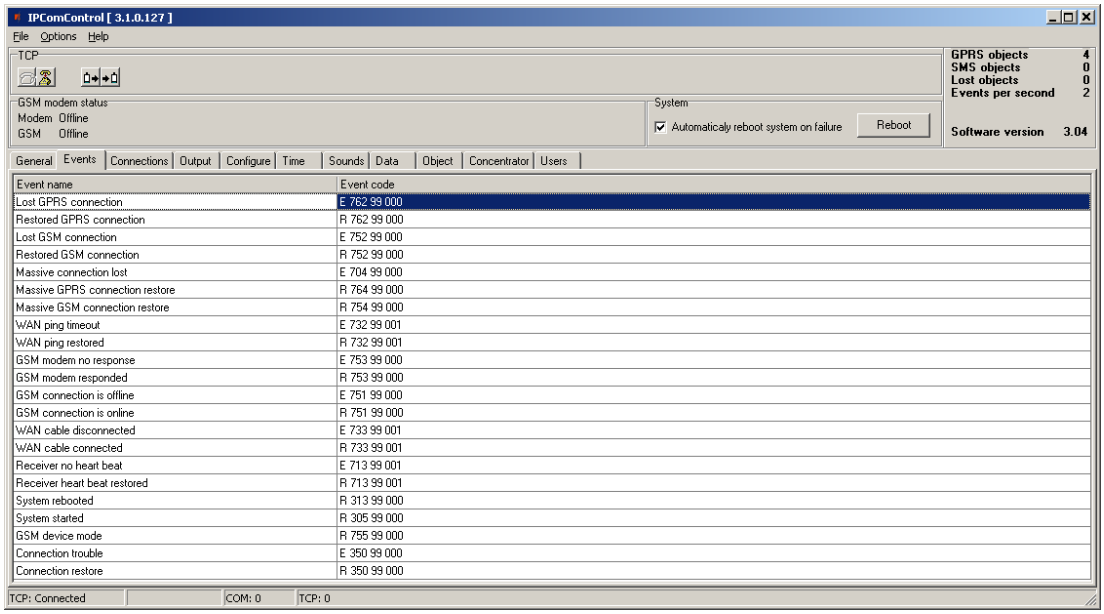
$T_{Tolerance}$ – time correction coefficient in seconds.

Receiver will form message with event code E 762 (connection to communicator is lost) and will send it to the monitoring software if no message is received during the set control time $T_{message}$.

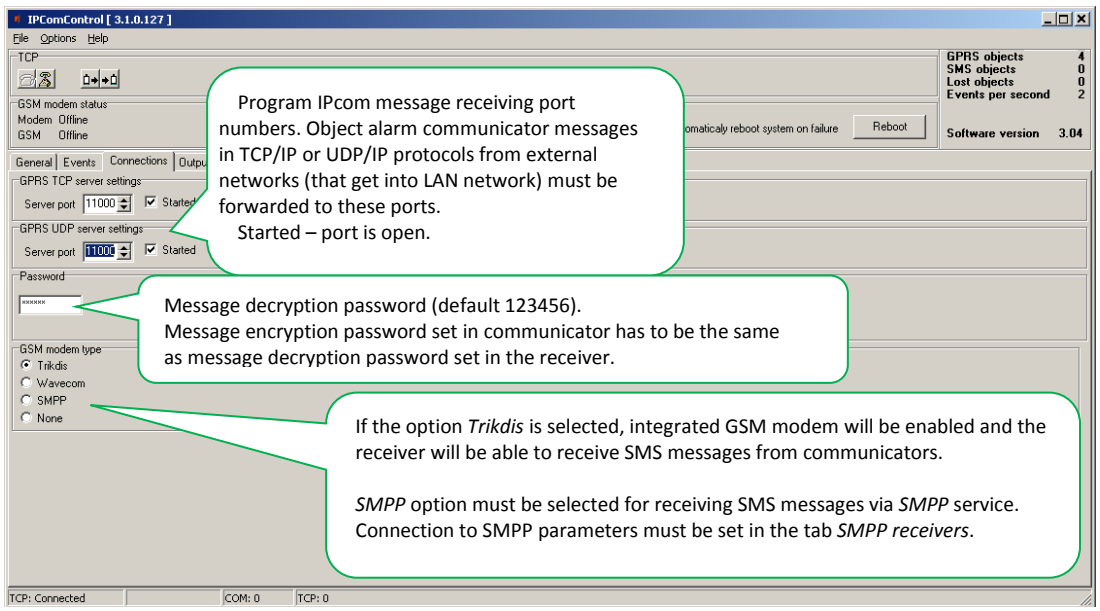
Receiver will form message with event code R 762 (connection to communicator is restored) and will send it to the monitoring software if the number of PING or other messages received from the communicator during the control time $T_{message}$ is equal to the number in the box *GPRS*.

Message formation times (when connection to SMS communicators is lost/restored) are calculated in the same way. However, PING message sending periods *via SMS* by the communicator are put into the formulas, and values of *N* and *Tolerance* are taken from the boxes *GSM*.

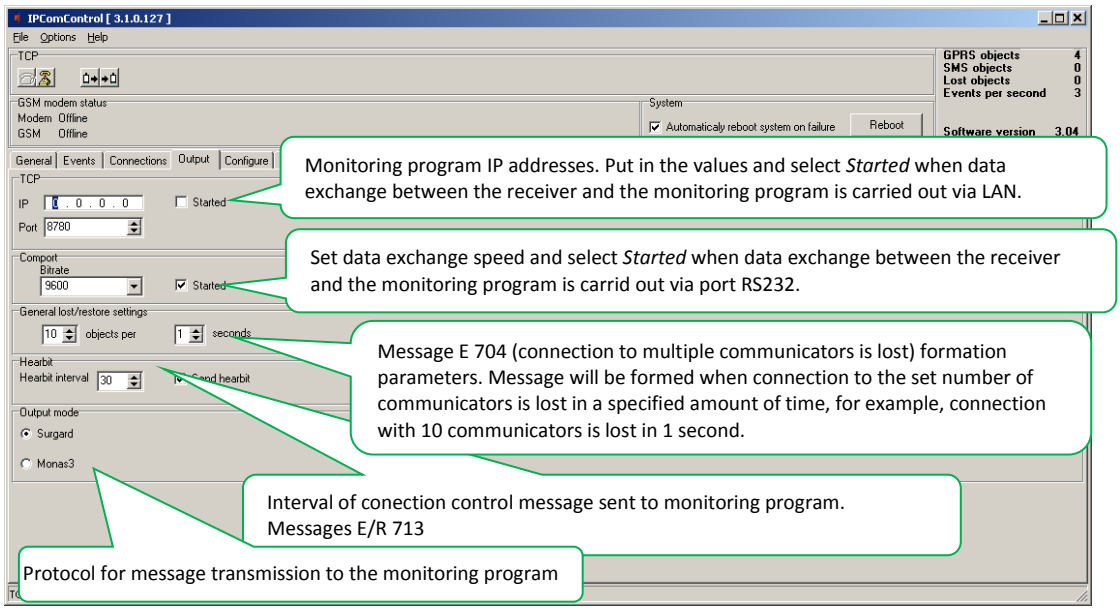
Tab ***Events***. The list of possible events is displayed under this tab. In case of an event, receiver will form a message with the list code *Event code* and will send it to the monitoring software.



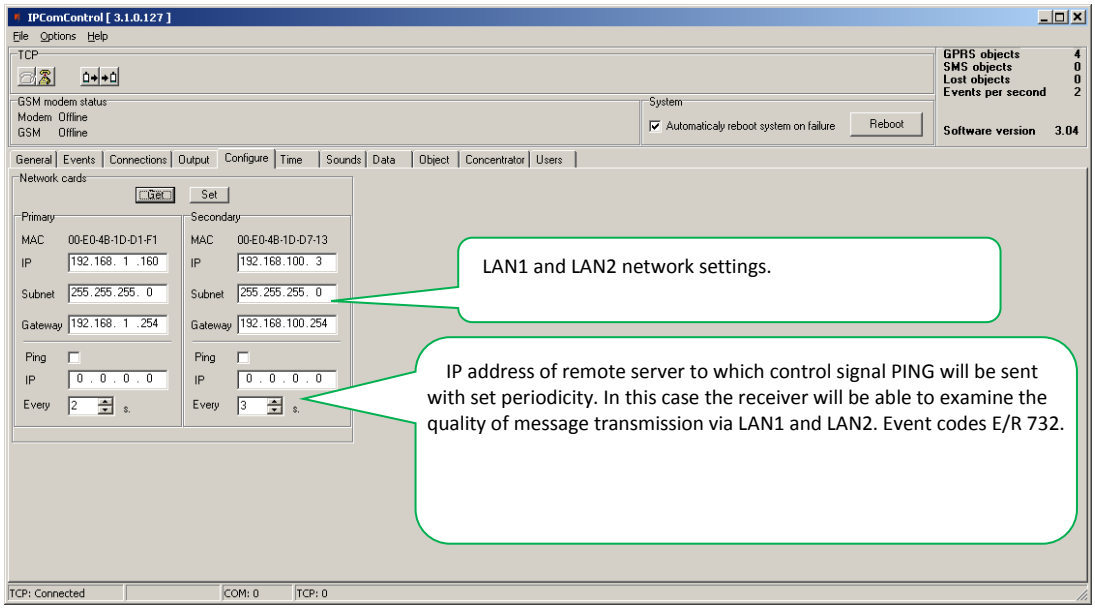
Tab ***Connections.***



Tab ***Output***.



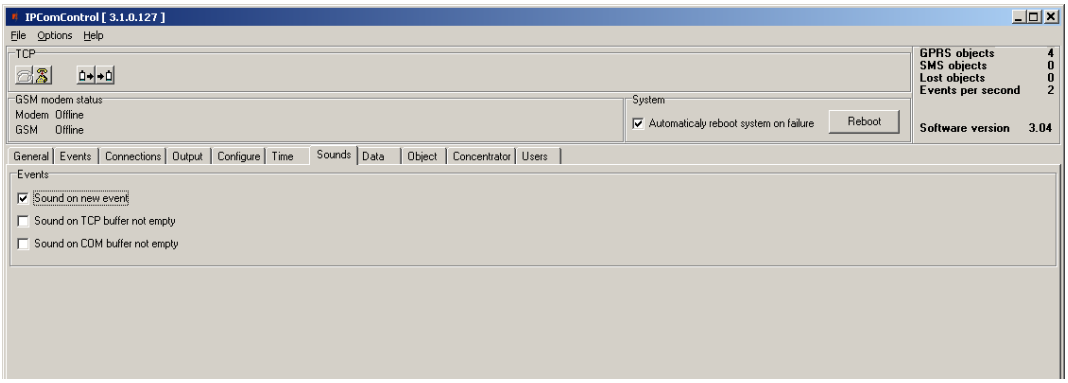
Tab ***Configure*** (Network settings).



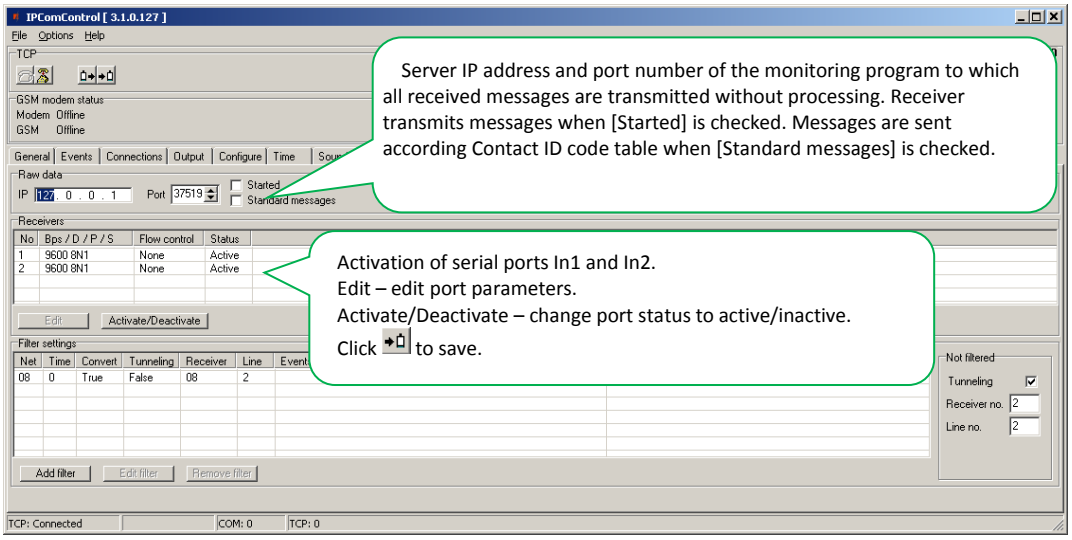
Notes:

1. *Receiver will reboot automatically when internet addresses are edited and Set is clicked on. Event code R 313.*
2. *Prepare the local network (LAN) in a way that information in TCP or UDP protocols from open internet would reach ports WAN1 and WAN2 of the receiver RL10 (forward the ports).*

Tab ***Sounds***. Set the events upon which the receiver will sound a signal.

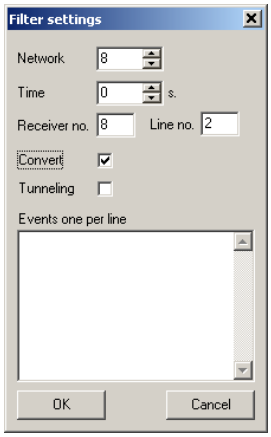


Tab ***Concentrator***. Set addresses to which all received messages are additionally transmitted. Message filtering and conversion parameter settings.



- Use box ***Filter settings*** to set message filtering parameters. Filter operation is displayed in Annex 1. Click ***Add filter*** to open tab ***Filter settings***. Set the rules for transmission of messages sent via IP connection channels to the monitoring software:
  - Type in the number of the network in the field ***Network***. Network number is set according to the number of the receiver in the message;
  - Type in the inactivity time for the same signal (or recurrent messages) in the box ***Time***;
  - Type in the receiver number indicated in the processed message in the box ***Receiver no***;
  - Type in the number of the receiver line indicated in the processed message in the box ***Line no***;
  - Check ***Convert*** if the structure of filtered messages needs to be edited;
  - Check ***Tunneling*** if structure of filtered messages does not need to be edited;

Note:
Tunneling – let through without edits;
Convert – write in set receiver and line numbers, and edit the order of displayed information in the radio message;

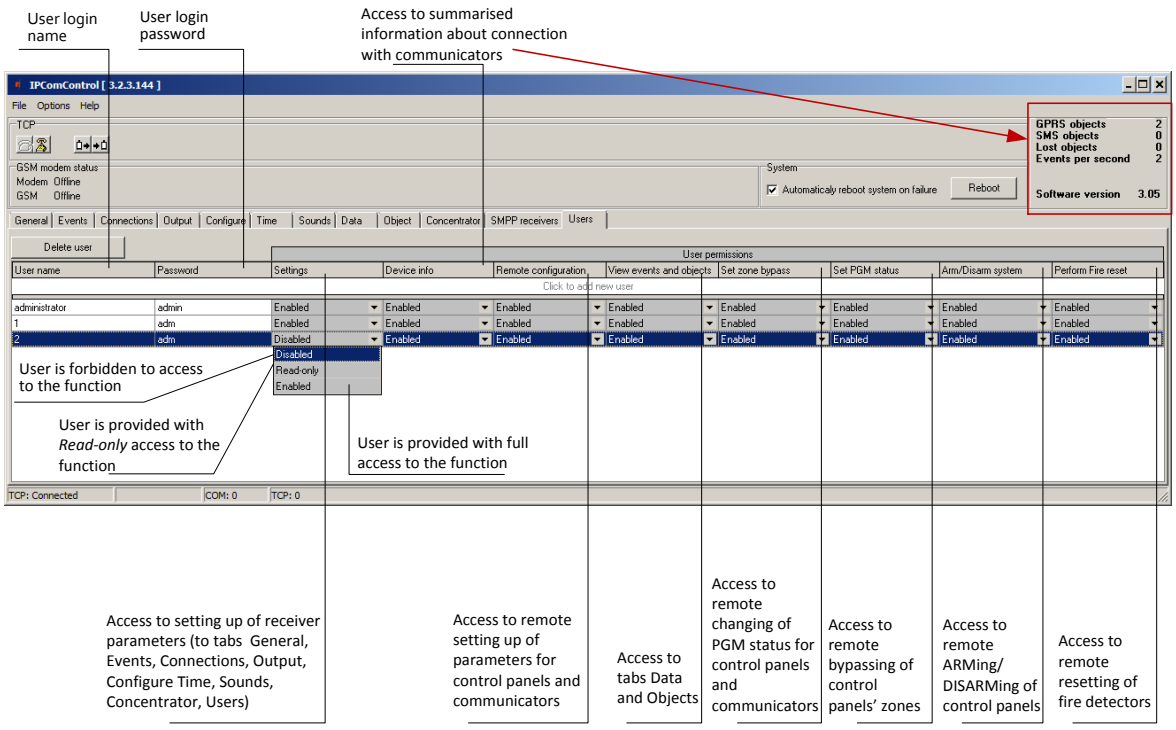


- Type in special event codes that are used in RAS-2M system to turn off repeated messages in the system in the field ***Events one per line***.
- Click ***OK*** to save new values. Several new filters can be formed and used.

➢ Check ***Tunneling*** in the field ***Not filtered*** to transmit message to the monitoring software using receiver and line numbers indicated in the tab ***General***.

➢ Messages are transmitted using set receiver and line numbers if ***Tunneling*** is unchecked.

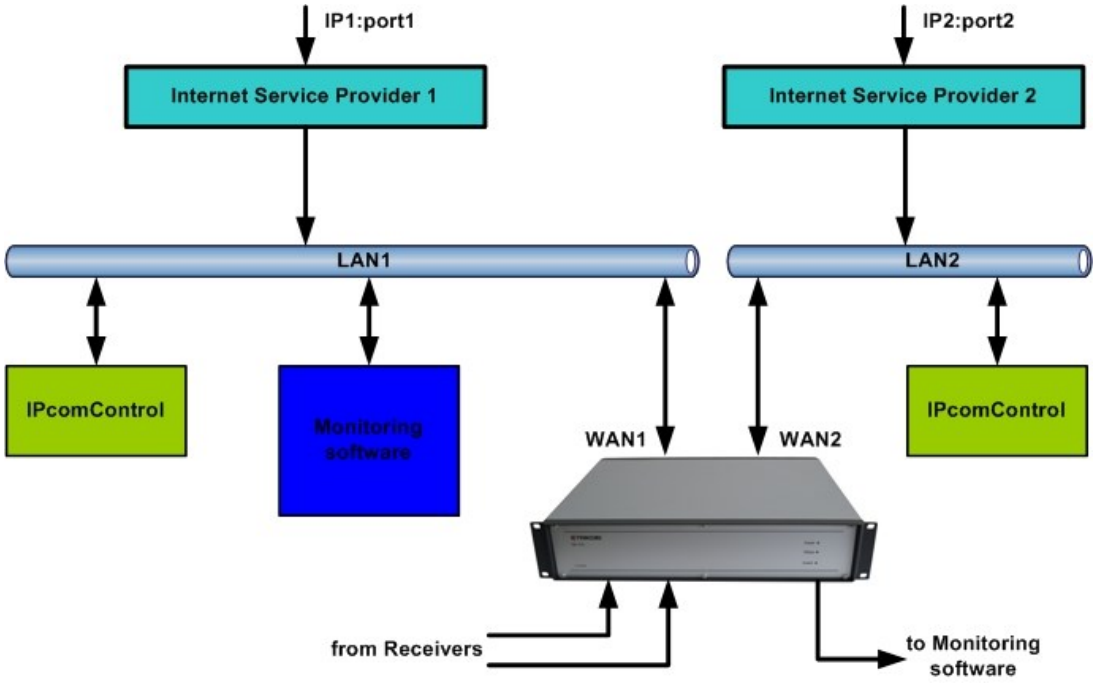
Tab ***Users***. Create program users and set access rights.



12. Click ***Write***  to save the edits into the receiver memory.

Computer Network Configuration

IP receiver is connected to the local network in the same way as any other computer. Recommended local network scheme is shown in the picture below.

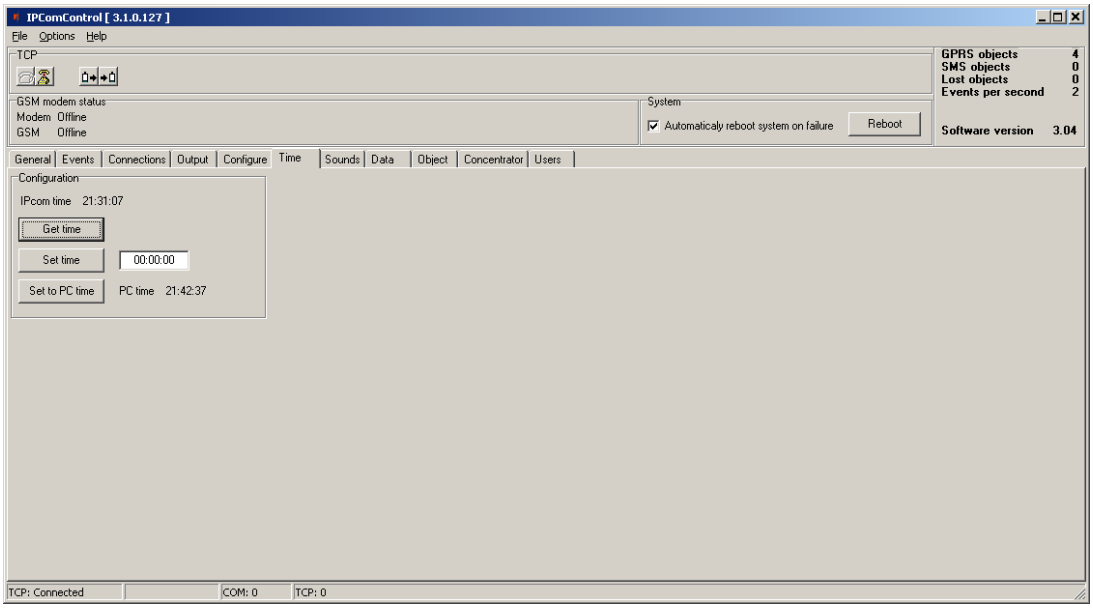


Preparing the receiver for operation

1. Connect Output.
   Use RS232 cable to connect receiver's Output to the computer with installed monitoring software.
2. Connect LAN networks to WAN connectors.
3. Connect GSM antenna and insert SIM card if GSM modem GM5 is used.
   SIM card PIN code must be disabled.
   Take off side and top covers of the receiver and insert SIM card into the modem as shown in the picture below. Put side and top covers back on.

4. Turn on the power supply.
   Turn on the power supply by pressing the button ***Power*** after all wiring is done. Indicator ***Power*** should light up. Receiver computer software will start loading. It may take several minutes. Equipment will start working after a sound signal.

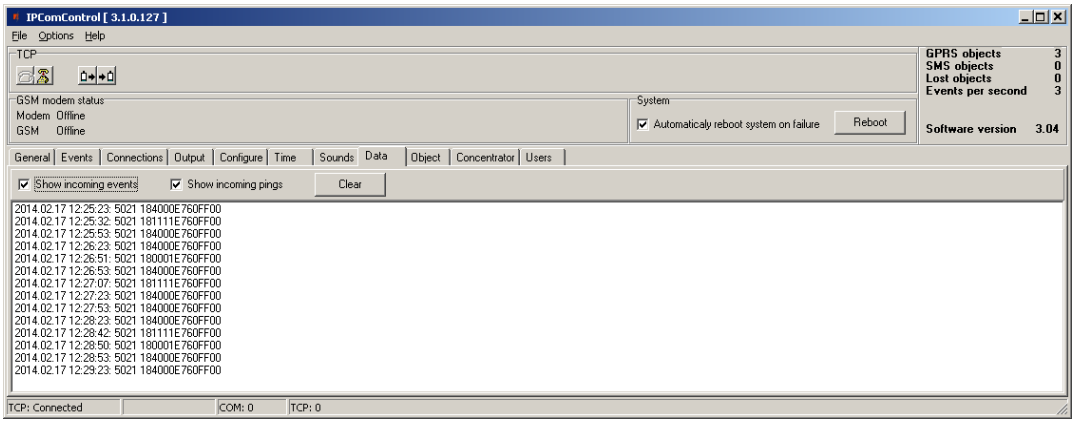
5. Run IPcomControl 3. Click ***Connect***  , then ***Read***  and set current receiver parameters.
6. Set the current time of the receiver.
   Set the receiver clock in the tab ***Time***. Click ***Set to PC time*** to save.



Operation

Receiving Messages

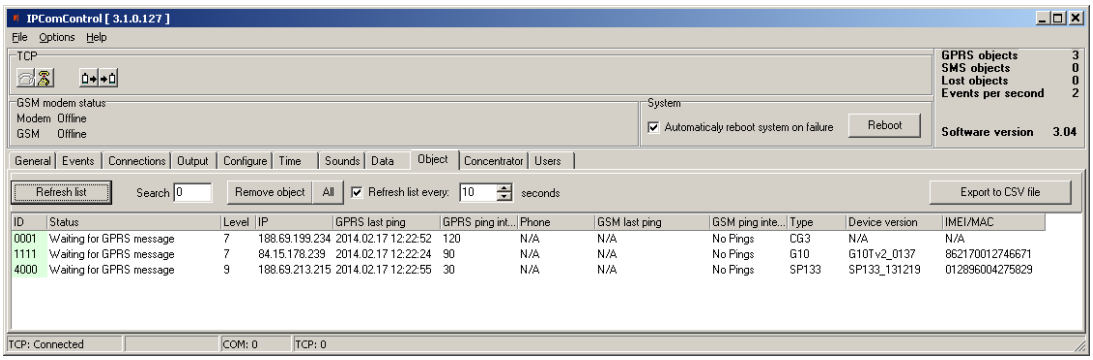
Received messages can be seen in the tab ***Data***. Click ***Clear*** to delete all entries.



Registered object list is displayed in tab ***Object***. It contains:

- ID – object's number;
- Status – connection status;
- Level - GSM connection strength;
- IP – transmission module address;
- GPRS last ping – date ant time of the last IP message;
- GPRS ping interval – connection control period of IP channel messages;
- Phone – subscription number of transmission module (communicator) SIM card;
- GSM last ping – date and time of the last message received via GSM;
- GSM ping interval – connection control period of GSM connection messages;
- Type – transmission module type;

- Device version – transmission module program version;
- IMEI/MAC – transmission module IMEI or MAC number.



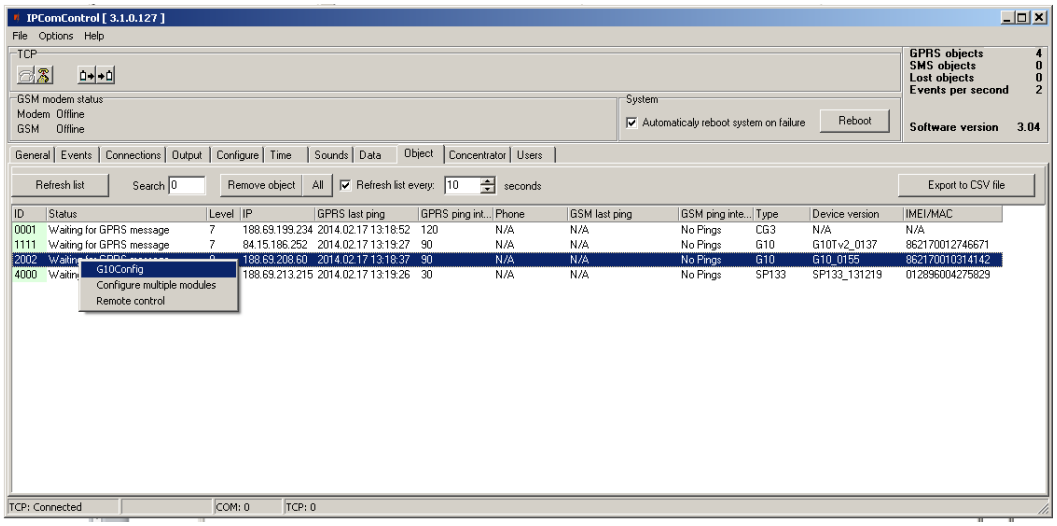
Use function ***Search*** to quickly find the data row for required object burglary or fire alarm communicator; function ***Remove object*** – to delete a selected line from the list; function ***Refresh list every: ..... seconds*** – to set list update period; click ***Export to CSV file*** – to create a list of registered objects (communicators) in a CSV file that can be opened using, for example, MS Office program Excel.

Remote Programming of Transmission Modules

Settings of the object transmission module can be set remotely.

a) setting up parameters for one transmission module

Right-click on the selected transmission module to open the menu and open the program to set the parameters. Log in, read current parameters and set them the according to the transmission module user manual. Save into the module memory.



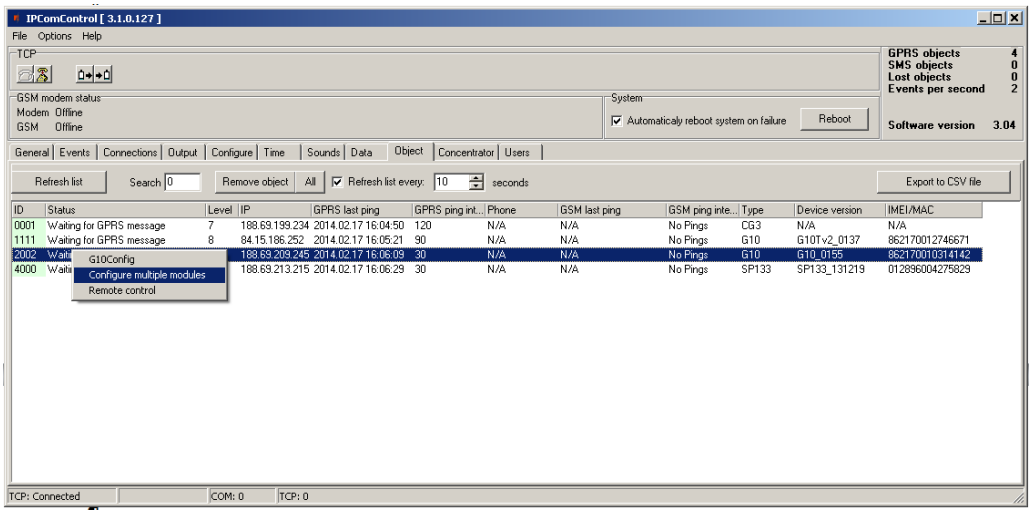
Note:

Logging in, reading and saving might take several minutes. Program will indicate when the next action is available.

Log off when finished. Module will reboot and will automatically resume reporting to the receiver after a certain time period.

b) setting up parameters of multiple modules at once

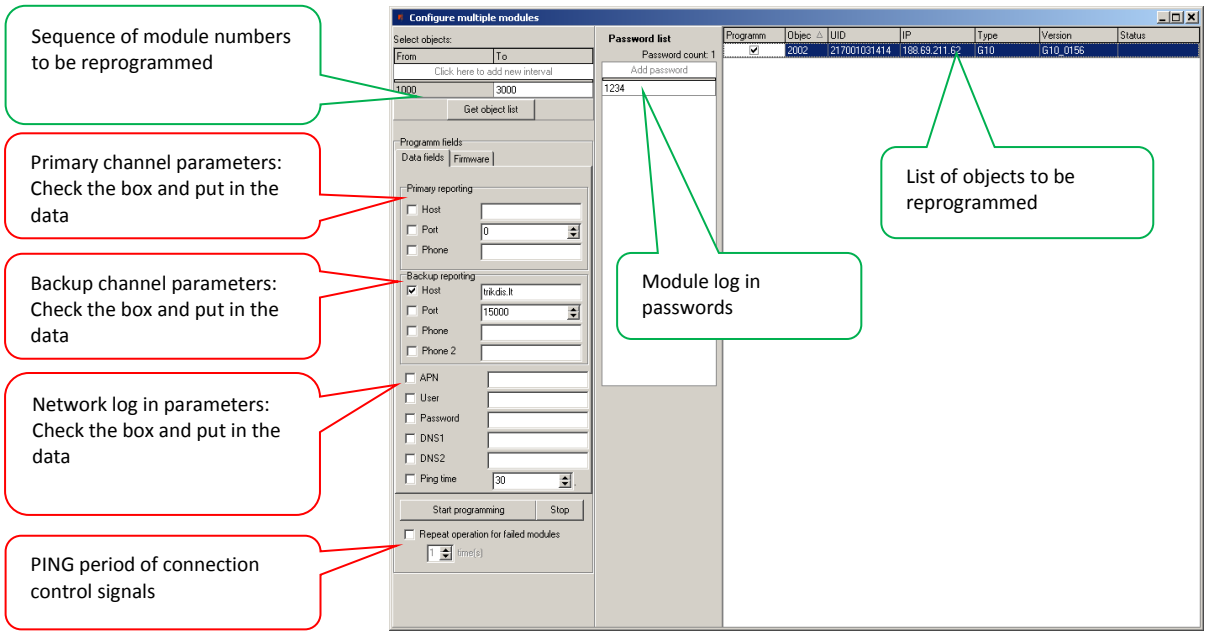
Right-click on any security module to open the menu and select *Configure multiple modules*.



A new window will open. Specify the sequence of transmission modules to be reprogrammed and put in the new parameters in the tab ***Data fields***.

Specify the sequence (from...to) of transmission modules undergoing the edit of parameters in the section ***Select objects***.

Click ***Get object list*** to open the list of all modules within the specified limits on the right side. Serial module numbers, IP addresses, module types and their program versions will be indicated in the list. If transmission modules of different types are displayed, deselect to eliminate from the list.

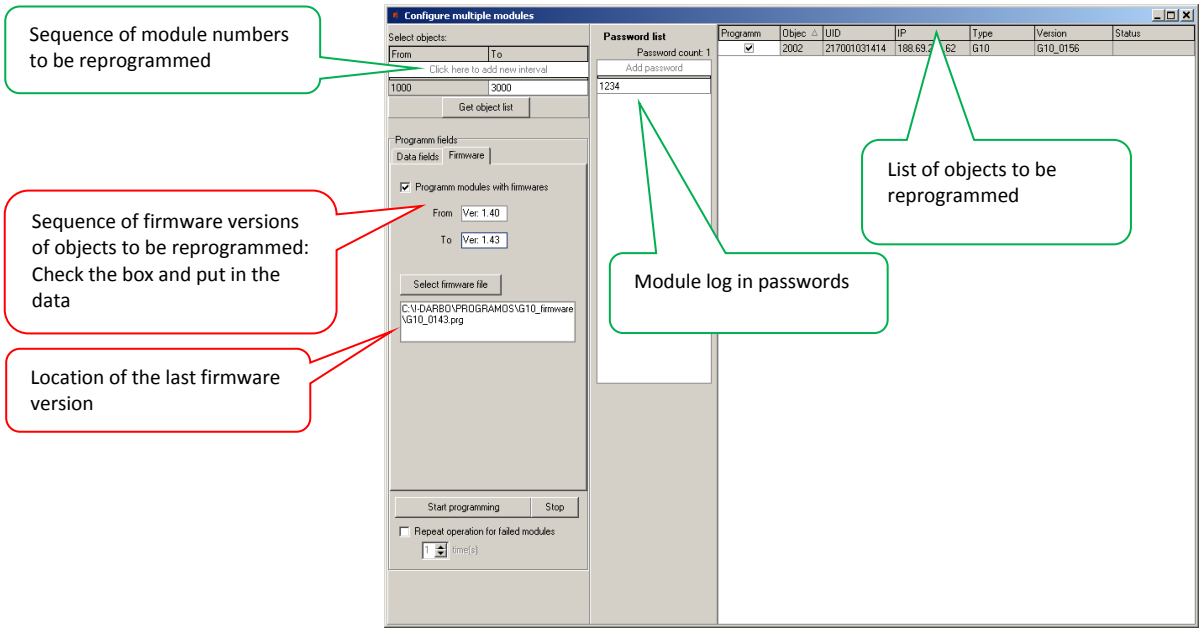


Indicate only those parameters that will be edited in sections ***Primary reporting*** and ***Backup reporting***. Specify APN, User, Password and DNS data if parameters of connection to the network operator will be edited. Select ***Repeat operation for failed module*** and specify the period value if connection control period is to be edited. Click ***Start programming*** to start a process of parameters edit. It may take several minutes. Program will inform once the process is finished. Click ***Stop*** to terminate the process.

c) upgrading firmware for multiple modules

Right-click and select ***Configure multiple modules*** to program multiple modules.

A new window opens. Specify the sequence of modules to be repgrogrammed and program versions in the tab ***Data fields***.



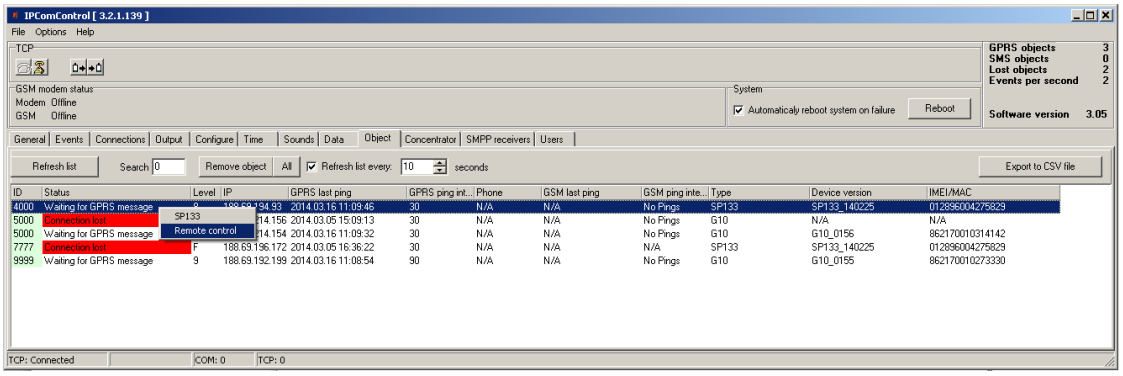
Check ***Program modules with firmwares*** and type in the sequence of program versions. Click ***Select firmware file*** and locate the file with extension *.prg.

Click ***Start programming*** to start the process of parameters edit. It may take several minutes. Click ***Stop*** to terminate the process.

Program versions of the modules are displayed in the tab ***Objects*** once process is finished.

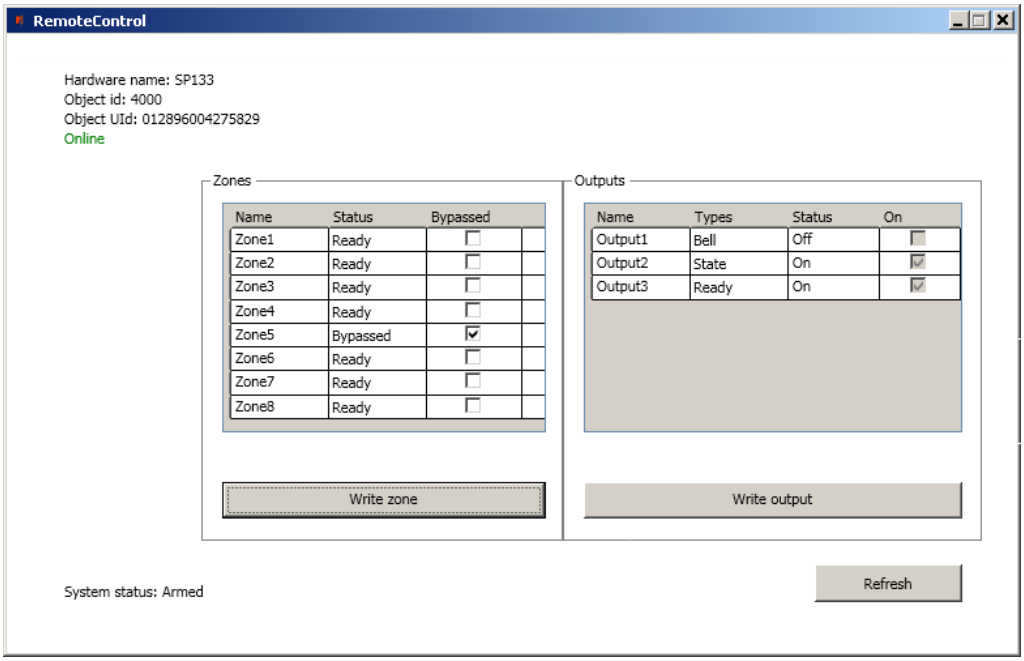
Remote Control of Transmission Devices

Transmission module in the object can be controlled remotely. It is important for the transmission module to support this function (not all manufactured transmission modules supports it).



Right-click on the selected transmission module to open the menu and select ***Remote control.***

A new window will open. Indicate the actions you would like to take and click ***Write zone*** and ***Write output*** at the bottom of the window. Click ***Refresh*** to refresh the window and check the edits.



Click **X** (Close) to close the window once finished.

Receiver's Internal Event Messages

There is receiver RL10'th internal event code list in the table below.

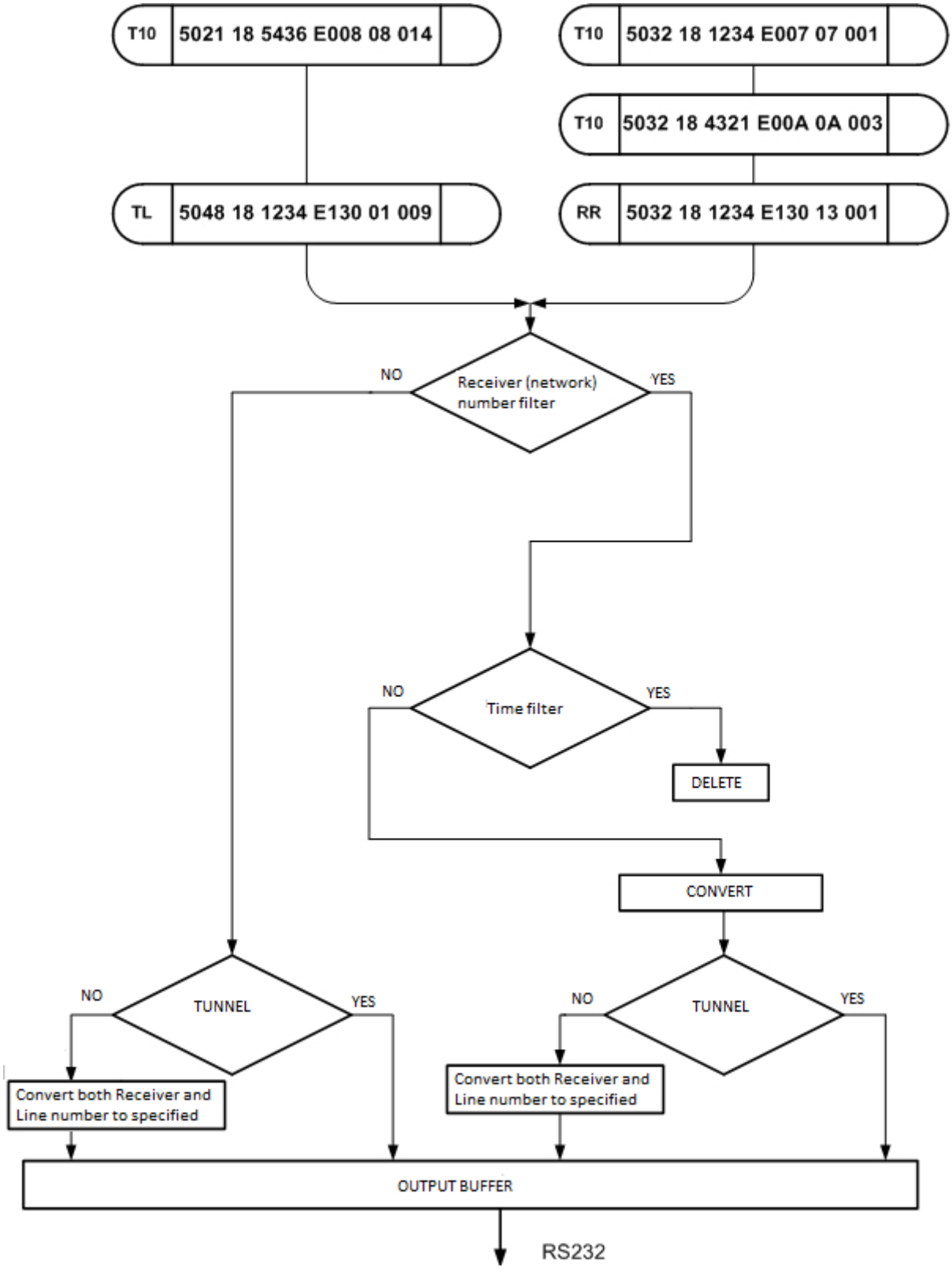
Please find conditions for generating of Internal Event Messages and sending them to the monitoring software in the same table below.

Event Code C ID	Name	Internal Event Message string values						Event message will be generated if:
					Editing Allowed			
		Receiver No	Line No	Account No (Object ID)	Event Code	Partition No	Zone No	
E762	GPRS connection lost	Pre-set Receiver No	Pre-set Receiver's Line No	Object ID transferred by Tx Module	☑	☑	☑	Object's Tx Module operates in GPRS mode; No any signal out of Tx Module within pre-set check time; Type of Tx Module is known; Switched on receiving via GSM modem/SMPP; At least one SMS message has been received from Tx Module; Massive GPRS connection loss has not been detected;
R762	GPRS connection restored	Pre-set Receiver No	Pre-set Receiver's Line No	Object ID transferred by Tx Module	☑	☑	☑	Object's Tx Module operates in GSM mode; Pre-set number of messages has been received to define GPRS connection restoration; Massive GPRS connection restoration has not been detected;
E752	GSM connection lost	-	-	-	☑	☑	☑	N/A
R752	GSM connection restored	-	-	-	☑	☑	☑	N/A

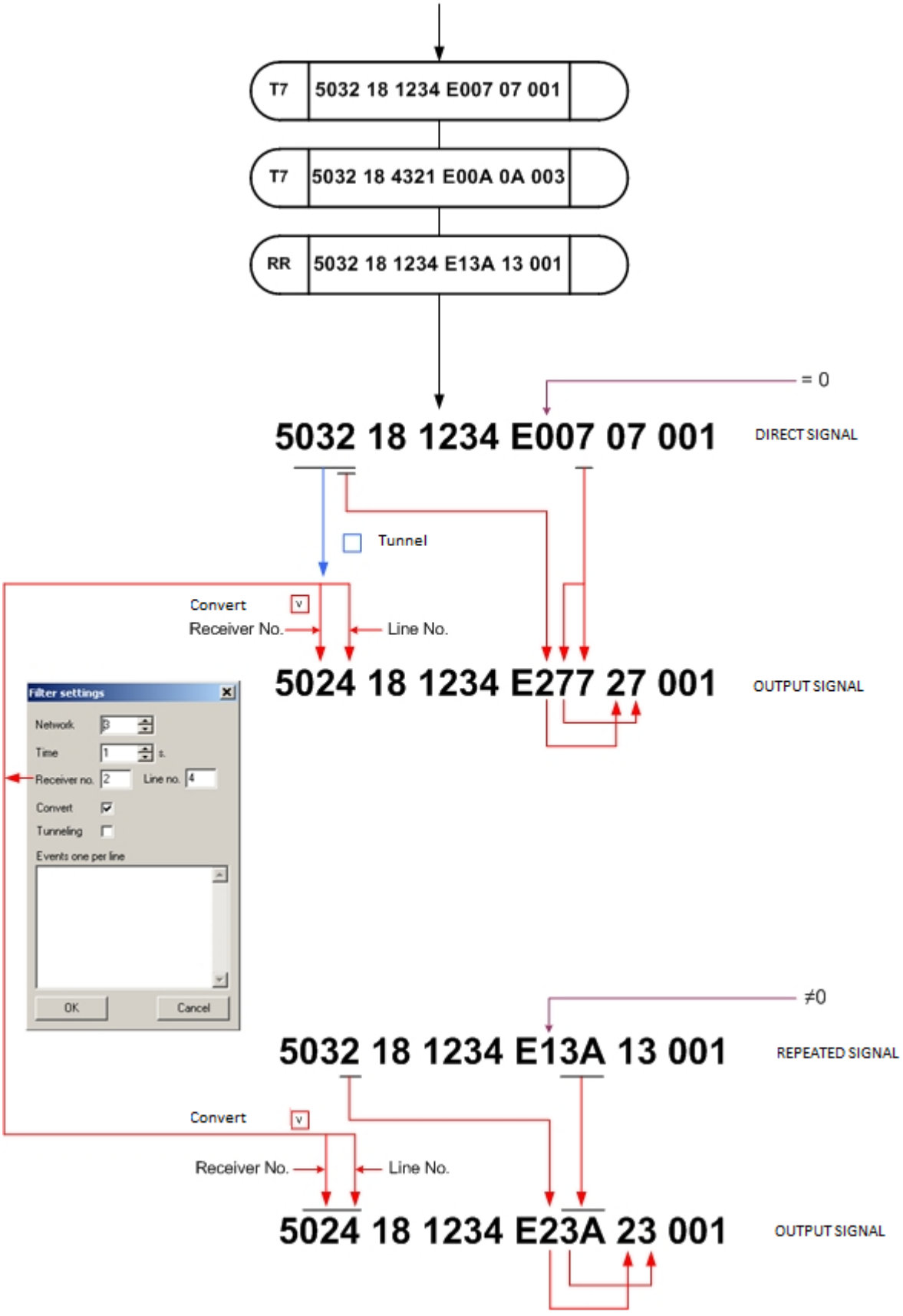
E704	Massive Communication loss	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (000)	Pre-set number of either GPRS or GSM connection losses per second has been detected
R764	Massive GPRS communication restore	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (000)	Pre-set number of GPRS connection restorations per second has been detected;
R754	Massive GSM restore	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (000)	Pre-set number of GSM connection restorations per second has been detected;
E732	WAN ping timeout	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (ETH No)	3 times in turn there is no answer signal from "PING" addressee (Object's Tx Module);
R732	WAN ping restored	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (ETH No)	Connection loss with particular Ethernet controller has been detected; There is at least one answer signal received from "PING" addressee (Object's Tx Module);
E753	GSM modem no response	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (000)	GSM modem answer signal has not been received within 10 seconds;
R753	GSM modem responded	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (000)	Connection loss with GSM modem has been detected; At least one message has been received from GSM modem;
E751	GSM connection is offline	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (000)	GSM modem notifies with service message that it's lost GSM connection; At least 1 minute has gone past from system start;
R751	GSM connection is online	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (000)	GSM connection loss has been detected; GSM modem notifies with service message that it has restored GSM connection;
E733	WAN cable disconnected	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (ETH No)	NET cable has been plugged out of particular Ethernet controller;
R733	WAN cable connected	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (ETH No)	NET cable plugging out has been detected; NET cable has been plugged into particular Ethernet controller;
E713	(COM) Receiver no heart beat	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (COM No)	No signal has been received per minute via COM input;
R713	(COM) Receiver heart beat restored	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (COM No)	COM input loss has been detected; At least one signal or message has been received via COM input;
R313	System rebooted	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (000)	Reboot command created by IPcomControl has been received; H/W fail occurred while signals via COM input were received;
R305	System started	Pre-set Receiver No	Pre-set Receiver's Line No	0000 hard-coded	☑	☑	☒ (000)	IPCom has started;
R755	GSM device mode	Pre-set Receiver No	Pre-set Receiver's Line No	Object ID transferred by Tx Module	☑	☑	☑	Object's Tx Module operates in GPRS mode; A Message has been received via GSM; Object's Tx Module operates in GSM mode; The FIRST message has been received via GSM; Connection loss with Tx Module has been detected; Pre-set number of messages has been received via GSM to define GSM connection restoration;

E350	Connection trouble	Pre-set Receiver No	Pre-set Receiver's Line No	Object ID transferred by Tx Module	☑	☑	☑	Object's Tx Module operates in GPRS mode; Massive GPRS connection loss has not been detected; Either Tx Module is unable to transfer messages via GSM or no messages has been received out of Tx Module via GSM; No messages out of Tx Module within pre-set check time;
								Object's Tx Module operates in GSM mode; No messages out of Tx Module within pre-set check time; Massive GSM connection loss has not been detected;
R350	Connection restore	Pre-set Receiver No	Pre-set Receiver's Line No	Object ID transferred by Tx Module	☑	☑	☑	Connection loss with Object's Tx Module has been detected; Massive GPRS connection restoration has not been detected; Pre-set number of messages has been received via GPRS to define GPRS connection restoration;
								Connection loss with Object's Tx Module has been detected; Massive GSM connection restoration has not been detected; Pre-set number of messages has been received via GSM to define GSM connection restoration;

Annex 1. Operation of Concentrator Filter



Algorithm of concentrator filtering



Example of radio message (encrypted in RAS-2M) filtering

Annex 2. Data Output message format

Output message format: 50RLs18AAAAEEEEPPZZZT

50	=Basic protocol
R	=Receiver Number
L	=Line Number
s	=space
18	=the token used to identify the message as Contact ID
AAAA	=Account Number (Object ID)
EEEE	=Event code
PP	=Partition Number
ZZZ	=Zone Number
T	=Terminator (DC4)

True message example: 5021 180000E71399001<DC4>