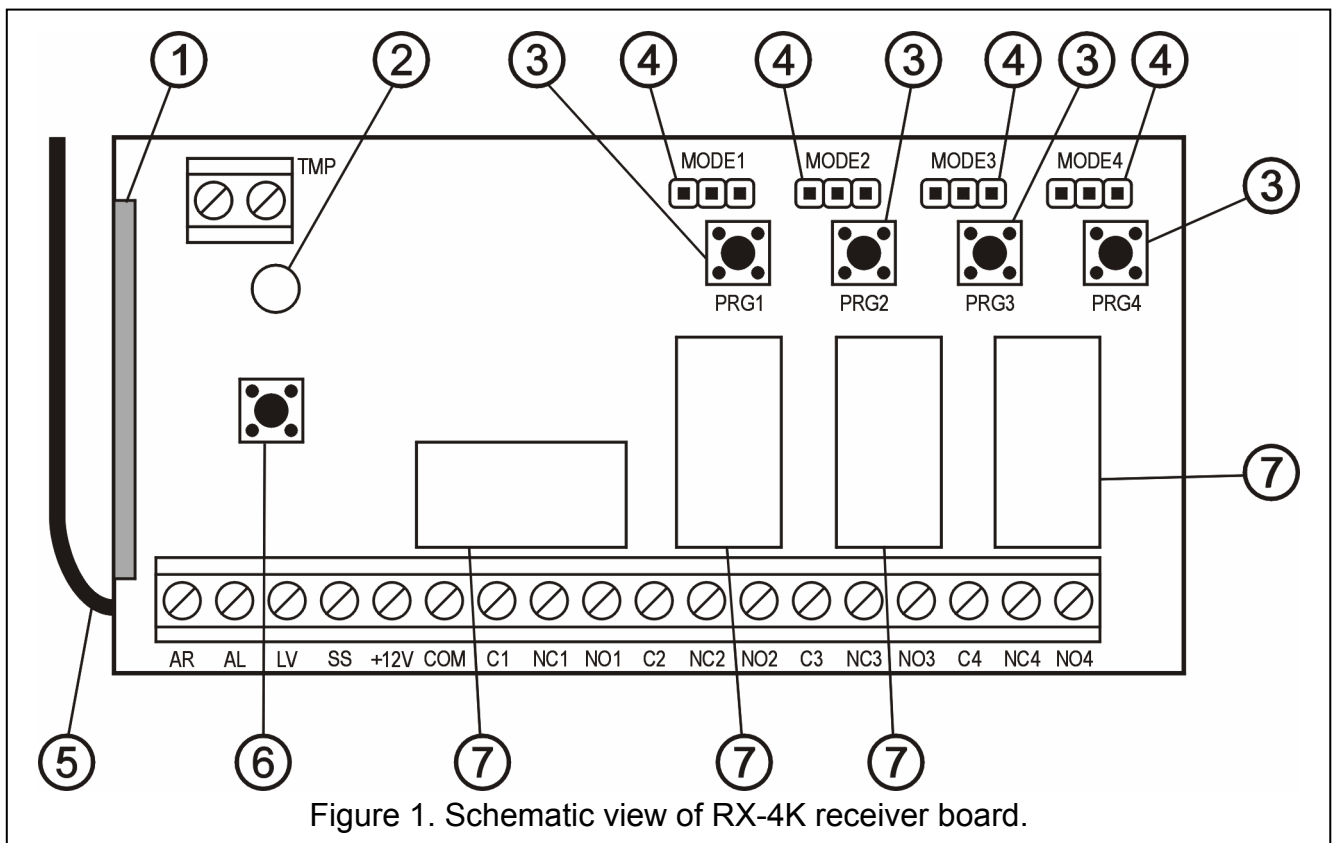


The RX-2K/RX-4K remote controller set enables electrical equipment to be remotely controlled by means of radio transmitters (remote keyfobs). The remote controller set can work with up to 340 remote keyfobs. **The RX-2K/RX-4K only supports SATEL-manufactured 433 MHz remote keyfobs.**

Interaction of the RX-2K/RX-4K with security systems is facilitated by inputs which provide information on the system status. They make it possible to easily organize signaling of arming/disarming, as well as of alarm clearance.

The design is based on the components of Microchip Technology Inc. which use the KEELOQ® code-hopping technology for transmission between the transmitter and the receiver. It ensures both security of use and resistance to spurious control signals coming from other devices.

1. Description of electronics board



Legend:

- 1 – receiver;
- 2 – LED indicator;
- 3 – programming buttons (PRG1 – channel 1; PRG2 – channel 2; PRG3 – channel 3; PRG4 – channel 4);
- 4 – pins to program the operating mode of relays (MODE1 – channel 1; MODE2 – channel 2; MODE3 – channel 3; MODE4 – channel 4);
- 5 – antenna;

- 6 – tamper contact;
- 7 – relays (in RX-2K only 2).

Description of terminals:

- AR** – information signal input – security system status (armed/disarmed);
 - AL** – information signal input – alarm;
 - LV** – signal output – low battery in remote keyfob (OC); the output activates when the receiver detects low voltage in the remote keyfob battery and remains active until a remote keyfob with good battery is used (it can be used e.g. to report a trouble in the security system);
 - SS** – siren control output (OC);
 - +12V** – supply voltage input (direct voltage from 9 V to 16 V);
 - COM** – common (ground);
 - Cn** – common terminal of relay;
 - NCn** – normally closed terminal of relay;
 - NO n** – normally open terminal of relay;
 - TMP** – tamper contact terminals.
- } n – relay (channel) number

The two-color **LED** indicates the module operating status and facilitates programming of the receiver parameters:

- green light – normal operating mode;
- red light – receiving signal from remote keyfob in normal operating mode;
- green blinking light – waiting for the first press of the remote keyfob button when entering new remote keyfob into the receiver memory;
- red blinking light:
 - waiting for the second press of the remote keyfob button (when entering new remote keyfob into the receiver memory),
 - the remote keyfob battery is exhausted (after pressing the remote keyfob button normal operating mode),
 - clearance of the receiver memory,
- alternately blinking red and green light – programming the monostable relay ON time;
- blinking by the sequence: red color, green color, extinction – started mode of programming from the computer.

The programming buttons **PRG1** to **PRG4** allow:

- entering remote keyfobs into the receiver memory;
- programming the monostable relay changeover time for the given channel.

Additionally, the **PRG1** button makes it possible to clear the receiver memory.

2. Installation

The receiver electronics board includes components sensitive to electrostatic discharges. These electrostatic discharges should be removed prior to installation. Also, touching the receiver board components should be avoided in the process of installation.

The RX-2K/RX-4K is mounted in a plastic housing. When closing the housing, be particularly careful so that the programming button is not pressed in by the cables.

It is recommended that the manufacturer specified batteries be used in the remote keyfobs. The battery status must be periodically checked (e.g. by noting how the LED on the receiver board lights when the remote keyfob button is being pressed) and, if necessary, the used batteries must be replaced by new ones.

Notes:

- Do not discard the used batteries. They should be disposed of as required by the existing regulations (European Union Directives 91/157/EEC and 93/86/EEC).
- Making any construction changes or unauthorized repairs is prohibited. This applies, in particular, to modification of assemblies and components.

3. Programming

The RX-2K/RX-4K can be programmed by means of programming buttons or a computer with DLOAD10 program installed. The **DLOAD10 program is available on web-site www.satel.pl**. The program offers more advanced operation of the RX-2K/RX-4K. It allows edition of the list of remote keyfobs by their unique serial numbers, deletion of individual remote keyfobs already entered in the system, and assignment of user names to remote keyfobs.

3.1 Starting communication with DLOAD10 program

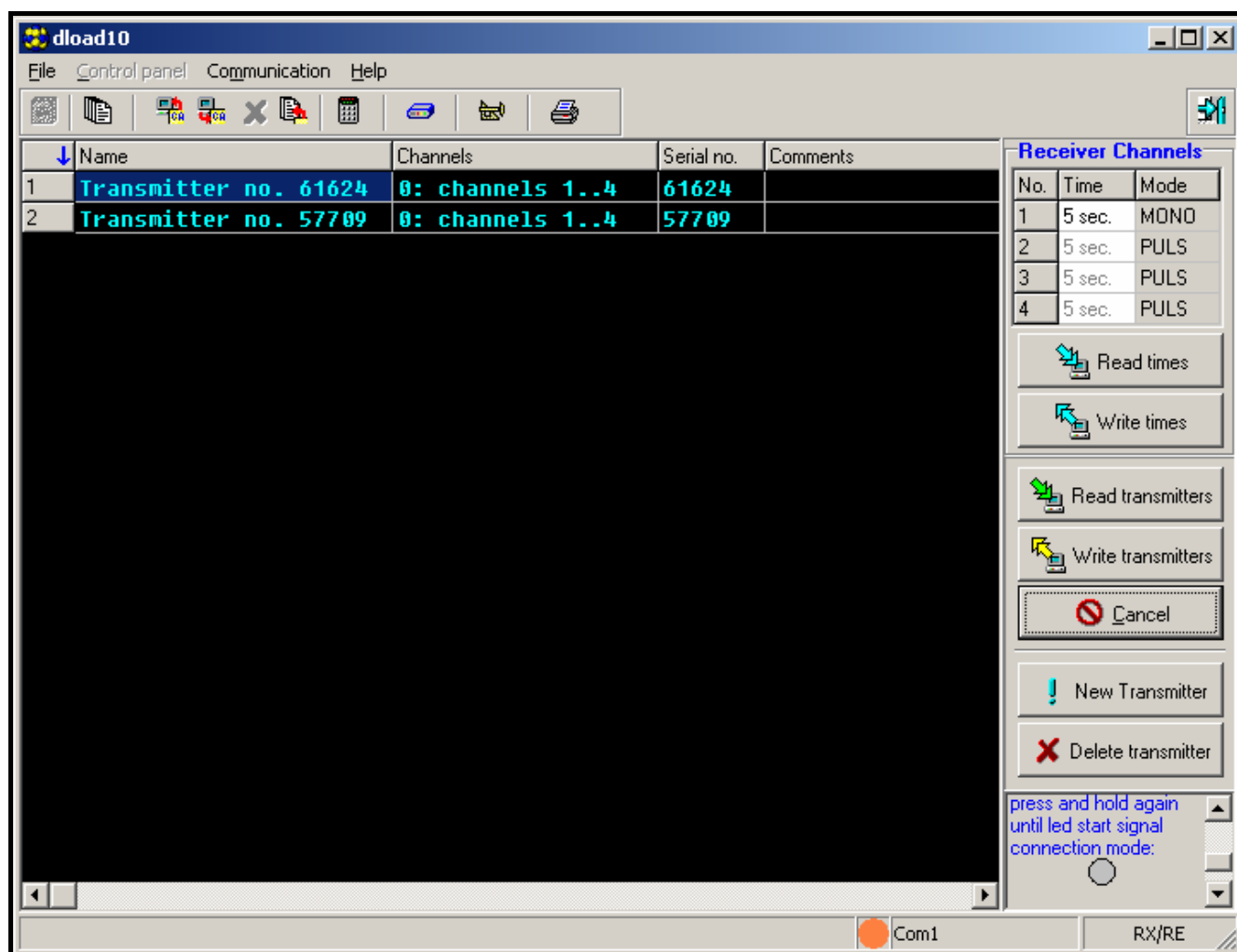
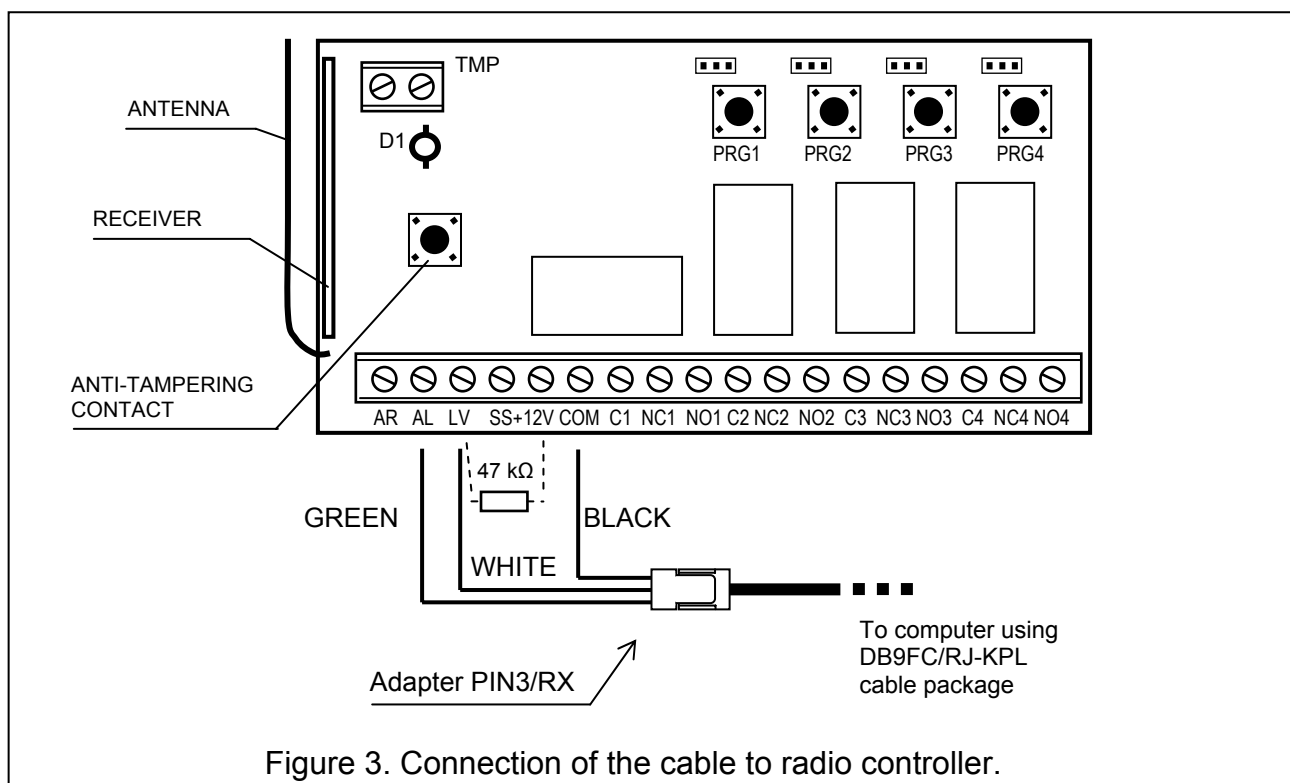


Figure 2. Management window for RX-4K in the DLOAD10 program.

In order to start the RX-2K/RX-4K communication with the DLOAD10 program, you should:

1. Connect the receiver to the computer by means of the DB9FC/RJ cable (see Figure 3).

As the controller has no separate RS port socket, some terminals of the connecting block are used for data transmission by reprogramming the purpose of the same.



In the programming mode, the following signals are passed onto the controller terminals:

- AL** – **Rx** of radio controller
- LV** – **Tx** of radio controller
- COM** – **ground** (common terminal)

The cable set includes an adapter, which must be connected to the 3-pin connector. The three wires of the adapter are to be connected to the controller terminals as shown in the figure 3.

Notes:

- If there is no communication with computer it is necessary to put a 47 kΩ resistor between LV and +12 V terminals.
 - Prior to connecting the adapter wires (green and white), disconnect other cables, if any, from the terminals AL and LV.
2. Start the DLOAD10 program in the computer (the program access is protected by password, which is **1234** by default and can be changed to any sequence of 16 characters – digits from 0 to 9 and letters from A to F can be entered).
 3. Enter the "Communication" menu, select the "Configuration" item, and indicate the computer port, the receiver is connected to.
 4. Start the computer programming mode in the receiver, following the procedure below:
 - press and hold down the PRG2 (RX-2K) or PRG4 (RX-4K) programming button until the LED changes for a while the color of its light to red;
 - release the PRG2 (RX-2K) or PRG4 (RX-4K) button momentarily, then press it again and hold down until the LED starts blinking according to the sequence: red color, green color, extinction.

Note: If communication with the DLOAD10 program fails to be established within one minute, the receiver will return to its normal operating mode.

5. In the DLOAD10 program, select "New device" in the "File" menu, and then the "RX-2K/RX-4K/RE-4K". The remote controller sets management window opens (see:

figure 2). Click on the "Read transmitters" button to open the list of remote keyfobs already entered into the receiver.

3.2 Adding remote keyfobs

The receiver offers extended features for remote keyfobs configuration. It makes it possible to control either all channels, or selected ones only.

3.2.1 Adding remote keyfobs by means of programming buttons

The number of channels the remote keyfob will be able to operate depends on the number of button used for entering the remote keyfob into the receiver memory. For example, if the remote keyfob is entered with the use of the **PRG2** button, the remote keyfob will be able to operate the channel 2 (RX-2K) or the channels **2, 3 and 4** (RX-4K). The channel 1 will be unavailable to it. The active buttons of the remote keyfob will be 1 (RX-2K) or 1, 2 and 3 (RX-4K). The others will be inactive. Shown in the table below are channels available in the remote keyfob, depending on which programming button was used to enter the remote keyfob.

			Remote keyfob available channels	Remote keyfob button No.			
				1	2	3	4
Programming button used	RX-4K	PRG1	1–4	1	2	3	4
		PRG2	2–4	2	3	4	
		PRG3	3–4	3	4		
		PRG4	4	4			
	RX-2K	PRG1	1–2	1	2		
		PRG2	2	2			

Table 1. Channels available in the remote keyfob (blank fields mean inactive buttons).

To enter remote keyfob into the receiver memory, you should follow the procedure below:

1. Press the selected programming button – the LED starts blinking green.
2. Press any button on the remote keyfob – the LED starts blinking red.
3. Press again the remote keyfob button – the LED light changes to steady green. The remote keyfob has been entered into the memory.

Note: If the memory is already full or the remote keyfob is incorrect (from another manufacturer), the receiver will return to its normal status after the first press of the remote keyfob button.

3.2.2 Adding remote keyfobs by means of DLOAD10 program

In order to enter a remote keyfob into the receiver memory with the DLOAD10 program you should:

1. Press the "New transmitter" button. The new remote keyfob adding window opens.
2. According to the displayed command, press any button of the remote keyfob.
3. According to the displayed command, press the remote keyfob button again.
4. Select, how many channels is the remote keyfobs to operate (compare Table 1).
5. If required, enter the remote keyfob name.
6. Press the "Next" button to add another remote keyfob, or the "End" button to close the window. The new remote keyfobs will now be included in the list of operated remote keyfobs with the annotation: "New, to write".



Figure 4. Window for adding new remote keyfobs in the DLOAD10 program.

7. Press the "Write transmitters" to save the entered changes. If the changes are not saved, the receiver will not be able to handle the new remote keyfobs.

Changing the number of channels used by the remote keyfob as well as editing its name can be done at any moment by means of DLOAD10 program.

3.3 Removing remote keyfobs

Individual deletion of remote keyfob is only possible by using the DLOAD10 program. The programming buttons make it only possible to erase full content of the receiver memory, i.e. also the remote keyfob entered into it.

3.3.1 Clearance of receiver memory

In order to clear the receiver memory, you should:

1. Press and hold down the PRG1 programming button until the LED changes for a while the color of its light to red (which will occur after approx. 3 seconds).
2. Release the PRG1 button momentarily, then press it again and hold down until the LED starts blinking red (which will occur after approx. 3 seconds), signaling thereby that the receiver memory is being erased.

When the LED starts lighting steadily green again, the receiver is ready for programming new remote keyfobs.

3.3.2 Removing remote keyfobs by means of DLOAD10 program

To remove the remote keyfob from the receiver memory you should:

1. Click on the remote keyfob to be removed on the list of remove keyfobs.
2. Press the "Delete transmitter" button and confirm selection in the pop-up window.
3. Press the "Write transmitters" button to save the entered changes. If the changes are not saved, the receiver will continue handling the remote keyfob that were to be removed.

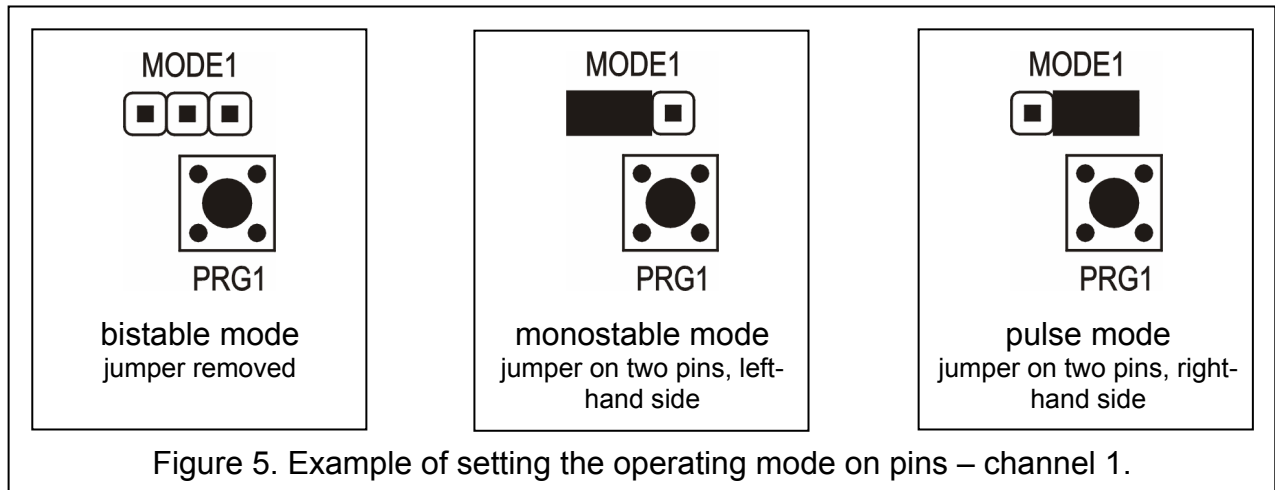
3.4 Programming relay operating mode

The relay can work in one of the three modes, depending on how the jumpers are set on pins.

Bistable mode (see Figure 5) – each press of remote keyfob button changes the relay status to the opposite one.

Monostable mode (see Figure 5) – relay activated for a preset time.

Pulse mode (see Figure 5) – relay activated for the time when remote keyfob button is pressed. After the button is held down for more than 30 seconds, the keyfob stops transmitting, thus preventing the battery discharge.



3.4.1 Programming monostable mode on-time

By default, the monostable mode on-time is preprogrammed at 5 seconds. It can be changed by the user and set within the range of **1 to about 250 seconds**.

In order to enter the new monostable on-time for the selected channel (relay) by means of the programming buttons you should:

1. Press the selected channel programming button twice – the LED will go out.
2. Press one of the active remote keyfob buttons (see ADDING REMOTE KEYFOBS) – the LED will start blinking green and red.
3. Having measured off the required time, press the remote keyfob button again – the LED light will turn into steady green.

You can change the monostable mode on-time in the DLOAD10 program by entering from the keypad a new value for the selected channel. To save the entered changes in the receiver memory, press the "Save times" button.

4. Interaction with the security system

Using the remote keyfob button you can arm/disarm the security system or trigger/clear an alarm. To be able to do so, connect the terminals of relays selected for control to the suitably preprogrammed control panel zones.

The SS receiver output can signal arming/disarming/disarming and alarm clearing by means of the remote keyfob. In order to ensure such signaling, it is necessary to connect suitably preprogrammed control panel outputs to the AR, AL inputs (the armed mode information output to the AR input, and the output signaling alarm to be canceled – to the AL input). The AR and AL inputs are monitored for 4 seconds since the remote keyfob was used. If there is a change in the status of the monitored inputs during that time, the SS output will trigger suitable signaling. The signaling is effected by shorting the SS output to ground for the pulse duration (0.16 second). The event can be identified by the number of pulses:

- 1 pulse – arming;
- 2 pulses – disarming;
- 4 pulses – disarming plus alarm clearing.

The SS output can be used e.g. to control a siren. Permissible current-carrying capacity of the SS output is 500 mA.

In the presented example, the channel 1 (relay 1) controls the control panel armed mode, while the channel 4 (relay 4) triggers the silent PANIC alarm. These relays operate in the pulse mode (jumpers suitably set on the MODE1, MODE4 pins) and feed the common ground (0 V) to the CTL, Z1 zones of the control panel. The remote keyfob must be entered

into the receiver memory by means of the PRG1 button. In order to arm/disarm the system, press and hold down the button No. 1 on the remote keyfob. To trigger the panic alarm, press the button No. 4. In order to avoid the risk of accidental alarm triggering, set a suitable sensitivity of the Z1 zone in the control panel (e.g. 3 seconds).

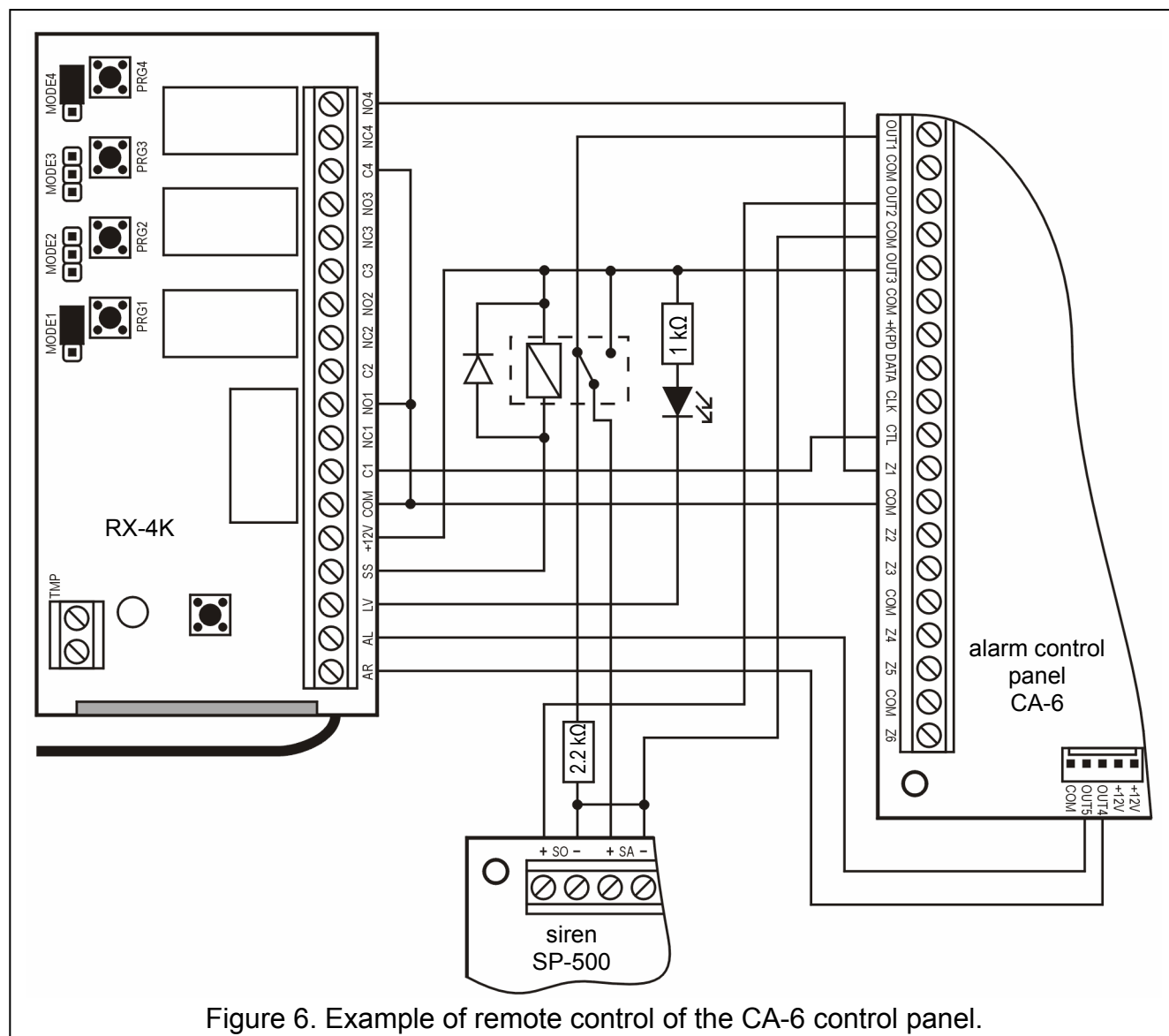


Figure 6. Example of remote control of the CA-6 control panel.

The SS output controls the relay, which supplies +12 V voltage to the +SA siren input and, consequently, generates a sound signal. At the moment of changeover, the OUT1 control panel output remains connected via the 2.2 kΩ resistor to the common ground in the siren, thus ensuring presence of the load on the OUT1 output, as well as cabling control when armed/disarmed states are being signaled. The resistor should be installed inside the siren housing.

The figure shows also a simple solution to low-battery indication in the remote keyfob (the LED is connected to the LV input).


The CA-6 control panel makes it possible to program the following parameters:

- OUT1 – alarm on for preset time (+12 V during the output on-time);
- OUT2 – alarm on until canceled (+12 V during the output on-time);
- OUT3 – power supply output (+12 V);
- OUT4 – armed mode indicator (type OC output – program +12 V during on-time);
- OUT5 – alarm on until canceled (type OC output – program +12 V during on-time);
- CTL – arming/disarming one or both partitions (FS 125);

- Z1 – 24H silent zone (using the remote keyfob button No. 4 will send a code to the monitoring station).

5. Specifications

Range in open area	up to 100 m
(an obstacle between the transmitter and the receiver will reduce the device operating range)	
Number of controlled outputs	4
Supply voltage, rated	12 V DC $\pm 15\%$
Current consumption, minimum	approx. 13 mA
Current consumption, maximum	approx. 65 mA
Current-carrying capacity of relay contacts at voltage of 24 V DC	2 A
Adjustment range of changeover time in monostable mode	1 to 255 s
Current-carrying capacity of LV (OC) output	50 mA
Current-carrying capacity of SS (OC) output	500 mA
Operating frequency range	433.05–434.79 MHz
Operating temperature range, receiver	-10 to +50 °C
Operating temperature range, transmitter (remote keyfob)	-20 to +55 °C
Housing dimensions	72x118x24 mm
Type of remote keyfob battery, P-2 / P-4	23 A 12 V
Weight:	
RX-2K	139 g
RX-4K	134 g

DECLARATION OF CONFORMITY		C E 0681
Product: RX-2K – remote controller set RX-4K – remote controller set	Manufacturer: SATEL sp. z o.o. ul. Schuberta 79 80-172 Gdańsk, POLAND tel. (+48 58) 320-94-00 fax. (+48 58) 320-94-01	
Product description: Radio remote controller set operating at 433 MHz with Keeloq code hopping system, equipped with 2 or 4 controlled outputs. The set consists of a receiver powered by 12 V source and battery operated P-2 or P-4 keyfob transmitters. This product can be used for remote controlling of low voltage equipment, such as intruder alarm panels.		
This product conforms to the following EU Directives: R&TTE 1999/5/EC		
This product meets the requirements of harmonized standards: R&TTE: EN 300 220-1: v.1.3.1; EN 300 220-3: v.1.1.1; EMC: EN 301 489-1: v.1.4.; EN 301 489-3: v.1.4.1 LVD: EN60950-1:2001		
Notified body taking part in conformity evaluation:		Identification No.: 0681
Gdańsk, Poland 2004-05-06	Head of Test Laboratory: Michał Konarski 	

SATEL sp. z o.o.
ul. Schuberta 79
80-172 Gdańsk
POLAND
tel. + 48 58 320 94 00
info@satel.pl
www.satel.eu