Operation manual
MAX radio receiver
and 'Programator USB'
computer program

- **user-friendly operation**
- **data archiving**
- **easy access control**

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Basics

ZSP remote control system is the group of electronic devices, based on microprocessors, with functional possibilities you will find nowhere in this kind of devices.

Control system consists of MAX receiver and all radio remote controls Key Automation.

Basic applications of MAX are controlling gates, rollers and external devices like lightening, alarm systems, electromagnetic locks, etc.

The receiver is very flexible and the possibilities of using depend on customer's ideas and needs.

Certificates

All MAX devices are certified according to European standards and are CE marked.

1. MAX radio receiver

1.1. Introduction

MAX radio receiver is, thanks to use of the first-class electronic components, characterized by great reliability and at the same time it is universal and can have lots of uses. Thanks to innovative, fully programmable functions it lives up to users' expectations.

MAX allows to receive the signals from KEY remotes and sending them through the USB port to PC. Programming of the receiver should be done using 'Programator USB' application.

Programming can also be done using the interface that allows to program the receiver without turning on PC. Functions are displayed on the LED screen.

1.2. Technical data

- Dynamically variable encryption - KeeLoq$^®$ - provides high class security;
- Operating frequency: 433,92 MHz;
- Receiver distinguishes up to 700 remotes all series, each of them addressable;
- Four separated, relay outputs of NO/NC type, working in mono-, bistable or momentary mode, with maximum load for each output - 1A/24V (AC/DC);
- Turn on time in monostable mode from 0,1 sec. to 110 min with resolution of 0,1 sec, bistable mode remembers last state before power down;
- PC connectivity (USB port). Permissible length of the wire connecting PC with receiver is 5m (1m wire is installed with the receiver). Number of MAX receivers connected to PC depends on number of USB ports;
- EEPROM memory cloning;
- Receiver's PIN code secures the device from changing its settings by an unauthorized person;
- EEPROM receiver memory is situated in the socket which eases servicing (possibility of making extra copies, etc.);
- 'Watch dog' system shielding the device from electromagnetic distortions;
- Fully configurable outputs-buttons mapping with access control;
- Full view over the remote controllers' list with ability to change or delete any remote (even without its presence) without changing the settings for any other remotes;
- Terminal for external aerial coaxial cable;
- Receiver is in plastic, splash-proof enclosure, with a board to turn down the wires to.
- Supply voltages: 12V – 24V AC/DC (switching converter is built in) or by USB port rated current of 120mA;
- Working temperatures of the receiver are: -20 C / +55 C;
- Dimensions: 144 x 60 x 30 mm.

1.3. MAX installation and description

Installation should begin with the set up of the receiver. MAX receiver consists of main board and splash-proof enclosure. The main board (fig.1.) have terminal blocks for connecting the power supply and peripheral equipment. Working temperatures of the receiver are -20C - +55C at normal humidity.

Receiver can be supplied with power by DC or AC of 12V – 24V (converter is built-in) or by USB port. Supplying is signalized by glowing of the dot on the display. The receiver has four outputs: NO (normally open) NC (normally closed). Red LEDs are showing actual operating state (they glow as long as the corresponding channel is on).

To make the radio range optimal remember that:
- neighborhood of the energetic devices and metal elements will shorten the range;
- radio interference from other sources will shorten the range;
- it's best to avoid concrete walls for mounting the receiver;
- it's best to remove old used batteries from the remotes;
- it's best to mount the receiver as high as possible.

NOTE!
Pay attention to correctly attach the interface board to the receiver's main board!
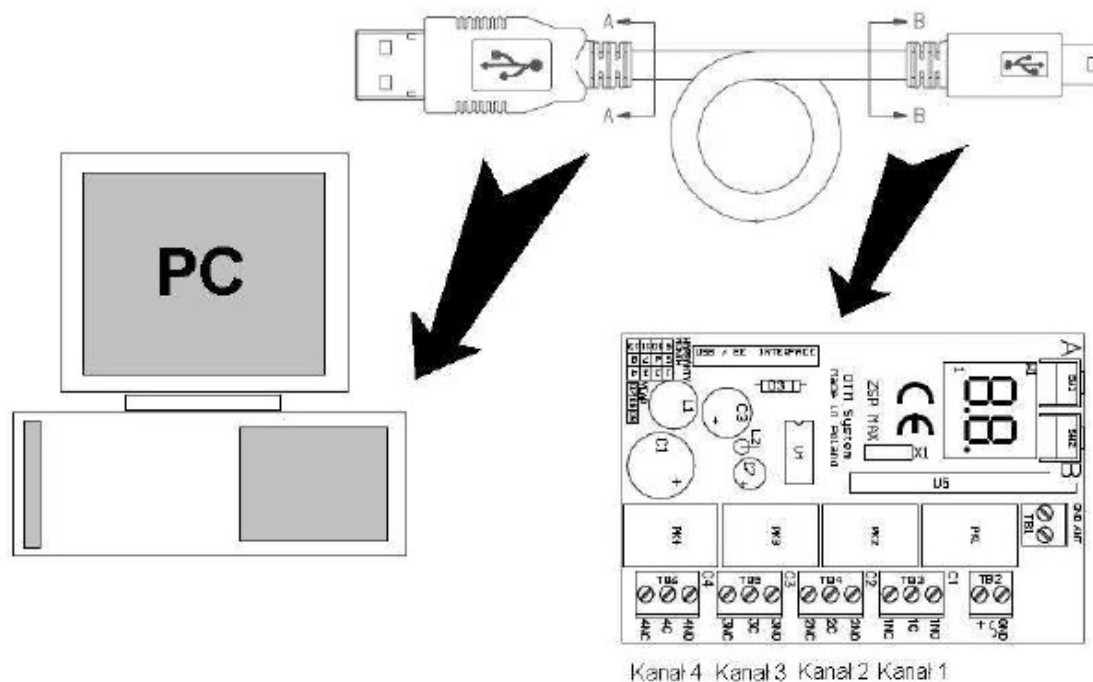

Fig.1. MAX installing diagram

1.4. Electrical connections description

1.4.1. Electrical supply

It is possible to supply the receiver only by USB port. Then there is no need to use any other supply. The receiver can be supplied with voltages from 12V to 24V AC/DC.

1.4.2. Receiver's outputs (1,2,3,4)

Receiver's outputs 1,2,3,4 have three terminals: NO (normally open), NC (normally closed) and CO (common) which are outputs for the relays (fig.1.). Maximum ratings for these contacts are 1A/24V (AC/DC). For normally open control inputs use NO and CO connectors. For normally closed control inputs use NC and CO.

1.4.3. USB connector / EEPROM interface

The pin connector on the main board may be used to connect PC (USB interface and cable needed) and to clone (copy) memory (B700 needed).

2. Computer program – the 'Programator USB'

2.1. Minimum system specification

- A computer with MS Windows XP/NT equipped with USB port and a mouse;
- MAX radio receiver and at least one ZSP type remote controller.

2.2. Program's capabilities

The application enables to program MAX receiver, changing the setting of its channels (mono-, bistable or momentary mode), adding/removing the remote controllers, configuring them, the import/export of the receiver's memory (remotes and channels settings) to PC or EEPROM memory of the receiver, adding detailed descriptions to registered remote controllers, recording events and printing data sheets.

2.3. To start the program

Plug in the MAX receiver to the PC using USB cable with the interface. The operating system will detect the new device and open the 'Found New Hardware Wizard'. Install the USB driver MAX1_USB_NTXP.inf by providing the access path. Restart your PC after installation.

The first execution of the application consists of copying all the files that are present on the CD. Then run the file called 'Programator.exe'. With next uses of the application you don't need to copy the files again.

In the application's directory you may find documents with following extensions:
- 'exe' – application's executable file
- 'log' –configuration file
- 'txt'- configuration file, editable in any text editor
- 'pdf' – application help file (this document)
- 'zsp' –receiver's exported memory files or recorded MAX data sheet

Check in the system's properties->device manager which port has been assigned by the driver. Then choose the COM port with the proper number from the drop-down menu in the application. After those operations the software is ready to work.

2.4. User interface

The program runs in graphic windowed mode. The interface is maximally simplified for the ease of use.
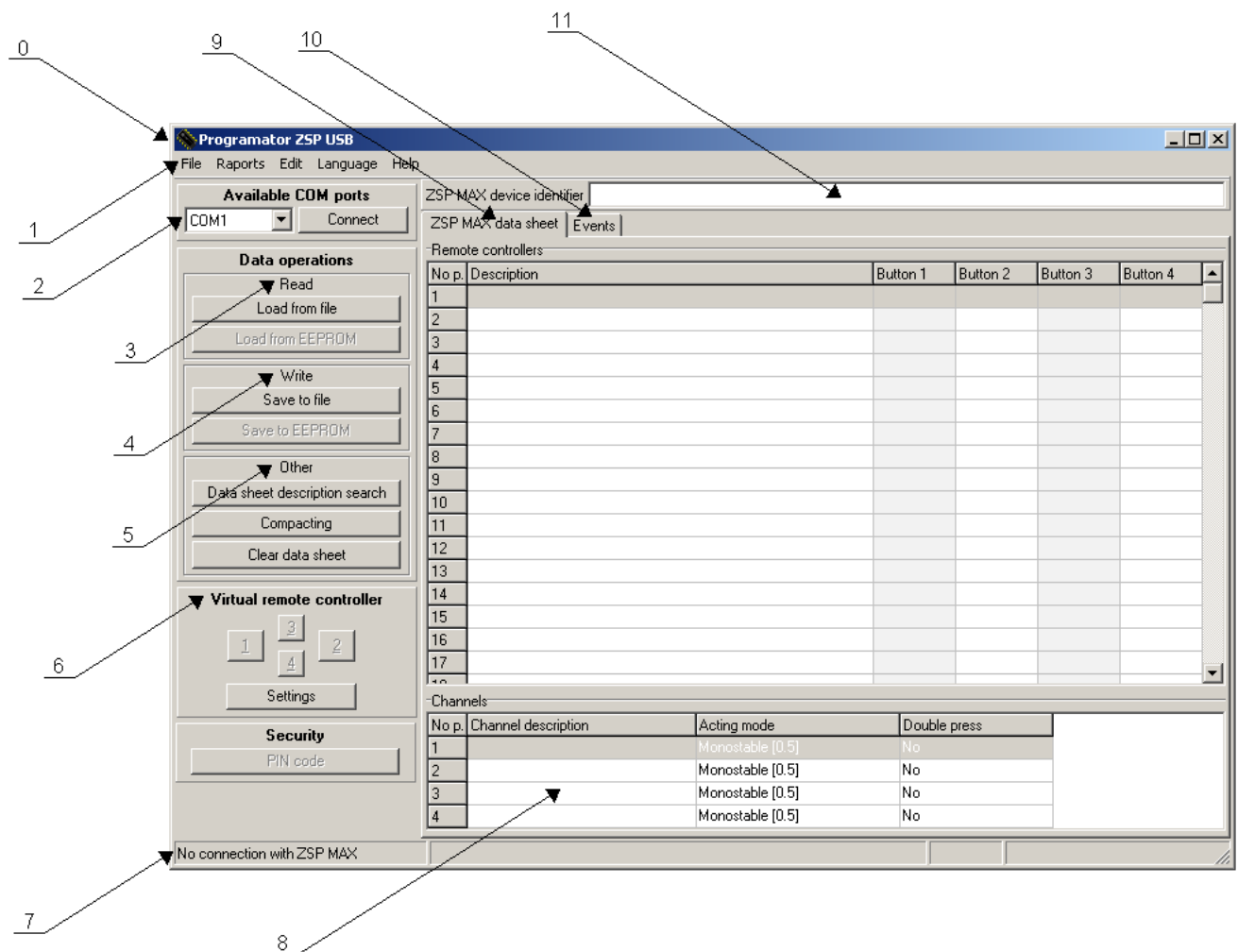
Main window contents:
0. Main form of 'Programator USB'.
1. Main menu with options: File, Reports, Edit, Language and Help.
2. Connection panel, used to connect to MAX receiver via chosen COM port.
3. Data operation panel, section 1: lets the user load the settings form file or EEPROM memory of MAX receiver to settings data sheet inside the application.
4. Data operation panel, section 2: lets the user save the settings to file or EEPROM memory of MAX receiver from settings data sheet inside the application.
5. Data operation panel, section 3: lets the user link the entries to their description, compact the data sheet of remote controllers settings and erase the data sheet.
6. Virtual remote controller.
7. Status bar, divided into three sections. First one, from the right, shows the connection status with MAX receiver. Second section contains hints for some of the program's functions. Third part is an information about data sheet savestate.
8. Part of MAX settings data sheet, it contains information about MAX channels configuration. Those information are: channel description and operation mode.
9. Part of MAX settings data sheet, includes a table with information about every remote controller added to the data sheet. For each controller there is: controller's number in memory, controller's user description and controller's button mapping (each button has a separate channel mapped to it). The table is 700 positions long.
10. Events tab, presenting subsequent operation events from the MAX receiver connected to the computer. In the table, there is, one by one:
    event date,
    event time,
    remote controller's number,
    remote controller's description,
    channel set (or channels) on the receiver and button(s) used for that on the remote controller,
    individual remote controller's serial number.
11. Text field with the settings description or name. Any string can be entered there, such as address, under which the receiver is being used.

2.5. Application configuration

For the ease of use it is advised to set up the application. After starting it, go to the upper left corner, open the menu 'File' and select 'Options'.

After having chosen the 'Options' element the options window appears. This window is divided into couple of sections which are responsible for the program configuration.
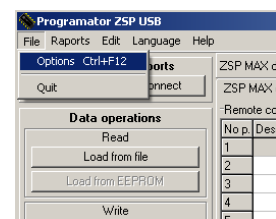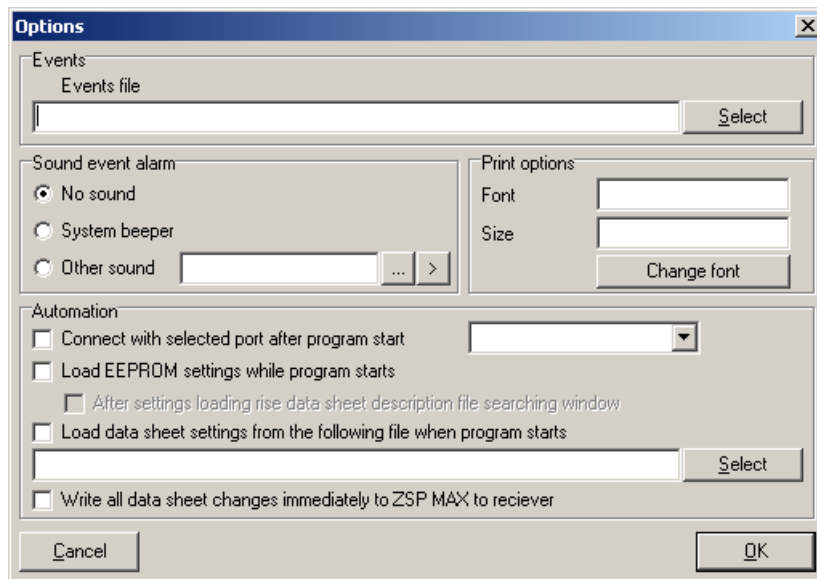
In the section 'EVENTS' you can enter the path to a file, where the receiver events are being stored. After pressing the 'SELECT' button you need

to manually enter the filename (name 'logi.txt' in the example) and choose, from the drop-down list below, a file format. Or you can just pick the existing file.
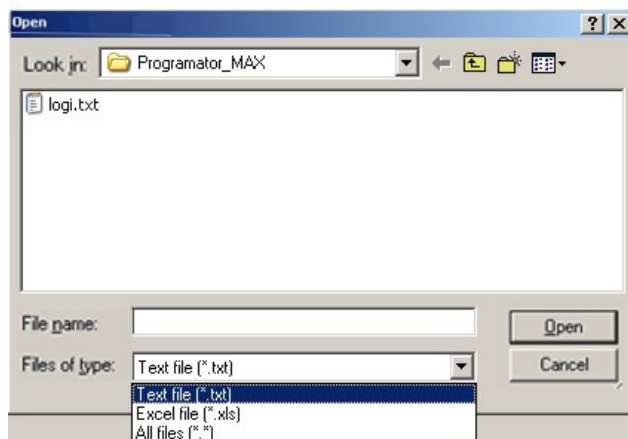

After having confirmed those actions with the 'OPEN' button the full path to the file and its name is being shown in the 'EVENTS' section of the configuration window.

Next section of the configuration window lets you choose a sound and whether it should or not be played with every

event taking place in the receiver. Further to the right there is a panel which allows to set a formatting of a generated rapport form the receiver. You can set up a style and size of font used.
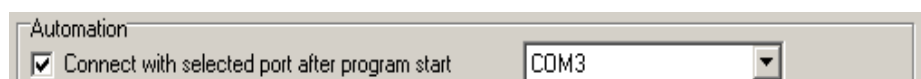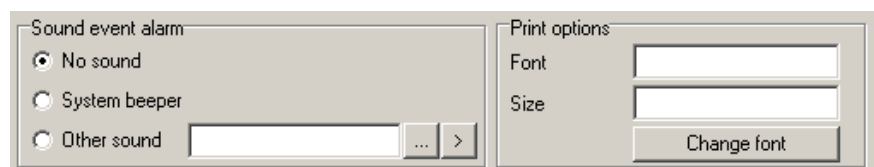
In the next section of the window it is possible to set up some operations to be executed after the start of the program. You can choose a port to use to communicate with the receiver and check the option to use this port each time the program is being started.

You can also check the option that the program automatically loads the settings from the MAX receiver's EEPROM. You can also tell the program, that after having read the memory it opens the window dialog to search for a file containing remote controllers' and channels' descriptions.
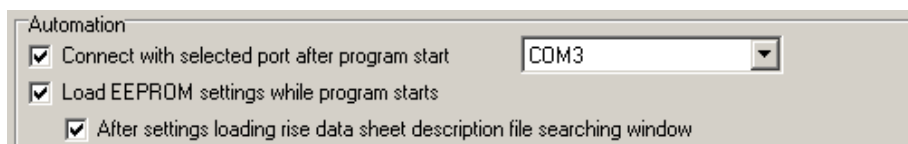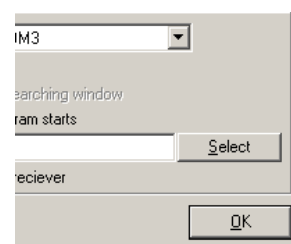
It is also possible to skip the EEPROM memory reading and load the data sheet settings from a file pointed out by the path.
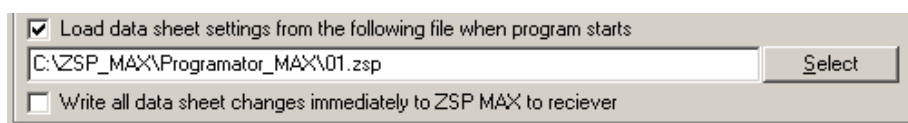
The last option is to set the program to immediately save to MAX receiver any changes made in data sheet.
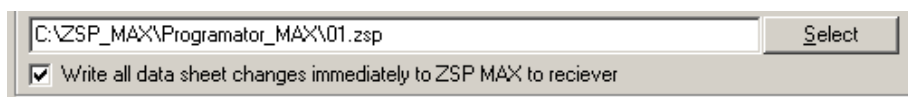
To apply the changes and close the window press the 'OK' button.

2.6. Connecting to the receiver

After the application starts, to connect to the receiver, first it is needed to choose a port to which the MAX receiver is physically connected and press the 'CONNECT' button.

If the application has been set up to automatically connect to the MAX receiver after startup there is no need to perform this step. You can verify the status of the connection in the lower left corner of the main window.

It is also possible to work with the program without connecting to the MAX receiver, although you will be limited to operate only on data stored in a file.

2.7. Adding a remote controller

To add a new remote controller to data sheet you need to double-click a free slot in the remote controllers section in the

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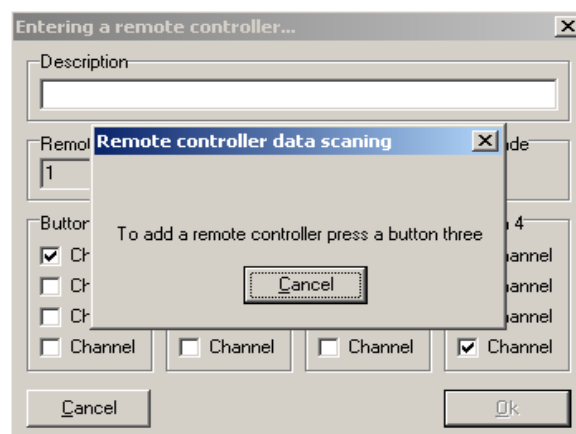
'MAX data sheet' tab. A dialog window called 'Entering a remote controller' will arise. Next, you should follow the instructions shown in 'Remote controller data scanning' sub-window. Further instructions can be found in next chapters.

2.8. Remote controller configuration

After adding a new remote controller, a configuration dialog window is being shown. First field is a description field where you can enter data such as name of the user. Then you can change the channel button mapping and stop the controller from being copied by disabling the simple add function.

The same type of window can be evoked by double-clicking the existing controller's entry or right-clicking on the controller's entry and selecting 'Edit remote controller' command.
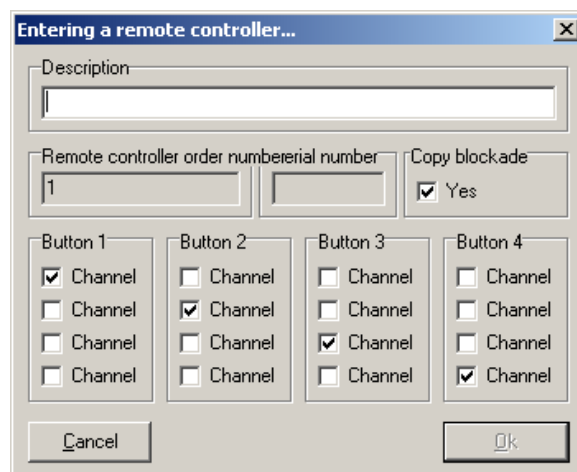
IMPORTANT !!! Don't forget to save any changes to receiver's memory before exiting the program (unless autosave option is turned on).

2.9. Moving the remote controller

To move the remote controller within the data sheet first right-click the desired remote controller's entry on the data sheet and then choose the 'CUT' option. All information concerning given controller will be saved to the program's clipboard.

After having chosen the new desired place for the controller data you should right-click that place and choose the 'PASTE' command.

To move several controllers at once first you have to select them by left-clicking on them while having the 'Ctrl' button on the keyboard pressed-down. Then to move them follow the exact guidelines as when only one controller is concerned.

IMPORTANT !!! Don't forget to save any changes to receiver's memory before exiting the program (unless autosave option is turned on).

2.10. Deleting the remote controller

To remove a remote controller from the data sheet press the right button of the mouse on the controller of your choice and select the 'Delete remote controller' function.
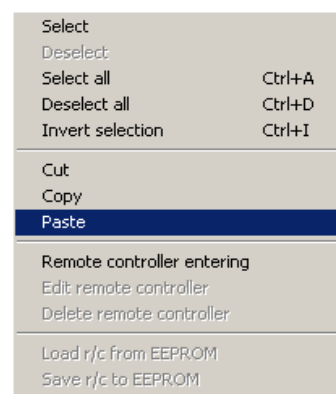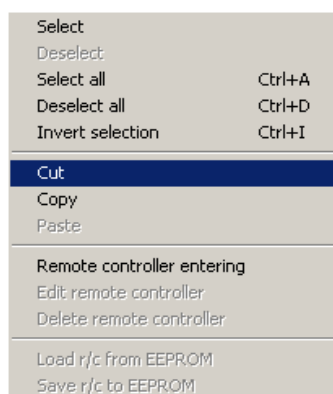
IMPORTANT !!! Don't forget to save any changes to receiver's memory before exiting the program (unless autosave option is turned on).

2.11. Receiver's channel configuration

The program allows to set up any mode for channel operation and its operation time. The four channel configuration is presented as four rows, as seen on the picture here.

No p.	Channel description	Acting mode	Double press
1		Monostable [0.5]	No
2		Monostable [0.5]	No
3		Monostable [0.5]	No
4		Monostable [0.5]	No

To change the values double-click the desired field. Each channel can have its own description, such as: 'main gate barrier control'.

2.12. Data operations

There are three levels of data storage implemented in the program: EEPROM memory of the MAX receiver, file on the disk or the settings data sheet in the program.

EEPROM memory in the MAX receiver contains information about previously registered remote controllers, their button configuration and the settings concerning simple copying of the remote controller. It also contains information about the operation mode of the receivers' channels and their operation time. However, the EEPROM memory does not contain the description of all those information.

To achieve this, store the data in the file on the hard drive (or any other kind of data storage device recognized by the operating system). In that way, in addition to any other data mentioned above, the descriptions are being stored. Therefore it is important that the file name could be associated with the receiver, by describing its operation place, for instance.

When moving EEPROM memory from the MAX receiver to a MAX receiver, which is completely compatible with it, it is necessary to reflect any data changes in a stored settings file. If any changes in the receiver are being made without synchronization with the appropriate settings file (as in case that the changes were made in the EEPROM but were not saved to file or were performed via the interface on the receiver) data mismatch may occur.

Program 'Programator USB' is capable of searching for settings' descriptions compliance using the 'Data sheet description search' function – it allows the choice of the most compatible data. (more details in chapter 2.13)

If it is certain, that the data in the file is fully coherent with the data in the EEPROM memory – while editing this data in 'Programator USB' application – there is no need to read them twice, just load it from file.

The program's settings data sheet contains the information that are only available while the program runs. If the application is terminated and the data has not been saved it will be lost. The MAX receiver works with the data stored in its own memory only, so it is important to copy any changes there from the data sheet to make them work.

To the left part of the main window, called 'DATA OPERATIONS', it is possible to perform the actions on the data stored in the settings data sheet, file or receiver's memory. The subsequent controls allow you to:

LOAD FROM FILE – you can load to the data sheet the descriptions and settings for the MAX receiver stored in file.

LOAD FROM EEPROM – this allows to load to the data sheet the settings for the MAX receiver stored in its internal memory. To add the descriptions to them, use 'DATA SHEET DESCRIPTION SEARCH', which is mentioned below.

SAVE TO FILE – it allows to save the descriptions, settings and the remote controllers visible in the data sheet to the file.

SAVE TO EEPROM – saves the settings and the remote controllers visible in data sheet to the EEPROM memory of the receiver. To save the descriptions as well, use 'SAVE TO FILE' command, described in section 2.13.

DATA SHEET DESCRIPTION SEARCH – find the file containing the most compliant data to the data already entered in the data sheet (information about the remote controllers and the MAX receivers' channels, which were just loaded from its memory). More instructions in the following chapter.

COMPACTING – organizes the data present in the data sheet by eliminating the spaces between the remote controllers' entries.

CLEAR DATA SHEET – erases all information present in the settings data sheet.
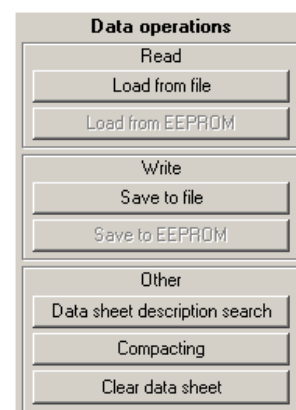
2.13. Data sheet description search

Data operations mentioned in the preceding chapters have indicated that there might be a need to link the settings from the MAX receiver's EEPROM memory to the information stored in the file on the computer.

Those two methods contain the same amount of information, only that EEPROM memory cannot contain the descriptions of entered remote controllers, descriptions of channels and the receiver identification. To link those two sources of information in one, maximally compliant entity, the data description search function is available in the application.

After having chosen the 'DATA SHEET DESCRIPTION SEARCH' button situated in the program's main window, the 'Settings file searching settings…' window
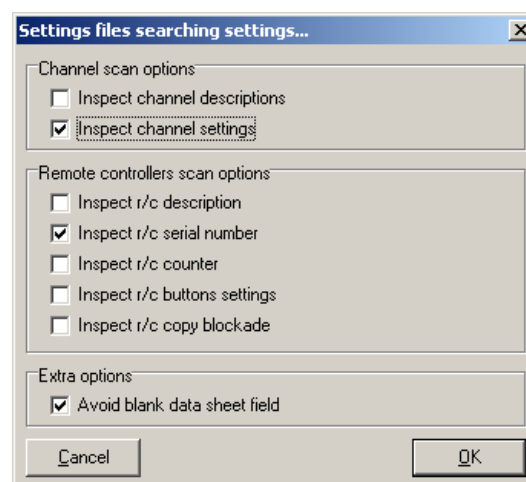
appears. You can choose according to which criteria will the application search for the compliant files. The possible options are presented on the picture next to.

After accepting with the 'OK' button the new window called 'Select items to search description for settings sheet' opens. Choose the group of files to verify or its location by using the add/remove controls situated in the middle of the dialog window.
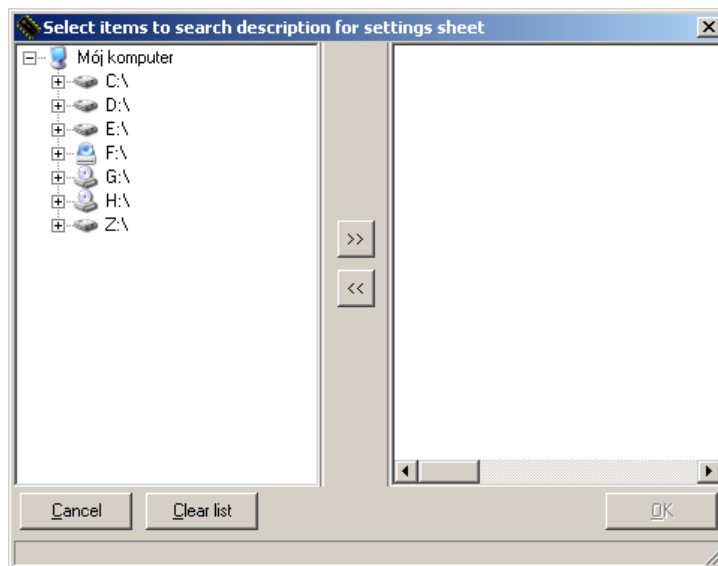
After accepting with the 'OK' button a list with most compliant files is being shown. The compliancy level is represented with percentage.
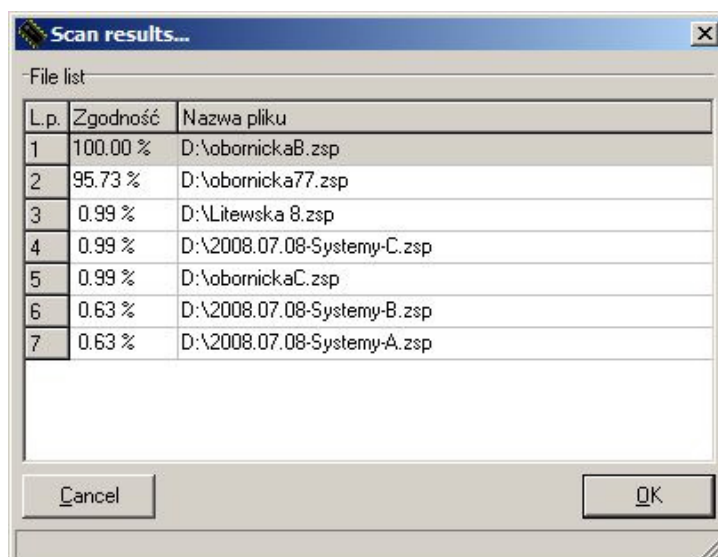

After choosing the file, the application may ask you to choose the right information source in case that the data present in settings data sheet differs from the one being loaded. The chosen information will be added to the data sheet. Information from the second source will be discarded. In practice, the default search criteria give the most coherent results.


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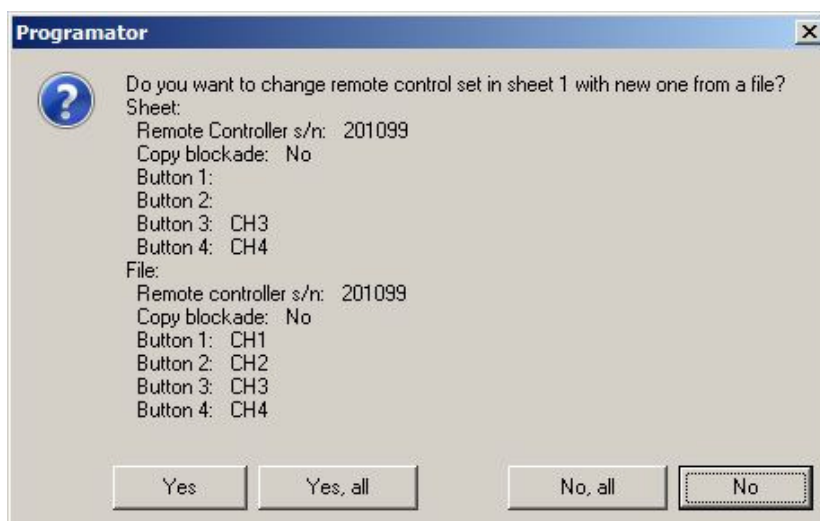
2.14. Virtual remote controller

Virtual remote controller, just like the functions from the previous chapter, is the software solution to control MAX channels by pressing buttons in the program. You can set up the virtual remote to work in the same way as the real remote controller. Every button can control one or more of the receiver's channels.
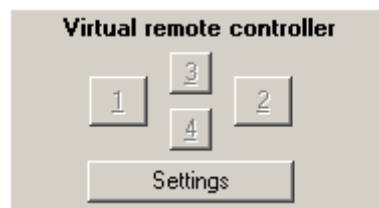
2.15. Events history

During the configuration of the program, the access path with receiver's history of events has been set up. The XLS file by default is opened by MS Excel, but it can also be viewed with Notepad in MS Windows. In the file you may find the date and time of every event, number of the remote that was used, number of the button and channels with descriptions. You can view how the receiver is working by looking at the 'EVENTS' tab. New event is signaled by the flashing description field or by sound signal that you may define in program's options.
After closing the 'Programator USB', events are no longer being registered.
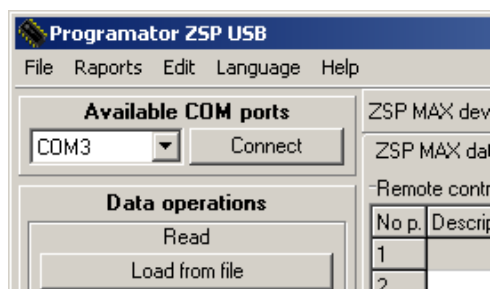
2.16. Printing the data sheet

There is a 'Reports' option in the menu, where you can print the MAX data sheets. The data sheet consists of information about receiver's identifier, remotes and channels configuration (see illustration below).

Arkusz Nastaw ZSP USB
Sejm RP, ul. Wiejska 6, 00-902 Warszawa

Ustawienia pilotów

Nr p.	Id pilota	Opis pilota	Przyc. 1	Przyc. 2	Przyc. 3	Przyc. 4	Blok. kopiow
1	33076	Aszkiełowicz Mieczysław	K1	K 2	K 3	K 4	tak
2	31535	Ajchler Romuald	K 4	K 3	K 2	K1	tak
3	31530	Błochowiak Anita	K1	K 2	K 3	K 4	tak
4	31510	Borowski Marek	K1				tak
5	31531	Beger Renata	K1	K 2	K 3	K 4	tak
6	39153	Celiński Andrzej		K 2			tak
7	31547	Ciemniak Grażyna	K1	K 2	K 3	K 4	tak
8	39149	Cieślak Mieczysław			K 3		tak
9	31546	Dorn Ludwik	K1	K 2	K 3	K 4	tak
10	31500	Dyduch Marek				K 4	tak
54	39608		K1	K 2	K 3	K 4	tak

Ustawienia kanałów

Nr p.	Opis kanału	Tryb pracy [czas w sek.]
1	brama główna	Monostabilny [0.5]
2	hotel poselski	Monostabilny [0.5]
3	brama północna	Monostabilny [0.5]
4	awaryjny wyjazd	Monostabilny [0.5]

3. Examples of use

3.1. Data archiving

'Pragramator USB' allows the user to record and read data sheets from the PC file and from the receiver's EEPROM memory. Such operations allows to transfer data from one storage place to another. Receiver's EEPROM memory is situated in the socket on the main board (see illustration next to). The memory modules in each receiver are compatible with one another, so it is possible to directly transfer the memory modules between them.

This allows to make a safety copy of data. It is possible to create a copy saved in the file or in the EEPROM memory. You can use the copy of EEPROM from one device directly as the data sheet for another receiver, which is controlled partly or fully by the same remotes.

Exchanging EEPROM memory modules start with switching off the receiver's supply. Use small, flat screwdriver to pull out the memory chip from the stand. Assembly and disassembly should be conducted with great care to avoid damaging memory's silicon enclosure or bend its connectors. While assembling EEPROM memory in the socket of the receiver's main board, align the cut on the side of the memory modules to the one in the stand (illustration next to).

3.2. Easy access control

Buttons to control receiver's channels can be set up freely in every registered remote ZSP. it allows its rights control, including access denial.
User-friendly interface of 'Programator USB' enables to change the channels on the buttons. Additionally, 'EVENTS' tab informs about receiver's current work. Every last event is signalized visually or by sound.

User who is controlling the access may use the Virtual remote controller to control receiver's channel, for e.g. after accepting the request of the entrance form somebody, which action has been registered as the last event.

Every event is archived in the MS Excel file, thanks to which it is easy to convert data sheets as and when it is needed.