

Multiswitch programmer PC102W

1. Product description

The PC102W - single cable multiswitch programmer (in the text - programmer) is useful instrument while configuring and troubleshooting SAT IF distribution system built on dSCR multiswitches based on new digital channel stacking components.

The application software "dSCRmaster" for Windows operating system PCs allows simply change parameters of the multiswitch: operating mode (static or dynamic), frequency plan for static mode, frequency and bandwidth of user bands for dynamic mode, output power level of each user band carrier and etc.

Service mode of the multiswitch could be switched on for quick finding the problem during installation work. In an internal memory four different configuration files can be stored (prepared on the PC) and send to the multiswitch by pressing dedicated buttons on the PC102W.

The programmer can feed DC power for the multiswitch using the external AC/DC power adapter and allows parallel connection to a PC over USB cable. The remote Wi-Fi access allows to modify parameters of dSCR multiswitch from any device (tablet, smartphone, laptop, PC) using web browser. The PC102W, wirelessly connected to the WiFi access point, can be used for remote control and monitoring of the multiswitch.

The programmer is supplied with an external AC/DC adapter (PS202F). An application SW "dSCRmaster" is available from the Web.

2. Safety instructions

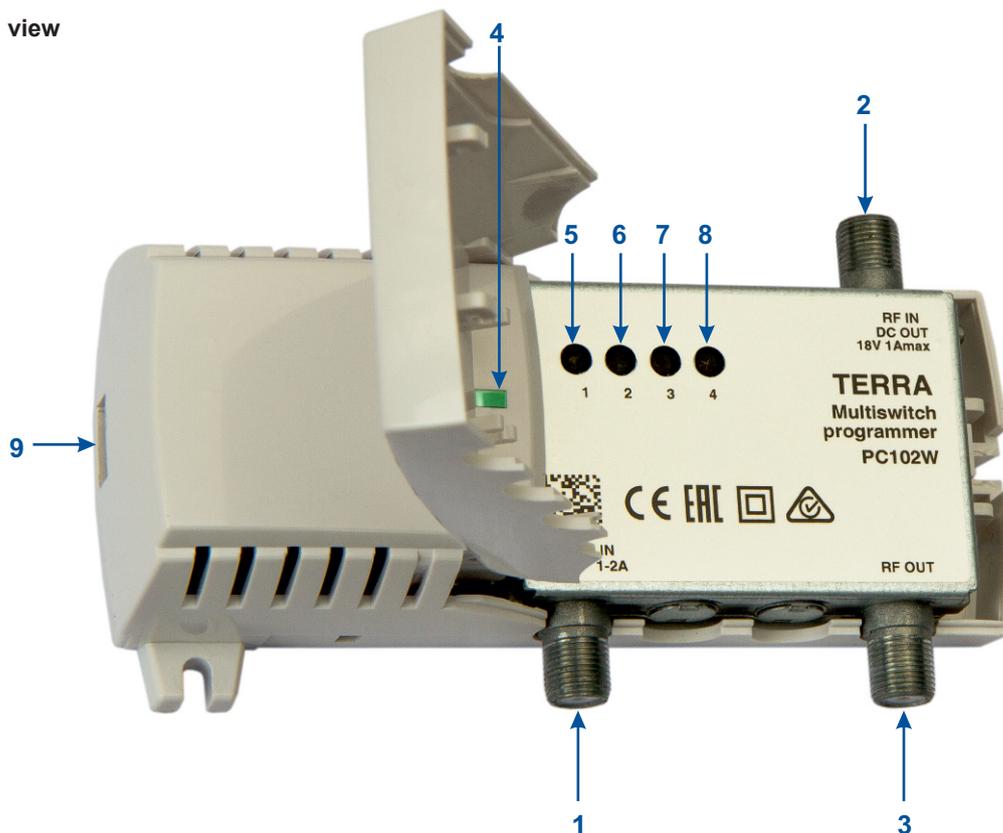
Installation of the programmer must be done according IEC60728-11 and national safety standards.

Any repairs must be made by qualified personnel.

To avoid the electric shock follow these instructions:

- Do not expose this programmer to moisture or splashing water and make sure no objects filled with liquids, such as vases, are placed near or on the unit.
- Avoid placing the programmer next to heat sources such as central heating components or in areas of high humidity.
- Keep the programmer away from naked flames.
- If the programmer has been kept in cold conditions for a long time, bringing it into a warm environment may cause condensation, so allow it to warm up for no less than 2 hours before plugging into the mains.
- Ventilation should not be impeded by covering the programmer, such as newspapers, table-cloths, curtains etc.
- The programmer must be fixed with steel screws \varnothing 3.5-4 mm. The screws are not included in a package.
- Always allow 10 cm of free space from the top, front and bottom of the unit to enable any heat to be dissipated.

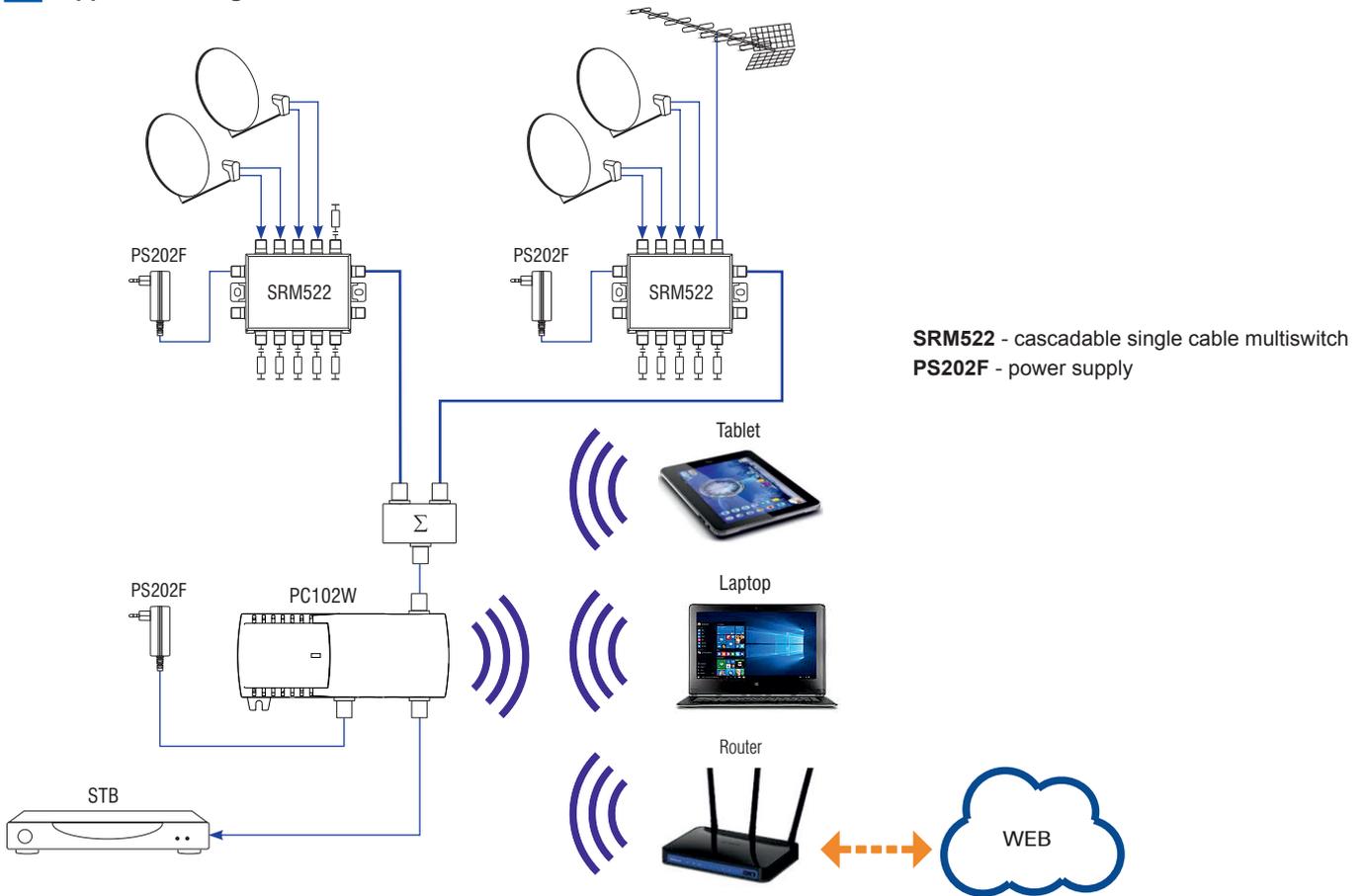
3. External view



1. **DC IN** - DC power voltage input 20V 1-2A from AC/DC adapter.
2. **RF IN** - RF input from controlled multiswitch, DC power voltage 18V 1A max. to the multiswitch.
3. **RF OUT** - RF output to receiver, DC pass from receiver to RF input.
4. Status LED. Blinks green two times per second with 1/2 duty cycle when Wi-Fi is connected, blinks green two times per second with 1/10 duty cycle, when no Wi-Fi connection available, blinks green ten times per second during communication with the multiswitch, glows red after communication error with the multiswitch.
- 5-8. Buttons for sending a stored configuration to the multiswitch. Button number corresponds to the stored configuration number.
9. Micro USB connector for PC connection.

Figure 1. External view of the programmer

4. Application diagram



5. Installation instructions

Read the safety instruction first.

Connect 20V AC/DC adapter to DC IN input of programmer. The green status LED [4] should blink with 1/10 duty cycle.

Open WiFi connections window in your Laptop. WiFi device with SSID of **PC102W** should appear in the list. Click "Connect". The connection password is **1234567890**. After connection the green status LED [4] should blink with 1/2 duty cycle.

Open the Web browser and enter **192.168.3.1** in the address bar. A web page of PC102W should appear.

Connect multiswitch output to RF IN connector of programmer. Open "Status" menu in the web page. Tables with information about the connected DSCR multiswitch should appear.

In case of connection trouble to the PC102W try to reset Wi-Fi settings to default values pressing the "4" button during power on.

6. Operating

6.1 Initial Web interface screen

The first screen that appears when the module accessed is the "Main" window, which gives general information on the device. Also this page can be accessed after selection of "Main" line in the main menu [1].

The screenshot shows the web interface with a menu icon [1], a dropdown menu [2] showing 'CONF. #1', a configuration name 'Dynamic 2x16' [3], and a toolbar [4] with buttons: Save, Set, Get, Export, Import, and Multisw. upgrade. Below is a table of output channels.

No	Type	Output frequency, MHz	Bandwidth, MHz	Level, dB	PIN	EN50494 UB 1	EN50494 UB 2	EN50607 UB 1	EN50607 UB 2	SKY UB 1	SKY UB 2	Status
1	DYNAMIC	1210	40	4	1	1	OFF	1	OFF	OFF	OFF	✓
2	DYNAMIC	1420	40	4	2	2	OFF	2	OFF	OFF	OFF	✓
3	DYNAMIC	1680	40	4	3	3	OFF	3	OFF	OFF	OFF	✓
4	DYNAMIC	2040	40	4	4	4	OFF	4	OFF	OFF	OFF	✓
5	DYNAMIC	985	40	4	5	OFF	OFF	5	OFF	OFF	OFF	✓
6	DYNAMIC	1050	40	4	6	OFF	OFF	6	OFF	OFF	OFF	✓
7	DYNAMIC	1115	40	4	7	OFF	OFF	7	OFF	OFF	OFF	✓
8	DYNAMIC	1275	40	4	8	OFF	OFF	8	OFF	OFF	OFF	✓

Figure 2. Main window

[5]

In the left upper corner of every configuration window you will see a main menu icon [1]. Using it, you can switch between the different configuration menu. The programmer can store four different configurations of the multiswitch. In the configuration drop down [2] you can select corresponding configuration. After this selection a configuration parameters table [5] will show parameters of selected configuration. You can enter a name for configuration in the edit box [3]. The group of buttons [4] is used to perform various operations with the contents of configuration parameters table [5].

Description of the buttons.

“Save” - save changes made in the configuration parameters table [5] to the memory of programmer.

“Set” - send parameters to the multiswitch. **Note:** when parameters are changed in the table [5], always press the “Save” button before sending parameters to the multiswitch.

“Get” - receive parameters from the multiswitch. After receiving, parameters will be shown in the configuration parameters table [5]. You can save received parameters by pressing the “Save” button.

“Export” - export parameters to file. A dialog with offer to “open file” and “save file to disk” will be opened. Choose the “save file to disk” option.

“Import” - import parameters from file. Exported parameters can be imported back to the programmer. Press onto “Click to select file” button (see Figure 3 “Import parameters”) to select exported file.

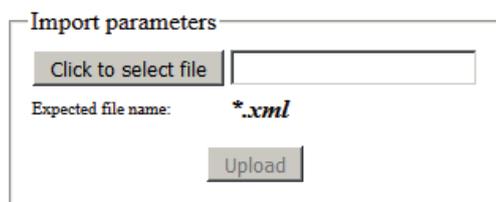


Figure 3. Import parameters

Press “Upload” button to send the file to the programmer. After importing, parameters will be shown in the configuration parameters table [5].

“Multisw. upgrade”- firmware upgrade of the connected multiswitch. Press the “Click to select file” button and select firmware binary file. If valid file was selected, a version number of new firmware will be displayed. Otherwise an error message will appear. Press the “Upload” button to upload new firmware to the device. Upload progress bar will appear and may take tenths of minutes to upload. Please be patient. Avoid power supply of the multiswitch interruption when a programming process is going on.

6.2 Multiswitch configuration parameters table

This table is shown in Figure 2 [5].

The multiswitch have 32 user bands. One row of table contains parameters of one user band.

Description of configuration parameters table columns:

“No” - number of user band.

“Type” - select type of the user band. Description of user band types:

“OFF” - user band not used.

“STATIC” - user band used in static mode. Input and output parameters of user band are fixed.

“DYNAMIC” - user band used in dynamic mode. Input parameters of user band are dynamically controlled by receiver. Output parameters are fixed.

“TEST TONE” - a test tone generated with specified output frequency on this user band.

The enabled columns of table depends on the selected type of user band.

When “OFF” type is selected, all columns are disabled.

6.2.1 Static type

Enabled columns in the “STATIC” type:

“SAT” - select satellite position from connected wideband LNB input (2 satellites) or chained outputs of multiple multiswitches;

“Input frequency, MHz” - enter input transponder frequency in range of 10700 - 12750 MHz;

“Polarization” - select the vertical or horizontal polarization of input transponder;

“Output frequency, MHz” - enter output frequency of user band in range of 950 - 2150 MHz;

“Bandwidth, MHz” - enter bandwidth of user band in range of 24 - 60 MHz. The bandwidth depends on modulation standard and symbol rate of input transponder and can be calculated using online calculator:

http://www.satbroadcasts.com/DVB-S_Bitrate_and_Bandwidth_Calculator.html;

“Level, dB” - enter relative output power of the user band in range of 0 - 8 dB;

“Output” - select multiswitch output number of the user band;

“IF frequency, MHz” - input transponder frequency recalculated to SAT IF frequency. Must be in range 950 -2150 MHz. Recalculation will be made after pressing the “Save” button;

“Status” - status of the entered parameters check. After pressing the “Save” button various checks of entered parameters are performed. In case of check success - status cell marked by symbol . In case of failure - corresponding error message will be shown and status cell marked by symbol .

6.2.2 Dynamic type

Enabled columns in the “DYNAMIC” type: “Output frequency, MHz”, “Bandwidth, MHz”, “Level, dB” - descriptions of these columns are the same as in “STATIC” type. See section 5.2.1.

Additional enabled columns the “DYNAMIC” type.

“PIN” - enter the PIN code intended for optional pairing of user band and receiver which is necessary for more reliable operation in multi-dwelling installations. When a user band is unprotected, any receiver of the installation can access to it with or without a PIN code. But once a user band has been accessed with is granted PIN code, the multiswitch only gives access to this user band to commands carrying the proper PIN code. The PIN code is used only in the EN50607 standard.

“EN50494 UB1” - select the user band slot number for EN50494 standard on output 1 of multiswitch. When slot number is set to “OFF” - corresponding user band will be not accessible on output 1 of multiswitch. This number can be in range 1 - 8.

“EN50494 UB2” - select the user band slot number for EN50494 standard on output 2 of multiswitch. When slot number is set to “OFF” - corresponding user band will be not accessible on output 2 of multiswitch. This number can be in range 1 - 8.

“EN50607 UB1” - select the user band slot number for EN50607 standard on output 1 of multiswitch. When slot number is set to “OFF” - corresponding user band will be not accessible on output 1 of multiswitch. This number can be in range 1 - 32.

“EN50607 UB2” - select the user band slot number for EN50607 standard on output 2 of multiswitch. When slot number is set to “OFF” - corresponding user band will be not accessible on output 2 of multiswitch. This number can be in range 1 - 32.

“SKY UB1” - select the user band slot number for SKY SCR standard on output 1 of multiswitch. When slot number is set to “OFF” - corresponding user band will be not accessible on output 1 of multiswitch. This number can be in range 1 - 32.

“SKY UB2” - select the user band slot number for SKY SCR standard on output 2 of multiswitch. When slot number is set to “OFF” - corresponding user band will be not accessible on output 2 of multiswitch. This number can be in range 1 - 32.

6.2.3 Test tone type

Enabled columns in the “TEST TONE” type:

“Output frequency, MHz” - enter output frequency of generated test tone in range of 950 - 2150 MHz;

“Output” - select multiswitch output in which the test tone will be generated.

6.3 Structure window

It is possible connect (chain) the outputs of multiple switches together with RF combiners and setup each of the switches to provide the signal from a different satellite position.

For example you can configure one switch for satellite A and a second one for satellite B. If the receiver now requests a channel from satellite A the first switch will enable the user band while the seconds switch will disable the user band. If the receiver requests a channel from satellite B, the first switch will deactivate the user band and the seconds switch will provide the user band. In static mode only one user band with same output frequency of connected multiswitches will be active, depending of selected satellite position.

The structure window is accessed after selection of “Structure” line in the main menu. In this window (Figure 4) whole structure of chained multiswitches is described.

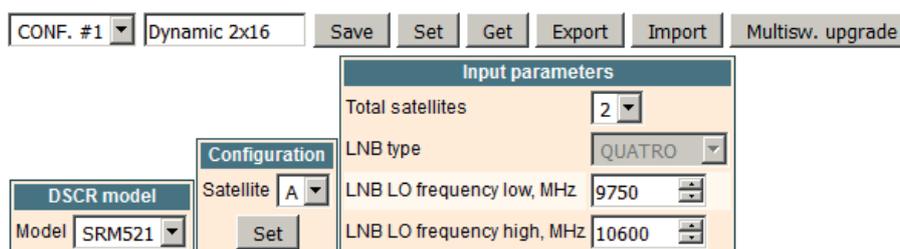


Figure 4. Structure window

The upper line of controls in the structure window is the same, as in the “Main window” (see section 6.1).

Before making any changes in the structure window, select correct model of the connected multiswitch in the “DSCR model” table. The next step is assignment of satellite positions to chained multiswitches.

1. Connect only one multiswitch for satellite A to programmer.
2. Select satellite A option in the “Configuration” table.
3. Press “Set” button in the “Configuration” table.
4. Repeat 1-3 steps for remaining chained multiswitches.

Now all chained multiswitches are set to different satellite positions. Connect all chained multiswitches to programmer. Select correct count of total satellites, LNB parameters in the “Input parameters” table. Press “Save” button. Press “Set” button to send configuration to all chained multiswitches. When only one multiswitch is connected to output network, select correct model of the connected multiswitch in the “DSCR model” table, set count of total satellites to one and LNB parameters in the “Input parameters” table. Press “Save” button.

Note: contents of “Configuration” and “Input parameters” tables depends of capabilities of selected DSCR model.

6.4 Settings window

The settings window is accessed after selection of “Settings” line in the main menu. In this window (Figure 5) output power and Wi-Fi settings are described.

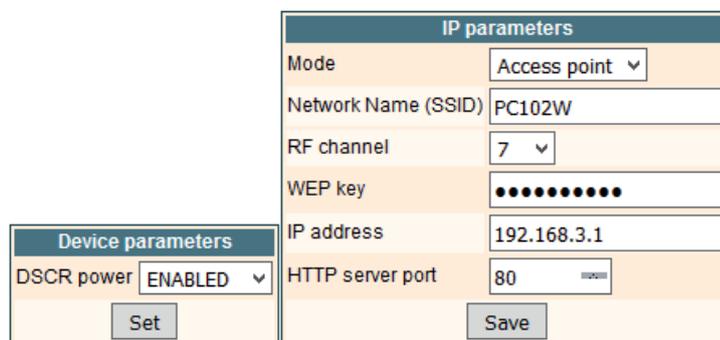


Figure 5. Settings window

The “DSCR power” line in “Device parameters” table used to switch on/off DC power voltage to the multiswitch from programmer. When the “DSCR power” is set to “ENABLED” - DC power voltage and 22 kHz commands from programmer is connected to RF input connector [2] (see section 3), DC power and 22 kHz commands from RF output connector [3] (see section 3) are disconnected. When the “DSCR power” is set to “DISABLED” - DC power voltage from programmer is disconnected from RF input connector [2], DC power and 22 kHz commands from RF output [3] are passed thru to connector [2] (see section 3).

The programmer can work as Wi-Fi access point and allow to connect other devices or connect to other access point in “Client” mode.

Wi-Fi settings in the “Access point” mode shown in Figure 5 above.

Note: in the “Access point” programmer supports only one connection and Wired Equivalent Privacy (WEP) security standard.

Description of the “IP parameters” table lines in “Access point” mode.

A service set identifier (SSID) is a sequence of characters that uniquely names a wireless local area network. It is a text string up to 32 characters length.

RF channel is the channel used for Wi-Fi radio in “Access point” mode.

WEP keys are a sequence of hexadecimal values taken from the numbers 0-9 and the letters A-F. The required length of a WEP key is 10 symbols.

IP address is the address to which will be possible to connect to the programmer.

Default port of the embedded HTTP server of programmer is 80. This port can be changed.

Wi-Fi settings in the “Client” mode shown in Figure 6.

IP parameters	
Mode	Client
SSID	
Password	
DHCP	ENABLED
IP address	192.168.1.10
IP subnet mask	255.255.255.0
Gateway IP address	192.168.1.1
DNS IP address	8.8.8.8
HTTP server port	80
Save	

Description of the “IP parameters” table lines in “Client” mode.

SSID of Wi-Fi router to which connects the programmer.

Wi-Fi password of Wi-Fi router to which connects the programmer.

When DHCP is enabled - all IP parameters will be obtained from the Wi-Fi router. You must know router assigned IP address to control the programmer.

When DHCP is disabled - you must enter all IP parameters manually.

Default port of the embedded HTTP server of programmer is 80. This port can be changed.

Figure 6. IP parameters in “Client” mode

The programmer scans all available Access Points at startup. Scanning results are displayed in the List of available Access Points table (Figure 7). This information helps to select a correct RF channel of programmer in the “Access Point” mode. To avoid inter-channel interference of WiFi signals it is recommended to select the RF channel at the minimum distance of four channels from the strongest neighboring Access Points RF channels.

List of available Access Points		
Network Name (SSID)	Signal level	RF channel
terra_test	-41 dBm	12
linksys 2a	-63 dBm	6
HP-Print-EC-LaserJet Pro MFP	-88 dBm	6
WL-330NUL-Private-4e6c	-88 dBm	1
linksys	-90 dBm	7

Figure 7. List of available Access Points table

6.5 Status window

The status window is accessed after selection of “Status” line in the main menu. In this window (Figure 8) status of the programmer and connected multiswitch is shown.

Device information	
Device model	PC102W
Serial number	PC102W0016470155
Software version	1.5
Hardware version	1.2
MAC address	00 1C A3 00 29 5E
IP address	192.168.3.1
Up time	0:33:44

DC parameters	
Power voltage,V	19.6
Input voltage,V	18.1
Output voltage,V	17.5
Load current,A	0.264

SAT A DSCR device information	
Model	SRM521
Serial number	SRM5210017010061
Software version	1.1
Hardware version	1.2
Up time	0:33:16

SAT A total input power, dBuV	
Vertical LO	52
Horizontal LO	50
Vertical HI	52
Horizontal HI	49

Figure 8. Status window

In the “Device information” table programmer status information is shown. In the “DC parameters” table DC voltages at “F” connectors of programmer and current consumption of multiswitch are shown. In the “SAT A DSCR device information” table connected multiswitch status information is shown.

In the “SAT A total input power” table total input power from LNB outputs, connected to the multiswitch is shown.

When more that one outputs of multiswitches are chained, corresponding SAT B, SAT C ... information and input power tables are displayed.

6.6 Set default parameters command

All parameters of programmer will be restored back to factory defaults. The exception – IP parameters – these parameters will be unchanged.

6.7 Programmer firmware upgrade command

Programmer firmware can be upgraded via web browser. Press the “Click to select file” button and select firmware binary file. If valid file was selected, a version number of new firmware will be displayed. Otherwise an error message will appear. Press the “Upload” button to upload new firmware to the programmer. Upload progress bar will appear and may take several seconds to upload, depending on the size of a file and a network connection speed. A message will be displayed asking to restart the device when the file was sent to the programmer. New firmware will be programmed into the programmer only after restart. Programmer will start up with a new firmware and continue to operate with previous parameters. Additional new firmware features (if any) may need to setup additionally to take effect.

Avoid power supply interruption when a programming process is going on.

Programmer has possibility to load software revision history and check availability for new software release. Click the “Check online” link. If computer (not programmer!) has internet access, it will show a list of all software releases with links to binary files. Binary file can be downloaded and saved to computer (see Figure 9). After that, use the firmware upgrade method as described above.

Current software version: 1.5

[Check online](#) for new software release

Firmware upgrade

Expected file name: **1030XX.bin**

Revision history

1.1 version (2016-12-08)	Download (241 kB)
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Figure 9. Firmware upgrade

6.8 Restart the programmer command

Programmer will be restarted after this command.

Technical specifications

Frequency range	DC+22 kHz, 47-2400 MHz
RF through loss	< 1.5 dB
Multiswitch powering/control	14/18 V & 600 mA max. EN50494/EN50607/DiSEqC 2.0
Supply voltage	18 - 20 V
Current consumption	5 V 200 mA from USB port
	20 V 50 mA* from mains adapter
Operating temperature range	0° ÷ + 50° C
Dimensions/Weight (packed)	133x73x39 mm/0.36 kg

* without external DC feeding

-  Caution!
-  Risk of electric shock.
-  This product complies with the relevant clauses of the European Directive 2002/96/EC. The unit must be recycled or discarded according to applicable local and national regulations.
-  Equipment intended for indoor usage only.
-  Apparatus is double insulated from the mains.
-  TERRA confirms, that this product is in accordance to following norms of EU: EMC norm EN50083-2, safety norm EN60065, RoHS norm EN50581.
-  TERRA confirms, that this product is in accordance with Custom Union Technical Regulations: “Electromagnetic compatibility of technical equipment” CU TR 020/2011, “On safety of low-voltage equipment” CU TR 004/2011.
-  TERRA confirms, that this product is in accordance with safety standard AS/NZS 60065 and EMC standards of Australia.