USER MANUAL

INSTALLATION, CONNECTION AND CONFIGURATION OF AUTOMOTIVE DSP PROCESSORS

RESOLUT A-DSP
RESOLUT J-DSP
RESOLUT T-DSP

(version 1.3)

Congratulate you with purchasing of processor **Resolut!** Our goal is to suggest you a product with uncompromising sound quality and wide opportunity of setup**.** We are sure that during operation of our processor you will feel fully its advantages and get real pleasure.

Before installation and setup study carefully this manual. It will help you to connect processor easily and quickly and to figure out in variety of settings.

The manufacturer reserves the right to change product and software for improvement of consumer's properties without additional notification.

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GENERAL RECOMMENDATIONS AND PRECAUTIONS

1. Processor is intended for installation in auto systems with power supply of 12 Volt direct current with grounded negative polarity upon the vehicle's body. Connection with another characters (for instance, with power supply of 24 volt or with positive polarity upon the vehicle's body) could disable it.

2. Be sure that you install processor correctly. Do not install it in engine compartment or another place with high level of humidity, heat ash and dirt to avoid damaging the device. Be sure it does not affect for mechanical and electrical car's component. Do not install processor in place without air circulation.

3. Plan in advance configuration of audio system and choose the best way to cable. Use cables, connectors and accessories which have high quality. Choose correctly cross section of feeder cables. We recommend cables with cross section not lesser than 1,5 mm in square. Optimal with cross section of 2,5 mm in square.

4. Pay attention to laying of cables for processor. They must be securely recorded on all length, they must not to contact with moving mechanisms and sharp edges or heating elements. Give cables mechanical protection for all length. Use for this special housings and sleeves. Do not lay cables outside the car.

5. Before to laying of cables for processor. They must be securely recorded on all length, they must not to contact with moving mechanisms and sharp edges or heating elements. Give cables mechanical protection for all length. Use for this special housings and sleeves. Do not lay cables outside the car.

6. In work with tools pay attention to safety. If necessary use glasses and gloves. Make sure that during the work pipelines of brake and fuel car's system and another important elements will not be hurted.

7. Pay attention to good quality of processor's anchorage. Bad quality of processor's anchorage can damage processor, cables and audio system's components or on-board electronics, moreover it can deal serious damage to passengers of auto and another autos.

CONNECTION OF PROCESSOR

Processor is built with module's principles and can be added by multiple options (high level inputs, modules for connections to MOST, module USB-Audio and other). The basic appearance of processor is shown in following pictures (view from the site of connectors' inputs and management and view from the outputs' connectors side):

1. Coaxial. Electrical input for connecting SPDIF source with coaxial output. Digital thread is supported in stereo. Playback of multi-channel signal (Dolby Digital, DTS) does not support.

2. Optical. Optical input for connecting SPDIF source with optical output (Toslink). Digital thread is supported in stereo. Playback of multi-channel signal (Dolby Digital, DTS) does not support

3. USB. Connects to PC's , laptop or MAC for management by Resolut DSP Tool software.

4. Control. Interface for connection Resolut Smart Remote Control

5. Power. Connector for Power supply, remote in and remote out:

- **+12 Volt** – processor's cable with positive polarity.
- **GND** – processor's cable with negative polarity (weight).
- **Rem IN** – inputs to power on the processor**.** Processor will turn on if it takes 12 Volt power supply (minimal power supply– 5 volt).

Rem Out – output for turning on amplifiers (+12 V, possible current to 50 mA).

Notice. *If you have got in system some devices, which is turning on by processor with overall consumption of current more than 50 mA . Use relays for reducing the pressure on Rem Out processor. Otherwise, it can disable the processor.*

Notice. *Normal work of processor is supported if it has got power supply from 10 to 16 volt. Short-term subsidence (not more than 2-3 seconds) of voltage to 6 volt are allowed.*

6. Outputs. Processor's signal outputs for turning on amplifiers.

PRINCIPLES OF PROCESSOR'S SETTINGS

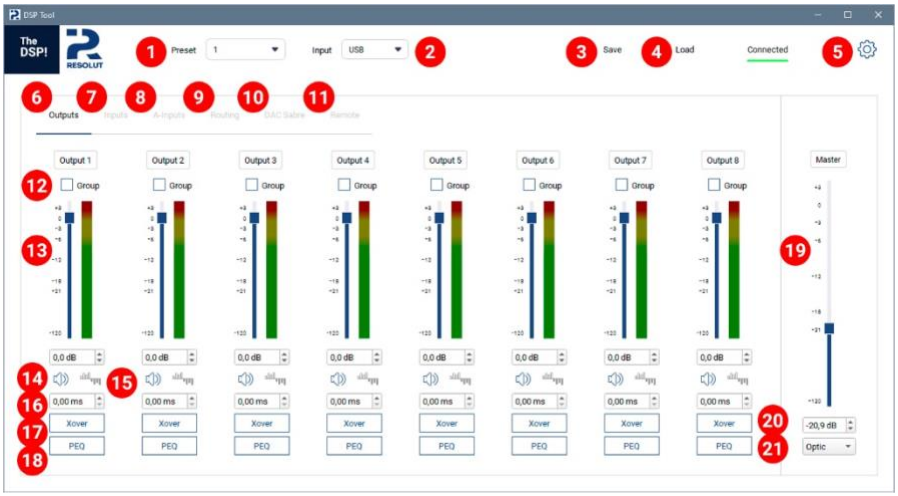
It uses **Resolut DSP Tool** software on your laptop or PC for processor's configuration. New version of software is available on our official web-site **resolut-audio.com.**

After setup you should use USB jack and connect processor to your laptop or PC and turn on software. Also, you can run the program, without connection to processor, for identifying the opportunities.

Advice: *You can use self-contained regime of program (without connection to processor) for preparatory creation audio system's configuration. Save created configuration to folder on your PC, then download it when processor is connected.*

WORKING OF PROGRAM FOR PROCESSOR'S SETTINGS

You can view menu of **Resolut DSP Tool** in this picture:



1. Preset. You can change presets when you configurate. You can save only 4 configurations.

2. Input. You can choose input source.

3. Save. You can save current configuration to file on your device, then you can return to it or use it to configurate another processor.

4. Load. You can download saved file on your device to processor.

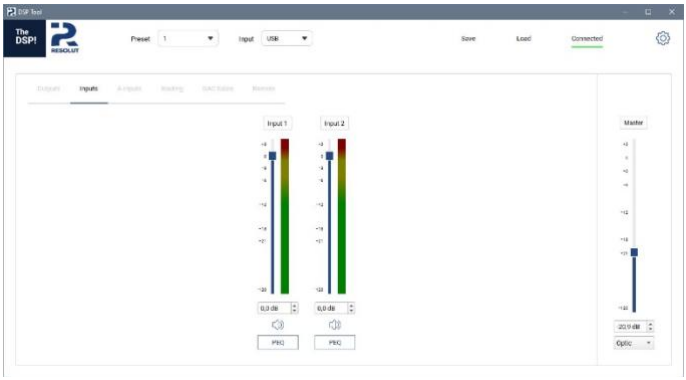
5. Settings menu. These actions are available:

- **Read All** –reading of current processor's configuration. In case, when connection between PC and processor is lost (for instance, random touch the USD jack and etc.), it is possible to read current processor's configuration for repeating software's displaying.
- **Choose Plugin** – Plugin update in processor when changing configuration. For instance, when adding or deleting the modules. After pressing software suggests to choose file with plugin, what is correspond processor's configuration. This update procedure will be described in detail in the corresponding section of this Guide.
- **Write Plugin** – Plugin update in processor in "manual" mode. Unlike the previous paragraph, it is proposed to select a file with a subroutine corresponding to the updated processor configuration. This update procedure will be described in detail in the corresponding section of this Guide.
- **Read Levels** – control of signals' level on outputs and inputs in real time regime.
- **Dark Mode** – upon request, you can change the color scheme of the control and settings program. For example, depending on the characteristics of the monitor or lighting conditions, a "dark" theme may be more readable.
- **Service** – menu of service functions that are not used during operation, but may be needed during processor update. For example, rebooting the processor.

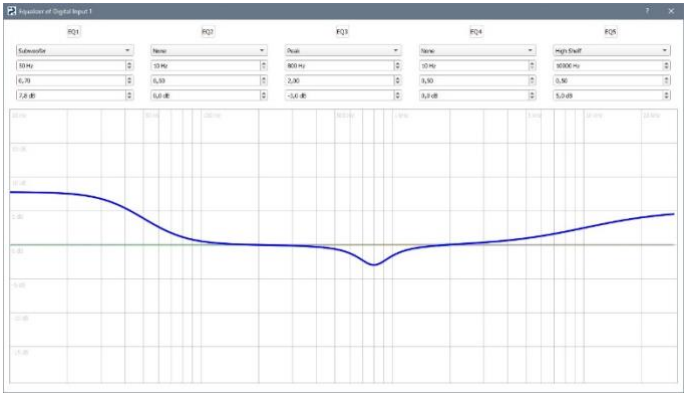
Advice: *Function Read Levels is turned off due to spends, although by a small margin, processor's computing power. However, signal's control on outputs and inputs may be helpful when configurating the processor. You can turn it on when configurate the processor and turn off when you end this action.*

6. Outputs. The control program contains several tabs grouped by functional purpose. When click, program is going to the first of these tabs, in which you can configure the output. This is the main tab of the program. If you are in another tab, clicking on Outputs will return you to the main window.

7. Inputs. When click, program shows digital inputs' tab channels adjustment**.** Use sliders forquick adjustment or state exact values of signals' level**.**



Pay attention, the PEQ buttons in the Inputs tab activate the Parametric EQ setup window for correcting input signals. You can correct frequency-response characteristic for each input channel.

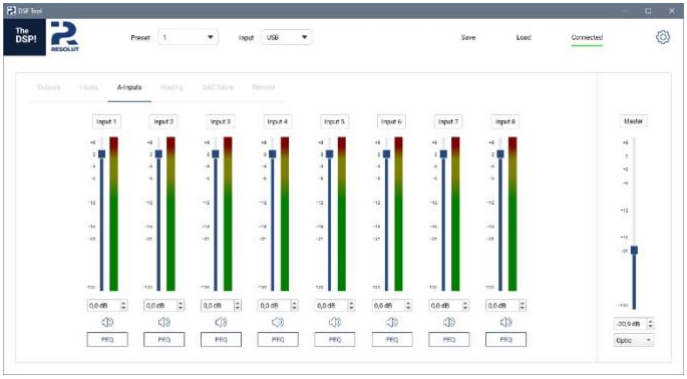


The choice of equalization's type are available in each adjustment of line:

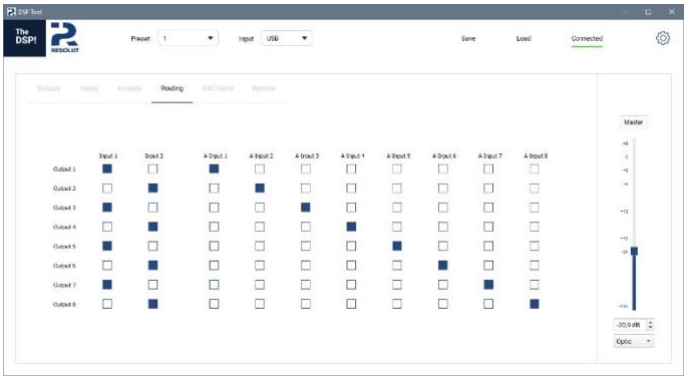
- **Low Shelf и High Shelf** – correction of frequency-response characteristic by “step”.
- **Peak** – traditional equalization in narrow frequency band.
- **All Pass 180 и All Pass 360** – all-pass filters.
- **Low Pass 12dB и High Pass 12dB** – additional filters of higher and lower frequencies.
- **Subwoofer** – setting amplitude-frequency characteristic correction for adjusting bass level with using of Resolut SRC remote control when Parametric mode is selected. Working of such adjustment will be discussed in corresponding section of this Guide.

Advice: *For reducing pressure on processor use only necessary number of lines. In other line use None regime in equalization's box.*

8. A-Inputs. When click, program shows analog input tab. configurating of analog inputs (with an installed analogue input module). Functions the same as for digital inputs.



9. Routing. When click, program shows box of signal's routing. Here you can indicate from which inputs to which outputs signal will go. The appearance and content of this box depends on the type of installed modules.



10. Expanded opportunities of processor's settings. In this tab, program displays settings window for digital-analogue converters of processor. The appearance and content of this tab depends on type of DAC used in a particular processor model. This part will be described in detail in corresponding section of this Guide.

11. Remote. Tab displays a window for selecting type and setting of remote control functions. The specifics of settings on this tab will be discussed in the corresponding section of this Guide.

12. Group. For convenience you can group some outpus' channels for synchronous adjustment of signals' levels and delays. Pay attention, equalization and filters for each channel is configurating individually.

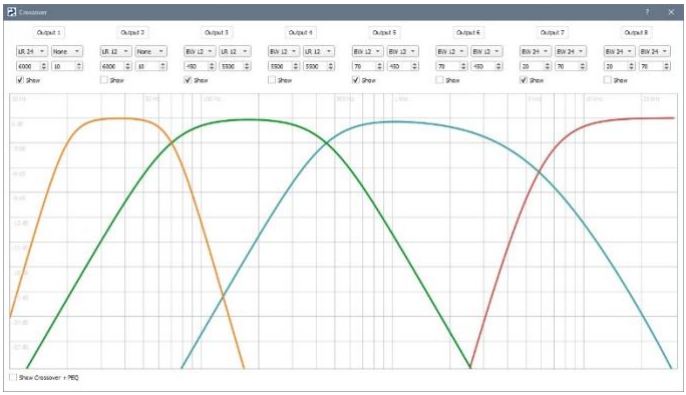
13. Volume slider Use sliders for quick adjustment or state exact values of signals' level.

14. Mute. Operational signal's muting in output channels.

15. Polarity. Operational polarity's changing of signal in outputs channels.

16. Delay. Exhibiting signal's delays in outputs channels.

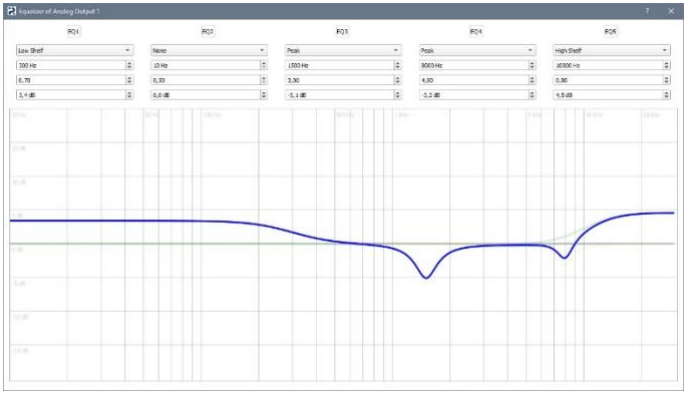
17. X-Over. When click, program shows menu of filters' adjustment. Filters of higher and lower and higher frequency with a choice of steepness and filter's type are available for each output channel. On graph frequency-response characteristic of selected channels are shown.



Advice: *For visual control of result obtained, we have provided an opportunity to evaluate resulting frequency-response characteristic in channels, taking into account operation of equalizer. To do this, click Show Crossover + EQ at the bottom of window.*

18. PEQ. When click, program shows menu of equalization's configuration. You can correct frequency-response characteristic for each output channel by five-line parametric equalizer. Available in each adjustment of line:

- **Low Shelf и High Shelf** – correction of frequency-response characteristic by “step”,
- **Peak** – traditional equalization in narrow frequency band,
- **All Pass 180 и All Pass 360** – all-pass filters,
- **Low Pass 12dB и High Pass 12dB** – additional filters of higher and lower frequencies.



Advice: *For reducing the pressure on processor use only necessary number of lines. In other line use None regime in equalization's box.*

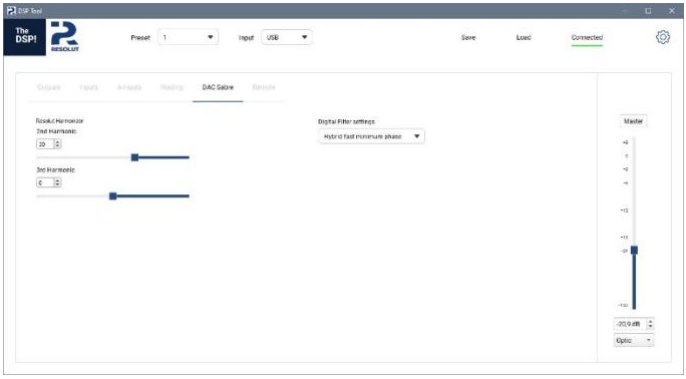
20. Master. While configurating of processor you can adjust general system volume (master-volume). Use sliders for quick adjustment or state exact values of signals' level.

21. Digital input switch. In this option you choose which type of spdif input you will use. Possible values is Coaxial and Optical

EXPANDED OPPORTUNITIES OF SOFTWARE

We are glad to suggest you more opportunities than other auto processors on market. Additionally to base settings was realized management of digital-analogue converters' work regime in Resolut processor.

If connection to processor in management window will be shown DAC tab. It's content depends on processor's model, example:



Configurating of harmonic's character in according with original Resolut Harmonizer technology. Using of digital-analogue converters' potential with our special developed original algorithm of processing sound signal give opportunity to configurate sound more accurate. Adjustment of second and third harmonic's level allows to make sound more "warm" and "soft" or more "acute" for focus to attack speed. In a sense, shown settings are alternative for physical replacement of operational amplifiers on digital-analogue processor's outputs.

We draw your attention that trough special phase signal's converter the harmonic's level can be adjusted not only in "plus" but also in "minus". Thus, it will make it possible not only to give processor desired sound's quality but also in some way to compensate for features of other audio section's components, ensuring more accurate and more convenience sound at all audio system.

The choice of work of the digital filter at the output of the signal-analogue converter. The principle of operation of any DAC consists in decoding a binary digital sequence (stream of 'zeros' and 'ones') with recovery at the output of a continuous analog signal. During this conversion, the reports are first restored - a sequence of pulses following with a certain frequency and having a variable amplitude. After it goes through a filter that cuts off the high-frequency component of the signal and at the output we get a continuous analog signal.

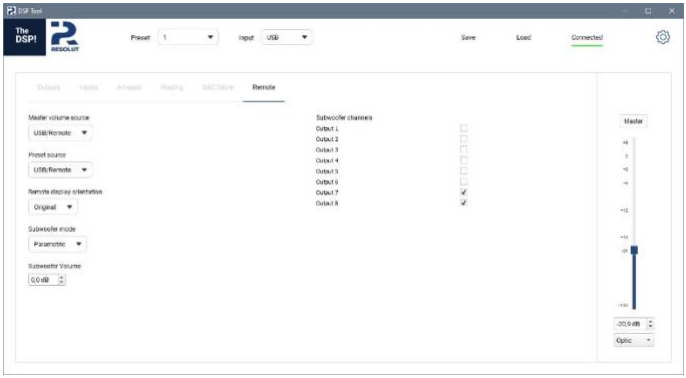
As a rule, developers of digital-to-analog converters realize several types of such filters in their chips, which differ in their characteristics and parameters. The type of

filter you select has a significant effect on the nature of the sound - it can be more “spacious” or “assembled”, more “dry” or more “musical”. However, not all manufacturers of audio equipment (and auto processors in particular) use this potential, usually preferring only one type of filter.

Our aim is to provide you with maximum and uncompromising system configuration options, therefore, in Resolut processors, we implemented a choice of output filters operation mode. The software allows you to directly change the type of digital filter while the processor is working and choose the one that provides the most comfortable sound specifically in your audio system.

CUSTOMIZATION CAPABILITIES OF RESOLUT SRC REMOTE CONTROLLER

If connection to processor of Resolut SRC remote controller you can adjust its functionality in Remote tab

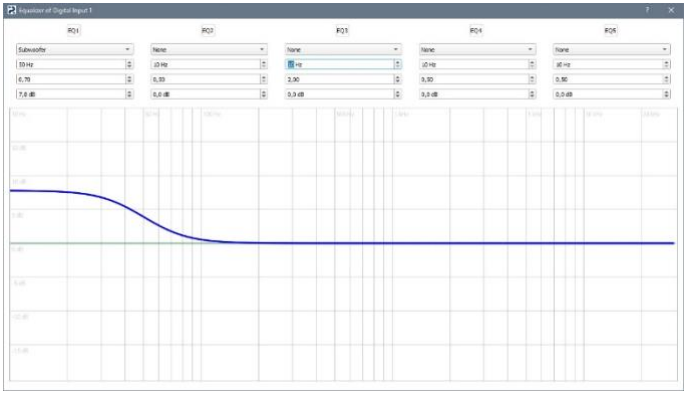


- **Master volume source** –choice of volume adjuster (optional Resolut SRC remote control, potentiometer connected to Control connector or adjustment from a standard source connected via MOST interface).
- **Preset source** – choice presets' adjuster (optional Resolut SRC console or a switch connected to Control connector).
- **Remote display orientation** – choice of orientation on the screen of optional Resolut SRC remote control. Allows you to install the panel in two variants - with right or left encoder position.
- **Subwoofer mode** –choice of bass level adjustment. Classic implies usual adjustment of subwoofer relative to other channels, and Parametric - bass level adjustment in all input channels according to frequency-response characteristic. Features of these modes will be described below.
- **Subwoofer volume** – signal level in subwoofer channel (in Classic mode) or bass boost level according to specified frequency-response characteristic (in Parametric mode).
- **Subwoofer channels** – choice of subwoofer adjustment in Classic mode.

Subwoofer mode Classic – traditional bass adjustment. Consists in correcting signal in subwoofer channels relative to others. Main disadvantage of this method is violation of consistency of the bands with significant level adjustments.

Subwoofer mode Parametric eliminates the problem of traditional bass level adjustment. In this mode, there is no signal level correction in individual subwoofer channels, but frequency-response characteristic is corrected in all output channels. Compared to traditional method, this does not compromise band alignment and maintains overall low frequency character.

Setting maximum frequency-response characteristic of bass level control in Parametric mode, go to Inputs tab and press the PEQ button in corresponding input channel. In opened window, select type of equalization Subwoofer and set the required frequency-response characteristic's correction by setting frequency, quality factor and maximum amplification.



Now you can adjust bass level through connected optional Resolut SRC (or set it in control and settings program in Remote tab). Signal will be corrected according to specified characteristic.

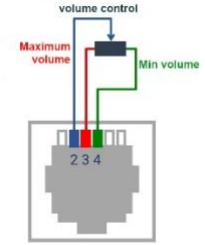
VOLUME CONTROL WITHOUT USING RESOLUT SRC REMOTE CONTROLLER

If necessary to adjust overall volume in system using the processor (example, if source does not have volume control), we strongly recommend using optional Resolut SRC wired control panel. In addition to adjusting volume, it allows you to switch sources and tuning presets, adjust bass level in system (subwoofer level or using parametric adjustment), and also provides some other possibilities

However, in some cases, when additional functions of remote control are not in demand, and only volume control is required, you can do with simplified way – using potentiometer with nominal value of 10-22 kOhm. For it you can use, example, any suitable wired subwoofer level control, which is supplied with some amplifiers.

To connect to Resolut processor, a flat "telephone" cable with at least three cores, terminated with RJ11 connector, is used. For reliable operation of remote control, try to choose quality cable with copper conductors. Do not select cable with CCA (Copper Clad Aluminum) conductors.

It is important! *Before connecting, must first check pinout of connector for compliance with connection scheme to Resolut processor. If mismatch, re-soldering of wires in remote control is required!*

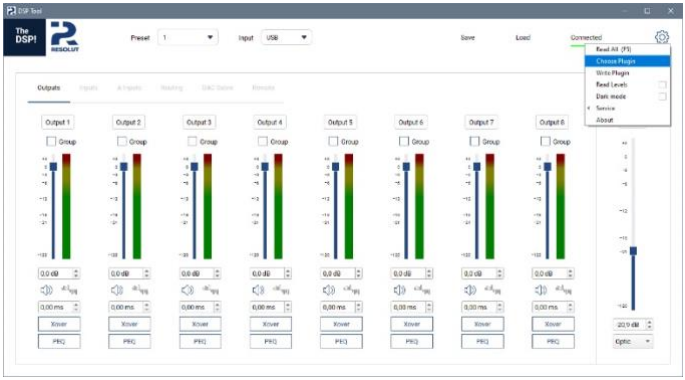


SUBPROGRAM'S UPDATE OF PROCESSOR

Processor has opportunity to update the subprogram when changing configuration. For instance, when adding and deleting modules. It can be done by these steps:

Step 1. Open the software Resolut DSP Tool. Save processor's configuration. Use button Save, give the name to this file and save it on your device.

Step 2. There are two ways to update a subprogram. Click on the processor debug and update icon (gear symbol).



- **Installing optional modules** through choose plugin item are recommended. In menu that opens, select desired item and run it by clicking OK.

- **If having an update file**, select Write plugin. In opened file menu, select prepared file and click "Open".

In setting's box choose **Write Plugin.** In new file's menu choose file with neededsubprogram and open it**.**

Step 3. Updating's procedure will run automatically. If program does not response more than 30 seconds, repeat the procedure. After successful try program will show message Plug in write successfully**.**

Step 4. New program will be installed in processor after reloading and all settings will be reset. At first opening volume's level will be stated on -70 Db in order to avoid damaging of connected amplifiers and acoustic systems.

Step 5. For returning previous configuration use button Load and choose file with saved previous configuration.

TECHNICAL SPECIFICATIONS AND CHARACTERISTICS OF RESOLUT A-DSP:

Configurations and possible connections:

- Number of analogue outputs: **8**
- Number of digital inputs: **2**

Digital processing:

- Central chip: **Analog Devices ADAU1452**
- Ratio signal/noise, digital input: **144 Db**

Digital-analogue transformation:

- Digital-analogue transformation: **AK449X, 32 bit**
- Frequency range of analogue outputs: **2 Hz – 60 kHz**
- Dynamical range of Digital-analogue transformation: **122 dB**

Analogue-digital transformation:

- chip of Digital-analogue transformation, resolution: **AK5558, 32 bit**
- Ratio signal/noise of Digital-analogue transformation: **115 dB**

Dimensions and weight:

- Size: **235 x 152 x 45 mm**
- Weight: **0,95 kg**

TECHNICAL SPECIFICATIONS AND CHARACTERISTICS OF RESOLUT J-DSP:

Configurations and possible connections:

- Number of analogue outputs: **8**
- Number of digital inputs: **2**

Digital processing:

- Central chip: **Analog Devices ADAU1466**
- Ratio signal/noise, digital input: **140 дБ**

Digital-analogue transformation:

- Digital-analogue transformation: **ES9028PRO, 32 bit**
- Frequency range of analogue outputs: **2 Hz – 65 kHz**
- Dynamical range of Digital-analogue transformation: **129 dB**

Analogue-digital transformation:

- chip of Digital-analogue transformation, resolution: **AK5558, 32 bit**
- Ratio signal/noise of Digital-analogue transformation: **115 dB**

Dimensions and weight:

- Size: **235 x 152 x 45 mm**
- Weight: **0,95 kg**

TECHNICAL SPECIFICATIONS AND CHARACTERISTICS OF RESOLUT T-DSP:

Configurations and possible connections:

- Number of analogue outputs: **8**
- Number of digital inputs: **2**

Digital processing:

- Central chip: **Analog Devices ADAU1466**
- Ratio signal/noise, digital input: **140 dB**

Digital-analogue transformation:

- Digital-analogue transformation: **ES9038PRO, 32 bit**
- Frequency range of analogue outputs: **2 Hz – 65 kHz**
- Dynamical range of Digital-analogue transformation: **132 dB**

Analogue-digital transformation:

- chip of Digital-analogue transformation, resolution: **AK5558, 32 bit**
- Ratio signal/noise of Digital-analogue transformation: **115 dB**

Dimensions and weight:

- Size: **235 x 152 x 45 mm**
- Weight: **0,95 kg**

GUARANTEE

Resolut production is under guarantee only in country, where it was sold and made by official Resolut distributor. Official distributor has the right to refuse to guarantee of the product, if this product was bought in another country and was sold to consumer with principle One Way Delivery Without Return.

Guarantee of Resolut production in Russian Federation is carried out in accordance with current law of Russian Federation. Guarantee is valid in 1 year from date of purchasing, what can be confirmed by check. Resolut guarantees that product does not has manufacturing and design flaws on moment of the first exploitation by consumer. Complete set of delivery is checked and confirmed by seller's and customer's signature. Claims about complete are not receivable after purchasing.

Guarantee is not valid in the following cases:

- Serial number of the product and check are falsified or lost.
- The product has got external and/or internal tracks of damage, what were caused by external things, liquid, particles, substances and etc.
- The product has got tracks of damage, what were caused by natural phenomenon, natural disaster, fire and etc.
- Failure to rule the product's exploitation, exceeding the exploitation's parameters, careless exploitation, incorrect connecting procedure and etc.
- The product was fixed by unauthorized persons and companies.
- The product has broken down owing to installed by uncertified installation center.

Distributor does not accept commitment about product's transportation. Resolut and Resolut distributor are not responsible for the expenses and overhead, what were caused by impossibility of exploitation this product.

Product _____

Serial number _____

Seller-company _____

Customer _____

Date of purchasing _____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