AUDIO

Powerbox Mk2

Regulated stompbox power supply

User's manual



www.n-audio.net

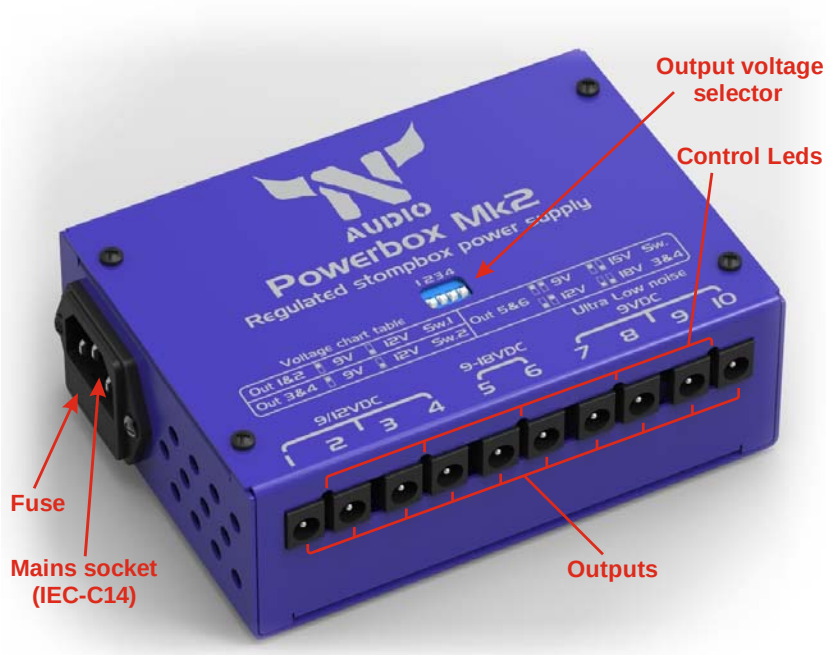
N-audio, 2012

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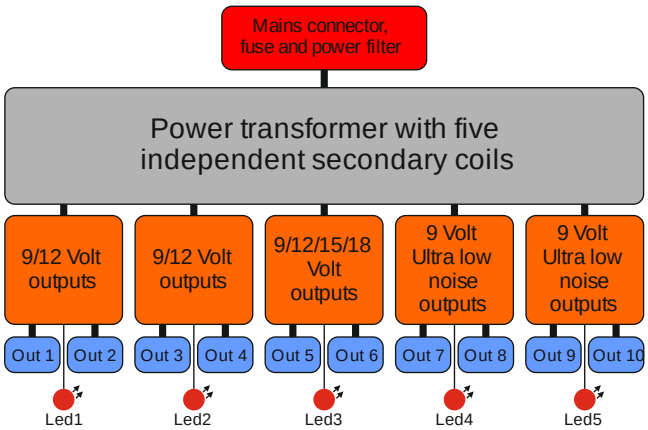
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Thank you for choosing the universal stompbox power supply N-audio Powerbox MK2. Its development is based on extensive testing, building prototypes tested in real performing conditions, and on the long-standing experience of N-audio. The result is a professional product, which can power a great variety and combinations of effects and can be used for years even in the harshest conditions.

I. What is Powerbox Mk2?



The universal guitar stompbox power supply Powerbox Mk2 is built in a compact metal box which measures 13x5x10 cm. The construction has been repeatedly optimised with the aim of using internal space most efficiently so the dimensions could be as small as possible, without compromise in quality. Powerbox Mk2's heart is a high-quality transformer with a reduced flux density, which guarantees reliable operation. In addition, the device has been designed with 5 galvanically split groups, each of them supplied with independent electronics for rectifying, filtering and stabilizing the current. In this way the typical adapter-powered ground loop problems are drastically reduced to achieve very low levels of noise. Each group is fitted with its own control LED, situated between the two out connectors. It indicates the presence of outgoing current.



Powerbox Mk2 Block chart

II. Output parameters of Powerbox Mk2

Powerbox Mk2 can power both effects with low power consumption and effects requiring more current or voltage. For this purpose, the outputs are divided in groups with different options:

- *Outputs for effects with high power consumption*

The first two groups – outputs 1 to 4 can deliver a maximum of 500 mA per group. This means the total consumption for outputs 1 and 2 should not exceed 500 mA and the total consumption for outputs 3 and 4 should not exceed 500 mA as well. Output voltage should be chosen between two fixed voltages – 9V and 12V. These outputs are designed for supplying with higher current consumption like delay pedals, processors, tube effects, loop systems, etc. They are, of course, universal and you can power lower consumption effects too – chorus, tremolo, compressor, distortion, overdrive, etc.

- *Outputs for effects with average power consumption*

Use output 5 and 6. Maximum power consumption for this group is 250 mA, which means that the total consumption for these two outputs should not exceed 250 mA. The output voltage can be chosen between four fixed voltages – 9V, 12V, 15V and 18V. They are specially designed for effects which require voltages up to 18V and can be used for any type of effects.

- *Outputs for effects with low power consumption*

Outputs 7 to 10 in two galvanically split groups are specially provided for supplying with low-consumption, noise-sensitive effects. Here the output current is fixed to 9.6V÷9.8V – exactly the voltage of a new 9-volt battery. They are characterized by incredibly low noise and have double filtering and stabilizing of the current. Maximum power consumption is 50 mA per group. They are designed for use with effects like wah pedal, overdrive, distortion, compressor, booster and the like.

III. Configuring output voltages of Powerbox Mk2

Changing the output voltages of Powerbox Mk2 is done with the help if a dip switch, situated at the top of the device. Selectors can be switched while the device is either switched on or off. **Be careful when switching! Maximum output voltage of 18V can damage effects which operate at lower voltage!** Before making any changes on the output voltages, make sure the effects can work with the desired voltage. Don't forget the output voltage is changed for the two outputs in the particular group. Check both effects when switching voltage. In order to get 9V at each of the 10 outputs, all 4 switches have to be up:



For all other combinations, refer to the table below:

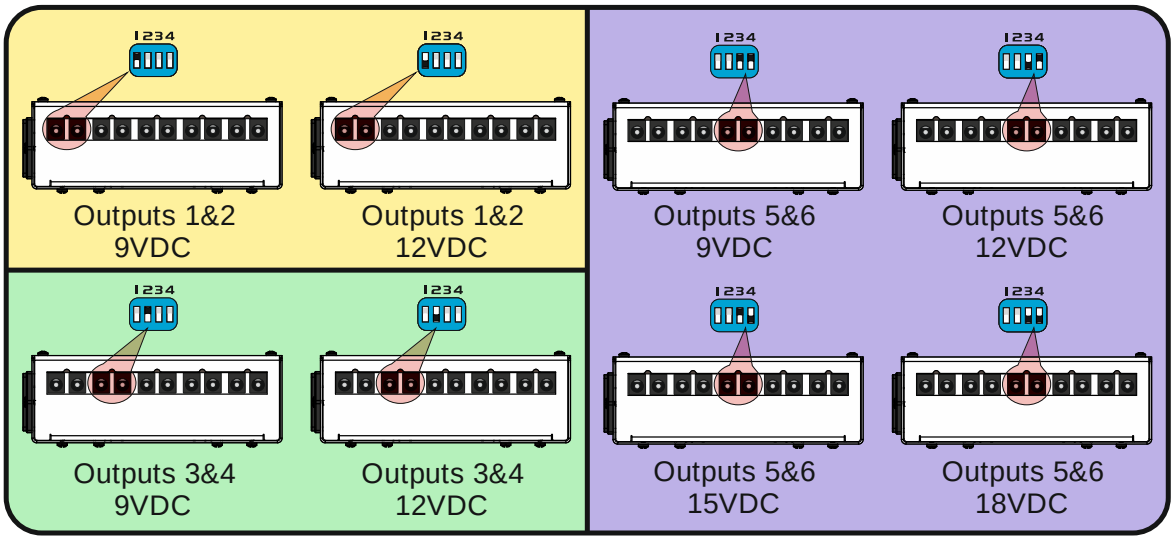
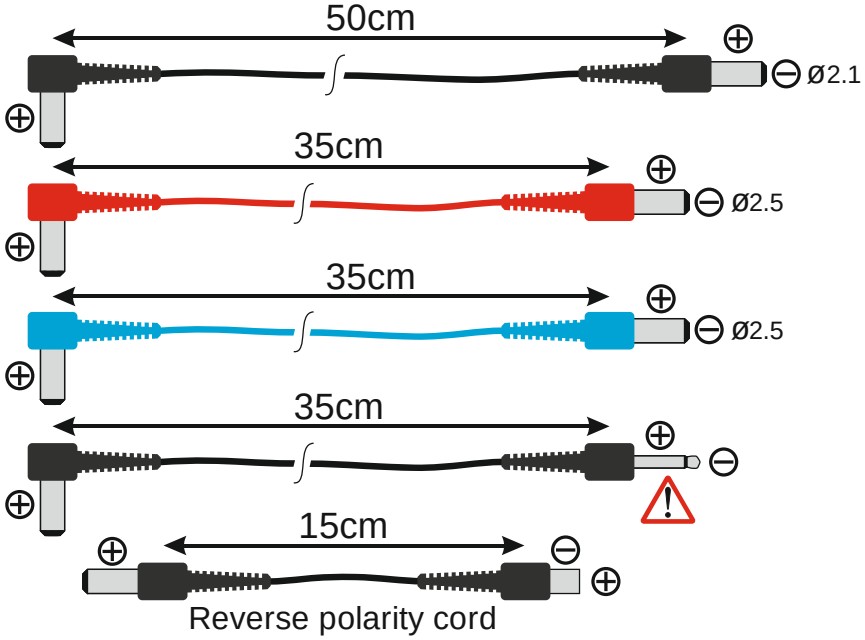


Table of all possible voltage combinations

IV. Types of power supply cables

Powerbox Mk2 comes with a set of power supply cables which includes:

- *8 standard black cables with diameter ø5.5/ø2.1mm, 50cm length*
- *2 (blue and red) cables with diameter ø5.5/ø2.5mm, 35cm length*
- *1 black cable with 3.5 mono jack, 35cm length*
- *3 polarity reversal cords, 15cm length*



NOTE! Most effects, using 3.5mm mono jack are center positive. The cable with a small jack is center negative. For this reason, you have to check the polarity of your effect. In general, in order for the effect to work, you have to use one reverse polarity cable, to switch polarities. You have to use the reverse polarity cord together with the 3.5mm jack cable with old ElectroHarmonix, Pro Co Rat, Vintage DOD, etc.

V. Center positive, center negative and negative ground effects

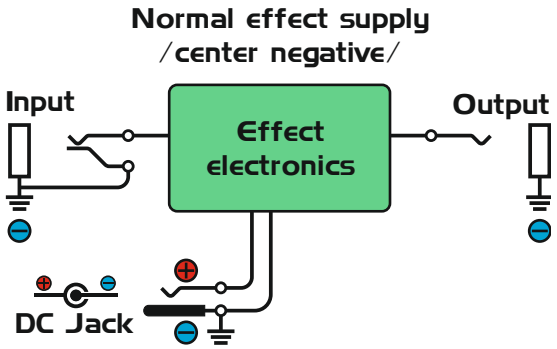
The majority of guitar effects are produced to be able to use a 9V battery or with an external adapter. Of course, owing to the specificity of the schematic resolution, there are effects which require different power supply. That is the reason why there are differences in their power connectors. When using external power adapter, usually the jack has an external diameter of ø5.5mm and internal - ø2.1mm. Effects which require stronger current use similar jack, but with bigger inner diameter - ø2.5mm. That is so, because these power supply connectors can withstand stronger current. There is also a small group of effects, which use 3.5mm mono jack. Exceptions include some processors, MIDI controllers, tube effects and others with specific power supply, where different supply connectors are needed.

- *Normal polarity effects - center negative.*

Guitar effects have standardized connectors and location of poles. They usually use center negative ø5.5mm/ø2.1mm jack. The symbol, which indicates the location of the poles, is this:



In this category we can put all guitar effects of manufacturers like Boss, Digitech, Ibanez, Morley, Tech21, TC Electronics, MXR, EBS, Xotic, Behringer, Fulltone, Carl Martin, Cmat mods and many others. With all of them, schematic representation looks like this:



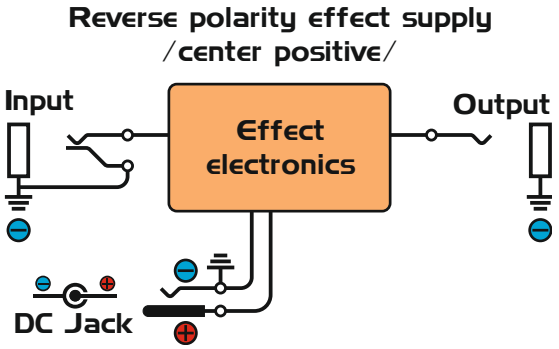
Note that the negative of this effect is connected to the ground of the input and output jacks.

- *Reverse polarity effects - center positive.*

There are effects which operate with reverse polarity. The symbol, which indicates the location of the poles, is this:



There are a relatively small number of effects in this category. The most notable example of this type is Moog's Moogerfooger line of effects. Here we include also effects powered with a 3.5mm mono jack. Most of them are reverse polarity effects. Effects which utilize this type of supply are Vintage Electro Harmonix, Pro Co Rat, Vintage DOD, etc. With all of them, schematic representation looks like this:

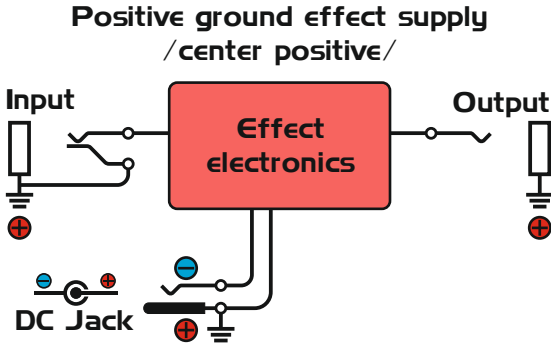


The difference with normal polarity effects - center negative is only that the polarity is reversed. The negative of the power supply is connected to the ground, connecting the input and output of the effect. These effects can be used with Powerbox Mk2, with the addition of a reverse polarity cord to the normal supply cable. When you power such effect with Powerbox Mk2, the second output can be used to power either a normal center negative or center positive effect.

- *Positive ground effects.*

A bit of history: After the radio lamps, the era of the first guitar effects begins with Germanium transistors. They used these because in the 1960s and 1970s silicon (BJT) transistors (which are widely spread nowadays) were not very popular. Transistors are two types: PNP and NPN. Due to the technological features in the development of germanium transistors, PNP transistors were cheaper to produce and more widespread. This is why many effects utilized exactly such transistors. PNP transistors are characterized bythe fact that the positive pole is connected to ground.

In the group of positive ground effects we can find Dallas Rangemaster, Fuzz Face, Tone Bender, some versions of Octavia and others; in general – effects built with PNP transistors. For safety reasons, in most of them a supply connector for an external adapter is omitted, but nevertheless there are some with supply jacks or modified ones with added supply output. Schematic representation for them looks like this:



Note that the ground is connecter to the positive pole of the power supply. Such effects can be powered by Powerbox Mk2. In almost all cases, the power supply hasreverse polarity, and a normal cable with a reverse polarity cord have to be used. It is important to know that **when you are powering such effect, the other free power output in the group should not be used with a normal or reverse polarity effect**. In it you can power **only** a center positive effect.

VI. Connecting effects to Powerbox Mk2

Powerbox Mk2 is designed to follow the natural order of effect pedals in the pedalboard. The normal order is from right to left after the guitar. Most often you find first effects like wah pedal, booster, compressor, overdrive, distortion and others. After that - phaser, chorus, flanger, delay, etc. In most cases, the effects in the group immediately after the guitar are analogue, and in order to work, they need a comparatively low current, which rarely exceeds 10mA. The next group of effects includes pedals like delay, which consume about 100mA. This is the reason why effects with lower power consumption are situated on the right, and others – on the left.

For proper connection of all effects and minimizing ground loop problems and to reduce unnecessary loading of PowerboxMk2, it is good to comply with some recommendations. Refer to all user manuals of all your effects. Write down the power supply voltage and the needed current for each effect and put them in descending order according to the maximum current consumption.

- Effects with high power consumption – e.g. 350mA, should be powered from one of the first outputs of Powerbox Mk2, and it is recommended to leave the other output of the corresponding group unused.
- You can combine several effects which require voltage different than 9V in one group. It is better if they have similar current consumption.
- Positive ground effects must be in a separate group.
- Avoid combining two effects with high and low power consumption, for example delay and overdrive in the same group.

Remember: Connecting effects to a combined power block must be well considered. If you think you can't do it on your own, don't hesitate to contact us and we can prepare an optimal scheme of connection of all your effects, free of charge. All you need to do is send the brands and models of your effects to http://n-audio.net/contact. We will get back to you as soon as possible!

VII. Plugging Powerbox Mk2 in the electricity

Powerbox Mk2 is designed with a standard 50/60Hz transformer. It is pre-configured to work at either 220V or 110V. You should be aware that the power supply should not be changed. You cannot operate a 110V Pedal Power using 220V power without the correct step down transformer. If for any reason short a circuit occurs and none of the LEDs works, it is most likely the fuse has blown. It is located at the lower part of the mains socket and can be easily replaced. First, unplug the power supply cable, and with the help of a screwdriver pull out the fuse. Replace it with a new one. You don't have to search for a new one at the moment; there is a spare one in there. In this way, you will be sure that in case you need one, you have it at hand. Powerbox Mk2 works with a standard 20x5 fuse. At 220V use 200mA fuse, at 110V – 400mA.

VIII. What effects Powerbox Mk2 can't power?

You can't power effects working with alternating current (AC) – for example Digitech Whammy, and effects which require voltage or stronger current higher than the maximum for the device. **You have to check the manuals for your effects whether they are compatible with Powerbox Mk2!**

IX. Specification

Dimensions: 13x5x10cm
Weight: 1.05Kg
Power supply: IEC connector 230VAC 50/60Hz (Europe) or 110VAC 50/60Hz (USA)
Transformer: 50/60Hz transformer with a reduced flux density
Circuit board: 2mm two-sided gold plated circuit board
Safety: fuse, short circuit protection in outputs
Outputs: 10 outputs ø5.5/ø2.1mm divided in 5 galvanic split groups
Indication: 5 LEDs

Output voltage and maximum output current:

Outputs	Output voltage	Total maximum output current
1&2	9/12VDC	500mA
3&4	9/12VDC	500mA
5&6	9/12/15/18VDC	250mA
7&8	9.7VDC	50mA
9&10	9.7VDC	50mA

Powerbox Mk2 comes with 3-year warranty!