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general overview audio modules

Power supplies with transformer audiophile line filter power adapter basics switching power supplies

Efficiency in contradiction to EMC

Madness for music lovers

Were an order

Audiophile power supply

An adjustable analog power supply that pushes the envelope



Ready-to-install compact module up to 5A (without transformer)

For setting up high-end power supplies with adjustable/stabilized output voltage An audio circuit is only as good as its power supply, since the output signal consists 100% of the operating voltage, only modulated by the input signal. Our power supplies are therefore specially designed with this in mind. The focus here is on the simple applicability and adjustability for the self-builder, as well as the use of optimized components: selected electrolytic series and fast diodes from different manufacturers and many other details.

Unfortunately, this finished module is no longer available

Still available as a kit from phelektronik

General description Specially

designed for use as an audiophile power supply, where the voltage has a significant influence on the sound. Normally there is no substitute for an oversized electrolytic filter. It delivers a perfect voltage that delivers an extremely high and distortion-free current slew rate, but unfortunately only with no load. As soon as a load is connected, there is a superimposed ripple voltage of 100Hz, the level of which decreases with increasing capacity of the electrolytic filter, but does not approach zero. Therefore, voltage stabilization is preferred in many applications.

Applications 1. In

connection possibilities

circuits where a certain operating voltage must be maintained.

- 2. In circuits whose voltage must not change with different loads
- 3. In the case of hum problems caused by ground loops, especially when two devices are supplied by one power pack, as there is no hum voltage here.
- 4. In circuits that are extremely sensitive to ripple voltages, such as. eg amplifier stages without negative feedback, or highly sensitive inputs.
- 5. Tube heaters. Conversion from AC to DC voltage (transformer voltage must then be increased: 6.3V to at least 10V; 12.6V to at least 15V).

All important circuit details are consistently implemented.

Only 8A Superfast diodes are used as rectifiers. After the generously dimensioned electrolytic filter, the heart of the circuit follows: a 5 ampere controller IC, which innately has very good properties and has been made audiophile by further measures by us. This includes, among other things, an inductance in the output circuit selected through experiments. The choke between the output electrolytic capacitors ensures a particularly high stability of the control electronics with critical digital loads due to possible high current clock frequencies.

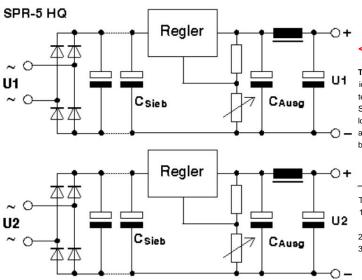
Due to this choke and other measures, unlimited large electrolytic capacitors can follow the output - contrary to many claims with other power supplies - and the parallel connection is simplified.

The output voltage is continuously adjustable from the respective maximum possible voltage down to approx. 1.3V. A potentiometer with 25 turns ensures sensitive adjustment. All modules are provided with M3x10mm spacer bolts

The output voltages can be used separately, in series or in parallel. If one of our electrolytic filter boards follows, the corresponding connection should be made at the output of the filter.

If the module is for a single voltage, both outputs can be connected in parallel.

The required AC voltage of the input transformer cannot be precisely determined in advance. Clue at bottom of page.



< basic circuit

Technical description 1. Two

identical, galvanically isolated voltage regulators 2. Strong connection terminals 3. Super-fast diodes with the corresponding performance 4. Several LOW-ESR filter capacitors connected in parallel 5. Stable and low-noise regulator with protective functions 6. Output voltage stabilized and adjustable: 1.3V to max 26V 7. High output capacities 8. Choke between the output electrolytic capacitors

The choke offers the following advantages:

- 1. Relief of the controller with digital loads that load the voltage with high clock frequencies.
- 2. Unlimited large electrolytic capacitors can also follow.
- 3. Better properties when the outputs are connected in parallel

< Different output circuits SPR-5HQ

1. Basic circuit Both

power packs are completely separate and the output voltages can be used independently of each other.

The two negative poles can also be connected, for example, so that two different voltages with a common negative potential are available.

2. Symmetrical output voltage (see also here)

The most common application of these power supplies. Ours, as well as most other audio modules, are supplied with such a voltage. Both halves are set the same, eg 2x18V (+/-18V) and connected in series by bridging the two middle terminals. This bridge serves as a zero point - also called mass or ground (GND). The voltage from plus to minus is the sum of the two individual voltages.

3. Parallel connection of the two outputs.

Used when only a single voltage is required. In this case, the maximum output current of the two halves adds up. So twice the current is available compared to a single output. It must be ensured that the two voltages are set exactly the same before parallel switching.

4. Series connection of the two outputs.

Is used when only a single voltage is required, the required level of which is higher than that of a single voltage, eg 1x48V at 2x24V. So twice the voltage is available compared to a single output. However, the current remains the same.

5. Parallel connection of the inputs

If only a single transformer voltage is available, the two inputs can also be connected in parallel. In this case, the outputs can also be connected in parallel. Another possibility would be to use each output voltage completely individually. It is not possible to connect the outputs in series if the inputs are connected in parallel.

SPR5 HQ



With this power supply, most audio modules in the small-signal range are optimally supplied. It is usually configured as a symmetrical power supply, as described in point 2 above. (e.g. +/-18V with input transformer 2x18V~)).

However, many other applications are conceivable, such as audiophile DA converters, music electronics of all kinds and industrial applications.

note max power loss!

The actually equipped electrolytic capacitors can deviate from the photos.

The global delivery situation does not always allow the same manufacturer to be used.

data per half

Max. input voltage:
Adjustable output voltage:: Max.
continuous output current: Max.
short-term output current: Max.
power loss per half: Stability:

Noise: Rectifier: Siebelkos:

Output electrolytic capacitors: Dimensions LxWxH* 1.3 - 26VDC 4A** 5A 12 watts 0.3%/A +20mV/A 0.003%/V 8A Superfast diodes

30VAC

 $7x2,200\mu F/50V = 15,400\mu F$ $2x2,200\mu F/50V = 4,400\mu F$ 120x86x40mm

*Height = from lower edge of circuit board

Price (incl. VAT)

108.00

<u>Unfortunately, this finished module is no longer available</u> as a kit from phelektronik Attention, before using the

power packs, set the output voltage to

under load

the required value and check it in the application under load.

**In the case of max. continuous current, it must be ensured that this can only flow

if the differential voltage between the input (seal capacitor in front of the controller) and the output does not exceed a maximum value SPR5-HQ = max 3V diff at 4.0A (3Vx4.0A =12W) see here With higher differential voltages, the max. current is correspondingly lower; eg

SPR5-HQ at 5V Diff = 2.4Amax; at 8V diff = 1.5Amax; It is

not recommended to constantly operate power supplies at the performance limit

Which transformer voltage is required for the respective output voltage?

- 1. The general rule: output voltage = transformer AC voltage only applies to a limited extent. The rectifier diodes have a fixed voltage drop of about 1.4 to 2 volts at full load. In addition, there is the control reserve of the power electronics of approx. 2-3V this results in a static loss of approx. 4-5 volts.

With a very low load, the DC output voltage can even be greater than the transformer voltage.

With an output voltage of 15V and below, the transformer voltage should be slightly higher than the output voltage. At 5V it should even be at least 9V transformer voltage.

However, because of the limited power loss, the transformer voltage should not be arbitrarily higher than the output voltage.

Machine Translated by Google he power that the electronic control system converts into heat. The calculation is actually quite simple. The general power formula is: current multiplied by voltage equals power. Since the control electronics consume energy, the entire power is never available as output power. In addition to the losses of the transformer, the heat is mainly caused by the heat from the control electronics, which is dissipated via a heat sink.

click on the graphic

This power loss is calculated using the formula: differential voltage of the controller (or input voltage minus output voltage) multiplied by the actual

current of the consumer.

If the maximum power loss is reached through extreme settings, the heat sink can reach a temperature of 85° to 105° degrees, depending on the housing and ventilation situation - this is harmless. The temperature of the nearby mounted electrolytic capacitors does not lead to overheating (max 50°). There are ventilation holes in the circuit boards underneath the coolers, which ensure better circulation if the bottom and top/rear wall of the case also contain holes.