**1216 AUDIOPHILE POWER SUPPLIER FOR PRE-AMPLIFIERS**
**± 9V …± 24V/1A**

## Description

Quasar kit No.1216 is part of a new line of constructions which combined form a full stereo system.

The line consists of the following KITS

| | |
|---|---|
| Quasar kit No.1214 | 6 inputs stereo selector |
| Quasar kit No.1215 | 6 input stereo pre-amplifier with pre-amplifying and recording outputs |
| Quasar kit No.1217 | Power supply ± 24V …± 80V-5A final amplifiers |
| Quasar kit No.1218 | Stereo amplifier 70W/8O with MOS-FET integrated circuit |

These may be used on their own or combined to create a stereo pre-amplifier or a powerful pre-amplifier or a powerful stereo amplifier or an integrated stereo amplifier or a multi-channel powerful stereo amplifier to be used for home cinema at very low cost when compared to commercial devices and quality equal to the best of them.
This kit has been developed in the Quasar Electronics laboratories, following the demand of many music lovers and sound professionals for symmetric stabilized low power supplier, specially designed for high fidelity audio applications, no adjustments required, protection from short-circuits, thermal protection and low cost.
The result is a power supplier which incorporates all the above specifications destined to power pre-amplifiers, RIAA equalisers, electronic crossovers, microphone pre-amplifiers, graphic equalizers and sound circuits in general. It is devoid of all kinds of network noise such us EMI and RFI.
The final plan was reached by computer simulation, production and tests of various prototypes and careful choice of materials.
The final result confirms what professionals in the planning laboratories and fanatic music lovers have been saying for years. That is that an amplifier is as good as its power supply.

## Technical Characteristics

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| Output rejection ripple | 82dB (100Hz) |
| Voltage stability | ±0,3 V |
| Output noise | 0,045 Vp-p |

Transformers required

For output voltage ±9-12V/1A a 2X12V-30VA transformer with Zener diode 1,3W 9 or 12 respectively.

For output voltage ±15-18V/1A a 2X18V-45VA transformer with Zener diode 1,3W 15 or 18 respectively.

For output voltage ±20-24V/1A a 2X22V-55VA transformer with Zener diode 1,3W 20 or 24V respectively.

## The circuit

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The power supplier is based on the well known power stabilizing integrated circuits LM317 (for positive supply) and LM337 (for negative supply).
The alternate power from the two independent secondary coils of the transformer is applied on points 1 and 2 for the one channel and 3 and 4 for the other channel.
Capacitors C1 and C2 which are connected in parallel with the coils of the transformer, prevent the input of various electromagnetic noises (EMI, RFI) which may be selected by the power transformer from the network or even produced by the transformer itself due to defaults in its construction.

Power resistances R1, R2, R3 and R4 ensure 'soft start' charging for filter electrolytic capacitors C11 and C12, diminishing the danger of absorption of a great mass of current during initial powering. Furthermore it ensures the protection and longevity of the whole rectifying sequence.
Diodes D1, D2, D3 and D4 as well as D5, D6, D7 and D8 are rectifying sequences for the alternating voltage.
The RC bridges, which are connected in parallel with each rectifying diode, that is resistances R5…..R12 and capacitors C3….C10, function as EMI filters.
Diodes D9, D10, D11 and D12 protect the integrated circuits from reverse voltages which may appear when the power supply begins to work and until electrolytic capacitors C11 and C12 are charged.
Diodes D13 and D14 protect the device supplied with power from reverse voltages which may appear when the power supply stops working and until electrolytic capacitors C11, C12, C23, C24 are totally de-charged with the help of resistances R 13 and R14.
The RC bridges, energized by resistances R17 and R18 and capacitors C17 and C18 prevent any tendency towards supersonic oscillation of these particular integrated circuits.
The voltage of diodes DZ1 and DZ2 determines the output voltage of the power supplier.
Capacitors C19 and C20 stabilise the reporting voltages of the zener diodes and also rid them from ripple.
In the table of materials these diodes are referred to as 15V/1,3 W as the demand for symmetric power voltage ± 15V is the most usual for pre-amplifier circuits, headphones amplifiers, electronic crossovers etc.
Finally polyester capacitors C13, C14, C21, C22, C25 and C26 are connected in parallel with the electrolytic capacitors of the circuit and improve the performance of the power supply especially at high frequencies.

**Construction**

The construction of the kit is easy provided the instructions are followed carefully.
The only tools needed will be a soldering iron, small cutter and a tweezer. The soldering is included in the packaging.
Before positioning each component, especially the resistances and the diodes, you can shape them with the tweezer which will help you bend the pins and give your construction a professional look.
Use a 15-25 Watt soldering iron. Do not use "solderin" as contemporary soldering wires contain all the materials necessary for effective soldering. Heat the soldering point (pad) together with the pin of the component for 3-5 seconds and approach the wire. The soldering material melts and stretches out around the soldering point

creating a small shining cone. Remove the soldering tool and do not move the board for 5-10 seconds until the soldering point stabilizes.
A correctly soldered point is shiny and uniform around the conductor. The cold soldering point is not uniform. It is dim and creates problems to the circuit.
Cut the excess wire with the cutter.
Begin the construction by soldering jumpers jumper J1 and J2, which are in the center of the board, with simple wire.
Then solder the resistances and the diodes taking special care where their polarity is concerned. Look at the printed circuit on the upper side of the board and at the plans that accompany the kit. After that solder all the pins and the polyester and electrolytic capacitors in the way they are designed on the silk-screen print of the board. Finally solder the two integrated-stabilisers IC1 and IC2 after you screw them tightly on their heat sinks. Then fix them on the board, screwing the screws from the back side. At this point look at the instructions and plans that accompany the kit once more.
Check the position and polarity of the components and their soldering. If everything is correctly placed, make the following connections :
To points 1 and 2 (positive voltage) and 3 and 4 (negative voltage) connect the independent secondary coils of the transformer. Power the primary carefully at 230 Volt after connecting a switch on the one line and a secure fuse-box (not included in the circuit) on the other. Assisted by a multimeter positioned at Volts/0-30V, check whether there is 15 Volt voltage at points 5(+) and 6(-). Do the same for points 7(-) and 6(+).
With the black pin of the multimeter attached to point 6 and the red to point 5 the organ should show 15 Volt (positive voltage).
With the black pin on point 6 and the red on point 7 the organ should show -15Volt (negative voltage).

If you encounter problems disconnect the power source and check all the components, soldering points and connections and try again.

**If it doesn't work…**

Have you soldered all the components ? Turn the board upside down and check all the soldering points one by one. If any one seems cold then heat it once again with the soldering tool. The cold soldering point does not shine and is dim. It creates a knot around the conductor and problems to the circuit. Carefully check the position and direction of each component, comparing it to the topographic diagram, the table of the materials and the theoretic circuit.

Check whether the bridges, diodes and the integrated circuits have been placed correctly. Make sure you have not placed a component in a wrong position.
If the incorrectly placed component is sensitive, for example a diode, zener, IC, de-solder it carefully and before you place it in its correct position check it, if this is possible. If you are in doubt it is better to replace it with a new one as apart from the problems it may create to the circuit is may also destroy something else too.

The circuit has been designed to function at the power level stated in the plans. A power level different than that recommended will not only not give you the expected results but may also result in destroying one of the components or even the circuit itself. This is also valid in the cases of reversed polarity power.

If you have used excessive amounts of 'solderin' it is possible that its residues on the printed circuit create problems. Carefully clean up the board with a cleaning spray (Electrolube PCC 200H or something similar) or acetone or any other similar solvent. Cleaning up the board will also help you examine it for short-circuits or omissions.

It is possible that while soldering you may have short-circuited 2 adjacent pads of the printed circuit together, especially the small feet of the ICs or any other of the modern tiny materials. Carefully check all the soldered points and adjacent pads of the printed circuit.
Make sure you have made all the connections correctly. If not, look at the external connections diagram which accompanies the construction instructions. The connections for the powering of the circuit, the polarity, the position and direction of the components on the board are found on the diagram.
If the above instructions have been correctly followed the device should function.

## The materials

| | | |
|---|---|---|
| **Resistances** | | |
| R1…R4 | 10O /2-5Watt | power resistance |
| R5…R12 | 470KO - 1/2W - 5% | (yellow, purple, yellow) |
| R13, R14 | 3,3KO - 1/2W - 5% | (orange, orange, red) |
| R15, R16 | 27O - 1/4W - 5% | (red, purple, black) |
| R17, R18 | 2,7O - 1/4W - 5% | (red, purple, gold) |
| **Capacitors** | | |
| C1, C2 | 1,5 nF (1n5 ? 1500p ? 152) | polyester capacitor |
| C3…C10 | 10 nF (0,01µF ? .01 ? 103) | polyester capacitor |
| C15, C16 | 100 nF (0,1µF ? .1 ? 104) | polyester capacitor |
| C21, C22 | 100 nF (0,1µF ? .1 ? 104) | polyester capacitor |
| C25, C26 | 100 nF (0,1µF ? .1 ? 104) | polyester capacitor |
| C13…C14 | 220 nF (0,22µF ? .22 ? 224) | polyester capacitor |
| C17, C18 | 1 µF (1µF ? 1 ? 105) | polyester capacitor |
| C19, C20 | 10µF / 40V | electrolytic capacitor |
| C23, C24 | 220µF / 40V | electrolytic capacitor |
| C11, C12 | 2.200µF / 40V | electrolytic capacitor |
| **Diodes** | | |
| D1…D8 | 1N5401 | diode 100V/3A |
| D9…D14 | 1N4001 | diode 100V/1A |
| DZ1, DZ2 | 15V/1,3W | zener diode* |
| **Circuits** | | |
| IC1 | LM317T | positive stabiliser |
| IC1 | LM337? | negative stabiliser |

*For different output voltage see technical characteristics above

Various Quasar kit board No 1216, 7 pins, solder, 2 heat sinks for IC1, IC2, 2 screws 3X12, 2 nuts, 4 screws to fix the heat sinks on the board

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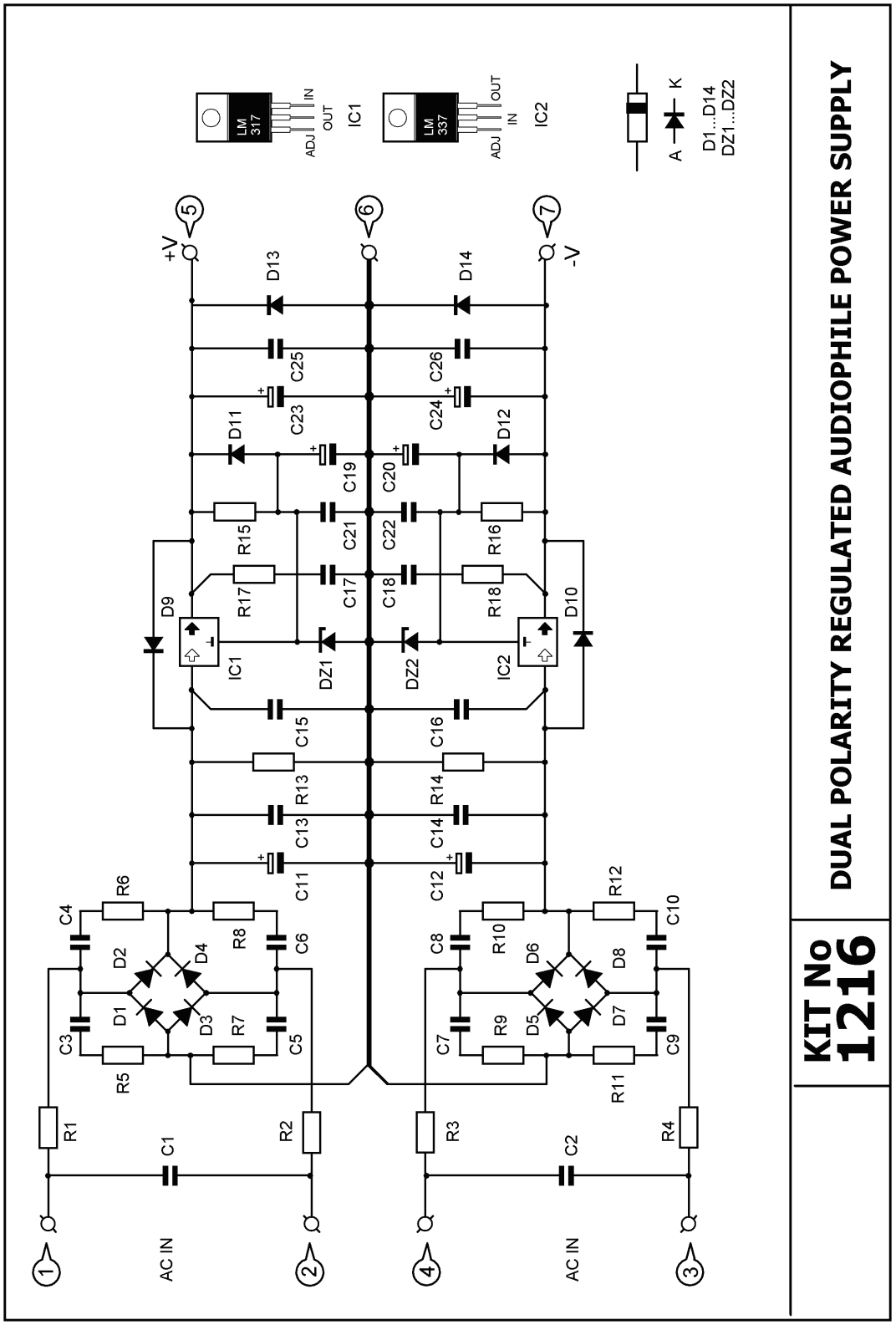

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