**1215 - AUDIOPHILE STEREO LINE LEVEL PRE-AMPLIFIER or CLASS "A" HEADPHONE AMPLIFIER**

## Description

Quasar kit No. 1215 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.1216 Power supply ± 9V …± 24/1A for pre-amplifiers
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 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 is a stereo pre-amplifier of high quality specifications destined to function with any audio source in order to boost its signal without any distortion and 'lead' any final amplifier such as Quasar kit No. 1218 or any other with similar quality specifications but with bigger or smaller power.
It can also be used to lead electrodynamic headphones with combined resistance of at least 600O or bigger, offering sound of incomparable quality in Class A functioning with a stabilized power supply for those who seek high quality personal listening experiences.
The printed circuit on which the pre-amplifier is assembled is especially designed so that its soldered paths do not introduce parasitic capacities which could lead the circuit to ultrasonic oscillations, to produce negligible ohm resistance and provide separate grounding for each channel.

## Technical Characteristics

| | |
|---|---|
| Input sensitivity | 250mV for 1 Volt output |
| Maximum Input voltage | 4 Volt |
| Combined input resistance | 50KO |
| Combined output resistance | 100O |
| Harmonic distortion | 0,01% (20Hz-1KHz-output voltage 1,2V) |
| Internal distortion | 0,04% (20Hz-1KHz-output voltage 1,2V) |
| Frequency response | 5Hz…140KHz (±1dB – output voltage 1,2V) |
| Response voltage | 8V/µsec |
| Gain | 12dB |
| Power | ±15V / 100mA |
| Transformer | 2X15V/30VA |

## The circuit

The pre-amplifier circuit consists of 3 stages.
The input – adjustment stage of the acoustic sources with 6dB gain.
The second stage of voltage amplification with a gain of 6dB too.

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The stage of output power amplification.

The description of the function will be done for the one channel. The components shown in parentheses regard the relevant materials for the other channel e.g. R1 (R51). For convenience reasons the numbering of the components of the one channel begin with 1 and of the other with 51.
The first stage is created around the well known for its high fidelity sound performances NE5534. This stage functions in Class ? . The special connection of transistors T1 (T51) and T2(T52) connected as a power source with resistances R6, R7 (R56, R57) which oblige the transistors of the performing amplifier to be led continuously and always function in Class A.
The R1,R2 and C1 netting contributes to the protection of the input with capacitor C1(C51) functioning as a passing filter of only the alternating component of the input signal, with R1(R51) assigning the input resistance of the pre-amplifier and R2(R52) protecting the negative input of the amplifier from the capacity of the input capacitor. In the same way the output is protected by resistance R4(R54). Capacitor C2 counterbalances for the improvement of the frequency response whilst it simultaneously controls possible oscillations of the performing amplifier.
The negative recoupling of this level is applied from the output to the negative (-) input (pin 2) of the amplifier and determines the amplification of the voltage of the first level of the pre-amplifier.
Capacitor C7(C57) restricts the repeated tendencies for deflection of the performing amplifier IC1(IC51) to reach potentiometer P1.
From the output of the first performing amplifier IC1(IC51) (pin6) through capacitor R22 (R72) the amplified by 6bB signal of the selected source is led to the output for recording (board pin no. 3 for the left channel and 13 for the right channel).
From the output of the first level through capacitor C7(C57) and potentiometer P1 the signal is led to the second level IC2 (IC52). Resistances R10(R60) protect the negative input of the amplifiers from the capacity of input capacitor C7 (C57). The output is protected by resistance R16 ( R66) in the same way.
Resistance R9 (R59) converts the alteration ratio of the resistance of potentiometer P1 (double) from linear to logarithmic without the disadvantages of the logarithmic potentiometers.
The functioning of the second level is absolutely the same with that of the first one the only difference being that the output of the second performing amplifier IC2 (IC52) leads to a power amplifier that consists of power transistors T5(T55) and T6(T65). Diodes D1, D2 andD3 (D51) (D52) and (D53), pole the power amplifier so that it functions in Class A whilst capacitor C13 (C63) stabilizes the polarity voltage which comes from these diodes.
Resistance R21 (R71) isolates the capacity of the coupling wire with the power amplifier and of course determines the output resistance of the pre-amplifier.
Finally capacitors C3 (C53) and C4 (C54) C5 (C55) C6 (C56) C9 (C59) C10 (C60) C11 (C61) C12 (C62) C14 (C64) C15 (C65) C16 (C66) and C17 (C67) filter the last remnants of switching current from the current lines before they reach pins 4(14) (-) and 5 (15) (+) and create noise and interferences to the signal. Every electrolytic capacitor is connected in parallel with a polyester capacitor of smaller capacity in order to improve the characteristics of the filter.

**Construction**

The construction of the kit is easy provided the instructions are followed carefully.
Each new board is assembled by one of our laboratory technicians who notes all the difficulties a beginner may encounter. Following this the 'Construction' part of this manual is written.
Lay out the components by categories (resistances, capacitors, diodes, transistors etc.).
The only tools needed are a soldering iron, small cutter and a tweezer. The soldering is included in the packaging.
Use a 15-25 Watt soldering iron. To better bend the more bulky components that have big pins use the tweezer.
Start soldering the resistances. If you do not know the colors you will find them noted next to each resistance value on the table of materials as well as on the back side of the kit packaging.
Then solder the 6 diodes (D1, D2, D3 – D51, D52 and D53). We remind you at this point that the diodes are not so many but that the materials of the other channel begin from number 50. This means that, for example material R7 is R57 for the other channel.
The reason we do the soldering of the diodes at this point is that they are components of small height and thickness. This means that when you turn the board to do the soldering they will not fall off or get out of position.
Now solder the small ceramic capacitors and after that the 4 bases of the integrated circuits, making sure their grooves fit with the relevant ones sketched on the board.
Following that, proceed with polyester capacitors C1, C3, C9, C11, C13, C17 and C18 as well as C51, C53, C59, C61, C63, C67 and C68. Do not solder capacitors C7 and C57 yet. Now solder all the electrolytic capacitors. You will be assisted by the silk-screen printing of the board where both the positive (+) and the negative (-) pins of each of them appears.
Following that solder all the pins which will be used to bond the board with its peripherals (power, inputs-outputs).
First solder transistors T1, T2, T3 and T4 as well as T51, T52, T53 and T54 and following that T5 and T6 as well as T55 and T56 of the other channel. Before you solder them on the board you must screw them on a type "P" heat sink with a 3X12 screw and the relevant nut.
Finally solder the two big capacitors C7 and C57 and the potentiometer.
Put the integrated circuits on their bases (the grooves for all of them face the right side of the board). Take care not to bend any of the small legs when you insert them in the bases. Your pre-amplifier is ready. What remains is a thorough double checking before you power it.

**Functioning**

If you are absolutely certain that you have not made any mistakes or you have not omitted one of the steps proceed to do the following connections :

At points 4(-) 14(-) and 5(+) and 15(+) and 6 (16) (common) connect power source ±15V / 100mA. Quasar kit No. 1216 is suitable for this job.

At points 1 (signal) and 2 (grounding) connect with an coaxial wire to the output of a sound source (CD or DVD player, radio, cassette player) or to the output of board SK 1214. Finally from points 7 (L OUT) and 6 (GND) and 17 (R OUT) and 16 (GND) with a coaxial wire lead the signal to the output of a final amplifier. Quasar kit No. 1218 is suitable for this purpose.
Power the circuit and power-on the signal source you have connected to the input. Adjust the potentiometer and if all has gone well you will listen to the sound from the source (CD or DVD player, radio, cassette player). It will be crystal clear. After at least 20 hours of continuous functioning of the pre-amplifier you will be able to relish the 'body' and the 'timber' of perfect sound.
From points 3 and 13 (for the other channel) and from grounding point 6 and 16 (for the other channel), you may get the stereo signal ready for recording to a cassette player or CD-R/RW or even to a computer through a sound processing program and of course a card that has AUX input.
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 diodes and the integrated circuits have been placed correctly. Make sure you have not placed a component in a wrong position.
If an incorrectly placed component is sensitive, for example a diode, 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.

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## Parts List

| | | |
|---|---|---|
| R1, R51 | 100KO - 1/4W - 5% | (brown, black, yellow) |
| R2, R52 | 470O - 1/4W - 5% | (yellow, purple, brown) |
| R3, R53 | 2.2KO - 1/4W - 5% | (red, red, red) |
| R4, R54 | 2.2KO - 1/4W - 5% | (red, red, red) |
| R5, R55 | 100O - 1/4W - 5% | (brown, black, brown) |
| R6, R56 | 100O - 1/4W - 5% | (brown, black, brown) |
| R7, R57 | 100O - 1/4W - 5% | (brown, black, brown) |
| R8, R58 | 27KO - 1/4W - 5% | (red, purple, orange) |
| R9, R59 | 15KO - 1/4W - 5% | (brown, green, orange) |
| R10, R60 | 470O - 1/4W - 5% | (yellow, purple, brown) |
| R11, R61 | 2.2KO - 1/4W - 5% | (red, red, red) |
| R12, R62 | 2.2KO - 1/4W - 5% | (red, red, red) |
| R13, R63 | 100O - 1/4W - 5% | (brown, black, brown) |
| R14, R64 | 100O - 1/4W - 5% | (brown, black, brown) |
| R15, R65 | 27KO - 1/4W - 5% | (red, purple, orange) |
| R16, R66 | 100O - 1/4W - 5% | (brown, black, brown) |
| R17, R67 | 4,7? O - 1/4W - 5% | (yellow, purple, red) |
| R18, R68 | 4,7? O - 1/4W - 5% | (yellow, purple, red) |
| R19, R59 | 10O - 1/4W - 5% | (brown, black, black) |
| R20, R70 | 10O - 1/4W - 5% | (brown, black, black) |
| R21, R71 | 47O - 1/4W - 5% | (yellow, purple, red) |
| R22, R72 | 4,7? O - 1/4W - 5% | (yellow, purple, red) |
| R23, R73 | 10O - 1/4W - 5% | (brown, black, black) |
| P1 | 2X100KO ? | linear potentiometer |
| C1, C51 | 1 µF (1µF ? 1 ? 105) | polyester capacitor |
| C2, C52 | 22pF (22J ? 22p ) | ceramic capacitor |
| C3, C53 | 100 nF (0,1µF ? .1 ? 104) | polyester capacitor |
| C4, C54 | 47µF /50V | electrolytic capacitor |
| C5, C55 | 100 nF (0,1µF ? .1 ? 104) | polyester capacitor |
| C6, C56 | 47µF /50V | electrolytic capacitor |
| C7, C57 | 2,2µF (2µ2 ? ? 225) | polyester capacitor |
| C8, C58 | 22pF (22J ? 22p ) | ceramic capacitor |
| C9, C59 | 100 nF (0,1µF ? .1 ? 104) | polyester capacitor |
| C10, C60 | 47µF /50V | electrolytic capacitor |
| C11, C61 | 100 nF (0,1µF ? .1 ? 104) | polyester capacitor |
| C12, C62 | 47µF /50V | electrolytic capacitor |
| C13, C63 | 1 µF (1µF ? 1 ? 105) | polyester capacitor |
| C14, C64 | 100µF /50V | electrolytic capacitor |
| C15, C65 | 100 nF (0,1µF ? .1 ? 104) | polyester capacitor |
| C16, C66 | 100µF /50V | electrolytic capacitor |
| C17, C67 | 100 nF (0,1µF ? .1 ? 104) | polyester capacitor |
| C18, C68 | 100 nF (0,1µF ? .1 ? 104) | polyester capacitor |
| D1…D3 | 1N4148 | general use diode |
| D51…D53 | 1N4148 | general use diode |
| T1…T4 | BC560 | PNP transistor |
| T51…T54 | BC560 | PNP transistor |
| T5, T55 | BD139 | NPN power transistor |
| T6, T56 | BD140 | PNP power transistor |
| IC1, IC51 | NE5534 | final sound amplifier |
| IC2, IC52 | NE5534 | final sound amplifier |

Various: Quasar kit No 1215 Board, 14 pins, solder, 4 small type 'P' heat sinks, , 4 screws 3? 12, 4 nuts, 4 sockets 8 DIL.

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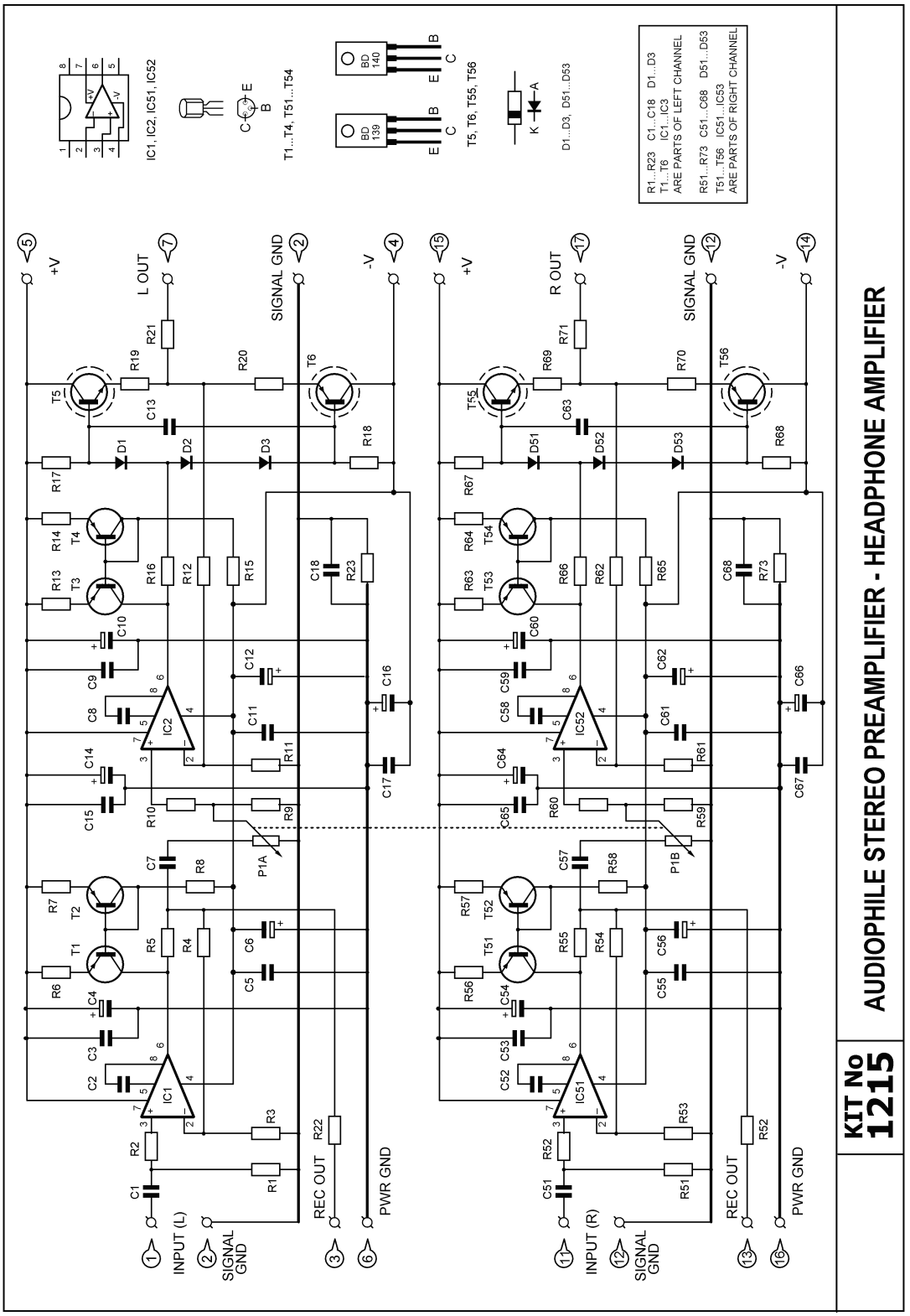

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