1218 - 75 Watt Audiophile Audio Amplifier

Description

Quasar kit No.1218 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.1216	Power supply for pre-amplifiers
Quasar kit No.121	Power supply for amplifiers

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 a powerful and reliable amplifier, specially designed for high fidelity audio applications, no adjustments required and low cost.
The result is a powerful amplifier which is easy to construct and destines to work with the new Audiophile Quasar kit range or any other similar pre-amplifier.
The final plan was reached by computer simulation, production and tests of various prototypes and careful choice of materials.
The result confirms the correct choice of the integrated circuit, design and the perfect collaboration between the components of the new Audiophile Series which is destined for music lovers who demand perfect sound at low cost.
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.
Quasar kit no. 1218 can be used in bi-channel and poly-channel amplifiers and can collaborate with any electronic crossover helping you construct active (subwoofer) or (2-way) or (3way) or (more ways) loudspeakers of high fidelity.

Technical Characteristics

Power output	50W RMS/8O (75W/4O)
Harmonic distortion	**<0.05%** (20Hz…20KHz/25 Watt)
Ratio of signal to noise	**105dBA** (1W @ 8 Ohm)
Frequency response	15Hz - 100KHz
Voltage ripple	10V/µsec
Power	±35V
Current required	2A by power supply polarity
Suitable power supply	Quasar kit No. 1216
Suitable transformer	2X22V/80VA per channel

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The circuit

The circuit of the final amplifier is based on the well-known integrated circuit TDA 7294 of ST Microelectronics.
This is a fantastic integrated circuit which although small can produce an output of 70W continuous current in 8Ω charge. It also has a variety of circuits to protect it from overloading and short-circuiting as well as a mute circuit. It comes in a Multiwatt 15 type case (15 meaning that the circuit has 15 pins). According to the manufacturing company it is ideal for use in home cinema, active loudspeakers and big televisions applications. Its main characteristics are

- High power function up to ±40V
- Output level with MOSFET power transistor
- High output power (over 100 Watt musical power)
- Muting and Stand by capability
- No noise for ON/OFF
- No filter to protect output required (Zobel or Boucherot)
- Very low distortion
- Very low noise
- Short-circuit protection
- Thermal protection

Due to the above characteristics it is used by many manufacturers of high fidelity products.
This integrated circuit uses only a few passive components because all the functions are automatically executed by the circuit itself. The components and their role are described here below:

How it works:

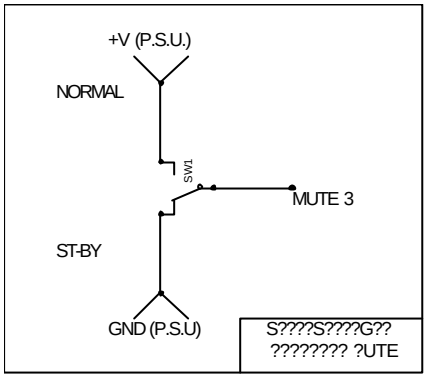
The input sound signal, from the output of a pre-amplifier (e.g. Quasar kit No. 1215) is applied to point 1 of the board.

Resistance R2 defines the input resistance of the amplifier and together with input capacitor C1 create a subsonic filter.

Bridge RC, consisting of resistance R2 and capacitor C2, create a supersonic filter that protects the amplifier from high frequency parasites that come from various home appliances, such as dimmers, mobile phones, motors etc., which may reach its input.

Resistances R3, R4 and R5 together with capacitors C3, C4 and C5 and diodes D1 and D2 create negative feedback bridging which determines the frequency response width.
Capacitors C12, C13, C14, C15, C16, C17, C18 and C19 together with diodes D3 and D4 filter the power voltage of the integrated circuit and simultaneously protect the loudspeakers from the increase in distortions in cases of over current of the input of the amplifier.

Resistances R6, R7 and R8 together with diode D9, switch S1 and capacitors C8 and C9 cooperate with the STAND BY circuit to protect the budspeakers from noises when the amplifier is opened or shut off. A 3 stage miniature ON/OFF switch is required to control the STAND BY function regardless of the number of channels (Quasar kit No. 1218) which are used at the amplifier. The central pin of the switch receives as many wires (Ø 0,25mm²) from pin 3 (MUTE) as the number of the boards of the final amplifiers used. When the switch grounds pin 3 (MUTE), the amplifier goes to STAND BY mode whilst when it is brought to positive the amplifier is energized. Finally, capacitor C6 improves the response of the amplifier in low frequencies whilst capacitor C7 is omitted and not included in the packaging (it is part of a modified circuit). Bridge R9, C20 connects the two groundings signal GND and the power GND. This is done so that some random noises that enter the network and are not rejected by the power supply do not enter the line of the signal and create distortions (a good reason to prefer power supply Quasar kit no. 1117).



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 tweezers. The soldering is included in the packaging.
Use a 15-25 Watt soldering iron. Does 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. To better bend bulky components with thick pins use the tweezers.

Begin by soldering jumpers J1 and J2 with a simple wire. Then solder the resistances and diodes taking care with their polarity. Look at the instructions and the plans that accompany the kit.
Now solder all the pins, the polyester capacitors and the electrolytic capacitors as shown on the silk screen print on the board. Finally after you screw the integrated circuit on the heat sink interposing the mica (otherwise you will encounter problems as pin 9 (-V signal) is internally connected to the metallic part of the circuit) solder the integrated circuit), solder it. At this point you may once more have a look at the instructions.

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.

Make sure you have correctly placed the bridges, diodes and integrated circuits and that you have not placed a component in a wrong position.
If the 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. 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.
Carefully clean all neighbouring points and if you discover a cut connect the points with a small piece of wire.

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	470O - 1/4W - 5%	(yellow, purple, brown)
R2, 3, 6	22KO - 1/4W - 5%	(red, red, orange)
R4	1KO - 1/4W - 5%	(brown, black, red)
R5	470? O - 1/4W - 5%	(yellow, purple, yellow)
R7	100KO - 1/4W - 5%	(brown, black, yellow)

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R8	47?O - 1/4W - 5%	(yellow, purple, orange)
R9	10O - 1/4W - 5%	(brown, black, black)
Capacitors		
C1	1µF (1µF ? 1 ? 105)	polyester capacitor
C2	2,2nF (2n2 ? 0.0022 ? 222)	polyester capacitor
C3, 4	47µF / 63V	electrolytic capacitor
C5	820 nF (0,82µF ? .82 ? 824)	polyester capacitor
C6	47µF / 63V	electrolytic capacitor
C7*	47µF / 63V	electrolytic capacitor
C8, 9	10µF / 63V	electrolytic capacitor
C10, 11	10nF (0,01µF ? .01 ? 103)	polyester capacitor
C12, 13	1000µF / 50 - 63V	electrolytic capacitor
C14, 15	100nF (0,1µF ? .1 ? 104)	polyester capacitor
C16, 17	470µF / 50 - 63V	electrolytic capacitor
C18, 19, 20	100nF (0,1µF ? .1 ? 104)	polyester capacitor
Diodes - Bridges		
D1, 2	1N4148	diode
D3, 4, 5	1N4001…7	diode
Integrated - IC		
IC1	TDA7294	integrated circuit amplifier

Various : Quasar kit no 1218 board, 7 pins, solder, heat sink (PL30/75 – one hole) for IC1, screw 3x12, nut, mica

- *Notice* Capacitor C7 *(47µF / 63V) is not used in this circuit. It is part of a modified circuit.*

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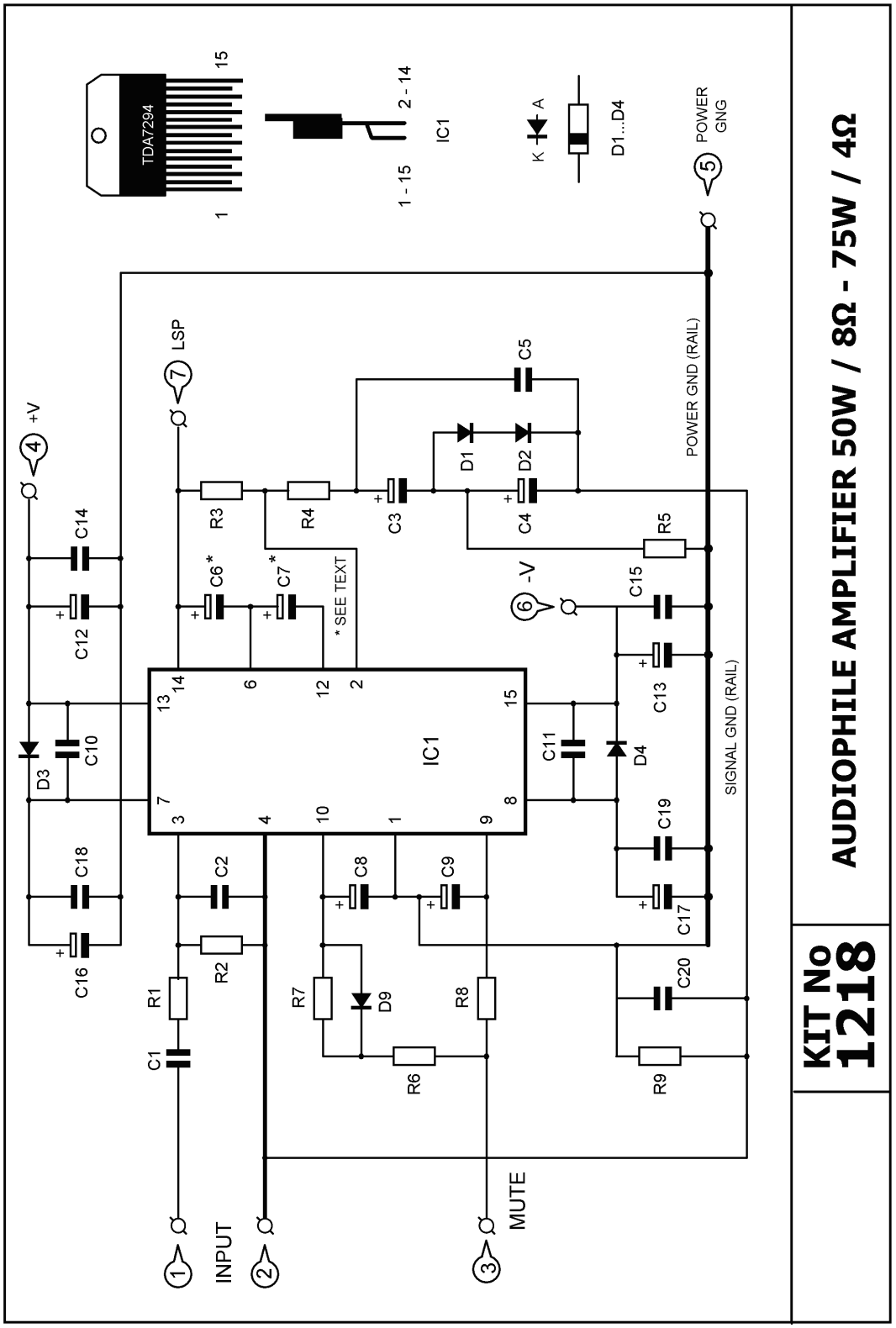

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