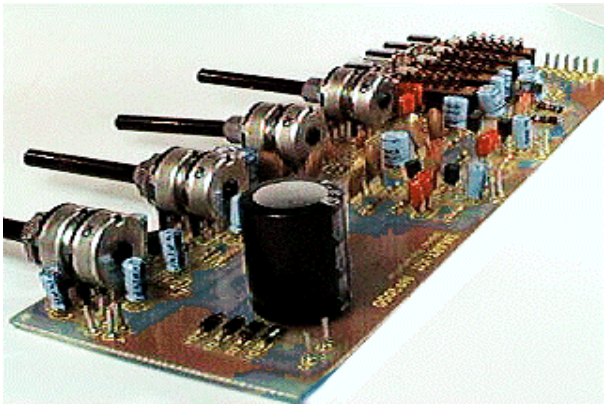
QUASAR ELECTRONICS KIT No. 1050

3-INPUT STEREO PREAMPLIFIER



General Description

This is a hi-fi preamplifier for the most demanding, that incorporates scratch filter, recording output, RIAA equalisation for the P.U. input, and has all the selector and function switches mounted on the p.c. board to keep interconnections low.

Technical Specifications - Characteristics

Working voltage: 18 V DC
Current: 100 mA
Inputs: 3
Frequency response: 20Hz - 20KHz

How it Works

The circuit is very simple. It consists of four transistors for each channel which form three distinct stages. Please note that throughout the description of the circuit and the construction instructions the components that appear in both channels are marked with two numbers in their code, one of which is enclosed in parenthesis (i.e. TR1(2)). The number in parenthesis is that of the same component in the other channel and is marked thus to help you find it in case you have to make a repair, and also to help you identify the component when you are building the circuit. The first stage which is built around TR5(7) & TR6(8) is the P.U. (magnetic head) preamplifier and RIAA equaliser. As you probably know the information on the record is recorded with a lot of emphasis added to the high frequencies and it is necessary to bring the signal back to normal before listening to the record because otherwise it would be unnaturally distorted with very predominant high frequencies. After the P.U. input circuit there is another voltage amplifier stage using TR3(4) and the output of this circuit is passed on to the tone control which is a classic, BAXANDALL type, passive tone control circuit. The final stage which is also the output of the preamplifier uses the fourth transistor TR1(2) and in it there are the volume and balance controls of the circuit. There is also a power supply stage on the circuit which is common for both channels and which consists of a rectifier bridge, a smoothing capacitor

and a zener diode to keep the supply voltage steady. The switches that can be seen in the circuit are of the push button type and are the input selectors for the TUNER, TAPE and PICK-UP (S1,2 and 3 respectively), MONO-STEREO (S4) selector and SCRATCH (S5) function switch. The recording output is taken just before the tone controls so that the signal which goes to the recorder does not get distorted in any way by the controls. The potentiometers are VR1,2 (BASS-TREBLE), VR3 (VOLUME) and VR4 (BALANCE) controls and they are all twin STEREO types which help to keep crosswalk between channels as low as possible.

Construction

First of all let us consider a few basics in building electronic circuits on a printed circuit board. The board is made of a thin insulating material clad with a thin layer of conductive copper that is shaped in such a way as to form the necessary conductors between the various components of the circuit. The use of a properly designed printed circuit board is very desirable as it speeds construction up considerably and reduces the possibility of making errors. Quasar Electronics Kit boards also come pre-drilled and with the outline of the components and their identification printed on the component side to make construction easier. To protect the board during storage from oxidation and assure it gets to you in perfect condition the copper is tinned during manufacturing and covered with a special varnish that protects it from getting oxidised and also makes soldering easier.
Soldering the components to the board is the only way to build your circuit and from the way you do it depends greatly your success or failure. This work is not very difficult and if you stick to a few rules you should have no problems. The soldering iron that you use must be light and its power should not exceed the 25 Watts. The tip should be fine and must be kept clean at all times. For this purpose come very handy specially made sponges that are kept wet and from time to time you can wipe the hot tip on them to remove all the residues that tend to accumulate on it.
DO NOT file or sandpaper a dirty or worn out tip. If the tip cannot be cleaned, replace it.
There are many different types of solder in the market and you should choose a good quality one that contains the necessary flux in its core, to assure a perfect joint every time.
DO NOT use soldering flux apart from that which is already included in your solder. Too much flux can cause many problems and is one of the main causes of circuit malfunction. If nevertheless you have to use extra flux, as it is the case when you have to tin copper wires, clean it very thoroughly after you finish your work. In order to solder a component correctly you should do the following:
- Clean the component leads with a small piece of emery paper.
- Bend them at the correct distance from the component's body and insert the component in its place on the board.
- You may find sometimes a component with heavier gauge leads than usual, that are too thick to enter in the holes of the p.c. board. In this case use a mini drill to enlarge the holes slightly. Do not make the holes too large as this is going to make soldering difficult afterwards.
- Take the hot iron and place its tip on the component lead while holding the end of the solder wire at the point where the lead emerges from the board. The iron tip must touch the lead slightly above the p.c. board. - When the solder starts to melt and flow wait till it covers evenly the area around the hole and the flux boils and gets out from underneath the solder.
The whole operation should not take more than 5 seconds. Remove the iron and allow the solder to cool naturally without blowing on it or moving the component. If everything was done properly the surface of the joint must have a bright metallic finish and its edges

should be smoothly ended on the component lead and the board track. If the solder looks dull, cracked, or has the shape of a blob then you have made a dry joint and you should remove the solder (with a pump, or a solder wick) and redo it.
Take care not to overheat the tracks as it is very easy to lift them from the board and break them.
- When you are soldering a sensitive component it is good practice to hold the lead from the component side of the board with a pair of long-nose pliers to divert any heat that could possibly damage the component.
- Make sure that you do not use more solder than it is necessary as you are running the risk of short-circuiting adjacent tracks on the board, especially if they are very close together.
- When you finish your work cut off the excess of the component leads and clean the board thoroughly with a suitable solvent to remove all flux residues that may still remain on it.

The construction of the preamplifier could not be done any easier. The p.c. board is marked on its component side with all the components involved and their correct orientation wherever this is necessary. The large number of components however and the requirements for high quality performance call for a very careful construction. Try to follow the component list and check each component in the list as you solder it on the board to make sure that you do not forget anything which will be much more difficult to find and solder in its place afterwards. The components should be soldered in a logical sequence starting from those which are not so sensitive to heat and proceeding towards the most delicate ones which are typically the semiconductors. If you choose this way to build your circuit you will have a checklist to help you make sure that everything has been done properly. We propose that you start soldering from the pins, you follow them up with the switches, the resistors, the capacitors taking care to insert the electrolytic properly as they are polarised and will be damaged if they are connected the wrong way round, the transistors and the diodes and finally, not because of their sensitivity but rather because of their bulk, you mount the potentiometers on the board. The potentiometers are all of the same value and look identical but you should make sure that the logarithmic one is used as the volume control if you want to have a natural and smooth variation of the volume of your music when you turn it.
Clean the board very well with a solvent to remove any traces of flux from the copper side, and make a visual inspection to ensure that there are no short circuits, missing components etc. Then make the following connections:
- Pins 11, (12) and 7, TUNER input, signal and ground respectively.
- Pins 13, (14) and 7 TAPE input, signal and ground respectively
- Pins 8, (9) and 7 P.U. input, signal and ground respectively.
- Pins 15, (16) and 7 RECORDING outputs, signal and ground respectively.
- Pins 3, (5) and 4, (6) output signal and ground respectively with the power amplifier, or the equaliser if you are going to use one.

These connections it is absolutely necessary to be made with special shielded audio cable to eliminate interference and noise of external origin.
- The secondary winding of 24 V/0.5 A mains transformer is connected at points 1 and 2.
Double check the above connections, make sure there will be some signal in one of the inputs, select it and turn the power on. You should be able to hear whatever you have selected from your amplifier, with very good quality, and the controls of the preamplifier should respond accordingly.

Adjustments

This kit does not need any adjustments, if you follow the building instructions.

Warning

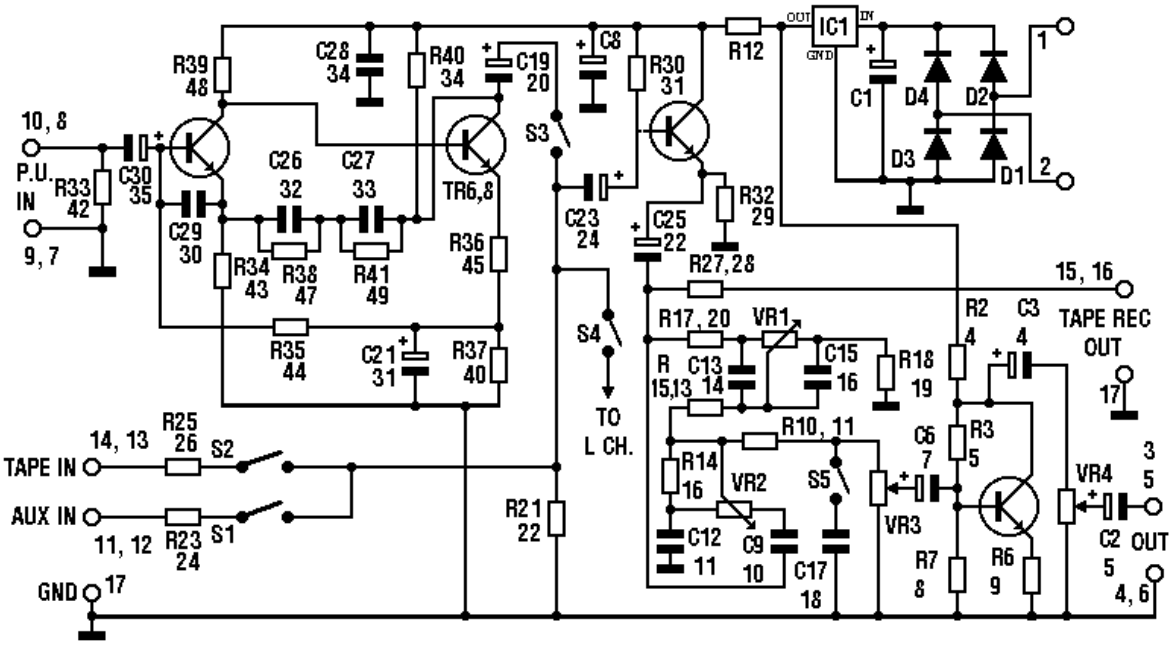
Quasar Electronics kits are sold as stand alone training kits.
If they are used as part of a larger assembly and any damage is caused, our company bears no responsibility.

While using electrical parts, handle power supply and equipment with great care, following safety standards as described by international specs and regulations.

If it does not work

Check your work for possible dry joints, bridges across adjacent tracks or soldering flux residues that usually cause problems.
Check again all the external connections to and from the circuit to see if there is a mistake there.
- See that there are no components missing or inserted in the wrong places.
- Make sure that all the polarised components have been soldered the right way round. - Make sure the supply has the correct voltage and is connected the right way round to your circuit.
- Check your project for faulty or damaged components.
If your project still fails to work, please contact us for information about our Get-You-Going service.

Schematic Diagram



Parts List

All components including printed circuit board, assembly instructions including schematics and detailed parts list are supplied when you purchase the kit.

Ordering

For pricing info and online ordering please visit:

http://www.quasarelectronics.com/1050.htm

For further info please contact us by e-mail:

mailto: sales@QuasarElectronics.com
