

QUASAR KIT No. 1126

3 MICROPHONE INPUTS PREAMPLIFIER

General Description

In every sound processing system like for example mixers, consoles etc. there are distinct parts with a specific purpose each which when they are put to work together produce the desired effect to the sound signal which is put through them. One of these audio components is the preamplifier which we are about to describe. It is a relatively simple circuit with a tone control stage which can be driven from a microphone preamplifier having a low output impedance or another similar sound source, and provides two different outputs with separate level controls which are sufficiently high to drive in turn a power amplifier, a monitor circuit, or both. The frequency response of the circuit is quite broad, the distortion is low and the sensitivity and output levels are quite high.

Technical Specifications – Characteristics

Supply voltage: 30VDC
Maximum Current:.....5 mA
Frequency response:....20 - 15.000 Hz
Input impedance:.....500 ohm
Input sensitivity:.....1 mV
Output impedance:.....10 K ohm
Output level:100 mV pp
Distortion (THD):.....0.1% max
Bass/Treble adj.:.....12 dB

ALSO:

- The circuit is very reliable as it uses semiconductors through out.
- It is simple to build and operate.
- It is small and can be fitted easily inside any existing case.
- It can be used with any dynamic microphone in the market.
- No adjustments are necessary for optimum performance.

How it Works

The operation of the circuit is very simple. If we have a careful look at the circuit we can easily see that the signal is applied at the base of Q1 through the series resistor R8 which is used to limit the signal in order to avoid overloading of the circuit's input. The capacitor C3 which is also connected in series with the input circuit is there to let only the signal through cutting at the same time any unwanted DC component. The resistor R1 biases the emitter of Q1 and R4 provides the collector to base feedback necessary in order to improve the response curve of the circuit. The resistor R2 determines the operating current of Q1, while R5 controls the overall consumption of the whole circuit. The capacitor C1 smoothes the supply voltage in order to prevent unwanted noise which can be produced by ripple in the supply. The amplified output signal is taken through C2 to a passive tone

control circuit otherwise known as a BAXANDALL circuit. The potentiometer P1 together with C4 and C5 are the section of the filter which controls the lower part of the audio spectrum (BASS) and P2, C6 and C7 control the higher frequencies (TREBLE). Finally the signal is taken to the two potentiometers P3 and P4 and from their wipers through the series resistors R10 and R11 to the two outputs of the circuit.

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 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 let the solder cool naturally without blowing on it or moving the component. If every thing 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.
- After 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. As it is the case with all the Quasar Kit projects all the components are clearly marked on the printed circuit board. You only have to follow the circuit diagram, insert the components in their assigned places and then solder them carefully. If you follow our instructions above you must first of all solder the pins in their places, then the resistors, the capacitors making sure that the electrolytic are inserted correctly with respect to their polarity. The potentiometers can be either soldered directly on the printed circuit in their assigned places, or if this is not convenient they can be connected with the circuit by means of shielded audio cable. Make sure that all the passive components have been placed correctly in their assigned places and if you are satisfied that all is OK solder the transistor in its place avoiding to overheat it in the process. You are now ready to test your preamplifier. The power supply must be connected across the pins 1 () and 2 (-) and it should be about 30 VDC. The input is across pins 3 (signal) and 6 (common) and the outputs are across 4 (signal) and 7 (common) and 5 (signal) and 8 (common). The two outputs are identical but have individually adjustable volume controls. This circuit can be combined with Quasar Kit 1127 which is a master preamplifier and a power amplifier to make a complete microphone amplifier for P.A. purposes. If you make the connections as described above you must be able to hear the signal from your microphone amplified and without distortion from the loudspeaker.

Adjustments

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

Warning

Quasar 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.

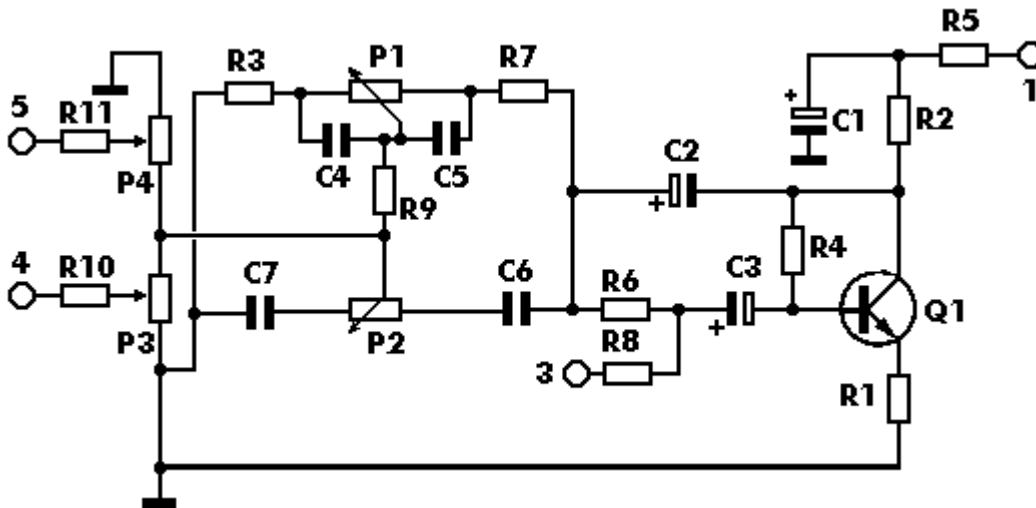
If it does not work

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/1126.htm>

For further info please contact us by e-mail:

[mailto: sales@QuasarElectronics.com](mailto:sales@QuasarElectronics.com)

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