# QUASAR ELECTRONICS KIT No. 1070

# Hi-Fi PREAMPLIFIER WITH REMOTE CONTROL

## General Description

This is a hi-fi STEREO preamplifier based on a single integrated circuit which employs a revolutionary new method for the various controls. Conventional preamplifiers use potentiometers for the controls and pass the audio signals through them. The problem with potentiometers is that as they are mechanical devices they tend to wear with time and this produces unwanted noise. Besides that the length of cable between the preamplifier board and the potentiometers can be another source of unwanted noise and distortion. Our circuit gets away with all these problems because the controls are electronically simulated in the IC itself, without having to take the signal through potentiometers. The integrated circuit incorporates VOLUME, BALANCE, BASS and TREBLE controls and it is only necessary to apply appropriate DC voltages externally to operate them. This can be done very easily with potentiometers in the manual mode or, if you want to build something really fancy, it is possible to use a remote control system to operate your hi-fi from a distance. Even though we use potentiometers for the various controls we do not have to worry about their quality or eventual wear as they are not in the signal path and their quality does not affect the system's performance. The integrated circuit which does all this is the TDA 1524 by PHILIPS and has the following characteristics:

## Technical Specifications - Characteristics

Device type: ..... TDA 1524 Working voltage:
Maximum input level: ..... 2.5 V Maximum output level:
Bass control (40 Hz): ..... +/- 15 dB / octave
Treble control: .(16 KHz):...+/- 15 dB / octave
Volume control: .....-81 - +21.5 dB
Total output noise: ..... 100 uV
Channel separation: ..... 60 dB

## How it Works

This is a really impressive array of specifications which, added to the DC control feature, sum up to a really interesting device fit to be used as the heart of a modern hi-fi preamplifier. As you can see from the specifications, the circuit is really meant to be a control unit for a preamplifier, leaving the choice of inputs open to the constructor's needs. There is not much to say about the method used to implement the various controls within the IC, nor is there any need to do it. The IC includes all the circuits necessary for a STEREO preamplifier with tone controls and only requires a few external components (mainly for input and output coupling) to complete the circuit. The potentiometers are single linear types, as the IC needs only one control voltage for both channels, and they are linear because it is a simple matter to design an electronic volume control which behaves logarithmically even if the control voltage varies linearly. The trimmers P1,2,3,4 are connected in series with the potentiometers in order to give you the chance to «fine-

tune» the controls to your personal tastes. The IC has low input sensitivity, which means that if you want to use it with a magnetic P.U. it is necessary to use a pre amplifier and a RIAA stage before being able to send the signal to the input of the TDA 1524. A suitable circuit that uses the same technology as the ‘1524 is the TDA 1029 which is an electronic, four input, selector switch. A very good circuit meant to be the companion of Quasar Electronics Kit 1070 is the Quasar Electronics Kit 1071 which employs the TDA 1029 as a selector switch and also incorporates a RIAA stage for magnetic pick-ups.

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## 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 leave 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 use of the TDA 1524 simplified the circuit very much.
There are very few components in his project and there are no critical points in the circuit. The potentiometers as we have already explained are NOT in the signal path and they can be placed anywhere with respect to the P.C.B.. The cables used to connect the potentiometers with the board can be of any type, they don't have to be shielded and they can be as long as you like. It is however necessary to follow the basic rules outlined above for the successful completion of electronic projects and although the basic directions have been given let us be a bit more specific about the circuit you are about to build. The printed circuit board is the same for the manual and for the remote controlled version of the preamplifier. If you are going to use the circuit without the remote control the first thing to do is to solder in place the four jumpers J1,2,3,4 which are marked on the board. The jumper connections should not be made if you are going to use the remote control unit Quasar Electronics Kit 1072. Then place the pins and the IC socket, solder in place the resistors and the trimmers, and continue with the capacitors taking care to insert the electrolytic the right way round. Finally place the IC in its socket taking care to avoid bending its pins during insertion and to align it correctly. When everything is in its place clean the board thoroughly and make a final inspection to ensure that there is nothing missing and that there are no faults in construction. When you are satisfied that everything is perfect, make the following connections:
- 5 - R, 8 - L & 10 (common) are the inputs of the circuit.
-7 - R, 6 - L & 10 (common) are the outputs.
- 9 (+) and 10 (-) power supply 12 VDC.
- 1,2,3,4,11 and 12 are for the remote control option.

The input signal can be provided by a RIAA corrected preamplifier for magnetic P.U. head, a cassette deck, or a radio or even better by the companion selector circuit the Quasar Electronics Kit 1071. Connect the output of the circuit to your power amplifier and turn everything on. P6 and P7 are the tone controls BASS and TREBLE respectively P7 is the volume and P8 is the BALANCE. It may be necessary to make slight adjustments to the trimmers behind P7 and P8, so that VOLUME is really «0» when P7 is turned fully anti-clockwise, and the level is equal in both channels when P8 is placed in is middle position. Similarly you can make adjustments to set the middle position of the tone controls wherever it pleases you most.

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**Adjustments**

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

## Warning

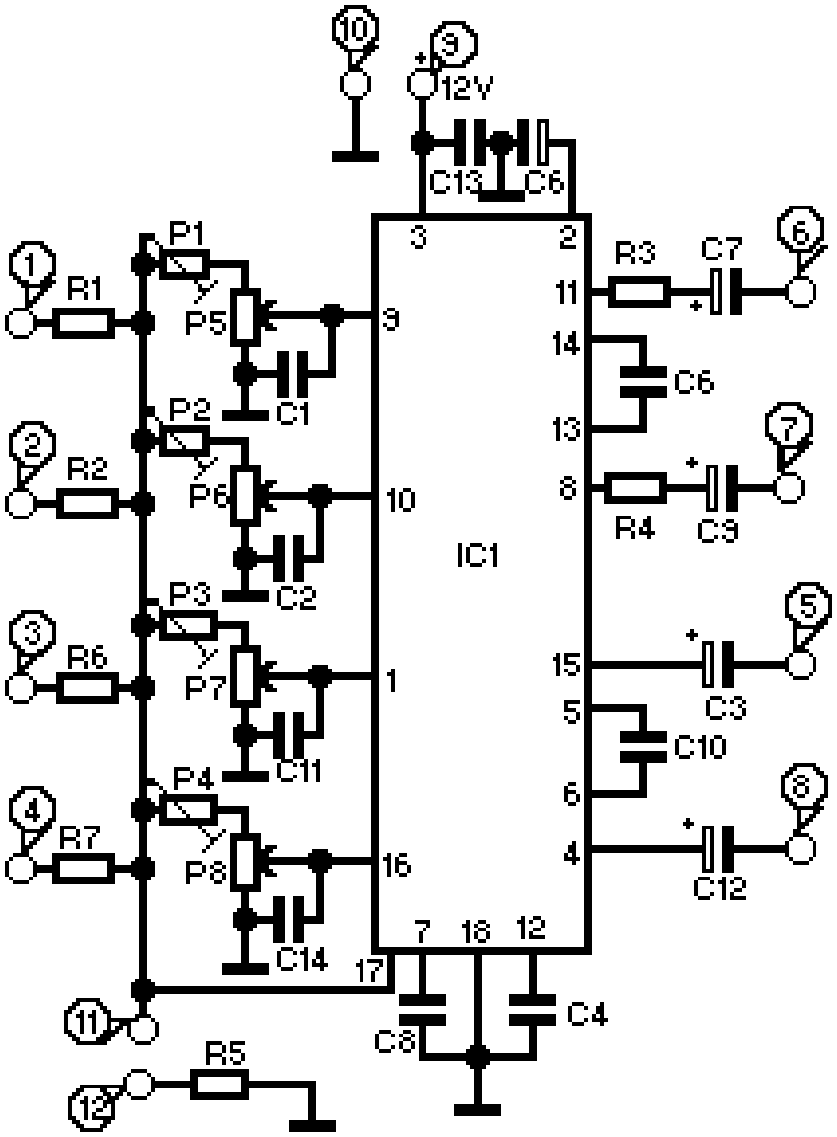
Quasar Electronics kits are sold as stand alone training kits.
If they are used as part of a larger assembly and any damage is caused, our company bears no responsibility.

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 everything checks out and your project still fails to work, please contact us for information on our Get-You-Going service.

## Schematic Diagram

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**Parts List**

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

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**Ordering**

For pricing info and online ordering please visit:

**http://www.quasarelectronics.com/1070.htm**

For further info please contact us by e-mail:

**mailto: sales@QuasarElectronics.com**