

QUASAR PROJECT # 3100 - Stereo Preamplifier with Tone Controls

General Guidelines for Electronic Kits and Assembled Modules

Thank you for choosing one of our products. Please take some time to carefully read the important information below concerning use of this product. The assembly and operating instructions are on the following pages.



WEEE Directive (Waste Electrical and Electronic Equipment)

Notice To All European Union Citizens.

Important environmental information about this product.

The crossed out wheeled bin symbol on this product, package or documentation indicates that disposal of this product after its lifecycle could harm the environment. Do not dispose of this product (or batteries if used) as unsorted municipal waste. It should be disposed by a specialized company for recycling. The unit should be returned to your distributor or to a local recycling service. Please respect the local environmental rules. If in doubt contact your local authorities about waste disposal rules.

Safety: General rules concerning safe use of our Kits or Modules

To ensure your safety, please observe these safety measures. In no way are these complete. As safety requirements vary, please check with your local authorities, in order to comply with local requirements. If in doubt, seek the help of a qualified person.

Battery or wall-adaptor operated devices are safe devices. They do not require special attention unless mains voltage is connected to an output e.g. a relay.



To ensure electrical safety, and also protection from fire or personal injury, make sure your mains operated equipment complies with these safety hints:

- Use a suitable plastic enclosure. If a metal enclosure is used, make sure it is properly earthed.
- Use a power switch if the device consumes more than 10W. Use a double pole switch for mains operated, transformer-less kits.
- Mount a fuse in series with the mains switch. Use a slow blow (T) 50mA fuse for transformers up to 10W and a 100mA fuse for transformers up to 20W.
- Use a mains input connector, or a robust power cord with a clamp.
- Internal wiring carrying mains voltages must have a minimum cross-sectional area of 0.5mm².

If supplied, attach the power rating label near the power cord of the device and fill-out the mains voltage, frequency, power consumption and fuse values.

Troubleshooting and Support

90% of non-working kits are due to poor soldering.

We operate a Get-You-Going service for non-working kits but there is a charge based on the time and components needed to complete the repair. Quite often it is not economically viable for us to repair and it is cheaper to supply a new ready-made product at full cost.

Disclaimer

Quasar Electronics reserves the right to change product specifications or to discontinue products without notice. Quasar Electronics cannot be held responsible for any loss or damage, direct or indirect, which might occur from the use of a product. Quasar Electronics Kits or Modules are intended for educational and demonstration purposes only. They are not intended for use in commercial applications. If they are used in such applications the purchaser assumes all responsibility for ensuring compliance with all local laws. In addition, they are not suitable for use as or as a part of life support systems, or systems that might create a hazardous situation of any kind.

QUASAR PROJECT # 3100 - Stereo Preamplifier with Tone Controls

This is a preamplifier and tone control unit which will make a useful addition to any of our power amplifier kits. It is extremely easy to construct due to the use of a special IC, the Philips TDA 1524A. This contains all the circuitry required to provide up to 20 dB of voltage gain, +/-15 dB of bass and treble control, channel balance, and a switchable loudness contour.

Because it uses voltage control, linear single gang pots can be used, which lowers the costs and reduces tracking errors. It also allows for control by switches or microprocessor if desired.

Features

- Simple construction
- Few external components
- Low noise and distortion
- Switchable loudness
- Will drive most power amps

Specifications

D.C. Input :	15-20Vdc supply (or 12V battery at 50 mA - see notes below for details)
Gain	20 dB max.
Maximum output :	> 3 V RMS
Maximum input :	> 300 mV, G = 20 dB > 3V RMS, G = 0dB
Input Z	> 10 k ohm
Output Z	< 300 ohm
Frequency resp. :	< 10 Hz to > 50 kHz + / - 1 dB
THD at 1kHz :	< 0.1 % @ 1V output
S/N ratio :	> 85 dB, G = 0 dB
Bass boost/cut	~ 15 dB @ 50 Hz
Treble boost/cut	~ 15 dB @ 15 kHz

How it works

All signal processing is done within the TDA1524A by voltage controlled amplifiers and voltage controlled filters. The IC provides a fixed voltage (~ 3.8Vdc) at pin 17, and this is used by all the variable resistors to provide an adjustable DC voltage to the appropriate control pins.

Current sensing is used to provide a flat response when R5 is connected to pin 17, and a loudness contour when disconnected.

100 nF capacitors are used on each pot to decouple any AC signals from the control inputs. 10 uF capacitors are used to couple both input and output audio signals whilst blocking DC. R1 and R2, are to ensure stability with capacitive loads. R3 and R4 make sure there are no DC spikes at the output sockets if the load is switched. C3 and C4 control the loudness contour. C5 and C6 control the treble turn-over frequency. C18 and C19 have been added to roll off the gain above 70 kHz. Low volume settings coupled with treble boost was causing HF instability in some instances. This should no longer be a problem.

C15, 16, 17 provide power supply filtering. D1 provides protection in case of incorrect supply polarity. The LED is a power on indicator and may be omitted if not required, or preferably mounted on the enclosure. If you are not using a switch pot, you can connect an external switch across the P1 switch pins, or connect a wire link there and switch the power supply.

The power supply is critical to the noise performance of the pre-amp. An on board regulator is provided to reduce mains hum. If you wish to use it with a car or other 12V battery, then you should omit the 7812 regulator, and place a wire link between the regulator input pin (marked VIn) and the output pin (marked 12V) on the PCB. *Do not short to earth!* This will be necessary because the regulator must have an input voltage at least 2- 3V greater than its output voltage, for it to maintain regulation. However the regulator will not be necessary with a battery supply.

If using a plug pack, its output voltage should be 15 to 20V DC. Because most plug packs have poor regulation, one rated at 12V DC will often be around 15V when lightly loaded. The current drain of the pre-amp is less than 50 mA, so many 12V unregulated supplies may be adequate if you have one. Replace D1 with a wire link if necessary, making sure you have the supply polarity correct!

If you are using a 15-20V supply for your power amplifier, you can use that as your pre-amp supply as well. Make sure you test the voltage first in all cases.

Construction

First, solder the five wire links (LINK1 to LINK5) to the board. Next install the lowest height components, starting with the resistors, diode, 100n caps and the IC

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socket. Do not fit the IC until after you have soldered the socket into place.

You may wish to use pins for the LED connection, if you are going to mount that on an enclosure. You can also use an external switch for the loudness control if you wish. The regulator can be mounted vertically, or bend the leads and bolt it to the board. No heatsink is required. Continue adding the components in ascending height order, leaving the pots, RCA sockets and C15 until last. If red and white banded RCA sockets have been supplied, fit the RED ones to the RIGHT input and output positions. You can choose to use either the DC socket or solder pins for the power connection.

Testing

Check the orientation of the IC and eCaps before powering up. Check the DC supply voltage is correct. Make sure the volume control is turned down, and that the other pots are centred. Then connect a music source and power amp, and increase the volume slowly. There will be no output at all for a small part of the rotation. This is normal due to the drop out voltage of the IC control. Then you should hear the music. Check the operation of the Bass, Treble and Balance controls, being careful not to use full boost at high volume.

Also check the operation of the Loudness switch being aware that it is level dependent and will have no effect at high volume as it is designed to compensate for changes in the human hearing response at low listening levels. The jumper or switch must be closed to give a flat response.

If there is no output, recheck all wiring, all component positions and polarity of diodes, ecaps, and orientation of the IC's. Check for bad solder joints, and solder bridges between tracks, especially the IC pins. Also check the DC voltage across the pots (IC pins 17 to 18) is between 3.5V and 4V.

The complete data sheet for the Philips TDA 1524A can be obtained from our web site at:

quasarelectronics.co.uk/ds.htm

For Technical Support on this kit please email:

support@quasarelectronics.co.uk

For our full range of kits please see our website at:

quasarelectronics.co.uk

Parts List

Resistors

R1, R2.....	220R (Red Red Brown)	2
R3, R4.....	4K7 (Yellow Violet Red).....	2
R5.....	2K2 (Red Red Red).....	1
R6.....	1K (Brown Black Red).....	1

Capacitors

C1, 2, 7, 8, 17	10uF eCap.....	5
C3, 4	47nF mylar (473).....	2
C5, 6	15nF mylar (153).....	2
C9.....	220nF poly. (224)	1
C10	100uF 25V eCap	1
C11, 12, 13, 14, 16	100nF mono.....	5
C15	1000uF 35V eCap.....	1
C18, 19.....	10nF mylar (103).....	2

Miscellaneous

IC1.....	TDA 1524A.....	1
IC2.....	LM 7812	1
P1.....	50k linear switch pot.....	1
P2, 3, 4.....	50k linear pot.....	3
X1, 2, 3, 4	RCA jack	4
D1	Diode 1N4004.....	1
L1	Red LED, 5mm	1
J1	DC socket, 2.5mm	1
18 pin DIL IC socket	1
3mm screw and nut.....	1
2 pin header and jumper.....	1
PCB Solder Pins.....	2
Kit 3100 Printed Circuit Board.....	1

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Circuit Diagram

