

DIY Kit 139. Stereo 1W audio amplifier with DC volume control

The TDA7053A is an integrated stereo audio power amplifier with DC volume control in a 16-pin dual-in-line plastic package. It is designed for use in TVs and monitors but is also suitable for battery-operated equipment.

The circuit used is straight out of the data book. PCB dimensions are a tiny 43mm x 40mm (1.7" x 1.6").

TDA7053A SPECIFICATIONS

- 4.5 - 18V supply voltage range
- 1.5A max non-repetitive peak output current
- 1.25A max repetitive peak output current
- 1.1W output power using 6V supply into 8Ω load (THD = 10%)
- 20kΩ internal input impedance
- 210uV noise output voltage
- 20Hz to 300kHz bandwidth (typical) at -1 dB

The kit is constructed on single-sided printed circuit board. Protel Autotrax & Schematic were used.

CONSTRUCTION

Start with the two resistors followed by the small monobloc capacitor. Next comes the IC socket with the electrolytic and polyester capacitors last. Be careful to get the electrolytic capacitors in the right way around. The positive lead is marked on the overlay. The negative lead is marked on the body of the capacitor.

Solder the power and audio cables (supplied by you) directly to the pads provided on the PCB.

CIRCUIT DESCRIPTION

All the work is done internally in the IC. The internal circuit consists of a differential input stage with integrated DC volume control, two class AB output stages and a stabiliser circuit.

Resistors R1 and R2 provide a DC input impedance to ground. The input signal is AC coupled into the amplifier via capacitors C3 and C4. The output stages are a BTL (Bridge Tied Load) configuration, resulting in increased output power at low supply voltages.

The gain of each amplifier channel is controlled by the DC voltage level on pins 2 and 8. This voltage is derived from the DC supply using a simple voltage divider network of resistor R3 and potentiometer VR1. Capacitor C5 across the potentiometer provides power supply decoupling of the volume control inputs. If the DC

volume control voltage falls below 0.4V the chip will switch to mute mode.

The maximum voltage gain of the amplifier is internally fixed at 40.5dB. The DC volume control has a logarithmic characteristic. The total gain can be controlled from +40.5 to -33 dB.

Due to the BTL output configuration the outputs are floating with respect to ground. **Therefore the outputs of the amplifier should never be connected to ground.**

Capacitors C1 and C2 provide power supply decoupling.

IF IT DOES NOT WORK

Poor soldering ("dry joints") is the most common reason that the circuit does not work. Check all soldered joints carefully under a good light. Re-solder any that look suspicious. Check that all components are in their correct position on the PCB. Are the electrolytic capacitors the right way round?

PARTS LIST - K107A

Resistors (0.25W carbon)

4K7 yellow violet red R1,2 2
27K red violet orange R3 1

Capacitors

100nF monobloc 104 C1 1
470nF polyester 474 C3,4 2
1uF 16V electrolytic C5 1
220uF 25V electrolytic C2 1

Semiconductors

TDA7053A IC1 1
Stereo Audio Amplifier IC with DC volume control

Miscellaneous

Potentiometer, 10K VR1 1
Single gang, PCB mounting
IC socket, 16 pin, for mounting IC1 1
PCB, K139 1

Web Address & Email

You can email us at peter@kitsrus.com if you have any problems or requests. See our Web page at:

<http://kitsrus.com>

The Data Sheet for the TDA7053A may be downloaded from the software download page on our website. Note the 'A' suffix is important. The TDA7053 with no suffix is a different IC and is used in our Kit 107.

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