Switching Amplifier for Analogue Signals

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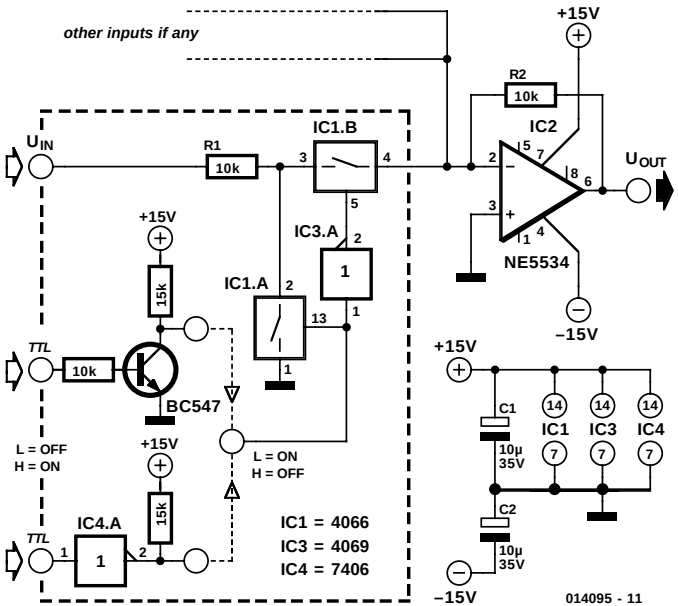
H. Prince



If analogue signals have to be switched, a bilateral switch such as the 4066 is often utilised. Because this IC can be powered from single-ended supply only, all the associated components are usually connected to the same asymmetrical supply (typically 8 V). The disadvantage of this is that the opamp runs on only half the power supply voltage, with the corresponding reduction in output voltage. The result is, among other things, a reduced signal to noise ratio.

The circuit described here solves this problem. The design is based on the fact that the current in the bilateral switch (IC1) at zero volts can flow in both directions. We will have to take precautions to make sure that the input voltage at the switch is not allowed to become negative. This is taken care of by using one of the switches in IC1 to short the input to ground at the right time.

The operation is as follows: When the switch input is 'high', IC1a is closed and IC1b is open so that no signal arrives that the inverting input. IC1a shorts the signal to ground. When the switch input goes 'low', IC1a is opened and IC1b is closed and the audio signal is amplified by the opamp.

In order to make the switching levels TTL-compatible,

a small buffer stage can be added to each input, consisting of a BC547, for example, or a 7406, as is shown in the schematic. If need be, multiple inputs can be connected to the virtual earth node resulting in a mixing circuit. The circuit inside the box has to be duplicated to achieve this.

The gain is easily calculated using the standard formula: $U_{out} = -(U_{in} \cdot R2)/R1$. The input impedance of each individual input is about 10 kΩ. Take note: the circuit inverts!

It speaks for itself that any spare ports and switches can be used for additional inputs. (014095-1)