

Guitar Pick-up Tone Extender



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This design extends the basic sonic possibilities of an electric guitar without the use of any electronic 'effects'. The expanded number of tone possibilities is brought about by mixing continuously-variable amounts of the output from each of the guitar's pick-ups, along with switching the phase of each pick-up. This effectively gives an infinite range of tones as opposed to the five available for a normally switched set-up. This is not a project for the faint-hearted, however; it involves modifying the wiring to the guitar's pick-up coils and switches, and possibly the scratch-plate itself, depending on the chosen location for the replacement for the standard 0.25-inch (6.3-mm) jack connector. Use of a cheap 'copy'-style guitar is recommended!

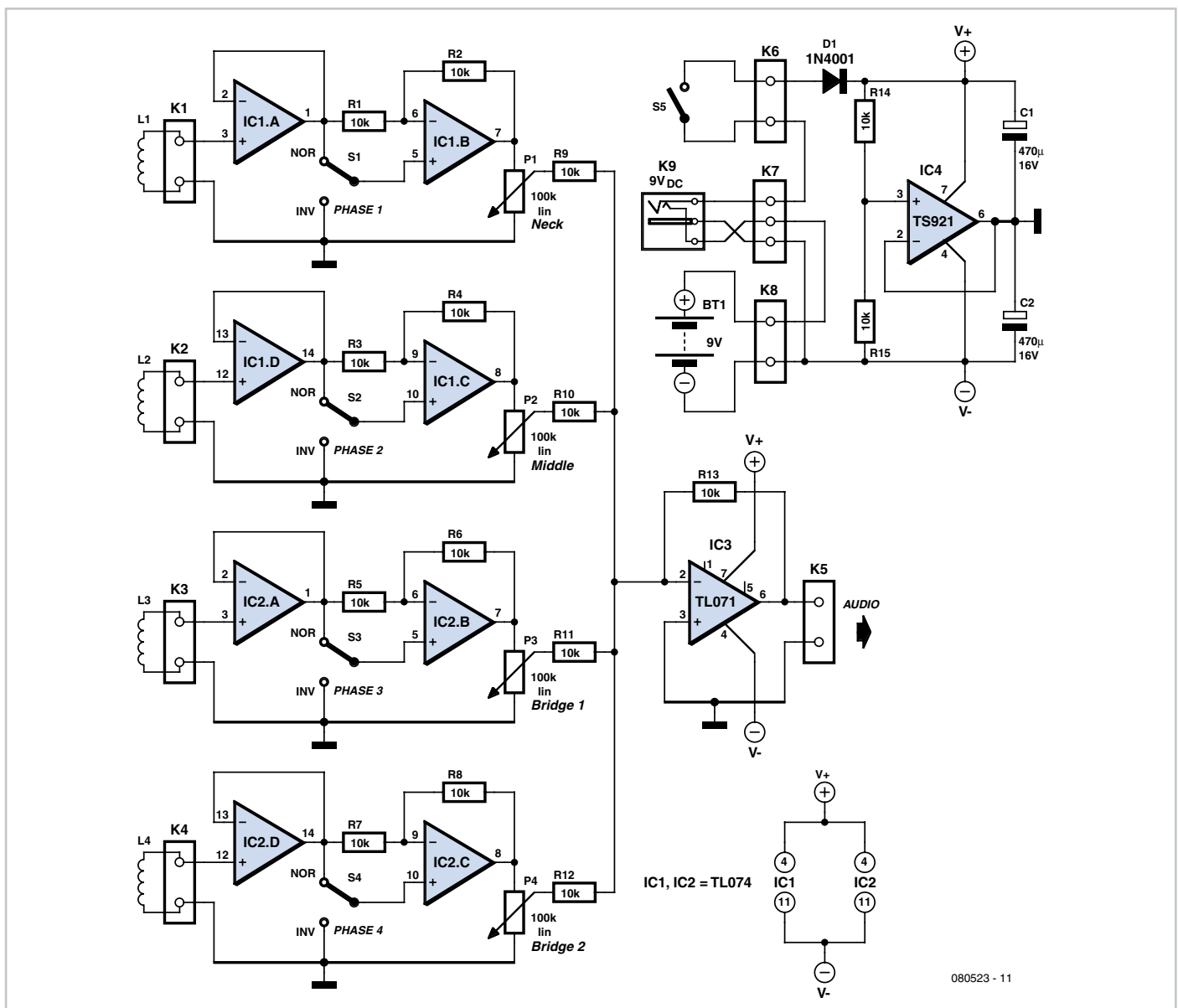
The standard 'Stratocaster'-style guitar features three pick-ups and a five-way switch that allows the player to select one of the following combinations:

- neck pick-up
- neck and middle pick-up in parallel
- middle pick-up
- middle and bridge pick-up in parallel
- bridge pick-up

Guitarists keen to find new sounds from their instrument sometimes alter the wiring and add other switches to this arrangement, but this is of course not a flexible arrangement, and certainly not something that could be altered mid-performance playing for a crowd, no matter if a dozen or so in a pub or 20 k at Glastonbury!

This project allows up to four pick-ups to be employed, since the bridge pick-up on a 'Stratocaster' is often a so-called 'humbucker' type, which can be split into two independent pick-ups, shown here as Bridge 1 (L3) and Bridge 2 (L4).

The really intrepid among you may decide to build the circuitry in SMD and incorporate a tiny board into the guitar. However, having four switches and four pots on the guitar may be too much of a good thing. The alternative is to wire the guitar pick-ups individually to





a 9-pin sub-D type connector that is added either to the guitar body or its scratchplate. The connector is linked to the input sub-D connector on the control unit via a long 'straight-through' serial interface computer cable. The Tone Extender circuitry may be built in a Vero style box, of which an example is shown in the photograph. Connection from the unit to an unmodified guitar amplifier is via a standard guitar lead. Each pick-up section consists of two opamps from a TL074 package, one inverter (e.g. IC1.A) and one buffer (e.g. IC1.B). Each has a normal/invert switch (NOR/INV, e.g. S1) to select the phase of the signal component, and a 100-k Ω linear law potentiometer at its output to set the desired level. The

output signals of all four opamp sections are summed by IC3 (a TL071) which provides a suitably low output impedance to drive the guitar amplifier. Opamp IC4 splits the supply voltage obtained from 9 V (PP3) battery BT1 into symmetrical rails V+ and V-. Alternatively, a battery eliminator with a regulated output voltage of 9 V DC may be connected to K9, when the battery is automatically disconnected.

Whatever method of construction is chosen, the unit effectively provides the guitarist interested in experimenting with unusual pick-up configurations a flexible way of quickly setting up and trying probably all possible variations, without having to get out the soldering iron and hard-wire each new idea. As such it should be an invaluable aid to allowing all manner of sonic possibilities to be realised.