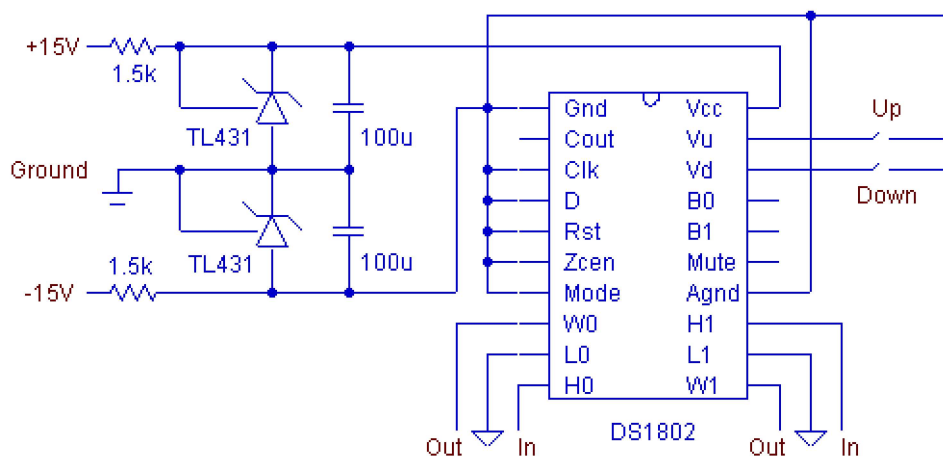


## DS1802 Silicon Potentiometer

The DS1802 is the dual audio 45kOhm (typically) pot with 65 steps (64x1dB and mute), known around for its possibility to be controlled by its own pushbuttons instead of, usually needed, certain logic circuitry. It is available in DIP package and hence seems very appealing for DIY. However, there are a few issues to be considered about its usage in the audio amplifiers.

Most of the digital potentiometers (there are exceptions like WM8816 and X9312) can not accept signals much beyond their supply voltages. For DS1802, 0.5V below the potential at its Gnd pin is the bottom, and 0.5V above the Vcc (whose safe maximum is 5.5V above the Gnd pin) is the upper limit. There are a few ways to center the signal inside these boundaries and Dallas recommends Wheatstone Bridge circuit (see App Note 161). I decided to shift the supply rather than signal, thus with one more regulator I could keep the signal path clean. So, DS1802's Gnd pin went down to -2.5V and all the other pins of DS that normally should go to ground went to this pin: Agnd, Zero-Crossing (enabled) and Mode (stereo), as well as the Up/Down buttons. Resistive networks themselves are connected straightforward. The DS1802's pin layout appeared almost ideal for such application.



(B0 and B1 pins can be used for balance.)

Note that the DS1802 will not, working with shown supply (you can try to push it harder but you will do that on your own risk), accept the conventional output level of the CD players. It will certainly clip with usual 2V RMS and more, and with such sources DS1802 is unusable unless you decide to attenuate the signal before it enters the pot (in my view this approach does not have much integrity though). Clipping is instant and very unpleasant but generally all is well as long as it does not occur. So, a lower voltage at the pot input is a must. This, however, won't be that bad for those using common base based or purely passive I/V converters in their CD players – almost always such kinds of stages will be happy to develop lower voltage.

Another problem might be the absence of the visual identification of the actual pot setting, however to include the display, much more engagement than described here is needed.

The circuit is simple, put it together, listen to and compare to some expensive *audiophile* volume control solution, you might be nicely surprised. Blue ALPS can not equal that precise soundstage and that female voices. Dynamics is excellent. One might find ALPS more natural but for me this silicon part had more good sides. Even if you take into account 2 regulators and caps (assuming you can steal raw voltages somewhere in the unit they are used in), price stays quite modest. High input impedance of the next stage is recommended. In my case the DS1802 drove the buffer whose input impedance was set to 50k. At the pot's input side, as expected, my EF86 anode follower failed to drive it (dynamics collapsed, 45kOhm and wiper loaded with 50k is too hard for this tube) but the diamond output stage of the AD844 did it happily. Cheap high end. Recommended.