Faster-Than-Light Speed: Fiction or Fact?

Positive and enjoyably musical subjective experience with optocouplers (LED/LDRs), configured as an adjustable voltage divider and acting as a volume control; a given that digital sources' output peak voltage is more than enough for most power amps and loudspeakers to go loud; and signal chain simplicity (without potentiometers, autoformers, or pre-amps), led me to re-examine some of the existing designs. The objective of improving the status quo of volume level control that is the Lightspeed and its variants, and make it available to cost-conscious DIYers was ripe for the picking. This type of volume control dates back 30 or more years according to some early adopters. It is in one form or another based on available technology. Set-up as an adjustable voltage divider is a common theme and designs are mostly differentiated by how power is delivered and controlled to make it function.

With an eye on other approaches' capabilities -volume controls having a zero volume setting– meaning complete silence; from silence a smooth transition to listening levels and depending on your threshold of pain, your source, amp, and loudspeakers' capabilities possibly beyond. By itself, a wide range of attenuation is possible. How about -120dB?! –could be more but my ohmmeter's max is at 40MΩ. Inherent to optocouplers used as voltage dividers are their varying input/output impedances do not always total a given value like a potentiometer. With this wide attenuation range the optocouplers will be varied from very high to minimum resistance specifications, while keeping the devices safe for a long time regardless of the volume level setting. The possibility of operating this optical volume control with batteries was also a really big turn on. Using 12x 1.5V alkaline D cells connected in series and parallel for dual banks of 9V, I estimate the battery life -depending on your daily use, and making sure it is off when not in use -at about 1 to 1½ years.

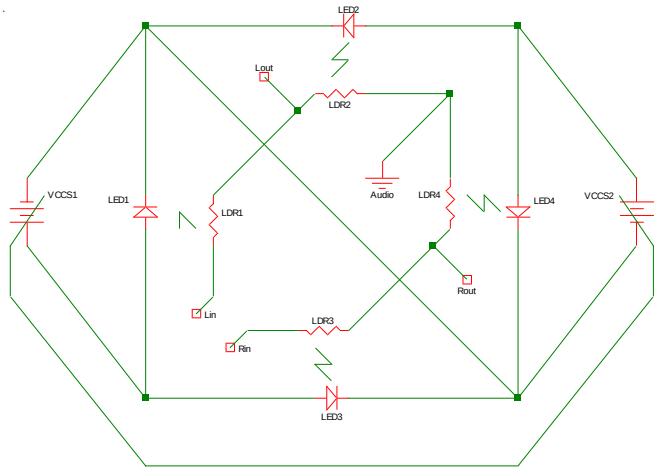
The design I am presenting, to describe it briefly, is configured as a bridge (search: Wheatstone) with the LEDs as the elements. Matching of optocouplers is still mandatory and these are Silonex NSL-32SR2. The bridge's voltage balance ratio is varied by a simple dual Voltage Controlled Current Source (VCCS) acting as the DC-DC power delivery control –a bank of batteries being the power source. This VCCS is precise to 1mV steps, will supply down to <1uA of current, and will accept an input of 6 to 24Vdc from a power source –most preferably a bank of alkaline battery cells. It certainly will work with rectified AC with a nice, stable and quiet regulator. Caveat being any ripple/noise will show up on the bridge. With ripple/noise, filter capacitors

across the LEDs explain the subjectively better sound heard by some.

A VCCS solution has been presented before and is being used by some DIYers but to my knowledge the shortcomings are still present. It is very complicated based on parts used and parts count with some microprocessor programming also needed. Plus I think a large, shiny volume knob is still much cooler than pushing up/down buttons.

By taking a second look at keeping an optocoupler within its specs this design solves some of the issues hounding present designs that I am aware of. By this virtue, in my humble opinion, it has become elegantly simpler and more functional. As a longtime Nelson Pass fan you can see his influence.

So much for the talking…I would like to present the *Warpspeed Control Engine*. Borrowing on Mr. Pass' principle of making simple simpler, here is the simplified but dramatic schematic:



For Star Trek fans, this is my rendering of a new generation starship Enterprise's warp engine (*nacelles*). It is powered by dark matter/antimatter. The dark matter/antimatter reactor in the center reacts depending on the power drive on the warp coils surrounding it.

The Warp Factor is controlled by a large and shiny knob, accessible only to the starship's captain, is shown in the picture:

Proof of concept is pictured below with storage tanks of dark matter/antimatter fuel:

Back panel with the design considerations I included –DC power; 2 pairs of outputs so I can bi-amp easily; and headphones:

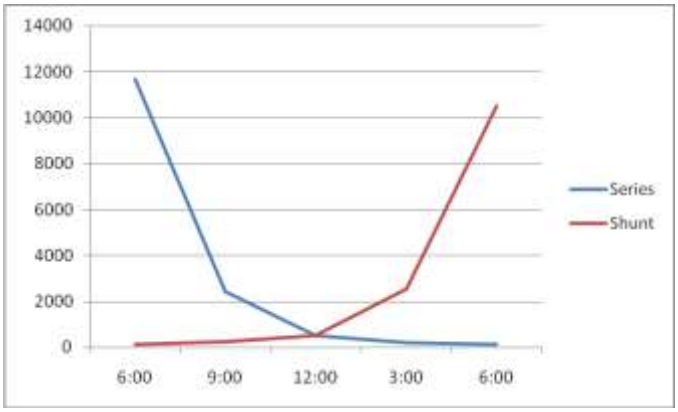
A closer look shows the back panel sporting a pair of inputs; 2 pairs of outputs; a power, line or headphones switch; power input plug; and a headphones out:

An inside peek shows the drive shaft. The dark matter/antimatter reactor filled with plasma seems to float in the air:

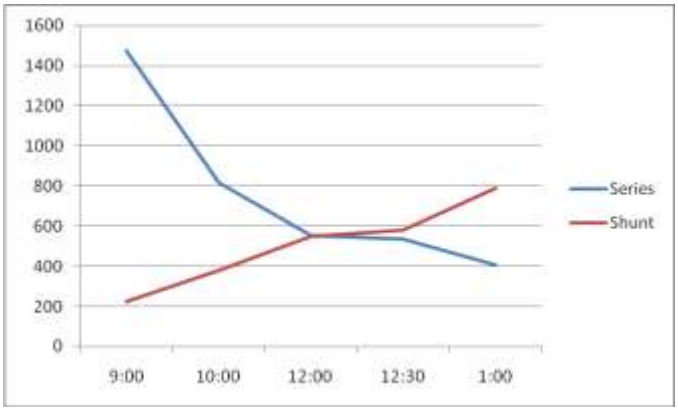
A closer look shows the optocouplers mounted very close to the connectors; Wiring looks more than necessary because of my decision to have 2 pairs of outputs and switchability to headphones:

Pictures with my system -the *Warpspeed* at well, warpspeed!

The graph below shows how the *Warpspeed* ramps up to faster-than-light speeds. With a clockwise twiddle of the large, shiny knob the warp factor increases and is shown in red while the warping of space and time is in blue:



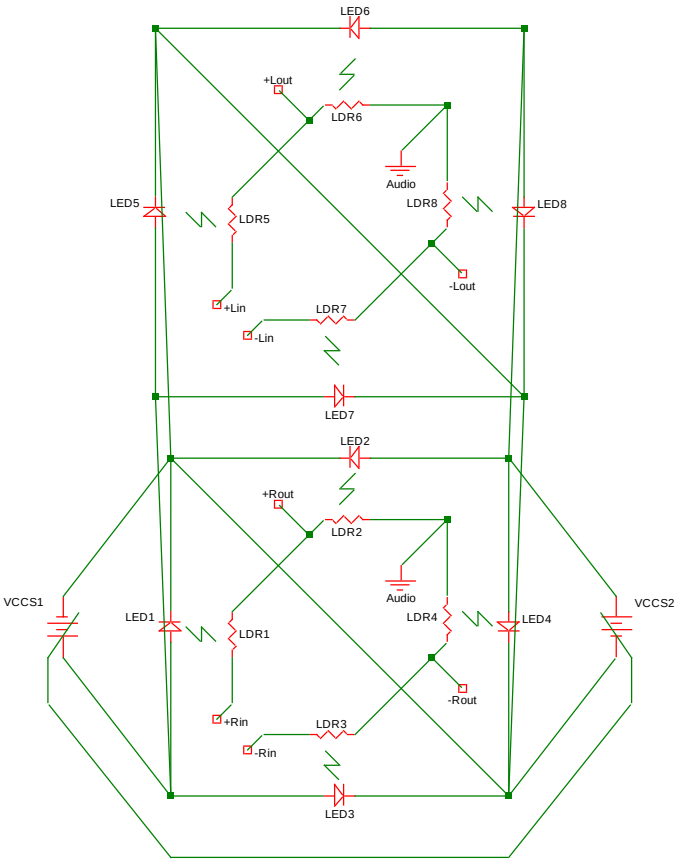
LDR response at typical listening levels:



Due to its relative simplicity and some other personal reasons, I have decided not to disclose the actual circuit at this time. Anyone interested please let me know and a partially built kit will be made available. All you have to do is provide your Enterprise's fuselage, other hardware like the large and shiny knob, and solder a few connections.

Balanced stereo can be built in one box with just one large, shiny knob to control volume. It is also possible with 2 boxes, 2 matched sets of optocouplers and replacement of the headphones out with a balanced XLR connector.

Next is the rendition in quantum mechanics' parallel dimension for balanced:



By the way, as banks of dark matter/antimatter cells are made to exist in parallel universes -up to maybe 24V, you will probably be able to complete a 5-year mission across vast music galaxies and "…to boldly go where no man (or woman) has gone before."

Disclaimer: An attempt to reverse engineer the *Warpspeed Control Engine* might result in the wrong ratio of dark matter/antimatter and cause engine failure or worse reactor meltdown. This is a scary scenario that might leave you adrift indefinitely outside the slipstream in a wormhole's dead calm.

PS: Picture shows two neighboring galaxies in the vast dark matter ocean of space…