

Q&A

WHAT'S UP:

Join us as we delve into the basics of electronics as applied to every day problems, like:

- ✓ Cheap Strobe
- ✓ Re-Using Old Transformers
- ✓ Dump Load Calculation

■ WITH RUSSELL KINCAID

In this column, I answer questions about all aspects of electronics, including computer hardware, software, circuits, electronic theory, troubleshooting, and anything else of interest to the hobbyist. Feel free to participate with your questions, comments, or suggestions.

Send all questions and comments to:
Q&A@nutsvolts.com

PHONO PREAMP

Q I need a simple phono preamp that will boost a ceramic cartridge output. The cartridge has an output of 400 MV and I need an output of 1V. The voltage gain would need to be 2.5 – about a 8 dB gain. It would be nice if it would work with a single supply power supply. Do you have any suggestions?

– Jeff Miller

A The ceramic cartridge output is high, so noise in the amplifier will not be a problem. I simulated it with an LT1006 which has a gain-bandwidth of 300 kHz; so almost any single supply op-amp will work. You will need a dual op-amp and double the circuit for stereo. This circuit is quite flat from 30 Hz to 30 kHz and distortion will be low. The venerable LM358 at 15 cents from

Allied is the most economical. It might not work on five volts but is good up to a 30 volt supply. The MC33202 at 95 cents from Mouser would be good for low voltage operation.

The schematic in **Figure 1** is from the simulator. V1 is the power supply which should not be greater than the rating of the op-amp. R5 and C2 comprise a filter to remove any hum that may be on the power line. R6 simulates the input impedance of the amp; if you know that there is a capacitor at the amp input, C3 is not needed. The ceramic cartridge is high impedance and won't affect the bias voltage if C1 is not used. However, I think C1 should stay. Otherwise, there will be two volts bias on the ceramic cartridge which might cause distortion. In fact, it may be a good idea to put a one meg resistor across the cartridge output to insure there is no DC across it.

CHEAP STROBE

Q I need to construct several cheap strobe lights, battery powered (preferably nine volt transistor), duty cycle about one second between flashes. I would appreciate any help or suggestions.

– Bob Haeberle

A For a cheap strobe, the throwaway camera comes to mind. You can get these free at some one hour photo shops; don't bother with the chain stores because they send used cameras to a recycler. An independent photo shop will most likely just throw them away and be glad to get rid of some. I got three from a local camera shop (could have had more). Two cameras were Kodak; one was no name. The Kodak units were made to snap together and came apart easily; the no name unit had two screws to remove the case but the case was broken because it was opened without removing the screws.

When you remove the PCB (printed circuit board), be careful where you put your fingers. I got shocked on the first one and it doesn't work anymore. The flash operates by charging a capacitor to about 300 VDC, then discharging it through a xenon lamp. There is a snap button that activates the charging circuit; you have to hold it down until a neon lamp glows to indicate that the capacitor is fully charged. There will be two contacts operated by the shutter to fire the flash. These contacts will have up to 300V on them and the current – when closed – will be high. I tried a TO-92 triac to take the place of the contacts and it worked! The triac was STMicroelectronics Z00607MA, rated 600V and 0.8

