

# ActsAudio

From time to time on [Churchbass](#) the topic of phantom power comes up for discussion. The usual reason is that someone is concerned about whether having phantom power coming from the board will damage the DI output on their gear. SWR amps are well known for not tolerating phantom power, and there are probably others out there as well.

One such discussion lead to some "more detailed than usual" circuit discussions, with CB members Donl Mathis and Keith Darwin providing lots of good information. Peter Wallace took the information and ran with it, developing a nice little schematic and layout for a Phantom Power Blocker. With Peter's permission (and his insistence that Donl and Keith get the credit they're due) we have made the circuit drawings and construction tips available here.

**WARNING:** These notes assume that you know your way around building electrical circuits. No warranty of any kind is offered or implied. If you choose to depend on this circuit to block phantom power then you do so at your own risk.

And now we'll turn this over to Peter...

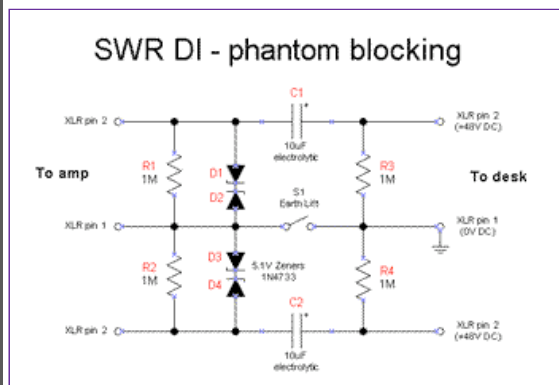
## The Churchbass Phantom Blocker

This device came out of a discussion on the [Churchbass](#) discussion group on how to deal with SWR's warning that their amp DI's should not be connected to a channel with phantom powering turned on. Some members had built similar devices, but this one incorporated a few people's ideas.

The descriptions are pitched at people who don't have a lot of electronics knowledge but have done some "follow the instructions" type construction and therefore know what all the bits are. Apologies to those for whom it is a bit basic :o)

Attached are:

- schematic
- layout on Veroboard
- pic of the final product



## The schematic

The main bits doing the work are the two capacitors - these block the phantom power DC voltage (+48V dc) which is on the + and - legs of the balanced channel to the desk. They are transparent to audio signals, however, so don't block the bass signal going out on these legs.

The zener diodes are for spike suppression - should a higher voltage than about 6V appear on either + or - leg on the amp side of the capacitors, the diodes go open circuit and the leg is grounded.

The 1Mohm resistors are bleed resistors to shunt away any charge buildup on the capacitors. Donl Mathis had suggested putting them one side, and Keith Darwin the other - in fact, both sides isn't a bad idea.

The switch is the earth lift switch, which just breaks the earth leg between amp and desk.

**IMPORTANT:** Dale Shirk emailed me with the following information regarding the capacitors used in this circuit:

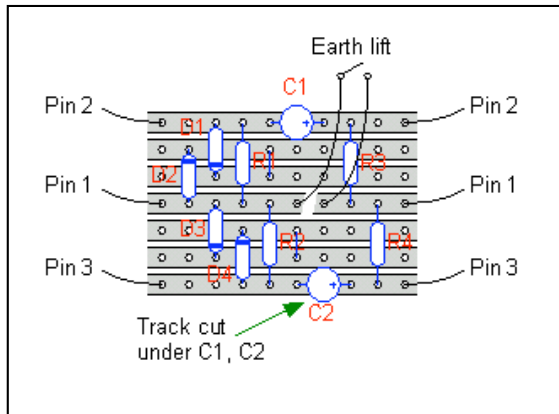
"I think it would be important to point out what may be obvious to some and not to others. **The voltage**

**rating of C1 and C2 should be 75 Volts or greater.**

Since the AES definition of P48 phantom power specifies the voltage as 48 Volts, + or - 4 Volts, the maximum voltage they will see could be as great as 52 Volts. C1 and C2 should be identical as well."

Thanks for the tip, Dale.

Click the picture for a larger version.



#### The layout

I built this on a small piece of Veroboard (at least, that's what it's called in New Zealand). It's a pre-etched and drilled circuit board that has parallel copper tracks (the grey bits on the layout) with holes at 0.1" spacing. Good for little jobs like this, and I had some lying around. Any place that has the other parts should stock something like this.

Note that the copper tracks are cut between the legs of the capacitors, and between the legs of the switch (although you can only see the cut for the switch on the attached layout).

Also note the links under the "R1" and "R2" labels.

With Veroboard, there's any number of ways you could do the layout - this just happens to be what I did.



#### The pic

I used a clear plastic box about 1" x 2" x 3". It's clear because that's the only one I could find that size, but helps coz I can see what position the switch is in :o) As you can see, the circuit board is very small - less than an inch square.

I leave the blocker permanently plugged into my amp, in the back of my rack case. It's actually easier to plug a mic lead into the blocker's flying lead than into the back of the amp.

Click the picture for a larger version.

#### Results

I've never noticed any difference in level or tone, when doing an A/B test with and without the blocker. Electronic theory says that there shouldn't be, but it's still nice to hear it. :o)

The main difference compared with the alternative I was using (an external DI) is that the SWR out level is noticeably hotter (louder) than the DI. You might want to warn your sound person.

This solves the only problem I've ever had with the SWR amp. I was really disappointed when I found the SWR DI couldn't cope with phantom power. We use phantom powering at church to power DIs, and it's not channel selectable - it's on for everything if on at all.

However, even with a channel selectable phantom, I'd still use this - it only takes someone pushing the wrong switch to fry the output stage of the DI.