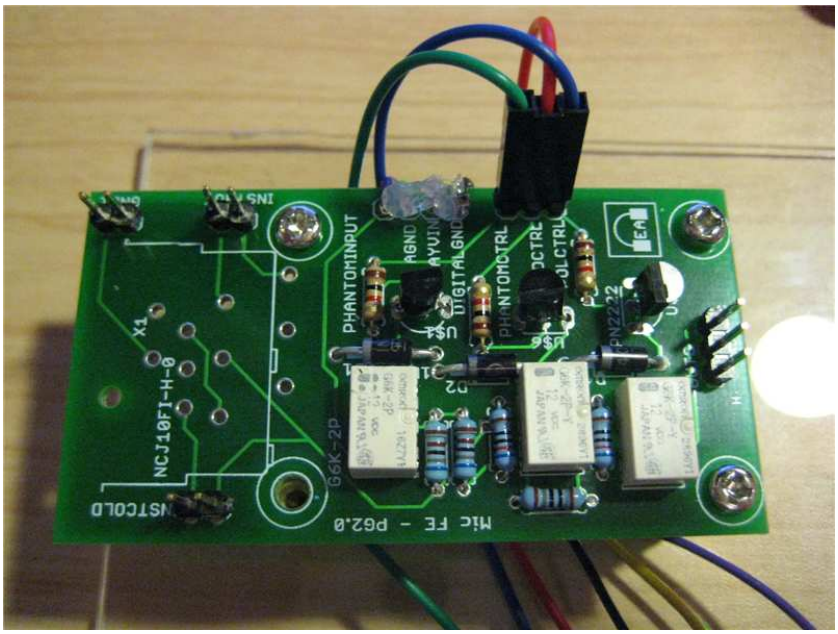
Expat Audio Digitally Controlled Mic Pre Frontend

Phantom, Pad & Polarity, all controlled from a 3.3V / 5V Source

Introduction

The Expat Audio digitally controlled mic pre front end essentially replaces toggle switches that usually made their way to the front panel of a mic pre (in the DIY world) for switching Phantom, Pad and Phase.
This allows the designed to keep all of their signals on one end of the board (near the connector), in addition to offering many opportunities to control this switching from a remote source, be it a different front panel, a PC or even Midi.



Revision Control & Edits

Expat Audio PCB's are typically designed using a X.Y versioning system
Please look on your PCB to see the version number. The silkscreen will either read "version X.Y" or PG X.Y

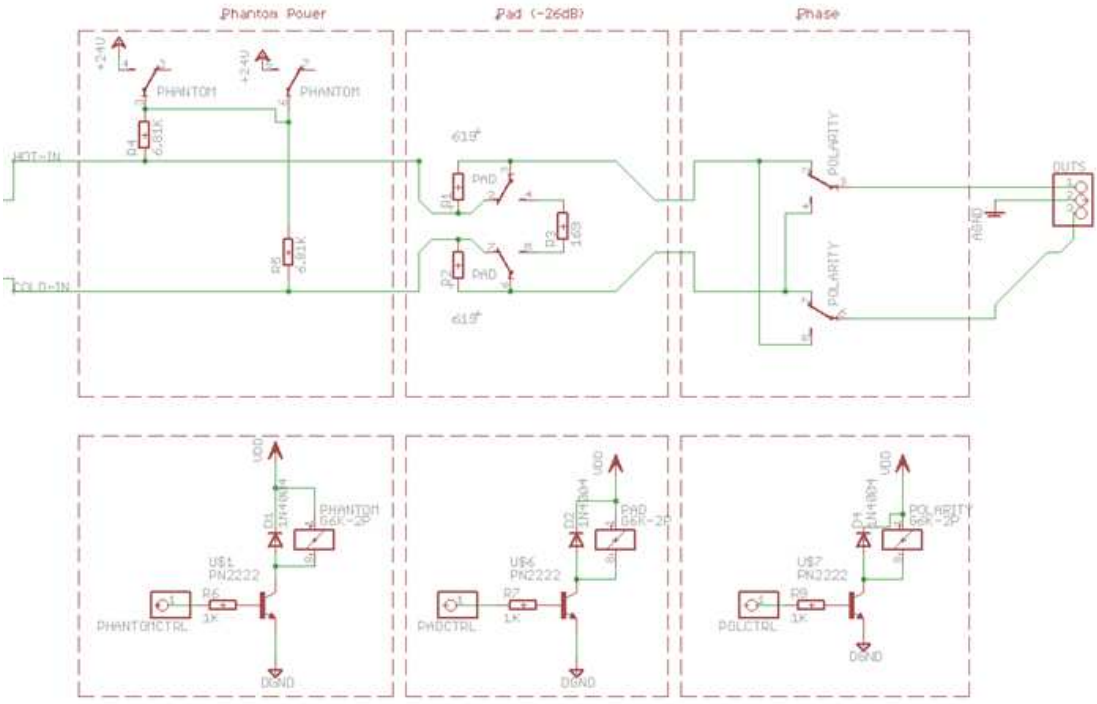
The MIC FE board is currently in revision PG2.0.
There are no known errors on PG2.0
PG1.0 was never released beyond prototype.

How it works

It works by using relays as switches, which are in turn, controlled by a digital source (usually 3.3V). The 3 button controller, available from Expat Audio, is a fine example of this.

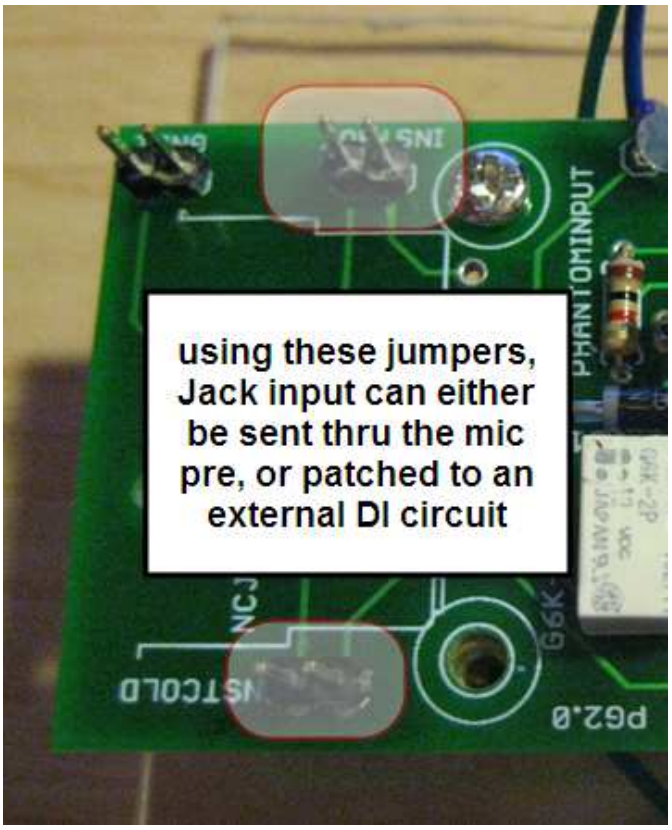
The board has switching transistors on board that are designed to take a small 3.3V signal and switch it up to the 12V required to switch on the relay.

Note: The schematic below lists 24V as the phantom voltage. Ignore this – it was used as my layout software didn't have a 48V symbol to hand ☺



Routing and Grounding

The board can accept XLR and Jack inputs, using a combo connector from Neutrik. As such, the Jack input (typically from a guitar) can be taken to a different circuit if required.



The additional GND jumper on the front on the PCB also allows the user to decide if they want to connect the connector shield into their analog ground in their system. Some users may want to experiment with this.

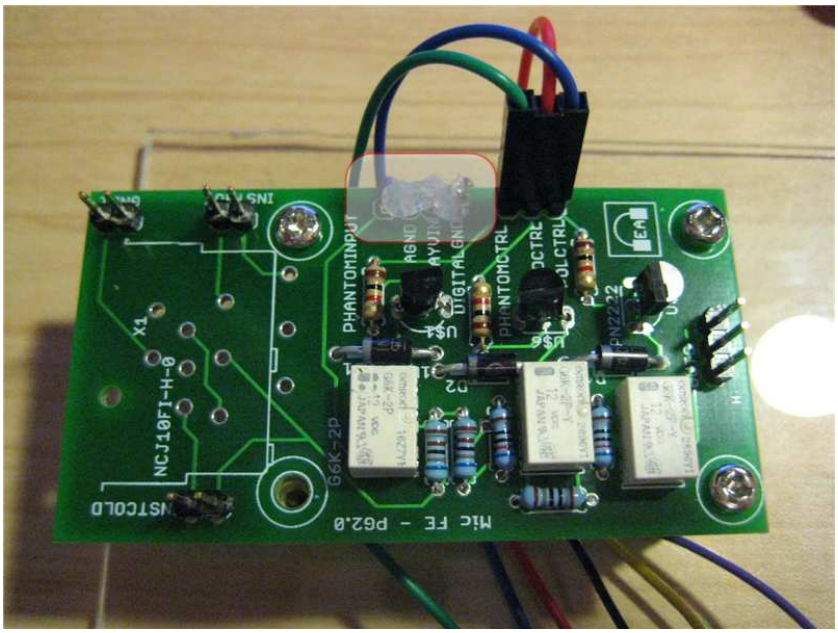
At all times, the product enclosure should be connected to safety-ground.

Pad Values

The pad values we use are calculated to give about a 20dB drop in signal level. However, you can customize these values yourself.

Good resources are at:
http://www.uneeda-audio.com/pads/

Connections for Power and Control



Four connections are required for powering this device.

- Phantom Power (48V)
- AGND - Analog Ground
- Relayvin – Voltage to switch relays – 12V normally.
- DGND – Digital Ground for the relays.

Why split the grounds?

The noise generated by switching relays can couple into the ground connection. If the relay ground is closely connected to a nearby analog circuit, then it's possible some click may be heard in the analog.
By keeping the grounds completely separate, and only bringing them together at one point (near the PSU), you face a lower chance of digital noise (relay switching) coupling into the analog signal chain.

3 connections are required for control. These are regular 3.3V inputs, although can be pushed to 5 if required.

Bill Of Materials

Part	Value	Device	Package	Description
AGND		PINHD-1X1	1X01	PIN HEADER
D1	1N4004	1N4004	DO41-10	DIODE
D2	1N4004	1N4004	DO41-10	DIODE
D4	1N4004	1N4004	DO41-10	DIODE
DIGITALGND		PINHD-1X1	1X01	PIN HEADER
GND1		PINHD-1X2	1X02	PIN HEADER
INSTCOLD		PINHD-1X2	1X02	PIN HEADER
INSTHOT		PINHD-1X2	1X02	PIN HEADER
OUTS		PINHD-1X3	1X03	PIN HEADER
PAD	G6K-2P	G6K-2P	G6K-2P	Low Signal Relay
PADCTRL		PINHD-1X1	1X01	PIN HEADER
PHANTOM	G6K-2P	G6K-2P	G6K-2P	Low Signal Relay
PHANTOMCTRL		PINHD-1X1	1X01	PIN HEADER
PHANTOMINPUT		PINHD-1X1	1X01	PIN HEADER
POLARITY	G6K-2P	G6K-2P	G6K-2P	Low Signal Relay
POLCTRL		PINHD-1X1	1X01	PIN HEADER
R1	619	R-EU_0207/7	0207/7	RESISTOR, European symbol
R2	619	R-EU_0207/7	0207/7	RESISTOR, European symbol
R3	169	R-EU_0207/7	0207/7	RESISTOR, European symbol
R4	6.81K	R-EU_0207/7	0207/7	RESISTOR, European symbol
R5	6.81K	R-EU_0207/7	0207/7	RESISTOR, European symbol
R6	1K	R-EU_0207/7	0207/7	RESISTOR, European symbol
R7	1K	R-EU_0207/7	0207/7	RESISTOR, European symbol
R9	1K	R-EU_0207/7	0207/7	RESISTOR, European symbol
RELAYVIN		PINHD-1X1	1X01	PIN HEADER
U$1	PN2222	PN2222	TO92-CBE	
U$6	PN2222	PN2222	TO92-CBE	
U$7	PN2222	PN2222	TO92-CBE	
X1	NCJ10FI-H-0	NCJ10FI-H-0	NCJ10FI-H-0	Neutrik Audio Connector XLR SERIES