Expat Audio 3 button control board.

Thank you for purchasing the Expat Audio '3 button control board'.
Please read through the instructions to familiarize yourself with the project before beginning, although this is a fairly simple project. You shoudn't require any greater skills than basic soldering of thru-hole components.

Revision Control

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 3 button control board is currently up to Version 1.0. There are no known issues with this board., however R5 does not have a value on the PCB. It is actually 47KOhm.

Description

The Expat Audio 3 button control board is a relatively simple board, designed to drive 3.3V CMOS logic outputs based on 3 momentary push switches. Switches for your design no longer have to be ugly toggle switches, they can be sexy looking backlit switches, that in turn toggle relays on and off deeper inside your product.

Examples of the type of switches that you can now use on your product are:



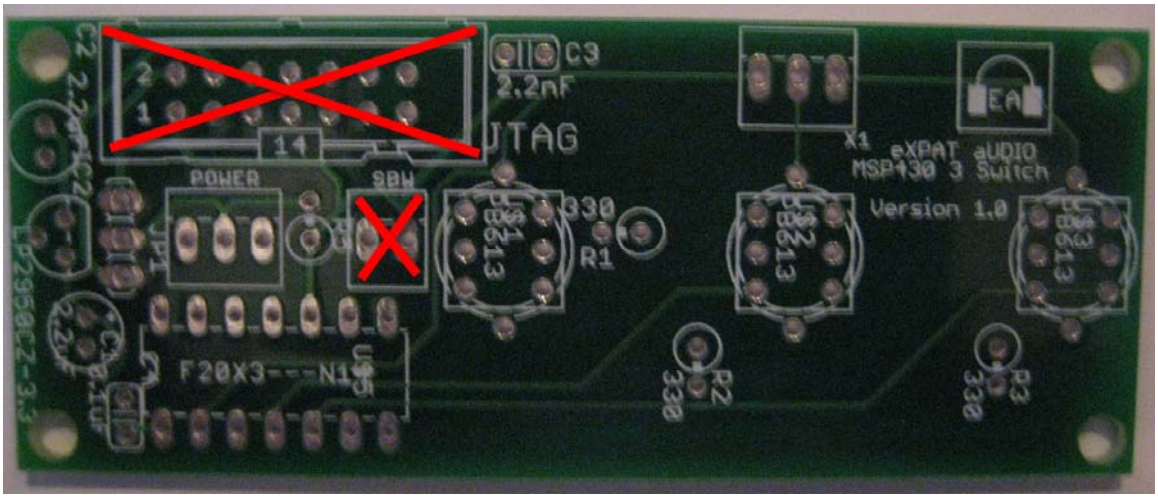
How it works

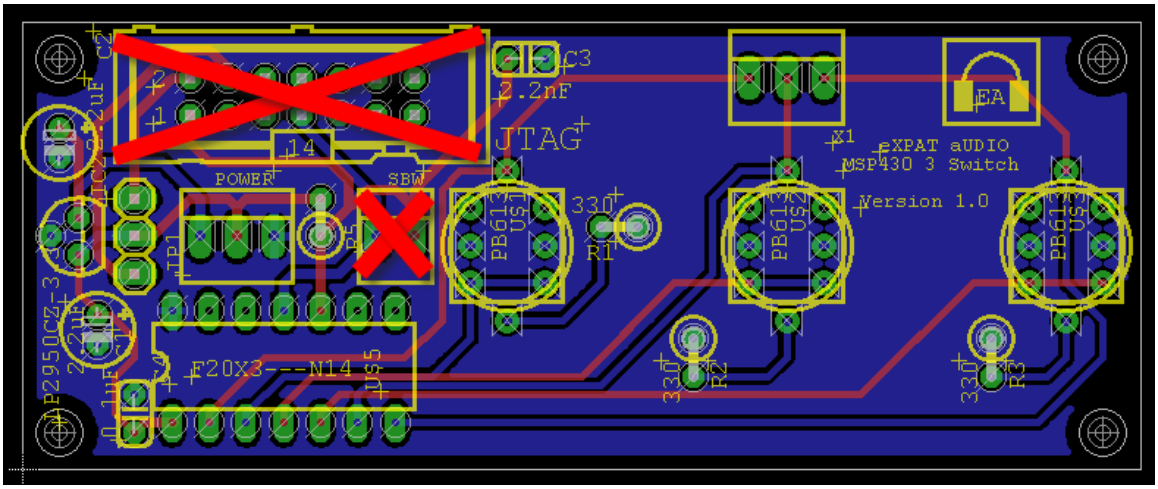
Initially designed to work with the digitally controlled mic front end, the board outputs 3.3V or 0V, based on toggling done by the switches. The microcontroller takes the momentary pushes, debounces the signal (to make sure it only registers one single push) then toggles the current value.

Non-Required Parts

Components marked in Red needn't be installed for the board the work. In fact, in future revisions, they might be removed. They are only used for debugging, with the additional hardware required.

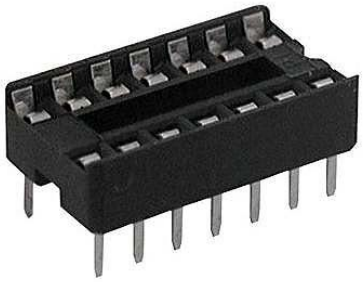
It's also useful to mount the switches on the other side of the board, so that components don't interfere with front panel mounting.

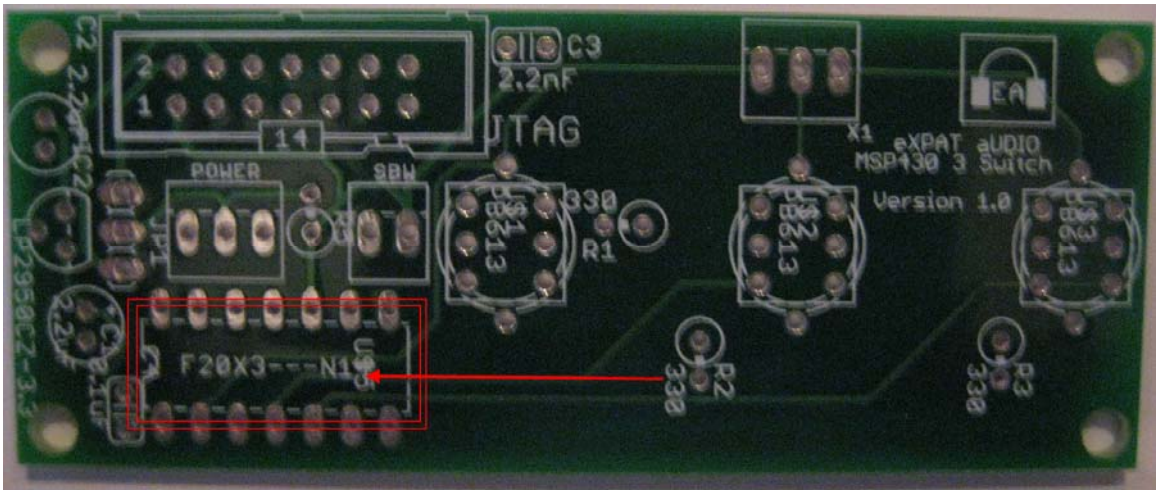




MSP430 Custom Programmed Controller

A 14pin DIL socket should always be used for the processor. Soldering the device directly exposes the device to ESD (static) and over-temperature, if your soldering skills aren't quite good enough. ☺

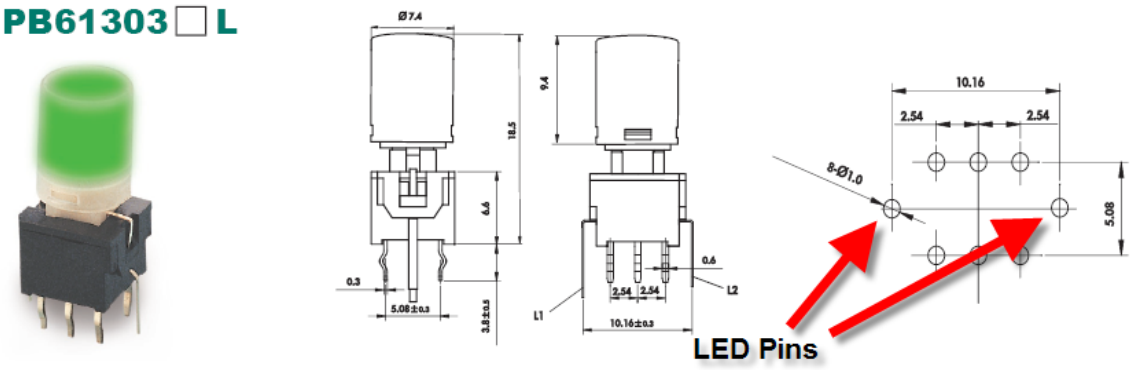




The pre-programmed microprocessor is available from both Expat Audio and http://www.diypartssupply.com

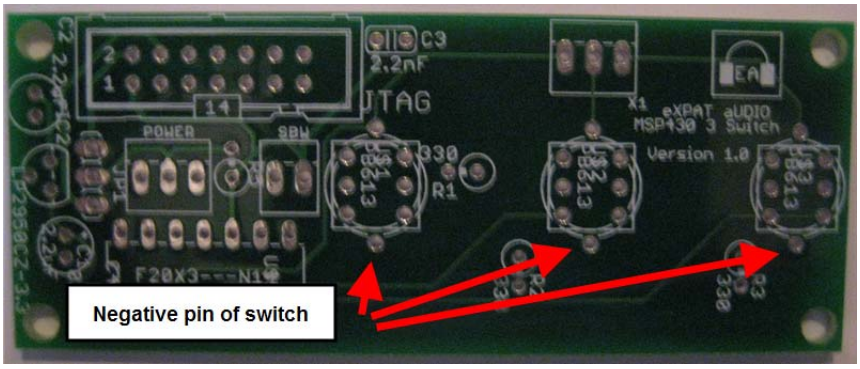
User Interface Switches

The switches used are PB613, made by the company “Highly Electric”. They are momentary push to make switches. For the onboard LED’s to work, please ensure the lower “negative” pin connects to the lower part of the board.



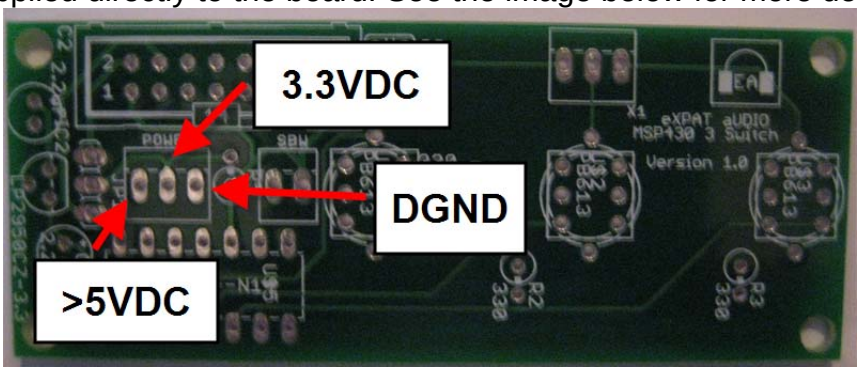
The polarity of the pins can be found by looking beneath the switch (look for the molding with the +’ve and –‘ive sign. Also, on the devices we received, the negative (cathode) is denoted with a red mark on the pin.

PB613’s are available from Rapid Online or http://www.diypartssupply.com



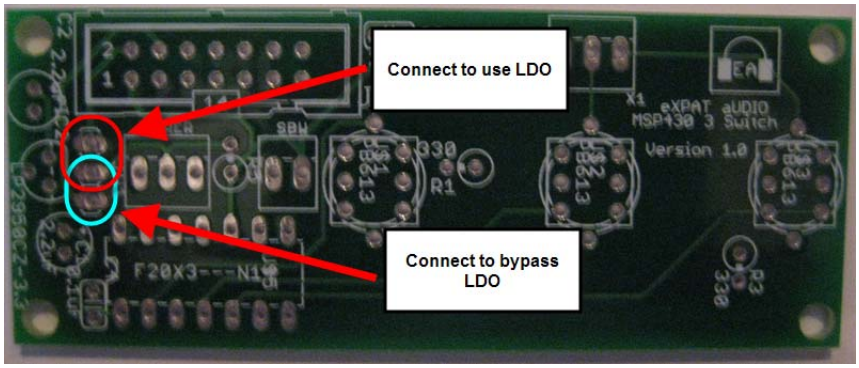
Power Supply

The control circuit can run from almost any power supply up to 12VDC. An onboard regulator (LDO) converters down to 3.3V operation. Alternatively, 3.3V can be supplied directly to the board. See the image below for more details.



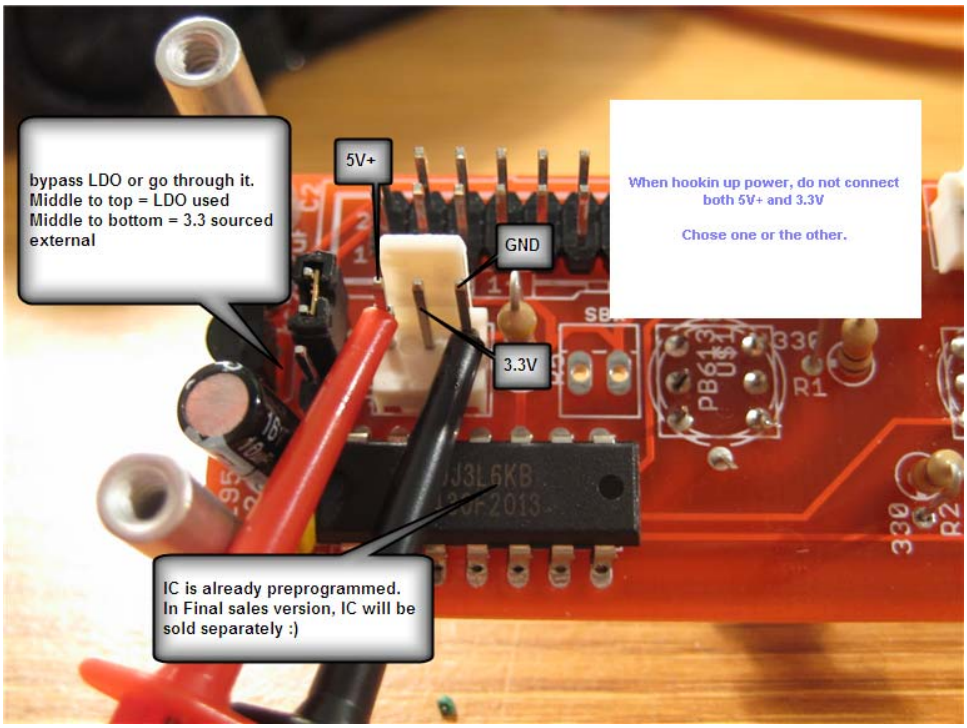
Power Connections to the board: Choose either external 3.3V or onboard regulation

The black jumper used below patches the incoming voltage either through the LDO circuit, or directly to the device.



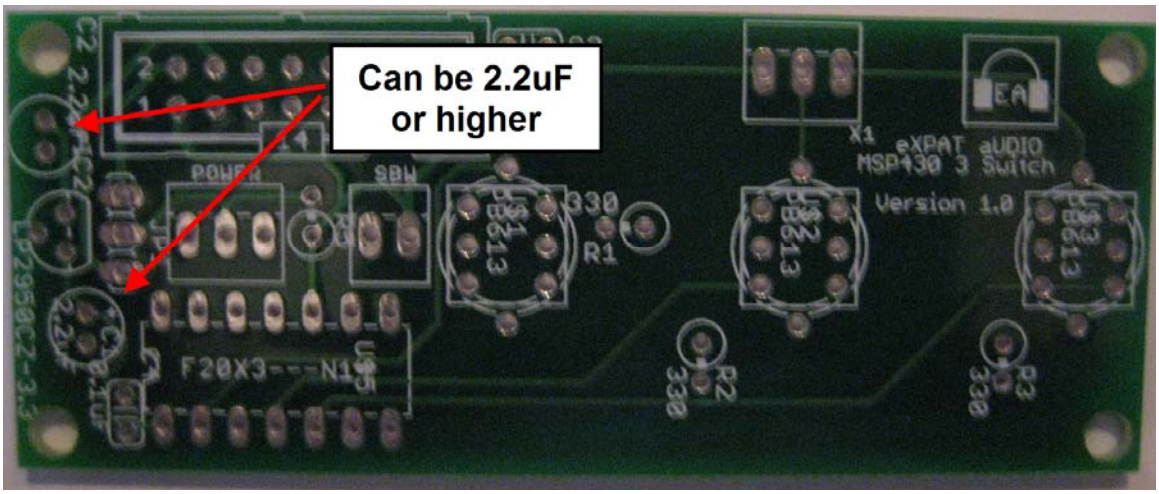
Use a jumper to select onboard regulation or use the 3.3V input directly.

The white connector in the image below has 5V, 3.3V and GND on it. GND is required as well as either 3.3V **OR** 5V.



Onboard LDO Capacitors

The electrolytic capacitors used in this product can be any value higher than 2.2uF, with a working voltage of 16V or higher. Please ensure they are polarized correctly. The PCB's have a small "+" to signify which pin should be positive. On the image above, the capacitors used show the negative leg (the cathode). That should be connected to the pin opposite the "+" symbol.



Bill Of Materials

Part	Value	Device	Package	Description
C1	2.2uF	CPOL-USE2-5	E2-5	POLARIZED CAPACITOR, American symbol
C2	2.2uF	CPOL-USE2-5	E2-5	POLARIZED CAPACITOR, American symbol
C3	2.2nF	C-US025-024X044	C025-024X044	CAPACITOR, American symbol
C4	0.1uF	C-US025-024X044	C025-024X044	CAPACITOR, American symbol
IC2	LP2950CZ-3.3	LP2950CZ-3.3	TO92	
JP1		PINHD-1X3	1X03	PIN HEADER
POWER	22-23-2031	22-23-2031	22-23-2031	.100" (2.54mm) Center Header - 3 Pin
R1	330	R-US_0309/V	0309V	RESISTOR, American symbol
R2	330	R-US_0309/V	0309V	RESISTOR, American symbol
R3	330	R-US_0309/V	0309V	RESISTOR, American symbol
R5	47K	R-US_0309/V	0309V	RESISTOR, American symbol
SBW	22-23-2021	22-23-2021	22-23-2021	.100" (2.54mm) Center Header - 2 Pin
U$1	PB613	PB613	PB613	
U$2	PB613	PB613	PB613	
U$3	PB613	PB613	PB613	
U$5	EA-3switchctrl	Pre-Prog IC	N14	Custom Programmed by expat audio
X1	22-23-2031	22-23-2031	22-23-2031	.100" (2.54mm) Center Header - 3 Pin