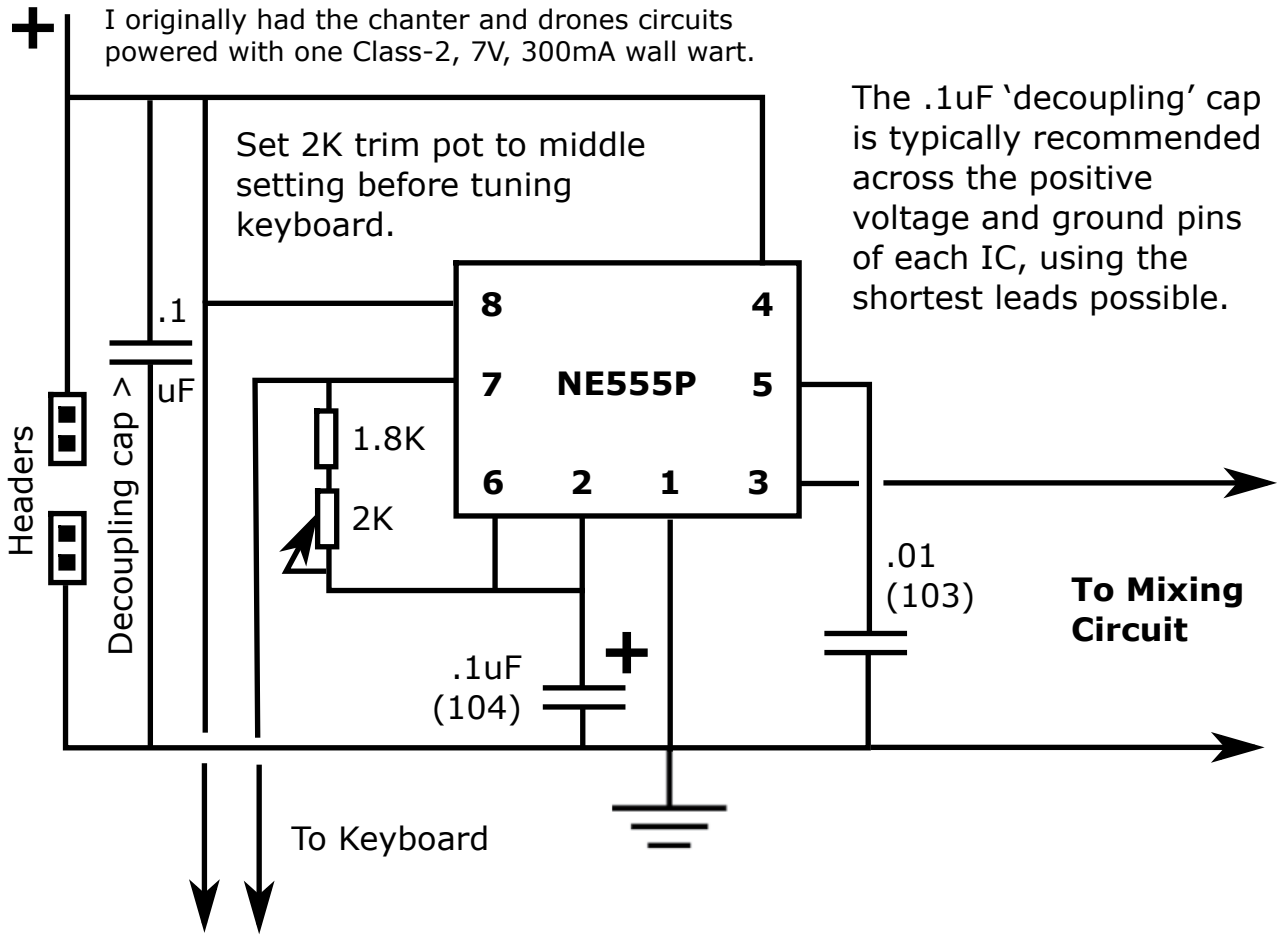
555 TIMER CHANTER CIRCUIT



I put two 2-hole female headers on the board, so that I could experiment with a large cap across the power supply. But, I never was able to hear any difference with a 100uF cap, a 220uF cap, or no cap there.

I have 4 test pins on my board—one on each of the ground rails for the chanter and drones circuits (even though the two ground rails are tied together) and one at the pin-3 output of each 555 timer. They're for easy measurement of frequency with the Hertz function of my digital multimeter.

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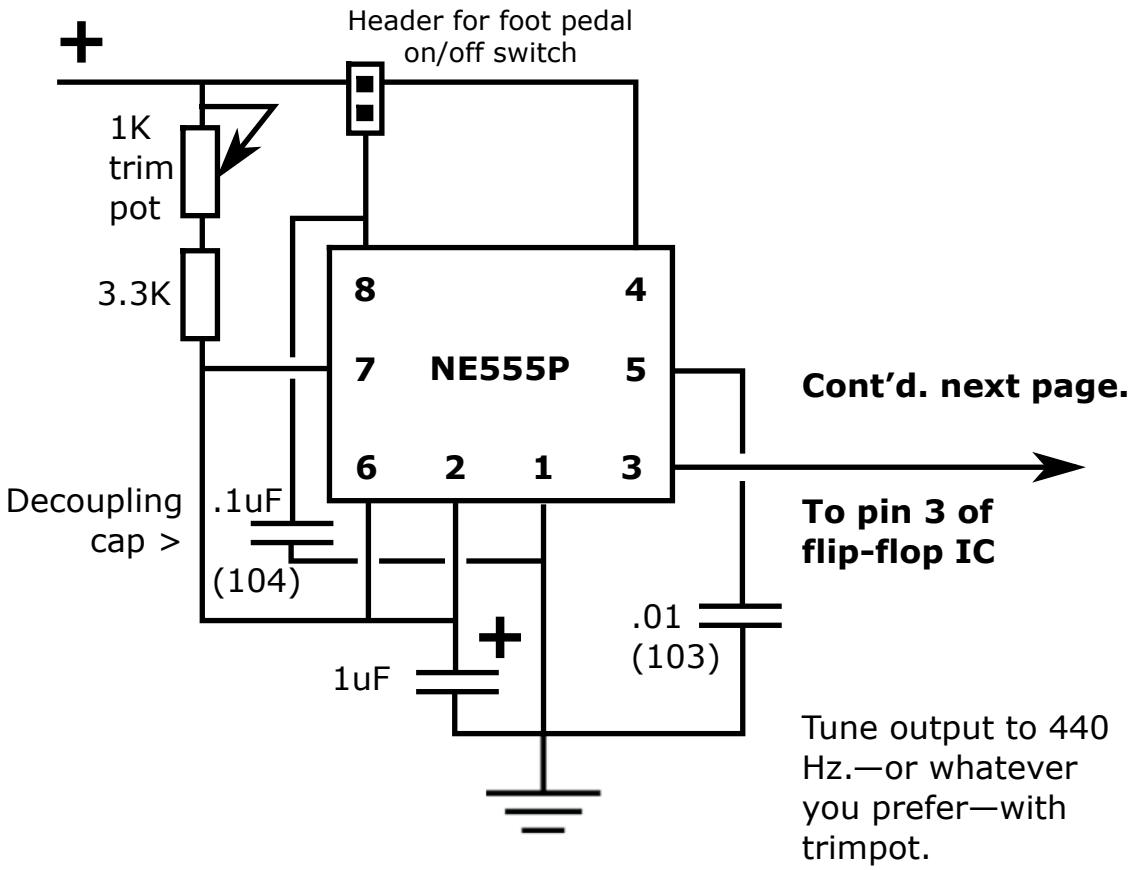
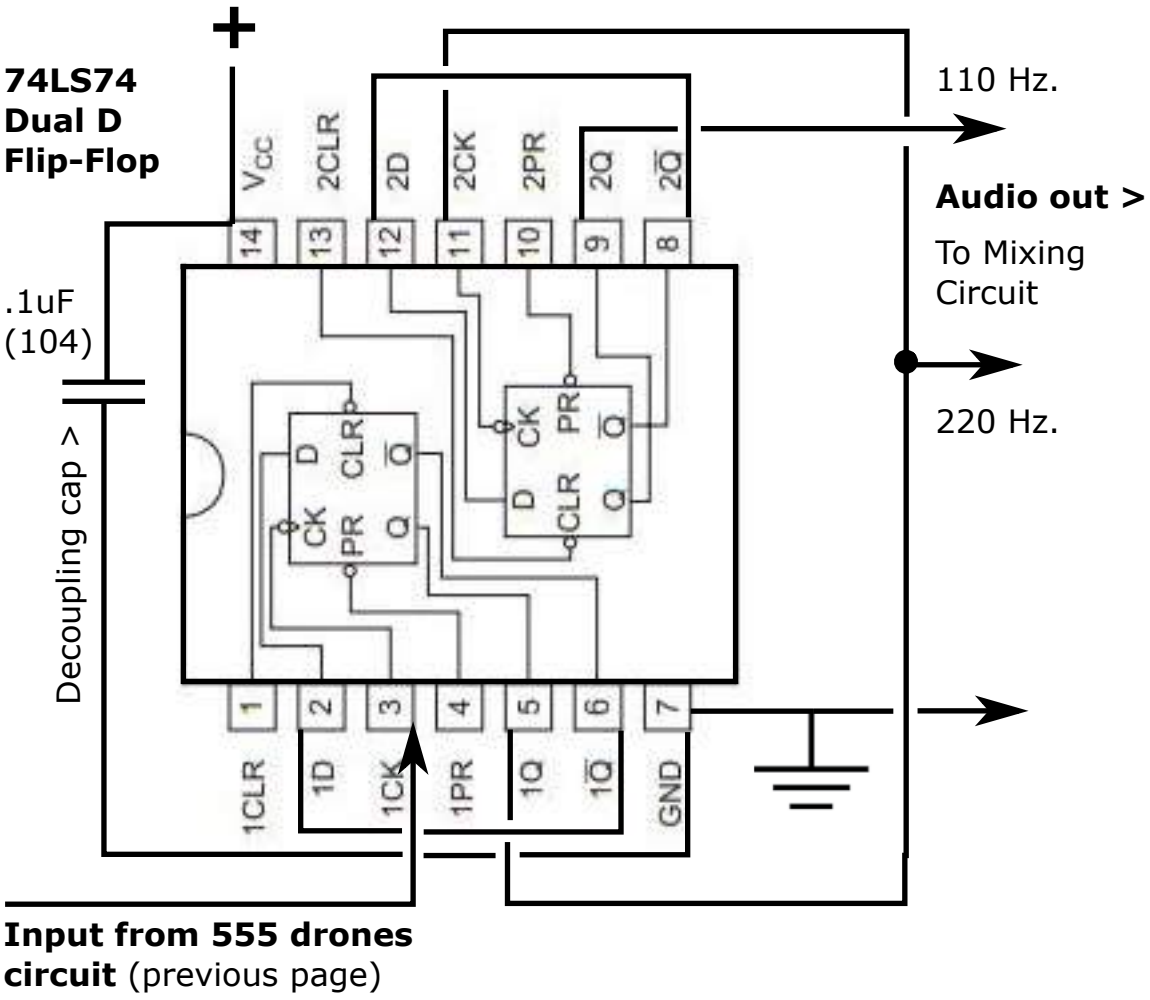
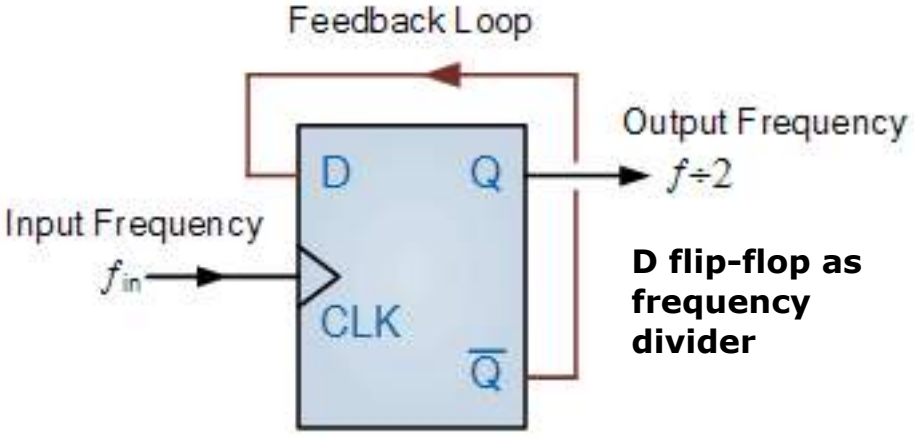
555 TIMER DRONES CIRCUIT



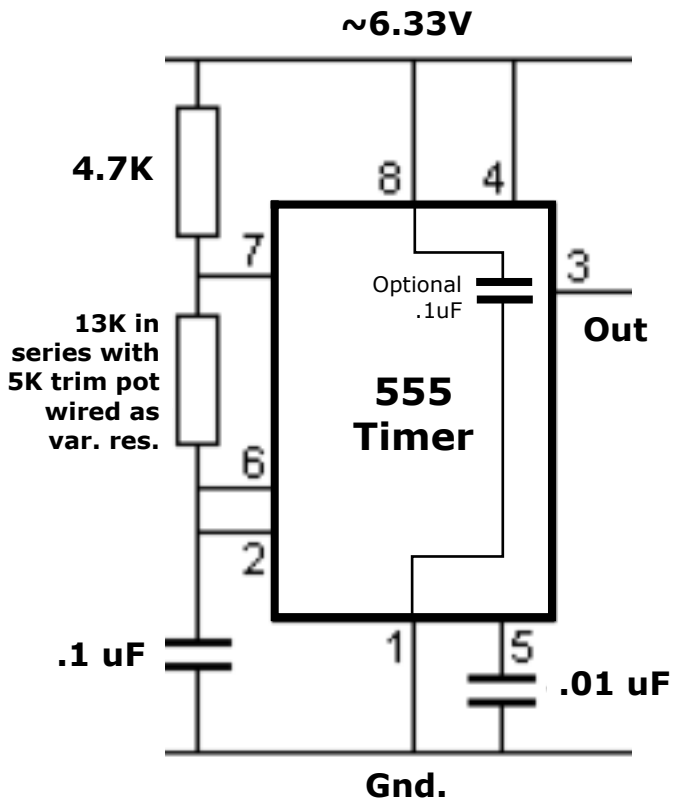




D flip-flop as frequency divider

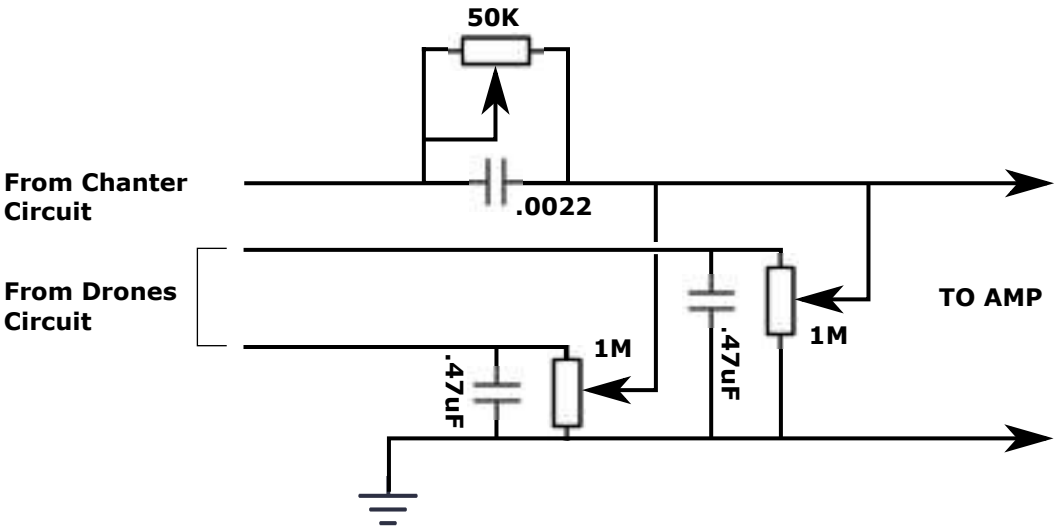
The DM74LS74AN flip-flop IC that I pulled out of something which I took apart, operates on a recommended voltage of 4.75-5.25 volts, with 7 volts being the absolute maximum supply voltage. It limited the input voltage range that I was able to use. A CD4013 IC might be preferable. In which case, you'd have to refer to the datasheet for the wiring. I don't think it's a pin-for-pin substitute.

ALTERNATIVE DRONES CIRCUIT



Someone in an online forum criticized the 555 Timer portion of my drones circuit. Above is an alternative.

You might want to run a test to make sure that the resistor/trimpot combination between pins 6 & 7 gives you whatever range you might wish to have for varying the drones frequencies, especially if perhaps you use a different supply voltage.



MOD BOARD 1/NEW MIXING CIRCUIT

This seemed to work on breadboard. Luckily I'd soldered female headers onto the board for the caps, so that I could continue to experiment. Because when I got everything soldered up, it no longer worked with 2 identical caps in the lower half of the circuit.

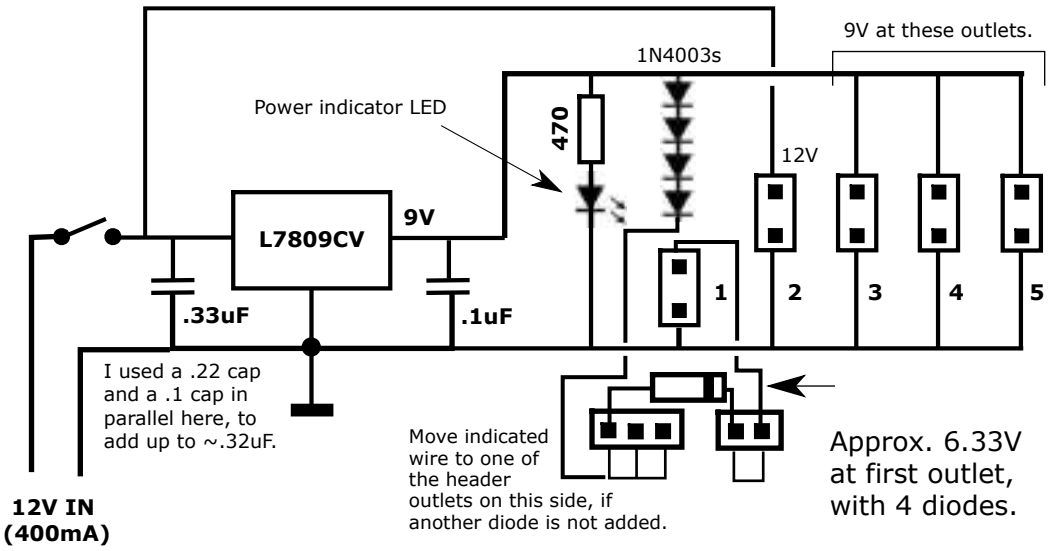
With my foot on the pedal to turn on the drones circuit, and even with the drones turned down *very* low, this adds an extra 'buzziness' to the chanter circuit. That slight vibrato goes away, however, when I take my foot off the pedal.

ADDENDUM: It works with 2 different caps in the lower half of the circuit. I settled on a 474 cap on the 220 Hz. line and a 103 cap on the 110 Hz. line.

As I mentioned above, I put 3-hole female headers (with the center pin pulled out) on the board for *all* of the caps, so that I could continue to experiment and play around.

If needed, a tiny bit of solder on the legs of the caps will ensure that they insert into the headers *snugly*.

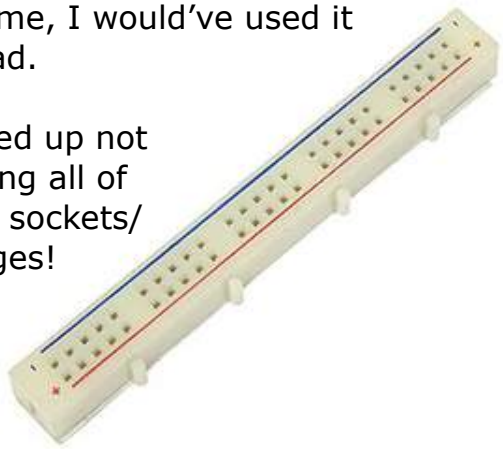
I built this circuit into the back of a new box for my 2nd 'Bagpipe' device, so that I could play with a whole host of modification circuits.



Originally, I had 4 outlets across the back of the box, putting out a very stable 9 volts, and 4 diodes reducing the voltage to the first outlet. I rewired the 2nd outlet directly to the 12V supply and added headers on the board for the option of an additional diode.

I screwed several of these (left) across the back of the box, as outlets.

But, if I'd had the strip below at the time, I would've used it instead.

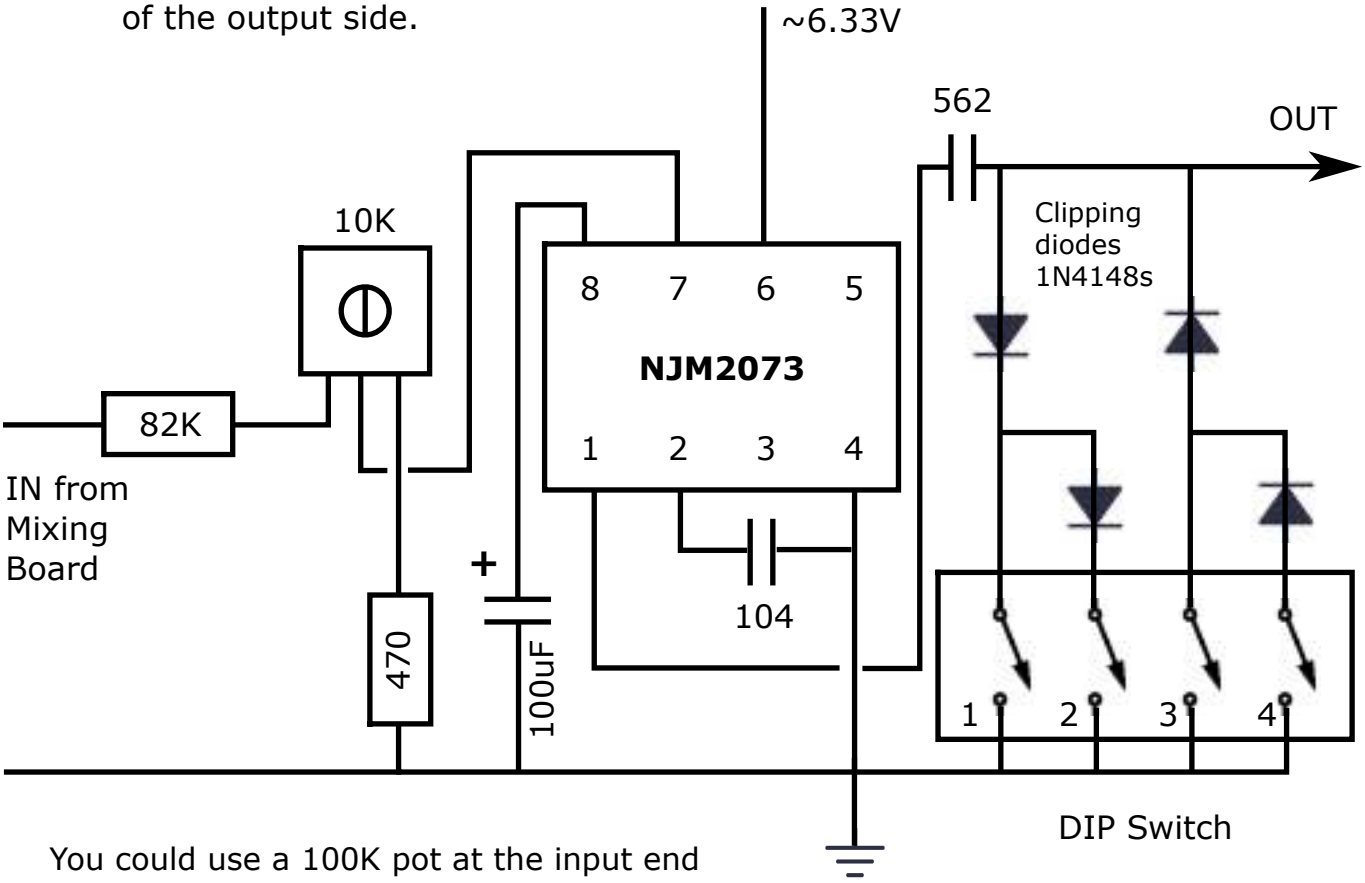


I ended up not needing all of those sockets/ voltages!

Although I contemplated adding a white LED, connected with a switch, inside of the box so that I could more easily see the trim-pots, to adjust them via my ports, with the lid on the box, and powering it via one of the 9V outlets. (Don't forget the resistor!)

SECOND MOD BOARD (Inspired by the "Dead Easy Dirt" circuit.)

I used half of an NJM2073 amp chip that I removed from a little Labtec CS-180 amp, instead of an LM386, and moved the pot to the input side of the circuit, instead of the output side.



You could use a 100K pot at the input end instead of the 3 resistances shown above. But, I found that only very a small range of the 100K pot was useful.

I'm liking the modified sound with the 110 Hz. line disconnected from the mixing board, the 220 Hz. drone volume cranked up halfway, and DIP switch #4 closed. However, some constructive/destructive interference weirdness becomes pretty discernible with the drone(s) cranked up.

The 3PDT switch added into my box, as shown on the next page, gives me the option of switching this circuit in and out. Between the clipping diodes, the trimpot above, and the 50K pot on the first mod board, the sound can be varied quite widely.

You can experiment with all kinds of things in the clipping department: different kinds of diodes, LEDs, even transistor junctions.

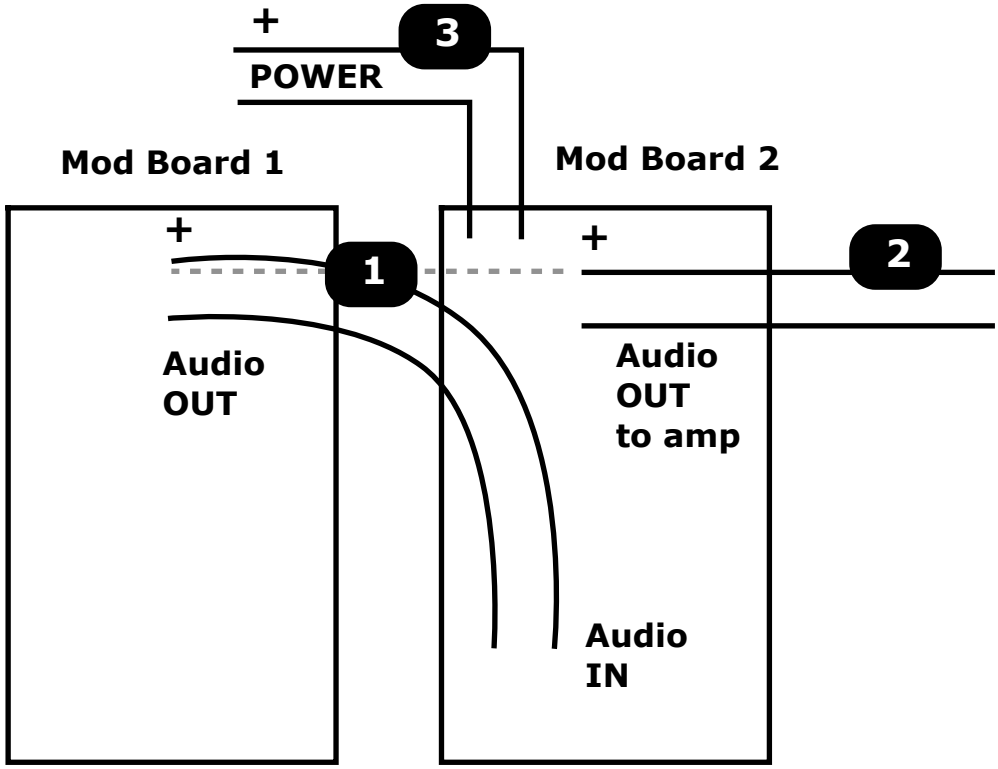
<u>Pages that are worth looking at, with regards to the Dead Easy Dirt circuit:</u>

https://www.cigarboxnation.com/profiles/blogs/let-s-talk-lm386-part-3-w-stripboard-dirt-box-layout

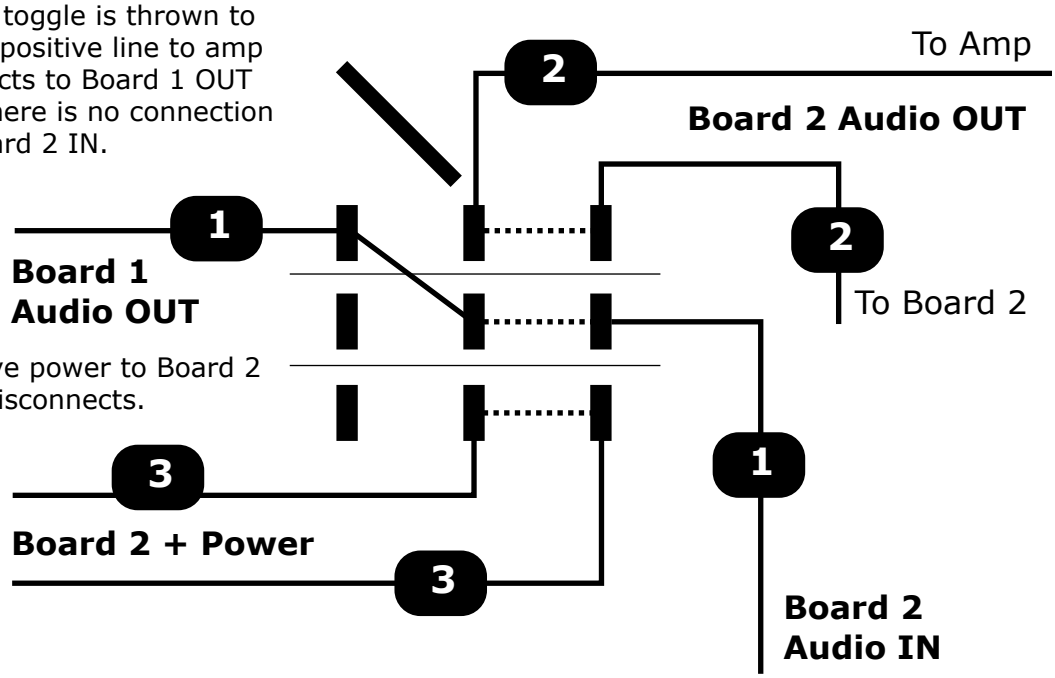
https://www.diystompboxes.com/smfforum/index.php?PHPSESSID=30f13d5f073d4a62901f2b69df2998a4&topic=101528.0

https://www.cigarboxnation.com/photo/cheap-dirt

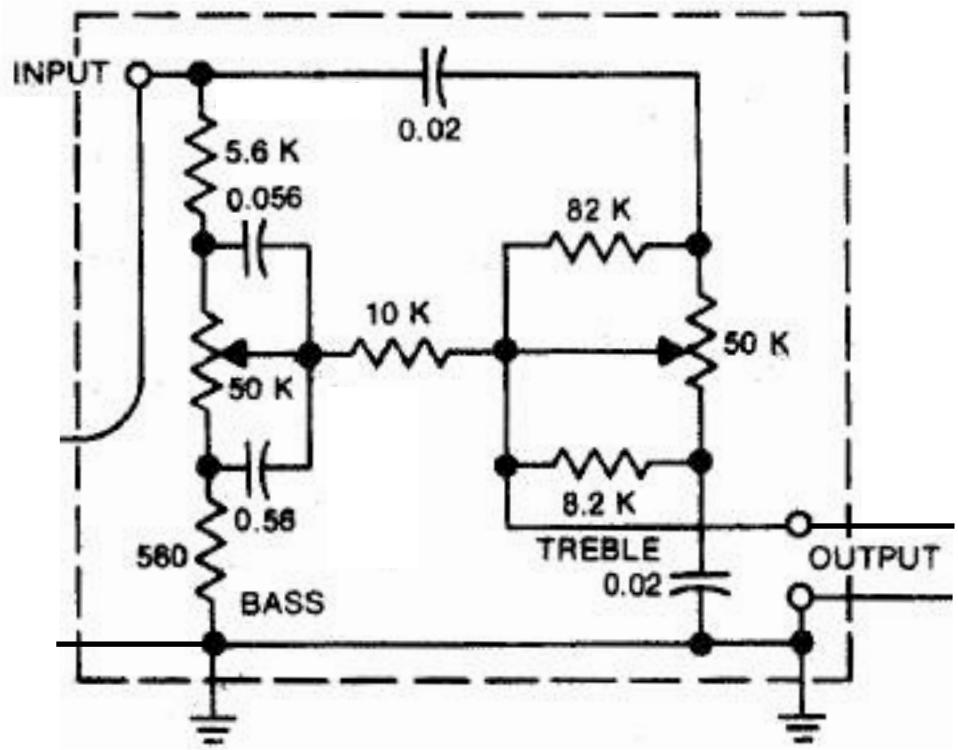
3PDT SWITCH WIRING (TO BE ABLE TO SWITCH 2ND MOD BOARD IN AND OUT)



When toggle is thrown to right, positive line to amp connects to Board 1 OUT and there is no connection to Board 2 IN.



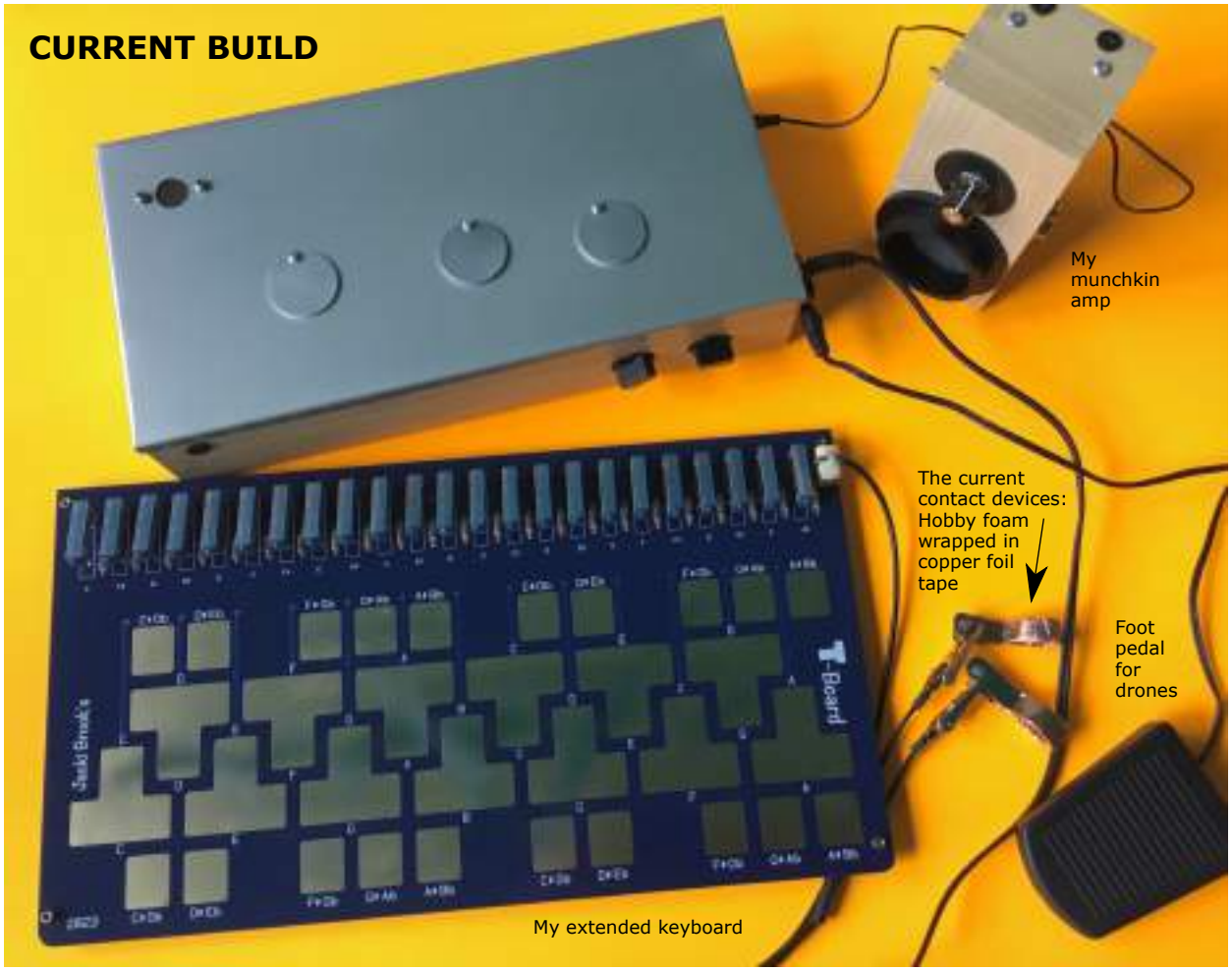
TONE CONTROL CIRCUIT



Circuit from *Basic Solid-State Electronics*, Van Valkenburgh, Nooger & Neville, Inc., Hayden, 1983, p. 2-115. I used some resistors in series and caps in parallel, to get to the ballpark of the spec'd components. And built it into the mint box below.

Yet another way to monkey around with the sound!

CURRENT BUILD



NOTE	FREQ.	APPROX. TOTAL RESISTANCE	SUGGESTED SERIES RESISTORS
C4	261.63	47.8K	39 or 47K
C4#	277.18	44.7K	39K
D4	293.66	41.8K	39K
D4#	311.13	39.1K	33K
E4	329.63	36.9K	33K
F4	349.23	34.5K	33K
F4#	369.99	32.3K	27K
G4	392.00	30.1K	24K
G4#	415.30	28.2K	24K
A4	440.00	26.2K	22K
A4#	466.16	24.5K	22K
B4	493.88	22.7K	18K
C5	523.25	21.2K	18K
C5#	554.37	19.7K	15K
D5	587.33	18.2K	15K
D5#	622.25	16.9K	15K
E5	659.25	15.6K	10K
F5	698.46	14.4K	10K
F5#	739.99	13.3K	10K
G5	783.99	12.2K	10K
G5#	830.61	11.2K	7.5K
A5	880.00	10.3K	7.5K
A5#	932.33	9.3K	6.8K

With 10K multi-turn trimpots. I've included this info again, so you don't have to go searching around for it—in case you actually want to build the thing.

Email brookware(at) vtelwireless.com, if you'd be interested in buying one of my extra extended keyboard boards (without the components).

And give me some time to respond.

LINKS TO FILES ON THE ENTIRE ADVENTURE:

https://www.mediafire.com/folder/q4ave4tjk87ns/Bagpipe_Project
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FIRST 9-NOTE, PUSHBUTTON DEVICE:

https://www.mediafire.com/file/
5fipj0ycacpmfz5/1stDeviceTune.mp3/file

https://www.mediafire.com/file/b7ybluxlu4oi5to/BagpipesPart-1.pdf/
file

https://www.mediafire.com/file/hbpi2p6pihu3me9/
Note_on_1st_Device.rtf/file

SHORT VIDEO OF ME PLAYING MY STYLOPHONE-TYPE KEYBOARD, *BEFORE* I BEGAN EXPERIMENTING WITH MODS:

https://www.mediafire.com/file/v7rtxmi2cevv93y/T-Board.mov/file
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More files at the first link above. I've documented every part of this adventure! Including mistakes, delusions, and circuits I abandoned.

I'll upload another MP3—at some point—with the mod boards and tone control circuitry utilized.