

Aaron Lanterman Buchla Pulser & Inverter PCB Rev 1

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Errors

- Corrected in Rev 1: R10 on the schematic and board is shown as going to pin 6 of IC3B, the negative terminal. This is catastrophically incorrect; R10 should connect to pin 5, the positive terminal, instead. The easiest way to do this is to omit R10 from its usual spot, and include it as a jumping resistor running from B4P3 to pin 5 of IC3.
- Corrected in Rev1 PCB but omitted from schematic: You must add jumper to connect the junction of R5, R38, and C1 with pin 2 of IC3A (which also connects with D2). I found the easiest way to do this is to solder a little tiny jumper between D2 (side near IC3) and C1 (side near IC3). Now that you know this change is coming, you can probably easily accommodate it by cleverly bending some leads over while stuffing and soldering. (If you don't do this, the op amp is not operating in proper feedback mode and you'll get a "threshold" effect when turning the offset control.)
- R103 and R104 are intended to create a +13.5 volt supply. On the original Easel, this is created on another board with an op-amp and transistor buffer. Here it's just a couple of resistors, forming "soft" supply, so to counteract loading I found that lowering R103 from 10K to 3.3K is a good idea.
- LOS and LCV should be 10K linear, not 50K.
- Fixed in Rev 1: I set some of the silkscreen text to the wrong layer in Eagle, so it didn't appear. Somewhere on the board it should say "Adapted by A. Lanterman," "Pulser & Inverter," and "Based on the Music Easel," and it should also say something about D3-D6 being 1N457s.
- R11 is labeled R22 on PCB.
- R22 is labeled R11 6K8 on PCB but should be 2K2 on PCB and schematic.
- R28 is labeled 6K8 on schematic and PCB but should be 100R.

Notes

- I am convinced that the 50K sliders marked on the original schematics (and this version of the board) should actually be 10K linear. The 120K input and shaping resistors (R105, R106, R107, and R108) are off-board in the original Easel, but included on-board in this adaptation.
- The original Easel has a 13.5 V supply, created using an op amp and a transistor. If you have such a supply, you may hook it to the +13.5 pin and omit R103 and R104. Otherwise, leave the +13.5 pins unconnected and use R103 and R104, which create a "soft" +13.5 V supply. I found it important to lower R100 and R106 to something like 3.3K to counteract loading.
- The circuit has been tested with RC4558s, which was deemed to be electrically similar to the original RC4136s used in the Easel. Other op amps will probably work (many will probably work better!), but they have not been tried.
- D3-D6 are 1N457s. I suspect a 1N4148s or a 1N914 will work, but I have not tested them.

- Changed in Rev 1: I have a tradition of specifying 2.2 ohm resistors (should probably be 1/2 watt) at the power inputs to perform power supply filtering along with 10 microfarad electrolytics. I picked 2.2 ohms since this choice shows up on some Buchla schematics; I did not pick it through any particularly scientific means. Any low resistance should work here. I actually use "ferrite beads," as suggested by Ken Stone, and not resistors in these spots.

Connections

Front panel connections usually have a square and round pad together in a white box. The round pad is the signal, and the square pad provides a convenient ground.

- PIC, PIO, FB - Pulse Input Common, Pulse Input One-Shot, and Feedback. You want to try to find a single-pole ON-OFF-(ON) switch, where the (ON) indicates momentary operation. Hook PIC to the common switch terminal, hook PIO to the (ON) terminal, and hook FB to the regular ON terminal. This will let you do just one "pulse," or if you switch to the feedback mode quickly after doing one pulse, the pulser will drive itself and you will get repeated pulses. The middle position turns off the pulsing. If need be, you could just use a regular on-off-on switch here.
- PCVA, PCVB - Pulser CV outputs A and B. A is active when AEN is set high; B is active when BEN is set high.
- PPA, PPB - Pulser pulse outputs A and B. A is active when AEN is set high; B is active when BEN is set high.
- Y1, Y2 - terminal of an electronic switch; connection made when BEN is set high (untested)
- Z1, Z2 - terminals of an electronic switch; connection made when BEN is set high
- ANOT, BNOT - logical "not" of AEN and BEN
- AEN, BEN - A and B enables; see other connection instructions for details of what they enable. I plan to connect these to a switch that will let be switch between automatically-on (connect to +15 V) and connect to an external input. Most users will probably just want to tie AEN to +15 so the A outputs are always enabled. Some users may want to just ignore the B outputs entirely. Some might want to only use the "B" part of the circuit to control the Z1,Z2 and Y1,Y2 electronic switches, and ignore the pulser B outputs. Do whatever makes you happy.
- INVI, INVO - inverter input and output; takes 0-10 V CV and outputs 10-0 V CV. The inverter is independent of the rest of the pulser, so you can invert whatever CV signals you want.
- LED - on the Easel schematics, this is actually called "LAMP" and is shown going through a lamp-looking symbol to a +12 V supply. I haven't tried doing anything with this, since it's a low priority for me, but if someone can get something to light up I'd love to hear about it.

Potentiometers

- LOS - Level (pulser rate) Offset (Easel schematics and this version of the PCB say 50K, but I recommend 10K linear)
- LCV - Level (pulser rate) CV; controls amount of influence of the LIN input (Easel schematics and this version of the PCB say 50K, but I recommend 10K linear)

- TRIM - Trims the pulser rate - set to personal taste