



# PolyDAC (X)

## PCB V3.3 Construction Notes

February 22<sup>nd</sup>, 2008



## Construction

### [3D Model](#)

Construction of the PolyDAC (X) is pretty straightforward and only requires good general soldering skills. As always, we recommend building the board up in layers starting with the smaller components like resistors and diodes and moving up to the largest components. If you have IC Sockets then fit them after the resistors and diodes. If not, then I would suggest leaving the IC's until last. Normal anti-static precautions should be followed throughout, especially when handling the IC's. Please pay particular attention to the orientation of the IC's, diodes and electrolytic/tantalum components.

If acquiring your own components then please follow these suggested guidelines when selecting suitable items:-

- All resistors should be 1% 0.5W Metal Film. Smaller wattage resistors down to 0.25W will work fine except for R201 which should be kept at 0.5W or greater.
- All capacitors less than 1nF are miniature ceramic discs. I would recommend Low-K types. The pcb footprint accepts 0.2" pitch components.
- All capacitors between 1nF and 1uF are 10% Metallised Polyester capacitors on a 0.2" pitch. These are usually rated to either 63V or 100V but larger voltages can be used as long as they fit in the space available.
- Capacitors over 1uF are either Low ESR Electrolytics or Tantalums. These should, ideally, be a minimum of 25V. Larger voltage ratings can be used but again, the larger the voltage the larger the footprint.
- Resistor networks contain 4 resistors with one end commoned. If you have problems sourcing these then simply replace them with 4 standard Metal Film resistors by inserting one end of each resistor in to its appropriate location and then joining all the free ends together and connecting this to the common connector (marked on the pcb with a square end).
- Trimpots are from the Spectrol/Vishay 64W/64X family or the Bourns 3296W/3296X family. These have their 3 pins inline and not staggered.
- I supply 2N3904 (NPN) and 2N3906 (PNP) transistors in my kits but any good general-purpose transistor will work fine here.
- The op-amps (AD712, TL074 and LF412) should be available from most electronic suppliers.
- The current release of the pcb (V3.3) requires a JST connector for the power as the pcb holes are slightly undersized for the more common Molex part.
- A pcb error requires a wire link be fitted from pin 5 of U102 (ATMega16) to pin 2 of R114 (resistor network next to the OPTIONS connector)



## Testing

Dipswitch S104 is used to provide various options for the PolyDAC. The current assignments are as follows (using firmware V3.9 or greater) :-

Switch #1: unused

Switch #2: unused

Switch #3: unused

Switch #4: OFF = Normal operation, ON = TEST mode allowing calibration of the DAC output.

Apply power to the unit making sure you are applying the power correctly. Check that no device is running hot. Any sign of smoke or strange smells turn off the power immediately and recheck the polarity of the power supply, and the direction of the ICs in their sockets.

The next thing to do is to make sure that we can receive MIDI data, I would suggest starting with the unit set to MIDI Channel 1 (all 4 switches on SW1 off).

Send it some notes and you should see the MIDI light flash

If you have the mode switch set to 'Poly' then as you press a note you should see the LEDs cycle, 1 then 2, then 3, then 4.

Next try MonoMode 1, if you press a key you should see all 4 gate lights come on at once. Try MonoMode 2 and you should see only GATE light 1 flashing as you press notes.

With everything functioning so far, it is time to finalise this stage by calibrating the PolyDAC. You will require a multi-meter and a small-bladed screwdriver.

Remove and re-apply power to ensure that the unit starts in its default configuration mode.

- Connect your meter to NOTE Output CV1
- Set PITCHBEND (P532) to its minimum position
- Adjust the TUNE knob (P402) to give a reading of 0.000V
- Set Dipswitch #4 to the ON position, all 5 LEDs should come on
- Adjust the SCALE trimmer (P401) to give a reading of 10.667V
- Return Dipswitch #4 to the OFF position
- Set the PITCHBEND (P532) to its maximum position
- Connect your meter to the PITCHBEND output (pin 1 of J531)
- Adjust the PITCH ZERO trimpot (P531) until you get a reading of 0.00V.

Your unit is now ready.

