



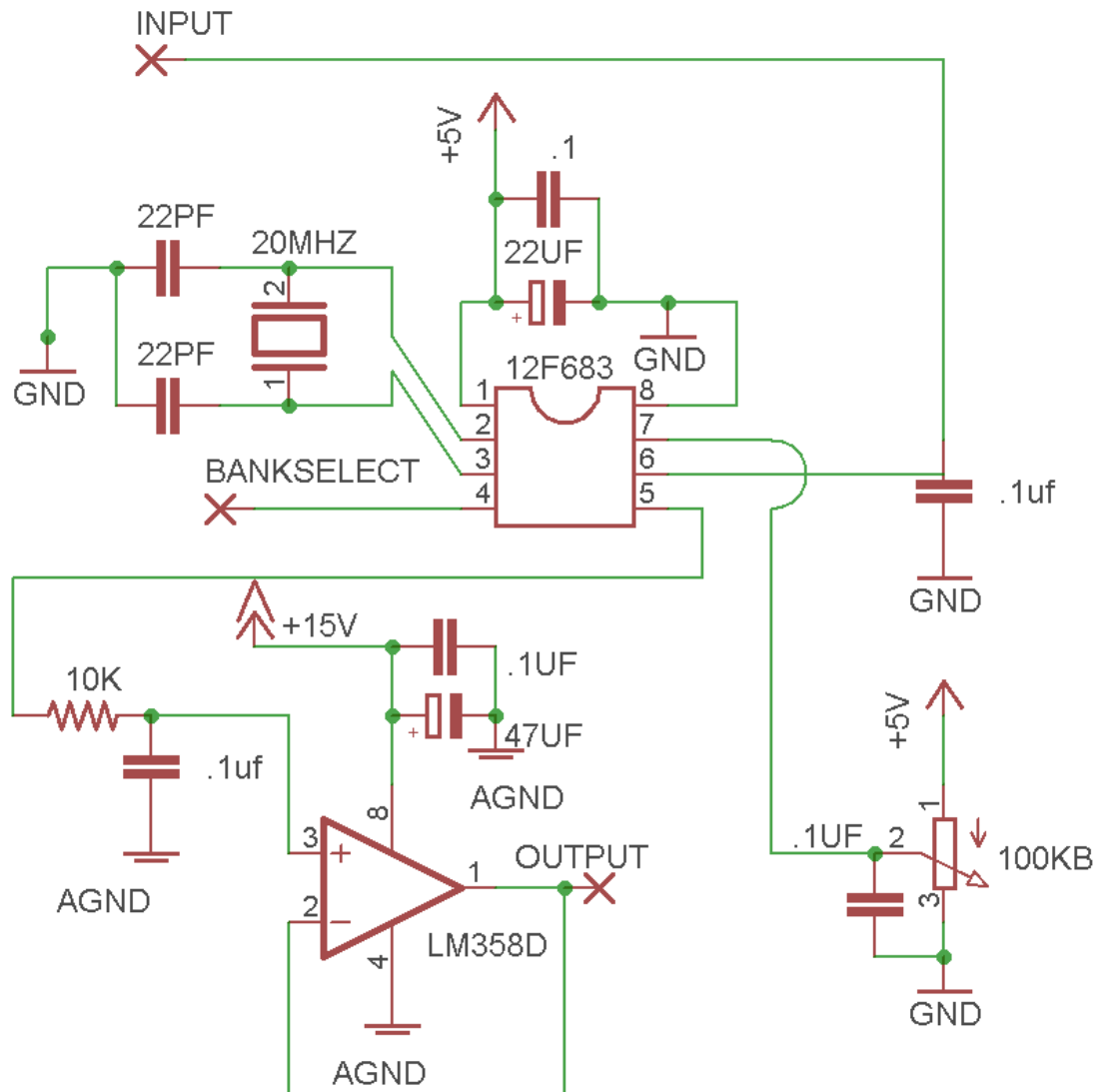
SIMPLE CV QUANTIZER

REV 4.0

Last Updated 3-15-2011

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1.SCHEMATIC



2.PARTS LIST.

PART	MOUSER Part #
C1 - .1UF FILM CAP	- 80-MMK5104J50J01TR18
C2 - 22UF 16V ELECTROLYTIC	- 647-UVR1C220MDD
C3 - 22PF CERAMIC	- 80-C322C220K2G5CA
C4 - 22PF CERAMIC	- " "
C5 - .1UF FILM CAP	- 80-MMK5104J50J01TR18
C6 - .1UF FILM CAP	- 80-MMK5104J50J01TR18
C7 - .1UF FILM CAP	- 80-MMK5104J50J01TR18
C8 - 47UF 16V ELECTROLYTIC	- 647-UVR1C470MDD1TD
C9 - .1UF FILM CAP	- 80-MMK5104J50J01TR18
R1 - B100K PC MOUNT 16MM POT	- RV170F-24-15R1-B15
R2 - 10K	- 71-CCF0710K0JKE36
IC1 - 12F683 PROGRAMMED FOR CV QUANTIZER	- n/a
IC2 - LM358	- 512-LM358AN
7805 VOLTAGE REGULATOR	- LM7805ACT
20MHZ CRYSTAL OSCILLATOR	- 815-AB-20-B2

The part numbers provided are simply those of the parts I used when building the circuit for myself, it is not critical for you to buy these specific brands. I am not affiliated with Mouser in any way, I am simply a happy customer. These part numbers are subject to change.

3.CIRCUIT DESCRIPTION.

The purpose of this circuit is to quantize control voltages to a musical mode for use with an oscillator using the 1v/oct standard.

The incoming control voltage is routed through the pad marked "IN" to IC1 on pin 6. Potentiometer R1 (marked B100k on the board) forms a voltage divider which creates a voltage which when inputted to pin 7 of IC1 selects a musical mode to be quantized to. The input is compared to all acceptable voltages in that musical mode and the closest match is outputted to the chip's PWM (pulse width modulator). A 20khz pulse is then outputted to pin 5 with a pulse width corresponding to the desired output voltage. This pulse is then filtered by R2 and C7, and then buffered by IC2 and then outputted through the pad marked "OUT."

IC1 and it's accompanying circuitry has a separate ground from the other components which is connected on the pad labeled "GND" on the board. Power for these parts is supplied either by either an external +5Vdc supply attached to the pad labeled "+5V" on the board or from an on board 7805 voltage regulator (use one or the other, do not install the 7805 if using an external +5v supply). If building multiples of this circuit you may use one on board 7805, then use the "+5V" pad to supply this voltage to another board. C1, C2, C5 and C6 provide power supply filtering and decoupling for this circuitry. C3, C4 and the 20mhz Crystal provides a timing pulse for IC1.

IC2 and it's accompanying circuitry is grounded through the pad labeled "AGND." V+ for this section should be applied to the pad labeled "+15v." +15v is non-critical, the circuit has been tested at voltages as low as +9v with no noticeable differences. C9 and C8 provide power supply filtering and decoupling for this circuitry.

The musical mode which the voltage is quantized to is selected by the position of the mode select potentiometer. There are two banks of musical modes available on each chip. When pin 4 of IC1 is connected to +5v the "standard" bank is selected, when connected to ground, the "octave" bank is selected.

STANDARD BANK

- 1.Bypass - Inputted voltage is outputted*
- 2.Major - Root, 2nd, 3rd, 4th, 5th, 6th, 7th*
- 3.Minor - Root, 2nd, flat 3rd, 4th, 5th, flat 6th, flat 7th*
- 4.Major Pentatonic - Root, 2nd, 3rd, 5th, 6th*
- 5.Minor Pentatonic - Root, flat 3rd, 4th, 5th, flat 7th*
- 6.Blues Scale Root, flat 3rd, 4th, flat 5th, 5th, flat 7th*
- 7.Whole Tone - Root, 2nd, 3rd, flat 5th, flat 6th, flat 7th*
- 8.Chromatic - All 12 notes*

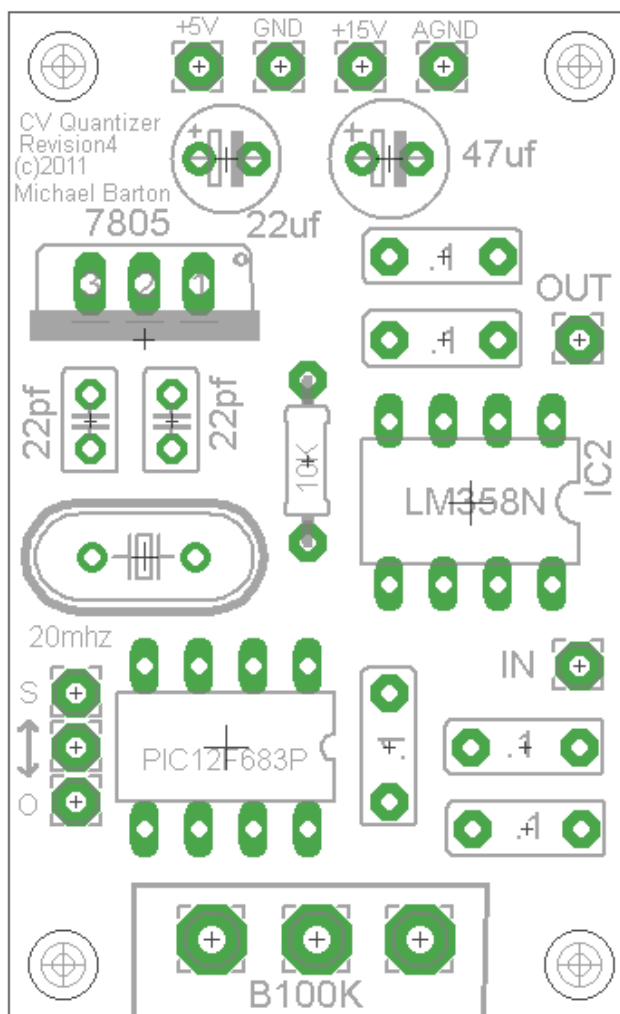
OCTAVE BANK

- 1.Bypass - Inputted voltage is outputted*
- 2.Octave - Root*
- 3.Octave and Fifth - Root, 5th*
- 4.Octave and Flat Fifth - Root, flat 5th*

5. Major Arpeggio - Root, 3rd, 5th
6. Minor Arpeggio - Root, flat 3rd, 5th
7. Dominant Arpeggio - Root, 3rd, 5th, flat 7th
8. Chromatic

4. THE BOARD.

The PCB for this project is designed to be mounted to a panel by the 100K pot. It is .7"x2.4" in dimension. A socket should be used for IC1 and is recommended for IC2. All polarized components have their polarities marked. The pads to the left of IC1 are used for bank selection, a jumper from the center pad to one of the outside pads selects between "Standard" or "Octave" banks. The pads at the top of the board are used to connect to the power supply.



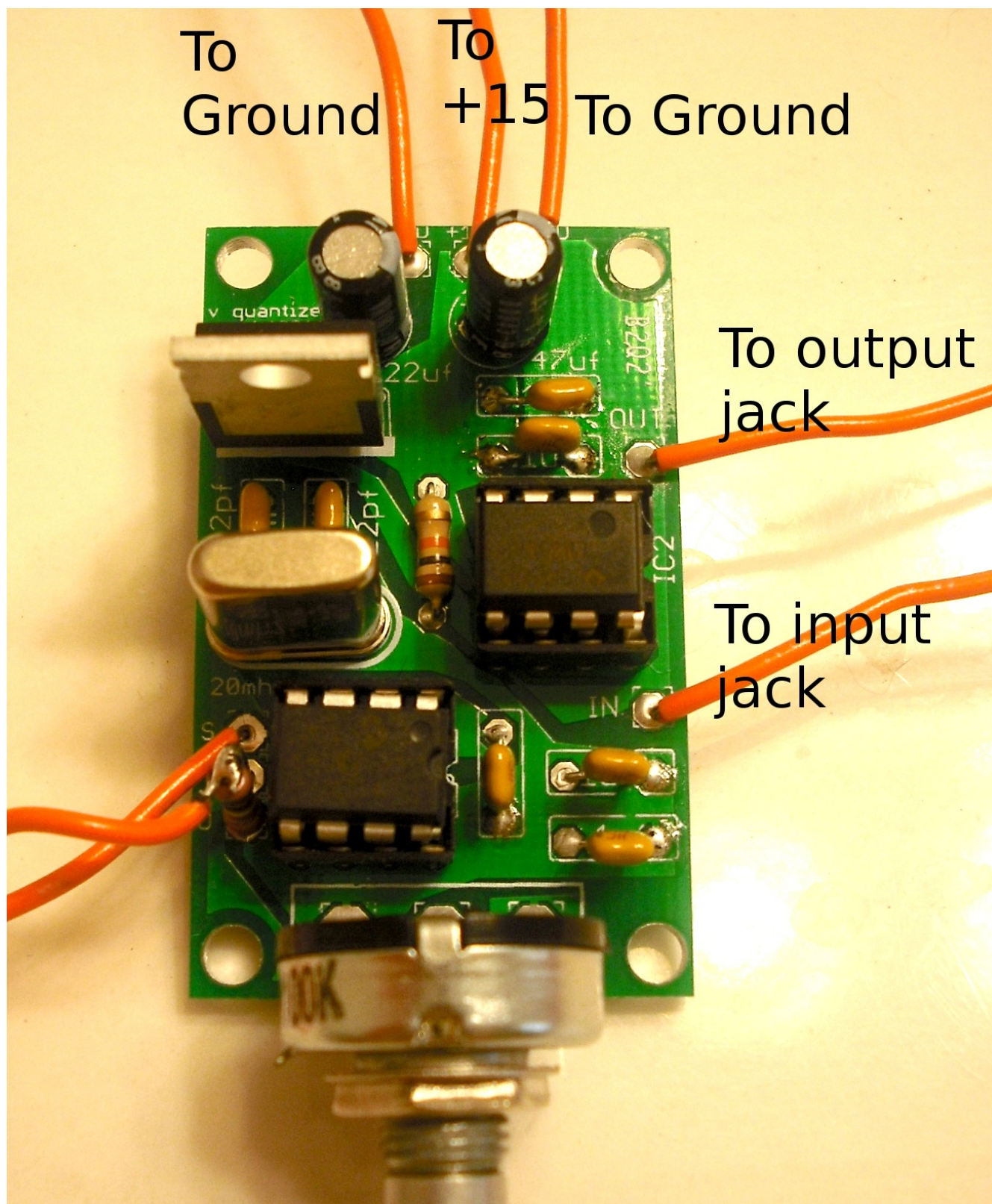
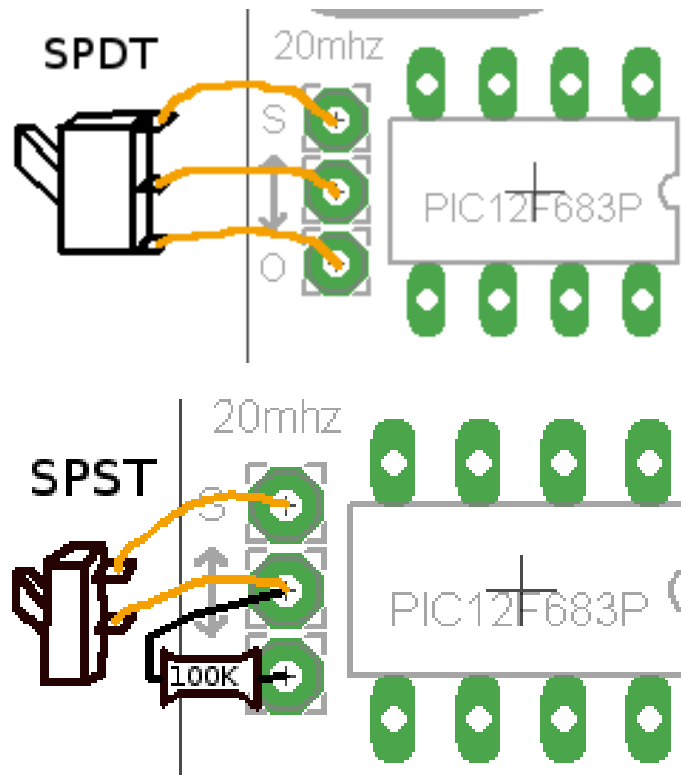


Photo of populated board with bank switching and labeling of wires for use as stand alone module

5. WIRING OPTIONS

1. Bank Select switching.

Instead of installing a permanent jumper to select which bank of musical modes is available, one can install a switch to go between them. With a Single Pole, Double Throw switch, no other parts are necessary (See picture below). With a Single Pole, Single Throw switch, a pull-up or pull-down resistor must be added.



6.REVISION HISTORY

3-15-11

Updated to reflect Rev4 board. Added "Wiring Options" section.

10-10-10

Redrew schematic. Updated circuit description to correspond with a change in the firmware (seperating major and minor modes). Added information on board.

10-4-10

First created.

Please e-mail Michael@Bartonmusicalcircuits.com with any questions or comments.

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