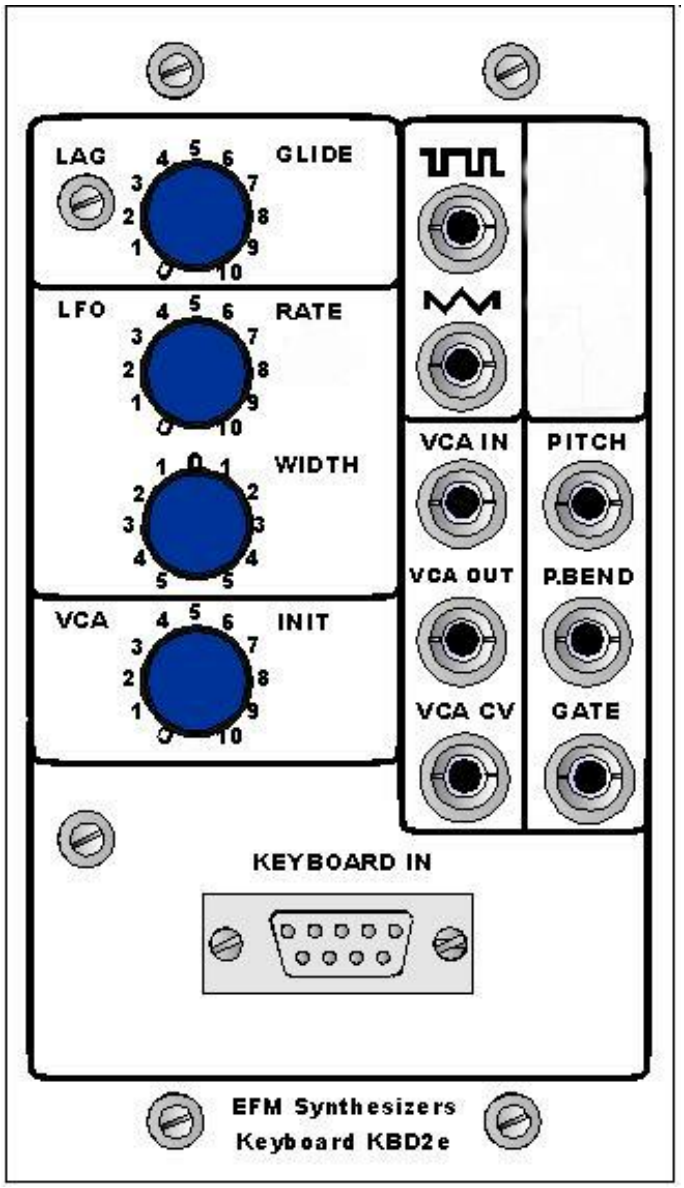
# EFM Synthesizers

**KBD 2e - Keyboard Converter**



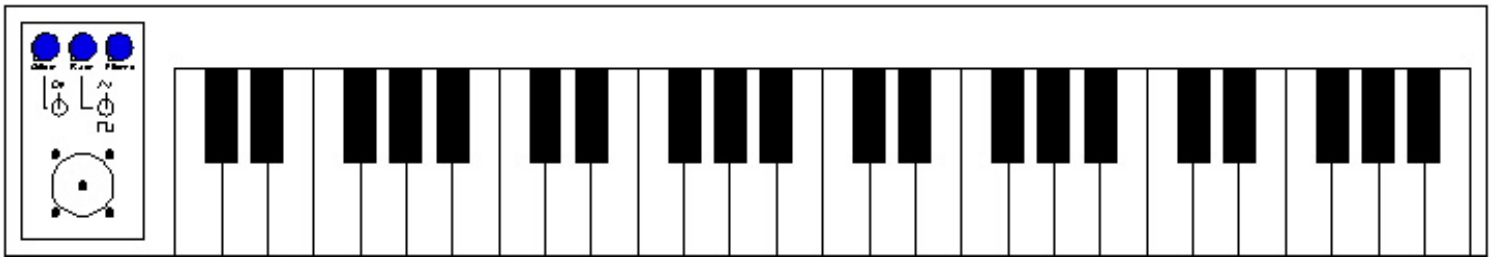

Keyboard converter / interface.
Features...

- 1 volt per octave control voltage
- Key gate
- Modulation LFO
- Modulation VCA
- Scaleable over 8 octaves.
- +/-12 or +/- 15V

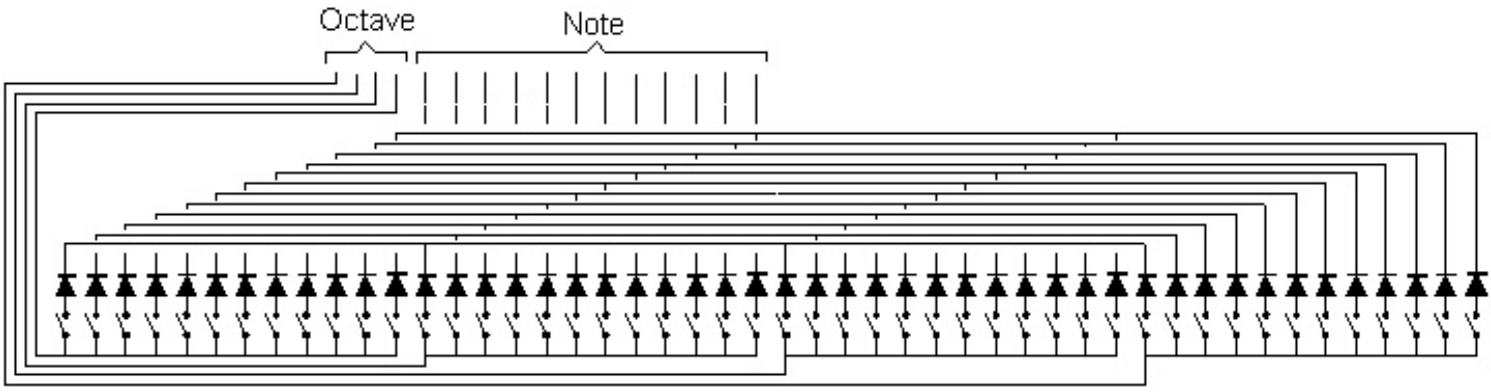
Requires one or two switch per key keyboard with a voltage divider of 1 resistor per key 100ohm 1%.

Like most EFM modules the KBD2e is multi functional. It's primary function is to convert a cheap plastic keyboard into a synthesizer controller. It can be built on a panel and bolted in the rack or installed in the keyboard case.

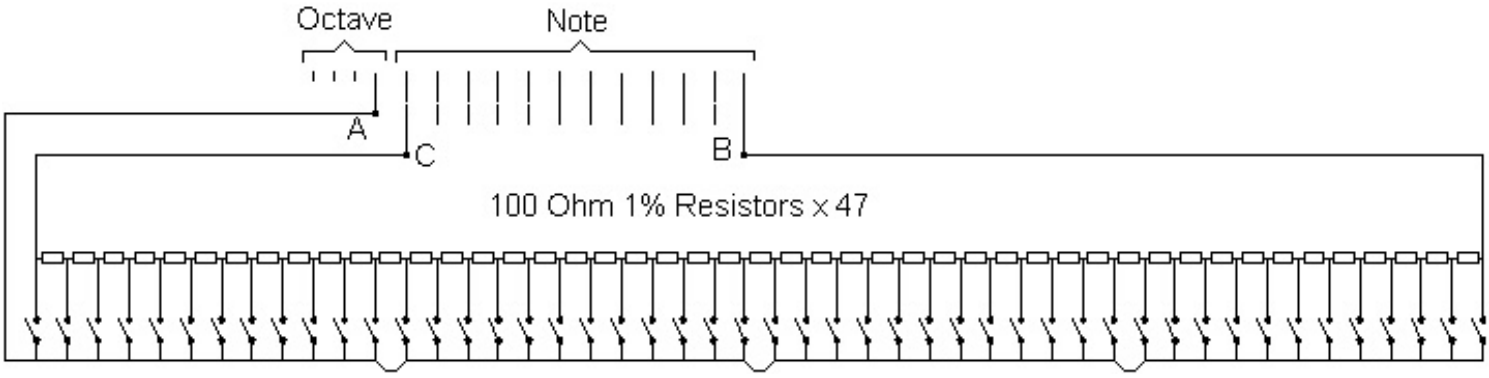
Getting the keyboard can be a problem. The easiest to convert I have found so far are the four octave Casio's. Once you have one you can ether build it in the case it came in or remove the keyboard and build it a more useable new case.



The hard part is converting the keyboard....We want to turn something like this...




Into something like this...




Remove the screws from the case and then cut, carve, pry, unscrew, and pull the existing electronics from the case. Be careful not to break or damage the PC-boards on the keyboard itself. Cut the keyboard away from the plastic case. Be careful to leave enough plastic on the sides of the keyboard to mount it to another case.Remove the screws holding the PC-boards to the back of the keyboard. Then remove the PC-boards. Save the screws and mounting hardware we will put the boards back on.

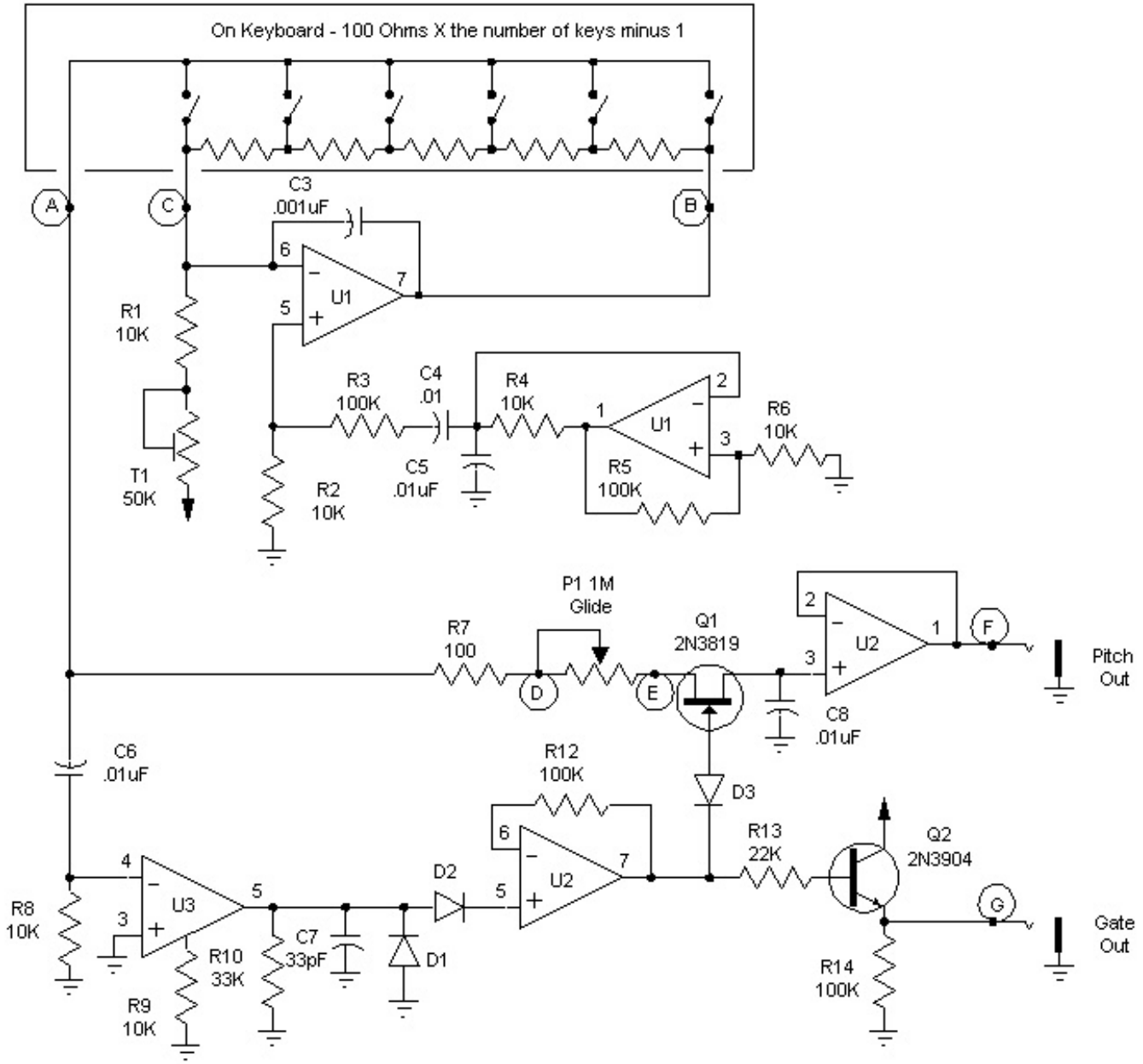
The keyboard is really a bunch of switches connected by a diode matrix. We need a resistor chain so the diodes must be removed from the board and the solder pads cleaned.

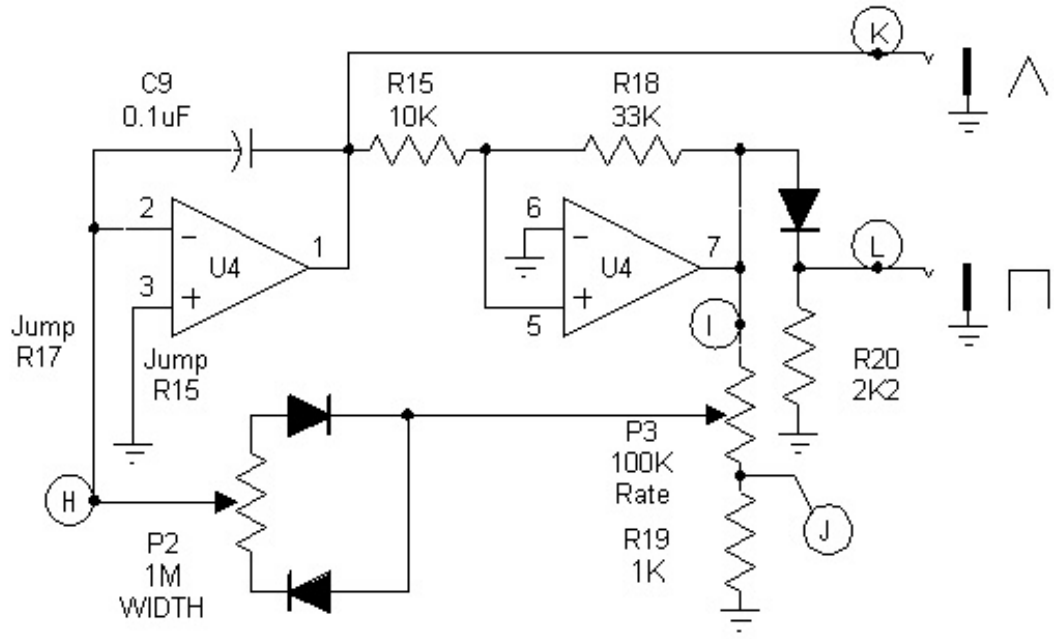
The chain is made with 100 ohm 1% resistors, one for each key minus one. So if you have 48 keys you need 47 resistors. It does not matter how many keys you have the

keyboard circuit can be scaled.

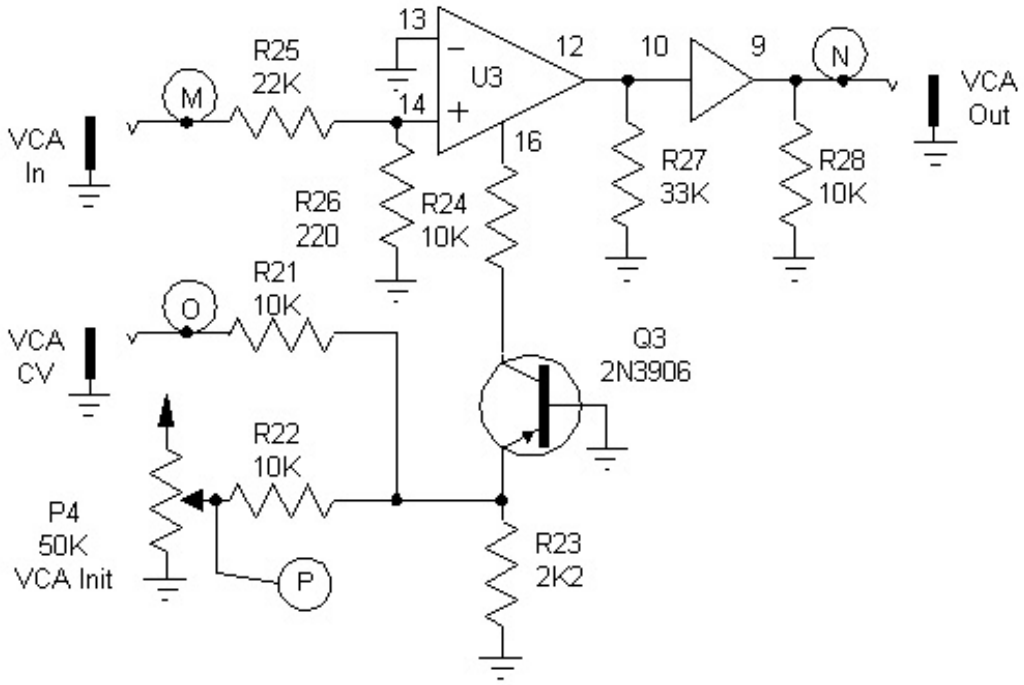
Remove the diode matrix form a switch buss using the switches and built a 47 resistor chain of 100 ohm 1% resistors. After all of the resistors are in place bridge the solder pads on the edge of the board to make a common point for all the switch pads to connect. Solder the connection wires to the ends of the chain and the common point before you screw it back to the keyboard.

Attach a digital ohm meter to the common point and one end of the chain. Press a key and measure the resistance. It should be 100 ohms X the number of resistors between the pressed key and the end of the chain. IE.. The lowest key should be 0 and the highest key 4700 ohms on a 48 key keyboard.





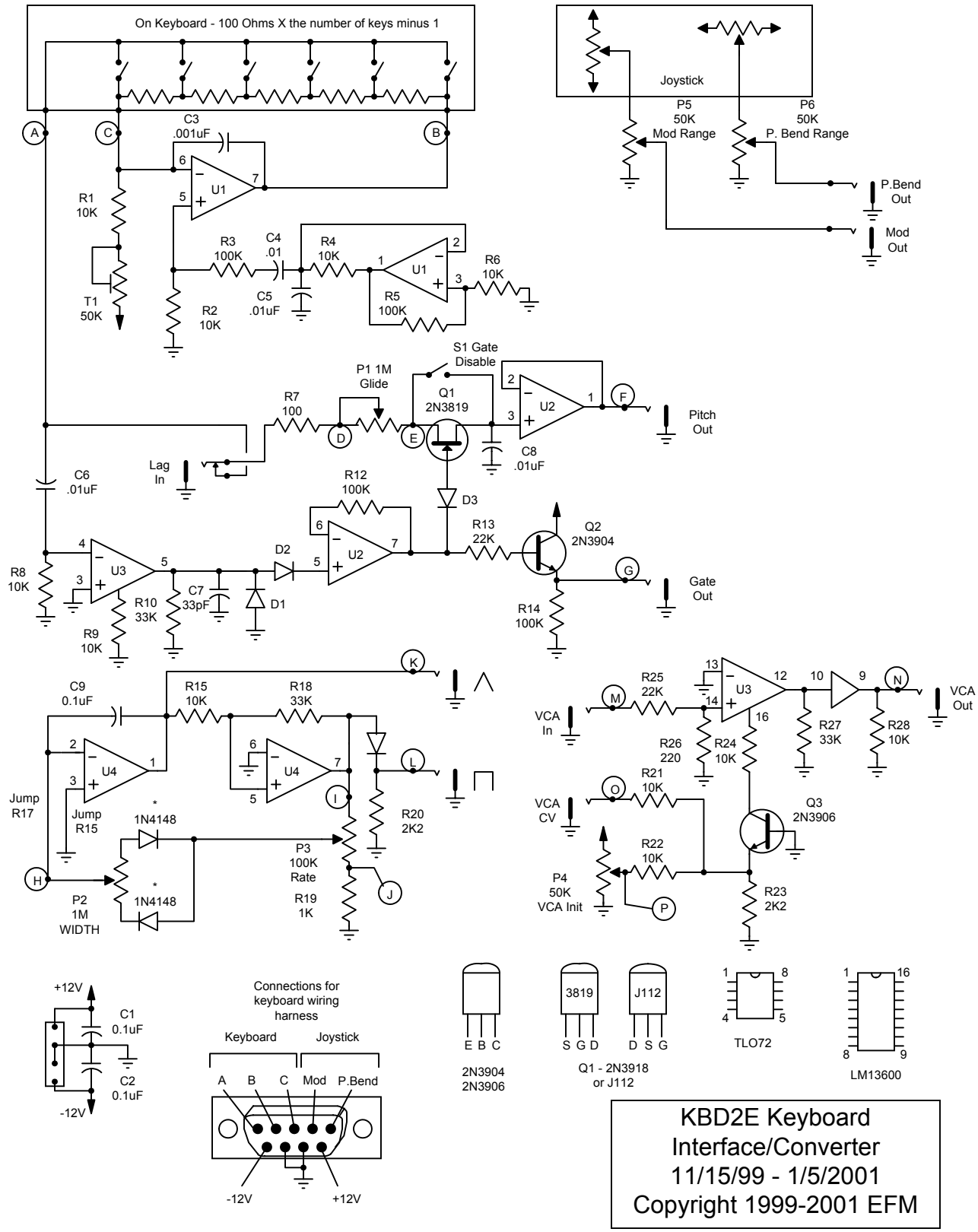

To add Width control, jump R15 and R17 on the board (2) 1N4148 diodes are connected between P2 (width) P3 (rate).



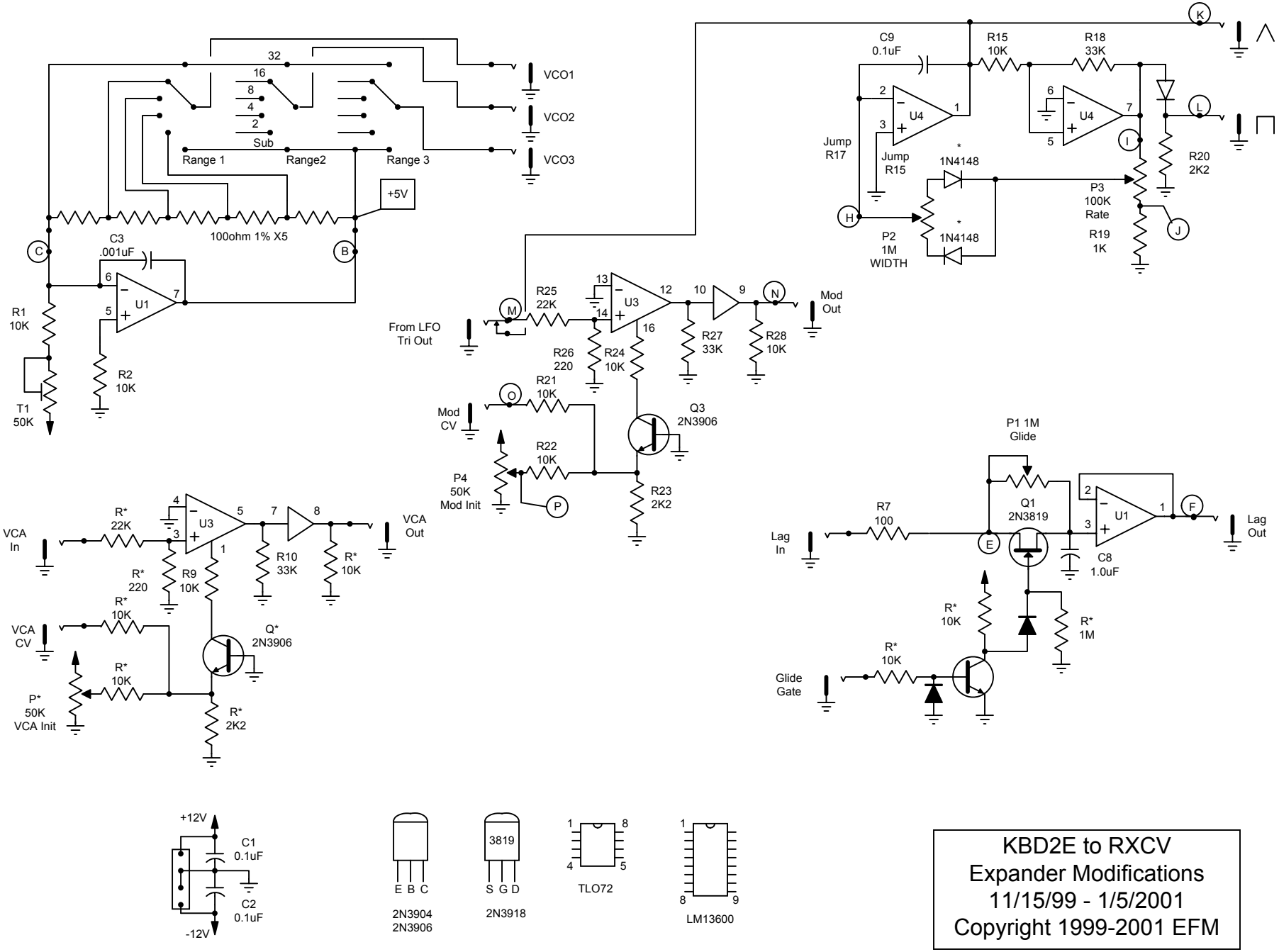

PARTS LIST

| Small Kit | | |
|---|---|---|
| C1,C2,C9 | 0.1 | 3 |
| C3 | .001 | 1 |
| C4-6 | .01 | 3 |
| C7 | 33p | 1 |

| | | |
|---|---|---|
| C8 | 1.0 | 1 |
| R1,R2,R4,R6,R8,R9,R16,R21,R22,R24,R28 | 10K | 11 |
| R3,R5,R12,R13,R14 | 100K | 5 |
| R7 | 100 | 1 |
| R11 | 47K | 1 |
| R15,R17 | 390K | 2 |
| R18,R27 | 33K | 2 |
| R19 | 470 | 1 |
| R20,R23 | 2.2K | 2 |
| R25 | 22K | 1 |
| R26 | 220 | 1 |
| D1-D3 | 1N914 | 3 |
| Q1 | 2N3819 | 1 |
| Q2 | 2N3904 | 1 |
| Q3 | 2N3906 | 1 |
| U1,U2,U4 | TLO72 | 3 |
| U2 | LM13600 | 1 |
| Full Kit | | |
| P1 | 1M | 1 |
| P2 | 50K | 1 |
| P3 | 100K | 1 |
| T1 | 10K | 1 |




KBD2E Keyboard
Interface/Converter
11/15/99 - 1/5/2001




KBD2E to RXCV
Expander Modifications
11/15/99 - 1/5/2001