Low-Key Transpose - Most digital keyboards assign the midi note number 36 to their lowest key. To the midi2cv8, note 36 corresponds to 3 octaves above the lowest key, so it produces a 3 Volt Pitch CV. To most analog keyboards, 3V. corresponds to the key 3 octaves above the lowest (0V.) key. Consequently, oscillators pitched for use with an analog keyboard will play three octaves higher on a digital keyboard. The midi2cv8 has a Low Key Transpose feature that transposes the lowest key on any keyboard to key #0 for a 0V. output.

Activate this feature by turning on the midi keyboard and holding down it's lowest key **WHILE** the midi2cv8 is turned on or reset. Releasing the key then sets it as the lowest note. After setting Low-Key Transpose you must next do some action that will send a midi Status Byte so the midi2cv8 can know the correct Running Status. Usually rolling the pitch wheel or sending a program change is the easiest way, but in some cases the keyboard controller must be reset by turning it off and back on again.

NOTE: When the V/Hz option is installed, the lowest key defaults to key 36 so Low-Key Transpose will not usually be necessary.

Running Status is a technique used by most controllers to conserve precious midi bandwidth. But if the midi2cv8 was off when the Status Byte came by - or has been reset since the last one - confusion results. If you reset the midi2cv8 and it is suddenly nonresponsive, turn the keyboard or controller off and back on again or otherwise reset its Running Status. If this gets things to respond but the keyboard is suddenly "folded", it means that the midi2cv8 had previously misinterpreted an implicit Note-Off - "no" status (actually the midi2cv8 has forgotten it) and a zero second byte - as a Set Low-Key request. Reset the midi2cv8 to clear the Low-Key Transpose, which is produceing the higher pitches for keys below the faux "Low-Key". Then also reset the controller again or you will be right back where you started.

Mono/Multi - The midi2cv8 defaults to Mono (Multi disabled). Multi is enabled by sending a Program #0 command (piano in General MIDI) on the Basic Channel and is disabled by resetting the midi2cv8. When Multi is enabled, notes on the Basic Channel are assigned to the first output group (Pitch, Gate, etc.), notes on the next channel above the Basic Channel route to output group 2 and so on as output groups are available. For example, in Two Voice Mode with Multi enabled a midi2cv8 set to Basic Channel 4 will route notes on midi channel 4 to output group 1 and notes on midi channel 5 will go to output group 2.

One Voice

Mode 1
1 voice

Provides complete control of a single synth voice. The Gate signal is high as long as any key is down. The 5 ms. Re-trigger pulse occurs each time a new note is played whether the previous key was released or not. Release velocity is assigned only on notes explicitly turned off with a Note Off Status.

Mono (all from Basic Channel)
output 1 = Pitch
output 2 = Attack Velocity
output 3 = Gate
output 4 = Trigger Pulse
output 5 = Pitch Wheel
output 6 = Mod Wheel
output 7 = Aftertouch
output 8 = Release Velocity

Multi
No Multi Enabled functions

Two Voice

Mode 2
2 voice

Provides Pitch, Velocity and Gate control of two synth voices. Gates are legatto (Gate signal does not go low when a new note is assigned to a currently assigned output) and notes are always assigned. Orphan note-offs are ignored (see mode 3). Mod Wheel and Pitch Wheel or two Pitch Wheel outputs are also provided.

Mono
output 1 = Basic Channel Pitch 1
output 2 = Basic Channel Velocity 1
output 3 = Basic Channel Gate 1
output 4 = Basic Channel Pitch 2
output 5 = Basic Channel Velocity 2
output 6 = Basic Channel Gate 2
output 7 = Basic Channel Pitch Wheel
output 8 = Basic Channel Mod Wheel

Multi
output 1 = Basic Channel Pitch
output 2 = Basic Channel Vel.
output 3 = Basic Channel Gate
output 4 = BC+1 Pitch
output 5 = BC+1 Velocity
output 6 = BC+1 Gate
output 7 = BC Pitch Wheel
output 8 = BC+1 Pitch Wheel

Mode 3
4 voice

Four Voice

Pitch and Gate control of four synth voices. Gates are leggato and new notes are always assigned. Orphan Note-Offs (when a note is to be turned off on an output that has already been reassigned) are ignored.

Mono	*Multi*
output 1 = Basic Channel Pitch 1	out 1 = BC Pitch
output 2 = Basic Channel Gate 1	out 2 = BC Gate
output 3 = Basic Channel Pitch 2	out 3 = BC+1 Pitch
output 4 = Basic Channel Gate 2	out 4 = BC+1 Gate
output 5 = Basic Channel Pitch 3	out 5 = BC+2 Pitch
output 6 = Basic Channel Gate 3	out 6 = BC+2 Gate
output 7 = Basic Channel Pitch 4	out 7 = BC+3 Pitch
output 8 = Basic Channel Gate 4	out 8 = BC+3 Gate

Mode 4
control change

Control Change

Converts MIDI Control Change messages for cc0 to cc7 to CVs.

Mono	*Multi*
output 1 = Basic Channel cc 0	output 1 = BC cc 0
output 2 = Basic Channel cc 1	output 2 = BC + 1 cc 0
output 3 = Basic Channel cc 2	output 3 = BC + 2 cc 0
output 4 = Basic Channel cc 3	output 4 = BC + 3 cc 0
output 5 = Basic Channel cc 4	output 5 = BC + 4 cc 0
output 6 = Basic Channel cc 5	output 6 = BC + 5 cc 0
output 7 = Basic Channel cc 6	output 8 = BC + 6 cc 0
output 8 = Basic Channel cc 7	output 9 = BC + 7 cc 0

Mode 5
analog drum

Analog Drum

This mode provides for control of devices that use variable amplitude pulses for triggering, such as analog drum circuits. Each output corresponds to a key and the each key activation produces a 5ms pulse with amplitude proportional to velocity

Mono	*Multi*
output 1 = Note 24h	No Multi Enabled Functions
output 2 = Note 25h	
output 3 = Note 26h	
output 4 = Note 27h	
output 5 = Note 28h	
output 6 = Note 29h	
output 7 = Note 2ah	
output 8 = Note 2bh	

Mode 6
din sync

DIN Sync

This mode converts MIDI Real Time messages into useful electrical control lines. The 24 ppq clock pulses and run/stop line are as required by DIN-Sync protocols. The 5ms. reset pulse is provided for control of analog sequencers and other applications where a distinction is made between MIDI Start and Continue commands.

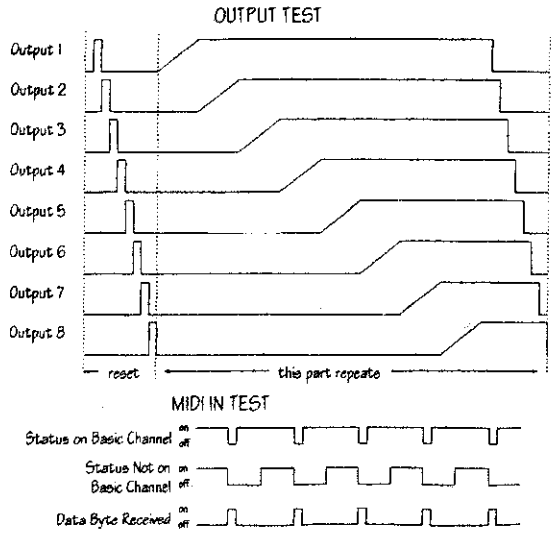
Mono	*Multi*
out 1 = Basic Channel pitch	out 1 = Basic Channel pitch
out 2 = " velocity	out 2 = Basic Channel vel.
out 3 = " gate	out 3 = Basic Channel gate
out 4 = " re-trigger	out 4 = BC + 1 pitch
out 5 = " pitch wheel	out 5 = BC + 1 velocity
out 6 = DIN start reset pulse	out 6 = BC + 1 gate
out 7 = DIN run/stop	out 7 = DIN run/reset
out 8 = DIN 24 ppq 1mS pulses	out 8 = DIN 24 ppq

Mode 8
Self-Test

Self-Test

Output Test - On power-up or reset this test first strobes the eight outputs in sequence, holding each high for 1 second before turning it off and stepping to the next. When all eight outputs have been turned on and off the test next sequentially ramps each output high over a 5 second period and leaves the output high when done. This part of the test loops continuously until midi data is received.

MIDI In Test - When MIDI data is received, the output test is interrupted and the MIDI In LED flashes brightly and regularly to indicate the kind of data that was received as shown at right. Reset to start the test again.



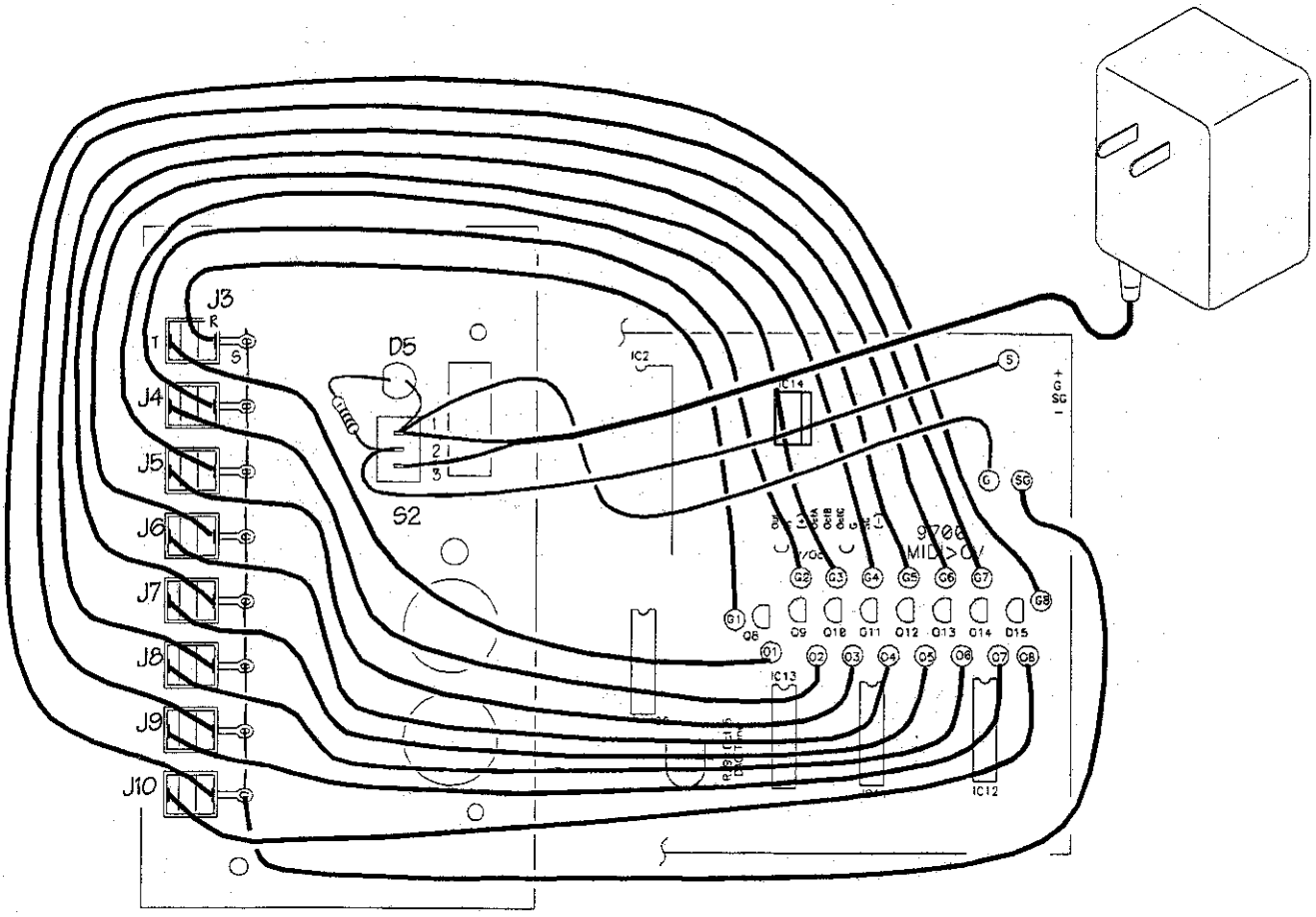


Fig 5. Stranded Insulated, Solid Insulated and Bare Wire are used to make the connections between the front panel jacks and power switch and the circuit board. The Power LED D5 and R38 mount on the lugs of the Power Switch.

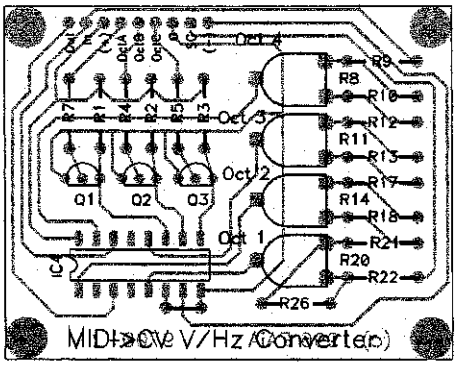


Fig 2. Detailing parts placement and phantom view of conductors of the V/Hz Adapter circuit board.

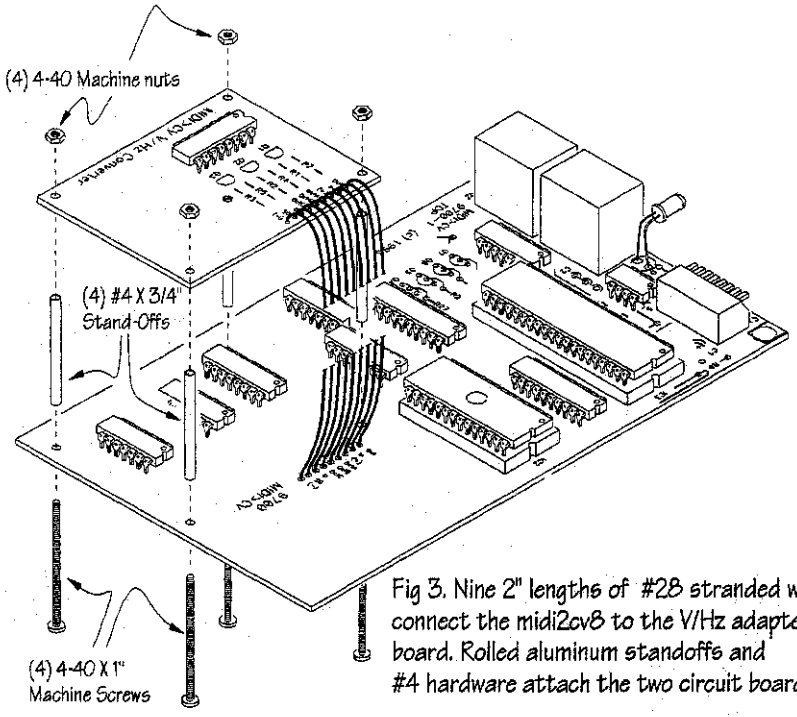


Fig 3. Nine 2" lengths of #28 stranded wire connect the midi2cv8 to the V/Hz adapter board. Rolled aluminum standoffs and #4 hardware attach the two circuit boards.

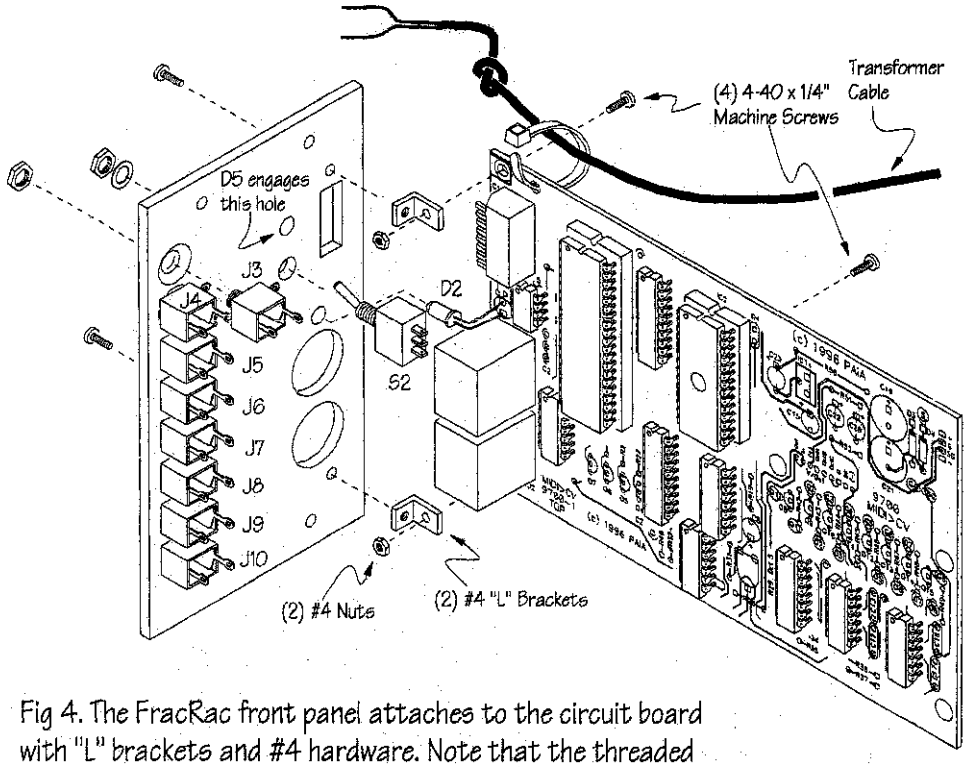


Fig 4. The FracRac front panel attaches to the circuit board with "L" brackets and #4 hardware. Note that the threaded holes are used to attach the brackets to the panel.

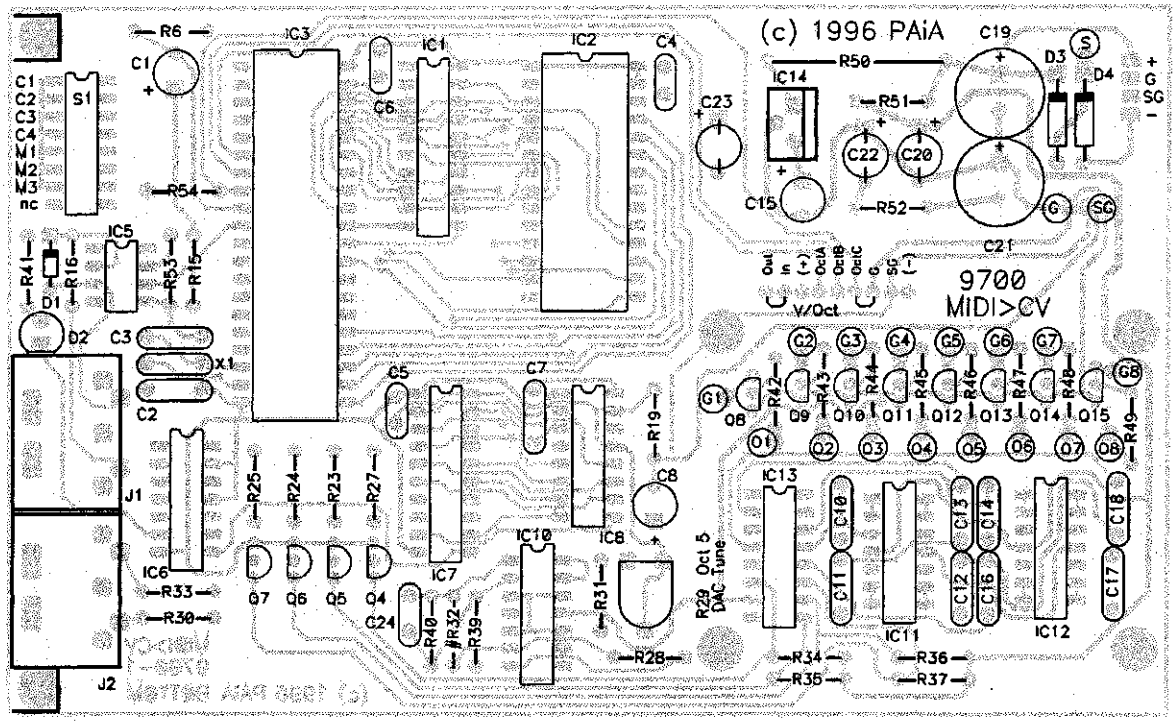


Fig 1a. Conductors on the top layer of the circuit board have been eliminated in this view that shows phantom bottom traces. This illustration will be useful if you need to trace out the circuit.

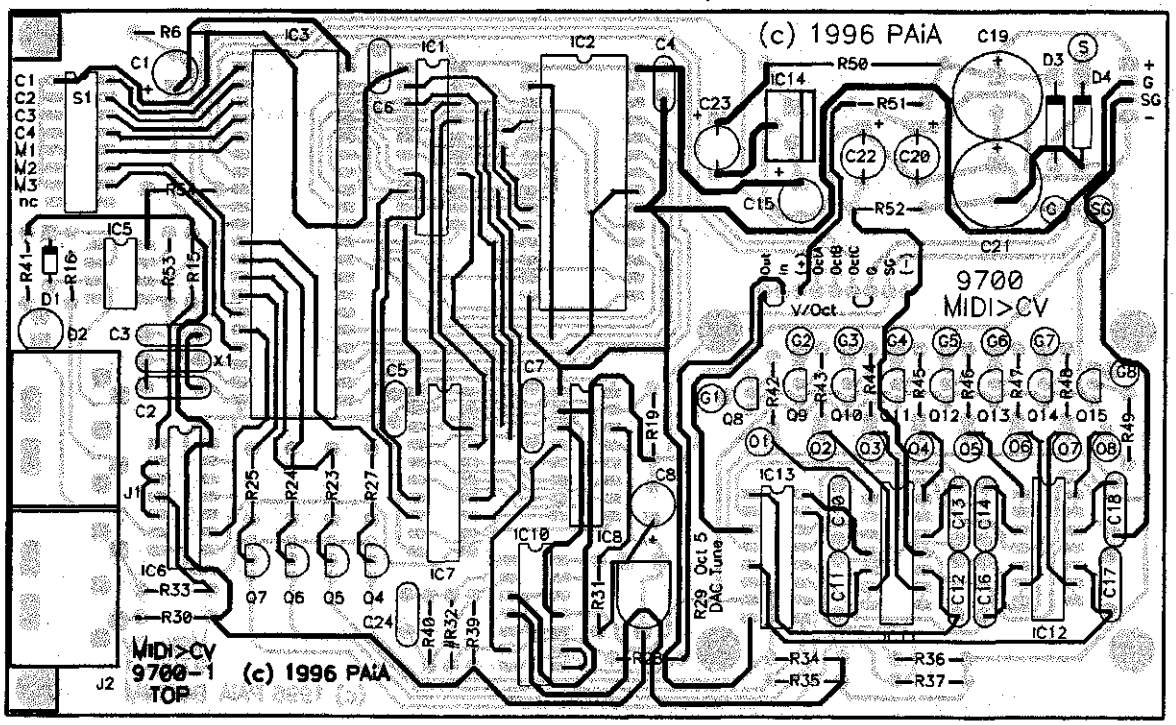


Fig 1b. Some of the traces on the top layer of the board disappear underneath ICs. Here's how these conductors, in bold, connect.

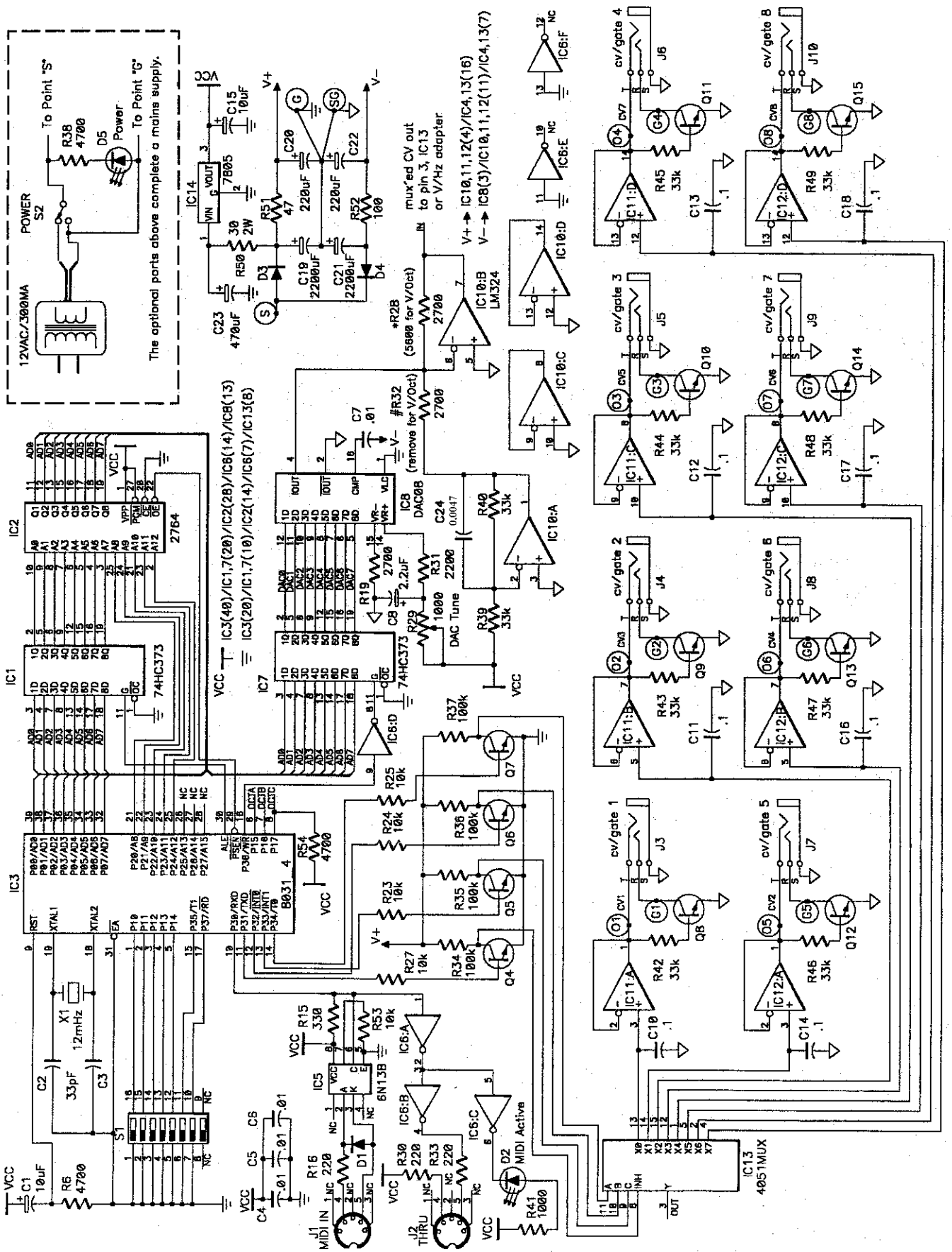


Fig 7. This schematic of the midi2cv8 is drawn assuming that the V/Hz adapter, which connects between the DAC output buffer IC10:B and the input of the MUX IC13, is being installed. Note that when a V/Hz adapter is not installed the value of *R28 changes and #R32 goes away entirely. P15-P17 of the processor are the octave select lines to the V/Hz Adapter.