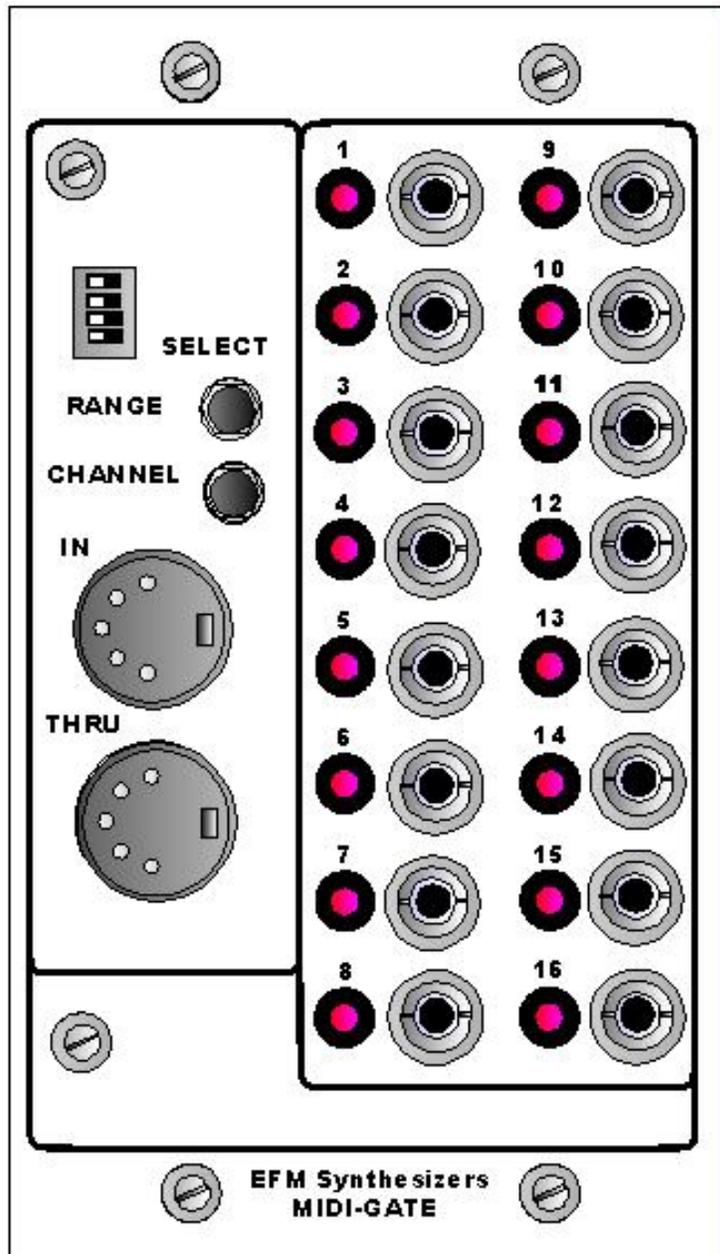


EFM Synthesizers

Midi-Gate - Midi to control gate converter



Midi to control gate converter.
Features...

- 16 +5V gates
- May all be on at the same time
- Envelope, Waveform Generation
- Used as a Midi controlled Analog sequencer
- Control lights, curtains, motors your entire set with midi track
- Selectable keyboard range
- May be stacked on a single channel.
- Selectable midi channel (1-16)
- +/-12 or +/- 15V

EFM Synthesizers

Midi-Gate

8-26-2001

The Midi-Gate is a synthesizer control device that can output sixteen midi-controlled concurrent 0 to +5V control gates.

These outputs can be set to respond to midi channels 1 through 16 then set to a group of 16 consecutive keys on a midi controller.

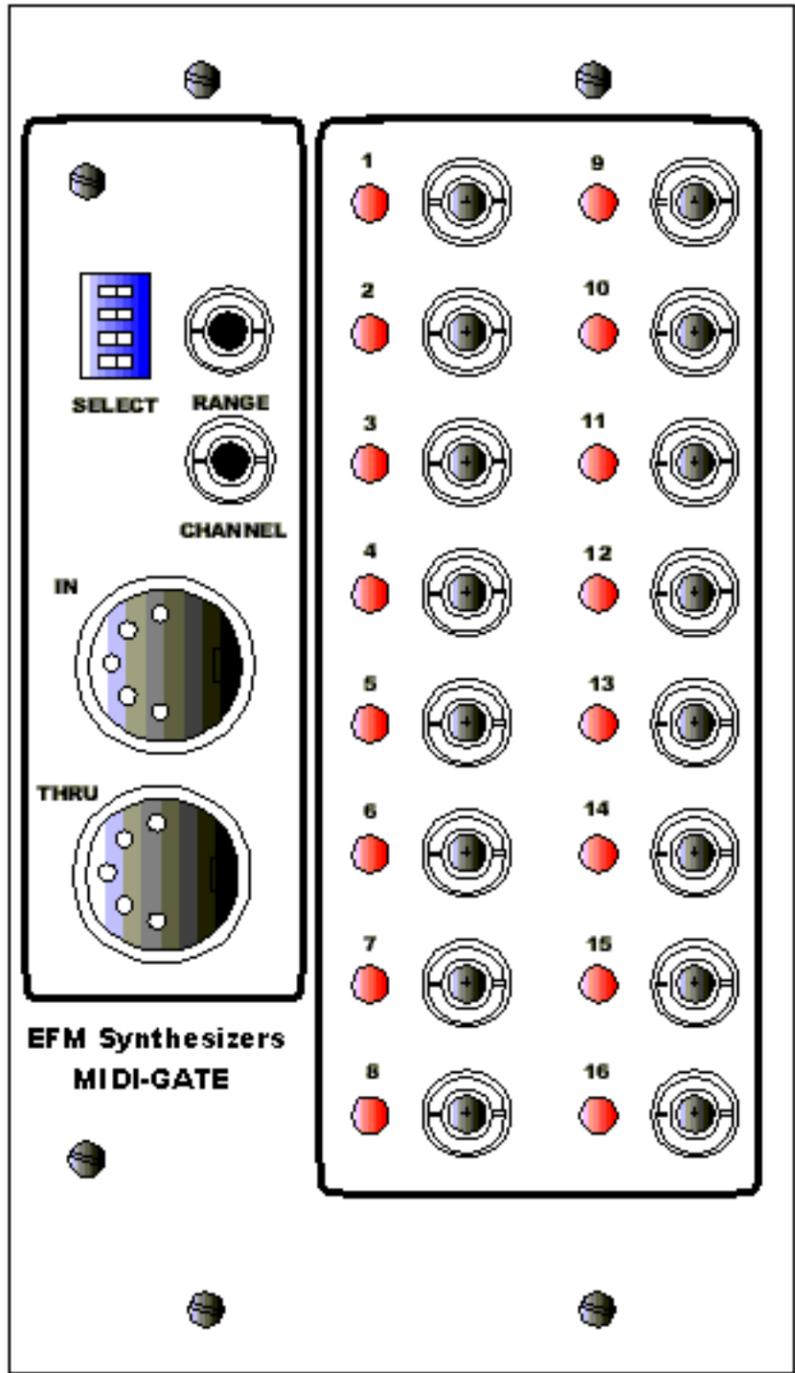
Multiple Midi-Gates can be used on the same midi channel and set to consecutive groups of keys on the controller.

The Midi-Gate is designed to control analog drum machines and synthesizers for musical applications. With a little additional circuitry the Midi-Gate can control anything that can be turned on. The possibilities are endless.

The Midi-Gate may function as, or used to control a wide number of devices.

- Drum Machines
- Modular Synthesizers
- Light Shows
- Midi Piano / Xylophone
- Analog Sequencer
- Envelope Generators
- Waveform Generators

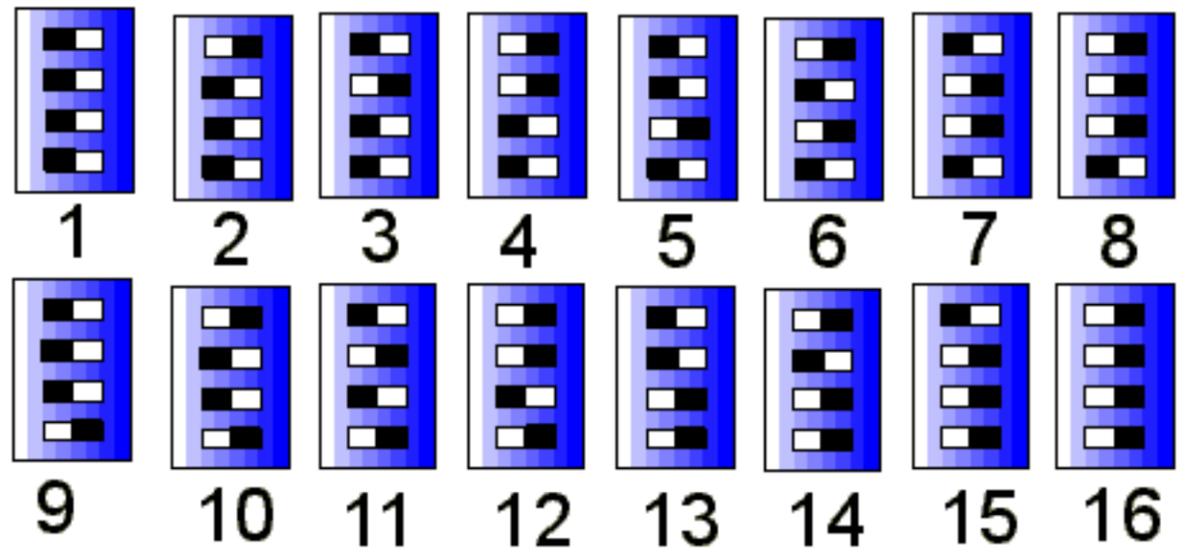
The Midi-Gate is fairly complex as these things go and should not be considered as a first project.



Setting the Midi Channel

The midi channel is selected by setting the dip switch to the desired channel then pressing the "Channel" button on the front panel.

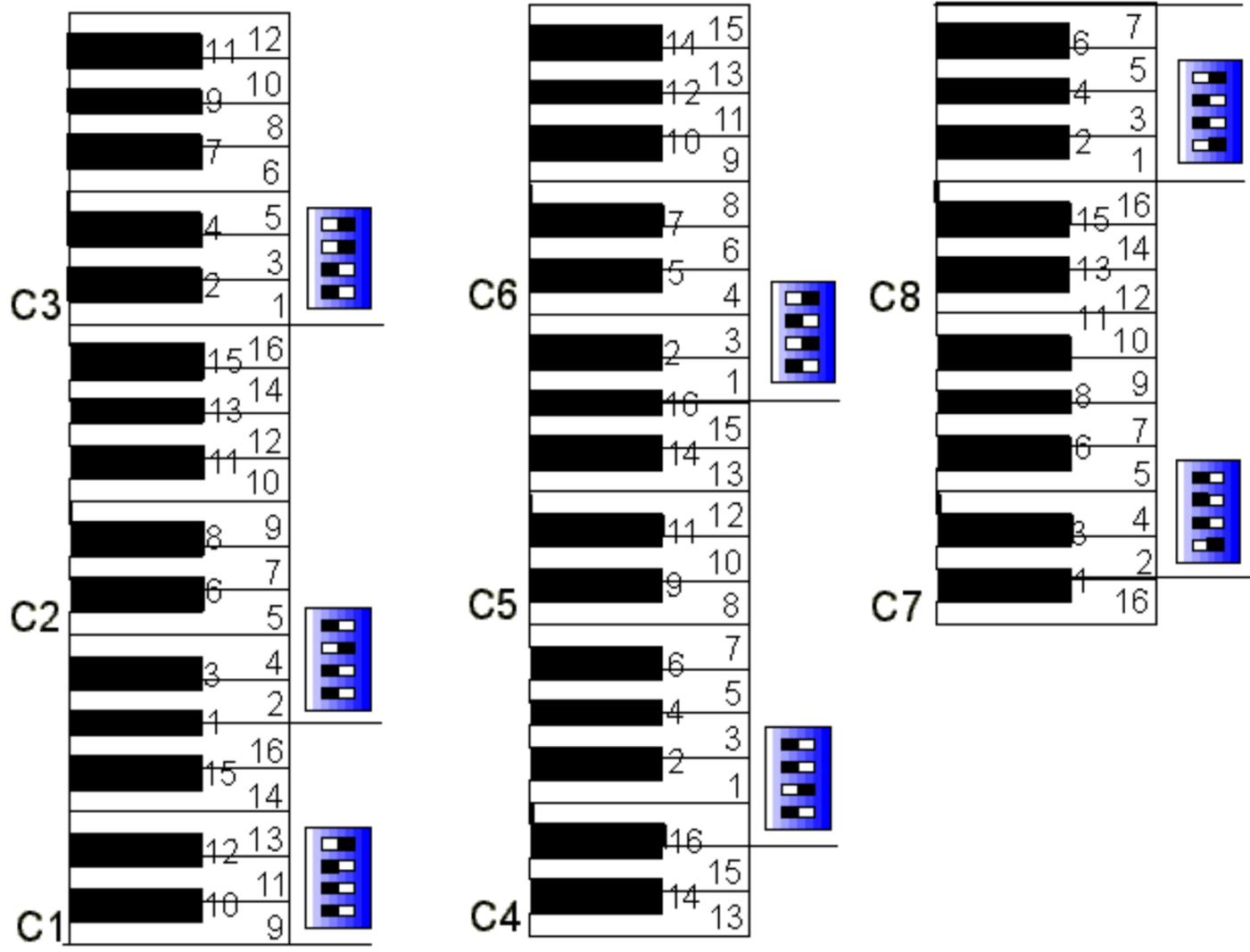
These settings are saved into on-chip memory that has a 40+ year lifespan. There is no need to reset the device at every power up.



Setting The Keyboard Range

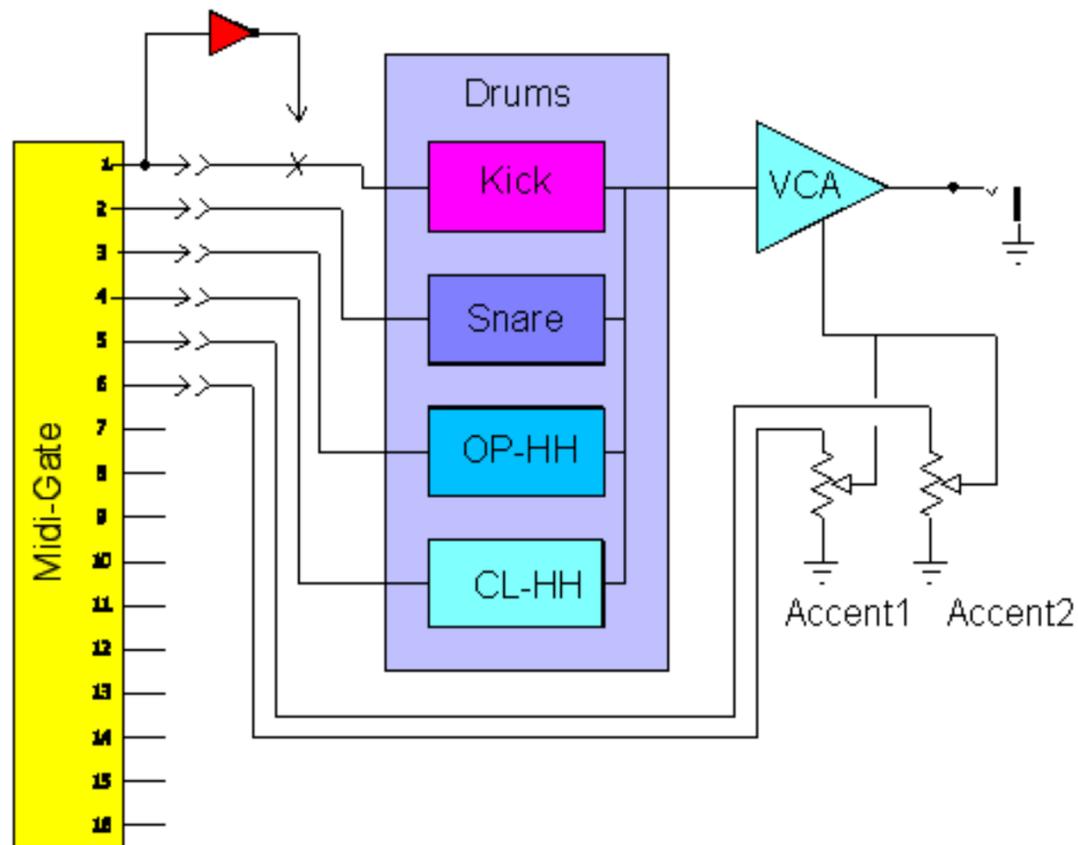
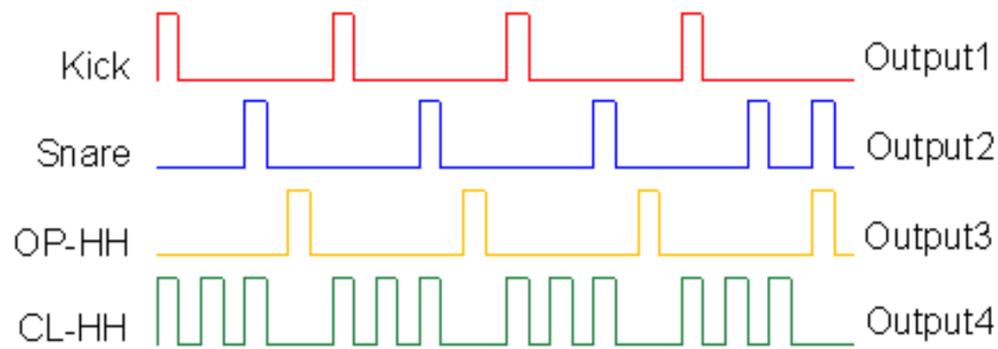
The keyboard range is selected by setting the dip switch to the desired range then pressing the "Range" button on the front panel.

These settings are saved into on-chip memory that has a 40+ year lifespan. There is no need to reset the device at every power up.



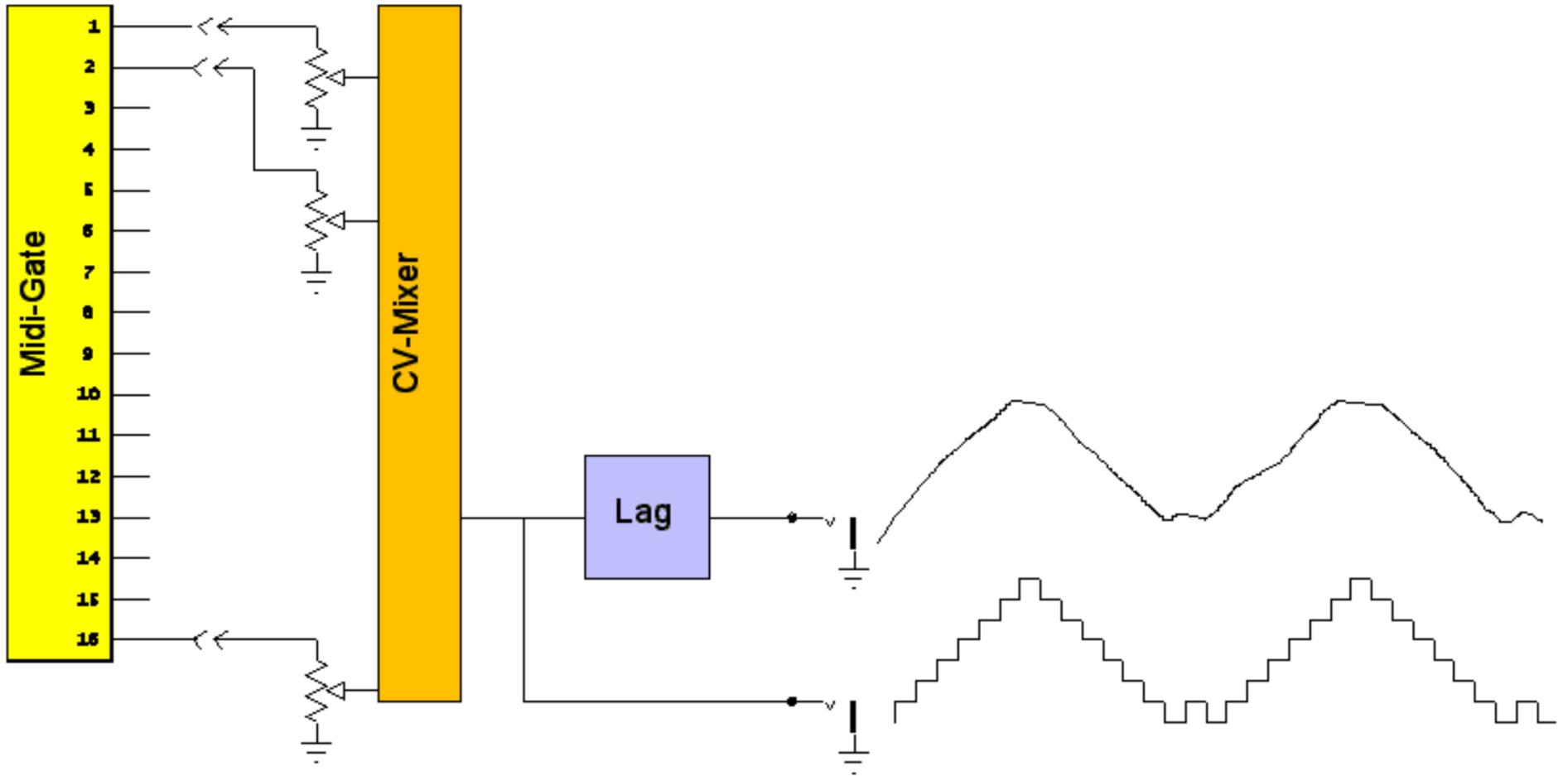
Midi-Gate to Drums

The Midi-Gate can be used as an analog drum brain. Some Roland drum machines trigger on a low going pulse. You will have to insert inverters between the Midi-Gate and the ring oscillators (drum modules). An extra pair of outputs can be used to vary the output of a VCA for accent.



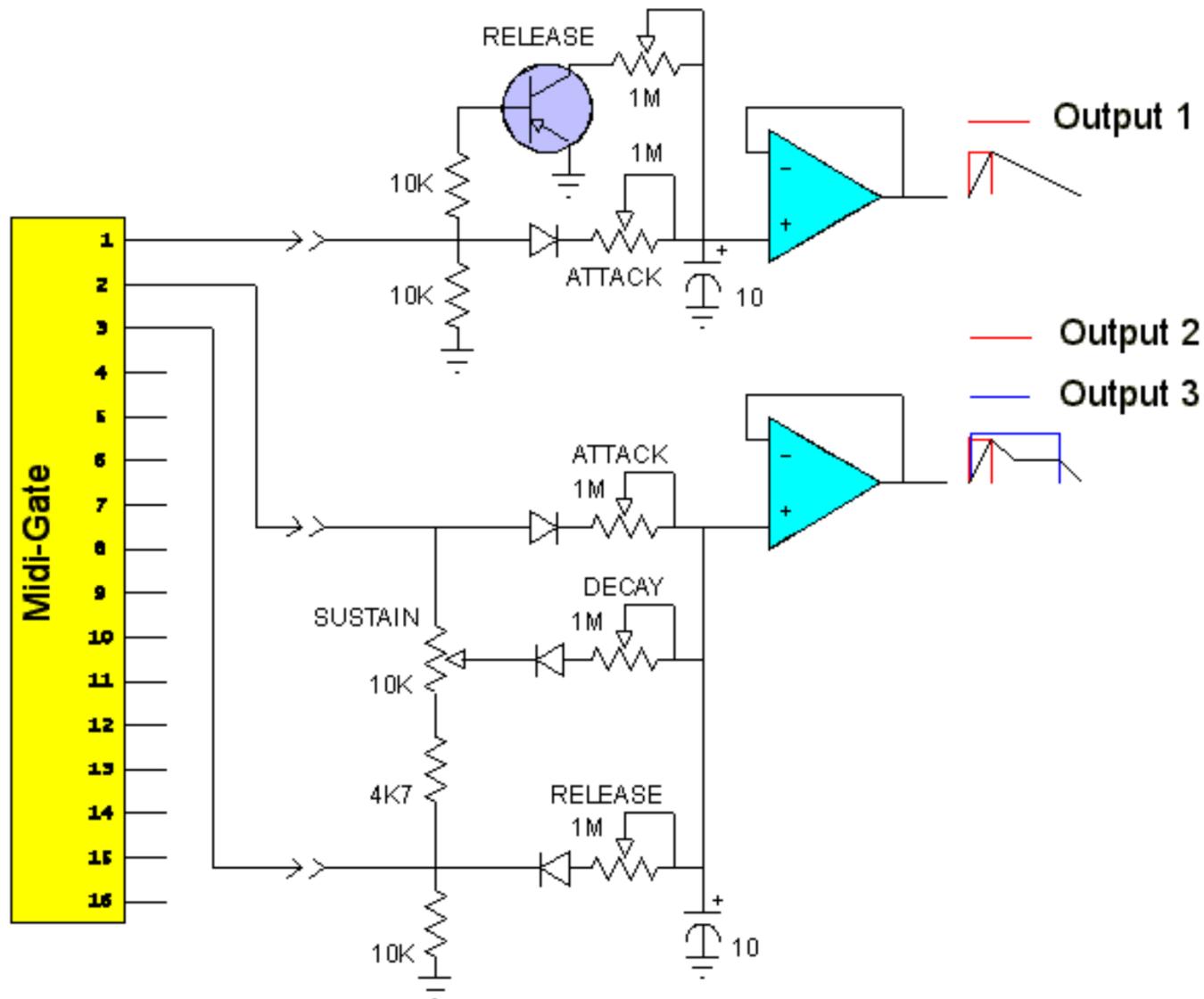
Midi-Gate to Waveform Generator

The Midi-Gate can be used as an waveform generator. This is one of the most simple of it's uses and requires only a CV mixer and CV lag. Set the output events (outputs 1-16) to occur in sequence. Be sure to butt the events right up against each other to avoid a unexpected drop in voltage while no output is on.



Midi-Gate to Envelope Generator

The Midi-Gate can be used as an envelope generator controller. The two examples here should be a good starting point for designing you own complex envelope generator.

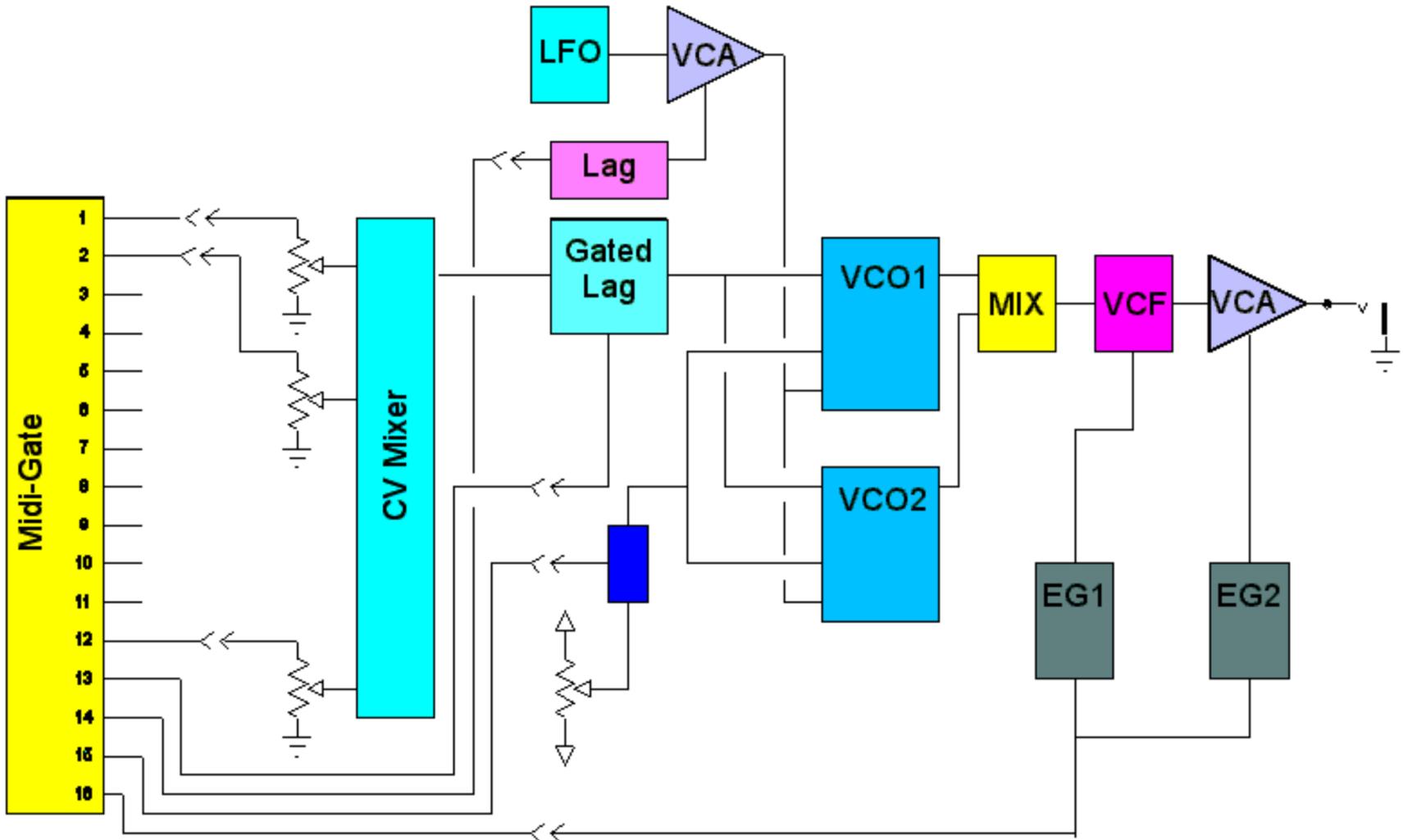


Midi-Gate to Analog Sequencer

The Midi-Gate can be used as an analog sequencer. This is a single module, 12-note example. Extremely complex sequences can be achieved by using 2 or more Midi-Gates.

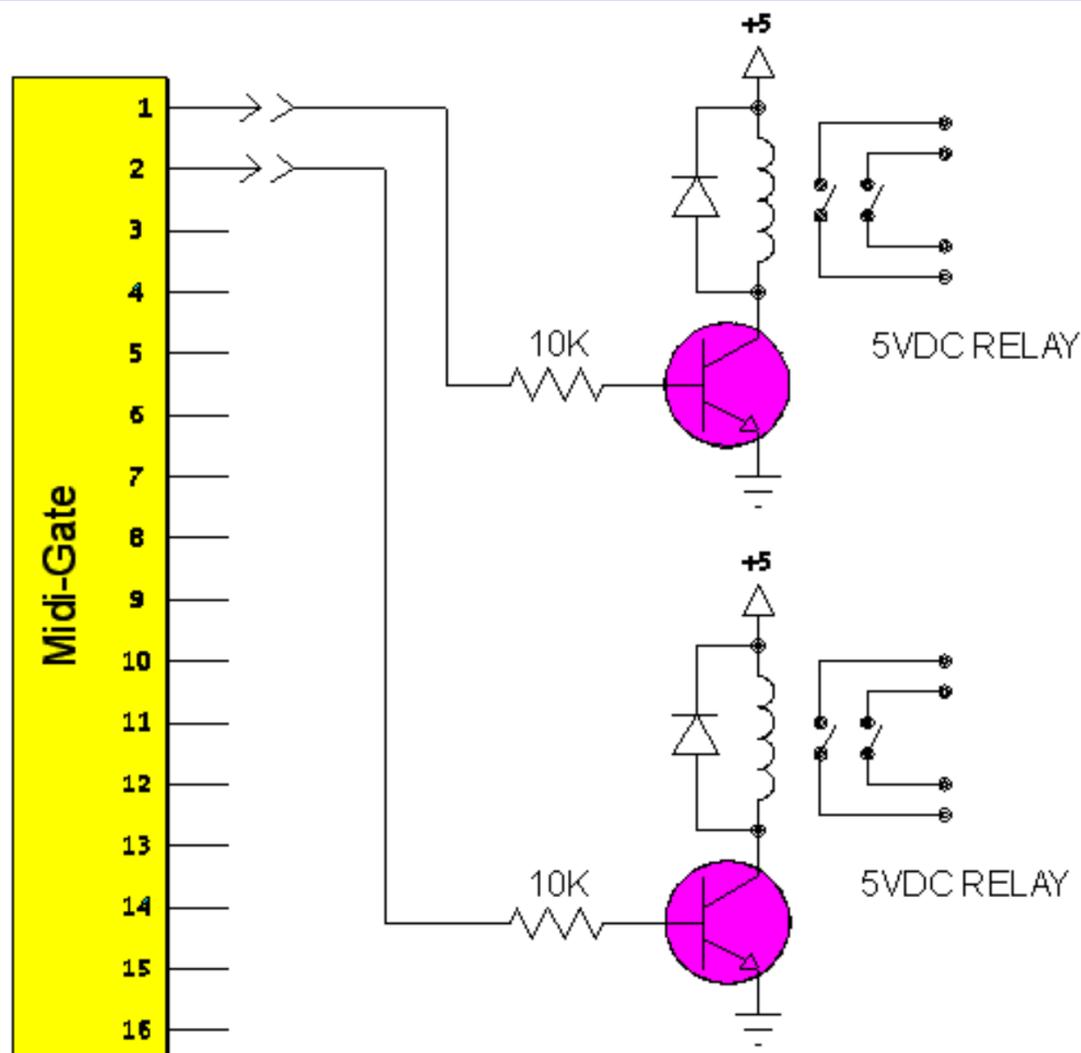
Connect outputs 1 through 12 to a CV-mixer. This generates CV to be used for VCO pitch. Output 13 is used to control a gated-lag generator. Whenever this output goes high the CV will glide from one note to another. Output 14 is sent to a lag generator for modulation. As the lag generators voltage rises it increases the amount of modulation voltage from the LFO to the VCOs. Output 15 is used to control a switch that connects a +/- voltage to the VCOs for transposing the pitch up or down. Output 16 is used to gate EG1 and EG2.

In your midi sequencer create a 4 bar pattern. Set each of the 12 notes events (outputs 1-12) to fire in sequence as the pattern is looped. The notes can be played by placing a gate event for gate output (output-16) to occur at the same time as the note event. To modulate notes place a mod event (output 14) to start the lag processor and then stretch it out to cover the time you want modulated. To transpose a sequence place a transpose event (output 15) to the transpose switch. To glide or slide from note to note place a glide event (output 13) to control a gated lag.



Midi-Gate to Relay or Solenoid

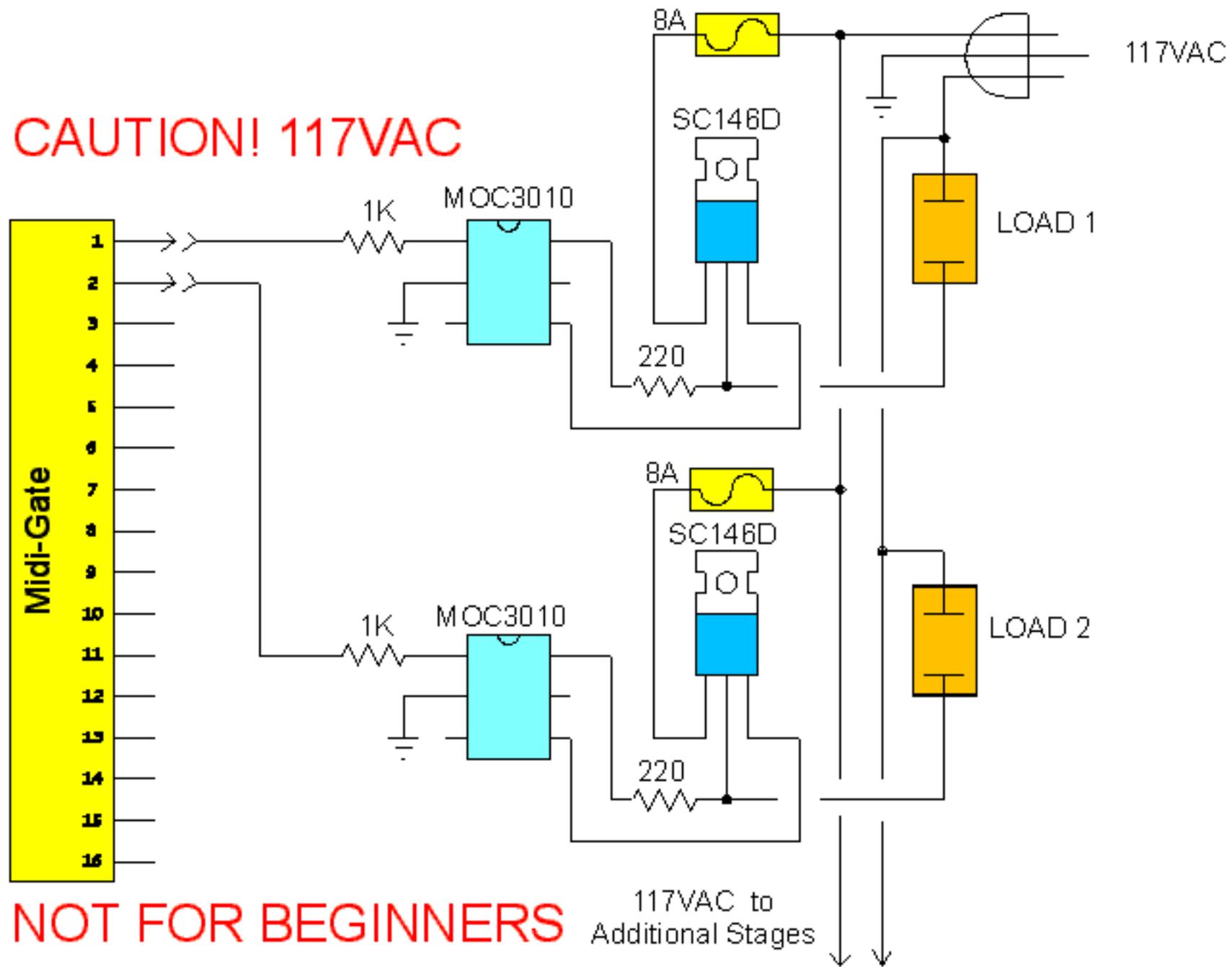
The Midi-Gate can be used to control almost anything by using relays or solenoids. You can use midi to control a complete set if you wish. Turn on motors to open and close curtains, raise and lower props, rotate turntables. You may also wish to convert an old piano or xylophone to a midi player by using solenoids to pull the hammers or push the mallets. One of the most novel uses is to control numatic valves to push and pull air cylinders. Connect these to a metal frame robot for repetitive tasks or dress up your robot for entertainment. Yes your robot can dance!



Midi-Gate to Light Show

NOT FOR BEGINNERS

The Midi-Gate can be used as an light show brain. CAUTION!!! This project uses line voltage be careful. NOT FOR BEGINNERS!!! The Midi-Gate outputs control triac opto couplers that in turn control 10A triacs. Use heatsinks. The cases must be isolated.



Assembly

Resistors

R1	Not Used
R2,9,10	220 ohm 1/4 watt 5% resistor
R3,5,7,11,12,13,14,15,16	10K 1/4 watt 5% resistor
R4	1K 1/4 watt 5% resistor
R6,8	3.3K 1/4 watt 5% resistor

Capacitors

C1,3	0.1 uf Ceramic (NOTE: C1 was changed to a 0.1uf Ceramic)
C4	.001 uf Ceramic
C5,6	22 pf Ceramic

Jumpers

There are 8 jumpers maked by a white line on the board. Install them now.

Sockets

Sockets for U2,3,4,5	1 8-pin, 1 18-pin, 2 16-pin
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Diodes

D1	Not Used
D2	1N4148
LED 1	Not Used

Transistors

Q1	2N3906
Q2	2N3904

ICs

U1	7805 +5V regulator
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Crystal

X1	8Mhz crystal
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Install the dip-switch and the midi-jacks.

The Midi-Gate was designed to function as a stand alone unit. The following instructions convert it for modular use.

Install the supplied 3-pin power-header with the red side facing MIDI-GATE (C) EFM 2000 in the space made for LED1.

Install a small jumper to connect the pad for the cathode (side with the stripe) of D1 and the pad for R2 that is right next to it. These pads are right next to the red pin of the power connector. NOTE: D1 and R2 are not used and should not be installed.

Check the connections to the regulator with a meter. The red pin should connect to the left most pin (input) of U1. The center pin is not connected and the black pin should connect to the center pin (ground) of U1.

Panel Assembly

Drill and label your panel then mount the 16 output jacks. Connect all of the output jack ground terminals with a piece of buss wire.

Mount LED2 - 17 bend the short lead over and connect it to the ground buss wire connecting the jacks together. Cut the long lead off to about 1/4".

Install R17 - 32 connect one side to the jack and the other to the long LED lead. One resistor for each jack.

Mount S2 and S4 to the panel.

Mount the pc board to the panel.

Connect S2 and S4 to the pads marked on the board for the range and channel switches

Connect the ground buss to the ground pad on the pc board.

Connect the output jacks to the pads marked 1-16 around U4 and U5.

Hook up the supplied 3-pin connector to your power supply the red side to +9 to +15VDC and the black side to ground.

Install U2,3,4,5 in their sockets.

Testing

Set your midi keyboard to channel 5 and connect it to the midi-in jack. Move select switch #3 into the on position all others should be off.

Connect the Midi-Gate to your power supply and turn it on. Nothing should be hot to the touch or smoke.

Press the Channel and Range switches. Then play the keys in the middle part of your keyboard. The LEDs should light up when you get into the range selected.

