William Mathewson Devices
Denver, CO
http://wmdevices.com
303-548-9205
sales@wmdevices.com

Sequential Switch Matrix

Hello. Thank you for purchasing the WMD Sequential Switch Matrix. May rhythm and feedback overwhelm your senses.

Concept

The Sequential Switch Matrix (SSM) is a four input, four output signal routing system. The digitally controlled analog signal paths allow for a variety of routing control options. The open architecture allows for many uses beyond simple signal routing and unity mixing.

Signal Path

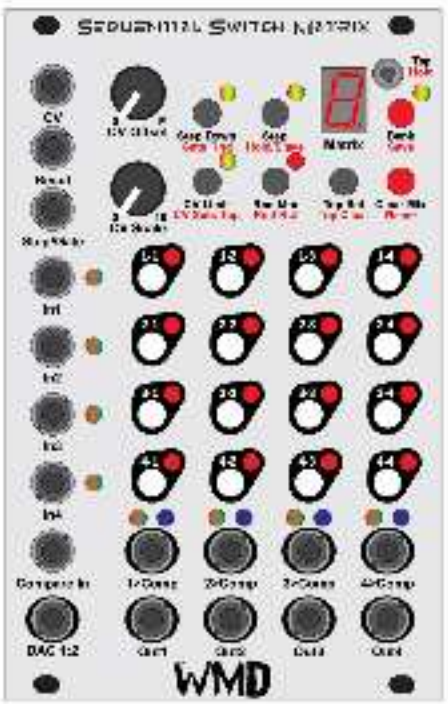
The signal path uses 0.1% resistors and will pass precision pitch or other CV signals with minimal gain and offset errors.

Inputs 1 - 4: These inputs accept bipolar +-10V signals before clipping. Signal level will illuminate the adjacent LED; green for positive voltages, red for negative.

Outputs 1 - 4: These outputs (along the bottom) contain the signals from the inputs (summed together) if the routing LED is lit.

Comparator: The Compare In input voltage is compared to each output voltage. If the output is higher than the Compare In voltage, the Comp output will be high (10V gate) for that channel. The blue LED will also be illuminated.

DAC 1:2 Out: This output is generated from the status of the first two columns. It is a weighted Digital to Analog conversion. **1-1** is the most significant bit, carrying a weight of 2.5 volts. **2-1** is exactly half that weight (1.25V). **4-2** is the least significant bit (0.020V). The two columns provide an 8 bit voltage output that is always present.



BUTTONS OPERATION: Black text for tapping buttons. Red text for push and hold functions. Hold time is about one second. It will begin toggling after being held more than one second.

Control Scheme

Routing Buttons: Tapping the routing buttons will toggle its state. If a button is pushed, it will change for that matrix only. Push and hold has no effect on routing buttons.

Matrix: The current matrix is displayed on the numerical display. It will read 0-9 then A, B, C, D, E, F to represent the 16 matrices in hexidecimal.

Bank: Tapping the Bank button will change banks. LED off is bank 0. Green is bank 1. Red is bank 2. Orange is bank 3. All settings (except for Rnd Rcl) are stored with each bank.

Save: Push and hold to save all banks, matrices and modes to the internal non-volatile memory. Powering down without saving will revert to the last saved settings.

Top: The top matrix will be the reset point when stepping. It is indicated by the decimal point on the Matrix display. Tap the "Top Set" button to set the top to the currently selected matrix. Push and hold **(Top Clear)** to clear the top, which will step through all 16 matrices.

CV Limit: When the LED is off, CV acts as an offset that can go beyond the Top. When the LED is Green (tap "CV Limit"), the CV is limited to the top, so the CV will be clipped to the Top Matrix.

CV Sets Top: Indicated by the LED being red. The CV will set the top matrix. This allows for CV control of the Top matrix, or CV control over the length of the sequence. CV will no longer change matrices in this mode.

Step Down: When the LED is off, gates and the Step button will step up. When the LED is green, gates and the Step button will step down.

Gate Rnd: Indicated by the LED being red, Gates (only, not the step button) will output a random matrix within the specified Top.

Step: Tapping will step through the matrices.

Hold/Slave: Indicated by the LED being red, this mode stops any CV or Gates from incrementing the matrix counter. You can still step through the Matrices with the buttons, as well as change modes.

If the Macro Machines Memory Manager is connected through the bus board, the SSM will listen for MIDI Control Changes and any received signals will change matrices. When a signal is received, the SSM will slave completely, and can only change matrices and banks from MIDI Control Change.

Clear Mtx: Tapping this will clear the matrix and any I/O connections.

Reset: Push and hold to reset the matrix counter to 0. Remember that CV is not part of the counter and can still offset the matrix that is output.

Rnd Mtx: Tapping this will randomize the currently selected matrix.

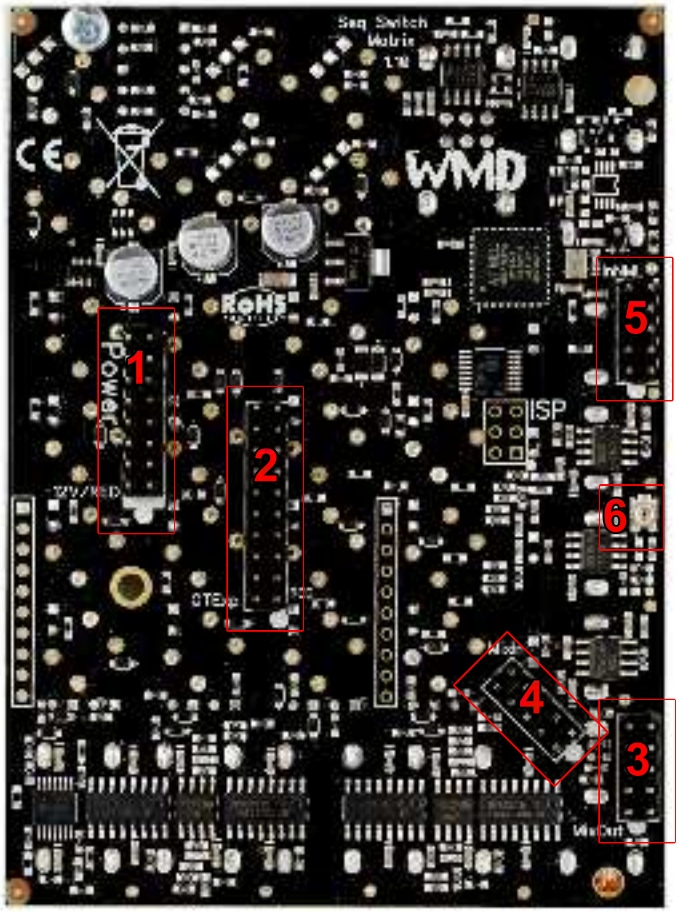
Rnd Rcl: Push and hold to light the red LED. When lit, the currently selected matrix will be randomized every time it is recalled via CV, Gate/Step or the Step button. This mode is stored with each matrix.

CV Input: The CV input is attenuated by the CV Scale knob, and added to the CV Offset control.

Step Input: This Trigger input will step the matrix counter depending on the modes set by the buttons per bank.

Reset Input: This Trigger input will set the matrix counter to 0 if counting up, to F if counting down.

Step and Reset are trigger inputs, the rising edge is detected, and the input must fall before another trigger can be detected.



SSM Expand

The SSM Expand 8 HP module provides extended functionality of the SSM.

Gate/Trig: Gate (Green LED lit) provides 10V outputs for each routing button. It mirrors the routing shown by the SSM LEDs.

Trig mode (Red LED lit) will output a trigger when a step (CV, Step/Gate or Reset) is taken. Pushing a routing button will not change the output thus providing synchronized triggers.

Trigger Length: CV and knob provide adjustable trigger length.

Retrig on Step: When on, gates and triggers will pulse off and on quickly when a step is taken.

Invert Behavior: When on, routings that are OFF will produce ON triggers or Gates.

DAC3/4: Two 4 bit DAC outputs that output a weighted 4 bit voltage between 0 and 5 volts. From routing columns 3 and 4.

Step: Outputs a trigger for each step, reset or CV change that is made to the SSM.

Installation: Connect the 20 pin ribbon cable to the GTExp header on the SSM, and the ToSSM connector on the Expand. Red Stripe Down.

Specs: 8 HP. 25mm Depth. 10V Gate Outputs. Current consumption is +40mA, -3mA. 12 month warranty.

Rear Connections & Calibration

1. Power. This is a 16 pin Power connector. Red stripe goes down. The second row down (Doepfer CV Bus) has an input for MIDI control change signals. This input is protected against any signal that may be present on the bus.

2. SSM Expand Connector (GTexp). Connect the SSM Expand with the included ribbon cable to this header. Red Stripe Down. Cable comes with the Expand.

3. MixOut. This connector provides the outputs of each channel at the rear of the SSM. Red Stripe Down.

4. MixIn. This connector provides unity gain access to the inputs of each channel. Red Stripe Down.

Connecting the MixOut to MixIn on a second SSM will pass all signals from the first to the second. Effectively giving 8 inputs to the second SSM. Beware that these inputs will be out of phase on the second module.

5. InNML. This connector provides access to the normals on the input jacks. Red Stripe Down.

Connecting the MixOut to the InNML on a second SSM will provide mix access (in phase) on that channel if no cable is plugged into the input.

6. DAC Gain. This is the gain calibration for the DAC 1:2 output. It is calibrated at the factory to output a range of exactly 5.000 volts.

Expand & Expand Connection





SSM Specs & Notes

The SSM is 16 HP.

Current consumption is +80mA and -32mA.

Input range is +-10V. Step/Gate and Reset sense signals at 0.8V.

Maximum Frequency of the Step/Gate is 26kHz. Pushing buttons at high clock speeds will slow the response as the buttons are debounced.

Compare Input is normaled to 0.5V.

Output range is +-10V.

The depth from the back of the panel is roughly 25mm with connectors.

The SSM and Expand are RoHS and CE compliant.

The SSM and Expand are covered under warranty for 12 months after purchase. Please contact us if you ever have problems. We will take care of you.