

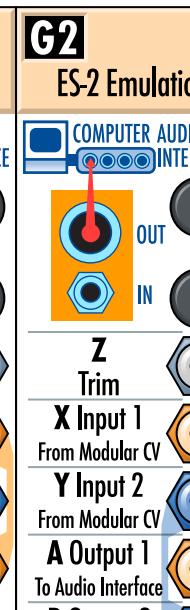
# expert sleepers disting Mrk 4

10-29-19

<b>A1</b> Precision CV Adder	<b>A2</b> Four Quadrant Modulator	<b>A3</b> Full Rectifier	<b>A4</b> Minimum Maximum	<b>A5</b> Linear to Exponential Converter	<b>A6</b> Quantizer	<b>A7</b> Comparator	<b>A8</b> Dual Waveshaper
<p><b>P0</b> Z OFFSET MODE 0=OCTAVE SHIFT ON 1=OCTAVE SHIFT OFF <b>P1</b> ADDER MODE 0: SUM &amp; DIFFERENCE 1: ADD Z &amp; MINUS Z 2: BOTH ADD Z</p>	<p><b>P0</b> Z SCALE (1/10 to 10 X) 0=INTEGER STEPS 1=SMOOTH NO STEPS</p>	<p><b>Z</b> MODE 0= INDEPENDENT 0= X &amp; Y COMBINED</p>	<p>GATE HI: MIN/MAX VALUE GATE LO: HOLD</p>	<p><b>P0</b> A INVERT GATE ON/OFF <b>P1</b> B INVERT GATE ON/OFF</p>	<p><b>P0</b> X INPUT ATTENUATION <b>P1</b> TRANPOSE MODE <b>P2</b> KEY <b>P3</b> OFFSET <b>P4</b> MIDI GATE ON-OFF</p>		
<p><b>Z</b> IN Offset ±10 Volts</p> <p><b>X</b> IN Input</p> <p><b>Y</b> IN Input</p> <p><b>A</b> OUT Sum Add Z</p> <p><b>B</b> OUT Diff. Sub Z</p>	<p><b>Z</b> Scale</p> <p><b>X</b> Input</p> <p><b>Y</b> Input</p> <p><b>X*Y*SCALE</b> Output</p> <p><b>X-Y-Z</b> Y-Z Y+Z</p> <p><b>A</b> OUT -X*Y*SCALE Output</p>	<p><b>Z</b> Mode</p> <p><b>X</b> Input</p> <p><b>Y</b> Input</p> <p><b>abs(X)</b> Sum</p> <p><b>abs(Y)</b> Difference</p>	<p><b>GATE</b></p> <p><b>Z Gate</b></p> <p>Gate Low: Hold</p> <p><b>X</b> Input (0= Halfwave Rectifier)</p> <p><b>Y</b> Input (0= Halfwave Rectifier)</p> <p>min(X, Y)</p> <p>minimum out</p> <p>max(X, Y)</p> <p>maximum out</p>	<p><b>GATE HI: 2.5V GATE LOW: -1.5V</b></p> <p><b>LINEAR EXP.</b> Z TUNE FROM NEAR 0 TO 2kHz</p> <p><b>X</b> Exponential In</p> <p><b>Y</b> Linear In</p> <p><b>A</b> Linear Out</p> <p><b>B</b> Exponential Out</p>	<p><b>Z</b> Hz/V Scale Tunning</p> <p><b>X</b> Voltage Input</p> <p><b>Y</b> Trigger Transpose</p> <p><b>A</b> Quantized Out</p> <p><b>B</b> Gate Out</p> <p>Note Change</p>	<p><b>Z</b> Hysteresis</p> <p><b>X</b> Input</p> <p><b>Y</b> Input</p> <p><b>If X &gt; Y</b> then Gate Out</p> <p><b>If X &lt; Y</b> then Gate Out</p>	<p><b>Z</b> Gain (Pos &amp; Neg)</p> <p><b>X</b> Folder Input</p> <p><b>Y</b> Triangle Input</p> <p><b>A</b> Folder Output</p> <p><b>B</b> Sine Output /Mild Distortion</p>
<p>RING MODULATOR</p>			<p>GATE HI: 2.5V GATE LOW: -1.5V</p> <p>OV IN= C3. YAMAHA = 1.1kH/V</p>			<p>GATE ON = +5V (GATE OFF = 0V)</p>	<p>B CAN BE USED AS DISTORTION</p>
<b>B1</b> Sample & Hold	<b>B2</b> Slew Rate Limiter	<b>B3</b> Pitch Tracker & Envelope Follower	<b>B4</b> Clockable Delay / Echo	<b>B5</b> LFO	<b>B6</b> Clockable LFO	<b>B7</b> VCO with Linear FM	<b>B8</b> VCO with Waveshaping
<p><b>P0</b> 0=SAMPLE AND HOLD. GATE ON: HOLDS X VALUE 1=TRACK &amp; HOLD. GATE ON: LETS X THRU GATE OFF: HOLDS X <b>P1</b> TIMING OFFSET</p> <p><b>P2</b> 0 1 2 3</p> <p><b>P3</b> NOISE ADDED TO X</p>	<p><b>P0</b> UP SLEW</p> <p><b>P1</b> DOWN SLEW</p>	<p>DOESN'T DETECT UNDER 27 Hz. BANDPASS FILTER PRE-DISTING AUDIO INPUT CAN BE USED FOR BETTER TRACKING.</p>	<p><b>P0</b> DELAY TIME MULTIPLIER</p> <p><b>P1</b> OUTPUT MODE 0: A:MIX B:DELAY 1: A:MIX B:MIX 2: A:DELAY B:DELAY</p>	<p><b>P0</b> LFO A OUTPUT ATTENUATOR</p> <p><b>P1</b> LFO B OUTPUT ATTENUATOR</p> <p><b>P2</b> LFO A OFFSET</p> <p><b>P3</b> LFO B OFFSET</p>	<p><b>P0</b> LFO A OUTPUT ATTENUATOR</p> <p><b>P1</b> LFO B OUTPUT ATTENUATOR</p> <p><b>P2</b> Y WAVESHAPE</p>	<p><b>P0</b> OCTAVE SHIFT</p> <p><b>P1</b> VCO A ATTENUATION</p> <p><b>P2</b> VCO B ATTENUATION</p> <p><b>P3</b> VCO A WAVEFORM</p> <p><b>P4</b> WAVEFORM SELECT</p> <p><b>P5</b> TRANSPOSE</p> <p><b>P6</b> Z FINE TUNE/SYNC</p>	<p><b>P0</b> OCTAVE SHIFT</p> <p><b>P1</b> VCO A ATTENUATION</p> <p><b>P2</b> VCO B ATTENUATION</p> <p><b>P3</b> Y WAVESHAPE</p> <p><b>P4</b> VCO B WAVEFORM</p> <p><b>P5</b> TRANSPOSE</p> <p><b>P6</b> Z FINE TUNE/SYNC</p>
<p><b>Z</b> Slew Rate</p> <p><b>X</b> Sample Input</p> <p><b>Y</b> Gate In</p> <p><b>A</b> Hold X</p> <p><b>B</b> Noise</p> <p>GATE FIRES ABOVE 1 VOLT</p>	<p><b>Z</b> Slew Rate</p> <p><b>X</b> Input</p> <p><b>Y</b> Input</p> <p><b>A</b> Linear Slew</p> <p><b>B</b> Logarithmic Slew</p>	<p><b>Z</b> Envelope Rate</p> <p><b>X</b> Audio Input</p> <p><b>Y</b> Pitch Modulator</p> <p><b>A</b> 1v/Octave Out</p> <p><b>B</b> Envelope Out</p> <p>0 VOLTS = C3 (130.81 Hz)</p>	<p><b>Z</b> Feedback</p> <p><b>X</b> Audio Input</p> <p><b>Y</b> Clock Input</p> <p><b>A</b> Mix/Mix/Delay</p> <p><b>B</b> Delay/Mix/Delay</p> <p>DELAY TIME: .053ms to 1700ms</p>	<p><b>Z</b> Tune</p> <p><b>X</b> Rate</p> <p><b>Y</b> Clock Input</p> <p><b>A</b> 1Hz/Volt Input</p> <p><b>B</b> Y ±5 Volts</p> <p>Waveshape/PWM</p> <p>-5V 0V +5V</p>	<p><b>Z</b> (1 to 16) Multiply/Divide</p> <p><b>X</b> Clock Input</p> <p><b>Y</b> ±5 Volts</p> <p><b>A</b> Waveshape/PWM</p> <p><b>B</b> Waveshape/PWM</p> <p>-5V 0V +5V</p>	<p><b>Z</b> Tune ±½ Octave</p> <p><b>X</b> Carrier Pitch</p> <p><b>Y</b> 1v/Octave Input</p> <p><b>A</b> Mod. Pitch Ratio</p> <p><b>B</b> FM In 100Hz/V</p> <p>0 1 2 3 4</p>	<p><b>Z</b> &gt;1v = Sync</p> <p>Tune ±½ Octave</p> <p><b>X</b> Pitch</p> <p>1v/Octave Input</p> <p><b>Y</b> ±5 Volts</p> <p><b>A</b> Waveshape/PWM</p> <p>0 1 2</p>
				<p>- VOLT ON RATE INVERTS LFO</p>	<p>- VOLT ON Z DIVIDES CLOCK</p>	<p>0 VOLTS = C3 (130.81 Hz, #48)</p>	<p>0 VOLTS = C3 (130.81 Hz, #48)</p>

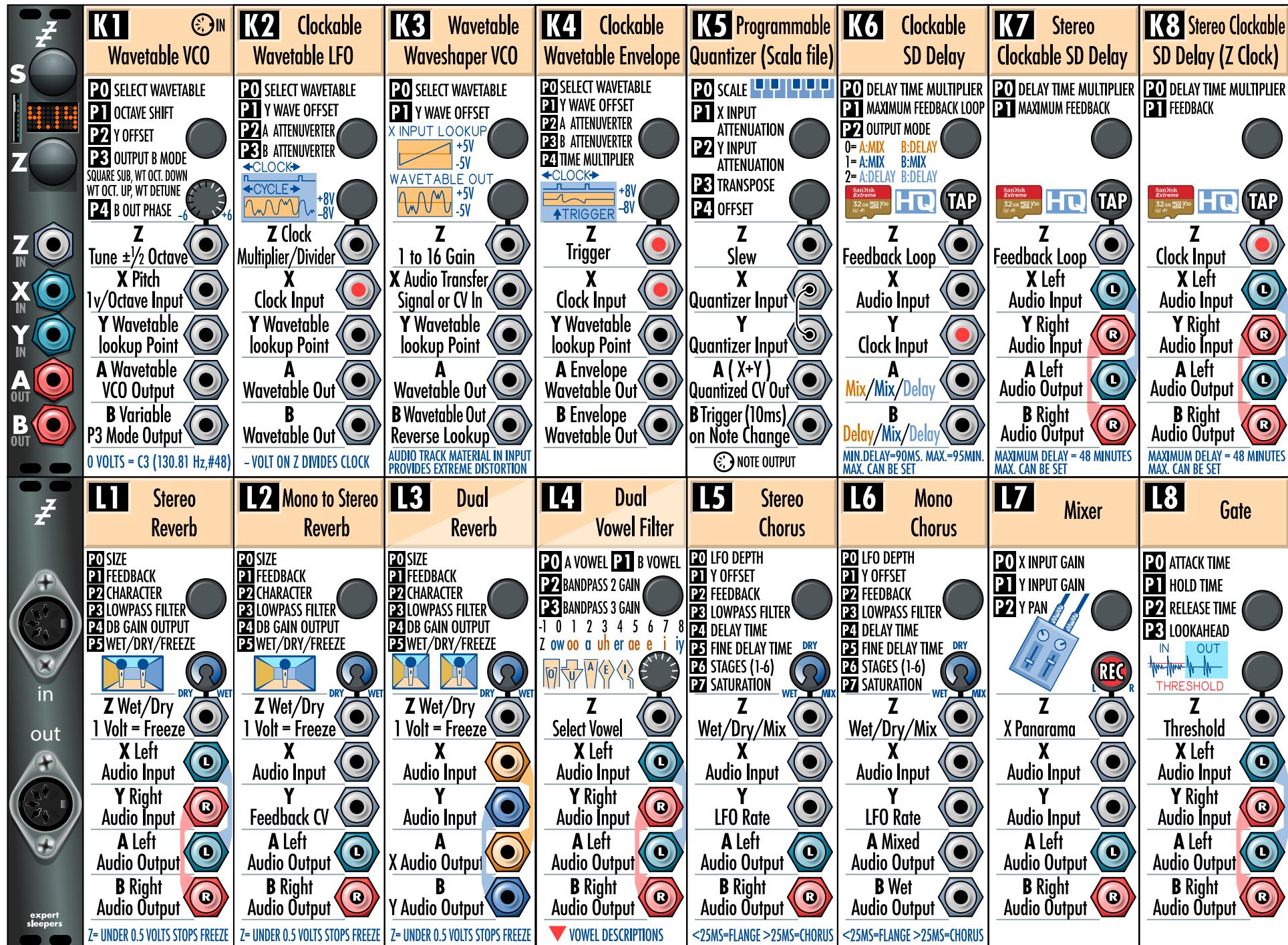
<p><b>S</b></p> <p><b>Z</b></p> <p><b>Z IN</b></p> <p><b>X IN</b></p> <p><b>Y IN</b></p> <p><b>A OUT</b></p> <p><b>B OUT</b></p>	<b>C1</b> Precision Adder (Fractional Offsets)	<b>C2</b> Voltage Controlled Delay Line	<b>C3</b> Clockable Ping Pong Delay Z Feedback	<b>C4</b> Clockable Ping Pong Delay Z Input Pan	<b>C5</b> Resonator (Drum Synth Filter)	<b>C6</b> Vocoder	<b>C7</b> Phaser	<b>C8</b> Bit Crusher
	<p><b>P0</b> OFFSET DIVISOR n/OCTAVE 1 = OCTAVES 7 = FIFTHS 12 = SEMITONES</p> <p><b>P1</b> SUM MODE</p> <p><b>Z Offset</b></p> <p><b>X Input</b></p> <p><b>Y Input</b></p> <p><b>A</b> Audio Output</p> <p><b>B</b> Audio Output</p> <p><b>X + Y + Offset</b></p> <p><b>X + Y - Offset</b></p> <p><b>MAXIMUM DELAY 200MS</b></p>	<p><b>P0</b> OFFSET TO Y DELAY TIME</p> <p><b>P1</b> Y ATTENUATOR</p> <p><b>P2</b> SATURATED LOOP</p> <p>OUTPUT A CAN BE USED FOR VIBRATO. OUTPUT B IS GOOD FOR CHORUS &amp; FLANGE EFFECTS.</p> <p><b>Z</b></p> <p><b>Bipolar Feedback</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Delay Time</b></p> <p><b>A</b> Audio Output</p> <p><b>B</b> Audio Output</p> <p><b>X + Y - Offset</b></p> <p><b>MAXIMUM DELAY 800MS</b></p>	<p><b>P0</b> OUT MODE 1=DRY OFF</p> <p><b>P1</b> TIME MULTIPLIER</p> <p><b>P2</b> INPUT PAN</p> <p><b>Z</b></p> <p><b>Feedback</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Delay Time</b></p> <p><b>A Left</b></p> <p><b>B Right</b></p> <p><b>A</b> Audio Output</p> <p><b>B</b> Audio Output</p> <p><b>X + Delay</b></p> <p><b>MAXIMUM DELAY 800MS</b></p>	<p><b>P0</b> FEEDBACK</p> <p><b>P1</b> TIME MULTIPLIER</p> <p><b>P2</b> DRY ON/OFF</p> <p><b>Z</b></p> <p><b>Pan CV Input</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Clock</b></p> <p><b>A Left</b></p> <p><b>B Right</b></p> <p><b>A</b> Audio Output</p> <p><b>B</b> Audio Output</p> <p><b>X + Delay</b></p> <p><b>MAXIMUM DELAY 800MS</b></p>	<p><b>P0</b> APPLIES OFFSET TO Y PITCH IN SEMITONES</p> <p><b>Z</b></p> <p><b>Gain</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>1v/Octave Input</b></p> <p><b>A</b></p> <p><b>Audio Output</b></p> <p><b>B</b></p> <p><b>Envelope of Audio Output</b></p> <p><b>0 VOLTS = C3 (130.81 Hz)</b></p>	<p><b>P0</b> FILTER BANK SELECT 0 = 1/2 OCTAVE SPACED BASED ON 100Hz. 1 = 1/3 OCTAVE SPACED BASED ON 250Hz</p> <p><b>P1</b> OUTPUT A GAIN</p> <p><b>P2</b> OUTPUT B GAIN</p> <p><b>Z</b></p> <p><b>Decay Time</b></p> <p><b>X</b></p> <p><b>Modulator Input</b></p> <p><b>Y</b></p> <p><b>Source Carrier Input</b></p> <p><b>A</b></p> <p><b>Audio Output</b></p> <p><b>B</b></p> <p><b>Envelope of Audio Output</b></p> <p><b>GATE ON = +5V (GATE OFF =0V)</b></p> <p><b>COMB FILTER PHASE SHIFTER</b></p>	<p><b>P0</b> Y OFFSET SAMPLE RATE</p> <p><b>P1</b> BIT REDUCER MODE</p> <p><b>P2</b> BIT MANGLING MODE</p> <p><b>Z</b></p> <p><b>Bipolar Feedback</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Sample Rate</b></p> <p><b>A</b></p> <p><b>Audio Output</b></p> <p><b>B</b></p> <p><b>Comparitor Out</b></p> <p><b>SEE MODE CHART BELOW</b></p>	
<p><b>in</b></p> <p><b>out</b></p> <p><b>expert sleepers</b></p>	<b>D1</b> DJ Filter	<b>D2</b> Tape Delay	<b>D3</b> Waveform Animator	<b>D4</b> State Variable Filter (2nd Order)	<b>D5</b> Low Pass / High Pass Filter	<b>D6</b> Low Pass / Band Pass Filter	<b>D7</b> Band Pass / High Pass Filter	<b>D8</b> Band Pass / Notch Filter
	<p><b>P0</b> RESONANCE</p> <p><b>DJ</b></p> <p><b>HIGHPASS</b></p> <p><b>LOWPASS</b></p> <p><b>Z</b></p> <p><b>Filter Sweep</b></p> <p><b>X Left</b></p> <p><b>Audio Input</b></p> <p><b>Y Right</b></p> <p><b>Audio Input</b></p> <p><b>A Left Filtered</b></p> <p><b>Audio Output</b></p> <p><b>B Right Filtered</b></p> <p><b>Audio Output</b></p> <p><b>Z = 0 VOLTS FILTER IS BYPASSED</b></p> <p><b>MAXIMUM DELAY 400MS</b></p>	<p><b>P0</b> TAPE LENGTH (10ms Units)</p> <p><b>P1</b> FINE LENGTH CONTROL</p> <p><b>P2</b> TAPE SPEED</p> <p><b>P3</b> OUTPUT MODE</p> <p>0: A:MIX B:DELAY 1: A:MIX B:MIX 2: A:DELAY B:DELAY</p> <p><b>Z</b></p> <p><b>Feedback</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Tape Speed</b></p> <p><b>A</b></p> <p><b>Mix/Mix/Delay</b></p> <p><b>B</b></p> <p><b>Delay/Mix/Delay</b></p> <p><b>DIAGONAL WAVE MULTIPLIER</b></p>	<p><b>P0</b> LFO DEPTH (4 LFO's)</p> <p><b>P1</b> Y OFFSET THRESHOLD</p> <p><b>P2</b> LFO RATE</p> <p><b>P3</b> SCALE -1=AUTO</p> <p><b>Z</b></p> <p><b>Separation</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Center Threshold</b></p> <p><b>A</b></p> <p><b>Animated Out</b></p> <p><b>B</b></p> <p><b>Square Waves Out</b></p> <p><b>DIAGONAL WAVE MULTIPLIER</b></p>	<p><b>P0</b> Y OFFSET</p> <p><b>P1</b> RESONANCE</p> <p><b>Z</b></p> <p><b>Blend</b></p> <p><b>Filter Type</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Frequency</b></p> <p><b>1v/Octave Input</b></p> <p><b>LP&lt;BP&gt;HP</b></p> <p><b>HP&lt;BP&gt;LP</b></p> <p><b>Filtered Output</b></p> <p><b>0 VOLTS = C3 (130.81 Hz)</b></p>	<p><b>P0</b> Y FREQ. OFFSET (-80/+80)</p> <p><b>Z</b></p> <p><b>Resonance</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Frequency</b></p> <p><b>1v/Octave Input</b></p> <p><b>A</b></p> <p><b>Low Pass Output</b></p> <p><b>B</b></p> <p><b>High Pass Output</b></p> <p><b>0 VOLTS = C3 (130.81 Hz)</b></p>	<p><b>P0</b> Y FREQ. OFFSET (-80/+80)</p> <p><b>Z</b></p> <p><b>Resonance</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Frequency</b></p> <p><b>1v/Octave Input</b></p> <p><b>A</b></p> <p><b>Low Pass Output</b></p> <p><b>B</b></p> <p><b>Band Pass Output</b></p> <p><b>0 VOLTS = C3 (130.81 Hz)</b></p>	<p><b>P0</b> Y FREQ. OFFSET (-80/+80)</p> <p><b>Z</b></p> <p><b>Resonance</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Frequency</b></p> <p><b>1v/Octave Input</b></p> <p><b>A</b></p> <p><b>Band Pass Output</b></p> <p><b>B</b></p> <p><b>High Pass Output</b></p> <p><b>0 VOLTS = C3 (130.81 Hz)</b></p>	<p><b>P0</b> Y FREQ. OFFSET (-80/+80)</p> <p><b>Z</b></p> <p><b>Resonance</b></p> <p><b>X</b></p> <p><b>Audio Input</b></p> <p><b>Y</b></p> <p><b>Frequency</b></p> <p><b>1v/Octave Input</b></p> <p><b>A</b></p> <p><b>Band Pass Output</b></p> <p><b>B</b></p> <p><b>Notch Output</b></p> <p><b>0 VOLTS = C3 (130.81 Hz)</b></p>

<b>E1</b>	<b>AR Envelope</b>	<b>E2</b>	<b>AR Envelope &amp; VCA</b>	<b>E3</b>	<b>Dual AR Envelope</b>	<b>E4</b>	<b>Stereo Compressor</b>	<b>E5</b>	<b>Side-Chain Compressor</b>	<b>E6</b>	<b>Mono Compressor</b>	<b>E7</b>	<b>Euro to Buchla Converter</b>	<b>E8</b>	<b>Buchla to Euro Converter</b>	
<b>P0</b> TRIGGER MODE <b>P1</b> Z MODE <b>P2</b> A ATTENUVERTER <b>P3</b> B ATTENUVERTER <b>P4</b> A OFFSET <b>P5</b> B OFFSET <b>P6</b> ATTACK SHAPE <b>P7</b> RELEASE SHAPE	<b>P0</b> TRIGGER MODE <b>P1</b> Z MODE <b>P2</b> A ATTENUVERTER <b>P3</b> B ATTENUVERTER <b>P4</b> A OFFSET <b>P5</b> B OFFSET <b>P6</b> ATTACK SHAPE <b>P7</b> RELEASE SHAPE	<b>P0</b> TRIGGER MODE <b>P1</b> Z MODE <b>P2</b> A ATTENUVERTER <b>P3</b> B ATTENUVERTER <b>P4</b> A OFFSET <b>P5</b> B OFFSET <b>P6</b> ATTACK SHAPE <b>P7</b> RELEASE SHAPE	<b>P0</b> THRESHOLD <b>P1</b> ATTACK TIME <b>P2</b> RELEASE TIME <b>P3</b> MAKE-UP GAIN <b>P4</b> LOOKAHEAD	<b>P0</b> THRESHOLD <b>P1</b> ATTACK TIME <b>P2</b> RELEASE TIME <b>P3</b> MAKE-UP GAIN <b>P4</b> LOOKAHEAD <b>P5</b> COMP. RATIO	<b>P0</b> THRESHOLD <b>P1</b> ATTACK TIME <b>P2</b> RELEASE TIME <b>P3</b> MAKE-UP GAIN <b>P4</b> LOOKAHEAD	<b>P0</b> OCTAVE SHIFT ±8V CV IN =1v/Oct CV OUT =1.2v/Oct GATE IN 4MS 10V 4MS 10V SUS 5V BUCHLA GATE IN BUCHLA GATE OUT	<b>P0</b> OCTAVE SHIFT ±8V CV IN =1.2v/Oct CV OUT =1v/Oct GATE IN 4MS 10V 4MS 10V SUS 5V BUCHLA GATE IN BUCHLA GATE OUT	<b>P0</b> Z IN <b>X</b> IN <b>Y</b> IN <b>A</b> OUT <b>B</b> OUT	<b>Z</b> IN <b>X</b> IN <b>Y</b> IN <b>A</b> OUT <b>B</b> OUT							
<b>Z</b> Envelope Times <b>X (&gt; 1V)</b> Trigger Input <b>Y (&gt; 1V)</b> Trigger Input <b>A</b> Envelope Out <b>B</b> Envelope Out MAX. ENV. = 8V + OFFSET ±8V	<b>Z</b> Envelope Times <b>X (&gt; 1V)</b> Trigger Input <b>Y</b> VCA Input <b>A</b> Envelope Out <b>B</b> VCA Out MAX. ENV. = 8V + OFFSET ±8V	<b>Z</b> Envelope Times <b>X (&gt; 1V)</b> A Trigger Input <b>Y</b> B Trigger Input <b>A</b> Envelope Out <b>B</b> Envelope Out MAX. ENV. = 8V + OFFSET ±8V	<b>Z</b> Compression Ratio <b>X Left</b> Audio Input <b>Y Right</b> Audio Input <b>A</b> Left <b>B</b> Right COMP. RATIO FROM 1 TO ∞	<b>Z</b> Side-Chain Input <b>X Left</b> Audio Input <b>Y Right</b> Audio Input <b>A</b> Left <b>B</b> Right COMP. RATIO FROM 1 TO ∞	<b>Z</b> Compression Ratio <b>X</b> Audio Input <b>Y</b> Side-Chain Input <b>A</b> Audio Output <b>B</b> Gain Reduction Output COMP. RATIO FROM 1 TO ∞	<b>Z</b> Tune ±½ Octave <b>X</b> 1v/Octave Input <b>Y</b> Gate Input <b>A</b> 1.2v/Octave Out <b>B</b> Gate/Trigger Out	<b>Z</b> Tune ±½ Octave <b>X</b> 1.2v/Octave In <b>Y</b> Gate/Trigger In <b>A</b> 1v/Octave Out <b>B</b> Trigger Out									
<b>P0</b> DELAY TIME MULTIPLIER <b>P1</b> OUTPUT A ATTENUVERTER <b>P2</b> OUTPUT B ATTENUVERTER <b>P3</b> ATTACK SHAPE <b>P4</b> DECAY SHAPE <b>Z</b> Envelope Shape <b>X</b> > 1volt Clock Input <b>Y</b> > 1volt Mute Input <b>A</b> Envelope Output <b>B</b> Envelope Output ENVELOPE = 0 TO 8 VOLTS	<b>P0</b> DELAY TIME MULTIPLIER <b>P1</b> OUTPUT A ATTENUVERTER <b>P2</b> OUTPUT B ATTENUVERTER <b>P3</b> ATTACK SHAPE <b>P4</b> DECAY SHAPE <b>Z</b> Envelope Shape <b>X</b> > 1volt Clock Input <b>Y</b> > 1volt Gate Input <b>A</b> Envelope Output <b>B</b> Envelope Output ENVELOPE = 0 TO 8 VOLTS	<b>P0</b> DELAY TIME MULTIPLIER <b>P1</b> OUTPUT A ATTENUVERTER <b>P2</b> OUTPUT B ATTENUVERTER <b>P3</b> ATTACK SHAPE <b>P4</b> DECAY SHAPE <b>Z</b> Envelope Shape <b>X</b> > 1volt Clock Input <b>Y</b> > 1volt Trigger Input <b>A</b> Envelope Output <b>B</b> Envelope Output ENVELOPE = 0 TO 8 VOLTS	<b>P0</b> DELAY TIME MULTIPLIER <b>P1</b> OUTPUT A ATTENUVERTER <b>P2</b> OUTPUT B ATTENUVERTER <b>P3</b> ATTACK SHAPE <b>P4</b> DECAY SHAPE <b>Z</b> Envelope Shape <b>X</b> > 1volt Clock Input <b>Y</b> VCA Audio Input <b>A</b> Envelope Output <b>B</b> VCA Audio Output ENVELOPE = 0 TO 8 VOLTS	<b>P0</b> FORWARD OR BACKWARD <b>P1</b> LENGTH (1 TO 16) <b>P2</b> SLEW RATE <b>P3</b> A&B OUT ATTENUVERTER <b>P4</b> A&B OFFSET <b>Z</b> Randomization <b>X</b> > 1volt Clock Input <b>Y</b> VCA Audio Input <b>A</b> Unipolar Output <b>B</b> Bipolar Output RANDOMNESS IS 50% AT 0 VOLTS	<b>P0</b> FORWARD OR BACKWARD <b>P1</b> LENGTH (1 TO 16) <b>P2</b> SCALE <b>P3</b> A&B OUT ATTENUVERTER <b>P4</b> MIDI GATE <b>P5</b> TRANSPOSE <b>Z</b> Randomization <b>X</b> > 1volt Clock Input <b>Y</b> Flip Modifier <b>A</b> +Volts Unipolar Output <b>B</b> ± Volts Bipolar Output RANDOMNESS IS 50% AT 0 VOLTS	<b>P0</b> LENGTH (1 TO 16 STEPS) <b>N</b> <b>CLOCK</b> <b>LOCK LOOP</b> <b>Z</b> Randomization <b>X</b> > 1volt Clock Input <b>Y</b> Flip Modifier <b>A</b> +Volts Unipolar Output <b>B</b> ± Volts Bipolar Output RANDOMNESS IS 50% AT 0 VOLTS	<b>P0</b> LENGTH (1 TO 16 STEPS) <b>N</b> <b>CLOCK</b> <b>LOCK LOOP</b> <b>Z</b> Randomization <b>X</b> > 1volt Clock Input <b>Y</b> Flip Modifier <b>A</b> +Volts Unipolar Output <b>B</b> ± Volts Bipolar Output RANDOMNESS IS 50% AT 0 VOLTS									

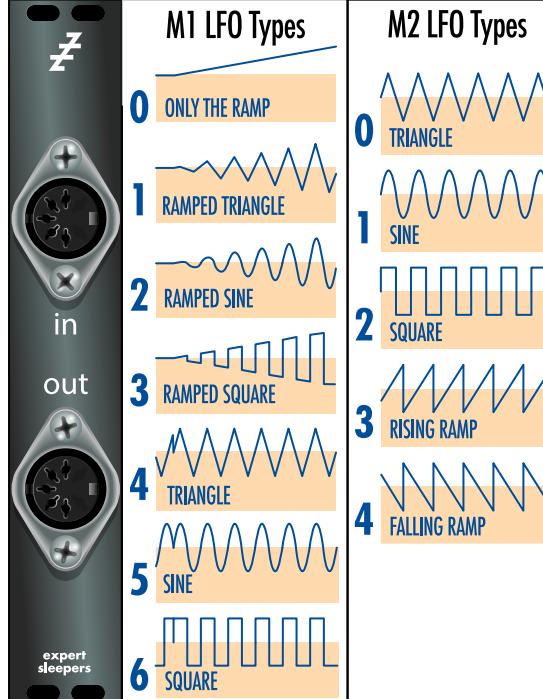
<b>G1</b> ES-1 Emulation	<b>G2</b> ES-2 Emulation	<b>G3</b> Pitch Reference	<b>G4</b> Frequency Reference	<b>G5</b> Tuner	<b>G6</b> MIDI Clock	<b>G7</b> MIDI to CV	<b>G8</b> CV to MIDI
 <p><b>S</b> IN: COMPUTER AUDIO INTERFACE OUT: COMPUTER AUDIO INTERFACE</p> <p><b>Z</b> Z Trim</p> <p><b>X</b> X IN: From Audio Interface X OUT: To Modular CV</p> <p><b>Y</b> Y IN: From Audio Interface Y OUT: To Modular CV</p> <p><b>A</b> A OUT: To Audio Interface A OUT: To Modular CV</p> <p><b>B</b> B OUT: To Audio Interface B OUT: To Modular CV</p>	 <p><b>S</b> IN: COMPUTER AUDIO INTERFACE OUT: COMPUTER AUDIO INTERFACE</p> <p><b>Z</b> Z Trim</p> <p><b>X</b> X IN: From Modular CV X OUT: To Audio Interface</p> <p><b>Y</b> Y IN: From Modular CV Y OUT: To Audio Interface</p> <p><b>A</b> A OUT: To Modular CV A OUT: To Audio Interface</p> <p><b>B</b> B OUT: To Modular CV B OUT: To Audio Interface</p>	<p><b>P0</b> SEMITONE <b>P1</b> OCTAVE <b>NOTE</b> <b>MIDI #</b></p> <p><b>Z Output Amplitude</b></p>	<p><b>MIDDLE C HERTZ</b> <b>261.6</b> <b>A4 HERTZ</b> <b>440.0</b> <b>F#5 HERTZ</b> <b>784.9</b></p>	<p><b>SHARP</b> <b>TUNED</b> <b>FLAT</b></p>	<p><b>P0</b> CLOCK A DIVISOR <b>P1</b> CLOCK B DIVISOR <b>P2</b> MIDI DIVISOR <b>P3</b> Y MODE (0 OR 1)</p> <p>0= RUN ON CLOCK IN 1= RUN/STOP</p>	<p><b>P0</b> TRANPOSE <b>P1</b> PITCH BEND DEPTH <b>P2</b> SCALE ● <b>P3</b> PORTAMENTO</p> <p><i>1v/Oct</i> </p>	<p><b>P0</b> TIMING OFFSET <b>P1</b> Z MODE (0 OR 1) 0= Z SETS VELOCITY 1= Z OUTPUTS MOD WHEEL VALUES CC1 (VELOCITY IS 64)</p> <p><b>Z Velocity or Mod. Wheel</b></p> <p><b>X</b> Pitch CV Input</p> <p><b>Y</b> Gate Input</p> <p><b>A</b> Pitch CV Output</p> <p><b>B</b> Gate Output</p>
<p><b>H1</b> Crossfade/Pan</p> <p><b>P0</b> MODE: EQUAL GAIN, EQUAL POWER, DJ-TRANSITION, FX LOOP</p> <p><b>P1</b> CLIP MODE: FOLD HARD CLIP, SOFT CLIP</p> <p><b>P2</b> B OUTPUT MODE: -1= COPY X, 0=NORMAL 1-99-LFO <b>P3</b> MIX B </p> <p><b>Z</b> Crossfade/Pan</p> <p><b>X</b> Input</p> <p><b>Y</b> Input</p> <p><b>A</b> Mix of X&amp;Y</p> <p><b>B</b> Inverse Mix of X&amp;Y/LFO</p> <p>FX LOOP: P2=-1, P3 = ATTEN.</p>	<p><b>H2</b> Dual Sample and Hold</p> <p><b>P0</b> MODE: SAMPLE &amp; HOLD, TRACK &amp; HOLD</p> <p><b>P1</b> TIMING OFFSET</p> <p><b>P2</b> NOISE ADDED TO X</p> <p><b>P3</b> NOISE ADDED TO Y</p> <p><b>P4</b> SLEW A <b>P5</b> SLEW B</p> <p><b>IN</b>  <b>GATE</b>  <b>OUT</b> </p> <p><b>Z</b> Hold Gate</p> <p><b>X</b> A Sample Input</p> <p><b>Y</b> B Sample Input</p> <p><b>A</b> Output</p> <p><b>B</b> Output</p> <p><b>GATE</b> = &gt; 1 VOLT</p>	<p><b>H3</b> Dual Quantizer (Z scale)</p> <p><b>P0</b> X INPUT ATTENUATION <b>P1</b> Y INPUT ATTENUATION <b>P2</b> X TRANSPOSE <b>P3</b> Y TRANSPOSE</p> <p><b>IN</b>  <b>GATE</b>  <b>OUT</b> </p> <p><b>Z</b> Scale ●</p> <p><b>X</b> CV Input</p> <p><b>Y</b> CV Input</p> <p><b>A</b> Quantized CV Output</p> <p><b>B</b> Quantized CV Output</p> <p>2ND MIDI NOTE ON NEXT CHANNEL</p>	<p><b>H4</b> Dual Quantizer (Z trigger)</p> <p><b>P0</b> X INPUT ATTENUATION <b>P1</b> Y INPUT ATTENUATION <b>P2</b> X SCALE/TRIG ● <b>P3</b> Y SCALE/TRIG ●</p> <p><b>-SCALE=</b> TRIGGERED <b>+SCALE=</b> ALWAYS ON</p> <p><b>P4</b> MIDI GATE</p>	<p><b>H5</b> Dual Euclidean Patterns</p> <p><b>P0</b> STEPS (1-16) <b>P1</b> PULSE PATTERN 1 <b>P2</b> X ROTATION <b>P3</b> PULSE LENGTH <b>P4</b> B ROTATION <b>P5</b> REPEAT</p> <p><b>IN</b>  <b>GATE</b>  <b>OUT</b> </p> <p><b>Z</b> Trigger</p> <p><b>X</b> CV Input</p> <p><b>Y</b> CV Input</p> <p><b>A</b> Quantized CV Output</p> <p><b>B</b> Quantized CV Output</p> <p>2ND MIDI NOTE ON NEXT CHANNEL</p>	<p><b>H6</b> Dual Delayed Pulse Generator</p> <p><b>P0</b> Z MODE: 0=DELAY 1=LENGTH 2 = FORCE BOTH OUTS HIGH 3 = BOTH OUTS LOW 4 = &lt;1V NO TRIG 5 = &gt;1V TRIGGER ON 6= TRIGGER BOTH OUTS</p> <p><b>P1</b> RANGE <b>P2</b> DELAY <b>P3</b> LENGTH</p> <p><b>Z</b> Function</p> <p><b>X</b> Clock Input</p> <p><b>Y</b> Reset Input</p> <p><b>A</b> Pulse Output 1</p> <p><b>B</b> Pulse Output 2</p> <p>MIN PULSE 10MS (MAX 40.96s)</p>	<p><b>H7</b> Dual Noise</p> <p><b>P0</b> TYPE A <b>Z</b> MAX  <b>P1</b> TYPE B -1 0 1 2 3</p> <p><b>P2</b> ATTENUATION A <b>P3</b> X ATTENUATION <b>P4</b> TRIG MODE /OFFSET / Y ATTENUATION <b>P5</b> SLEW RATE</p> <p><b>Z</b> if Type = -1 Blend Mix</p> <p><b>X</b> if P2 = -1 A VCA VC Input</p> <p><b>Y</b> if P3 = -1 B VCA VC Input</p> <p><b>A</b> Noise Output</p> <p><b>B</b> Noise Output</p> <p>Z WORKS WITH P0-1 SETTING</p>	<p><b>H8</b> Quantizer 2</p> <p><b>P0</b> PATTERN  <b>P1</b> SCALE ● <b>P2</b> KEY <b>P3</b> X ATTENUATION <b>P4</b> TRIG MODE /OFFSET / Y ATTENUATION <b>P5</b> SLEW RATE</p> <p><b>Z</b> Interval between A&amp;B</p> <p><b>X</b> CV Input</p> <p><b>Y</b> Trigger or CV Input</p> <p><b>A</b> Quantized CV Output</p> <p><b>B</b> Quantized CV Output</p> <p>0 VOLTS CORRESPONDS TO C</p>

Audio and Midi Play List Info: <http://youtube.com/watch?v=vaRF-YQtkFM>

<b>I1</b> IN: NOTE ON/OFF Audio Playback	<b>I2</b> IN: NOTE ON/OFF Clocked Audio Playback	<b>I3</b> IN: NOTE ON/OFF Audio Playback with 1 Volt/Octave	<b>I4</b> IN: NOTE ON/OFF Audio Playback with Z Speed	<b>I5</b> IN: NOTE ON/OFF Audio Playback with Reverse	<b>I6</b> IN: NOTE ON/OFF Audio Playback with Scrub	<b>I7</b> IN: NOTE ON/OFF Dual Audio Playback	<b>I8</b> IN: NOTE ON/OFF Dual Audio Playback with Z Speed
<p><b>P0</b> MEMORY CARD FOLDER </p> <p><b>P1</b> ENVELOPE TIME</p> <p><b>Z IN</b> Sample Select</p> <p><b>X IN</b> X CV IN Retrigger</p> <p><b>Y IN</b> Y CV IN Start Position</p> <p><b>A OUT</b> A Left Audio Output</p> <p><b>B OUT</b> B Right Audio Output</p> <p><b>X:</b> END OF FILE LENGTH = 8V</p>	<p><b>P0</b> MEMORY CARD FOLDER </p> <p><b>P1</b> ENVELOPE TIME</p> <p><b>P2</b> Z FUNCTION </p> <p><b>Z IN</b> Sample Select</p> <p><b>X IN</b> X CV IN Retrigger</p> <p><b>Y IN</b> Y Clock Input</p> <p><b>A OUT</b> A Left Audio Output</p> <p><b>B OUT</b> B Right Audio Output</p>	<p><b>P0</b> MEMORY CARD FOLDER </p> <p><b>P1</b> OCTAVE SHIFT</p> <p><b>P2</b> ENVELOPE TIME</p> <p><b>P3</b> MIDI MODE: 1 &amp; 0 ARE MONO POLY ASSIGN 1-4 WITH MULTIPLE DISTINGS</p> <p><b>P4</b> PITCH BEND DEPTH</p> <p><b>Z IN</b> Sample Select</p> <p><b>X IN</b> X CV IN Retrigger</p> <p><b>Y IN</b> Y 1v/Oct CV Pitch Input</p> <p><b>A OUT</b> A Left Audio Output</p> <p><b>B OUT</b> B Right Audio Output</p>	<p><b>P0</b> MEMORY CARD FOLDER</p> <p><b>P1</b> SAMPLE SELECT</p> <p><b>P2</b> ENVELOPE TIME</p> <p><b>Z IN</b> Playback Speed </p> <p><b>X IN</b> X CV IN Retrigger</p> <p><b>Y IN</b> Y CV IN Start Position</p> <p><b>A OUT</b> A Left Audio Output</p> <p><b>B OUT</b> B Right Audio Output</p>	<p><b>P0</b> MEMORY CARD FOLDER</p> <p><b>P1</b> Y SAMPLE OFFSET</p> <p><b>P2</b> ENVELOPE TIME</p> <p><b>Z IN</b> Playback Speed </p> <p><b>X IN</b> X CV IN Retrigger</p> <p><b>Y IN</b> Y CV IN Start Position</p> <p><b>A OUT</b> A Left Audio Output</p> <p><b>B OUT</b> B Right Audio Output</p>	<p><b>P0</b> MEMORY CARD FOLDER</p> <p><b>P1</b> SPEED LIMIT</p> <p><b>P2</b> SLEW LIMIT</p> <p><b>P3</b> Y OFFSET</p> <p><b>Z IN</b> Sample Select</p> <p><b>X IN</b> X CV IN Retrigger</p> <p><b>Y IN</b> Y CV IN Start Position</p> <p><b>A OUT</b> A Left Audio Output</p> <p><b>B OUT</b> B Right Audio Output</p>	<p><b>P0</b> MEMORY CARD FOLDER</p> <p><b>P1</b> PANNING MODE 0 = A: MONO LEFT B: MONO RIGHT</p> <p><b>P2</b> ENVELOPE TIME</p> <p><b>Z IN</b> Sample Select</p> <p><b>X IN</b> X Trigger for A</p> <p><b>Y IN</b> Y Trigger for B</p> <p><b>A OUT</b> A Left Audio Output</p> <p><b>B OUT</b> B Right Audio Output</p>	<p><b>P0</b> MEMORY CARD FOLDER</p> <p><b>P1</b> A SAMPLE SELECT</p> <p><b>P2</b> B SAMPLE SELECT</p> <p><b>P3</b> PANNING MODE 0=BOTH 1=A SAMPLE 2=B SAMPLE 3=NONE</p> <p><b>P4</b> SAMPLE SELECT Z </p> <p><b>P5</b> ENVELOPE TIME</p> <p><b>Z IN</b> Playback Speed</p> <p><b>X IN</b> X Trigger for A</p> <p><b>Y IN</b> Y Trigger for B</p> <p><b>A OUT</b> A Left Audio Output</p> <p><b>B OUT</b> B Right Audio Output</p>
<p>S  4TH</p> <p><b>Z IN</b> 4TH</p> <p><b>X IN</b> 4TH</p> <p><b>Y IN</b> 4TH</p> <p><b>A OUT</b> 4TH</p> <p><b>B OUT</b> 4TH</p>	<p><b>Z IN</b> 4TH</p> <p><b>X IN</b> 4TH</p> <p><b>Y IN</b> 4TH</p> <p><b>A OUT</b> 4TH</p> <p><b>B OUT</b> 4TH</p>	<p><b>Z IN</b> 4TH</p> <p><b>X IN</b> 4TH</p> <p><b>Y IN</b> 4TH</p> <p><b>A OUT</b> 4TH</p> <p><b>B OUT</b> 4TH</p>	<p><b>Z IN</b> 4TH</p> <p><b>X IN</b> 4TH</p> <p><b>Y IN</b> 4TH</p> <p><b>A OUT</b> 4TH</p> <p><b>B OUT</b> 4TH</p>	<p><b>Z IN</b> 4TH</p> <p><b>X IN</b> 4TH</p> <p><b>Y IN</b> 4TH</p> <p><b>A OUT</b> 4TH</p> <p><b>B OUT</b> 4TH</p>	<p><b>Z IN</b> 4TH</p> <p><b>X IN</b> 4TH</p> <p><b>Y IN</b> 4TH</p> <p><b>A OUT</b> 4TH</p> <p><b>B OUT</b> 4TH</p>	<p><b>Z IN</b> 4TH</p> <p><b>X IN</b> 4TH</p> <p><b>Y IN</b> 4TH</p> <p><b>A OUT</b> 4TH</p> <p><b>B OUT</b> 4TH</p>	<p><b>Z IN</b> 4TH</p> <p><b>X IN</b> 4TH</p> <p><b>Y IN</b> 4TH</p> <p><b>A OUT</b> 4TH</p> <p><b>B OUT</b> 4TH</p>
<p><b>SAMPLE IS FIT BETWEEN CLOCKS</b></p> <p>(CC#21)=LOW, 1-4=ROUND ROBIN</p>	<p><b>SAMPLE IS FIT BETWEEN CLOCKS</b></p> <p>(CC#21)=LOW, 1-4=ROUND ROBIN</p>	<p><b>Z: 0=NORMAL SPEED NEG=SLOW</b></p> <p>UP TO 50 SAMPLES (NOT 100)</p>	<p><b>Z: 0=NORMAL SPEED NEG=SLOW</b></p> <p>DO NOT REMOVE CARD</p>	<p><b>Z: 0=NORMAL SPEED NEG=SLOW</b></p> <p>DO NOT REMOVE CARD</p>	<p><b>Z: 0=NORMAL SPEED NEG=SLOW</b></p> <p>DO NOT REMOVE CARD</p>	<p><b>Z: 0=NORMAL SPEED NEG=SLOW</b></p> <p>MIDI NOTE 48 =A (MIDI 49 =B)</p>	<p><b>Z: 0=NORMAL SPEED NEG=SLOW</b></p> <p>MIDI NOTE 48 =A (MIDI 49 =B)</p>
<p><b>J1</b>  OUTPUT File Playback (Clocked)</p>	<b>J2</b> Multisample 2  IN Audio Playback	<b>J3</b> OUTPUT Playback (free running)	<b>J4</b> IN: NOTE ON/OFF Audio Playback with End	<b>J5</b> IN: NOTE ON/OFF Audio Recorder	<b>J6</b> Multisample  IN Audio Playback	<b>J7</b> Mono  IN Audio Recorder	<b>J8</b> Audio Playback with Crossfade
<p><b>P0</b> MIDI FILE SELECT </p> <p><b>Z</b> Midi File Select If <b>P0</b> = -1</p> <p><b>X</b> Clock Input</p> <p><b>Y</b> Retrigger CV Input</p> <p><b>A</b> Pitch CV Output</p> <p><b>B</b> Gate Output</p> <p><b>in</b> <b>out</b></p> <p><b>expert sleepers</b></p> <p><b>UNALTERED MIDI FILE PLAYBACK</b></p>	<p><b>P0</b> MEMORY CARD FOLDER </p> <p><b>P1</b> OCTAVE SHIFT </p> <p><b>P2</b> ENVELOPE TIME</p> <p><b>P3</b> MIDI MODE</p> <p><b>P4</b> PITCH BEND AMT.</p> <p><b>P5</b> PANNING MODE</p> <p><b>Z</b> Tune ±1/2 Octaves</p> <p><b>X</b> Retrigger CV Input</p> <p><b>Y</b> 1v/Octave Pitch CV Input</p> <p><b>A</b> Left Audio Output</p> <p><b>B</b> Right Audio Output</p>	<p><b>P0</b> MIDI FILE SELECT </p> <p><b>P1</b> SAMPLE SELECT</p> <p><b>P2</b> ENVELOPE TIME</p> <p><b>Z</b> Playback Speed</p> <p><b>X</b> 1v/Octave CV Speed</p> <p><b>Y</b> Retrigger CV Input</p> <p><b>A</b> Pitch CV Output</p> <p><b>B</b> Gate Output</p>	<p><b>P0</b> MEMORY CARD FOLDER</p> <p><b>P1</b> SAMPLE SELECT</p> <p><b>P2</b> ENVELOPE TIME</p> <p><b>Z</b> End Position or Retrigger CV</p> <p><b>X</b> Retrigger or End Position CV</p> <p><b>Y</b> Start Position CV</p> <p><b>A</b> Pitch CV Output</p> <p><b>B</b> Gate Output</p>	<p><b>Z &gt; 1 VOLT = RECORD</b></p> <p><b>Z = RETRIGGER</b></p> <p><b>X = RETRIGGER</b></p> <p><b>Z &lt; 1/2 VOLT = STOP</b></p> <p><b>STOP</b> 1/2 VOLT 2 VOLT RECORD</p> <p><b>Z</b> Record/Stop Gate</p> <p><b>X</b> Left Audio Input</p> <p><b>Y</b> Right Audio Input</p> <p><b>A</b> Left Audio Output</p> <p><b>C</b> Right Audio Output</p>	<p><b>P0</b> MEMORY CARD FOLDER</p> <p><b>P1</b> OCTAVE SHIFT </p> <p><b>P2</b> ENVELOPE TIME</p> <p><b>P3</b> MIDI MODE</p> <p><b>Z</b> End Position or Retrigger CV</p> <p><b>X</b> Retrigger or End Position CV</p> <p><b>Y</b> Start Position CV</p> <p><b>A</b> Pitch CV Output</p> <p><b>B</b> Gate Output</p>	<p><b>Z &gt; 1 VOLT = RECORD</b></p> <p><b>Z &lt; 1/2 VOLT = STOP</b></p> <p><b>STOP</b> 1/2 VOLT 2 VOLT RECORD</p> <p><b>Z</b> Record/Stop Gate</p> <p><b>X</b> Left Audio Input</p> <p><b>Y</b> Right Audio Input</p> <p><b>A</b> Left Audio Output</p> <p><b>B</b> Right Audio Output</p>	<p><b>P0</b> MEMORY CARD FOLDER</p> <p><b>P1</b> OCTAVE SHIFT</p> <p><b>P2</b> CROSSFADE TIME</p> <p><b>P3</b> 0=GATE ON/OFF</p> <p><b>Z</b> Sample Select</p> <p><b>X</b> Gate/Clock CV</p> <p><b>Y</b> 1v/Octave Pitch CV Input</p> <p><b>A</b> Left Audio Output</p> <p><b>B</b> Right Audio Output</p> <p><b>GATE ON = +5V (GATE OFF =0V)</b></p>
<p><b>CC#21)=LOW, 1-4=ROUND ROBIN</b></p>	<p><b>CC#21)=LOW, 1-4=ROUND ROBIN</b></p>	<p><b>X: 2 VOLTS DOUBLES 1/2 HALVES IT</b></p>	<p><b>DO NOT REMOVE CARD</b></p>	<p><b>DO NOT REMOVE CARD</b></p>	<p><b>DO NOT REMOVE CARD</b></p>	<p><b>DO NOT REMOVE CARD</b></p>	<p><b>DO NOT REMOVE CARD</b></p>



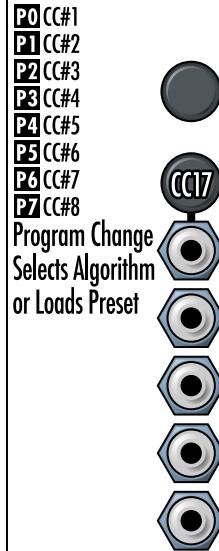
<b>M1</b> Delayed LFO	<b>M2</b> Scaled LFO	<b>M3</b> Logic	<b>M4</b> Half-Wave Rectifier	<b>M5</b> Stereo Filter	<b>M6</b> Stereo Tape Delay	<b>N1</b> Switch	<b>N5</b> Pulsar VCO
<p><b>P0</b> A LFO TYPE  <b>P1</b> B LFO TYPE  <b>P2</b> LFO RATE RANGE  <b>P3</b> RAMP TIME RANGE  <b>P4</b> ATTENUVERTER A  <b>P5</b> ATTENUVERTER B</p> <p><b>Z</b>  <b>Z IN</b>  <b>X</b>  <b>X IN</b>  <b>Y</b>  <b>Y IN</b>  <b>A</b>  <b>A OUT</b>  <b>B</b>  <b>B OUT</b></p>	<p><b>P0</b> A LFO TYPE  <b>P1</b> B LFO TYPE  <b>P2</b> LFO RATE RANGE  <b>P3</b> MODE: MIN/MAX, SCALE/OFFSET  <b>P4</b> X OFFSET  <b>P5</b> Y OFFSET</p> <p><b>Z</b>  <b>Z IN</b>  <b>X</b>  <b>X IN</b>  <b>Y</b>  <b>Y IN</b>  <b>A</b>  <b>A OUT</b>  <b>B</b>  <b>B OUT</b></p>	<p><b>P0</b> B OUTPUT LOGIC TYPE  <b>P1</b> X IN THRESHOLD  <b>P2</b> Y IN THRESHOLD  <b>P3</b> X IN HYSTERESIS  <b>P4</b> Y IN HYSTERESIS</p> <p><b>Z</b>  <b>A Out Logic Type</b>  <b>X</b>  <b>Min. or Offset</b>  <b>Y</b>  <b>Max. or Scale</b>  <b>A</b>  <b>LFO Output</b>  <b>B</b>  <b>LFO Output</b></p>	<p><b>P0</b> MODE  <b>0:</b> A= POS X + NEG Y  <b>B:</b> NEG X + POS Y  <b>1:</b> A= POS X + POS Y  <b>B:</b> NEG X + NEG Y  <b>2:</b> A= POS X - POS Y  <b>B:</b> NEG X - NEG Y  <b>3:</b> A= POS X  <b>B:</b> POS Y</p> <p><b>Z</b>  <b>Threshold</b>  <b>X</b>  <b>Input</b>  <b>Y</b>  <b>Input</b>  <b>A</b>  <b>Output</b>  <b>B</b>  <b>Output</b></p>	<p><b>P0</b> MODE  <b>0:</b> LOW, BAND, HIGHPASS  <b>P1</b> RESONANCE</p> <p><b>HIGH</b>  <b>BAND</b>  <b>LOW</b></p> <p><b>Z</b>  <b>Frequency CV In</b>  <b>X</b>  <b>Left</b>  <b>Audio Input</b>  <b>Y</b>  <b>Right</b>  <b>Audio Input</b>  <b>A</b>  <b>Left</b>  <b>Audio Output</b>  <b>B</b>  <b>Right</b>  <b>Audio Output</b></p>	<p><b>P0</b> TAPE LENGTH (10ms Units)  <b>P1</b> FINE LENGTH CONTROL  <b>P2</b> FEEDBACK  <b>P3</b> OUTPUT MODE  <b>0=A&amp;B:MIX</b>  <b>1=A&amp;B:DELAY</b></p> <p><b>Z</b>  <b>Tape Speed CV In</b>  <b>X</b>  <b>Left</b>  <b>Audio Input</b>  <b>Y</b>  <b>Right</b>  <b>Audio Input</b>  <b>A</b>  <b>Left</b>  <b>Audio Output</b>  <b>B</b>  <b>Right</b>  <b>Audio Output</b></p>	<p><b>P0</b> MODE 0=SWITCH 1=TRIG.  <b>P1</b> HYSTERESIS FOR SWITCH  <b>P2</b> CROSSFADE IN MS.  <b>P3</b> Y MODE  <b>0=X&amp;Y SEPARATE 1=X&amp;Y LINKED</b>  <b>P4</b> MASKING 0=Z TUNING  <b>1=STOCHASTIC MASK</b>  <b>2=99=BURST MASKING</b>  <b>P5</b> OCTAVE</p> <p><b>Z</b>  <b>CV or TRIGGER</b>  <b>X</b>  <b>Audio or CV In</b>  <b>Y</b>  <b>Audio or CV In</b>  <b>A</b>  <b>Output</b>  <b>B</b>  <b>Output</b></p>	<p><b>P0</b> SELECT WAVEABLE SET  <b>P1</b> SELECT WAVE  <b>P2</b> WINDOW → 0 1 2 3  <b>P3</b> Y MODE  <b>0=X&amp;Y SEPARATE 1=X&amp;Y LINKED</b>  <b>P4</b> MASKING 0=Z TUNING  <b>1=STOCHASTIC MASK</b>  <b>2=99=BURST MASKING</b>  <b>P5</b> OCTAVE</p> <p><b>Z</b>  <b>Tune/Masking</b>  <b>X</b>  <b>Fundamental</b>  <b>1v/Octave Input</b>  <b>Y</b>  <b>Formant</b>  <b>1v/Octave Input</b>  <b>A</b>  <b>Positive Mask</b>  <b>VCO Output</b>  <b>B</b>  <b>Negative Mask</b>  <b>VCO Output</b></p> <p><b>0 VOLTS = C3 (130.81 Hz, #48)</b></p> <p><b>INPUTS &amp; OUTPUTS DC-COUPLED</b></p>
<p><b>M1 LFO Types</b></p> <p><b>0</b> ONLY THE RAMP  <b>1</b> RAMPED TRIANGLE  <b>2</b> RAMPED SINE  <b>3</b> RAMPED SQUARE  <b>4</b> TRIANGLE  <b>5</b> SINE  <b>6</b> SQUARE</p> <p><b>in</b>  <b>out</b></p> <p><b>expert sleepers</b></p>	<p><b>M2 LFO Types</b></p> <p><b>0</b> TRIANGLE  <b>1</b> SINE  <b>2</b> SQUARE  <b>3</b> RISING RAMP  <b>4</b> FALLING RAMP</p>	<p><b>M3 Logic Types</b></p> <p><b>-2</b> FOLLOW  <b>-1</b> INVERSE  <b>0</b> AND  <b>1</b> OR  <b>2</b> XOR  <b>3</b> NAND  <b>4</b> NOR  <b>5</b> XNOR</p>	<p><b>RECTIFIER MODE 0</b>  <b>IN X</b> <b>IN Y</b> <b>OUT A</b>  <b>0</b> <b>M</b> <b>n</b></p> <p><b>IN X</b> <b>IN Y</b> <b>OUT B</b>  <b>0</b> <b>M</b> <b>a</b></p> <p><b>RECTIFIER MODE 1</b>  <b>IN X</b> <b>IN Y</b> <b>OUT A</b>  <b>1</b> <b>M</b> <b>AA</b></p> <p><b>IN X</b> <b>IN Y</b> <b>OUT B</b>  <b>1</b> <b>M</b> <b>V+/VI</b></p> <p><b>RECTIFIER MODE 2</b>  <b>IN X</b> <b>IN Y</b> <b>OUT A</b>  <b>2</b> <b>M</b> <b>AA</b></p> <p><b>IN X</b> <b>IN Y</b> <b>OUT B</b>  <b>2</b> <b>M</b> <b>V-/VI</b></p> <p><b>RECTIFIER MODE 3</b>  <b>IN X</b> <b>OUT A</b>  <b>4</b> <b>M</b> <b>A</b></p> <p><b>IN Y</b> <b>OUT B</b>  <b>4</b> <b>M</b> <b>AA</b></p>	<p><b>N8</b> Clockable SD Ping Pong Delay</p> <p><b>P0</b> DELAY TIME MULTIPLIER  <b>P1</b> MAXIMUM FEEDBACK LOOP  <b>P2</b> OUTPUT MODE  <b>P3</b> INPUT PAN</p> <p><b>0=A:MIX</b>  <b>1=A:DELAY ONLY B:DELAY ONLY</b></p> <p><b>Sandisk Extreme 32GB 90MB/s U3 A1</b></p> <p><b>TAP</b></p> <p><b>Z</b>  <b>Feedback Loop</b>  <b>X</b>  <b>Audio Input</b>  <b>Y</b>  <b>Clock Input</b>  <b>A</b>  <b>Left Output</b>  <b>B</b>  <b>Right Output</b></p> <p><b>Mix/Delay Only</b></p> <p><b>LONGEST DELAY = 48 MINUTES</b></p>	<p><b>VIDEO HYPERLINKS</b></p> <p>Clicking on Algorithm Titles will launch Expert Sleepers Videos.</p> <p>Firmware Upgrade Guide <a href="http://youtube.com/watch?v=X_su06bYBgM">http://youtube.com/watch?v=X_su06bYBgM</a></p> <p>Encoder &amp; Menu System <a href="http://youtube.com/watch?v=pS3p1QsTlwk">http://youtube.com/watch?v=pS3p1QsTlwk</a></p> <p>Selecting Algorithms <a href="http://youtube.com/watch?v=o-FcmdBuGuw">http://youtube.com/watch?v=o-FcmdBuGuw</a></p> <p>Settings <a href="http://youtube.com/watch?v=2-CXf07ge_I">http://youtube.com/watch?v=2-CXf07ge_I</a></p> <p>Disting's Help Menu <a href="http://youtube.com/watch?v=W4pkxkqMob0">http://youtube.com/watch?v=W4pkxkqMob0</a></p> <p>Parameters <a href="http://youtube.com/watch?v=3sNxNhcq5nA">http://youtube.com/watch?v=3sNxNhcq5nA</a></p> <p>Knob Recorder <a href="http://youtube.com/watch?v=c-x57d5hWZw">http://youtube.com/watch?v=c-x57d5hWZw</a></p> <p>Tap Tempo <a href="http://youtube.com/watch?v=lmRAvSC3l2s">http://youtube.com/watch?v=lmRAvSC3l2s</a></p> <p>Presets <a href="http://youtube.com/watch?v=ALoETplJtzk">http://youtube.com/watch?v=ALoETplJtzk</a></p> <p>Select Buss <a href="http://youtube.com/watch?v=clgizd9fTSQ">http://youtube.com/watch?v=clgizd9fTSQ</a></p> <p>Audio Playlist Format <a href="http://youtube.com/watch?v=pY5vSRZVpz8">http://youtube.com/watch?v=pY5vSRZVpz8</a></p>		



## MIDI CONTROLS

CC1 IN Set Parameter 0  
 CC2 IN Set Parameter 1  
 CC3 IN Set Parameter 2  
 CC4 IN Set Parameter 3  
 CC5 IN Set Parameter 4  
 CC6 IN Set Parameter 5  
 CC7 IN Set Parameter 6  
 CC8 IN Set Parameter 7

## CC18 MIDI Continuous Controllers



CC17 IN Z Knob

C18 IN Algorithm

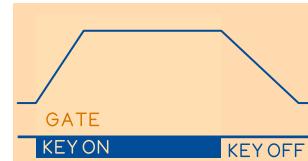
Program Change IN  
 Selects Algorithm or  
 Loads Preset.

## ▼ Envelope Parameters

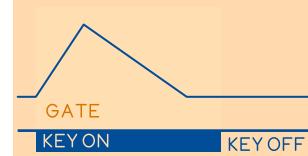
**E1 E2 E3**

**P0 ENV. TRIGGER MODE**

SUSTAIN: ASR ENVELOPE WILL SUSTAIN WITH GATE HIGH



AUTO: ENVELOPE WILL COMPLETE FULL CYCLE

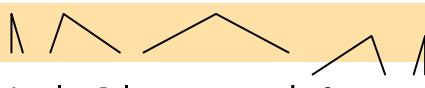


LOOP: ENVELOPE LOOPS LIKE AN LFO

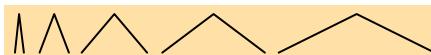


**P1 SHAPE MODE**

Variable shaped Envelopes



Attack & Release times are the Same



**P2 ENV. A ATTRNUVERTER**

Envelope A Output Attenuverter (bipolar with positive and negative attenuation)

**P3 ENV. B ATTRNUVERTER**

Envelope B Output Attenuverter (bipolar)

## \* Pulse Modes

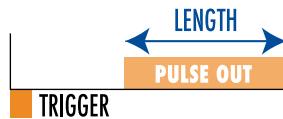
**H6**

**P0 Z MODE**

**PULSE Z MODE: 0 DELAY**



**PULSE Z MODE: 1 LENGTH**



**PULSE Z MODE: 2 OVERRIDE**

Z Gate will make Outs High

**PULSE Z MODE: 3 OFF GATE**

Z Gate will stop Outputs

**PULSE Z MODE: 4 ON GATE**

Z Gate will enable Outputs

**PULSE Z MODE: 5 + Z GATE**

Z Gate will add to Outputs

playlist-wavetable.txt contains

```
disting playlist v1
MoogAnnaSwp.wav
-wavelength=1024
Blofeld_Jupiter.wave
-wavelength=128
ES_Trumpet
```

The ES\_Trumpet folder has 12 separate wav files for each cycle and a test file called "playlist.txt" contains...

```
disting playlist v1
Trumpet_01.wav
Trumpet_02.wav
Trumpet_03.wav
Trumpet_04.wav
Trumpet_05.wav
Trumpet_06.wav
```

All wav files need to be 16 bit mono and any sample rate.

MoogAnna.wav



Sample Length is 1024 Samples for one cycle  
 (This file has 16 cycles)



Cycle Length is 128 Samples  
 (This file has 64 cycles)

## ★ MULTI-SAMPLE PLAYLIST

playlist-multi.txt (filename)

disting playlist v1  
 bells  
 violin  
 Ebass  
 RockKit

## MULTI-SAMPLE FOLDER PLAYLIST

playlist.txt (filename)  
 disting playlist v1  
 -loop=0 (One-Shot)  
 -loop=1 (Loop)  
 -retriggerOnSampleChange=0  
 Sample.wav  
 -switch=48  
 (Lowest Note of Sample)  
 -natural=50 (Pitch of Sample)



<b>48</b> C3 130.8	<b>49</b> C#3 138.6	<b>50</b> D3 146.8	<b>51</b> D#3 155.6	<b>52</b> E3 164.8	<b>53</b> F3 174.6	<b>54</b> F#3 185	<b>55</b> G3 196	<b>56</b> G#3 207.7	<b>57</b> A3 220	<b>58</b> A#3 233.1	<b>59</b> B3 246.9
-switch=48		VioD3.wav	-natural=50	-switch=52	VioF3.wav	-natural=53		-switch=56	VioA3.wav	-natural=57	

## MIDI NUMBER, NOTE & FREQUENCY CHART with General Midi Drums

<b>12</b> C0 16.4Hz	<b>13</b> C#0 17.3Hz	<b>14</b> D0 18.4Hz	<b>15</b> D#0 19.4Hz	<b>16</b> E0 20.6Hz	<b>17</b> F0 21.8Hz	<b>18</b> F#0 23.1Hz	<b>19</b> G0 24.5Hz	<b>20</b> G#0 26Hz	<b>21</b> A0 27.5Hz	<b>22</b> A#0 29.1Hz	<b>23</b> B0 30.9Hz	<b>24</b> C1 32.7Hz	<b>25</b> C#1 34.6Hz	<b>26</b> D1 36.7Hz	<b>27</b> D#4 38.9Hz	<b>28</b> E1 41.2Hz	<b>29</b> F1 43.7Hz	<b>30</b> F#1 46.2Hz	<b>31</b> G1 49Hz	<b>32</b> G#1 51.9Hz	<b>33</b> A1 55Hz	<b>34</b> A#1 58.3Hz	<b>35</b> B1 61.7Hz
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Side Stick	Hand Clap	Closed H-Hat	Pedal Hi-Hat	Open Hi-Hat	Crash Cymbal	Ride Cymbal	Tambourine	More Cowbell	Real Kick	Vibraslap													
<b>36</b> C2 65.4Hz	<b>37</b> C#2 69.3Hz	<b>38</b> D2 73.4Hz	<b>39</b> D#2 77.8Hz	<b>40</b> E2 82.4Hz	<b>41</b> F2 87.3Hz	<b>42</b> F#2 92.5Hz	<b>43</b> G2 98Hz	<b>44</b> G#2 103.8Hz	<b>45</b> A2 110Hz	<b>46</b> A#4 116.5Hz	<b>47</b> B2 123.5Hz	<b>48</b> C3 130.8	<b>49</b> C#3 138.6	<b>50</b> D3 146.8	<b>51</b> D#3 155.6	<b>52</b> E3 164.8	<b>53</b> F3 174.6	<b>54</b> F#3 185	<b>55</b> G3 196	<b>56</b> G#3 207.7	<b>57</b> A3 220	<b>58</b> A#3 233.1	<b>59</b> B3 246.9

Kick Drum 1      Real Snare      Synth Snare      Low Floor Tom      High Floor Tom      Low Tom      Mid Tom      High Mid Tom      High Tom      China Cymbal      Ride Bell Cymbal      Splash Cymbal      Crash Cymbal 2      Ride Cymbal 2

Low Bongo	Open High Conga	Low Timbale	Low Agogo	Maracas	Short Guiro	Claves	Mute Cuica	Mute Triangle															
<b>60</b> C4 261.6	<b>61</b> C#4 277.2	<b>62</b> D4 293.7	<b>63</b> D#4 311.1	<b>64</b> E4 329.6	<b>65</b> F4 49.2	<b>66</b> F#4 370	<b>67</b> G4 392	<b>68</b> G#4 415.3	<b>69</b> A4 440	<b>70</b> A#4 466.2	<b>71</b> B4 493.9	<b>72</b> C5 523.3	<b>73</b> C#5 554.4	<b>74</b> D5 587.3	<b>75</b> D#5 622.3	<b>76</b> E5 659.3	<b>77</b> F5 698.5	<b>78</b> F#5 740	<b>79</b> G5 784	<b>80</b> G#5 830.6	<b>81</b> A5 880	<b>82</b> A#5 932.3	<b>83</b> B5 987.8

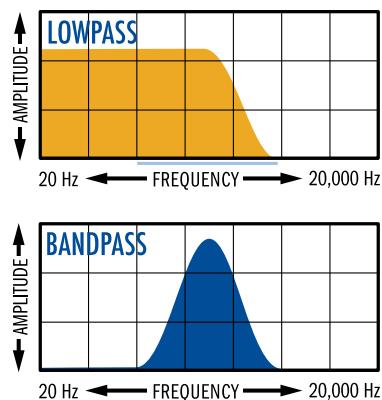
High Bongo      Mute High Conga      Low Conga      High Timbale      High Agogo      Cabasa      Short Whistle      Long Whistle      Long Guiro      High Wood Block      Low Wood Block      Open Cuica      Open Triangle

<b>84</b> C6 1046.5	<b>85</b> C#6 1108.7	<b>86</b> D6 1174.7	<b>87</b> D#6 1244.5	<b>88</b> E6 1318.5	<b>89</b> F6 1396.9	<b>90</b> F#6 1480	<b>91</b> G6 1568	<b>92</b> G#6 1661.2	<b>93</b> A6 1760	<b>94</b> A#6 1864.7	<b>95</b> B6 1975.5	<b>96</b> C7 2093	<b>97</b> C#7 2217.5	<b>98</b> D7 2349.3	<b>99</b> D#7 2489	<b>100</b> E7 2637	<b>101</b> F7 2793.8	<b>102</b> F#7 2960	<b>103</b> G7 3136	<b>104</b> G#7 3322.4	<b>105</b> A7 3520	<b>106</b> A#7 3729.3	<b>107</b> B7 3951.1
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A6 F6 G7 H8 Scales in C for Quant.and Shift Register Quant. Modes

<b>0 Chromatic</b>	
Chromatic	
<b>1 Major</b>	
Major Scale	
<b>2 Minor</b>	
Minor Scale	
<b>3 Triad</b>	
Major Triad	
<b>4 3b+5</b>	
Minor Triad	
<b>5 Fifth</b>	
Root +5th	
<b>6 Triad+6</b>	
Major Triad +6th	
<b>7 3b+5+6</b>	
Minor Triad +6th	

D4 D5 D6 D7 D8



B4 Clockable Delay/Echo

Parameter 0 values

- 15 - 1/6 -3 - 3/8
- 14 - 1/48 -2 - 1/2
- 13 - 1/32 -1 - 3/4
- 12 - 1/24 0 - x1
- 11 - 1/16 1 - x1.5
- 10 - 1/12 2 - x2
- 9 - 1/8 3 - x3
- 8 - 1/6 4 - x4
- 7 - 3/16 5 - x5
- 6 - 1/4 6 - x6
- 5 - 5/16 7 - x8
- 4 - 1/3 8 - x16

G6 Clock Output for MIDI Clock

Parameter 0 and 1 values

- 2 - Run/stop
- 1 - Reset pulse
- 0 - 1/32
- 1 - 1/24
- 2 - 1/16
- 3 - 1/12
- 4 - 1/8
- 5 - 1/16
- 6 - 1/12
- 7 - 1/1
- 8 - 1/2
- 9 - 1/1
- 10 - 2/1
- 11 - 3/1
- 12 - 4/1
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