

<b>A-1 Precision Adder</b>  Has knob recorder Parameters 0: Z smooth or integers	<b>A-2 Four Quadrant Multiplier</b>  Has knob recorder Parameters 0: Z smooth or integers	<b>A-3 Full-wave Rectifier</b>	<b>A-4 Minimum Maximum</b>
<b>Z</b> Offset	<b>Z</b> Scale	<b>Z</b> Mode ●	<b>Z</b> Gate
<b>X</b> Input	<b>X</b> Input	<b>X</b> Input	<b>X</b> Input
<b>Y</b> Input	<b>Y</b> Input	<b>Y</b> Input	<b>Y</b> Input
<b>A</b> $X + Y + Z$	<b>A</b> $X * Y * Z$	<b>A</b> $\begin{matrix} \text{abs}(X + Y) \\ \text{abs}(X) \end{matrix}$	<b>A</b> $\min(X, Y)$
<b>B</b> $X - Y - Z$	<b>B</b> $-X * Y * Z$	<b>B</b> $\begin{matrix} \text{abs}(X - Y) \\ \text{abs}(Y) \end{matrix}$	<b>B</b> $\max(X, Y)$
<b>A-5 Linear/ Exponential Converter</b>	<b>A-6 Quantizer</b>  Parameters 0: Attenuation X 1: Transpose mode 2: Key	<b>A-7 Comparator</b>	<b>A-8 Dual Waveshaper</b>  Has knob recorder
<b>Z</b> Tune	<b>Z</b> Scale & Mode ●	<b>Z</b> Hysteresis	<b>Z</b> Gain
<b>X</b> Exp In	<b>X</b> Input	<b>X</b> Input	<b>X</b> Input
<b>Y</b> Linear In	<b>Y</b> Transpose Trigger In	<b>Y</b> Input	<b>Y</b> Input
<b>A</b> Linear Out	<b>A</b> Quantized	<b>A</b> $X > Y$	<b>A</b> Folded X
<b>B</b> Exp Out	<b>B</b> Trigger	<b>B</b> $X < Y$	<b>B</b> Shaped Y

<b>B-1</b> <b>Sample and Hold</b>  Press Z to trigger	<b>B-2</b> Slew Rate Limiter	<b>B-3</b> Pitch & Envelope Tracker	<b>B-4</b> <b>Clockable Delay/Echo</b>  Has tap tempo
<b>Z</b> Slew rate	<b>Z</b> Slew rate	<b>Z</b> Slew rate	<b>Z</b> Feedback
<b>X</b> Input	<b>X</b> Input } summed	<b>X</b> Audio In	<b>X</b> Audio In
<b>Y</b> Trigger	<b>Y</b> Input	<b>Y</b> Offset A	<b>Y</b> Clock
<b>A</b> Sampled X	<b>A</b> Linear slew	<b>A</b> V/Octave	<b>A</b> Dry+delay
<b>B</b> Noise	<b>B</b> Log slew	<b>B</b> Envelope	<b>B</b> Delay only
<b>B-5</b> <b>LFO</b>  0: Attenuation A 1: Attenuation B 2: Offset A 3: Offset B	<b>B-6</b> <b>Clockable LFO</b>  Has tap tempo Parameters 0: Attenuation A & B	<b>B-7</b> VCO with Linear FM  Parameters 0: Octave shift 1: Attenuation A 2: Attenuation B	<b>B-8</b> VCO with waveshaping  0: Octave shift 1: Attenuation A 2: Attenuation B 3: Y offset
<b>Z</b> Tune	<b>Z</b> Multiplier	<b>Z</b> Tune	<b>Z</b> Tune
<b>X</b> Hz/V In	<b>X</b> Clock	<b>X</b> V/Octave	<b>X</b> V/Octave
<b>Y</b> Waveshape	<b>Y</b> Waveshape	<b>Y</b> Linear FM	<b>Y</b> Waveshape
<b>A</b> Saw/Sin/Tri	<b>A</b> Saw/Sin/Tri	<b>A</b> Sine	<b>A</b> Saw/Tri/Saw
<b>B</b> Square	<b>B</b> Square	<b>B</b> Saw	<b>B</b> Square

<b>C-1</b> <b>Precision</b> <b>Adder</b>  Has knob recorder Parameters 0: Z divisor	<b>C-2 Voltage</b> <b>Controlled</b> <b>Delay Line</b>  Parameters 0: Y offset	<b>C-3</b> <b>Clockable</b> <b>Ping Pong</b>  Has tap tempo Parameters 0: Output Mode	<b>C-4</b> <b>Clockable</b> <b>Ping Pong</b>  Has tap tempo Parameters 0: Feedback
<b>Z</b> Offset	<b>Z</b> Feedback	<b>Z</b> Feedback	<b>Z</b> Input Pan
<b>X</b> Input	<b>X</b> Audio In	<b>X</b> Audio In	<b>X</b> Audio In
<b>Y</b> Input	<b>Y</b> Delay Time	<b>Y</b> Clock	<b>Y</b> Clock
<b>A</b> $X + Y + Z$	<b>A</b> Delay only	<b>A</b> Left	<b>A</b> Left
<b>B</b> $X - Y - Z$	<b>B</b> Dry+delay	<b>B</b> Right	<b>B</b> Right
<b>C-5</b> <b>Resonator</b>  Push Z for 'strike' Parameters 0: Y offset	<b>C-6</b> <b>Vocoder</b>  Parameters 0: Filter bank	<b>C-7</b> <b>Phaser</b>  Parameters 0: Y offset 1: Number of stages	<b>C-8</b> <b>Bit Crusher</b>  Parameters 0: Y offset 1: Reduction mode 2: Mangling mode
<b>Z</b> Gain	<b>Z</b> Decay	<b>Z</b> Feedback	<b>Z</b> Bit depth
<b>X</b> Audio In	<b>X</b> Modulator	<b>X</b> Audio In	<b>X</b> Input
<b>Y</b> V/Octave	<b>Y</b> Carrier	<b>Y</b> Sweep	<b>Y</b> Sample rate
<b>A</b> Audio Out	<b>A</b> Audio Out	<b>A</b> Dry+phase	<b>A</b> Output
<b>B</b> Envelope	<b>B</b> Envelope	<b>B</b> Phase only	<b>B</b> Comparator

<p>D-1</p>	<p>D-2 Tape Delay</p> <p>Parameters 0: Tape length</p> <p><b>Z</b> Feedback</p> <p><b>X</b> Audio In</p> <p><b>Y</b> Tape speed</p> <p><b>A</b> Dry+delay</p> <p><b>B</b> Delay only</p>	<p>D-3</p>	<p>D-4 State Variable Filter</p> <p>Parameters 0: Filter resonance</p> <p><b>Z</b> Filter Type</p> <p><b>X</b> Audio In</p> <p><b>Y</b> V/Octave</p> <p><b>A</b> LP/BP/HP</p> <p><b>B</b> HP/BP/LP</p>
<p>D-5 LP/HP Filter</p> <p><b>Z</b> Resonance</p> <p><b>X</b> Audio In</p> <p><b>Y</b> V/Octave</p> <p><b>A</b> Low pass</p> <p><b>B</b> High pass</p>	<p>D-6 LP/BP Filter</p> <p><b>Z</b> Resonance</p> <p><b>X</b> Audio In</p> <p><b>Y</b> V/Octave</p> <p><b>A</b> Low pass</p> <p><b>B</b> Band pass</p>	<p>D-7 BP/HP Filter</p> <p><b>Z</b> Resonance</p> <p><b>X</b> Audio In</p> <p><b>Y</b> V/Octave</p> <p><b>A</b> Band pass</p> <p><b>B</b> High pass</p>	<p>D-8 BP/Notch Filter</p> <p><b>Z</b> Resonance</p> <p><b>X</b> Audio In</p> <p><b>Y</b> V/Octave</p> <p><b>A</b> Band pass</p> <p><b>B</b> Notch</p>

<b>E-1 AR Envelope</b>  0: Trigger Mode 1: Z Mode 2: Out A Attenuverter 3: Out B Attenuverter	<b>E-2 AR Envelope (w/ push)</b>  Press Z to trigger Parameters 0: Trigger Mode	<b>E-3 AR Envelope &amp; VCA</b>  0: Trigger Mode 1: Z Mode 2: Out A Attenuverter 3: Out B Attenuverter	<b>E-4 AR Envelope &amp; VCA</b>  Press Z to trigger Parameters 0: Trigger Mode
<b>Z Times</b>	<b>Z Times</b>	<b>Z Times</b>	<b>Z Times</b>
<b>X Trigger</b>	<b>X Trigger</b>	<b>X Trigger</b>	<b>X Trigger</b>
<b>Y Trigger</b>	<b>Y Trigger</b>	<b>Y VCA In</b>	<b>Y VCA In</b>
<b>A Env Out</b>	<b>A Env Out</b>	<b>A Env Out</b>	<b>A Env Out</b>
<b>B Env Out</b>	<b>B Env Out</b>	<b>B VCA Out</b>	<b>B VCA Out</b>
<b>E-5 Dual AR Envelope</b>  0: Trigger Mode 1: Z Mode 2: Out A Attenuverter 3: Out B Attenuverter	<b>E-6 Dual AR Envelope</b>  Press Z to trigger Parameters 0: Trigger Mode	<b>E-7 Euro to Buchla Converter</b>  Parameters 0: Octave shift	<b>E-8 Buchla to Euro Converter</b>  Parameters 0: Octave shift
<b>Z Times</b>	<b>Z Times</b>	<b>Z Tune</b>	<b>Z Tune</b>
<b>X Trigger A</b>	<b>X Trigger A</b>	<b>X IV/Oct</b>	<b>X 1.2V/Oct</b>
<b>Y Trigger B</b>	<b>Y Trigger B</b>	<b>Y Gate</b>	<b>Y Gate/trigger</b>
<b>A Env Out A</b>	<b>A Env Out A</b>	<b>A 1.2V/Oct</b>	<b>A IV/Oct</b>
<b>B Env Out B</b>	<b>B Env Out B</b>	<b>B Gate/trigger</b>	<b>B Trigger</b>

<b>F-1</b> <b>Clockable AD (mute)</b>  Has tap tempo Parameters 0: Output Attenuverter	<b>F-2</b> <b>Clockable AD (gate)</b>  Has tap tempo Parameters 0: Output Attenuverter	<b>F-3</b> <b>Clockable AD (trig)</b>  Has tap tempo Parameters 0: Output Attenuverter	<b>F-4</b> <b>Clockable AD &amp; VCA</b>  Has tap tempo Parameters 0: Output Attenuverter
<b>Z</b> Shape	<b>Z</b> Shape	<b>Z</b> Shape	<b>Z</b> Shape
<b>X</b> Clock	<b>X</b> Clock	<b>X</b> Clock	<b>X</b> Clock
<b>Y</b> Mute	<b>Y</b> Gate	<b>Y</b> Trigger	<b>Y</b> VCA In
<b>A</b> Env Out	<b>A</b> Env Out	<b>A</b> Env Out	<b>A</b> Env Out
<b>B</b> Env Out	<b>B</b> Env Out	<b>B</b> Env Out	<b>B</b> VCA Out
<b>F-5 Shift Register CVs</b>  0: Direction 1: Length 2: Slew rate 3: Output attenuator	<b>F-6 Shift Register Quantized</b>  0: Direction 1: Length 2: Scale 3: Output attenuator	<b>F-7 Shift Register Triggers</b>  Press Z to modify seq Parameters 0: Length	<b>F-8 Shift Register Dual Trigs</b>  Parameters 0: Length A 1: Length B
<b>Z</b> Randomness	<b>Z</b> Randomness	<b>Z</b> Randomness	<b>Z</b> Randomness
<b>X</b> Clock	<b>X</b> Clock	<b>X</b> Clock	<b>X</b> Clock
<b>Y</b> Modify	<b>Y</b> Modify	<b>Y</b> Modify	<b>Y</b> Modify
<b>A</b> Unipolar	<b>A</b> Quantized	<b>A</b> Trigger	<b>A</b> Trigger A
<b>B</b> Bipolar	<b>B</b> Trigger	<b>B</b> Inverse	<b>B</b> Trigger B

G-1 ES-1 Emulation	G-2 ES-2 Emulation	G-3 Pitch Reference  Parameters 0: Semitone 1: Octave	G-4 Frequency Reference
<b>Z</b> Trim	<b>Z</b> Trim	<b>Z</b> Amplitude	<b>Z</b> Amplitude
<b>X</b> Input 1	<b>X</b> Input 1	<b>X</b>	<b>X</b>
<b>Y</b> Input 2	<b>Y</b> Input 2	<b>Y</b>	<b>Y</b>
<b>A</b> Output 1	<b>A</b> Output 1	<b>A</b> Sine Out	<b>A</b> Sine Out
<b>B</b> Output 2	<b>B</b> Output 2	<b>B</b> Square Out	<b>B</b> Square Out
G-5 Tuner	G-6	G-7 MIDI/CV  Parameters 0: Transpose 1: Bend depth	G-8 CV/MIDI  Parameters 0: Offset 1: Z Mode
<b>Z</b> Amplitude		<b>Z</b> Unused	<b>Z</b> Mod or Vel
<b>X</b> Input		<b>X</b> Unused	<b>X</b> Pitch CV
<b>Y</b>		<b>Y</b> Unused	<b>Y</b> Gate
<b>A</b> Output		<b>A</b> Pitch CV	<b>A</b> Unused
<b>B</b> Sine Out		<b>B</b> Gate	<b>B</b> Unused

<p>H-1 Crossfade/ Pan</p> <p>Has knob recorder Parameters 0: Crossfade/pan law</p> <p><b>Z</b> Fade/pan</p> <p><b>X</b> Input 1</p> <p><b>Y</b> Input 2</p> <p><b>A</b> Left Out</p> <p><b>B</b> Right Out</p>	<p>H-2</p>	<p>H-3</p>	<p>H-4</p>
<p>H-5</p>	<p>H-6</p>	<p>H-7</p>	<p>H-8</p>



I-1 Audio Playback	I-2 Clocked Audio Playback	I-3 Audio Playback V/Oct  Parameters 0: Octave shift	I-4 Audio Playback Z Speed  Parameters 0: Sample selection
<b>Z</b> Select	<b>Z</b> Select	<b>Z</b> Select	<b>Z</b> Speed
<b>X</b> Retrigger	<b>X</b> Retrigger	<b>X</b> Retrigger	<b>X</b> Retrigger
<b>Y</b> Start Pos	<b>Y</b> Clock	<b>Y</b> V/Oct	<b>Y</b> Start Pos
<b>A</b> Left Out	<b>A</b> Left Out	<b>A</b> Left Out	<b>A</b> Left Out
<b>B</b> Right Out	<b>B</b> Right Out	<b>B</b> Right Out	<b>B</b> Right Out
I-5	I-6	I-7	I-8

<p>J-1 MIDI Playback (Clocked)</p>	<p>J-2</p>	<p>J-3 MIDI Playback (Free)</p> <p>Parameters 0: MIDI File selection</p>	<p>J-4 Audio Playback End CV</p> <p>Parameters 0: Sample selection</p>
<p><b>Z</b> Select</p>		<p><b>Z</b> Speed</p>	<p><b>Z</b> Trigger /End Pos</p>
<p><b>X</b> Clock</p>		<p><b>X</b> V/Oct</p>	<p><b>X</b> End Pos /Trigger</p>
<p><b>Y</b> Retrigger</p>		<p><b>Y</b> Retrigger</p>	<p><b>Y</b> Start Pos</p>
<p><b>A</b> CV Out</p>		<p><b>A</b> CV Out</p>	<p><b>A</b> Left Out</p>
<p><b>B</b> Gate Out</p>		<p><b>B</b> Gate Out</p>	<p><b>B</b> Right Out</p>
<p>J-5 Audio Recorder</p> <p><b>Z</b> Record</p> <p><b>X</b> Input L</p> <p><b>Y</b> Input R</p> <p><b>A</b> Output L</p> <p><b>B</b> Output R</p>	<p>J-6</p>	<p>J-7</p>	<p>J-8</p>

# Expert Sleepers disting mk4 Quick Reference Guide

## For firmware v4.1

**X**, **Y** and **Z** are **Inputs**.

**A** and **B** are **Outputs**.

### Changing Algorithm

Either:

- Push 'S' and hold in while turning, or
- Use the menu:
  - Press 'S' twice
  - Turn to select algorithm
  - Press to accept

## **Parameters**

Turn 'S' to modify the currently selected parameter.

Press 'Z' to cycle between parameters (if the current algorithm has more than one parameter).

## **Tap Tempo**

If available – press 'Z'. The time between two presses defines the delay/LFO/etc. time.

## **Knob Recorder**

If available – push 'Z' and hold in while turning. Release to begin playback. Turn 'Z' to stop playback and regain manual control.

## **Menus**

Press 'Z' to cancel menu mode.