

## Bank I-a

<b>I-a Precision Adder</b>  Has knob recorder Parameters 0: Z smooth or integers	<b>I-b Four Quadrant Multiplier</b>  Has knob recorder Parameters 0: Z smooth or integers	<b>I-c Full-wave Rectifier</b>	<b>I-d 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>2-a Linear/ Exponential Converter</b>	<b>2-b Quantizer</b>  Parameters 0: Attenuation X 1: Transpose mode 2: Key	<b>2-c Comparator</b>	<b>2-d 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

## Bank I-a

3-a Sample and Hold  Press Z to trigger	3-b Slew Rate Limiter	3-c Pitch & Envelope Tracker	3-d Clockable Delay/Echo  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
4-a LFO  0: Attenuation A 1: Attenuation B 2: Offset A 3: Offset B	4-b Clockable LFO  Has tap tempo Parameters 0: Attenuation A & B	4-c VCO with Linear FM  Parameters 0: Octave shift 1: Attenuation A 2: Attenuation B	4-d 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

## Bank I-b

<b>1-a</b> <b>Precision Adder</b> Has knob recorder Parameters 0: Z divisor	<b>1-b</b> Voltage Controlled Delay Line Parameters 0: Y offset	<b>1-c</b> Clockable Ping Pong Has tap tempo Parameters 0: Output Mode	<b>1-d</b> Clockable Ping Pong 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>2-a</b> <b>Resonator</b> Push Z for 'strike' Parameters 0: Y offset	<b>2-b</b> Vocoder Parameters 0: Filter bank	<b>2-c</b> Phaser Parameters 0: Y offset 1: Number of stages	<b>2-d</b> Bit Crusher 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

## Bank I-b

<p>3-a</p>	<p>3-b 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>3-c</p>	<p>3-d 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>4-a LP/HP Filter</p>	<p>4-b LP/BP Filter</p>	<p>4-c BP/HP Filter</p>	<p>4-d BP/Notch Filter</p>
<p><b>Z</b> Resonance</p>	<p><b>Z</b> Resonance</p>	<p><b>Z</b> Resonance</p>	<p><b>Z</b> Resonance</p>
<p><b>X</b> Audio In</p>	<p><b>X</b> Audio In</p>	<p><b>X</b> Audio In</p>	<p><b>X</b> Audio In</p>
<p><b>Y</b> V/Octave</p>	<p><b>Y</b> V/Octave</p>	<p><b>Y</b> V/Octave</p>	<p><b>Y</b> V/Octave</p>
<p><b>A</b> Low pass</p>	<p><b>A</b> Low pass</p>	<p><b>A</b> Band pass</p>	<p><b>A</b> Band pass</p>
<p><b>B</b> High pass</p>	<p><b>B</b> Band pass</p>	<p><b>B</b> High pass</p>	<p><b>B</b> Notch</p>

## Bank I-c

<p><b>I-a AR Envelope</b></p> <p>0: Trigger Mode 1: Z Mode 2: Out A Attenuverter 3: Out B Attenuverter</p>	<p><b>I-b AR Envelope (w/ push)</b></p> <p>Press Z to trigger</p> <p>Parameters 0: Trigger Mode</p>	<p><b>I-c AR Envelope &amp; VCA</b></p> <p>0: Trigger Mode 1: Z Mode 2: Out A Attenuverter 3: Out B Attenuverter</p>	<p><b>I-d AR Envelope &amp; VCA</b></p> <p>Press Z to trigger</p> <p>Parameters 0: Trigger Mode</p>
<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>
<p><b>2-a Dual AR Envelope</b></p> <p>0: Trigger Mode 1: Z Mode 2: Out A Attenuverter 3: Out B Attenuverter</p>	<p><b>2-b Dual AR Envelope</b></p> <p>Press Z to trigger</p> <p>Parameters 0: Trigger Mode</p>	<p><b>2-c Euro to Buchla Converter</b></p> <p>Parameters 0: Octave shift</p>	<p><b>2-d Buchla to Euro Converter</b></p> <p>Parameters 0: Octave shift</p>
<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>

## Bank I-c

<b>3-a</b> <b>Clockable AD (mute)</b>  Has tap tempo Parameters 0: Output Attenuverter	<b>3-b</b> <b>Clockable AD (gate)</b>  Has tap tempo Parameters 0: Output Attenuverter	<b>3-c</b> <b>Clockable AD (trig)</b>  Has tap tempo Parameters 0: Output Attenuverter	<b>3-d</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>4-a</b> Shift Register CVs  0: Direction 1: Length 2: Slew rate 3: Output attenuator	<b>4-b</b> Shift Register Quantized  0: Direction 1: Length 2: Scale 3: Output attenuator	<b>4-c</b> Shift Register Triggers  Press Z to modify seq Parameters 0: Length	<b>4-d</b> Shift Register Dual Trigs  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

## Bank I-d

I-a ES-1 Emulation	I-b ES-2 Emulation	I-c Pitch Reference  Parameters 0: Semitone 1: Octave	I-d 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
2-a Tuner	2-b	2-c	2-d
<b>Z</b> Amplitude			
<b>X</b> Input			
<b>Y</b>			
<b>A</b> Output			
<b>B</b> Sine Out			

## Bank I-d

<p><b>3-a</b> 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><b>3-b</b></p>	<p><b>3-c</b></p>	<p><b>3-d</b></p>
<p><b>4-a</b></p>	<p><b>4-b</b></p>	<p><b>4-c</b></p>	<p><b>4-d</b></p>



## Bank 2-a

I-a Audio Playback	I-b Clocked Audio Playback	I-c Audio Playback V/Oct  Parameters 0: Octave shift	I-d 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
3-a MIDI Playback (Clocked)	3-b	3-c MIDI Playback (Free)  Parameters 0: MIDI File selection	3-d Audio Playback End CV  Parameters 0: Sample selection
<b>Z</b> Select		<b>Z</b> Speed	<b>Z</b> Trigger /End Pos
<b>X</b> Clock		<b>X</b> V/Oct	<b>X</b> End Pos /Trigger
<b>Y</b> Retrigger		<b>Y</b> Retrigger	<b>Y</b> Start Pos
<b>A</b> CV Out		<b>A</b> CV Out	<b>A</b> Left Out
<b>B</b> Gate Out		<b>B</b> Gate Out	<b>B</b> Right Out

# Expert Sleepers disting mk4 Quick Reference Guide

## For firmware v4.0

**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

### Changing Bank

- Press 'S' (to enter the menu)
- Turn to select 'Bank' (change bank)
- Press to accept
- Turn to select bank
- 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.