Continuum and ContinuuMini

User's Guide

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Firmware Version 9.9x

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About this document

This User Guide includes information for the latest "Slim" Continuum Fingerboards, earlier Full-Size and Half-Size Continuum Fingerboards, the ContinuuMini (also referred to as "Mini") an the Eurorack EaganMatrix Module (also referred to as "EM Module"). If Full-Size or Half-Size models are specifically referenced those terms will be used, otherwise the term "Continuum" when used on its own applies to all Continuum models (except the ContinuuMini).

Some information herein also pertains to the Expressive-E Osmose Keyboard as related to Haken Editor and EaganMatrix functions. Please consult the Expressive-E Osmose manual set for full documentation on Osmose use and operation.

The current version of this document can be found online in the Resources section of www.HakenAudio.com. It is also included in the latest firmware release file set under "User Guides" and available in the EaganMatrix Cogwheel pull down menu. We suggest "Slim" Continuum Fingerboard owners read this guide at least up to Section 10. ContinuuMini owners should consult section 16. The knowledge you gain will save you time in the future and significantly enhance your experience with your Continuum Fingerboard or ContinuuMini. After you finish reading this guide, please keep it available as a reference.

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IMPORTANT!

The analog audio/headphone output of the Continuum Full Size and Half Size models and ContinuuMini, and dedicated headphone output of the "Slim" Continuum models is a TRS stereo (unbalanced) connection. DO NOT use a mono TS audio cable to connect to this output. Damage to the analog circuitry can be caused by doing this for an extended time period. Refer to the hook up diagrams in Section 12 for proper Continuum Fingerboard connections.

Current Versions

Always use the current version of the Editor to Upgrade firmware. For example, if you are upgrading to 9.55 from an earlier version, always use the 9.55 editor to perform the upgrade. Always consult Haken Audio before upgrading a 3x or 5x Half or Full Size Continuum Model.

The EaganMatrix Module must run Haken Audio firmware version 9.85 or greater (currently 9.85 is for the EaganMatrix Module only). Never attempt to install an earlier version prior to this on the module. The EaganMatrix module contains some presets not intended to be run on Continuum or ContinuuMini that output a high amplitude constant sound as many Eurorack oscillators.

The current Continuum and ContinuuMini version is 9.55. Firmware installation instructions are detailed below.

Table of Contents

1.0 OVERVIEW OF THE CONTINUUM FINGERBOARD 8

1.1. THE PLAYING SURFACE 8
1.2. THE EAGANMATRIX 9
1.3. WHAT SETS THE CONTINUUM FINGERBOARD APART 10

2. HAKEN AUDIO HARDWARE 11

2.1. THE CONTINUUM FINGERBOARD 11
2.2. THE CONTINUUMINI 12
2.3. THE CONTINUUM VOLTAGE CONVERTER (CVC) 14

3. HISTORICAL CONTEXT 15

3.1. CONTINUUM "TOUCH AREA" 15
3.2. FAST CONTINUOUS-PITCH PLAYING 16

4. MIDI ENCODING 18

4.1. ENCODING PRINCIPLES OF THE CONTINUUM FINGERBOARD 18
4.2. CONNECTING AN EXTERNAL MIDI SYNTHESIZER 19
4.3. SPECIALIZED KYMA ENCODING 21

5. CONNECTIONS & SPECIFICATIONS 22

5.1. I/O CONNECTIONS FOR THE "SLIM" CONTINUUM FINGERBOARD 22
5.2. LEFT AND RIGHT PANELS OF THE FULL-SIZE AND HALF-SIZE CONTINUUM FINGERBOARD 23
5.3. EAGANMATRIX EURORACK MODULE 25
5.4. HARDWARE SPECIFICATIONS FOR CONTINUUMS AND CONTINUUMINI 26
5.5. HAKEN AUDIO PRODUCT COMPARISON CHART 27

6. OPERATING THE CONTINUUM FINGERBOARD 28

6.1. TURNING ON THE CONTINUUM FINGERBOARD 28
6.2. PLAYING THE CONTINUUM FINGERBOARD 28
6.3. MONO (MULTIPLE FINGERS COMBINED CREATE A SINGLE NOTE) 30
6.4. ROUNDING, PITCH TABLES, AND THE PITCH TABLE EDITOR 33
6.5. PEDAL JACKS 36
6.6. KENTON MINI CONTROLLER AND KENTON USB MIDI HOST 37
6.7. ARTURIA BEATSTEP AND BEATSTEP PRO 40
6.8 ANCKORAGE CONTINUUM REMOTE SUPPORT 42

7. CALIBRATION OF THE CONTINUUM FINGERBOARD 43

7.1 REFINING CALIBRATION USING THE HAKEN EDITOR 43
7.2 REFINING CALIBRATION USING FRONT PANEL ("SLIM" CONTINUUM) 43
7.3 REFINING CALIBRATION USING THE OVERLAY STRIP (HALF-SIZE & FULL SIZE CONTINUUMS) 44
7.4 DISCARDING CALIBRATION 44
7.5 ACTUATION – ADDRESSING STUCK NOTES AND SENSITIVITY ON "SLIM" CONTINUUMS 44

8. INTRODUCTION TO THE HAKEN EDITOR (WITH POST 9.55 FEATURE SUMMARY) 45

8.1. SETTING UP THE HAKEN EDITOR 52
8.2. USING THE HAKEN EDITOR 54
8.3. HAKEN EDITOR SHORTCUTS 57
8.4. CURRENT PRESET AND SELECTING SYSTEM PRESETS 57
8.5. OPEN AND SAVE USER PRESETS IN THE EDITOR 61
8.6. USER PRESET SLOTS AND PRESET GROUPS (SELECTING, SAVING & STORING PRESETS) 63
8.7. OPEN A PRESET GROUP FILE 64
8.8. SAVE A PRESET GROUP FILE 66
8.9. CEE COMBINATION PRESETS (PRIMARILY INTENDED FOR 6X PROCESSING CONTINUUMS) 68
8.10. DESIGNING SOUNDS FOR THE CONTINUUM FINGERBOARD AND CONTINUUMINI 77

9. CONTINUUM CONFIGURATION AND CONTROL WITHOUT USING THE HAKEN EDITOR 78

9.1 INTRODUCTION TO THE FRONT PANEL DISPLAY AND CONTROLS ("SLIM" CONTINUUMS) 78
9.2 INTRODUCTION TO THE OVERLAY STRIP (HALF-SIZE AND FULL-SIZE CONTINUUMS) 88

10. CONFIGURATION OPTIONS 88

10.1. LEVELS (PRE AND POST) – NEW TO 9.53 (AND LATER) FIRMWARE 89
10.2. INTERNAL SOUND (LOAD SYSTEM PRESET) 90
10.3. MIDI PROGRAM, MIDI ROUTING 91
10.4. CONTINUUM VOLTAGE CONVERTER (CVC) – ALSO APPLIES TO UCVC (WITH POLYPHONY LIMITATIONS) 93
10.5. (BASE) POLYPHONY 94
10.6. CHANNEL (NOTE) PRIORITY 96
10.7. X BEND 97
10.8. Y CONTROL 99
10.9. Z CONTROL 100
10.10. MIDI NOTE PROCESSING 101
10.11. MIDDLE C 102
10.12. SPLIT POINT AND SPLIT MODE 103
10.13. MONO FUNCTION AND MONO INTERVAL 105
10.14. ROUND INITIAL, NORMAL ROUNDING, RELEASE ROUNDING, ROUNDING VIA Y 107
10.15. ROUND RATE 109
TUNING (SELECT PITCH TABLE) 110
10.16. PEDAL 1 AND PEDAL 2 ASSIGNMENTS 111
10.17. **PEDALS MIN AND MAX RANGE** 113
10.18. OPTIONS 114
10.19. SEND 116
10.20. LOAD AND STORE (USER PRESET SLOTS) 117
10.21. COGWHEEL MENU 117
10.22. SURFACE DISPLAY 119
10.23. PITCH TRIM 120
10.24. ADDITIONAL OPTIONS 121

11. UPDATING FIRMWARE INTO CONTINUUM, CONTINUUMINI OR EAGANMATRIX MODULE 122

12. CONNECTING TO EXTERNAL HARDWARE AND THE EDITOR 124

12.1. ANALOG AUDIO ONLY ("SLIM" AND HALF-SIZE/FULL-SIZE MODELS) 125
12.2. DIGITAL AUDIO OUTPUT ("SLIM" AND HALF-SIZE/FULL-SIZE MODELS) 126
12.3. CONNECTING "SLIM" CONTINUUMS TO GENERATION 1 AND GENERATION 2 CVCS 127
12.4. ANALOG AUDIO AND CVC 128
12.5. DIGITAL AUDIO AND CVC 129
12.6. ANALOG AUDIO AND CEE (FOR HALF-SIZE/FULL-SIZE + CEE OWNERS ONLY) 130
12.7. DIGITAL AUDIO AND CEE (FOR HALF-SIZE/FULL-SIZE + CEE OWNERS ONLY) 131
12.8. ANALOG AUDIO, CVC AND CEE (FOR HALF-SIZE/FULL-SIZE + CEE OWNERS ONLY) 132
12.9. DIGITAL AUDIO, CVC AND CEE (FOR HALF-SIZE/FULL-SIZE + CEE OWNERS ONLY) 133
12.10. CONNECTING A SOFTSYNTH 134
12.11. CONNECTING TO KYMA (MAC) 135
12.12. CONNECTING TO KYMA (PC) 136
12.13. CONNECTING MIDI KEYBOARD, CONTINUUM AND KYMA (MAC) 137
12.14. CONNECTING MIDI KEYBOARD, CONTINUUM AND KYMA (PC) 138
12.15. CONNECTING TO EXTERNAL MIDI SYNTHESIZER THROUGH HAKEN EDITOR 139
12.16. CONNECTING A KENTON CONTROLLER WITH COMPUTER 140
12.17. CONNECTING A KENTON (OR OTHER) CONTROLLER STANDALONE (NO COMPUTER) 141
12.18. USING A BEATSTEP OR BEATSTEP PRO WITH COMPUTER 142
12.19. CONNECTING A BEATSTEP STANDALONE (NO COMPUTER) 143
12.20. CONNECTING MULTIPLE USB CONTROLLERS STANDALONE (NO COMPUTER) 144
12.21. PROCESSING DIGITAL SOUND (AES) THROUGH CONTINUUM/EAGANMATRIX 145

12.22. USING MULTIPLE EAGANMATRIX INSTRUMENTS WITH EDITOR 146
12.23. USING CONTINUUM AS A DSP PROCESSOR 147
12.24. CONNECTING AN IOS APP TO CONTINUUMINI (USB HOST BASED CONTINUUM CONNECTION) 148
12.25. CONNECTING AN IOS APP TO HALF OR FULL SIZE CONTINUUM THROUGH BLUETOOTH INTERFACE 149
12.26. CONNECTING AN IOS APP TO CONTINUUMINI OR SLIM CONTINUUM THROUGH BLUETOOTH INTERFACE 150
12.27. CONNECTING A CONTINUUMINI TO EVATON TECHNOLOGIES UCVC 151
12.28. PLAYING ANIMOOG Z (OR OTHER BLUETOOTH CONNECTED APPLICATION) WITH CME WIDI UHOST OR WIDI JACK 152
12.29. USING SENSEL MORPH WITH CONTINUUMINI (OR CONTINUUM) 153
12.30. USING MULTIPLE MPE EXTERNAL CONTROLLERS (I.E. TWO SENSEL MORPHS) WITH CONTINUUMINI ... 154
12.31. USING THE EAGANMATRIX MODULE WITHOUT COMPUTER CONNECTION 155
12.32. USING THE EAGANMATRIX MODULE SOLELY THROUGH EURORACK CV CONTROL 156

13. HARDWARE MAINTENANCE FOR THE CONTINUUM FINGERBOARD 157

13.1. CLEANING 157
13.2. SURFACE ALIGNMENT (HALF-SIZE AND FULL-SIZE MODELS ONLY) 157
13.3. CONTINUUM FINGERBOARD HARDWARE PROBLEMS 158
13.4. SENSOR STUCK ON, OR SENSOR INTERMITTENTLY TURN ON 159
13.5. SENSOR STUCK OFF – SCAN FILE 159
13.6. FACTORY CALIBRATION OF THE CONTINUUM FINGERBOARD 159
13.7. FACTORY ALIGNMENT OF THE "SLIM" CONTINUUM FINGERBOARD 160
13.8. DO - IT - YOURSELF REPAIRS AND ADJUSTMENTS (CONTACT HAKEN AUDIO) 161

14. PERFORMANCE CONTROLLER ASSIGNMENTS 162

14.1. SENDING MIDI PERFORMANCE VALUES TO THE CONTINUUM FINGERBOARD 162
14.2. RECEIVING MIDI PERFORMANCE VALUES FROM THE CONTINUUM FINGERBOARD 162
14.3. MIDI CC ASSIGNMENTS 162

15. CONFIGURATION CONTROLLER MIDI ENCODING ASSIGNMENTS 165

15.1. LOAD, STORE, AND LIST PRESETS – MIDI ENCODING 165
15.2. MIDI DEVICE COMPATIBILITY – MIDI ENCODING 167
15.3. X, Y, AND Z MIDI ENCODING 168
15.4. ROUNDING AND PITCH TABLE MIDI ENCODING 169
15.5. POLYPHONY, ROUTING, AND SPLIT MIDI ENCODING 169
15.6. PEDALS (SEE ALSO SECTION 14) MIDI ENCODING 170
15.7. MONO FUNCTION MIDI ENCODING 170
15.8. FIRMWARE VERSION AND CVC SERIAL NUMBER MIDI ENCODING 170
15.9. OTHER CONFIGURATION CONTROLLER MIDI CC ASSIGNMENTS 171

16. USING THE CONTINUUMINI 172

16.1. CONNECTING UP 172
16.2. THE CONTINUUMINI SEVEN SEGMENT DISPLAY 174
16.3 CONTINUUMINI LEVER 174
16.4 PRESET DISPLAY 175
16.4. CONNECTING TO THE EAGANMATRIX (HAKEN EDITOR) 175
16.5. PLAYING THE CONTINUUMINI 176
16.6 OCTAVE BUTTONS AND CONTINUUMINI RANGE 178
16.6. MENU SYSTEM OPTIONS AND PRESET SELECTION 179
16.7. CVC CONNECTION AND SETUP (USED WITH "I2C" SETTING = 1) 183
16.8. PITCH REFERENCE 185
16.9. CONTINUUM VS. CONTINUUMINI PRESETS AND USAGE 186
16.10. USE OF PEDALS AND SYSTEM PRESETS ON THE CONTINUUMINI 187
16.11. ERROR CODES 187
16.12. USING THE CONTINUUMINI IN PARALLEL WITH A HALF OR FULL SIZE CONTINUUM 188
16.13 PLAYING THE CONTINUUMINI FROM AN EXTERNAL MIDI CONTROLLER THROUGH EAGANMATRIX 189

16.14. Monophonic vs. Duophonic vs. Polyphonic MPE ContinuuMini Operation 190
16.15. Playing the ContinuuMini from the Continuum (or another MPE controller) 193
16.16. Playing the Continuum from the ContinuuMini 194
16.17. Playing the ContinuuMini from Other MPE/non-MPE MIDI Controllers through the EaganMatrix 195
16.18. Playing the ContinuuMini Directly from Another Source 196
16.19 Connecting the Anckorage Spring Sound App to the ContinuuMini 197
16.20 Connecting without Computer - Reliably 198
16.21. Recording the ContinuuMini with a DAW for processing and playback 199
16.22. ContinuuMini Troubleshooting Use Cases 200
16.23. ContinuuMini Factory Calibration 207

17. "SLIM" CONTINUUM TROUBLE SHOOTING 210

17.1 Powering Issues & Booting 210
17.2 Haken Editor will not connect or does not display as expected 210
17.3 Presets do not display Categories as Expected after firmware Upgrade 211
17.4 I cannot record Audio through the USB MIDI Interface 211
17.5 I can't figure out how to get my CVC (or uCVC) to work. 211
17.6 I can't get the Continuum to work with my DAW as expected (especially on Windows PC) 211
17.7 My Kenton "KillaMix" USB Controller does not work 214
17.8 My BeatStep (or other USB Controller) does not work 215
17.9 How do I connect a Linnstrument to my Continuum 215
17.10 The Continuum surface does not respond as expected 215
17.11 The LED display looks like I am playing it but I am not 215
17.12 The Continuum makes no sound or sounds very faint. 216
17.13 The Digital Audio I/O does not work 216
17.14 After Loading New Firmware my custom presets are gone 216
17.15 I Do Not Seem to be Getting the Stereo Separation I Expect 216
17.16 I Can't Connect my Expressive-E Touche Controller to the Slim without a Computer 217
17.17 I Can't Seem to Upgrade my Slim using my Mac 217
17.18 My Editor keeps disconnecting from the Continuum over USB 217
17.19 Firmware starts loading but never finishes or aborts with an error message 217
17.20 Audio (AES) Inputs do not seem to work in the Matrix for Continuum 218
17.21 My Kenton USB Midi Host is not Working as Expected 218
17.22 Can I use a MIDI-CV Converter with the Slim instead of a CVC? 218
17.23 I can't seem to get rid of Noise or Hum from the Audio Output Port 218
17.24 I tried upgrading to 9.x or later from 8.x or earlier and my Continuum doesn't work now 219
17.25 I have stuck notes after upgrading firmware on my Slim model 219
17.26 I Keep Getting DSP Messages and Possibly Can't connect Editor 219
17.27 Some Presets Sound Distorted 219
17.28 I get "Something is Fishy" Messages when updating firmware 219
17.29 Presets don't seem to be displayed correctly or Preset Categories are Missing 220
17.30 When recording Y in a DAW I get unexpected curves 220
17.31 When working on big presets in EaganMatrix I can't type in any more values 220
17.32 The Slim USB connection sometimes disconnects with the Haken Editor 220
17.33 My fingers do not Seem to be detected when playing the Slim Fingerboard 220
17.34 Can't run two Haken Editors at the same time 221
17.35 TRS Mini Midi Jacks not outputting as expected to external Synth or Eurorack 221
17.36 Connecting two computers to ContinuuMini (or Slim Continuum) USB for Midi Control 221
17.37 Editor comes up with blank screen – Especially on Upgrading MAC OS 222

18. SUPPORT AND CREATING DEBUG FILES FOR SUPPORT 222

18.1 Creating a Max Console Hardware Log 222
18.2 Creating a Continuum Profile 223
18.3 Scan Files (Continuum and Slim Continuum Only) 223

19 EAGANMATRIX (EURORACK) MODULE 224

19.1 EAGANMATRIX MODULE OVERVIEW AND CONNECTIONS 224
19.2 CONNECTING AND POWERING YOUR EAGANMATRIX MODULE 225
19.3 INITIAL SETUP AND USE 226
19.4 EAGANMATRIX MODULE CONTROL AND DISPLAY FUNCTIONS 227
19.5 W, X, Y, Z BUTTONS 230
19.6 W, X, Y AND Z CV INPUTS 233
19.7 MACRO CONTROLLER OFFSET BUTTONS (I, II, III, IV) 238
19.8 MACRO CONTROLLER CV INPUTS (I, II, III, IV) 240
19.9 PRESET SELECTION AND DISPLAY 241
19.10 SAVING CURRENT PRESET TO A USER PRESET POSITION ON THE MODULE 243
19.11 SAVING CURRENT PRESET USING THE HAKEN EDITOR 243
19.12 OCTAVE SHIFTING 244
19.13 PERFORMANCE MODE PITCH DISPLAY 245
19.14 ROUNDING DISPLAY 246
19.15 CV INPUT VOLTAGE CALIBRATION A/D (ANALOG TO DIGITAL CONVERTER) 247
19.16 EAGANMATRIX MODULE CONFIGURATION (MENU SYSTEM) 247
19.17 EAGANMATRIX MODULE USE CASES 252

20 EAGANMATRIX MODULE TROUBLESHOOTING 265

20.1 THE VOLUME OUTPUT BY THE EM MODULE SEEMS TOO LOW 265
20.2 I DON'T GET SOUND AS EXPECTED WHEN CONNECTING CV TO W, X, Y AND Z 265
20.3 EDITOR MACRO CONTROLLERS DON'T WORK WHEN USING THE EM MODULE 266
20.4 EXTERNAL AUDIO PROCESSING USING PR PRESETS DOES NOT SEEM TO WORK 266
20.5 CONTROL VOLTAGE INPUT DOES NOT WORK AS EXPECTED 266
20.6 UNEXPECTED OPERATION WHEN MIDI CONNECTED 266
20.7 CAN'T CONNECT TO DAW AND EDITOR AT THE SAME TIME THROUGH USB MIDI 267
20.8 CAN'T FIGURE OUT HOW TO PLAY TWO SOUNDS AT ONCE (POLYTIMBRAL SPLITS) 267
20.9 THE MODULE IS OUT OF TUNE 267
20.9 BLANK EDITOR SCREEN OR PROBLEMS USING EAGANMATRIX MODULE WITH CONTINUUM & USB 268
20.10 I HAVE FIRMWARE LOADING ISSUES WITH TWO EAGANMATRIX MODULES 268
20.11 I CAN'T SEEM TO SWITCH BETWEEN TWO EAGANMATRIX MODULES IN THE EDITOR 268
20.12 THE HAKEN EDITOR DOES NOT COME UP CORRECTLY (YOU GET BLUE LED CONNECTION) 269
20.13 THE MAHLING PHRASE AND ADDITIVE BANK DATA SEEMS CORRUPTED OR MISSING 269
20.15 I LOADED THE WRONG FIRMWARE ON EAGANMATRIX MODULE (PRE 9.8X) AND ITS SHOWS "DSP" 270

21 CONNECTING THE HAKEN EDITOR & FIRMWARE UPDATE 270

21.1 FIRMWARE UPDATE PROCEDURE IN HAKEN EDITOR: 272
21.2 FINE TUNE EDITOR CONTROL (CHECK AFTER FIRMWARE UPDATE) 275

22 PLAYING TO/FROM EXTERNAL MIDI CONTROLLERS AND PLUGINS/DAWS 275

22.1 PLAYING WITH USB CONTROLLERS WITHOUT A COMPUTER CONNECTION 278

23 APPENDIX 1 - CURRENT EAGANMATRIX PRESETS AS OF FIRMWARE TBD 280

1.0 Overview of the Continuum Fingerboard

1.1. The Playing Surface

The Haken Audio Continuum Fingerboard tracks the position and pressure of fingers on its playing surface. Unlike a Midi keyboard, which only starts and stops notes, the Continuum Fingerboard lets the performer intimately interact with the sound throughout every note, breathing life and expression into the musical performance.

The Continuum Fingerboard is neither an easy-to-use gadget nor a device for replacing electronic or acoustic instruments; instead, it is a new instrument in its own right, with immediate appeal as well as lifelong challenges for the serious musician.



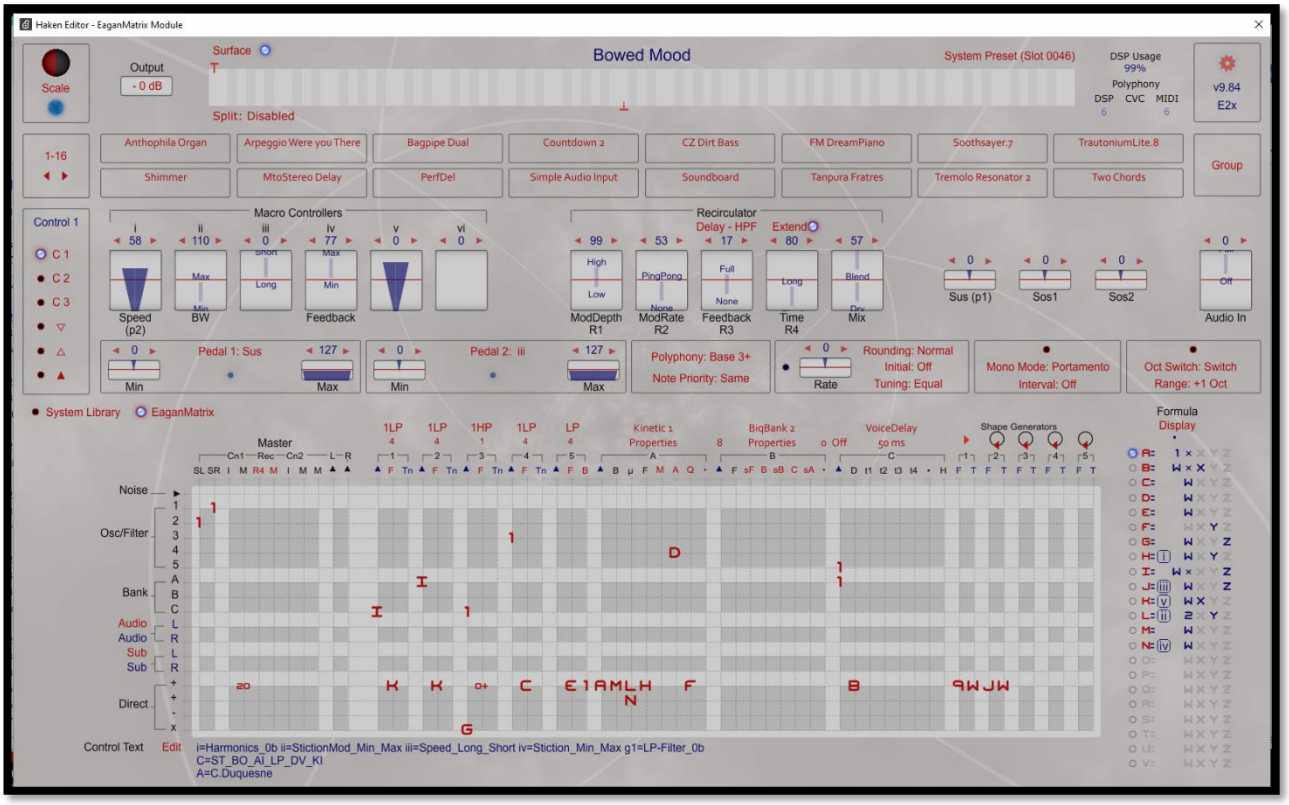
The Continuum Fingerboard has a built-in synthesizer specifically designed for Continuum playing. The internal synthesizer has predefined sounds as well as the ability to create user-defined sounds. Stereo output from the internal synthesizer can be heard through the high quality analog output (stereo line level and headphone level) as well as the AES digital audio outputs.

All Continuum Fingerboards share the same sensing technology and differ only in playing surface size, form factor and connection/interface types. The ContinuuMini is a much smaller device, sharing the same synthesis technology but simplified finger sensing. The ContinuuMini can track the pitch of only one or two fingers.

The Haken Editor application (for Mac and Windows), connects to the Continuum Fingerboard, ContinuuMini, EaganMatrix Module and Osmose keyboard via Midi. The Continuum Fingerboard and Osmose keyboard performance data can control external synthesizers via Midi, or (for Continuum and ContinuuMini) analog modular synths via the Continuum Voltage Converter (option).

1.2. The EaganMatrix

The EaganMatrix is the modular digital synthesizer built into the Continuum Fingerboard, ContinuuMini, EaganMatrix Module and Osmose keyboard – all programmed though the Haken Editor.



For the Performer

Many new sound algorithms have been finely-crafted with the EaganMatrix. These EaganMatrix Presets exploit the unprecedented control possible with the Continuum Fingerboard. They provide the performer with an ever-increasing set of sophisticated sound environments to shape and explore using novel finger techniques.

Note: Continuum and Osmose presets are in large part compatible, however, some adjustments need to be made to port a preset from one to the other due to differences in Y and Z usage. See the EaganMatrix Preset Porting Guide section in the EaganMatrix Manual for more information.

For the Sound Designer

Not only does the EaganMatrix provide a large number of system presets for the performer, but it is also a fantastic tool for the sound designer. The Haken Editor provides the EaganMatrix user interface. Since the EaganMatrix requires no external synthesizer other than normal Continuum, EaganMatrix Module or Osmose connection, sound designs can easily be shared with other Continuum Fingerboard and Osmose keyboard players.

The radically new design of the EaganMatrix requires the sound designer to think in a mathematical way that is different from traditional hardware and software synthesizers. A large variety of traditional and non-traditional sound generation functions are built into the EaganMatrix allowing for the generation of an incredibly large sonic palette using many different kinds of synthesis. As the sound designer masters the EaganMatrix, its novel capabilities will allow creation of musically satisfying relationships between fingers on the playing surface and the sounds produced, relationships that rival the warmth and complexity of acoustic instruments. For more information, please see the EaganMatrix User's Guide available in the Resources area at www.HakenAudio.com.

1.3. What Sets the Continuum Fingerboard Apart

The Continuum Fingerboard has been under development since the 1980s, culminating in the Continuum Fingerboard with Light Action. In recent years, the idea of "Expressive Controllers" and "Expressive Midi" have been popularized, and many devices based on inexpensive sensing technologies have hit the market. As a result, there is much confusion of the capabilities of the Continuum Fingerboard compared to other "Expressive Controllers".

These are five key features of a Continuum Fingerboard with Light Action that set it apart from other "Expressive Controllers":

1. The Continuum Fingerboard has unparalleled temporal resolution. This means it has quick response to user actions. The Continuum Fingerboard hardware does a complete scan of all of its sensors several times per millisecond, and this is evident in the resulting sound when a skilled player performs well-designed presets.

2. The Continuum Fingerboard has unparalleled pressure resolution. The pressure resolution is up to 15 bits in long sustained notes, allowing tiny pressure-related timbre changes, and detailed pitch trajectories in pressure-weighted portamentos, not possible on any other electronic instrument.

3. The most important part of a note (from a psychoacoustic perspective) is the attack. On the Continuum Fingerboard, the detailed pressure trajectory of the finger is tracked and reported, and the details of the attack shape allow an experienced player to intricately control the sound in that all-important part of each note. Other "Expressive Controllers" encode the attack as a single 7-bit number, called the "strike value." This 7-bit "strike value" is used to trigger envelopes; the fine structure of the real attack is lost, and attack details are automated just as they are with Midi keyboards. In contrast to this single value, the Continuum evaluates a high speed stream of surface data which can effectively encode the complex trajectory of an attack.

4. On the Continuum Fingerboard, you can roll your finger slightly to create beats in intervals, or make the beats melt away. Precise pitch requires accuracies of position (center of finger) of about 30 microns, or put another way, accuracies to 1/500th of a semitone. The Continuum Fingerboard alone makes it possible to play each note with this micro-tuned pitch accuracy from beginning to end. The Continuum Fingerboard alone allows for perfect fifths, perfect fourths, exact major thirds, etc. (standard performance technique in acoustic string instruments and vocal choral ensembles) — exact finger placement allows a skilled performer to play all intervals in a piece with perfect frequency ratios or slide in and out of perfect ratio during notes. We have become accustomed to the strictly quantized 12-pitches-per-octave music in the synth world, but any good singer, string player, woodwind player, etc. adjusts each note's pitch to fit what is going on.

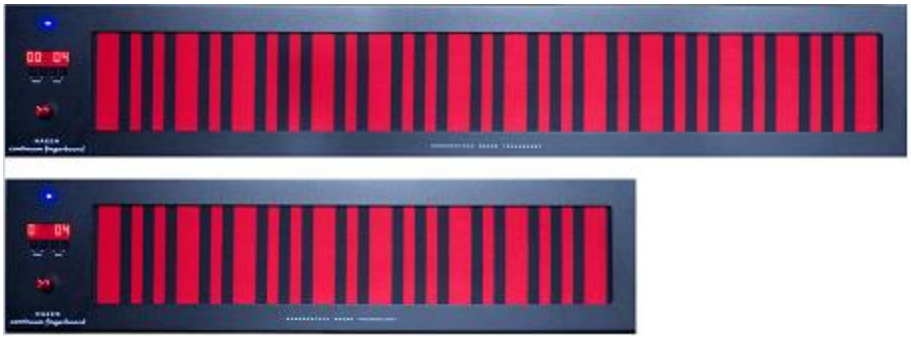
5. The EaganMatrix synthesizer developed for the Continuum Fingerboard is far beyond any other synthesizer in how it uses finger information to affect the sound. Other "Expressive Controllers" use standard synth designs with simple parameter mappings (both in their own device and in controlling other third party synths) but those cannot give the depth of interaction between the finger motion and the sonic result that is possible with the EaganMatrix. In acoustic instruments, performer's motions have a complicated effect on the timbre, and this is much of what makes an acoustic instrument interesting to listen to for many hours. Nobody would listen to a single synth patch for very long if there is no interesting fine-structure control, it gets boring quickly, and synths make up for this shortcoming by playing lots of different timbres. Other "Expressive Controllers" do not solve this problem as well as the Continuum Fingerboard does.

Conventional wisdom assumes fast live performance is not possible on a continuous pitch instrument like the Continuum Fingerboard, because it is too difficult to place fingers accurately quickly enough. This is incorrect; please see Section 3. Playing fast passages as well as playing slow passages expressively on a Continuum Fingerboard will require much practice. An acoustic instrument requires extensive skills and musicianship to create an expressive performance; it should be expected that the same is true for an electronic instrument. The Continuum Fingerboard should not be seen as a way to replace other instruments or to "make it easy" (thereby deskilling the

musical performance process); the Continuum Fingerboard has been designed to give the skilled performer the depths of expression and capabilities found in a fine acoustic instrument.

2. Haken Audio Hardware

2.1. The Continuum Fingerboard



"Slim" Continuum Fingerboards – 70 and 46 Half-Step Size Models

The Continuum Fingerboard has been under continual development since the 1980's. Early versions used many different sensing technologies. By the 1990's experience showed that an electromechanical system involving magnetic technologies provided the most accurate way to track tiny movements of multiple fingers. By the early 2000's, the nylon-manufactured-into-neoprene over the electromechanical sensing system was found to give the best surface feel and consistent tactile feedback. Five years later, Continuum Fingerboards incorporated a custom-designed DSP board to scan the sensors, synthesize internal sounds, and do I/O.

In more recent years all Continuum Fingerboards incorporate a "Light Action" playing surface, made possible by a combination of state-of-the-art sensor technologies (super-sensitive Hall-effect sensors), as well as state-of-the-art precision-machined mechanical components, underneath the layer of neoprene. Continuum Fingerboards with "Classic Action" were already the most sensitive electronic instrument in existence. The "Light Action" playing surface has extended the Continuum Fingerboard's pressure sensitivity, pitch accuracy, and temporal resolution even further.

Since the middle of 2016 until 2020, Continuum Fingerboards shipped as "L2x" (Light Action with a double-processing-power DSP), or as "L6x" (Light Action with Continuum EaganMatrix Expansion (CEE) for a total of three double-processing-power DSPs). As of late 2018, ContinuuMinis are shipping as "M2x". Other configurations are possible, such as the "C1x" (Classic Action with single-speed processor, no longer manufactured). What is in a particular Continuum Fingerboard can be identified by running the Haken Editor and noting the System Identifier.

All "Slim" Continuums Fingerboards and Osmose keyboards have 6x processing power (they all have a Light Action surface a total of three double-processing-power DSPs). All ContinuuMinis and Eurorack EaganMatrix Modules have 2x processing power (one double-processing-power DSP). Between mid-2016 until 2020, Full-size and Half-size Continuum Fingerboards shipped as "L2x" (Light Action with a double-processing-power DSP), or as "L6x" (Light Action with EaganMatrix Expansion for a total of three double-processing-power DSPs). Prior to 2016 other configurations were built, such as the "L1x" (Light Action with single-processing-power DSP) and "C3x" (Classic Action with three single-processing-power DSPs). What is in a particular Continuum Fingerboard can be identified by running the Haken Editor and noting the System Identifier.

The Continuum uses a system identifier to easily note its size and processing power that can be viewed in the Haken Editor next to the "DSP Usage" display. Current firmware version installed also appears in this area.



This System Identifier is coded as XXYZZ, where XX (70 here) is the number of half-steps on the playing surface; ***Y=*****"s"** *(Slim),* **"o"** *(Osmose),* **"M"** *(ContinuuMini),* **"E"** *(EaganMatrix Eurorack Module),* **"L"** *(Light Action Half-size or Full-size Continuum),* **"C"** *(Classic Action Half- or Full-size Continuum); and* ***ZZ*** *= Processing power (1x, 2x, 3x, 4x, 5x, or 6x.)*

Note: Prefix 70, 46, 29, etc. indicates number of half steps supported on the fingerboard. The complete current model list is (96 and 46L models may have varying processing power indications):

94U6x – Full-size "thick" Continuum with upgrade board

46L6x – Half-size "thick" Continuum with Light Action and three 2x DSP boards built in

94C1x – Full-size "thick" Continuum with Classic Action (6x upgrade not supported)

49o6x – Osmose

70s6x – Slim70 (6x processing models)

46s6x – Slim46 (6x processing models)

29m2x – ContinuuMini

E2x – EaganMatrix Module (no playing surface but can be played by other Continuum models)

"Slim" Continuum Fingerboards incorporate a 1.2" depth low profile form factor versus the earlier Half- and Full-size Continuum models (ca. 2.75" depth). See HakenAudio.com for more information on currently available Continuum Fingerboards, ContinuuMinis, and EaganMatrix Eurorack Modules. See ExpressiveE.com for information on the Osmose keyboard.

2.2. The ContinuuMini



Original ContinuuMini and Updated Model – Identical to Original with Optional (Screw On) Touch Lever

The ContinuuMini has been designed to be a portable and more affordable version of Haken Audio's larger Continuum Fingerboards. The ContinuuMini is fun to play, has the same sound engine as the larger Continuums, and delivers its own unique and rewarding musical performance experience.

The ContinuuMini has exactly the same sound engine as the full-sized 2X DSP Continuum Fingerboard, delivering the same level of sound quality that Continuum owners have come to enjoy with 2x DSP processing support (a limited number of Continuum 6x DSP features are not available on 2X ContinuuMini and EaganMatrix Module products).

The playing surface of the ContinuuMini has been designed to translate finger movement from one or two fingers at a time into beautiful musical expression. While based on similar design philosophies as the Continuum Fingerboard, the ContinuuMini has its own unique playing experience. The Mini's playing surface can respond to incredibly light touch, which leverages an underused aspect of human control, the ability of the hand to deliver delicate light touch finger input. Lighter than playing a piano, or strumming a guitar, or even lighter than the action of modern Midi keyboard controllers.



Every nuance of finger movement is captured and translated into sound through interaction with this highly-optimized playing surface. And complete control of the fully programmable EaganMatrix sound engine opens up a world of sonic possibilities.

Due to its robust bidirectional implementation of MPE and MPE+, the ContinuuMini can control external synths or be played by external Midi controllers.

The pedal input can be used as a continuous sustain pedal input, for dynamic sustain or a variety of other uses within the EaganMatrix.

The pedal input can also function as a bidirectional serial port. Currently this communicates with control voltage convertors, like Haken Audio's CVC or Evaton Technologies microCVC, useful for interfacing with analog modular systems. We're excited about the possibilities of future uses for this port, further harnessing the EaganMatrix engine in new and novel ways.

We are very proud of how we have been able to leverage our decades of hardware and software expertise into the ContinuuMini. The ContinuuMini fulfills a need for a small portable musical instrument that is intimate and expressive.

Information on using the ContinuuMini can be found in Chapter 16.

2.3. The Continuum Voltage Converter (CVC)



Second Generation Continuum Voltage Converter (works with all Continuum models)

Haken Audio's Continuum (Control) Voltage Converter is designed for use with analog control-voltage synthesizers. The CVC converts the polyphonic X (pitch), Y (front-back), and Z (pressure) outputs of the Continuum Fingerboard into control voltages and gates. Alternatively, user-defined preprocessed control voltages can be defined with the EaganMatrix.

A total of 16 unique continuous voltage streams are available from a CVC. It is capable, for example, of being configured to produce four separate sets of X, Y, Z and Gate outputs to drive a variety of modular systems playing four part harmony from the fingerboard.

The CVC may be used as a desktop device or mounted in a standard 19 inch rack with optional rack ears. The current second-generation CVC model is less deep than the first-generation model, but in all other respects is identical in function with the addition of a 3.5mm TRS I2C interface for connection to the "Slim" Continuum model's IC2 port. (See Section 12.3 for CVC connection options for the "Slim" Continuum.) The CVC can also be used with half-size and full-size Continuums using the five pin DIN I2C connection and a fully populated Midi cable (as unused Midi pins are used for the I2C connection).

"Slim" Continuums can also use the first-generation CVC and Evaton Technologies uCVC with a custom 3.5mm to DIN adapter available from Haken audio (or you can make your own – see section 16.7 as it's the same adapter used to connect the ContinuuMini to the first-generation CVC). The ContinuuMini connects to the second generation CVC with a standard 3.5mm TRS cable.

For more information, please see the CVC User's Guide available in the Resources area at www.HakenAudio.com.

3. Historical Context

Electronic music history can teach us about greater possibilities that are different from what current Midi instruments offer. Rather than discount historical instruments as "old", Haken Audio endeavors to revive lost skills and ideas, and build on them.

The two historical electronic music instruments most like the Continuum Fingerboard are the Ondes Martenot and the Trautonium. Like the Continuum, both the Martenot and the Trautonium have continuous pitch capabilities, and both have pitches arranged horizontally with constant cents-per-inch spacing.

The Martenot can only play one pitch at a time when it is played in continuous-pitch mode. The Continuum extends this to polyphonic continuous-pitch playing. Unlike the Martenot, where the right hand controls pitch and the left controls articulation, on the Continuum each finger controls both pitch and articulation of a note.

The Trautonium has two monophonic continuous-pitch manuals, and the right and left hands can play simultaneously on each manual. The Continuum extends the Trautonium's dual polyphony to higher polyphony; on the Continuum each finger can play its own note on the super-sensitive multi-touch surface. The ContinuuMini is more limited than the Continuum, and closer to Trautonium in implementation.

3.1. Continuum "Touch Area"



A Martenot player controlling amplitude with the left hand and continuous pitch with the right. The left hand is pressing the Martenot's Touché; the right hand is in front of the keyboard, moving the Martenot's ring for continuous pitch changes.

In certain performance situations, the Martenot's separation of right hand (pitch) and left hand (articulation) is advantageous. For such situations, the Continuum supplies a similar capability through a configurable "Touch Area". The Touch Area on the Continuum is a small user-definable (and programmable) area on the surface set aside for left hand articulation control; the rest of the surface is for playing notes. The articulation for each note may be totally controlled by this area, or articulation may be controlled by a combination of the Touch Area and the fingers of the right hand. Since playing Continuum with Touch Area control is very different from playing without it, sounds are specially designed for use with the Touch Area. A performer can use the Touché when playing polyphonically — the left hand affecting articulation for all the notes played with the right hand. The Continuum's Touch Area is more

sophisticated than the Touché on the Ondes Martenot; the Continuum's Touch Area responds more quickly, is more



accurate, and can control sound parameters in more complex ways.

The Continuum Touch Area can be placed anywhere on the Continuum surface, allowing for easy left or right handed control, though it normally is placed at the lowest end of the Continuum's playing surface.



The above graphic shows the Touch Area in its default position in the Haken Editor. It should be moved into the appropriate position for the Continuum model being used. Ranges of all Continuum Fingerboards are noted above, with the "Slim" models listed on top of the fingerboard graphic above.

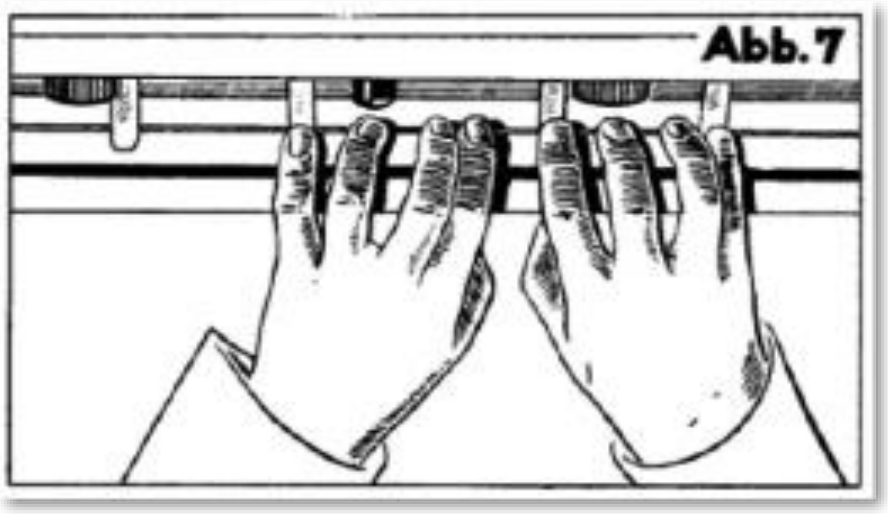
3.2. Fast Continuous-Pitch Playing

The Trautonium pioneered fast duo-phonic playing in a continuous-pitch electronic environment. This is a challenge, because continuous-pitch instruments require accurate finger placement, and it is hard to place fingers accurately while playing fast passages that cover several octaves.

Oskar Sala overcame this problem, as you can hear in his magnificent Trautonium performance of Genzmer's Rondo in 1940 https://www.youtube.com/watch?v=8g_3UfPEpsY. This recording is largely forgotten, or erringly discounted as must-have-been-faked by people that know of it.

The Oskar Sala Mixtur-Trautonium,
played in the 1940 recording of Genzmer's Rondo.

The same techniques Oskar Sala used to play fast passages can be used on the Continuum Fingerboard, by a performer willing to practice extensively and attain advanced playing skills. Oskar Sala's technique is built on three ideas:



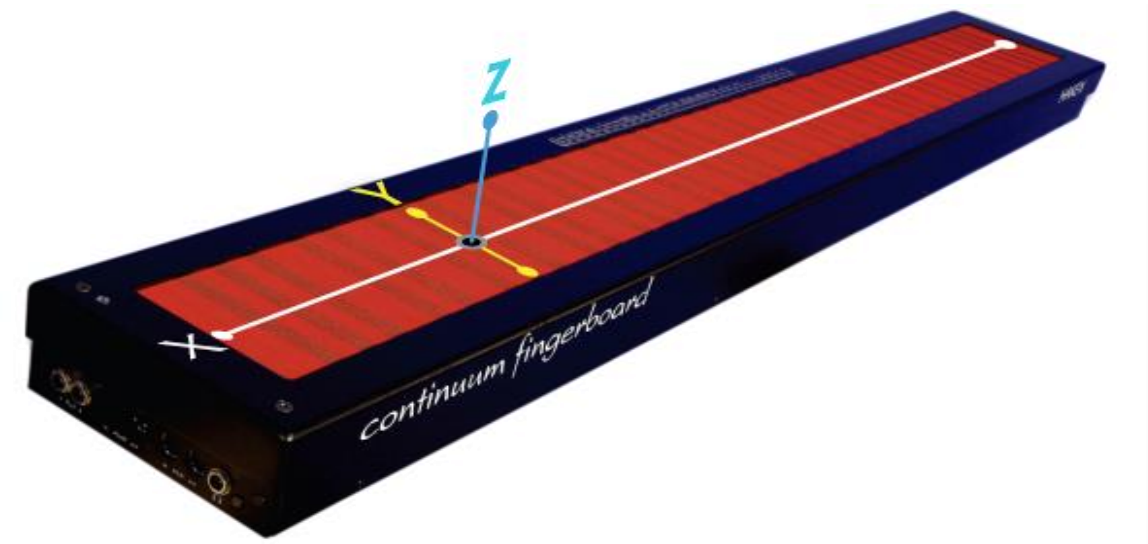
(1) The image above is from the 1933 Trautonium User's Guide (in German: "Trautoniumschule"). Notice how the fingers are positioned for a major scale; the left-hand pinky is on the tonic of the scale. This could be any major scale; all major scales have this same spacing between fingers. To change major scales, the hands only need to be moved left or right to a different tonic. Since 7 fingers are required for the 7 notes in an octave, this technique requires both hands to cover an octave (5 fingers will not suffice).

(2) The performer 'parks' fingers in position for the micro-tuned pitches of one octave and can play any note in that octave without moving the hands. The hands stay in one position for the duration of the fast passage; only vertical finger movement is required to play each note in the passage. Octaves are switched with a Tri-Value pedal. The Tri-Value pedal has three positions: at rest, up one octave, and down one octave. The Continuum Fingerboard's Tri-Value pedal is a *custom-wired* Linemaster 476-S (Haken Audio no longer sells these but you can order and wire your own – see section 6.5). The Continuum improves on the Trautonium by requiring much less vertical finger motion to play a note, much finer and faster articulation control, and higher polyphony — at the same time inheriting the Trautonium's capability of playing super-fast continuous-pitch passages.

(3) For uniform dynamics within the super-fast passage, use the "Legato TZ" mono mode (see Section 6.3).

4. Midi Encoding

4.1. Encoding Principles of the Continuum Fingerboard



The Continuum Fingerboard assigns each finger on the playing surface its own Midi channel. By default it tracks 8 fingers, using Midi channels 1-8. It may be configured to track between 1 and up to 16 fingers by using all 16 available Midi channels, 1-16. The ContinuuMini tracks the pitch of at most two fingers and is encoded in a similar way to the Continuum.

The Continuum Fingerboard tracks pitch (X), front-back position (Y), and pressure (Z) for each finger. The exact pitch of each finger is encoded as the nearest Midi note number to the initial position of the finger, plus the Pitch Bend on the finger's Midi channel. Note numbers range from 15 to 109 on a full-size Continuum Fingerboard, and from 39 to 85 on a half-size Continuum Fingerboard. Note number range can be changed by transposing or scaling the range of the Continuum Fingerboard. This is accomplished by selecting a new Middle C location (Section 10.11) or a custom Pitch Table (Sections 6.4 and 10.16). The default Pitch Bend range is eight octaves. The default encoding for finger pressure uses Midi Channel Pressure, and the default encoding for front-to-back uses Midi controller 74 (Brightness).

The Continuum Fingerboard's Midi encoding can follow the "Multidimensional Polyphonic Expression" (MPE) standard. As per the MPE standard, the Continuum uses controller 127 on channel 1 to specify polyphony, RPN 0 on channel 2 to specify bend range, and channels 2 through P+1 for notes (P is the polyphony).

MPE is very similar, but not exactly the same as, the Continuum Fingerboard's encoding that dates from 2001. You can customize the Continuum Fingerboard's Midi encoding if you are controlling a synth that does not support MPE. For example, you might configure Z as Midi controller 11 (Expression) rather than Channel Pressure. Also, you can configure the Continuum to use 14-bit pressure encoding (Section 10.9).

Continuum Fingerboard configuration changes may be made three ways: using the Haken Editor computer application (Section 8), using the Continuum Fingerboard's playing surface (Section 9), or by sending Midi configuration messages to the Continuum Fingerboard (Section 15).

4.2. Connecting an External Midi Synthesizer

In addition to playing internal sounds, you may want to connect your Continuum Fingerboard to an external Midi synthesizer. If your Midi synthesizer can do the "MPE" standard, simply load one of the MPE or MPE+ System Presets (in the "Midi" category of System Presets) in the Continuum, and set your Synthesizer to use MPE, and it should work. In practice, many synthesizers do not support MPE. This section will describe how to configure your Continuum without using MPE or MPE+.

To play polyphonically, the externally connected synthesizer should be capable of creating channelized voices, that is, Midi voices that are on discrete Midi channels. On some synthesizers this is called Multi-Timbral Mode. A requirement for the Continuum Fingerboard is that this multi-timbral aspect extends to any continuous controller that the Continuum is sending out to the synthesizer. Each continuous controller must affect only its own Midi channel and cannot affect other Midi channels. Each Continuum Fingerboard note contains channelized information in the X, Y, and Z directions, and that includes Midi Note information and continuous controller (Midi cc) information. The chart below shows the output of a Continuum Fingerboard that is set to four voice polyphony (not 4+), with a preset configured such that Y is sending out Midi cc74 and Z is sending out Midi cc11 (MPE/MPE+ is not set for Y or Z).

Voice Number	X (left to right)	Y (front to back)	Z (pressure)
1	Midi Note and Pitch Bend on Channel 1	Midi cc74 on Channel 1	Midi cc11 on Channel 1
2	Midi Note and Pitch Bend on Channel 2	Midi cc74 on Channel 2	Midi cc11 on Channel 2
3	Midi Note and Pitch Bend on Channel 3	Midi cc74 on Channel 3	Midi cc11 on Channel 3
4	Midi Note and Pitch Bend on Channel 4	Midi cc74 on Channel 4	Midi cc11 on Channel 4

If the Y/Z setting for the preset is set to MPE or MPE+, the Continuum or ContinuuMini will output on Midi channels 2 to max polyphony set+1, as MPE normally reserves channel 1 for configuration information. Also note that if you press monophonically, repeatedly articulating separate notes, each note will cycle through the available channel polyphony based on the Note Priority set.

If the connected external synthesizer is not capable of this kind of discrete channel operation, then it may not work well with the Continuum in a polyphonic sense. However, it is possible that it could be used very well monophonically; see Section 6.3.

Note that a special Channel 1 processing mode is now implemented if the preset is set to MPE+ or MPE mode. In this mode, the Continuum/ContinuuMini/EaganMatrix Module will still output on channels 2 to Max Polyphony +1, but it will accept polyphonic external input on channel 1. This is particularly useful when connecting an external non-MPE MIDI keyboard to the ContinuuMini which can only output duo-phonically from the playing surface. When connected, the external MIDI keyboard (or sequencer/controller) can play up to eight voice polyphony on the Mini on channel 1.

When you connect your Continuum Fingerboard to your synthesizer, you will need to configure both the Continuum Fingerboard and the synthesizer for optimal interface support.

The easiest way to properly configure an external synthesizer is to follow these two steps:

(1) Connect your synthesizer through the Haken Editor as an external input, so you can use the Editor and your synthesizer at the same time (see Sections 12.9 and 12.14). Make it work predictably and reliably with a polyphony setting of 1 both on the Continuum Fingerboard and the external synthesizer. Then, once this working well,

(2) Change polyphony on the synthesizer and the Continuum Fingerboard to match the multi-timbral capabilities of your external synthesizer.

For step one, configure your external synthesizer to respond to Midi channel 1. Set the maximum pitch bend range allowed with an equal value for positive and negative value pitch bends (some synthesizers allow different values for the two directions). Set a matching pitch bend range on your Continuum Fingerboard (Section 10.7).

If the default Channel Aftertouch for MPE/MPE+ presets is not supported, set the Continuum Fingerboard to send a Midi cc value for Z (Section 10.9) to something that will control an amplitude change in the external synthesizer, usually Midi cc11 or Midi cc07. Note this this will take the preset out of standard MPE/MPE+ mode.

If the default CC74 is not supported, set Y (Section 10.8) to a Midi cc value that typically controls a timbral shift in the synthesizer. This will also as above take the Continuum out of MPE/MPE+ mode. Setting either Y or Z to specific CC values will mean the Continuum's lowest MIDI output channel will be 1 (not 2 and in MPE/MPE+ modes) and the max output channel will be Max Polyphony (not Max Polyphony +1 as in MPE/MPE+ modes).

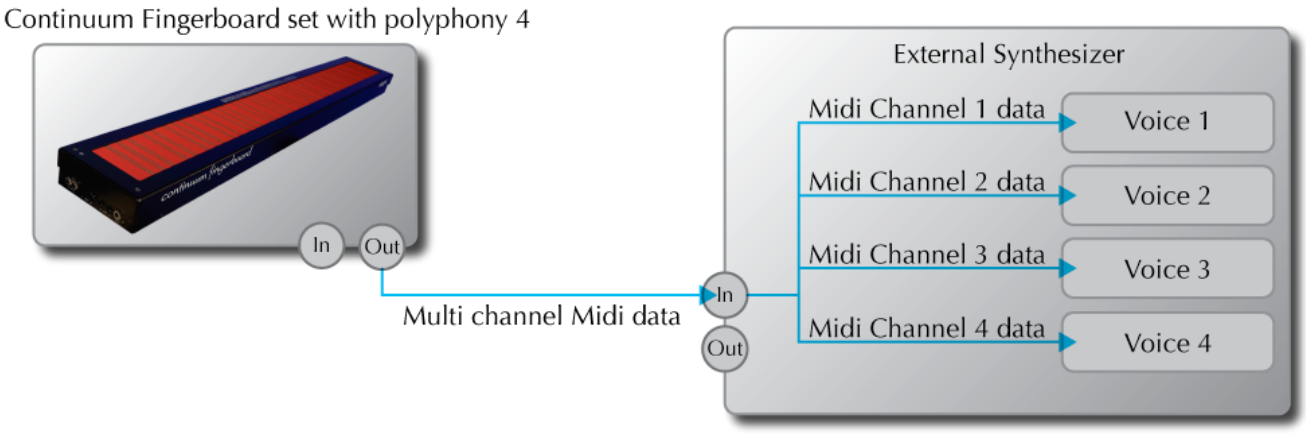
To confirm that pitch bend has been set up correctly, you can do the following test: Play an octave glissando on your Continuum Fingerboard. Then lift your finger and put it down again at the location where the glissando ended. The pitch you hear should match the ending pitch of the glissando. If it does not, pitch bend ranges are not configured to match each other correctly.

Play the synthesizer and confirm that the sound gets louder and quieter when the surface is pressed harder and softer, and that changes in the Y direction have a desired timbral shift effect. It is a good idea to read through Section 8.10 on further sound design considerations.

Once all of this is working as expected, increase the polyphony of the Continuum Fingerboard, and set a matching polyphony change on the synthesizer. This is where it can get confusing. Polyphony on an external synthesizer usually means number of simultaneous notes on a single Midi channel. Polyphony for a Continuum Fingerboard means number of Midi channels, each channel with a single Midi note, pitch bend and control values for Y and Z. This is a very important concept to understand.

The external synthesizer needs a multi-channel functionality to work correctly, such as the 4 channel example below (in this case set to non MPE/MPE+ mode):

For wiring information and diagrams, refer to Sections 12.9 and 12.14 of this User Guide.



4.3. Specialized Kyma Encoding

If you use Symbolic Sound Corporation's Kyma with your EaganMatrix based device, each finger's position and pressure is available in standard Kyma Midi-event values of !KeyPitch (left-to-right position), !KeyTimbre (front-to-back position), and !KeyVelocity (finger pressure). These values continually change as the fingers move. Note that !KeyPitch is Midi note numbers, with a fractional value to indicate exact finger position.



The start of each finger's placement on the Continuum Fingerboard surface is interpreted as a !KeyDown. Kyma will send Midi information back to the Continuum which will automatically configure the polyphony of the Continuum Fingerboard surface to match the currently playing Kyma sound. Kyma uses the default Continuum Fingerboard cc values for Y and Z and will automatically configure the Continuum accordingly.

It may be useful to smooth !KeyVelocity (finger pressure) when you use it in Kyma. Undesirable audible effects can be caused by the Continuum Fingerboard's scan rate, or the parameter updates at Midi transmission rate. Continuous event smoothing is available globally within the Kyma system preferences.

To get the quickest real-time response from Kyma, choose the shortest Overall System Delay that works for your Sound (also in the Kyma preferences).

See Section 10.10 for required Kyma-specific configuration, and Sections 12.10 through 12.13 for connection diagrams.

5. Connections & Specifications

ContinuuMini players may wish to skip to Section 5.4 and Section 16.0, as sections 5.1 and 5.2 are specific to the larger Continuum Fingerboards. Section 5.3 details connects to the EaganMatrix Module.

5.1. I/O Connections for the "Slim" Continuum Fingerboard

This section describes the connections for the "Slim" Continuum Fingerboard which has same internal processing and playing capabilities of the L6x Full and Half Size models in a lower profile form factor with slightly different connection options and a new onboard user display/control interface. It uses the same EaganMatrix sound engine and editor as the other continuums. Connections are made to the Continuum Fingerboard on only the left side of the instrument.



	Left End of Continuum Fingerboard
1	Power Inlet. (110V/220V 8 Amp Universal power supply included with purchase). Note: There is no power switch on the "Slim" model Continuums. They will power on and automatically boot when the 5VDC power supply is plugged into a wall outlet.
2	Pedal 1 input. Connect a standard passive switch, damper pedal, or passive continuous pedal using 1/4" TRS cable; see Section 6.5 for pedal details.
2	Pedal 2 input. Connect a standard passive switch, damper pedal, or passive continuous pedal using 1/4" TRS cable; see Section 6.5 for pedal details.
3	3.5 mm MIDI I/O. Universal Midi (Note: Slim Continuum supports TRS Type B Midi Output pin configuration and TRS A or TRS B for Midi input. Make sure you have the right adapter for your equipment. (Note: Not required to be connected if USB MIDI connection is being used – the preferred connection). Uses 3.5mm to MIDI DIN adapters (not included).
4	MIDI over USB (Note: MIDI Host required to play Continuum directly without a computer). A to B USB cable included with purchase. **Note: This is not an audio USB interface. You cannot record Continuum audio over this USB connection. You must connect the Continuum's audio outputs to a sound interface or mixer.**
5	I2C port for connection to the Continuum Voltage Converter (CVC). Uses 3.5mm TRS cable to the current CVC or custom 3.5mm TRS to DIN IC2 adapter (not included) if connecting to the Generation 1 CVC that only has Midi DIN ports.

	Left End of Continuum Fingerboard
6	Digital Audio I/O. 3.5m SPDIF Connections Uses RCA connectors assuming digital audio cable (not included).
7	Analog Mono audio Left and Right outputs. A standard 1/4" mono cable can be used. **To connect your Slim L and R analog output to equipment that uses UNBALANCED audio**: Use TS (MONO) 1/4 inch cables between the Slim L and R output and your equipment. Use high-quality cables that are as short as possible for best results. If you have only one speaker, connect only to the Slim L output; the Slim will detect this and automatically mono sum the signal. **To connect your Slim L and R analog output to equipment that uses BALANCED audio**: Use TRS 1/4 inch shielded cables (cables you would use for any high-quality BALANCED audio) between the Slim L and R output and your equipment.
8	Analog audio out, headphone level. TRS Stereo jack. **Note: Never connect a mono cable to this jack. Damage could result to the headphone circuitry.**
	Right End of Continuum Fingerboard
9	On/Off Switch

5.2. Left and Right Panels of the Full-size and Half-size Continuum Fingerboard

Connections are made to the Continuum Fingerboard on both the left end and the right end of the instrument.



	Left End of Continuum Fingerboard
1	LED. Normally dim blue. Changes color depending on configuration state, via interaction through the Haken Editor or the Red Button (9).
2	Pedal 1 input. Connect a standard passive switch, damper pedal, or passive continuous pedal; see Section 6.5 for pedal details.

	Left End of Continuum Fingerboard
3	Pedal 2 input. Connect a standard passive switch, damper pedal, or passive continuous pedal; see Section 6.5 for pedal details.
4	Digital audio input (AES3 format), and a high-speed link from the Continuum EaganMatrix Expander (xCEE).
5	Digital audio output (AES3 format), and a high-speed link to the Continuum EaganMatrix Expander (xCEE).
6	Midi input.
7	Midi output and Continuum Voltage Converter (CVC) control output.
8	Analog audio out, headphone level. TRS Stereo jack.
9	The Red Button, used for configuration procedures when the Haken Editor is not available.
	Right End of Continuum Fingerboard
10	Power plug (110/220v, 50-60hz)
11	Fuse (4 amp)
12	On/Off switch

For detailed connection diagrams showing how to interface the Continuum with the outside world visit Section 12 of this User Guide.

Note: A new Upgrade is available for Half-Size and Full-Size Continuums that adds 6X DSP processing, compatible to current Slim Continuum models. Contact Haken Audio for more information.

- 6x processing power
- AES3 Digital audio I/O
- Input rate 32 kHz to 192 kHz
- Output rate 48 kHz, 96 kHz, or matched to input
- Analog audio output left and right, or mono sum
  Compatible with unbalanced TS or balanced TRS cables
- Headphone output
- Midi over USB
  (USB-A to USB-C cable included with purchase)
- Universal 3.5mm Midi In (Type A, Type B, and TS)
  (adapter to 5-pin DIN Midi In included with purchase)
- 5-pin DIN Midi Out
- i2c port for communication to the Continuum Voltage Converter (CVC)
- Foot pedal inputs (Haken Audio recommends Yamaha FC3A and FC7)

With this DSP upgrade, a Light Action Continuum will be equivalent to a Slim Continuum minus display/buttons/knob**.**



5.3. EaganMatrix Eurorack Module

The EaganMatrix Module is a Eurorack implementation of the EaganMatrix functions available in a 2X processing Haken Continuum such as the ContinuuMini. It allows Eurorack systems to take advantage of the numerous physical modelling capabilities available to Continuum and Osmose users replacing the Continuum Fingerboard or Osmose keyboard inputs with CV inputs from any Eurorack or CV based controller or Midi inputs. As with Continuum, the EaganMatrix module supports preset editing through the Haken Editor and the module also supports the same Midi input and control functions described in this manual. See Chapter TBD for more information.

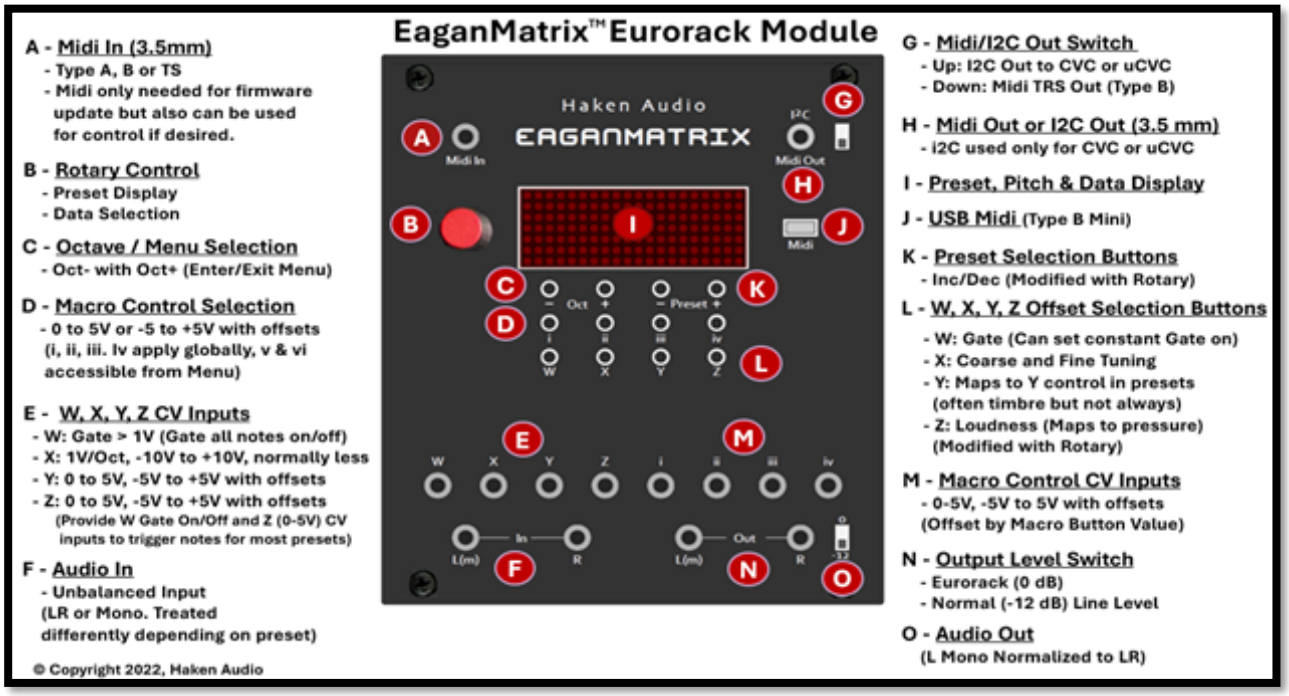
Controls and connections for the EaganMatrix Eurorack Module include:





Power
Uses +/- 12V, +5V volts from Eurorack power
Current: 25 mA +-12, 300 mA +5

22 HP
Depth: 30mm,
25mm Front Panel to
Rear Connector



5.4. Hardware Specifications for Continuums and ContinuuMini

	Full-size Continuum	Half-size Continuum	ContinuuMini
Pitch Range	Nearly 8 octaves (9350 cents)	Nearly 4 octaves (4610 cents)	Over 2 octaves (2850 cents)
Pitch Resolution	better than .1 cents	better than .1 cents	better than 1 cent
Magnetic Sensors	512	256	4
Surface Polyphony	max 16 fingers	max 16 fingers	1 finger, 2 limited
EaganMatrix Max Polyphony	8 voice (L2x standard), 24 voice (L6x option)	8 voice (L2x standard), 24 voice (L6x option)	8 voice (M2x)
EaganMatrix Combinations	1 matrix (L2x standard), 3 matrices (L6x option)	1 matrix (L2x standard), 3 matrices (L6x option)	1 matrix (M2x)
Specialty Sounds Max Polyphony	24 voices	24 voices	8 voice
Control Voltages using CVC	16 (4 each for 4 voices), 16 (8 each for 2 voices)	16 (4 each for 4 voice), 16 (8 each for 2 voice)	16 (8 each for 2 voice)
Midi Polyphony	15	15	1 (2 limited)
Scan Interval	330 µs	330 µs	700 µs
Interface	Midi, 1/4" headphone, AES3, i2c for CVC, two 1/4" pedal jacks	Midi, 1/4" headphone, AES3, i2c for CVC, two 1/4" pedal jacks	Usb, 1/8" headphone, i2c for CVC, one 1/8" pedal jack
Audio Output (Analog)	24 bit D/A, up to 5v p-p, 100 mW power	24 bit D/A, up to 5v p-p, 100 mW power	24 bit D/A, up to 5v p-p, 100 mW power
Audio Output (Digital)	24 bit AES3, 48/96 kHz or sync to AES3 input	24 bit AES3, 48/96 kHz or sync to AES3 input	n/a
Power	50W, 110 or 220 Vac	50W, 110 or 220 Vac	500 mA Usb (210 avg)
Size	135·19·7.5 (54·7.5·3")	72·19·7.5 (28.5·7.5·3")	53·6·2 cm (21·2.5·0.75")
Case Size	150·28·16.5 (59·11·6.5")	86·28·16.5 (34·11·6.5")	n/a (tube is 24" by 2.5")
Weight	10.2 kg (22.5 lb), with case 17 kg (38 lb)	7.3 kg (16 lb), with case 11.2 kg (25 lb)	0.25 kg (9 oz)

5.5. Haken Audio Product comparison Chart

Comparison Chart	Slim70 70s6x	Slim46 46s6x	Full-size 94L2x	Half-size 46L2x	Mini 29M2x	EaganMatrix Module *E2x*
Advanced Magentic Sensor Playing Surface	•	•	•	•		
Hybrid Magnetic/Strip Sensor Playing Surface					•	
Pitch Resolution Better Than 0.1 Cents	•	•	•	•	•	•
Playing Surface Range (half steps)	70	46	94	46	29	
Extendable Pitch Range Via Octave Switching	•	•	•	•	•	•
Dedicated Octave and Preset Select Buttons	•	•			•	•
Configuration Using Surface Interaction			•	•		
Configuration Using Built-in Display	•	•			•	•
Haken Editor Software for Mac or PC	•	•	•	•	•	•
System Access Through Midi	•	•	•	•	•	•
Maximum Surface Polyphony	16	16	16	16	2	
SHARC Internal Sound Engine with EaganMatrix Sound Technology	6x	6x	2x/6x	2x/6x	2x	2x
Maximum Sound Engine Polyphony	24	24	8/24	8/24	8	8
Expandable DSP (to 6x processing power)	included		optional		no	no
Control Voltage Convertor Compatibility (CVC and µCVC via i2c)	•	•	•	•	•	•
Power	AC 110V or 240V		AC 110V or 240V		USB	Eurorack +/- 12V, 5V
Midi I/O	TRS 3.5mm, USB		5 Pin DIN		USB	USB
Support for MPE and MPE+*	•	•	•	•	•	•
Audio Output	analog and digital		analog and digital		analog	analog
Audio Input	digital		digital		none	analog
CV Input and Control						•
i2c Serial Support	•	•	•	•	•	•
Foot Pedal Inputs	2	2	2	2	1	
Weight	9.8 kg	6.9 kg	10.2 kg	7.3 kg	0.35 kg	0.17 kg

** MPE+ is an enhanced MPE (Multidimensional Polyphonic Expression) implementation by Haken Audio. MPE+ is backwards compatible with MPE. MPE+ adds support for true 14 bit controllers and offers extended intelligent communication between controller and synthesizer.*

www.HakenAudio.com

6. Operating the Continuum Fingerboard

ContinuuMini players may wish to skip to Section 6.4, as the next few sections are specific to the Continuum Fingerboards. EaganMatrix Module users may wish to skip this section and move to section 19.

6.1. Turning On the Continuum Fingerboard

The Continuum Fingerboard should be placed on a solid stand or table. The stand or table should not move appreciably when vibrato or other finger motions occur on the playing surface. Many performers prefer the Continuum Fingerboard at a slight angle; for ideas please see the description of Edmund Eagan's Continuum Stand in the Accessories area of www.HakenAudio.com.

"Slim" continuum models turn on automatically when powered through the included 5V wall adapter. Some prefer to connect their Slim Continuums to a power strip or other powering device with an On/Off switch. Half-size and Full-size Continuum Fingerboards have a power switch. In both cases, when powered, the top LED should light within a few seconds and turn solid blue. If it doesn't, please turn it off and check the power connection and then (on Half-Size and Full-Size models) the fuse. If you repeatedly blow fuses, please contact technical support; this indicates a serious problem.

The Continuum Fingerboard will be slightly warm to the touch if it has been turned on for a while. This is normal and does not indicate a problem.

When you first receive your Continuum Fingerboard, connect the supplied USB cable (for "Slim") or USB-Midi interface cable (Half-Size/Full-Size) between your Continuum and your Mac or PC, and run the Haken Editor (see Section 8 for setup details). Once the Editor is running, refine the surface calibration (see Section 7).

You will want to use high efficiency headphones with your Continuum's headphone jack. *Take care when you first put on your headphones; verify that the Gain setting is appropriate. Refer to Sections 8 and 10.1 to learn how to set the Gain (Pre and Post).* The Continuum Fingerboard's headphone jack is capable of a wide output voltage range and can optionally be used for professional-level audio stereo line level output. (**Never plug a mono cable directly into the headphone jack; that would short one channel to ground and potentially damage the headphone circuit.)**

We suggest you play with the Continuum Fingerboard's many built-in sounds before connecting external synthesizers and get used to the feel and operation of the playing surface.

6.2. Playing the Continuum Fingerboard

Performing on the Continuum Fingerboard is challenging. Like a fretless instrument, you must rely on audio feedback, finger memory and manual dexterity for accurate intonation and expression. You will find that the Continuum Fingerboard requires its own technique, different from any other instrument.

When you play a traditional music keyboard, it is normal to feel the key hit a hard stop as you play a note, even if you are playing quietly. Also, traditional keyboards are usually velocity sensitive. On an instrument like a piano, a single velocity value is associated with the speed of the key movement.

In contrast, the Continuum Fingerboard is both velocity sensitive and, more importantly, pressure sensitive. It continually outputs a stream of pressure values. (A continuous stream of velocity values can be derived from the pressure values, since velocity is pressure-change-over-time.) The pressure values continue whenever pressure changes until the note is terminated. It is unusual to hit the hard stop (or "bottom out") except for the very loudest notes. This distance from zero pressure to maximum pressure is relatively small yet offers an extremely wide range of dynamic possibilities. Note that many presets will distort if you try and press to the bottom of the finger bed. The lighter the touch you master on the Continuum Fingerboard, the greater the expressive possibilities it will offer you. Even if you have a refined keyboard technique on a piano or synthesizer you will still need to develop new playing skills to master the Continuum Fingerboard.

Don't assume that the Continuum Fingerboard will respond like a pressure sensitive drum pad. The Continuum Fingerboard's playing surface has been designed for a finger technique. The human hand is an extremely sensitive input/output device. Thanks to the Continuum Fingerboard's design the performer is free from the greater mechanical forces that are required to actuate a note on an acoustic keyboard instrument like a piano or harpsichord. As such, the mechanical feedback devices inside the Continuum Fingerboard are designed to take advantage of the lighter pressures that a human hand can easily and quickly generate. Keep this in mind as you play your Continuum Fingerboard. You'll be rewarded with a decidedly musical response to your subtle and dynamic playing gestures. A lighter touch will also minimize heat buildup on the fingertips that can be caused by overly aggressive contact with the surface.

As a suggestion, start playing the Continuum Fingerboard with just one note at a time; leave the chords until later. Practice vibrato and dynamic variations. Try to imitate the expressive playing of other performers on other instruments; a favorite is to imitate Clara Rockmore playing Rachmaninoff on the Theremin. When you start playing chords, start simple and listen to the beats adjust as you roll your fingers on the playing surface. Try playing drone tones and add a melody. Practice just intonation and alternate tunings.

A finger's initial contact with the surface is especially important. As with acoustic instruments, your Continuum Fingerboard allows you to shape the first milliseconds of a sound — much more detailed and varied control than provided by other electronic instruments. Much of the skill of an advanced Continuum Fingerboard player involves shaping the fine structure of attacks of sounds (for presets that do not impose an attack profile using shape generators – see the EaganMatrix manual).

Chords containing half-step intervals present a particular challenge. When you place fingers closely together (less than 150 cents apart) on the playing surface, the Continuum Fingerboard can have trouble resolving the two fingers. This may result in a smaller pitch interval than you expect, or it may result in a single finger (not two fingers) being detected. If this occurs, try spreading the notes vertically on the fingerboard so that the notes in the half-step interval are not horizontally on the same plane.

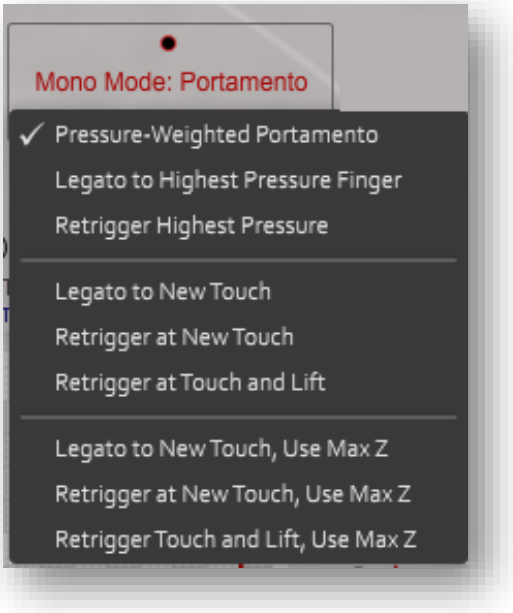
If playing chords with smaller than 100 cent intervals is of interest to you, and if you learn how to program the EaganMatrix or have an external flexible synthesis system, one approach is to have the front-back position enable an octave shift in your synthesis system. This will allow you to play tiny intervals and unisons by placing fingers an octave apart at the front and back of the playing surface. Another approach is to use a Sustain Pedal to build up a tone cluster from several closely spaced pitches that you touch one at a time. A third approach is to use custom Pitch Tables to stretch half steps or repeat surface pitches (Section 6.4).

6.3. Mono (Multiple Fingers Combined Create a Single Note)

The Continuum Fingerboard tracks up to 16 fingers on its playing surface. When multiple fingers are touching the surface, each finger can trigger its own note, or the combination of fingers can correspond to a single note. This latter can be done a variety of ways on the Continuum Fingerboard — using the Touch Area (Section 3.1), using Lowest Channel Number (abbreviated LCN, Section 10.6) with a custom-programmed EaganMatrix, or, most commonly, using "Mono." Mono is a powerful performance feature unique to the Continuum Fingerboard. It can be used for playing single-note lines with articulation reminiscent of wind instruments, for oscillating back and forth accurately between two pitch centers, for whammy-bar effects, for piano-style glissandi (when used with Round Rate 127, Section 10.15), or for special trills, turns, and other ornamental effects. *These mono functions are beyond the sensing capabilities of the ContinuuMini and do not apply to EaganMatrix module.*

Mono Functions

The Continuum Fingerboard supplies nine Mono Functions that allow you to process the combination of multiple fingers different ways. These are available in the Control 2 Panel of the Haken Editor Under "Mono Mode/Type" selections. Click the selectable (red) text to view and change the current option.



Haken Editor Mono Mode Selections

For the description below, we will assume Mono is being used to perform single-note lines with a variety of transitions between notes. If one finger is down, and another is pressed, Mono can convert this into two consecutive single notes with one of the following transitions between the notes:

Mono Function	Details	Midi Encoding
Portamento (pressure weighted)	The second note has no attack or decay of its own; instead, it continues with the sustain portion of the first note, but smoothly glides to the new pitch, based on the relative pressure of the two fingers.	A highly optimized series of Pitch Bend messages will be used to glide the pitch to the new note.
Legato Z (to highest pressure finger)	The second note sounds when the pressure of the second finger exceeds the pressure of the first finger. The second note has no attack or decay of its own; instead, it continues with the sustain portion of the first note but jumps to the new pitch.	When the second finger reaches a pressure greater than the first, a Pitch Bend will be used to jump to the new pitch; no Note Off or Note On will be transmitted.
Retrigger Z (highest pressure)	The second note sounds when the pressure of the second finger exceeds the pressure of the first finger. The second note has an attack and decay; it sounds much like it would if the first note had not been played.	When the second finger reaches a pressure greater than the first, a Note Off will be transmitted for the first finger, and a Note On for the second finger.
Legato T (to new touch)	The second note sounds as soon as the second finger touches the surface. The second note has no attack or decay of its own; instead, it continues with the sustain portion of the first note but jumps to the new pitch.	As soon as the second finger touches the surface, a Pitch Bend will be used to jump to the new pitch; no Note Off or Note On will be transmitted.
Retrigger T (at new touch)	The second note sounds as soon as the second finger touches the surface. The second note has an attack and decay; it sounds much like it would if the first note had not been played. If the second finger is lifted before the first, the pitch jumps back to the first finger's pitch.	As soon as the second finger touches the surface, a Note Off will be transmitted for the first finger, and a Note On for the second finger. Then, if the second finger is lifted before the first, a Pitch Bend will be used to jump back to the first finger's pitch.
Retrigger TL (at touch and lift)	The second note sounds as soon as the second finger touches the surface. The second note has an attack and decay; it sounds much like it would if the first note had not been played. If the second finger is lifted before the first, the first note re-attacks.	As soon as the second finger touches the surface, a Note Off will be transmitted for the first finger, and a Note On for the second finger. If the second finger is lifted before the first, a Note Off will be transmitted for the second finger, and a new Note On will be transmitted for the first finger.
Legato TZ (to new touch, use Z max)	The second note sounds as soon as the second finger touches the surface. The second note has no attack or decay of its own; instead, it continues with the sustain portion of the first note, but jumps to the new pitch, and uses the max pressure of the two fingers.	As soon as the second finger touches the surface, a Pitch Bend will be used to jump to the new pitch; no Note Off or Note On will be transmitted. The dynamics will be controlled by the highest pressure finger.

Mono Function	Details	Midi Encoding
Retrigger TZ (at new touch, use Z max)	The second note sounds as soon as the second finger touches the surface. The second note has an attack and decay; it sounds much like it would if the first note had not been played. If the second finger is lifted before the first, the pitch jumps back to the first finger's pitch, and uses the max pressure of the two fingers.	As soon as the second finger touches the surface, a Note Off will be transmitted for the first finger, and a Note On for the second finger. Then, if the second finger is lifted before the first, a Pitch Bend will be used to jump back to the first finger's pitch. The dynamics will be based on the highest pressure finger.
Retrigger TLZ (touch and lift, use Z max)	The second note sounds as soon as the second finger touches the surface. The second note has an attack and decay; it sounds much like it would if the first note had not been played. If the second finger is lifted before the first, the first note re-attacks, and uses the max pressure of the two fingers.	As soon as the second finger touches the surface, a Note Off will be transmitted for the first finger, and a Note On for the second finger. If the second finger is lifted before the first, a Note Off will be transmitted for the second finger, and a new Note On will be transmitted for the first finger. The dynamics will be based on the highest pressure finger.

Fingers Pressure and Mono Transitions

Mono transitions can be controlled by finger pressure or by time. If one finger is pressed down, and then a second is pressed down in addition to the first, the transition is as follows:

Portamento: The transition begins when the second finger touches the surface (the pitch glide begins) and ends when the first finger is lifted (the pitch glide is completed). The pressure of each finger, as well as the pitch of each finger, determines the pitch played during the transition. Long and short transitions may be performed under control of finger pressure, without changing any externally configured parameters. The pitch glide rate may vary within a single transition, depending on how the performer adjusts the relative finger pressures. If many fingers are down, the pitches and the pressures of each finger are combined to compute the total pitch. The variable nature of this pitch glide allows the performer to create complex glide curves that would be difficult if not impossible to program into a conventional synthesizer.

Legato Z and Retrigger Z: The transition occurs when the second finger reaches a higher pressure than the first. If many fingers are down, the finger with the highest pressure is played; if fingers are changing pressure, transitions occur whenever a new finger becomes the finger with highest pressure.

Legato T, Retrig T, Retrig TL: The transition occurs as soon as the second finger touches the surface. If many fingers are down, the last finger to touch the surface is played.

Legato TZ, Retrig TZ, Retrig TLZ: The transition occurs as soon as the second finger touches the surface. If many fingers are down, the last finger to touch the surface is played. The dynamics are based on the highest pressure finger. This mode is especially useful for fast playing with the Tri-Value Pedal (Section 6.5).

Activating Mono Functionality

Mono is active in the following three situations:

(1) The Continuum Fingerboard has polyphony 1. Multiple fingers are tracked, but only one note at a time is played on the synthesizer. Only single-note lines can be played, with Mono transitions between the notes.

(2) The Continuum Fingerboard has polyphony greater than 1, but the surface is split so that only one voice is assigned to a range of pitches. Within that pitch range, Mono is used, and only single-note lines can be played in that range.

(3) Polyphony is greater than 1, and the Mono Interval (the pitch interval within which single-note transitions will occur) has been configured. If the second finger is within the Mono Interval of the first finger, a single-note line will be played. If the second finger is outside the Mono Interval of the first finger, multiple notes will sound at once. This

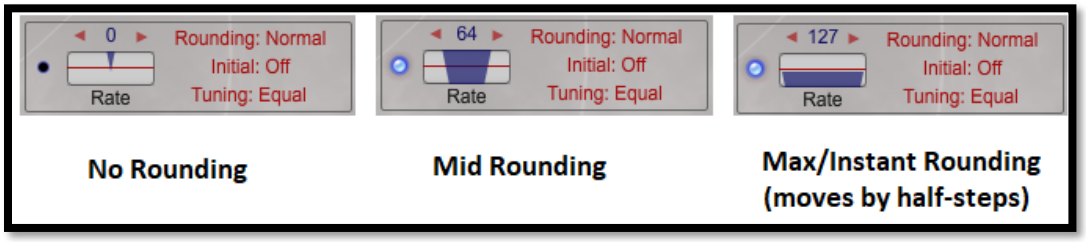
feature can be selectively enabled and disabled during a performance using the Mono Switch pedal function, allowing a performer to play (for example) both mono mordents and polyphonic mordents.

6.4. Rounding, Pitch Tables, and the Pitch Table Editor

Rounding

The Continuum Fingerboard and ContinuuMini include a sophisticated mechanism to quantize finger positions to predetermined scale grids ("Pitch Tables"), such as Equally Tempered or Just tunings. It allows you to place fingers with positional errors, and still hear a note (or a chord, if you are playing polyphonically) that corresponds to perfectly placed fingers. You may then slide your fingers (glissando) to new positions; the notes will glide in pitch to the new finger positions, and then they will be corrected. When finger positions are corrected, we refer to this as "rounding the finger position". Finger position may be corrected when the finger first touches the surface (Round Initial), and after as the finger slides on the surface (Round Rate). The Round Rate mechanism works in such a way as to not diminish the expressive possibilities of subtle pitch changes like vibrato (periodic variation in pitch), grace notes (small glissandi) or large pitch sweeps. For instance, if a note is played with vibrato, small adjustments will be made so that the averaged finger position (and the perceived pitch) is precisely correct.

The Round Rate mechanism allows you to control the rate at which finger position correction drifts toward the currently active Pitch Table, anywhere from instantaneous to glacial (minutes long). A Round Rate of 0 means no rounding; small Round Rates cause a slow drift to grid positions; larger rates round more quickly. The maximum Round Rate of 127 causes immediate/instant rounding; with this fully rounded rate you will get a fretted guitar style half-step glissando when you slide a finger over adjacent grid positions.

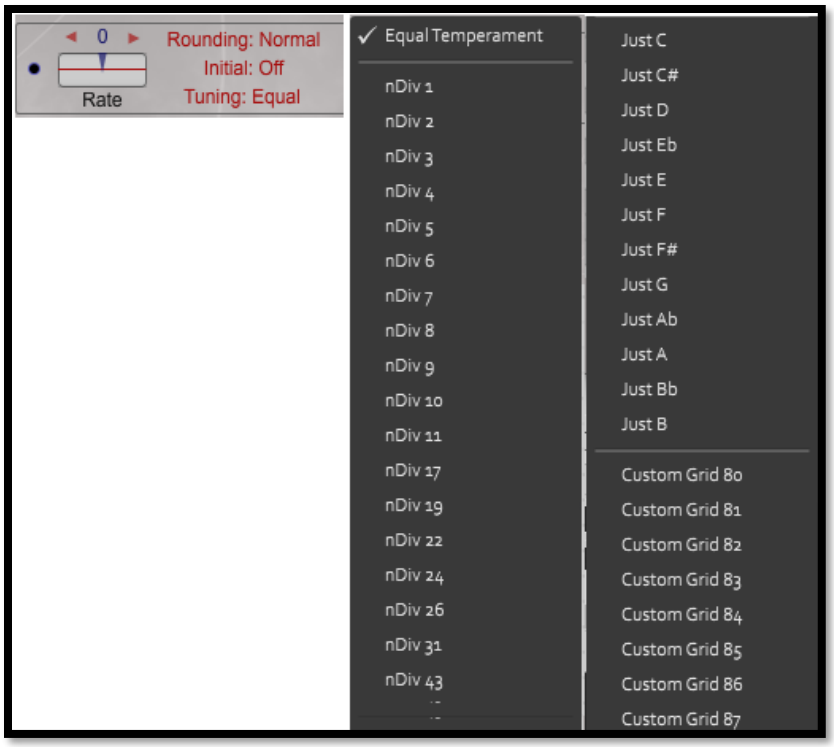


The Round Rate mechanism not only corrects finger position while the finger is in contact with the surface, but it continues to correct even after the finger is lifted from the surface (during the release portion of the note).

The Round Rate can be modified at any time during a performance. You can configure the Round Rate (Section 10.15) using the Haken Editor, front panel display ("Slim" Continuum) or the Configuration Strip (half-size and full-size Continuums). You can also change the Round Rate using pedals or Midi Input CCs (see Section 14).

Pitch Table

The Haken Editor (for all Continuums) and Continuum Fingerboard (for half-size and full-size models) allows you to choose Pitch Tables for Just tuning, equal tuning, N Division tuning, and user-defined custom Pitch Tables for correcting finger positions via Rounding. In the Just tuning, any of the major triads (I, IV, V) will have perfect 4:5:6 frequency ratios in the rounded finger position, and the ii and vi minor triads will have perfect 10:12:15 frequency ratios. You can change the tonic key for the tuning at any time, even while fingers are pressing on the Continuum Fingerboard's playing surface; the Round Rate mechanism will correct the positions of those fingers to the new tuning. As in equal temperament tuning the time the tuning rounding takes is dependent on setting of Round Rate. N Division tuning rounds the surface to a number of divisions of each octave on the playing surface, based on all the C pitches. For instance, an N Division setting of 1 will round every finger position to the closest C note. An N Division setting of 2 will round each finger to the closest C or F#, whichever is closest. An N Division setting of 24 will round each finger to the closest quarter step.



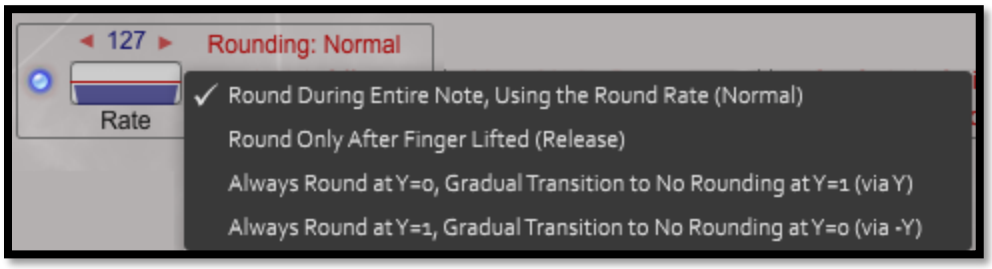
Pitch Table Options from Control Panel 1 (C1) of Haken Editor

Disadvantages of Rounding

Ideally, the Continuum Fingerboard is played without the idea of a predetermined scale unless a preset specifically relies on full rounding (such as some of the organ presets). A skilled violinist is not constrained to pitches from a particular scale during a performance; instead, the violinist micro-adjusts the pitch of each note for optimal harmonic musical results. Similarly, a skilled Continuum player is constantly listening and adjusting finger position to obtain the desired results and does not rely on the Round Rate mechanism to make up for inability to place fingers properly. For beginners, the Continuum's Rounding feature seems to be helpful, but the short-term convenience will eventually have long-term consequences. Important finger placement, muscle memory, and listening skills will be compromised. A Continuum player that requires Round Rate is a bit like a singer that requires auto-tune to sing in tune. The exception would be in playing a preset that has a pitch center that is indeterminate, like an ensemble of strings or voices.

Additional Rounding options:

In addition to the normal Rounding during an entire note, rounding can also be to engage when a finger is lifted or rounding based on Y position.



Release Rounding

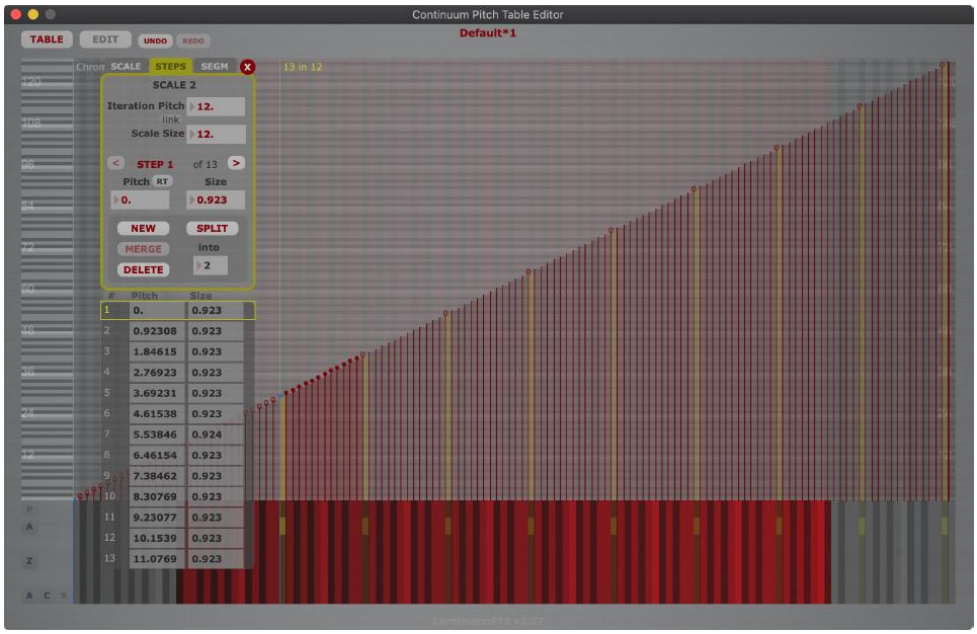
Release Rounding is different from the Continuum's other Rounding mechanisms. Release Rounding limits the effect of Round Rate so that it only adjusts pitch once a performer's finger is lifted but has no effect while the finger is touching the surface. Once the finger is lifted from the Continuum's surface and the note is still sounding through a release envelope, a performer can no longer correct an "out of pitch" note. Release Rounding is valuable for timbres which are plucked and have a long release after the finger is lifted, such as the Continuum's internal sound "Metal Bar." Release Rounding may be of interest to Continuum players who otherwise avoid the Round Rate mechanisms.

Rounding via Y Position

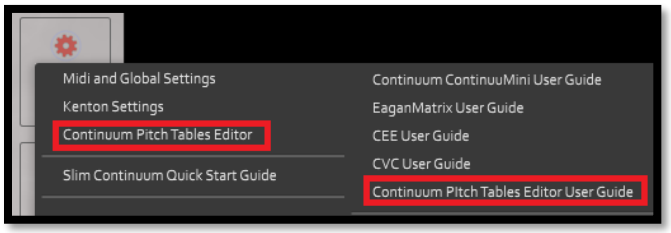
Rounding via Y Position allows a variable amount of finger position correction, depending on the front-to-back placement of a finger on the surface. If the loaded preset does not use Y for timbral control, Rounding via Y Position can be a convenient way to use finger position correction as-needed for certain notes in a performance. During practice sessions, Rounding via Y Position provides an convenient way to rely less and less on rounding: as a player's proficiency at placing fingers accurately improves, the player can gradually change Y position to reduce automatic finger position correction. See Section 10.14 for details.

Pitch Table Editor: Simple and Radical Uses

A graphical Pitch Table Editor (PTE) and its User Guide are available in the Cogwheel menu (Section 10.22). The PTE is for creating custom downloadable Pitch Tables and was written by Continuum Fingerboard player Pablo De La Loza. The PTE can be used for creating Pitch Tables for use with Rounding, or for radically pitch-warping the playing surface. For example, the PTE allows you to define Pitch Tables that stretch or shrink the size of octaves or repeat or reverse the same pitches at different points on the surface.

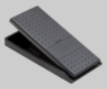


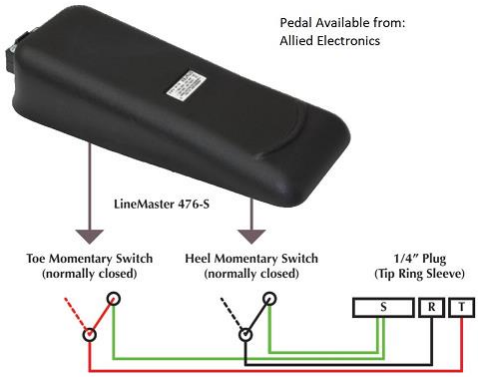
Accessing Pitch Table Editor and its User Guide from the Cogwheel menu::



6.5. Pedal Jacks

Continuum Fingerboards have two quarter inch pedal jack inputs, located on the left interface panel between the power adapter input and the SPDIF digital interface connectors. These are labeled Pedals 1 and 2. ContinuuMinis have a single 3.5mm pedal jack that requires a Hosa MHE-100.5 (or equivalent) adapter. The pedal jacks have been tested with Yamaha FC3, FC4, FC5, and FC7 pedals (others may work but have not been qualified). Many of the parameters to control with pedals are continuous parameters, so the FC3 and FC7 are recommended as they have continuous output values. Using a pedal jack is equivalent to sending the corresponding Midi controller value to the Continuum Fingerboard's Midi In (see Section 14), except the pedal jack has higher precision.

Pedal Model	Output	Use
Yamaha FC7 	Continuous data values from 0 to 127. This pedal's "dual zone" feature requires additional pressure to reach the highest output values; this feature can be disabled with the pedal's adjustment screw. The pedal's range can be reduced and/or reversed, using the Haken Editor's Pedal Min/Max settings (Section 10.18). The EaganMatrix and CVC read this pedal with high accuracy; Midi accuracy is limited to 7 bits.	A sweepable pedal from 0 to 127, with the ability to stay at a non-zero point when the foot is removed (used by many of the EaganMatrix system presets as Pedal 2).
Yamaha FC3 	Continuous data values from 0 to 127. This range can be reduced and/or reversed, using the Haken Editor's Pedal Min/Max settings. The EaganMatrix and CVC read this pedal with high accuracy; Midi accuracy is limited to 7 bits.	As a traditional sustain type pedal action, with the added benefit of a sweepable range from minimum to maximum. Returns to zero when the foot is removed (used by many of the EaganMatrix system presets as Pedal 1).
Yamaha FC4 	Switch with two values, 0 (off) and 127 (on). Other values for off and on can be selected using the Haken Editor's Pedal Min/Max settings. (When this pedal is detected by the Haken Editor, a picture of the FC5 will appear; the FC4 and FC5 are equivalent.)	As a traditional sustain type pedal action limited to switch values. Returns to zero when the foot is removed.
Yamaha FC5 	Switch with two values, 0 (off) and 127 (on). Other values for off and on can be selected using the Haken Editor's Pedal Min/Max settings.	A compact alternative to the FC4.
Linemaster 476-S 	Tri-Value pedal, a switch pedal with three positions: at rest, heel, and toe (Available from Allied Electronics though you will have to wire yourself). The corresponding values generated for each pedal position depend on the pedal's assigned function. Wiring Diagram:	Ideal as an Octave pedal (Section 3) or as Advance pedal (Full Advance and Half Advance functions, Sections 8.9 and 14.3).

Pedal Model	Output	Use
		

On the Continuum Fingerboard, Sustain and Sostenuto are continuous controls, allowing for fade and swell of sustained notes. They can also be applied using switched pedals for traditional effects. Section 10.17 describes changing the pedal assignments for the jacks; a complete list of pedal assignment options is in Section 14.

6.6. Kenton Mini Controller and Kenton USB Midi Host

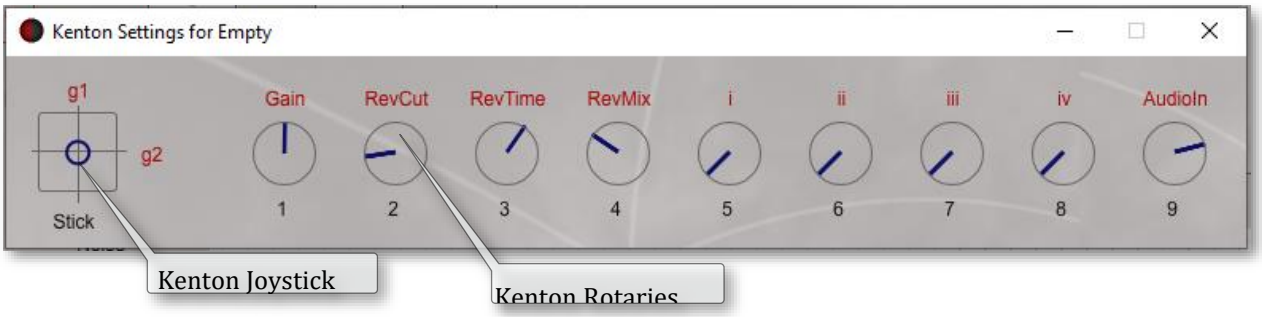


Kenton Mini USB Controller

The Kenton Killamix™ Mini Controller seamlessly integrates with the Continuum Fingerboard. http://www.kentonuk.com/products/items/midicontrol/kmix-mini.shtml. The Kenton Mini Controller provides physical buttons for loading presets from the Continuum Fingerboard's Internal User Preset Slots, and the buttons are lit to indicate which preset is loaded. It also provides physical rotaries for configuration parameters and pedal values, allowing precise setting of parameters. Each rotary has a ring of LEDs that indicates its current value.

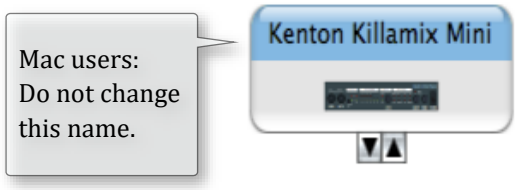
When the Kenton Mini Controller is used in conjunction with the Haken Editor, changes made via the Kenton will also be updated on the Haken Editor's screen, and changes in the Haken Editor are reflected by the Kenton's LEDs.

The Kenton Settings option in the Editor's Cogwheel Menu (Section 10.22) allows you to customize Kenton functionality. The shortcut for the Kenton Settings window is Command+K (Control+K Windows).



Kenton Mini Controller Window

Whenever the Kenton Mini Controller (or any controller for that matter) is used in conjunction with the Haken Editor, its USB cable must be plugged into the computer **before** launching the Editor. **Mac users**: When the Kenton is connected, do not rename the device called "Kenton Killamix Mini" in the AudioMidi setup program. The Editor uses that name to auto-connect to the Kenton controller. Changing the name will cause a failure in the connection routine.



The Kenton functions are:

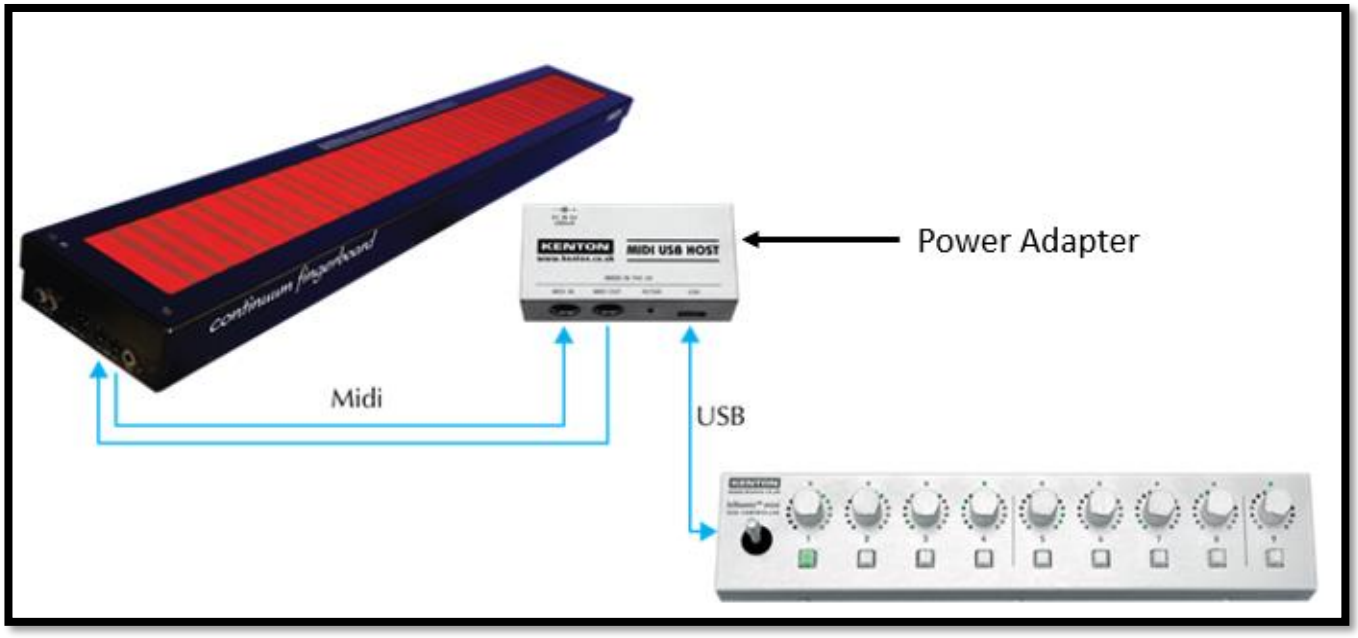
Buttons 1..8 load from Internal User Preset Slots 1..8 (if Button 9 is unlit) or Internal User Preset Slot 9..16 (if Button 9 is lit). Button lights 1..8, together with Button light 9, always indicate which Internal User Preset Slot was most recently loaded.

Rotaries 1 through 9 are assignable in Kenton Settings, in the Cogwheel Menu. The rotaries are predefined with default assignments shown below.

Kenton default rotary assignments	
1	Gain (Post) level of the internal synthesizer
2	RevCut – Recirculator R3 Setting
3	RevTime – Recirculator R4 Setting
4	RevMix – Recirculator Mix Setting
5	Internal Sound Macro Controller i
6	Internal Sound Macro Controller ii
7	Internal Sound Macro Controller iii
8	Internal Sound Macro Controller iv
9	Audio Input level (Digital Input for continuum or Analog input for EaganMatrix Module)

Special operations are initiated by pressing the rotaries on the Kenton. Pressing rotary 1 or 2 toggles rotary 1 or 2 respectively to values between 0 and 127. Pressing rotaries 3 or 4 changes which System Preset is selected. Pressing rotary 9 before a button press will store to an Internal User Preset Slot, rather than load.

In some live performance situations, it is inconvenient to have a computer running the Haken Editor. The Kenton Mini Controller together with a Kenton USB Midi Host (or other Midi host) can be used with a Continuum Fingerboard, without the need of a computer. For a live performance situation, the Kenton Mini Controller provides lights that indicate the most recently loaded Internal User Preset Slot, and physical switches for loading presets; this may be preferable over loading presets using the Continuum's front panel or Configuration Strip (for half-size and full-size models).

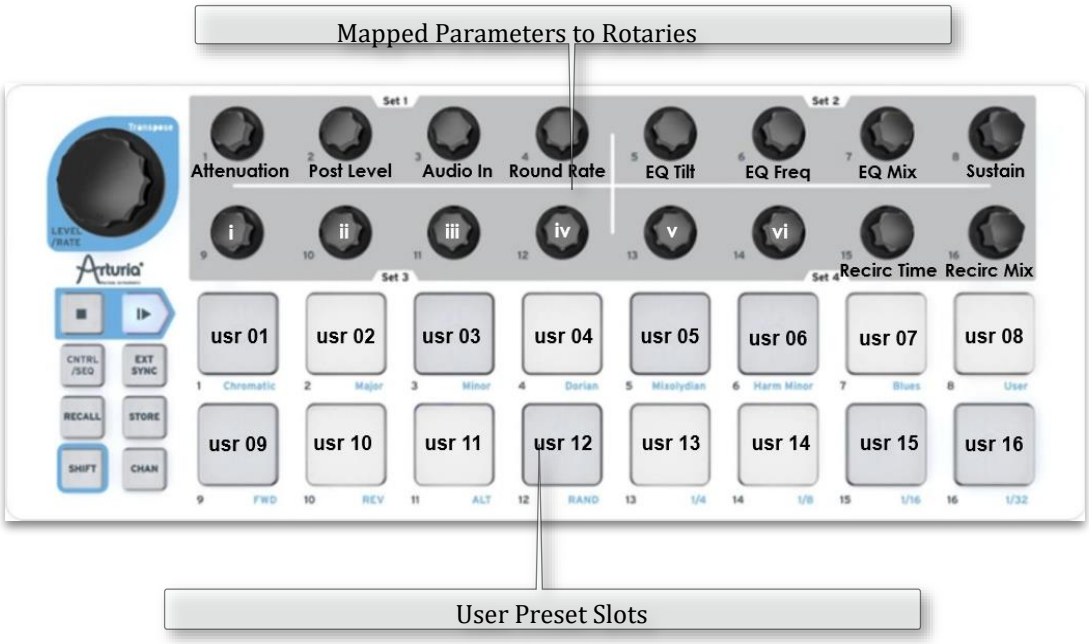


Kenton Mini Controller with a Kenton USB Midi Host (just one Midi Host option), without need of a computer

See Sections 12.15 and 12.16 for connection diagrams for the Continuum Fingerboard and the Kenton Mini Controller, with and without the Editor.

NOTE: The latest Kenton USB Midi Host may not output at least 5V when powered by external hubs. You should connect this directly to a USB adapter connected to a wall socket if it is to power the ContinuuMini. You may also experience issues when trying to use the Kenton Midi Host connected to a hub for expanding USB ports. It appears to work fine for USB-to-Midi DIN connections, but if you want to use multiple USB devices that require USB Hosts, for example a ContinuuMini and Slim Continuum and/or BeatStep together, a USB interface that supports multiple USB Midi hosts (like iConnectivity MIO XM) is recommended.

6.7. Arturia BeatStep and BeatStep Pro



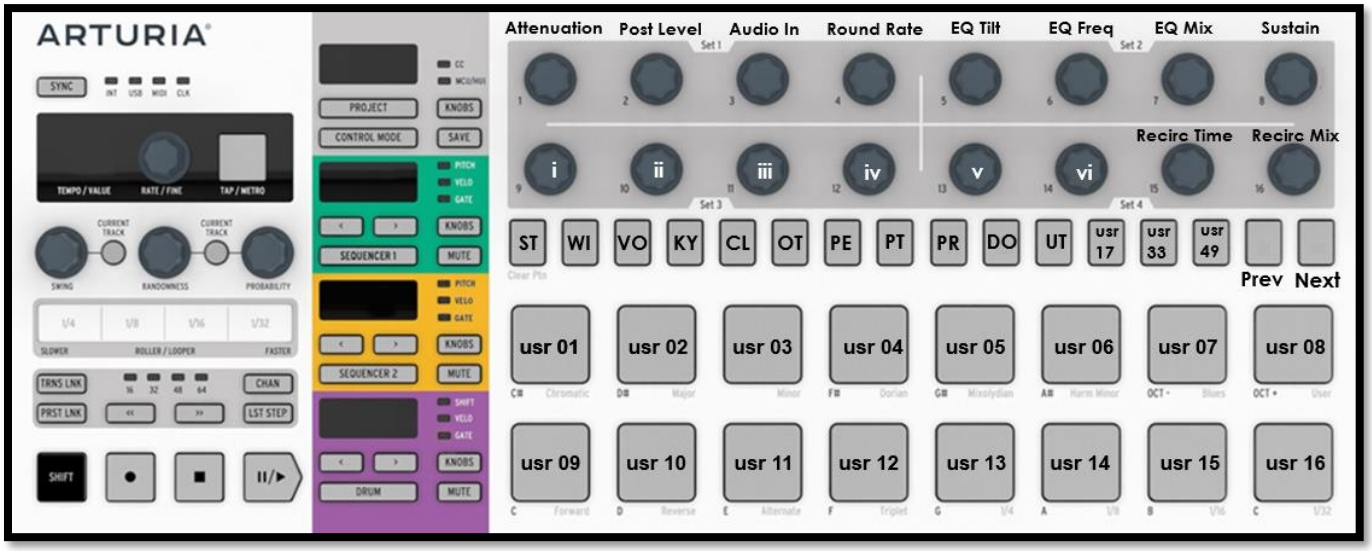
The Arturia BeatStep and BeatStep Pro seamlessly integrate with the Continuum Fingerboard. They provide physical buttons for loading presets from the Continuum Fingerboard's Internal User Preset Slots, and it also provide physical knobs for manipulation of configuration/control parameters and pedal values, allowing precise setting of parameters. Each of its "endless" rotary knobs control values in a relative mode – twisting to the right increases the parameter value and twisting to the left decreases the parameter value. When the BeatStep is used in conjunction with the Haken Editor, changes made via the BeatStep will also be updated on the Haken Editor's screen.

Haken Audio provides a configuration file for the BeatStep and BeatStep Pro (in the Third Party folder). When this configuration file is loaded into the BeatStep, each knob has a standard function for use with the Continuum Fingerboard. Note: The Beatstep configurations post 9.55 firmware are different that 9.55 and early versions as the method of changing presets has changed in post 9.55 firmware to use a CC index and a Program Change instead of two sets of CCs.

The BeatStep and the Kenton have some similar functionality, but unlike the Kenton, the BeatStep does not have two-way communication with the Continuum Fingerboard. On the other hand, the Arturia BeatStep has the advantage that it is much less expensive, and it is simpler to hook up in a standalone situation. The BeatStep and BeatStep Pro come with a 3.5 mm TRS Mini to Midi Din cable to connect between it and the Continuum Fingerboard's Midi In for Half-Size and Full-Size models. A 3.5 mm TRS-TRS Mini cable can be used to connect to the latest "Slim" Continuums without need for MIDI host required is the USB connection is used.

See Sections 12.17 and 12.18 for connection diagrams for the Continuum Fingerboard and the Arturia BeatStep, with and without the Editor.

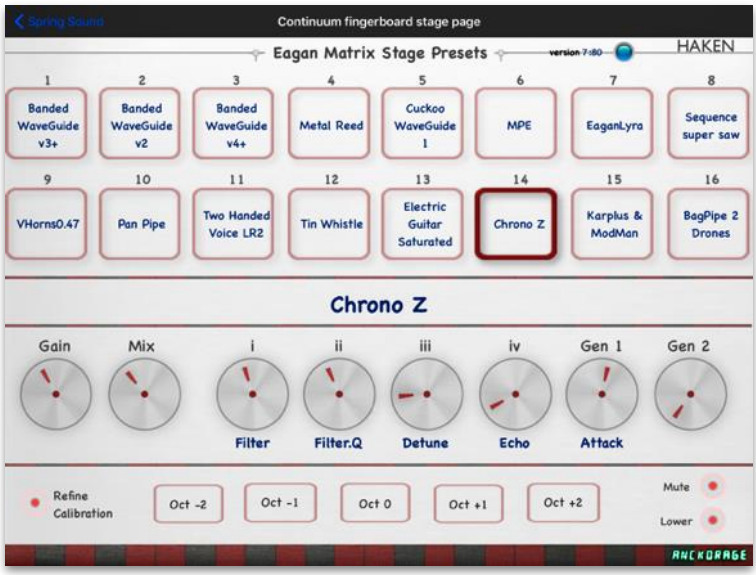
Note that BeatStep Pro configuration files are also available for both the Continuum and ContinuuMini. The BeatStep Pro has the advantage of being able to easily select any of the 128 User Presets now supported by the Continuum (after firmware release 9.0). A BeatStep Pro template has been created allowing the user to select any User Preset with only 2 button pushes (bank + preset 1..16) and the user can also directly access a number of categories and scroll up and down through them.

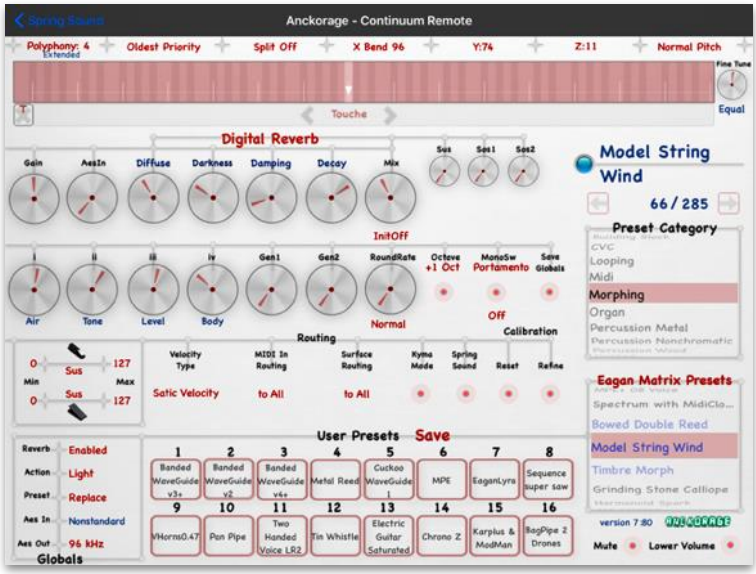


6.8 Anckorage Continuum Remote Support

The **Continuum Remote** is an iPad and iPhone interface for loading presets from the Continuum Fingerboard's Internal User Preset Slots and loading system-defined internal sounds. The Continuum Remote includes graphic readout and touch-based control for sound parameters and pedal values. Unlike the Haken Editor, the Continuum Remote does not provide EaganMatrix editing capabilities. The Continuum Remote is intended for use in situations where an iPad or iPhone is more convenient than a laptop, and sound editing capabilities are not required.

The Continuum Remote is part of **Anckorage's SpringSound App**, a spring-based physical modeling synthesizer, available for iPad and iPhone through Apple's App Store. The app is designed and programmed by Christophe Duquesne.





7. Calibration of the Continuum Fingerboard

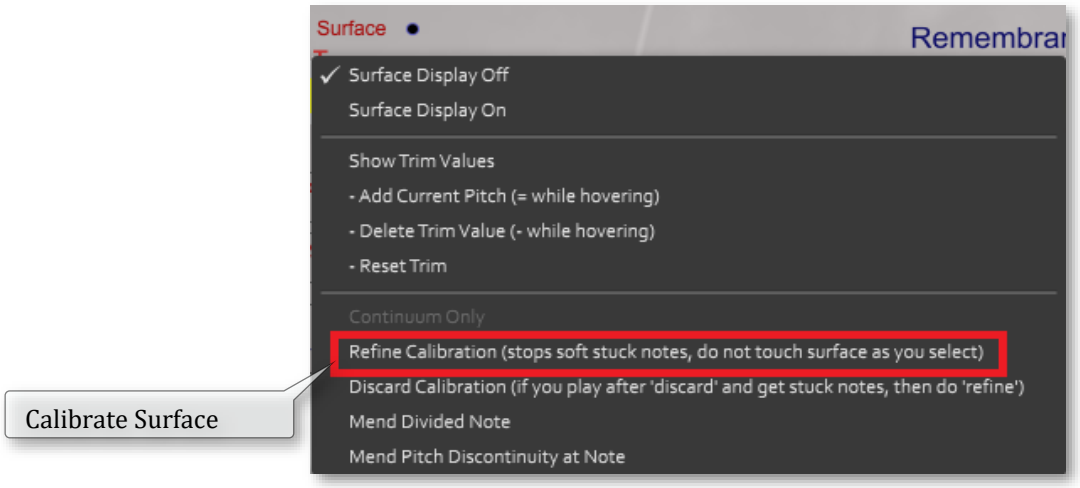
ContinuuMini and EaganMatrix module owners may wish to skip this section, as it is specific to the Full-size and Half-size Continuum Fingerboard (the ContinuuMini auto-calibrates on startup).

Before playing the Continuum Fingerboard for the first time, and each time it is transported it to a new location, it is important to refine its calibration. A refined calibration avoids "stuck notes". Calibration results are stored in the Continuum Fingerboard's permanent memory, so it is not necessary to refine calibration every time you turn it on. Refine calibration using the Haken Editor (see Section 8) or the Overlay Strip (see Section 9).

This Calibration is for the Half-size and Full-size Continuum Fingerboard only, not for the ContinuuMini.

7.1 Refining Calibration using the Haken Editor

At time you may experience a "stuck" note and need to refine the calibration of the playing surface. Make certain nothing is pressing on the Continuum Fingerboard (no fingers or other objects on the playing surface or frame), then click on the Surface control at the top left-hand corner of the editor and then select the Refine Calibration option.



7.2 Refining Calibration using Front Panel ("Slim" Continuum)

Make certain nothing is pressing on the Continuum Fingerboard (no fingers or other objects on the playing surface or frame). Perform the following steps (be careful to do nothing else).

1. Press the **Oct–** and **Oct +** buttons on the front panel together and release to enter the Menu System.
2. Use the **Oct +** or **Oct –** buttons to navigate to the "**Cal**" Option.
3. Press **Preset +** button.
4. Press **Oct –** and **Oct +** buttons together to exit the Menu System

7.3 Refining Calibration using the Overlay Strip (Half-Size & Full Size Continuums)

Make certain nothing is pressing on the Continuum Fingerboard (no fingers or other objects on the playing surface or frame). Press and release the Red Button (on the left side next to the headphone jack), then touch the surface at the spot labeled "Calibrate" on the Overlay Strip. Release that spot then touch the Surface at the spot labeled "1". Release that spot; your calibration has been refined.

7.4 Discarding Calibration

This discards all previous calibration data. Discarding the calibration can make the playing surface too responsive, resulting in stuck notes. You can expect stuck notes to occur during the first hour of playing after discarding calibration; it will be necessary to refine calibration (see above) whenever you get stuck notes.

Using the Haken Editor: Click on the Calibrate Surface menu then choose Discard. This is the preferred method.

Using the Front Panel on the "Slim" model:

1. Press the "Octave –" and "Octave +" buttons on the front panel together and release to enter the Menu System.
2. Use the "Octave +" or "Octave –" buttons to navigate to the "Cal" Option.
3. Press **Preset -** button. The screen should indicate calibration was discarded.
4. Press **Oct –** and **Oct +** buttons together to exit the Menu System

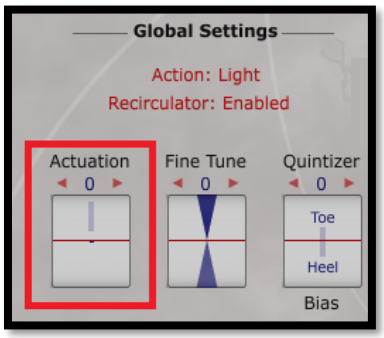
Using the Overlay Strip – Half-Size and Full-Size models: Press and release the Red Button, then touch at "Calibrate", then touch at "0".

Help is Available

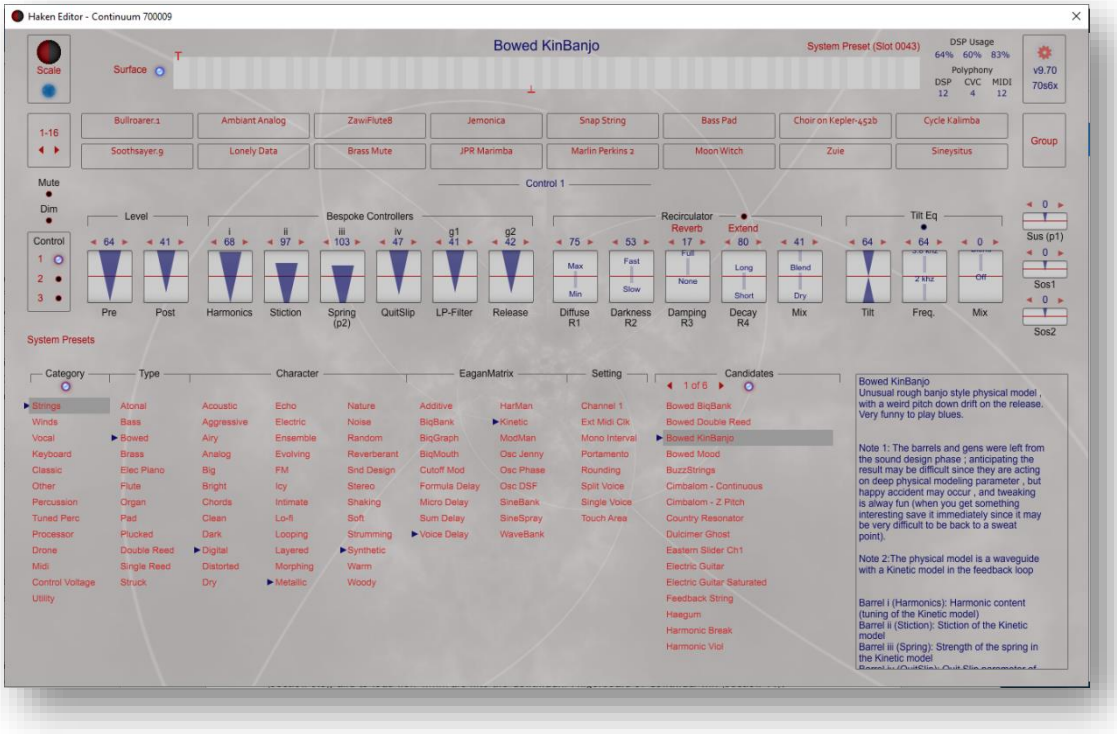
If you cannot get a good calibration, please contact Haken Audio for help. A good calibration is vital to a good Continuum Fingerboard playing experience.

7.5 Actuation – Addressing Stuck Notes and Sensitivity on "Slim" Continuums

If you perceive the fingerboard sensitivity is a bit sluggish on slight pressure to actuate a note, or if after upgrading firmware on the Slim models you have some stuck notes and you have performed "Refine Calibration" a couple times, you may need to change the "Actuation" Control setting in Midi and Global Settings. This is a "fine-tune" control to optimize the behavior of the playing surface's low level sensitivity. Typically (but not always) higher settings increase surface sensitivity. The default value is 0. You can experiment with this control. It won't harm anything. If you happen to have stuck notes when you are playing (or the notes play fine but the LED display appears to still be playing notes when you are not), try a refine calibration and continue. If the stuck notes persist, after a few cycles of playing and refine calibration, then try adjusting the Actuation value until stuck notes disappear (normally setting it lower if you have set it higher to try and increase sensitivity). (Note this has no effect for Half and Full Size models).



8. Introduction to the Haken Editor (with Post 9.55 Feature Summary)



The Haken Editor is used with all Continuum Fingerboard models and optionally with the EaganMatrix Module (only needed for firmware upgrade). The Haken Editor is an application by Edmund Eagan and Lippold Haken, available for both Mac and PC from the Haken Audio website. Most interaction with the Haken Editor comes from one expandable interface window that has a number of sub control panels and now different themes/skins, light theme shown above. The editor is used to create and configure all presets for playing parameters as well as (for half-size and full-size models) emulate the Continuum Fingerboard's Overlay Strip (Section 9), the Editor can also be used to save presets to your computer's file system, and open/load them later (Section 8.5), and to load new firmware into the Continuum Fingerboard, ContinuuMini or EaganMatrix Module (Section 11).

IMPORTANT: Keep the Editor application in the "Haken Editor" folder as supplied by Haken Audio. The Editor refers to other folders in this Haken Editor folder and will not function correctly when moved outside the Haken Editor folder. The editor is only meant to be used in conjunction with Continuum Fingerboards. It is not a stand-alone application and must be connected to the Continuum for operation. Also it does not load samples into the Continuum. It is used to create physical models that are loaded into the Continuum for sound generation (presets using a .mid extension but they are not MIDI files).

The Editor requires a bidirectional Midi communication. For the ContinuuMini, use the USB cable supplied with your ContinuuMini or any fully populated USB cable (as the Mini required power though the USB cable in addition to data).

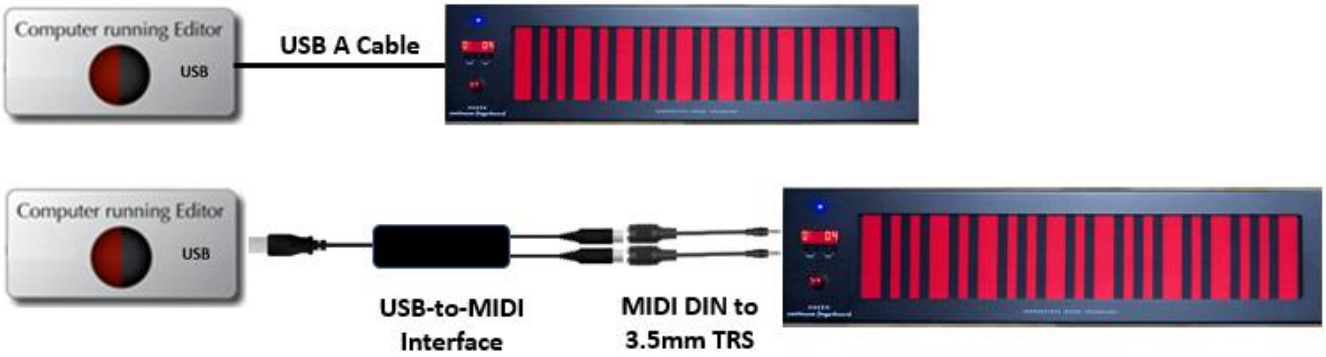
For the Half-Size and Full-Size Continuum Fingerboards, use a Midi DIN cable to connect between your Mac or PC and your Continuum Fingerboard (if they have Midi DIN connections), or if the computer does not support MIDI directly, a USB-to-MIDI interface is required. Connect the USB-Midi Adapter cable's MIDI Out DIN connector to the continuum's Midi In; connect the USB-Midi cable's MIDI DIN In connector to the Continuum's Midi Out. The Haken Editor automatically detects the Roland UM-ONE USB-Midi interface, but other USB-Midi cables will also work,

once you configure them in the Haken Editor (see Section 8.1). However, to upgrade firmware on the half-size and full-size models, you must use the Roland UM-ONE.



If you have trouble with your USB-Midi cable:
(1) Try resetting the USB-Midi cable by unplugging and re-plugging its USB connector.
(2) If you continue to have problems, try connecting your USB-Midi cable through a **powered USB hub**.

For "Slim" Continuum Models, you have the choice to connect to the computer running the Haken Editor with a USB connection direct to the computer's USB port (or through as USB hub). The same connection applies for the ContinuuMini. This is the preferred option and a USB cable is included with the Continuum for this purpose. You also have the option to use a USB to MIDI interface and connect to the Continuum using MIDI DIN-to-3.5mm adapters (not included).



Note: A variety of USB-to-MIDI interfaces might be used, however Haken Audio recommends the Roland UM-One, which is required for half-size and full-size models for firmware upgrades. Half-Size and Full-Size models must use this Roland USB interface for firmware updates. "Slim" Continuums and ContinuuMinis can use the standard USB Midi interface.

For other connection examples, please see Section 12. For ContinuuMini connections see section 16. For EaganMatrix Module see section 19.

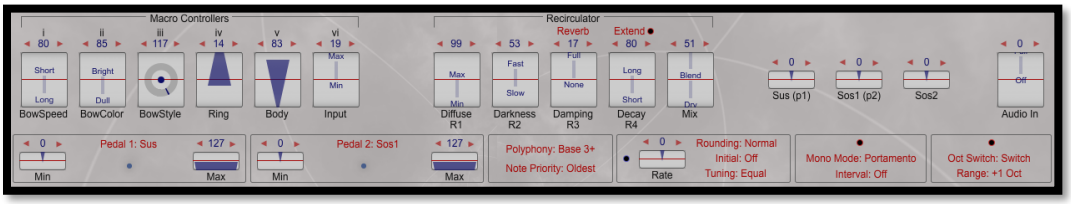
8.0.1 What's New in the Haken Editor and EaganMatrix (Post 9.55 Firmware)

Note that the Haken editor has been redesigned for use with all firmware after 9.0. Some of the top level new features and improvements are:

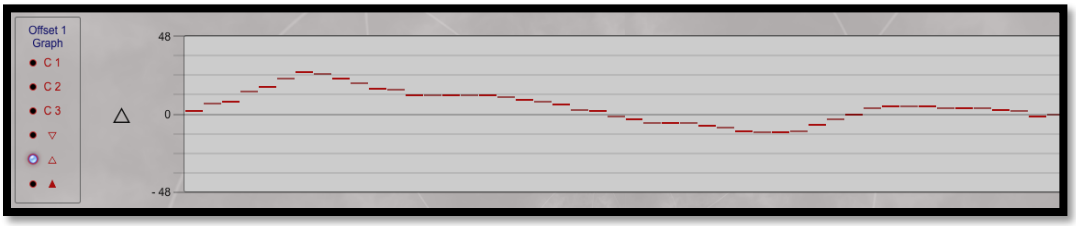
- Support for EaganMatrix Module (See Section 19)
- Support for Osmose – See Expressive E manual Set
- New Editor Look and Feel, similar to 9.55 but optimized for better performance use.
    - Bespoke Controls now Renamed Macro Controllers. Macro Controllers g1 and g2 are now renamed v and vi as they are identical to i, ii, ii and iv.



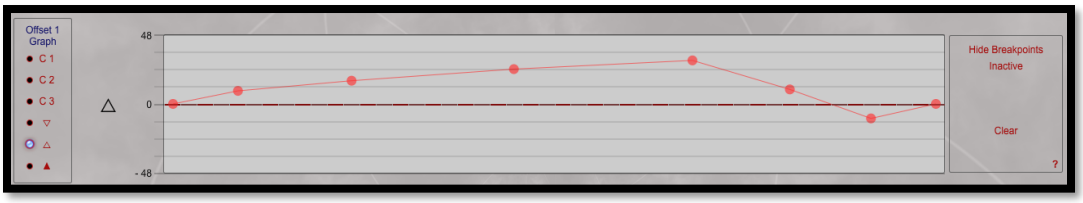
- Rearrangement of Control Panels for better performance use cases



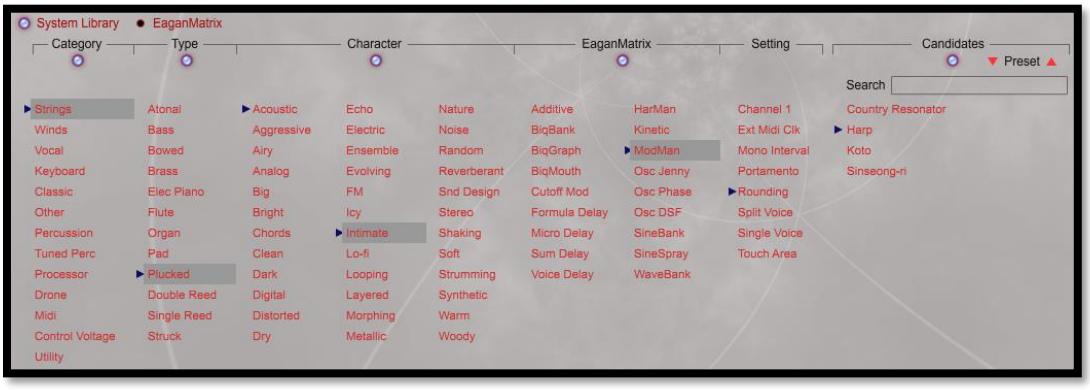
- Control Panels now add new Graphing options that allow for arbitrary note sets to be manipulated in various ways. For example you can set a pattern of notes to play as base notes or offsets to a another graph (See below).



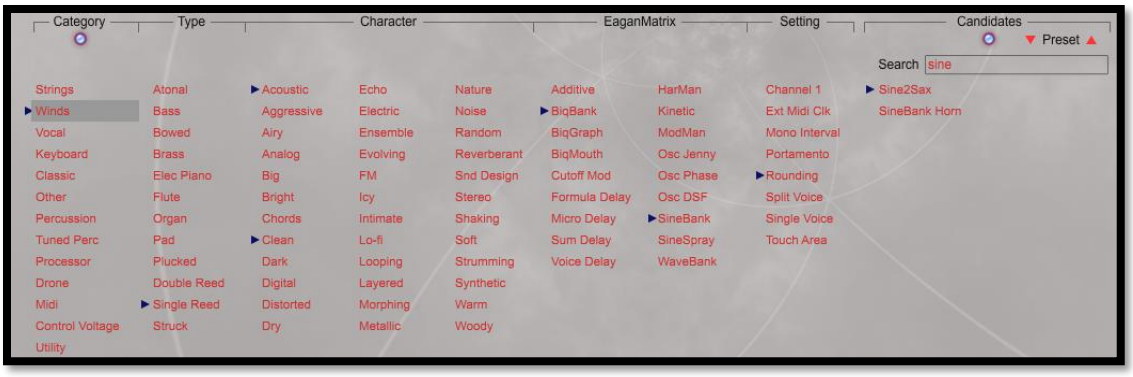
- New global breakpoints feature on the Graph layout



- A new System Preset selection panel which alternates with the EaganMatrix display when selecting the "System Presets / EaganMatrix" toggle text at the middle left-hand side of the screen. Post 9.55 Haken Editor supports selection not only by preset category (available in previous post 9.0 versions) but now also by sub-filter selection to narrow down searches for specific sounds you are looking for.



- You can also input a search text field for searching for specific presets by name (or partial name), that will take any sub-filtering into consideration.



- When in the Edit Panel Preset Category Codes Display can be accessed.



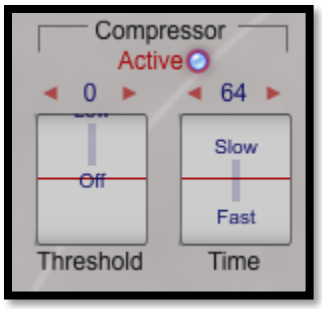
Note: These codes are used in the Editor by Haken Audio for creating System Presets mapping to the desired filtering options (Main Type, Sub Type, Character, EaganMatrix specific function and Setting). They are not of use for your own preset creation:



- New Attenuation display/Control mapping to Attenuation setting on Slim and EaganMatrix module. Click, Hold and drag up/down to change setting from 0dB (max output) down to no output (-infinity).:



- New Compressor function added to the Master Section and Editor. Select Active control to turn it on in editor and save preset if you want the Compressor to be active when loaded. This provides very light compression using the Threshold and Time setting as long as Threshold is set to a non-Off value. Midi CC81 (Threshold) and CC82 (Time) can be used to set the values from an external Midi controller and will take effect as long as the Compressor is activated.



- Additional WaveBank option: "Le Caine" – a special square wave based bank.



  - The Le Caine banks (named for Hugh Le Caine) allow you to control amplitudes (1x, 2x, 3x, 4x, 5x and 8x frequencies) of harmonic square waves. With the right controls you can create numerous timbre variations; you can cancel out even or odd harmonics, etc. It was not possible to do additive sine wave synthesis with the hardware Le Caine had available, but he did quite a lot with additive square wave synthesis that this new bank attempts to model.

- Ability to select presets using Category CC and then Program Change. cc57,cc58,cc81,cc82 are no longer used
  - Selecting categories and presets has changed, and the old cc57,cc58,cc81,cc82 are no longer used. The cc0 and cc32 work differently now, and now Program Change is used:
  - On channel 16, Program Change selects the preset.
  - Before you send the Program Change on channel 16, you can select the Category with cc0.
  - If you have a category with more than 128 presets, use Channel 16 cc32 to select the high 7 bits of preset number BEFORE you send the Program Change. If you do not send cc32 the high bits of the preset number are defaulted to value 0.
  - To save a User Preset, send the program change on Channel 15. But normally use Channel 16 to load presets, including User Presets.
  - If someone has a Beatstep (or similar third party device) , after turning on the Continuum / EaganMatrix Module, etc. the Beatstep can just send Program Change messages on channel 16 to select a user preset – the cc0 value defaults to 0 on turn on (meaning user presets)

Note: In the Haken Editor's Cogwheel display, for your Haken Audio instrument connected, Select the "List of Preset Selects via Midi" to see a list of the CC and Program Change commands to access each system preset:

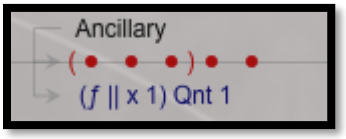
```
List of Preset Selects via Midi (for EaganMatrixModule)


Midi Program on Channel 16 selects the Preset number (zero-based) to load.
Optionally precede Midi Program by Controller 0 to select Category,
and also Controller 32 when high bits of the Preset number are nonzero.
On power-up, Controller 0 defaults to value 0 (User Presets).


cc0 =  6  cc32 = 0  pgm =  0    Acrylic Clock
cc0 =  3  cc32 = 0  pgm =  0    Additive Gnilham
cc0 =  3  cc32 = 0  pgm =  1    Additive Vocal 1
cc0 =  3  cc32 = 0  pgm =  2    Additive Vocal 1 Transform
cc0 =  5  cc32 = 0  pgm =  0    Ambiant Analog
cc0 =  9  cc32 = 0  pgm =  0    Ambient Delay
cc0 =  5  cc32 = 0  pgm =  1    Analog ADSR
cc0 =  5  cc32 = 0  pgm =  2    Analog ADSR - Var1
cc0 =  9  cc32 = 0  pgm =  1    Analog Echo
cc0 =  9  cc32 = 0  pgm =  2    Analog Echo Ext
cc0 =  5  cc32 = 0  pgm =  3    Analog Overload
cc0 =  5  cc32 = 0  pgm =  4    Another Big One
cc0 =  4  cc32 = 0  pgm =  0    Apiary
cc0 =  6  cc32 = 0  pgm =  1    Around the Periapsis
cc0 =  6  cc32 = 0  pgm =  2    Around the Periapsis Ch1
cc0 =  5  cc32 = 0  pgm =  5    Arpeggiator 4 Step
cc0 =  5  cc32 = 0  pgm =  6    Arpeggiator Resonant
cc0 = 13  cc32 = 0  pgm =  0    Audio Through
```

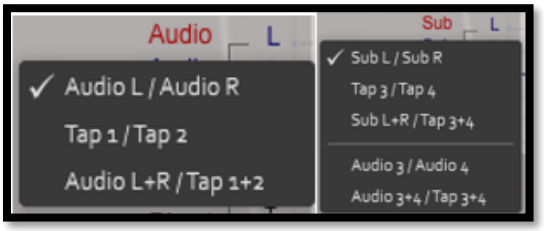
- Additional Ancillary level now supported for more complex formulas
  - **In 9.55 and earlier:**
  - Part 1: Domain of the ancillary equation (Formula, W, X, etc.)
  - Part 2: First Ancillary Operation
  - Part 3: First Ancillary Amount
  - **In Post 9.55:**
  - We've added two new parts:
  - Part 4: Second Ancillary Operation
  - Part 5: Second Ancillary Amount

    Example: In this new structure you could use an Absolute Multiply followed by an Quantize.
    W + X + Y + Z (Ancillary 1) AbsMult *1 (Ancillary 2) Previous Value Qnt 1



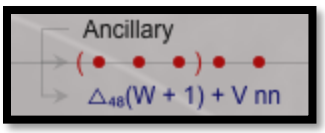
- Reworked the Audio/Submix/Tap matrix rows to be more inclusive and work better for processing presets that might run on Slim Continuums or on Thick Continuums or on EaganMatrix Modules.

  - Audio L / Audio R are analog audio inputs on EaganMatrix Module, digital audio input on first dsp on Thick Continuums and Slim Continuums
  - For two-combination presets, Audio L / Audio R on the first preset is digital audio input, on the second it is audio out from the first preset.
  - For three-combination presets, it works the same as two-combination presets with this addition: on the third preset Audio 3 / Audio 4 is audio out from second preset.
  - The Audio 3 / Audio 4 is only used for triple combinations processing presets (will be extremely rare, but it is there for completeness).

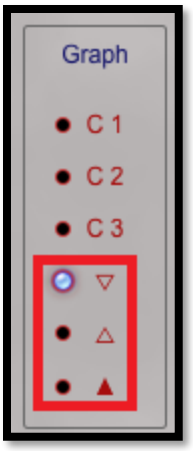


- On the Slim, the display showing fingers on the surface (showing their relative tuning to 100 cent steps) no longer shows the Touch Area's finger. It was confusing since that is not really a note that plays.

- Formulas have new features:
  - The Blend control now has a transfer function (like Y and Z).
  - The Ancillary Formula area is reworked; most notably it has a second Ancillary Operations you can apply if you want to.
  - Also, it allows you to do lookups into values in the Graph, Offsets Graph 1, or Offsets Graph 2 after applying the first ancillary operator. You can do 0..1 interpolating value lookups, or you can do integer non-interpolating value lookups; the former is useful for things that you would also use Shape Generators for; the latter is useful for selecting note numbers in a sequence or other such operations.



  - To go with the Graph Lookup capabilities of formulas, the Graphs can be selected just like the Control 1, Control 2, and Control 3 panes can be selected.



- Surface Menu Additions – For Haken Audio Support Debugging
    - **Mend Divided Note** – As you press a finger on the surface (usually at a medium-light pressure) and erroneously hear two notes (and see two rings in the Surface Display), select this menu option, and if the firmware can understand the problem it will fix it. You may need to try more than once to get this to work.
    - **Mend Pitch Discontinuity at Note** – If there is a pitch discontinuity on the surface, as you are pressing at the discontinuity, choose this menu option. The firmware might be able to identify the problem and fix it. You may need to try more than once to get this to work.
      These operations should only be done after an otherwise really-good calibration.
- More Screen Scaling options
- Improved USB3 Hub Compatibility
- 6x Upgrade now available for Half and Full Size Continuum Models. Requires shipping back to Haken Audio.



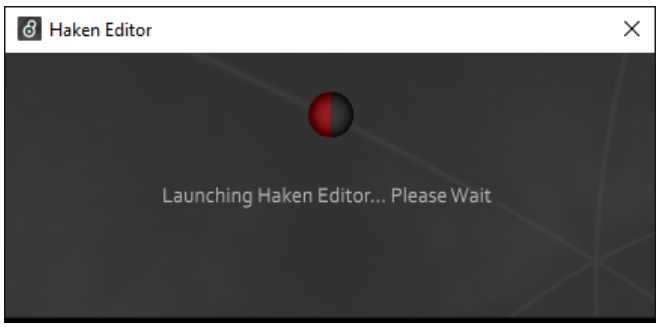
- Additional model number supported
    - 94U6x – Full-size thick Continuum with upgrade board
    - 46L6x – Half-size thick Continuum with Light Action and three 2x DSP boards built in
    - 94C1x – Full-size thick Continuum with Classic Action (Classic Action continuums cannot be upgraded with the 6x upgrade)
    - 49o6x – Osmose
    - 70s6x – Slim70
    - 46s6x – Slim46
    - 29m2x – ContinuuMini
    - E2x – EaganMatrix Module

- Additional presets (post 9.55), with a significant expansion of PR (DSP Processing) presets intended to operate on Audio Inputs (specifically included for EaganMatrix Module use which accepts direct Mon/Stereo Analog inputs. However the processing presets should also work on Continuums with AES digital audio inputs.

8.1. Setting up the Haken Editor

When you run the Haken Editor for the first time, make sure that you have the before-mentioned bidirectional Midi connection set up. The Haken Editor will not function at all if this is not set up properly.

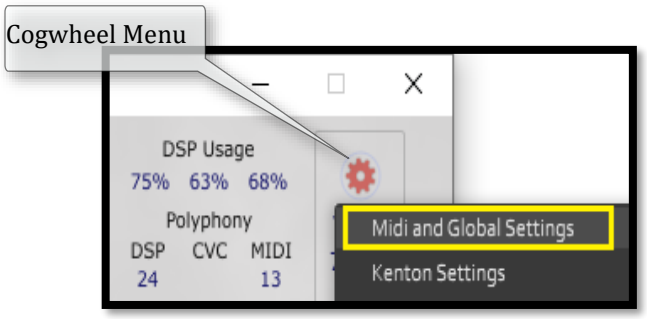
Make sure your Continuum or ContinuuMini is on and connected to your computer through USB, then launch the Haken Editor, and wait for the Editor to appear on the screen. An intro splash screen will appear for about 45 seconds:



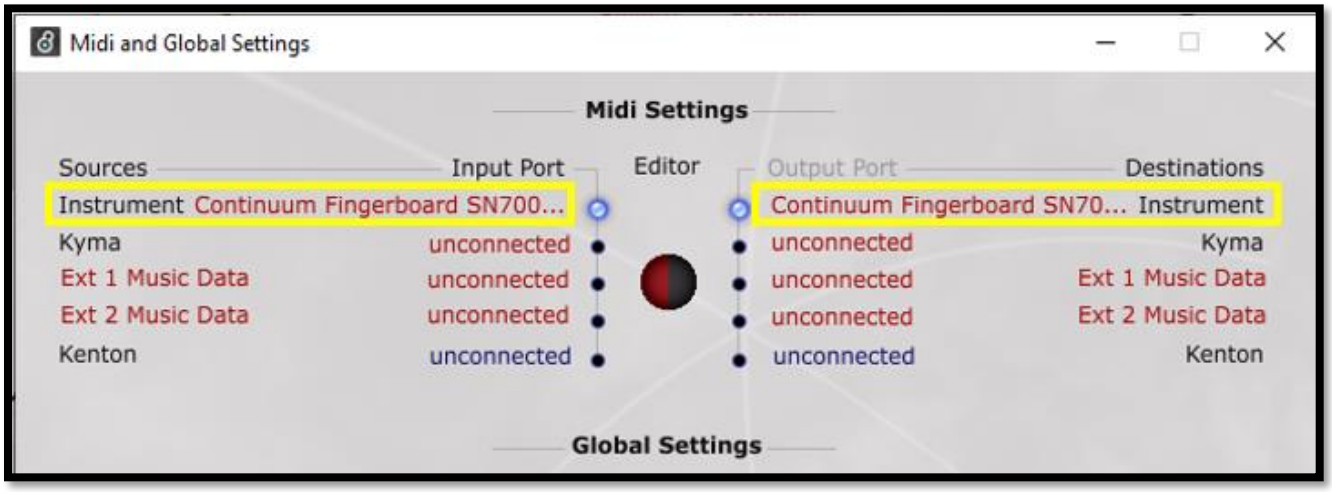
after which the editor should come up and finish loading for about 15 seconds. If running for the first time, the default dark theme will appear (this can be changed in Midi and Global Settings to a Light or Neon Theme).



The LED on your Continuum may change colors but should eventually change to a steady blue state as should the LED in the Editor (indicating connection established). Normally the Continuum or ContinuuMini will be automatically detected, however, if the LED in the editor remains gray at first launch, the Midi routing in the Editor might have been connected to a different Continuum device if you have more than one (for example a ContinuuMini or Osmose). To establish/verify this connection, go to Midi and Global Settings in the cogwheel menu as shown below.



Select Midi and Global Settings to view the Midi Settings selections.



Midi and Global Settings (in the cogwheel menu)

Check that the (Continuum) Instrument Source and Destination I/O Port LEDs are both blinking. It is possible for the Output Port LED to blink but not the Input port. If the Source Instrument Continuum Input Port LED is not blinking, the editor has not established proper connection with the Instrument. The example above uses a "Slim" Continuum connected using its onboard USB interface. In this case the Continuum device is detected and displayed. If you connect to the Continuum using a UM-ONE Midi interface, the UM-ONE device will be detected and displayed. It is possible to connect both Continuum USB and UM-ONE to your computer and select the one desired, but not recommended. Note: "Slim" model continuums do not require a UM-ONE for operation or firmware download if the USB port is used. Always connect the USB device to your computer before bringing up the editor.

The Midi Connections area has three pairs of popup menus for routing Midi data from Source/Input Port and Destination/Output port, as described below.

The "Continuum" Instrument connections: Connections from/to the Continuum Fingerboard.

If you are using a direct USB connection to "Slim" Continuums, ContinuuMini or a Roland UM-ONE USB-Midi cable connection, your Continuum connections will be automatically detected (though if you have multiple Continuums or ContinuuMinis connected the editor will normally remember the last one connected and default to that). Otherwise, click on the popup menus (red text) to select your connections. Once the input and output connections for the Continuum Fingerboard are correctly made, the LED at the top-left of the main Editor window will change to from "off/gray" to "blue".

If the LED does not change from "off" (or possibly a temporary green state in "Slim" models) to "blue":
(1) Double-check your cable connections. For a Continuum Fingerboards using the direct Midi Connection, the USB-Midi cable's "Out" should be plugged into the Continuum Fingerboard's Midi In, and the USB-Midi cable's "In" should be plugged into the Continuum's Midi Out.
(2) Double-check your popup selections in the Haken Editor's "Midi and Global Settings" making sure the desired Continuum Instrument is selected.
(3) Try resetting the USB-Midi cable by unplugging and re-plugging its USB connector.
(4) If you continue to have problems, try connecting your USB-Midi cable through a powered USB hub.
(4) If using the direct USB connection on "Slim" models and ContinuuMini verify the USB port is operational. If you repeatedly plug different Continuum devices into the same USB port, the computer can become confused and expect a wrong device. Rebooting the computer normally solves this issue. In some cases you may have to go into the operating system are clear the USB port allocation.

Note: If you are connecting more than one Continuum or ContinuuMini to your computer, you can only run one editor connection at a time, but you can easily switch between Continuum connections by changing the input and output port Instrument devices in Midi and Global settings.

The "Kyma" connections: Connection between the Continuum Fingerboard and Symbolic Sound's Paca(rana) hardware via the Editor.

If you are running Symbolic Sound Paca(rana) hardware, you can connect to it via Midi or (even better) connect to it using Delora's KymaConnect software. A bidirectional connection between the Paca(rana) and the Continuum is necessary in order for Kyma to communicate information about its currently playing sound to the Continuum Fingerboard. Set to "unconnected" if no Kyma Paca(rana) system is present. (Also see Section 10.10 for a required Kyma-specific configuration option.)

The External Device ("Ext1, Ext2") connections: Connections between the Continuum Fingerboard and an External Midi Devices via the Editor.

The "ExtDevice" connections create a bidirectional communication with a hardware or software synthesizer and the Continuum Fingerboard through the Haken Editor. If you do not have an external synthesizer or controller, set the "ExtDevice" to "unconnected." Make sure the desired device is selected. This can be a ContinuuMini if you wish to send data from a Continuum to ContinuuMini. Make sure you connect the device before bringing up the editor or it will not be detected. Set the Ext device for the desired input and output data types:

- Music – Midi Note, Pitch Bend, Aftertouch, Velocity and some Continuum controller data
- Config – Control data such as preset changes
- All – Both Music and Config Data

Remembering the Midi Setup connection in the Haken Editor:

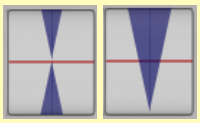
When the Editor is closed, the Midi connections are automatically remembered. When the Editor is reopened it will try to establish connections with the same named Midi ports. Midi devices should be turned on and connected before starting the Editor. If you connect an external device while the editor is running, it will not be detected until the editor is restarted.

Examples

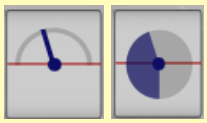
Please see Section 12 for examples showing connections to external hardware.

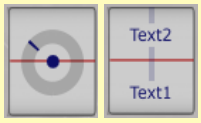
8.2. Using the Haken Editor

The control types in the Haken Editor are popup menus, dials, toggles, controls, and sliders.

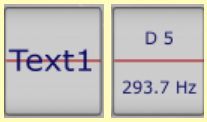
Macro Controllers (i, ii, iii, iv v, vi) 	The i, ii, iii, and iv Macro Controllers are parameters for the currently loaded preset. Click and drag mouse vertically to desired value. Numerical value above each control will update as well. Note: These were previously called "Barrels" and "Gens". They are now all identical in nature and simply called "Macro Controllers" (i, ii, iii, iv, v (old Gen1/g1) and vi (old Gen2/G2). Note: Macro Controllers is the new name for Bespoke Controls 

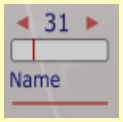










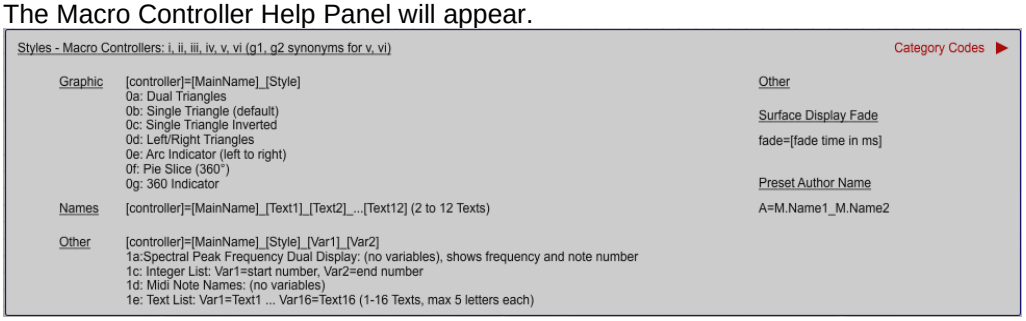


Most of the earlier "Barrel" graphics have been removed. The previous "Barrel" styles are no longer available from the Cog Wheel. Online help on configuring Macro Controllers is available by selecting the Edit text at the bottom left of the matrix. Note: The option for opening Controller Style is no longer supported as all the styles are listed in the table.



To add Macro Controllers Select Edit at the lower left hand corner of the editor and enter your desired control(s).

The Macro Controller Help Panel will appear.



Consider the following Macro Controller Layout:



The edit text to define these would be:
"i=BowSpeed_Long_Short ii=BowColor_Dull_Bright iii=BowStyle_0g iv=Ring_0c g1=Body g2=Input_Min_Max"

Radio Button Selections

Selection one option from a number of selections (primarily Control Panels and System Preset selections)

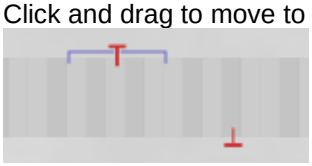
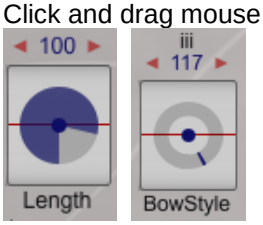
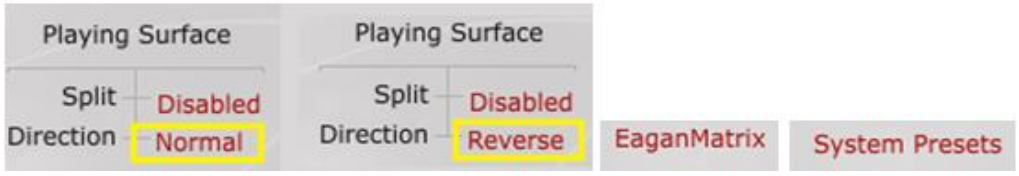
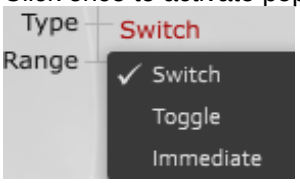
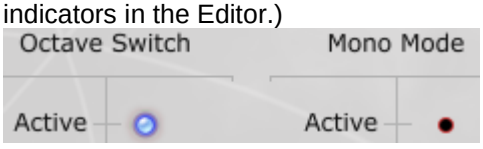


Sliders (9.55 and earlier) & Vertical Controls

Click and drag indicator to desired value (Pedal controls previous to Haken Editor 9.7).



Note: Horizontal sliders in Haken Editor 9.7 versions and above have been replaced with vertical controls which are easier to adjust:

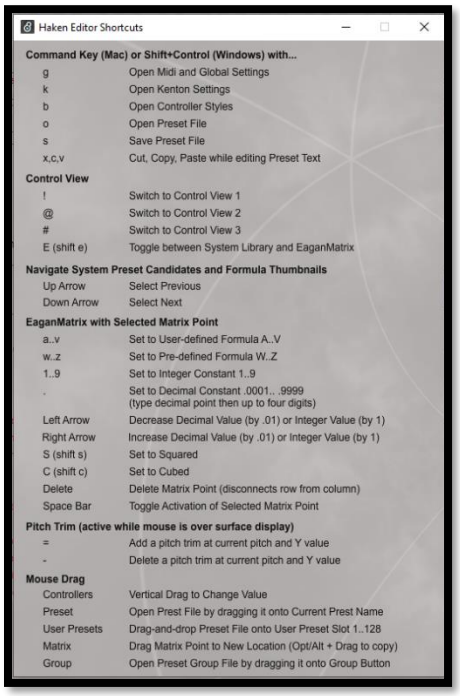
	
Draggable Objects	Click and drag to move to a selected position (Middle C and Touch Control) 
Dial	Click and drag mouse vertically to desired value (alternate control style). 
Toggle Text Value	Click to toggle value which might also change a display state (as in "System Preset"/"EaganMatrix" Toggle). 
Selectable Exclusive Objects	Click Red Text in an object to select from a series of other objects and perform an operation (load presets). 
Popup Menu Text or Numerical	Click once to activate popup, click on the desired value to make a selection. 
LED State Change with Blue Halo	Click to change. Shines blue for "on", dark for "off". (Here "Led" refers to small status indicators in the Editor.) 

The Haken Editor gets the current configuration from the ContinuuMini's or Continuum Fingerboard's internal memory. When the Haken Editor is running, changes made any of these ways will also be updated on the Haken Editor's screen:

- the ContinuuMini's 4-button interface, or
- the Continuum's front panel interface ("Slim" Continuum)
- the Continuum Overlay Strip (Half-Size and Full-Size Continuums), or
- the Kenton Mini Controller, Arturia BeatStep/BeatStep Pro, or another external Midi controller that might change a Continuum parameter including loading presets.

8.3. Haken Editor Shortcuts

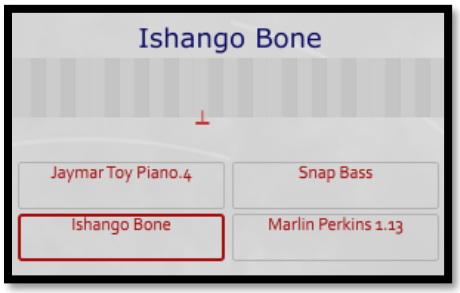
This list of keyboard shortcuts can be found inside the Cogwheel menu of the Haken Editor.

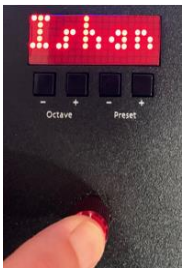


8.4. Current Preset and Selecting System Presets

The "Current Preset" is the preset that sounds when you play on the surface. This may be one of the 128 User Preset, one of the 400+ System Presets or one you or the Continuum user community might have created or modified yourself. The Current Preset can also be edited, saved to disk (Section 8.5), or stored to a User Preset Slot (Section 8.6).

Haken Editor releases after 9.0 always show the current preset at the top of the Haken Editor screen. The red or black rotary on "Slim" Continuum and red faced rotary on the EaganMatrix Module can be pushed to scroll the current preset across the LED screen in normal playing mode.



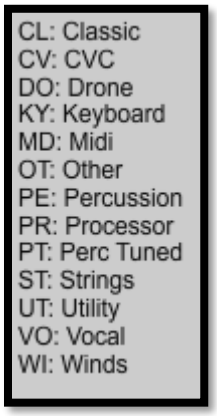


System Presets in the Haken Editor are now organized into a number of 2-letter mnemonic category codes which are displayed on the LED panels of Slim Continuums and EaganMatrix Module with the current preset number loaded in that category:

For example Utility Category, preset #41 would be displayed as follows:



Current Preset Categories include:



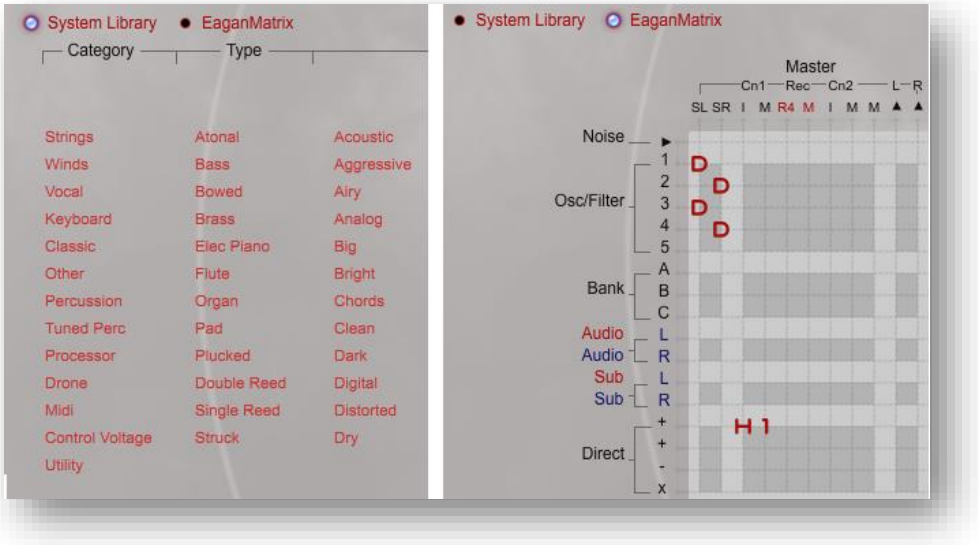
ContinuuMini displays presets as its LED screen as a category number followed by preset number:

315 indicates Category 3, Preset #15.

1121 indicates Category 10, Preset #21



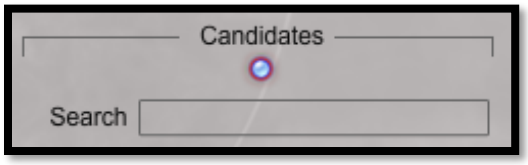
System Preset selection in the Haken Editor (after version 9.55) is performed by entering the "System Library" selection window that appears on the bottom half of the editor screen. This is the default view when running the editor. If the EaganMatrix toggle is selected, select the EaganMatrix will appear in its place.



Haken Editor 9.7 and above contains a System Presets selection panel containing a list of Categories and Candidate Presets within that category that can loaded as the current preset choosing the desired selectable Filtering options.

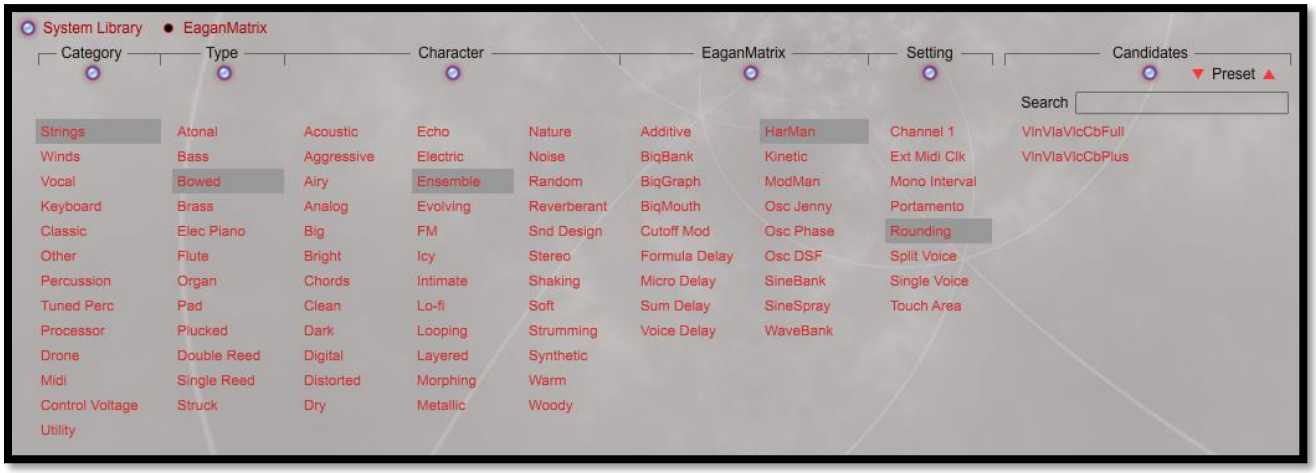
To search for presets either

- Use the Search Text entry field to search for a desired string in the System Preset's name



- Select any option or set of options in any of the filter headings. Headings include:
  - **Category** (Select major category of preset: Stings, Vocal, Utility, etc.)
  - **Type** (select a more focused type in the category" Atonal, Bowed, Brass, etc.)
  - **Character** (Select the character of the preset desired: Airy, Clean, Soft, etc.)
  - **EaganMatrix** (Select desired EaganMatrix modeling function: BiqBank, WaveBank. etc.)
  - Select a Setting

  Presets that match to the selected options will be listed in the Candidates column. Note the more filtering options you select, the higher the likelihood of getting no matches.



On loading the preset, System Presets panel will show the selected filtering options as well as indicate (with black triangle markers) all filtering options that apply to the selected preset along with the Help text for that preset. This new feature allows for a much more convenient preset selection method as well as helps the user who want to study EaganMatrix programming and desires to find examples that use a specific set of EaganMatrix facilities.



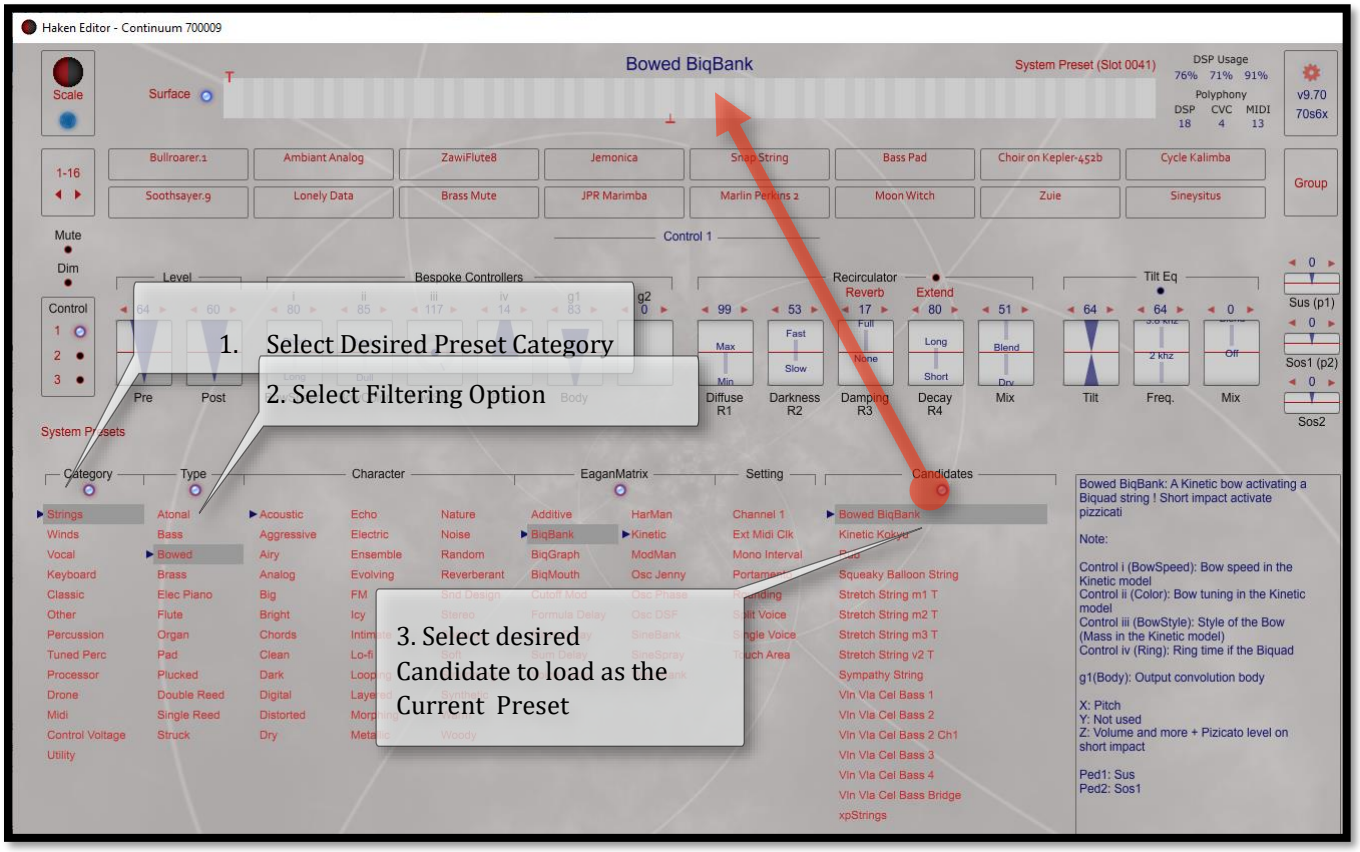
Note that once a filtering option is selected, a radio icon is lit informing the user that that option is active:



Click the Radio icon to turn off that filtering option.



To load one of the System Presets into the Current Preset, simply select the desired preset from the Candidates list.



Note that many combination of Categories and Filtering options may produce no Candidate matches. If this happens, reduce the scope of filtering until you get a desired set of Candidates. You can always turn off all sub-filtering and only apply Category/Candidate selections.

8.5. Open and Save User Presets in the Editor

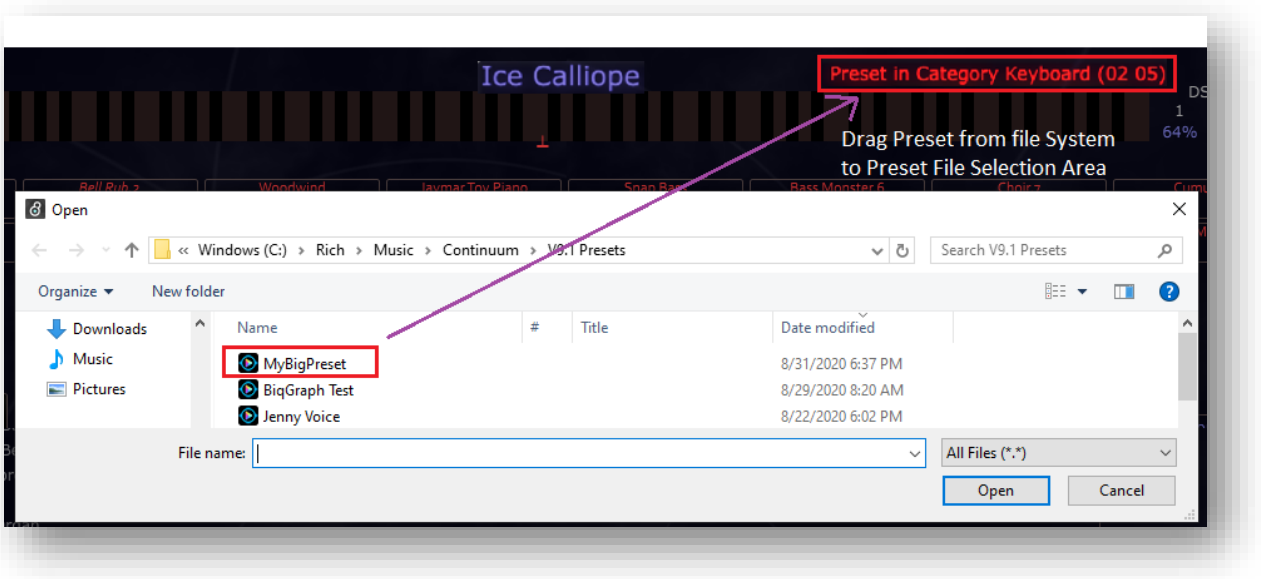
In new versions of the Haken Editor (post version 9.0) a toggle text field appears to the right of the Preset name at the top of the screen which lists the numeric preset category and preset number. Click the "Preset in Category …" text to bring up menu selection to Open and Save a preset to disk.



Open Preset from Disk

To open a Preset file on your Mac or PC, choose "Open Preset from Disk", or press Command+O (Mac) or Control+O (Windows). Navigate to the directory of your choice in the Open dialog and select the desired preset.

You can also drag a file from the Finder (Mac) or Explorer (Windows) and drop it onto the Editor's "Preset" File selection area:



The Preset indicator will change to note that the current preset has been loaded from disk.



In this case, the Preset number on the LED for "Slim" model Continuum Fingerboard will change to "usr 00", indicating the file is an externally loaded preset, not a User or System Preset (User Presets start at "usr 01").



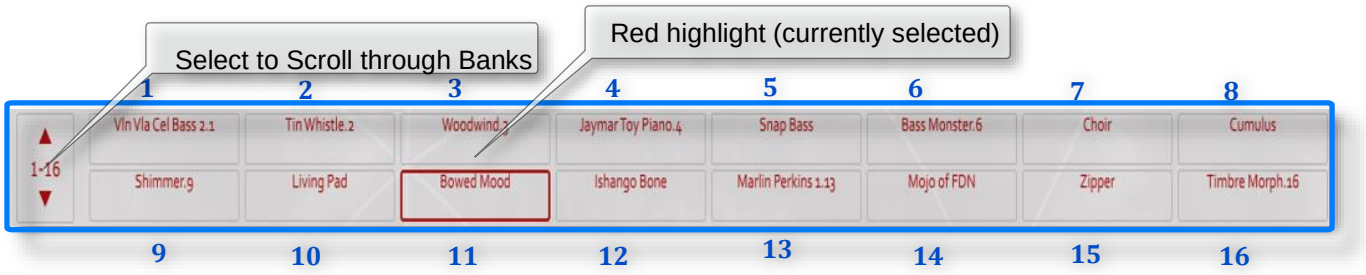
A Preset file holds a complete configuration of the Continuum Fingerboard (except for a few settings that are Global and are common for all presets). You can find Preset files in the Archives folder within the Haken Editor's folder, or anywhere else on your computer where you have previously saved Preset files. These use the .mid file extension so be careful not to load a general MIDI file which should be rejected by the editor.

Save Preset to Disk

To save a Preset file on your Mac or PC, choose "Save Preset to Disk" in the Current Preset popup menu, or press Command+S (Mac) or Control+S (Windows). The default name selected for the file in the "Save As" dialog will be the current preset name reflected in the Haken Editor, which you can change to any name you like if desired before saving.

8.6. User Preset Slots and Preset Groups (Selecting, Saving & Storing Presets)

In addition to opening and saving Preset files on your computer, you can also load and store presets into any of the 128 Internal User Preset Slots inside your Continuum Fingerboard. This number has been expanded from 16 User presets in earlier Haken Editor releases (for 2x and 6x models). They are arranged into eight banks of 16 presets for ease of use through editor selection. When you change or add presets to them in the editor, they will be written to the Continuum or ContinuuMini. External Midi devices such as the BeatStep Pro can be used to bring up any of them as the current preset being played in addition to using the editor or front panel on the Slim Continuum.



The display defaults to Bank 1 (Presets 1-16) which are prepopulated in the EaganMatrix release. The other banks are accessible in the Haken Editor by scrolling down (and up) using the arrow indicators in the bank select area to the left of the User presets. You can access bank presets 1-16, 17-48, 49-64, 65-80, 81-96, 97-112, 113-128. Currently all but Bank 1 is empty on firmware installation. Haken Audio may prepopulate more in future. Note: Only 2x and 6x Continuums can access the extra banks. Note that once all 16 presets in a bank have been loaded as a group or individually using Shift-Click, they cannot be erased (blanked out). You can load the /Utilities/Empty preset into a preset slot if you want that position to make no sound.

Note on the Slim Continuum these show up a "**00 0-128**" in the LED display and you can use the **Preset + and Preset -** buttons to scroll through them. On the ContinuuMini they show up as **0-128**, however presets 120-128 are displayed as 1'0 = 120, 1'1 = 121, … 1'8 = 128. This is because the number 2 requires more segments in the display that this allows three digits to be fit into two segment slots.

It is usually preferable to save Preset files in your Computer's file system (Section 8.5), but when you do not have your computer connected to your Continuum Fingerboard and need access to custom user designed sounds, the Internal User Preset Slots give you access to up to 128 presets stored internally in your Continuum Fingerboard that will be retained on power off/power on (as are all the System Presets).

To recall a User Preset from a slot, simply click on the desired User Preset Slot.

User Preset Slot 2 ("Tin Whistle") has been recalled



and is now the Current Preset.

To store the Current Preset into a User Preset Slot, shift-click on the target User Preset Slot. The preset will be renamed appending ".n" to the name, where n is the preset slot number 1-16.

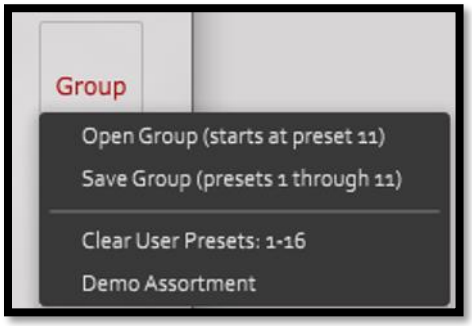


Tin Whistle has been stored into User Preset slot 97 (slot 1 of 16 for that bank).

It is also possible to drag and drop a preset (.mid) file directly from your disk into any of the 16 User Preset slots. In this case the preset will not be renamed. Note that only .mid files created with the Eagan Matrix can be used as this is not a general MIDI file.

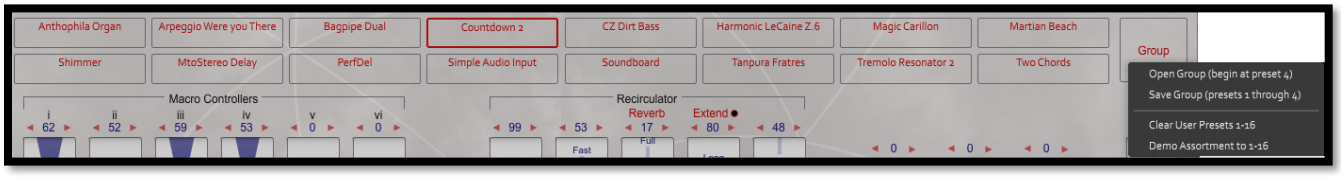
8.7. Open a Preset Group File

A "Preset Group" provides a convenient way to load a group of user presets into the User Preset Slots from your computer's file system. Preset Group operations are accessed from the Group control at the top right of the screen:



A Preset Group can have anywhere from 1 to 16 members and can be loaded into any User Bank starting at any position. The members of a Preset Group load back into the selected user bank at the selected preset position starting at the first preset in the group. If there are more presets in the group than can be restored based on the position selected, they will be ignored. A common use of the preset group is to store a full set of 16 presets than can be restored into a complete bank, but any smaller set from 1 to 16 presets can be placed in a group.

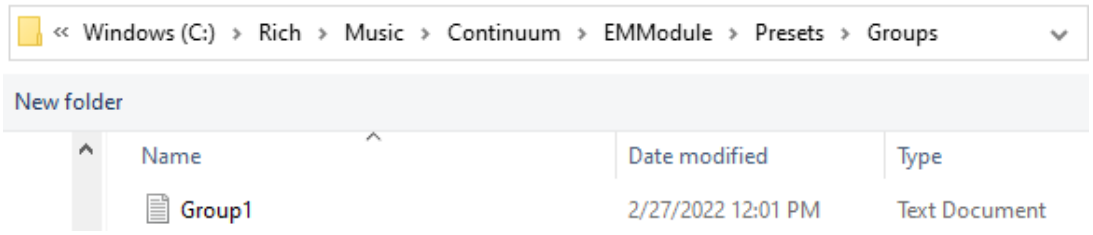
To open a Preset Group file, select a User Preset in any bank of User Presets, go to the Group control and choose "Open Group" in the Group popup menu, or drag a Preset Group .txt file you have created from the Finder (Mac) or Explorer (Windows) and drop it onto the Editor's Group popup area. The group will start loading from the first preset in the group at that position. For example Preset #4 is selected here and if a group is loaded it will load from Preset #4



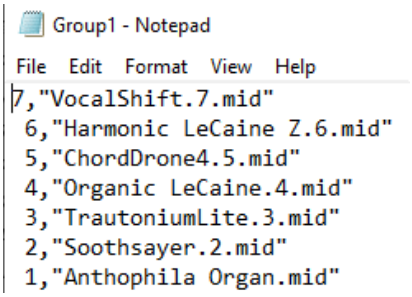
.

A Preset Group file contains a list of User Preset files for the Internal User Preset Slots. You can store 1-16 presets in a group based on the User Preset list. When you open a Preset Group file, the Internal User Preset Slots will be updated to contain the presets listed in the Preset Group file. It is suggested that each Preset Group be stored in its own its own folder as it will contain the group.txt file and all the group member presets (.mid files).

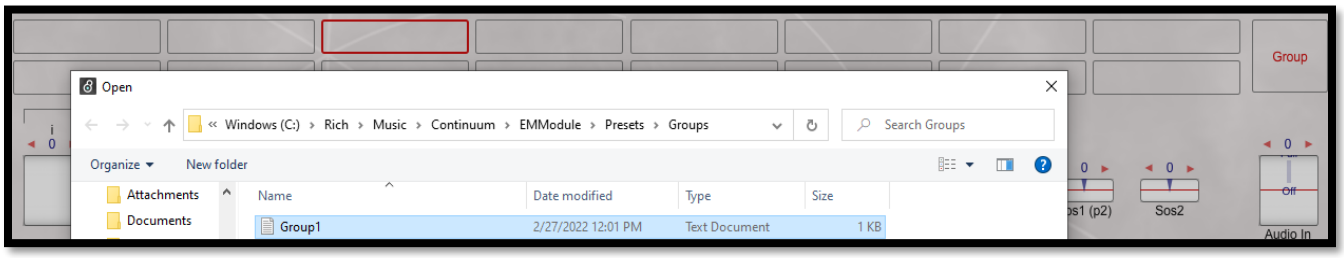
As an example, a preset Group ("Group1.txt") has been stored in directory …/Groups and it contains seven presets. The folder containing the Preset Group can have any name. It does not need to match any of the names of the files inside the folder.



The order of the presets can be seen by looking at the group.txt file. Note presets are stores and restored in reverse order.



Let's select an empty User Preset Bank (#17-33 in this case) and then select User Preset #3. Then select Group control "Open Group (starts at preset #3)" – note it tells you what User Preset you are restoring the selected Group from. Navigate to the Group you want to restore ("Group1.txt" in this case).



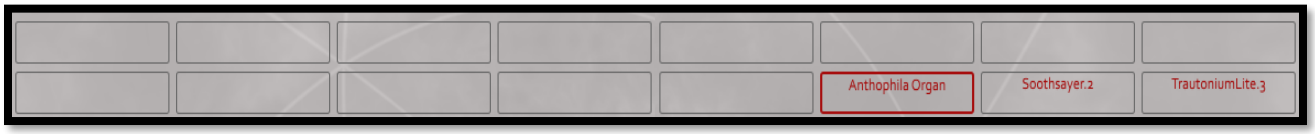
Select it and then the group should restore at your selected position activating the first preset as the current preset. (Note: You could have dragged a group file to that position to perform the same operation).



Group of seven presets restored at Use Position #3

After restoration, User Presets 1-2 are still blank and the original sequence of presets in the group are restored in positions 3-9.

If this same operation is performed at User Position 14, the first three presets in the group will be restored, but the remaining presets will be discarded.



Finally if you restore a preset group over a full set of user presets, only the presets defined in the group will be restored from the given position.

Restoring the above group from preset 9:



Will overwrite presets 9-15 with the preset group and the original presets in that group will be retained:



8.8. Save a Preset Group File

To save a Preset Group file onto your Mac or PC, select the ***last*** Internal User Preset Slot you want included in the Preset Group file, then choose Save in the Group popup menu. This Save Group option will create the Preset Group file as well as individual Preset files. For example, if you click on the Internal User Preset Slot 5 and then choose Save in the Group popup menu, you will get a Preset Group file that contains the list of Internal User Preset Slots 1..5, as well as 5 Preset files (one for each listed preset). It is best to save each Preset Group is in its ***own*** folder; that folder will contain the Preset Group .txt file as well as all the group member presets (.mid files). The "Save Group" menu option will inform you what preset range will be saved.



Highlighting User Preset 7 and choosing Save Group from the Group pop up menu will prompt the disk system for a location to store the Preset Group .txt as well as its 7 User Presets from slots 7,6,5,4,3,2 and 1. The Save Dialog will also allow creation of a new folder for the Preset Group; it is best to save each Preset Group in its own folder.

To avoid accidentally overwriting your Preset Groups with a possible future firmware update it is best not to store the Preset Group folders in the Haken Editor folder.

8.9. CEE Combination Presets (Primarily Intended for 6X Processing Continuums)

Note: Combination Presets do not apply to ContinuuMini, EaganMatrix Module or Continuums with than less than 3X Processing, though best results are intended for 6X processing models.

As opposed to a split that uses an EaganMatrix preset on one half of the fingerboard and External Midi output on the other (allowing the Continuum to be used seamlessly in conjunction with other MPE instruments), all combination presets will reduce available polyphony. You may get "Reduce Polyphony" messages in some combination groupings especially if playing polyphonically. You may have to reduce polyphony to the point that the preset does not perform as expected. This is normal operation as combination presets reduce the available DSP processing versus loading a single preset. Also because each preset is often tightly coupled with specific fingerboard operation, layering presets may produce unexpected results as the same fingerboard inputs will be applied to all layers. They are provided as a way to expand the Continuum's sonic palette and you may find them useful depending on the presets selected (or programmed) - as long as you are aware of these limitations.

Combination Presets can *only* be used on Continuum Fingerboards that have at least 3x DSP processing capability. Thus they are supported on all "Slim" model Continuums and those expanded past 2x processing. Combination Presets cannot be used by the ContinuuMini or EaganMatrix Module which are limited to 2x processing. Also note that multiple Continuum Fingerboards cannot be connected to provide more processing power, but you can play one Continuum Fingerboard or ContinuuMini from another in effect simulating some of the CEE combinations modes.



A Combination Preset made of three presets, in User Preset Slots 1, 2, and 3.

A Combination Preset consists of two or three adjacent User Presets whose outputs ae combined in a number of ways. The Editor will clearly note the combination grouping by highlighting the border around all presets in a group as shown above. When a Combination Preset is loaded, each of the presets in it is assigned one or more of three DSPs, referred to as DSP 1, DSP 2, and DSP 3. A Combination Preset can be in one of several playing modes depending on the selection in the Split options under the Display panel (Section 10.12):

Available Combination Preset Modes: (Note some of these have changed from previous combination mode options). Now the first preset in a dual grouping uses DSPs 1 and 2 and the second preset in the grouping uses Preset 3.

Split between Two Presets (Below/Above): The Continuum surface is split so that the first preset in the combination is played below the split point and the second preset above it.

Split between Two Presets (Above/Below): The Continuum surface is split so that the first preset in the combination is played above the split point and the second preset below it.

Processing of Two Presets (Finger/Processing Only): The first preset uses finger data and the second preset processes the first.

Processing of Two Presets (Finger/Finger): Both presets use finger data and the second preset doubles (mixes with) the first.

Three Presets (Layered): Each preset uses its own DSP and all three layer with each other.

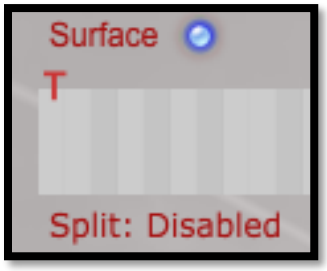
8.9.1 Creating Combination Presets

You are not limited to creating only one Combination preset. You can create as many as can be made from the number of User Presets you have set, though they cannot overlap. They can be created in all User Preset banks.

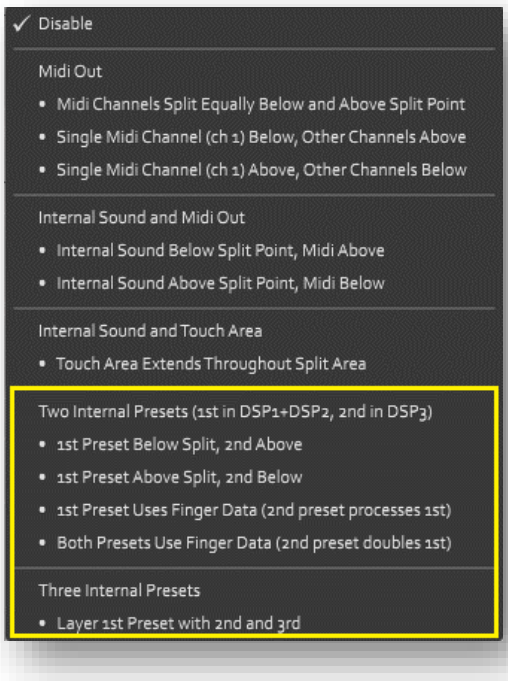
To create a Combination Preset, store two or three presets into consecutive User Preset Slots. Then click on the first of the presets you want in your combination group. This will also make that preset the current preset until you create the combination group.



Then bring up the **Split** panel loaded under the Surface display:



Make the desired Combination Preset selection. Note there are other options in this panel that relate to how sound and MIDI are output based on the split point.



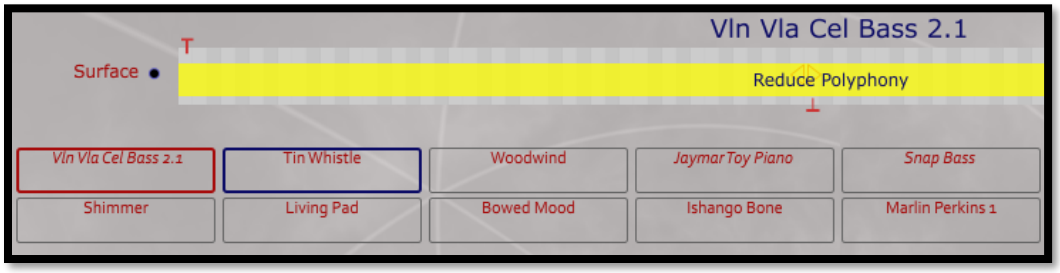
Once you make your Dual or Triple Preset Combination selection, the appropriate User presets will all be highlighted in the group that has been created. The currently selected preset in the group is highlighted in red and the others in blue. IN addition the first preset in the group will be renamed with the User Preset slot number appended to the name.



You can select another User preset and that will be highlighted as normal, but if you click any of the presets in the combination group the entire set will be highlighted so you always know all are in effect. You must however remember the type of Dual or Triple combination created as that is not displayed.



You may get "Reduce Polyphony" messages when creating Combination presets, especially with 6x processing continuums. In this case go to the first preset in the group and reduce its Polyphony by 1. That will normally remove the message.



8.9.2 Combination Presets and Slim Continuum

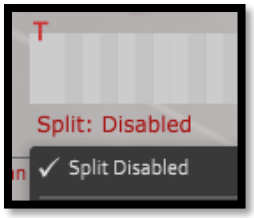
On "Slim" model Continuum Fingerboards, a combination preset is also indicated on the front panel placing two or three LEDs on the bottom LED panel display for any preset that is part of the combination:





8.9.3 Removing/Disabling Combination Presets

To remove any combination preset, select the first User Preset in the Combination Group (all will still be highlighted) and in Split option, set to Disabled. Note that if you select the second or third preset in an active combination group, it will always show up as Disabled.



The combination outline will disappear and the User Presets will be back in their normal playing state for that group.



If desired you can set to a current Combination Preset to a different combination or split type as well in this manner.

8.9.4 Editing Presets in a Combination Group

You can select any preset in the Combination Group for editing. The currently selected preset in a group will be highlighted in red. The others will be highlighted in Blue:



When a Combination Preset is selected for edit ("Tin Whistle" in the image above), edits you make in the EaganMatrix only affect that preset, but you will also hear the other presets in the Combination Preset when you play on the surface. After you make edits to the first preset, *you **must** shift-click on that User Preset Slot to save edits to the slot*. (You will lose edits unless you remember to do this!) If you try ad save a preset to a different slot in the combination preset you will get an error message:



If you want to edit the other presets in the Combination, first save any edits you made to the first preset by shift-clicking on its User Preset Slot. Then click on the second (or third) User Preset Slot. When you complete your edits, once again *shift-click in the same preset's User Preset Slot to save your combination edits*. **(Once again, you will lose edits unless you remember to do this!)**

8.9.5 Storing (Saving) and Loading (Opening) Combination Presets

When storing a preset group that contains one or more combination presets, those combination configurations will be retained if you restore (Open) the group.

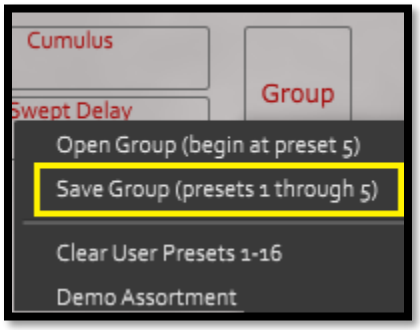
For example, let's say we want to store the first five presets in a group and the first three of those contain a combination preset:



Select the fifth User preset. That will be highlighted as the current preset (and the combination indication then disappears (but the combo is there there).



Then go to the Group icon and the Save Group option will be available:



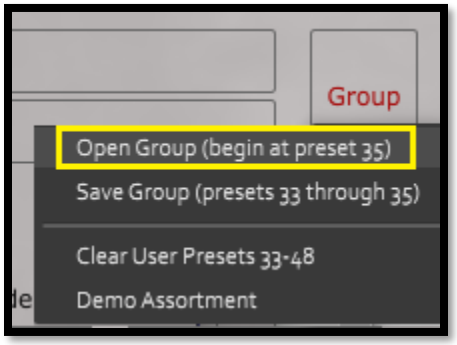
Select Save Group and store to a desired location on the disk (not in the current firmware directory that will get overwritten if you load a new firmware release).



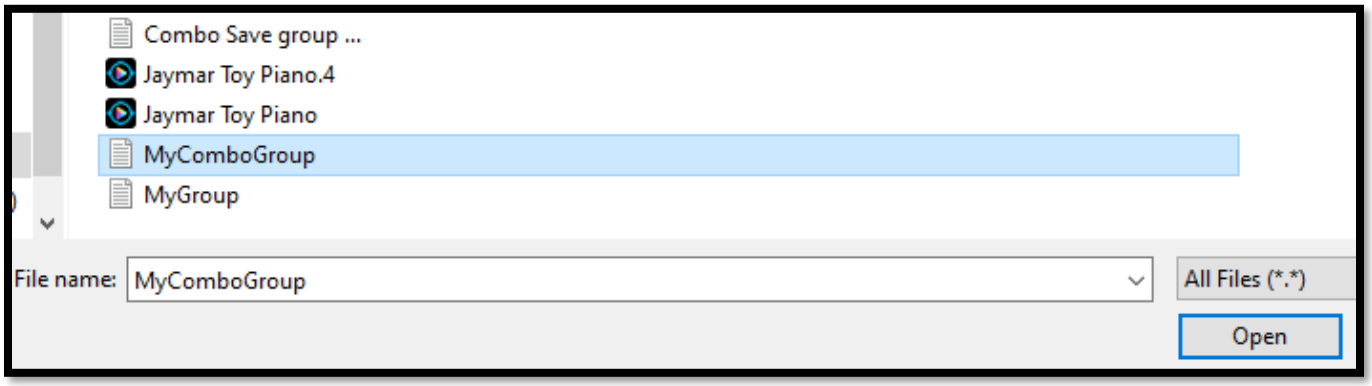
Or perhaps you want to Clear your current displayed group of 16 presets, or perhaps you navigate to a group that has nothing stored yet. Select a User Preset position where you want to restore the group:



Then use the Group Icon's Open Group option. It will tell you the User Preset position it will start restring at:



Select the Group preset file to restore:



After selecting Open, the preset group will be restored to the selected location and the combination group will be maintained.



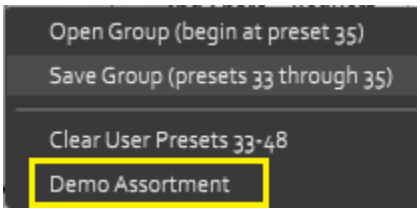
Important: To change a Combination Preset to back to the original individual presets, save the parts of the Combination to disk first that you may have edited except for the first preset. Disable the Combination preset as noted above and then load the individual preset files. Then you can save the first preset. The first preset in a combination group retains the combination information. If you save that preset and then load it back into a user position, the following presets will be treated as if they are part of the original combination group. Retaining the combination information in the first preset allows a group to be saved and restored as a combination group.

Note: When saving a set of preset with a combination group in it, if the combination ends the group, make sure to select the last preset in the group. If you select the first preset in the combination and save, the other one or two presets will not be stored in the group.

8.9.6 Demo Groups and Combination Groups

Several example Combination Presets may be available in the Group menu in future releases.

Currently only the default Demo group assortment is available that sets User Preset 1-16 to a select set (this can be restored in any User Preset bank).



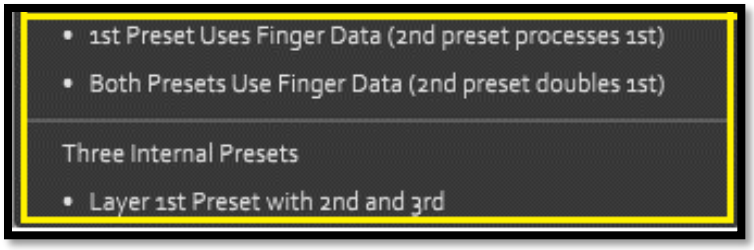
Note: Never delete any files in the directory in which you store your Groups, be they normal Groups or Groups that contain Combination presets. If you do the presets used in each group may be deleted and the group will not load correctly (will stop loading at the point it encounters a missing preset).

8.9.7 Special Preset 1 Combination and Split Preset Usage

Important: A Combination Preset will get most of its performance parameters from the first preset in the Combination Preset. This includes settings such as transposition, mono interval, round rate, etc., ignoring the performance parameters that are stored in the second or third preset in the Combination Preset.

As noted above, all the combination preset information (and split information) for a combination preset is stored in the first preset. Disabling the Combination or split will then allow that preset to be treated normally. If you store the first preset in a combination group or store a preset that has been configured as a Split and then load that and store in another user position. That position will take on the associated combination or split characteristics.

8.9.8 Combination Presets – Preset Layering and DSP Processing



Combination presets can be played as layered presets and can also be programmed in the EaganMatrix to use DSP information from one preset in another to create complex preset combinations (the letter being a very advanced EaganMatrix programming topic). Layered presets simply combine the two presets. No EaganMatrix programming is needed.

- To play two presets at the same time all using the same fingerboard input select "Both Presets Use Finger Data (2nd preset doubles the first)
- To play three presets at the same time all using the same fingerboard input select "Layer 1st Preset with 2nd and 3rd.

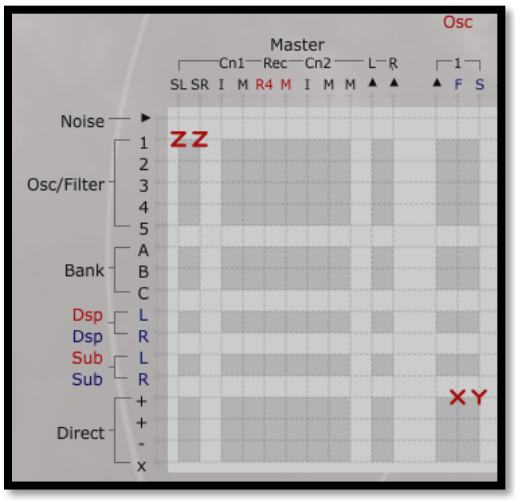
Note: The following options are for Expert/Advanced Level EaganMatrix programmers:

The third option "1st Preset Uses Finger Data (2nd preset processes the first) should only be used if you intend to program the DSP information from the first preset in the second preset. There may be some preset groups in the future that will be included in firmware release for general use, but for now the user must program this themselves and in this case the second preset does not use W (gate), X, Y or Z formulas as it does not process fingerboard data. In fact, all three of the combination modes above allow for the processing of DSP data according to the following rules:

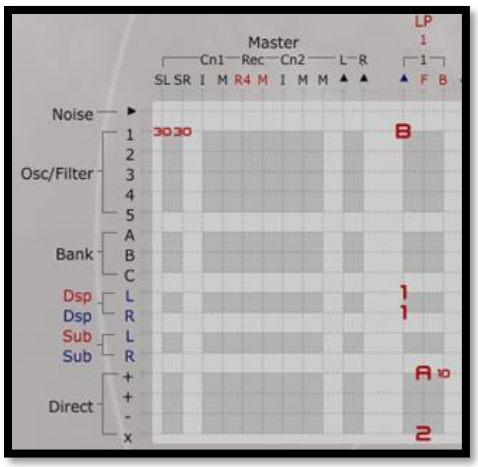
The DSP EaganMatrix rows are used to send DSP information from one preset to be processed by the other in Combination mode:

- DSP matrix rows provide output from other DSPs in combination presets.
- DSP matrix rows have meaning only in the 2nd or 3rd preset of Combination presets.
- If one pair of DSP rows is used in the matrix of the last preset of a two- or three-preset combination, that pair of DSP rows provides stereo output summed from the Master Sections of the other preset(s) in the combination.
- For three-preset combinations: If both pairs of DSP rows are used in the matrix of the third preset, the first pair of DSP rows provides stereo output from the Master Section of the first preset in the combination, and the second pair of DSP rows provides stereo output from the Master Section of the second preset in the combination.
- For three-preset combinations: If a pair of DSP rows is used in the matrix of the second preset, that pair of DSP rows provides stereo output from the Master Section of the first preset in the combination. There is no option to exclude fingerboard data in preset #2 or preset #3 in the triple combination option. If you want preset #2 or #3 to operate in this manner, simply don't use fingerboard related formulas to process the DSP information.

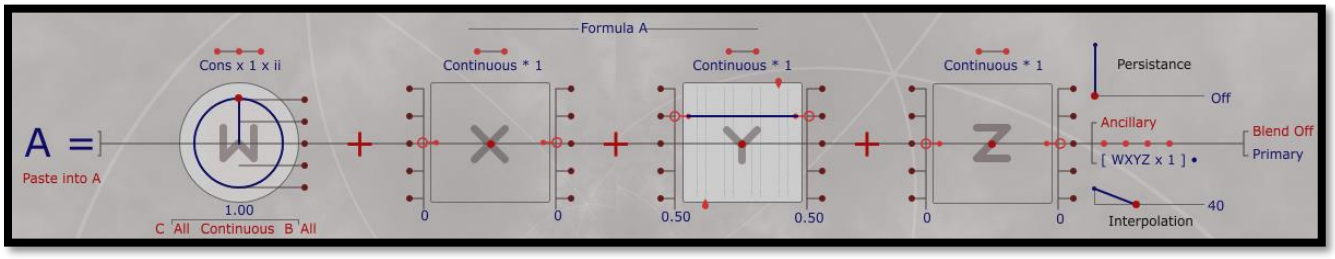
When designing a preset for this category remember the first preset in the combination group should contain the fingerboard X, Y and Z programming desired to play the preset. The following is a simple example of that the first preset might be (but it could be any preset you choose). In this case a simple Oscillator uses standard X pitch tracking with Y controlling the Spectral Balance and Z is used to output to SL/SR (very similar to the Utilities/Sine Wave examples only with Y control on Spectral Balance).

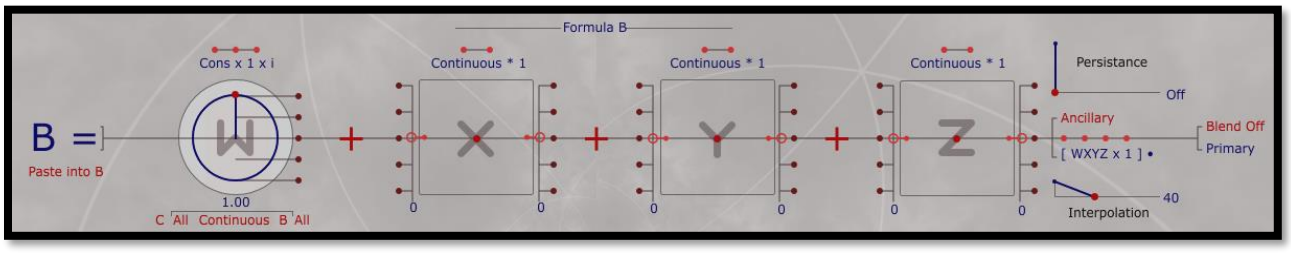


However, the second preset is intended to be a DSP processor that does not use fingerboard. If it does use X, Y or Z in formulas, unpredictable results can occur. In this case the DSP inputs are used to process the digital output of the first preset.

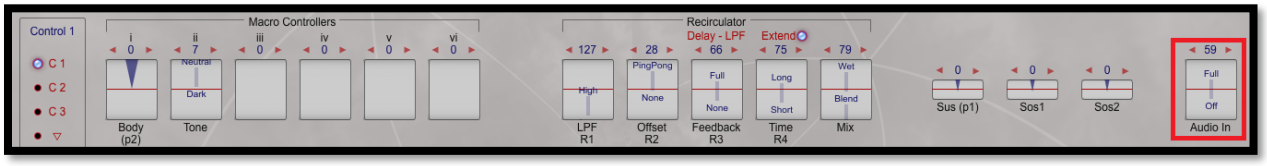


Here the DSP inputs are sent into a Low Pass Filter. Note the output of the filter is sent to SL/SR using a constant, not a fingerboard pressure (Z) formula.
The formulas used in the filter to control the filter Frequency (Formula A) and modulation input to the filter (formula B) both are "math" only formulas that do not use X, Y or Z in a manner that assumes they will be used on the fingerboard:

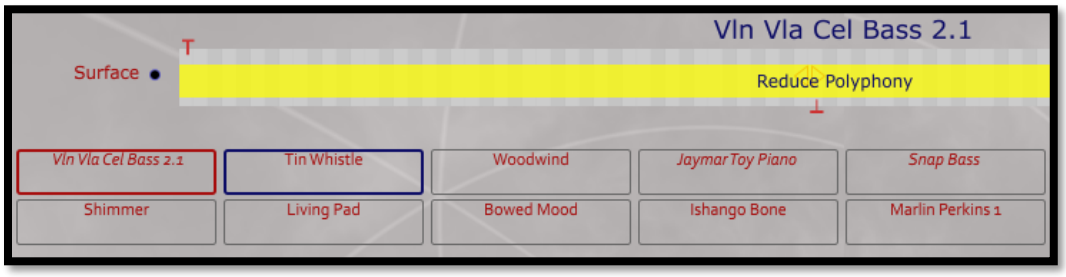




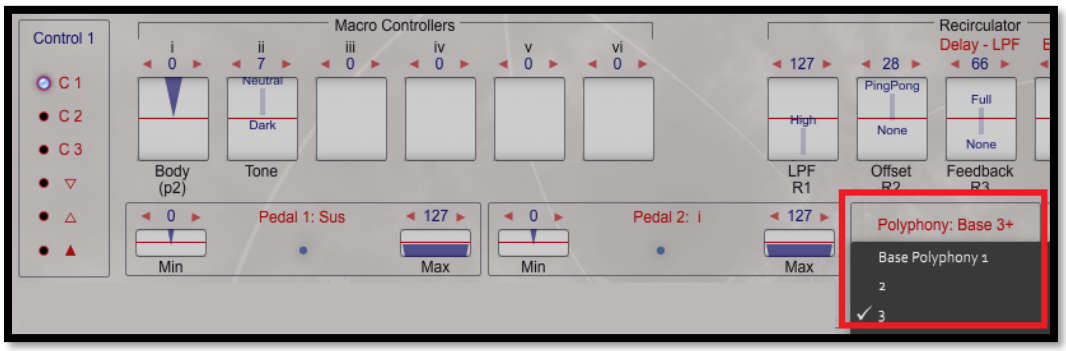
Note: For the second preset to take effect, you must set the Control Panel 1, "Audio In" control to a desired input level to allow output of the first preset to be used as input to the second DSP processing preset.



See the EaganMatrix Manual for information on creating presets.
Note when creating combination presets, you may exceed the internal Polyphony limit. A message will be displayed in this case.



Go to Control Panel 1 and reduce the polyphony in increment of 1 until the message disappears.



8.9.9 Combination Presets and External Midi Input

When sending Midi control data to combination presets (for example changing Macro Controller iii), the first preset in a combination group will receive the Midi data. It will not be sent to the second or third presets in the group so that control options are not misinterpreted. If you want to change control data for the second or third preset in a combination group it must be done manually through the controls in the editor. You can also assign a pedal to be used in one preset and another pedal to be used in another to get limited external control of both presets.
External Midi note data will apply to all presets in the combination group.

8.10. Designing Sounds for the Continuum Fingerboard and ContinuuMini

The Continuum Fingerboard and ContinuuMini can be used to control a wide variety of sound synthesis algorithms. The System Presets, and User Preset files prepared by other Continuum players, provide many possibilities. You may also design your own custom sounds in the EaganMatrix or using an external synthesizer. Presets are usually customized specially for Continuum Fingerboard or for ContinuuMini, since the ContinuuMini has a different playing surface and different feel from the Continuum Fingerboard. Please consider the following suggestions when selecting or designing sounds to be used with the Continuum Fingerboard and ContinuuMini.



The X Direction

The X direction of the Continuum Fingerboard is generally mapped to pitch.

The left to right (X) direction is extremely accurate and can be used for accurate continuous pitch creation and pitch effects like vibrato and glissandi. Unless otherwise desired as a specialized effect, avoid synthesis algorithms with built-in vibrato. A performer's finger movements can create far more expressive pitch and amplitude modulations that produce a much more realistic vibrato than what is programmed into the typical sound synthesis patch.

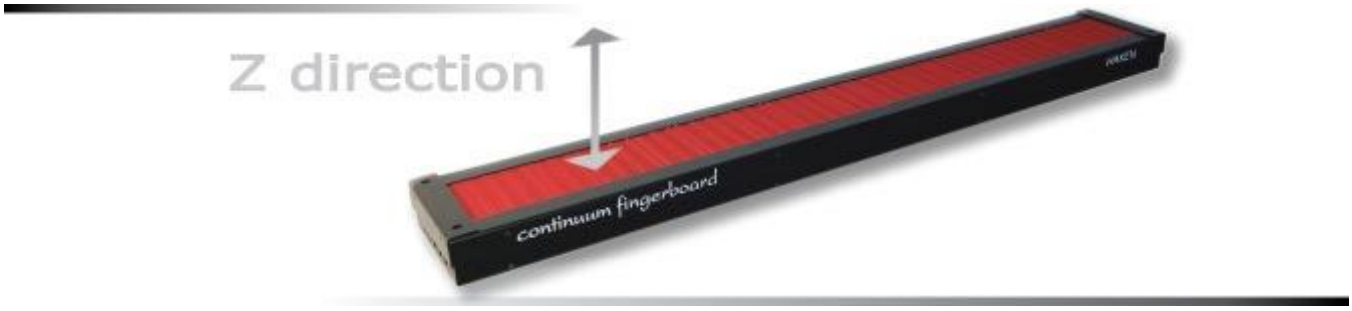


The Y Direction

The Y direction of the Continuum Fingerboard is generally mapped to a timbre shift.

Make good use of the front-back (Y) position available from the Continuum Fingerboard. When deciding what parameters to control by front-back position, keep in mind that the Continuum Fingerboard measures front-back position less accurately than pitch or pressure. The front-back position can provide an important expressive tool for the performer when it is used to control appropriate timbre parameters. All the System Presets in the Continuum Fingerboard utilize Y to some extent. The Eagan Pluck String is a good example of Y usage, as Y is mapped to multiple sound destinations with formulas employing different Y transfer functions.

The Z Direction



The Z direction of the Continuum Fingerboard is generally mapped to a loudness shift.

Use synthesis algorithms that have timbre changes associated with loudness changes. Some sampling synthesizers change only the volume as the performer's finger pressure changes during a note. This limits the apparent dynamic range and expressive possibilities available to the performer. With acoustic instruments, the timbre changes as the volume changes. Keep this in mind as you design your Continuum Fingerboard sounds.

Generally you should use synthesis algorithms that have dynamics controlled by a continuous controller (like expression, volume, or breath). Avoid using Note On key velocity to control dynamics. While the Continuum Fingerboard can be configured to transmit Note On key velocity, it is rarely recommended. Key velocity (sometimes also called Strike in other "Expressive Controllers") is a single discrete value that is determined on the note's attack and discards the fine structure of the attack. For musically interesting and expressive performance, a finger's initial contact with the surface is especially important. Much of the skill of an advanced Continuum Fingerboard player involves shaping the fine structure of attacks of sounds. For this reason the Continuum Fingerboard (like Midi breath controllers) defaults to transmitting a constant 127 for key velocity and does all dynamic control (for attack and other parts of the sound) in a continuous fashion.

Finally, avoid synthesis algorithms that trigger amplitude envelopes on Note On. An apparent 'double trigger' or 'stutter' effect can result:. First you hear the amplitude envelope that is triggered when the finger comes in contact with the playing surface, then you hear a second amplitude increase as the performer's finger pressure increases on the playing surface. In most cases only the performer's finger pressure variations should be controlling the amplitude, not a built-in envelope. However, if you find that the sound uses an amplitude envelope that you like and don't want to discard, consider mapping pressure into another controller that does not affect amplitude.

9. Continuum Configuration and Control Without Using the Haken Editor

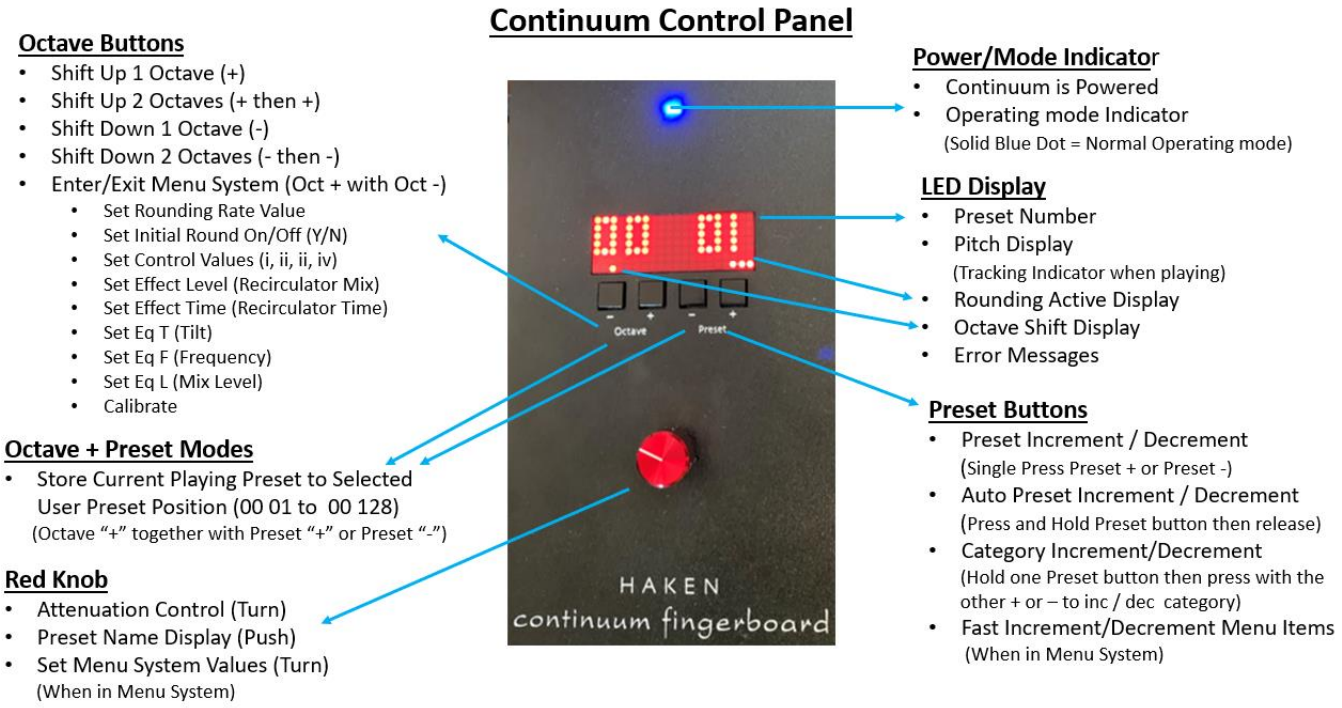
All Continuum models can be controlled from the instrument without the need for the external Haken Editor or external EaganMatrix configuration.

ContinuuMini players may wish to skip this section, as it is specific to the larger Continuum Fingerboards though ContinuuMini is also configurable without the Haken Editor. See Section 16 for details on controlling the ContinuuMini without the editor.

9.1 Introduction to the Front Panel Display and Controls ("Slim" Continuums)

See Section 5.1 for connection descriptions. New model "Slim" Continuums do not use the Overlay strip used on half-size and full-size models (discussed in the next section). They have a front panel user interface similar to that used on the ContinuuMini and an additional Rotary (red or later black knob) used for volume/attenuation control and preset display. This section described the on-board user interface that provides the following features:

- LED Power and Continuum Mode Indicator
- Current Preset Display
- Preset Selection
- Pitch Tracking Display
- Octave Transposition
- Control Parameter Settings



9.1.1 Power / Mode Indicator

A small single rectangular LED at the top of the user panel indicates that the Continuum is powered on and in one of the following modes of operation

- Constant Blue – Continuum has booted and is in normal playing mode. The current preset should be displayed, or Empty.
- Blinking Blue – The Continuum did not boot properly. Does the display read "DSP"?. The Continuum may have booted into SAFE mode.
- Blinking Pink and or Green for a short time and then goes to solid blue. Expected display when booting.
- Green (Yellowish) – Firmware is being downloaded

9.1.2 Rotary Knob

The "Red Knob" or "Black Knob" rotary on the Slim Continuum front panel has the following functions. This will be referred as the Rotary from here on.

- When turned it changes attenuation after entering the Menu System (See below).
- When pushed during normal operation, the current preset name will scroll on the LED display while the knob is pushed and when released the LED will return to the current preset number (Category/Preset) display.
- When turned while pressing the **Oct -** button will increment or decrement categories. When released the current category will be set to the last displayed value.
- When turned while pressing the **Oct +** button will increment or decrement presets within the current category. Presets will not increment or decrement to the next or previous category. They will be settable

from presets 1 to Max number within the current category. The Category abbreviation will not be displayed during this operation.

- When turned in the Menu System, it can change parameter values quickly versus using the Preset increment and decrement buttons.
- When pushed in a Control Mode (i, ii, iii, iv) in System menu, it will display the name of the Control set in the Haken Editor.
- When changing Attenuation or a menu system item, it should start changing from the current displayed position.
- If power is applied to the Continuum while the Rotary is depressed, the Continuum will revert to its default factory state and the user must perform a factory calibration and refinement procedure. Note: This operation should only be performed if there is an issue with the continuum that indicates a factory reset is required. Please consult Haken Audio before performing a factory reset.

Note: When using the Rotary to modify, you always have to "capture" the value (rotate past the value) before it starts modifying the value – that is true for Attenuation as well as in the menu system.

9.1.3 LED Panel Display Functions

The LED display reports a number of things to the user depending on the operating mode

- Status information when booting – Current Firmware version
- Error messages – For example will report a (Midi) Loop
- Current Preset Number
- Current Preset Name
- Pitch tracking when playing
- Octave
- Menu System Options

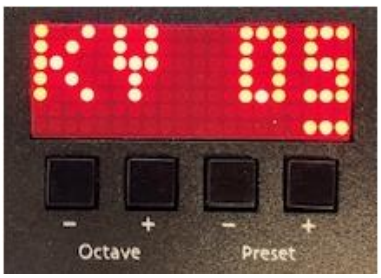
Normal LED Display When Not Touching the Fingerboard

The LED Display works in conjunction with the **Octave +/-** buttons, **Preset +/-** buttons and user interaction with the fingerboard.

On successful booting the LED panel displays the last user preset loaded into the Continuum or User Preset **usr 01** after firmware updates. Presets are displayed as an EaganMatrix two letter Category abbreviation ("VO" = Voice, "KY" = Keyboard, etc.) followed by the associated preset number in that category, for example: **KY 05**. The **usr** Category is reserved for User presets. Preset **usr 00** has the special meaning: A custom preset was loaded from disk.

The following is the display for the first user preset and the fifth preset in the keyboard category.





Current category abbreviations include:

"ST" – Strings

"WI" – Winds

"VO" – Vocal

"KY" - Keyboard

"CL" – Classic Presets

"OT" - Other Category

"PE" – Percussion

"PT" – Tuned Percussion

"PR" – Processor (DSP processing presets)

"DR" – Drones

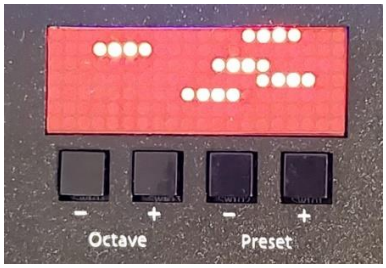
"MD" – Midi Presets

"CV" – Control Voltage Presets

"UT" – Utility Presets (example presets)

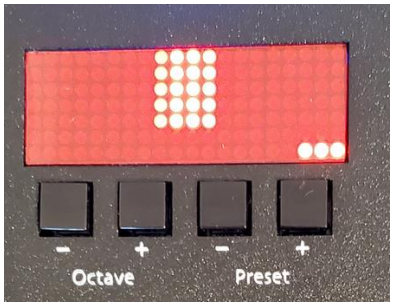
Pitch Tracking Display

In order to assist the performer in learning how to play in tune on the Continuum and also determine exact tuning when playing, when the fingerboard is depressed, the LED panel displays four adjacent LED elements for up to five polyphonic voices indicating how far off the pitch played in each voice is from 0 cent offset tuning (four dots in the center of the display). If you play in the center of a fingerboard note on a non-rounded preset and rock your finger you will see the tuning indicator follow on the screen in the left or right direction indication how far off from the 0 cent offset the pitch is. If you move far enough in once direction, the pitch will slide to the next note and the indicator will scroll completely off the panel and reappear on the other side. The following is an example of five voice polyphony where it is evident the tuning played for all five voices is not optimal.

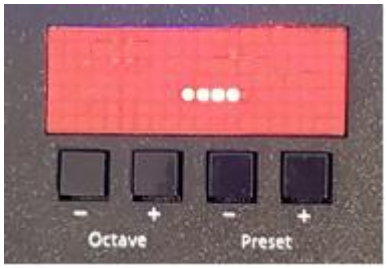


Dots under the tuning display on the right side (over the **Preset +** button) indicate that rounding is applied to the preset.

A rounded preset will display the tuning dots in the center of the display if the fingers are kept stationary as they are automatically pitch corrected when played. If rounding is not total, when the fingers are moved slightly the pitch indication will move as expected. Fully rounded presets will in a fixed position on a given note.



Of course if only one voice is playing, only one row of tuning indicators will be displayed.



9.1.4 LED Display Messages

The LED panel can display the following messages with associated meanings:

- '**FACtRY**' – Continuum is in factory calibration (from the Cal menu – should be a rare operation)
- '**ALIGN**' – In surface alignment procedure (from Cal menu - not a user operation unless instructed to by Haken support).
- '**REFINE**' and '**DISCRD**' – also Cal menu option. This might be used when a note gets stuck.
- '**editor**' – appears when you have made changes in the Editor that are unsaved, and you press "Preset –". Avoids discarding current presets under edit if accidentally Pressing "Preset –" instead of Octave+ button. To get out of this mode, either save your edits, or if you do not want to save edits use the Editor to go to other preset, or if you do not want to save edits you can also press Preset+ (which is not protected like this and then "Preset –" twice to decrement from there.
- '**loop**' – Midi loopback detected; need to fix your setup so you don't have a MIDI loopback. This can happen (for example) if software unexpectedly loops back Midi data, or if a third party MIDI hardware defaults to copy midi-in-to-midi-out before it is initialized. Users are strongly recommended to use Midi and Global Settings to route third party midi softsynths through the Editor using "Ext 1" or "Ext 2". If that is done properly, all Midi loopbacks can be avoided, and also you can avoid having Continuum configuration data sent to your softSynth/DAW, etc.
- '**Wait**' – sending list of user preset names and categories to Editor or iPad or displayed when storing a current preset to disk that gets updated on the Continuum.
- '**9.85**' (example) – during powerup the firmware version is displayed for a short time.
- '**dsp'** – the dsp chips inside the Slim are not communicating with each other properly. This should not occur, and probably indicates a firmware bug or serious problem. It also might occur if the editor crashes for some reason and sends unexpected information to the Continuum. Try repowering. If the condition persists, please contact Haken Audio support.
- '**FILE1**' – when in RECOVERY MODE (power-up with Rotary pressed down), after some initializations, this will come up indicating it is ready for Update File 1. RECOVERY MODE not expected to be needed by the user. Please contact Haken Audio before attempting this procedure.
- '**FILE2**' – After update file 1 is completed, this comes up indicating it is ready for Update File 2.

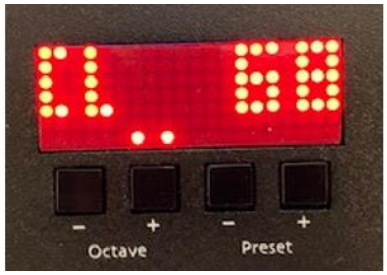
9.1.5 Octave Shift Control

The Octave Down (-) and Octave Up (+)controls can be pressed at any time before or during playing to shift the current octave up to two octaves up or down.

If the octave buttons are pressed while no finger is playing, the expected octave shift will occur when the next note is played and affect all notes played. If the Octave Shift buttons are pressed while one or more notes are being played, the octave shift will occur the next time all fingers release form the surface and start playing again.

Octave Shift up and down indicators appear above the associated **Oct -** and **Oct +** buttons on the bottom row of the LED Display. If no indicators are present, Octave Shift is not engaged. One LED on over the respective octave increment or decrement buttons indicates a shift of one octave is in effect and two LEDs on indicate a shift of two octaves.





9.1.6 Preset Selection (Incrementing and Decrementing Presets)

The preset buttons increment and decrement presets within each EaganMatrix Category. Once the last of the presets in a category is reached the next category and its presets will be displayed. For the User Preset category "usr 00", only presets that are defined (this can include the Empty preset) are displayed. Unallocated user preset positions will be skipped using the Preset "+/-" buttons.

Preset +/- Button Functions

- A quick press will increment or decrement from the current preset/category. Holding down the **Preset +** or **Preset -** buttons will fast increment or fast decrement through all the presets. Empty presets within the **usr** category will be skipped in this process.
- Holding either **Preset +** or **Preset -** will auto-increment or auto-decrement presets until you release the button.
- Holding **Preset –** while pressing **Preset +** will decrement presets by 10 withing a category (works across preset categories).
- Holding **Preset +** while pressing **Preset -** will increment presets by 10 within a category (works across preset categories).

To randomly access a preset either connect to the Haken Editor or connect a MIDI device programmed to select presets through buttons or other controls. Templates are available for Arturia BeatStep and BeatStep Pro controllers that can be useful here.

Note: A special function applies to the **Preset -** button. If you are editing a preset in the Halen Editor (for example have a formula selected in the EaganMatrix) and press the decrement button, the preset will not change and the LED display will show: "EDITOR". This is a safety feature to prevent the EaganMatrix programmer from losing work when editing a preset when accidentally changing presets on the Continuum.

9.1.7 Category Selection (Incrementing and Decrementing Categories) Prior to Haken Editor 9.7

To increment category, hold the **Oct -** button while simultaneously pressing **Preset +** and **Preset -**.

Note: Haken Editor Versions for the Slim Continuum prior to 9.7 incremented and decremented categories by pressing one preset button and then pressing the other. This increments and decrements presets within in a category by 10 in Haken Editor version 9.7 and above.

9.1.8 Storing System Presets in User Preset Positions

The Continuum now supports up to 128 User Presets that are stored in Category 0 (**usr** category), Preset positions 1 to 128 (these are arranged in banks of 16 presets in the EaganMatrix Editor for simplified access). Use the following button sequence to store any of the System Presets in one of these positions:

- Bring up a System Preset you wish to store in one of the User Positions (could also be a preset of your own you loaded into position **usr 00**).
- Press the octave increment ("+") button and then either the preset increment ("+") or decrement ("-") button (you can also press them together).

- The display should change to show "**to nnn**", where "nnn" is the **usr** preset position you want to store your preset to.
- While continuing to hold down the octave increment button use the Preset increment or decrement buttons to move to a user preset position of your choice noting it may have a preset already stored in it.
- While holding **Oct +** during this operation you can press **Preset +** and while holding that press **Preset -** to increment user preset positions by 10. Holding **Preset –** while pressing **Preset +** will decrement by 10. You can easily move through the entire 128 user preset positions to select the slot you want to store in.
- Release all buttons and the current system preset should now be stored in the desired user preset "nnn") location you selected. Scroll to preset "usr nnn" to confirm or display that in the editor.

Note: You can also use the EaganMatrix Editor to store System Presets or presets of your own creation in one of the 128 User Preset positions (preferred method if you have the editor connected).

Note: New Continuum Menu button operation:

And a side note: Setting output attenuation has moved to the first menu item. If no buttons are held down, twisting the knob no longer does anything outside the menu system. It was too easy to screw up output attenuation level when using knob for other things.

9.1.9 Continuum Menu System

The Control Panel's Menu System functions allow you to edit/change the value of a number of EaganMatrix Preset parameters and Continuum controls (such a controls, rounding, recirculation etc.) and also perform calibration if required. The Menu System is entered by pressing both of the Octave buttons together.

One single simultaneous press is all that is required to enter the Edit System. You can then release. Pressing both Octave buttons together again will exit the Menu System.

Once in the Menu System, the Octave increment and decrement buttons will scroll sequentially through the menu options. The Preset increment and decrement buttons are then used to change the value of the control parameter selected. The Rotary can also be used to change parameter values.

Control Parameters are described below.

Note: You can move back and forth between parameters in the Menu System setting them to values as you wish and they will be retained after exiting the Edit Mode. These parameter changes will only apply to the current preset being edited and played. If you move to another preset and come back to the one you have edited, the original setting of that preset will be restored. If you store the current preset with changes to a User preset, the changes will be retained. In this case make sure to store that preset to your computer from the EaganMatrix editor if you want to retain those changes as they will be overwritten the next time you store something to that User Preset location.

The values of the parameters displayed in the Menu System will also change on the display if altered by the EaganMatrix or some other MIDI controller programed to change these values, such a BeatStep Pro.

9.1.9.1 Attenuation ("Rrt nnn")

This changes the current Attenuation. On the center setting it registers ca. -24 dB. When turned all the way to the left it decreases gain to -infinity (silence). When turned all the way to the right it increases gain to a max of 0dB. Note: The Gain controls in the EaganMatrix can be used to adjust volume.

9.1.9.2 Round Rate ("Rrt nnn")

This control changes the rounding rate of the current preset for all notes played (the Normal setting in EaganMatrix). A value of zero means no rounding is applied. You can set this from a value of 1 (minimum rounding) to 127 (full rounding/totally quantized).

The LED indication for Round Rate set are the two right most LEDs on the bottom row set to on.



The leftmost LED indicates that rounding will be applied when playing a note. The rightmost indicator indicates that rounding will be applied when releasing a note. This is the default (Normal) setting for Round Rate, however, in the EaganMatrix, Round Rate during the note can be disabled and only rounding on release can be set if desired. In this case only the rightmost LED will be displayed on the panel.



9.1.9.3 Round Initial ("RIn Y/N")

This control changes the preset to use Round Initial Mode or not. It can be used in conjunction with the Round Rate control or set by itself if Round Rate is set to zero.

Press the Preset Increment button to change Round Initial to YES ("Y") if it is set to No ("N"). Press the Preset Decrement button to change Round Initial to NO ("N") if it is set to YES ("Y").

The LED indication for Round Initial set is the third LED on the bottom row from the right set to on.

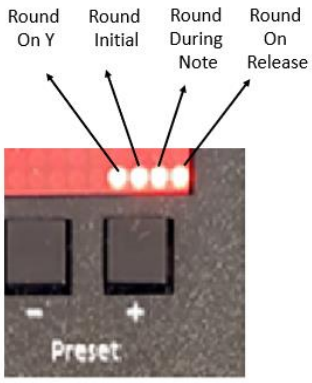


If Round Initial is set with Normal Round rate, three LEDs will bet set to on.



Note: The EaganMatrix allows for two additional rounding modes on Y (Round Max from Y=0 to no rounding at top of Y and Round Max at Y=1 no rounding at bottom of Y) that are not used that often, but if set in the EaganMatrix for a preset will be indicated by the fourth LED from the right on the bottom row being enabled.

Here is the full LED indicator key for determining rounding mode in the LED display:



9.1.9.4 Controls ("i, ii, iii, iv nnn")

Four Menu System options cycling through the Menu System to set the four EaganMatrix control values from 0 to 127. When selected, the current control value is displayed which can be incremented or decremented with the Preset buttons.

The Rotary can also be used to change the control value but it must "capture" the current value by rotating past first and then values will change. If the Rotary is pressed, the name of the control set in the EaganMatrix is displayed (or blank if no control name is set).

9.1.9.5 Effects Level ("EfL nnn")

Sets the Recirculator Mix to a value from 0 (Recirculator Off) to 127 (Max Effect Level). The Preset increment and decrement buttons can be used to change the value.

The Rotary can also be used to change the value but it must "capture" the current value by rotating past first and then values will change.

9.1.9.6 Effects Time ("EfT nnn")

Sets the Recirculator Time (Decay for Reverb) to a value from 0 (Off) to 127 (Max). The Preset increment and decrement buttons can be used to change the value.

The Rotary can also be used to change the value but it must "capture" the current value by rotating past first and then values will change.

9.1.9.7 Eq Tilt ("EqT nnn")

New to 9.1 and later firmware. EqT refers to a parameter in the new master equalization filter section added to the EaganMatrix stereo output processing. This can be applied to any preset. It is a general eq based on a stereo pair of shelving filters with separate controllable low and high frequency components in the range 120Hz to 15KHz. The Eq settings can shape the sound either subtly or drastically "brighter" or "darker".

EQ Tilt sets the balance between the lower frequency and higher frequency filters. The further one goes to each extreme, the sharper the eq slope (tilt) is. In this way it can be used for subtle or major tonal shaping.

9.1.9.8 Eq Frequency ("EqF nnn")

New to 9.1 and later firmware. EqF refers to a parameter in the new master equalization filter section added to the EaganMatrix stereo output processing (See above).

EQ Frequency defines the crossover point between the two shelving filters. It thus has little effect when Eq Tilt is set to flat. The larger the tilt, the great effect this will have.

9.1.9.9 Eq (Mix) Level ("EqL nnn")

New to 9.1 and later firmware. EqL refers to a parameter in the new master equalization filter section added to the EaganMatrix stereo output processing (See above).

EQ Mix (Level) sets the dry/wet blend/mix of the Eq control. 0 means EQ is bypassed, 64 means half-filtered half-dry, 127 means all EQ.

Currently existing presets from the 9.0 release default to Eq Mix = 0 so that the sound of the previous preset is retained for those used to it. Some suggested values for Eq Tilt and Eq Frequency are already applied in some presets which will take effect proportionally as Eq Mix is incremented.

9.1.9.10 Calibration ("Cal -/+")

This function performs the following operations, which should not be needed as they are performed at the factory prior to shipment. At times, however, you may experience stuck notes that are not resolved using the Refine Calibration procedure in the EaganMatrix Editor.

Refine Calibration: In the Cal Menu press the **Preset +** button

Factory Calibration

See Section 13.7.1. Contact Haken Audio before attempting this procedure to make sure it is indicated. At times you may experience stuck notes that are not resolved by quickly moving your finger over the fingerboard surface or using the Refine Calibration procedures available int eh Editor.

Surface Alignment

See Section 13.8.

9.1.9.11 Factory Reset / Restoration

If the Continuum does not upgrade firmware correctly and appears to be hung on repowering or in an unexpected state, a Factory Reset may be required. To restore the ContinuuMini to its default Factory configuration

- Remove power from the Slim Continuum.
- Exit the Editor if it is running and connected
- Depress the Rotary and while depressed repower the Continuum
- Rerun the Editor and hopefully you will connect and get the Blue LED in the Editor (as well as on the Continuum). At this point the Continuum will likely be restored to a previous firmware version and will require an upgrade to the current desired version. See Haken Audio Web Site for versions.
- Refinement / Factory Recalibration may be required if the instrument does not perform as expected after restoration.

Note: This operation should only be performed if there is an issue with the continuum that indicates a factory reset is required. Please consult Haken Audio before performing a factory reset.

9.2 Introduction to the Overlay Strip (Half-Size and Full-Size Continuums)

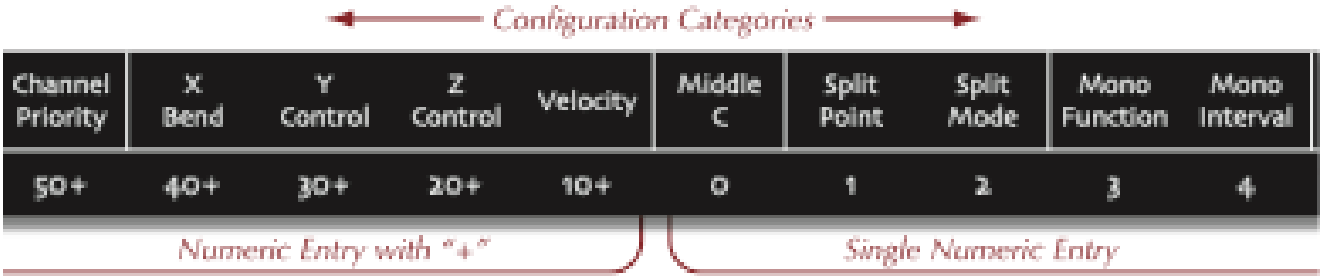
The Continuum Fingerboard's Overlay Strip specifies where to press for each configuration option available from the playing surface.



The Overlay Strip

The Overlay Strip area is divided so that each option and numeric area matches one semitone of Continuum Fingerboard surface.

Below is a close up of a section of the Overlay Strip:



The configuration categories are along the top of the Overlay Strip. Along the bottom are numeric entry values. The numeric values to the left have a "+" after the number. That denotes they are used in conjunction with the numeric values to the right to create composite value. For instance "30+" and "2" makes the number "32".

The Continuum Fingerboard's configuration is changed by using this Overlay Strip and following these general directions:

Start	The colour of the LED is dim blue during normal operation.	✹
Red Button	Press and release the Red Button next to the Headphone output on the side of the Continuum Fingerboard. The LED will turn from dim blue to bright red.	✹
Configuration Category	Touch the far edge of the Continuum Fingerboard surface at a configuration category. The LED will shine a brighter green while your finger is touching the surface and return to a dim green after the touch.	✹
Numeric Entry	Touch the far edge (back) of the Continuum Fingerboard playing surface at a numeric value. Touching a numeric with a plus after the numeral means the Continuum Fingerboard is waiting for a second numeric touch. For instance, touching "80+" then "4" is equivalent to a numeric value of 84. The LED will shine a brighter green while your finger is touching the surface. The LED will return to a dim green when it is waiting for the second half of a dual numeric touch.	**single** ✹ **or dual** ✹✹✹
Configuration Changed	After the single numeric touch or the dual numeric touch the LED will go back to dim blue. The configuration has been changed.	✹

10. Configuration Options

Sections 10.1 to 10.24 describe configuration options available for the Continuum Fingerboard and ContinuuMini. The descriptions apply to configuration from the Haken Editor, as well as from a Continuum Fingerboard's playing surface using the Overlay Strip (for Half-Size and Full-Size models accessed by pressing the "Red Button" on the side of the Continuum). Normally if you press the Red button:

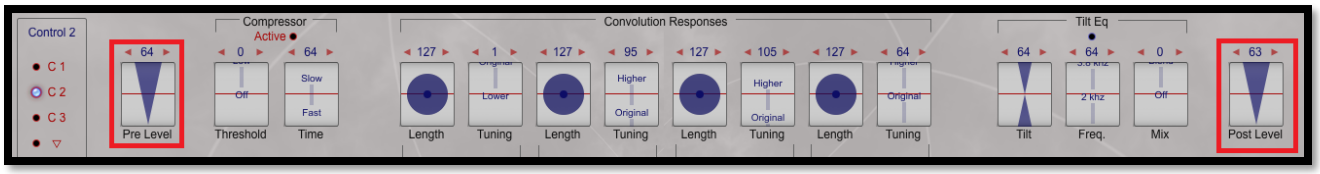
- LED goes Red indication select configuration option
- Press anywhere under the desired option and LED goes green indicating select parameter(s)
- Select desired parameter(s) and LED will go back to normal blue state indicating configuration success.

Each configuration option uses a table with this layout:

Category Name (as it appears on the Overlay Strip) *This is the first surface touch when you configure using the Overlay Strip.*	
Numeric Value(s) on the Overlay Strip *This is the second and possibly the third surface touch when you use the Overlay Strip.*	In here will be the explanation as to what this Category-Numeric value combination means.
	Functionality specific to the Haken Editor. For half-Size and Full-Size models, almost all the functionality of the Overlay Strip is replicated in the Editor.

The Haken Editor now is formatted allowing selection of three Control panels containing different functions that all used to be on one page. These will be noted in all descriptions below so the user can easily find them.

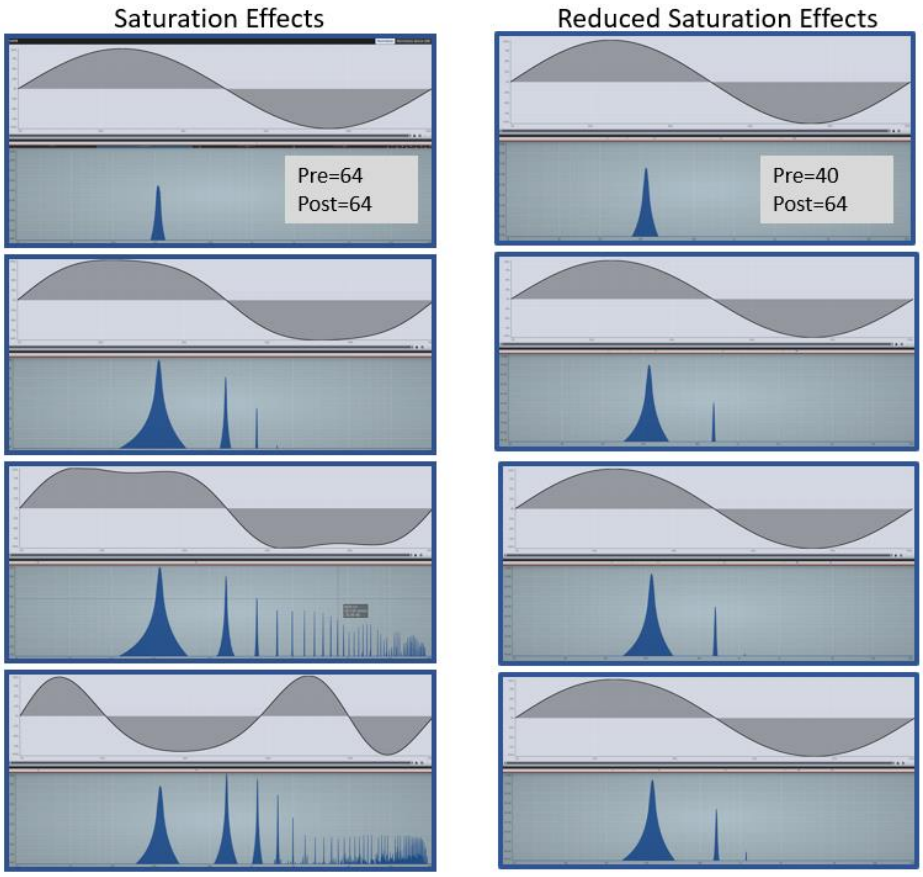
10.1. Levels (Pre and Post) – New to 9.53 (and later) Firmware



Pre and Post Level	
0	The two Level controls let you set Pre and post Master Section gain. (Note that gain works independently from the Attenuation knob on "Slim" Continuum Fingerboards) Note: Pre and Post Level controls that replace the previous single Gain control. "Pre" and "Post" Levels are for controlling level before and after the master section. This is important for changing levels on presets designed (for example) for low polyphony to high polyphony -- adjust "pre" level and thereby avoid saturation effects or adjust "post" level if you like the saturation effects and just want it quieter (Post = old Gain control).
1 to 127	Level of the output from soft to loud. Excessively high gain may clip at high polyphony in Post mode.

Pre and Post Level	
	The Post Level is the last step in the signal chain, just before the Continuum Fingerboard's audio signal is converted from floating point to integer and sent to the Digital to Analog converters. Tip: Use low Post Level values, together with high SL and SR values in the matrix, to introduce a soft saturation in the EaganMatrix. Found in Control Panel 1. Relatively low levels of Pre and high levels of Post make to harder to saturate the output. Relatively high levels of Pre and low levels of Post make to easier to saturate the output.

Saturation effects are automatically applied for a number of reasons from increased polyphony to excessive Z pressure on some presets (even the sine wave), to EaganMatrix programming that creates large amplitudes to even setting the output past unity on purpose to create these effects. Here's an example of a preset that can kick in saturation based on Z pressure. Four pressure levels are presented from low to high. You can see reducing the Pre-Gain value significantly reduces the saturation effect on the original SineSpray in this case that is set with a very low Harmonic Truncation (basically creating a sine wave that is really hot and saturation kicks in).



10.2. Internal Sound (Load System Preset)

The Continuum Fingerboard's built-in synthesizer has hundreds of System Presets available.

To select a System Preset in the Editor: Choose a Category (click on the red category name, below the grey word "Category," to see the popup of categories). Then choose a System Preset within the Category (click on the red System Preset name, below the grey words "System Preset," to see the popup). For details see Section 8.4.

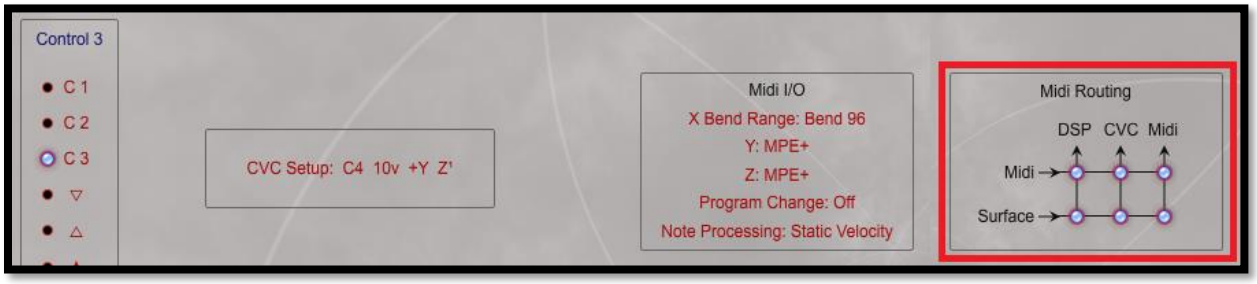
To select a System preset using the Overlay Strip: Use numeric touches that add up to the system preset number. For example, to select System Preset #171, press and release the Red Button, touch "Internal sound," touch 100+, touch 70+, touch 1. (Any combination of numeric touches adding up to 171 can be used.) The preset number of each System Preset in shown in the Editor's System Preset menu, and a complete listing of all system presets (with preset numbers) is available in the Editor's cogwheel menu.

System Presets can be modified by setting configuration values for i, ii, iii, iv, and Gen 1 in the Haken Editor, or via the Overlay Strip, or by pedal, or using an Arturia BeatStep, or using the Kenton Mini Controller, or a custom programmed Midi controller. They can be further modified using the EaganMatrix (see the EaganMatrix User Guide).

See Sections 8.4 through 8.8 for more information on loading and storing Presets, Preset Groups, and saving presets to your Mac or PC disk.

10.3. Midi Program, Midi Routing

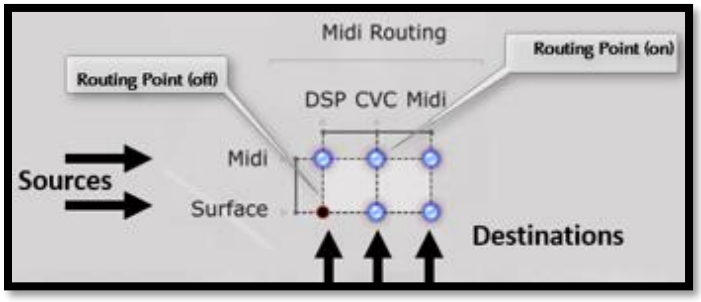
Midi Program: (On Control 3 Panel)



Found on the Control 3 panel under Midi IO. This will cause the Continuum Fingerboard to send a Midi Program (1 to 20) Change message selected from a dropdown list on all active Midi channels through its Midi output. The Program Change is sent immediately when you configure it, and each time the preset is loaded.

Midi Program	
1 to 20	Sends the numeric Midi Program message on all active Midi channels.
0	The Continuum Fingerboard external Midi Program feature is disabled.

Midi Routing: (On Control Panel 3)



By default, the Continuum Fingerboard merges Midi messages from the Midi In jack to all of the following: Midi Out jack, CVC (Continuum Voltage Converter), and the built-in synthesizer. The Midi In messages are merged with the Midi messages that track fingers on the playing surface. Caution: If you supply Midi notes to the Midi In

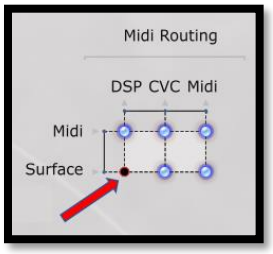
jack, you will want to avoid having notes from both the playing surface and the Midi In using the same Midi channel; the merged Midi messages will interfere with each other.

These are the values for the Routing configuration option from the playing surface:

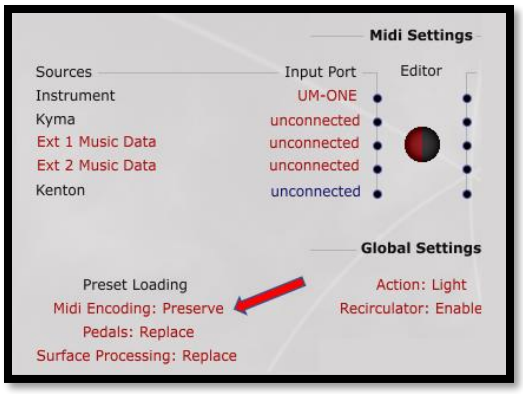
Routing	
0	Disable merging data from the Midi In jack.
1	Midi In data is merged with playing surface data and goes to Midi Out.
2	Disconnects the playing surface from the Internal Sound.
3	Disconnects the playing surface from the CVC.
◉	More options are available in the Haken Editor program, which uses a routing matrix, as explained below.

◉ **Haken Editor Midi Routing Matrix**	
Led On (Blue)	Data passes from the source to the destination below. Click Led to turn off.
Led Off	Data is blocked from the source to the destination below. Click Led to turn on.

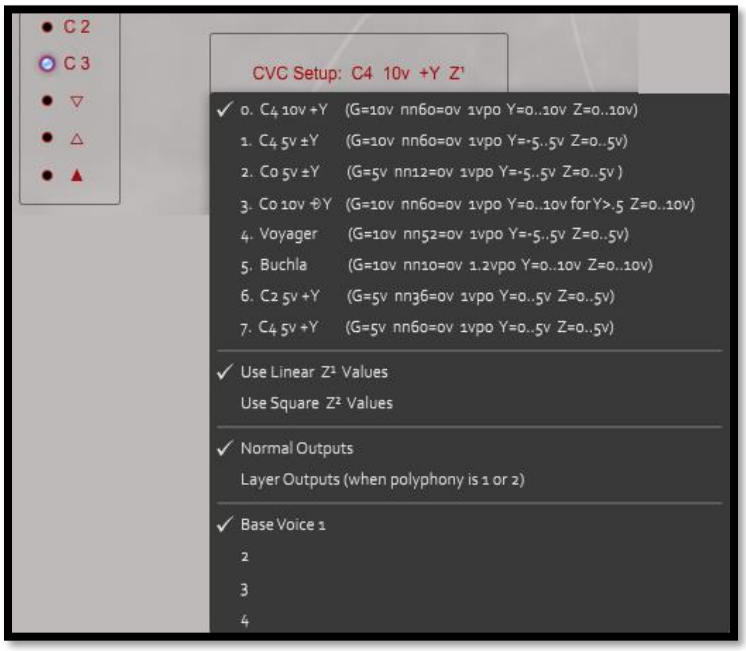
A common routing option that applies to both Continuum and ContinuuMini is disabling the fingerboard from sending data to the DSP for those who want to use the device as a MIDI controller, perhaps sending data directly to a DAW. You can disable output to the DSP as follows. Note that the blue light is still on in the DSP column for input. This will allow the DAW to still play the EaganMatrix DSP synth.



This will apply for the current preset. If you want this to apply for all presets, go to Midi and Global Settings through the cogwheel and set MIDI encoding from the default "Replace" to "Preserve" to retain the settings for all presets.



10.4. Continuum Voltage Converter (CVC) – Also applies to uCVC (with polyphony limitations)



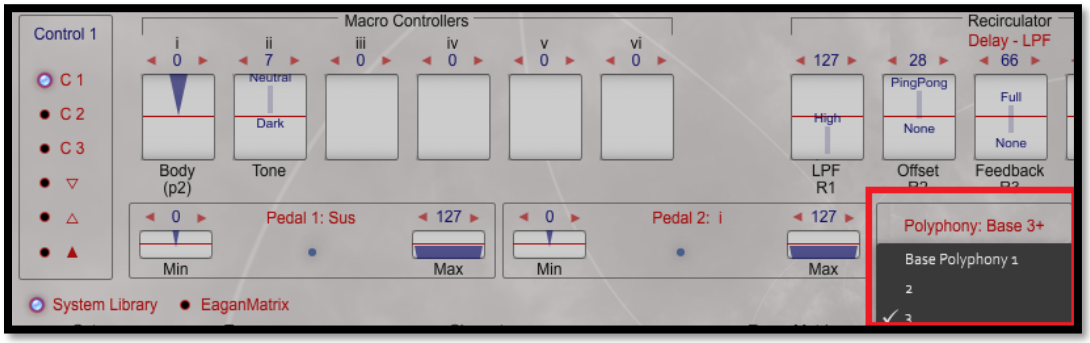
Found in Control Panel 3. Select standard CV definitions for the Continuum Voltage Converter (CVC), as described in the CVC User Guide (available under Cog Wheel selection option or in the Resources area of www.HakenAudio.com). This option has no effect if there is no CVC (or uCVC) connected, or if an EaganMatrix preset is active and the matrix's CVC section specifies control voltages.

CVC	
Option 0..7	Maps to the CVC options listed above. Note the additional option (#7) in 9.85 firmware and later for preferred EaganMatrix Module CVC connection using 5V scaling.
Use Linear or Square Z Values	Sets type of Z pressure function that the CVC will use if not explicitly programmed in the EaganMatrix.
Normal or Layer Outputs	Applies when Polyphony is set 1 or 2. Will duplicate channels based on the Polyphony setting. For example if you are set Lowest priority, playing a single note will output on channels 1 and 3. Playing two note polyphony will output on channels 1&3 for first note and 2&4 for second note.

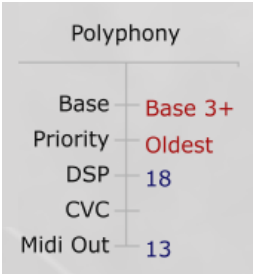
CVC	
	Setting Oldest Priority and playing a single note will alternate output for each new note played on channels 1&3 and 2&4. Playing two note polyphony will alternate between channels pairs in this manner.
Base Voice	Sets the base (lowest) voice for CVC output. If Base voice is set to 1, CVC output will follow the normally Polyphony setting from channel 1 to channel 4 if connected. Note that If playing the EaganMatrix Module through CV, only monophonic MPE cycling will apply. If base voice set to 2, Oldest Polyphony will play channel 2, 3, 4 and then the next note will not be output. In other words Channel 1 will not be output. If set to Lowest Polyphony, only channel 2 will be played. IN this case if you play 2 or 3 note polyphony channels 2&3, or 2, 3&4 will always be output. Setting base voice will 3 or 4 will limit CVC output in a similar manner.

10.5. (Base) Polyphony

Found in the Polyphony section in Control Panel 1. Sets the base polyphony of the preset.



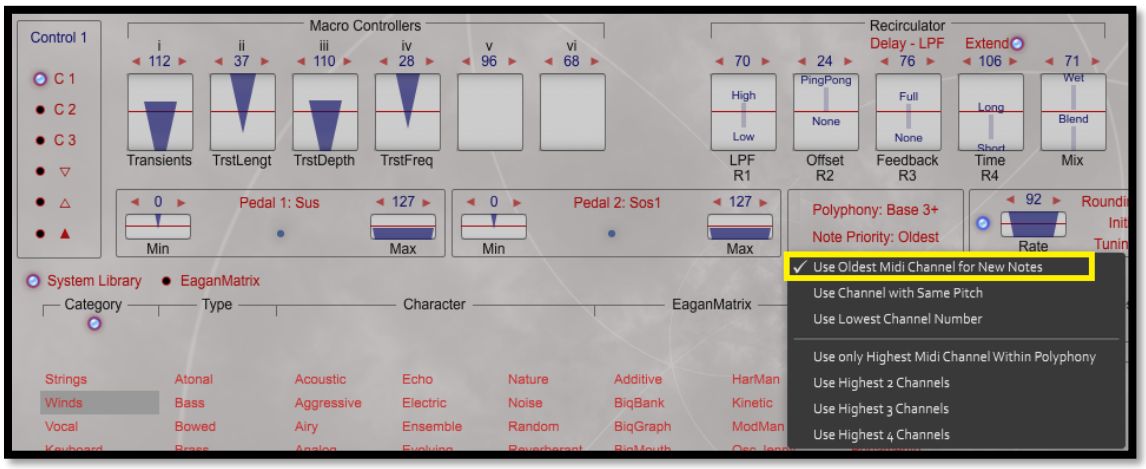
Polyphony	
1 to 16	Select base polyphony. Controls the maximum number of simultaneous output notes. The actual polyphony can be greater or smaller than the base polyphony you choose, due to split, mono interval, and other influences. When base polyphony is set to 16, certain Specialty Sounds can play at DSP polyphony 24. The CVC polyphony is limited by the number of CV outputs. Note: Each DSP supports a max polyphony of 8, thus the max polyphony/voices for the following Continuum processing is: 1x DSP Models = 8 (earlier half-size and full-size models) 2x DSP Models = 16 (later half-size and full-size models and ContinuuMini) 3x DSP Models = 24 (6x Expanded Continuums and all "Slim" models)
Allow Expanded Polyphony (+)	Allows using increased polyphony on Continuums that have extra processing power. This affects "Slim" model Continuums that have 6x processing power, Continuums with double-processing-power DSPs (2x processing power), internally or externally expanded Continuums (3x to 6x processing power, see System Identifier in Section 2.1.), and ContinuuMini or EaganMatrix Module (2x processing power). ◉ Indicated in Editor by "+" after Base Polyphony value.

Polyphony	
	Expanded Polyphony will increase the polyphony N times, where N is the DSP processing power of your Continuum (6x for "Slim" model Continuums, 2x for ContinuuMini, etc.). For example, on a "Slim" model 6x Continuum Fingerboard if you set Polyphony 3+, it will allow creation of 3x6 = 18 DSP voices. Also note that the max number of Midi Channels output also is multiplied by the 6x processing power (however the max number of Midi channels a Continuum outputs on is 13 – channels 2-14 in MPE/MPE+ modes or channels 1-16 for non MPE modes – Y/Z set to a specific CC).  For 6x processing models, setting polyphony greater than 3+ will not affect the number of output channels, but will for lower processing models. The Continuum will never output MIDI performance data on Channels 15 and 16 which are reserved for control information. Note that some MPE implementations use Channel 1 for control information. Setting the Continuum to MPE or MPE+ modes will never output on Channel 1. **<u>1x DSP Continuum Users Note</u>**: With the introduction of the "Slim" model, numerous presets are set to Polyphony 2+ or 3+ allowing 16 or 24 voice Polyphony respectively. Since 1X models do not support expanded polyphony the polyphony is always the base polyphony (max 8 regardless of what is set). You may have to expand the base 2 or 3 to a higher value if you want to play more than 2 or 3 voices in this case.
Allow Increased Computation Rate	Doubles sample computation rate on Continuums that contain only 2x DSPs. This affects L2x and L6x Continuums, and M2x ContinuuMini. This should be used sparingly, since doubling the sample computation rate will reduce the number of voices that can be computed, and most EaganMatrix sounds do not benefit from a higher sample computation rate. ◉ Indicated in Editor by "^" after Base Polyphony value.
◉	The Editor also displays the actual polyphony for DSP, CVC, and max Midi Out channels. Click on Polyphony to change the base polyphony. Found in Control Panel 2.

A Polyphony status summary also appears at the top right-hand corner of the editor under DSP Usage. This information is always displayed. It includes the DSP Usage, CVC channels (if CVC is connected) and max MIDI Channels that will be used for the preset.



10.6. Channel (Note) Priority



Found in the Polyphony section of Control Panel 1. Fingers on the playing surface will generate output for Midi channels depending on the Polyphony and Split configuration. The order in which new notes from the playing surface are assigned to Midi channels can be Oldest (assign the new note to the Least Recently Used channel), Same (assign to channel that played the same pitch), or Lowest (assign to the lowest channel number that is available). The default is Oldest. The High 1 through High 4 settings are useful in directing which Midi channels are being currently used by the Continuum in overdub Midi performances.

Channel Priority		
0	Oldest	Assign to channel that was least recently used.
1	Same	Assign to channel that was playing same pitch.
2	Lowest	Assign to lowest channel number (LCN) that is not already playing a note. (Note: This mode is convenient when you want to predict what channel you are playing on.)
3	High 1	Only highest channel of current polyphony is used. See explanation below.
4	High 2	Only highest two channels of current polyphony are used.
5	High 3	Only highest three channels of current polyphony are used.
6	High 4	Only highest four channels of current polyphony are used.

High 1 through High 4

To do a Midi overdub recording with the High 1-4 settings, decide on the number of voices for each overdub pass. For instance, if the sound used for playing has a polyphony of 8 and it is desired to have two voices available for each overdub pass, then:

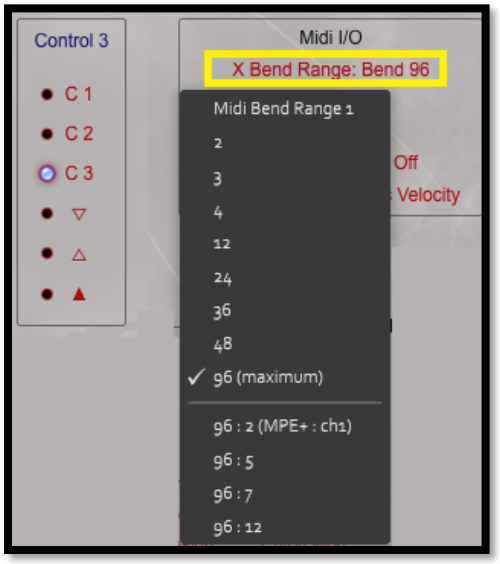
1. For the first pass set Channel priority to High 2 and Polyphony to 2. The first pass (the initial recording) is recorded onto Midi channels 1 and 2.
2. For the second pass leave Channel priority at High 2 and set Polyphony to 4. The second pass is recorded onto Midi channels 3 and 4, while the first pass can be heard on Midi channels 1 and 2.
3. For the third pass leave Channel priority at High 2 and set Polyphony to 6. The third pass is recorded onto Midi channels 5 and 6, and the first two passes are heard on channels 1 through 4.

4. For the final pass leave Channel priority at High 2 and set Polyphony to 8. The fourth pass is recorded onto Midi channels 7 and 8, and the other three passes are heard on channels 1 through 6.

An Important Caveat!

Midi-based multitrack recording like this may or may not compromise the Midi bandwidth. The Continuum Fingerboard's Midi bandwidth is highly optimized in relation to the current polyphony of a Continuum performance. Recording and overdubbing Midi in this fashion described above may overflow the Continuum's Midi stream, since the Continuum doesn't "know" the overall polyphony from the combination of surface and Midi In activity but can only make data streaming adjustments according to polyphony from the playing surface.

10.7. X Bend



Found in Midi IO section in Control Panel 3. X Bend is the Midi pitch bend range that the Continuum Fingerboard uses to encode its Midi output. Set X Bend to the match the Midi pitch bend range you set on your external synthesizer. You should select the largest bend available on your synthesizer, so that you can play the longest possible glissandi. The pitch bend range of 96 allows you to glissando over the complete pitch range of the full-size Continuum Fingerboard. Since Pitch Bend is encoded in 14 bits, it provides 1.2 cent encoding accuracy at a 96 half-step range, and 0.15 cent accuracy at a 12 half-step range. MPE+ always uses 96 half-step range; MPE+ pitch bend encoded with 21 bits has .009 cent accuracy

X Bend	
1 to 96	Midi Pitch Bend range as expressed in half steps (default is 96).
MPE+ 96:2, 96:5, 96:7, 96:12	The Midi Pitch Bend range is 96 half steps for MPE+ encoding on Midi channels 2 and above. The Bend Range for Channel 1 input to the Continuum (from a sequencers or keyboards) is 1, 2, 5, 7, or 12 half steps. Encoding of MPE+ X value with 21 bits of accuracy: The 7 LSBs are encoded with cc87 (LSBs are 0 if no cc87 is present). When cc87 is followed by Pitch Bend, the cc87 bits are appended as LSBs to the Bend data bits, for a synchronous 21-bit update.

X Bend	
◉	The Haken Editor has a reduced selection set comprised of the most useful values.

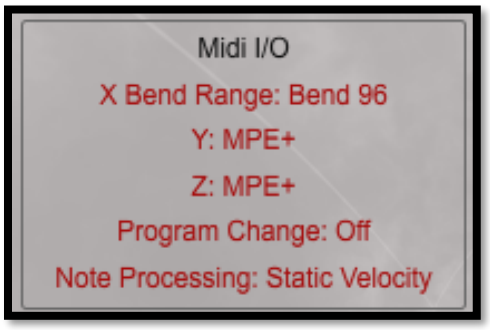
When using an external synthesizer, it is important to verify proper Pitch Bend Range configuration: Play a glissando; when you lift your finger at the end of the glissando, play a new note at the spot where you lifted your finger. The pitch at the end of the glissando should match the new note's pitch; if not, the Pitch Bend Range configured on your Continuum Fingerboard does not correctly match your synthesizer.

Note that MPE defaults a minimum pitch bend of 12. If you need to use one of the smaller values, set your preset to a Y or Z preset value to take it out of MPE mode. The pitch bend setting of 1, 2, 3 and 4 +/- semitones will then be available in addition to higher values.

At times you may want to set a standard (non-MPE+) pitch bend to output a maximum resolution based on the size of your Continuum or ContinuuMini. Normal Pitch Bend (what you would expect for example on a PB Wheel) uses two bytes with 14 bit resolution as noted. The center (no effect) point is typically displayed as 8192 (or 0) bending down to 0 (or -8192) and up to 16384 (or 8191). Min maps to 0,0 (MSB=0H, LSB=0H). Center maps to 0,64 (MSB=0H, LSB=40H). Max maps to 127,127 (MSB=7FH, LSB=7FH). This is easy to grasp on a pitch bend wheel, but the Continuum is a dynamic playing surface. It has note guides but if you are not rounding they are just guides, not "keys". It will be very difficult to find the exact center of a pitch when pressing so in some sense pitch bend center is a bit relative when playing on the dynamic fingerboard.

Obviously the smaller the pitch bend is set the more pitch bend resolution is available for that bend range. For ContinuuMini then, a pitch bend of 96 is not that useful even though it is the MPE+ default as the range of the ContinuuMini is much closer to a max pitch bend of 24. Sometimes you need to play around a bit with your controller to map pitch bend accurately to the desired range to get portamentos to map to the right pitches as described above.

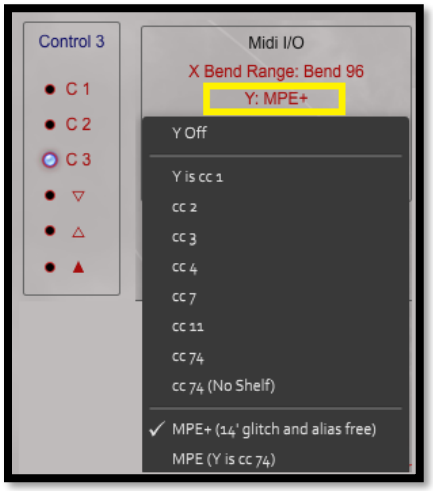
Also at times you may want to do some debugging of pitch bend using a Midi monitor such as Midi-Ox. It can be difficult to decipher pitch bend in the sea of other CC messages that will be output by the Continuum or ContinuuMini (CC1, Aftertouch, CC74, etc.). One way to limit your Midi output stream to only Note On, Note Off and pitch bend is to set Y and Z to Off for that preset, however, that will take it out of MPE mode.



From here on your Midi output stream only contains Note On, Note Off and Pitch bend and can easily be analyzed with your Midi Monitor:

```
311426  2  --    144    69   127    1  A  4 Note On
311427  2  --    224    35    83    1  ---  Pitch Bend
311428  2  --    224    83    79    1  ---  Pitch Bend
311428  2  --    224    16    78    1  ---  Pitch Bend
311430  2  --    224    50    77    1  ---  Pitch Bend
311432  2  --    224    90    76    1  ---  Pitch Bend
311432  2  --    224   110    75    1  ---  Pitch Bend
311434  2  --    224   124    74    1  ---  Pitch Bend
311434  2  --    224     5    74    1  ---  Pitch Bend
311436  2  --    224    17    73    1  ---  Pitch Bend
311438  2  --    224    49    72    1  ---  Pitch Bend
311438  2  --    224    62    71    1  ---  Pitch Bend
311440  2  --    224    87    70    1  ---  Pitch Bend
```

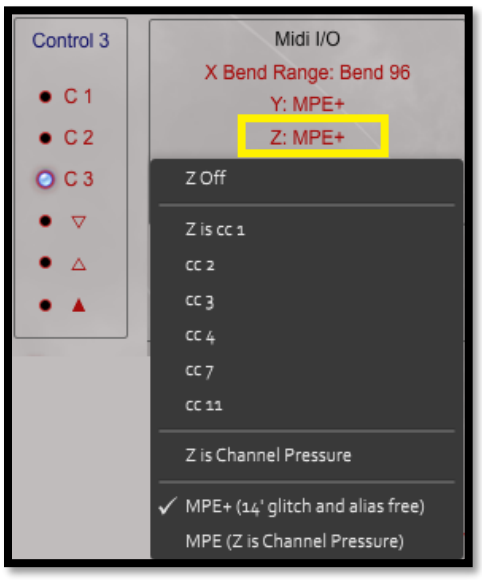
10.8. Y Control



Found in Midi IO section in Control Panel 3. The continuous controller number that Y (front to back position) sends through the Midi output. The most common choices are: 1 for "modulation", 2 for "breath", or 74 for "brightness" (the default).

Y Control	
0	Off (no controller information sent).
1-4, 7,11,74	Continuous controller number generated by the Y position (default is 74 when set MPE mode). When Y is set to non-MPE mode, MIDI is output on channels 1 to N instead of 2 to N+1 in MPE/MPE+ modes.
127	Transmit Y value using controller 74, without shelving values at both ends of the y range.
MPE+	Encoding of MPE+ Y value with 14 bits of accuracy: The 7 LSBs are encoded with cc87 (LSBs are 0 if no cc87 is present). When cc87 is followed by cc74, the cc87 bits are appended as LSBs to the cc74 data bits, for a synchronous 14-bit update.

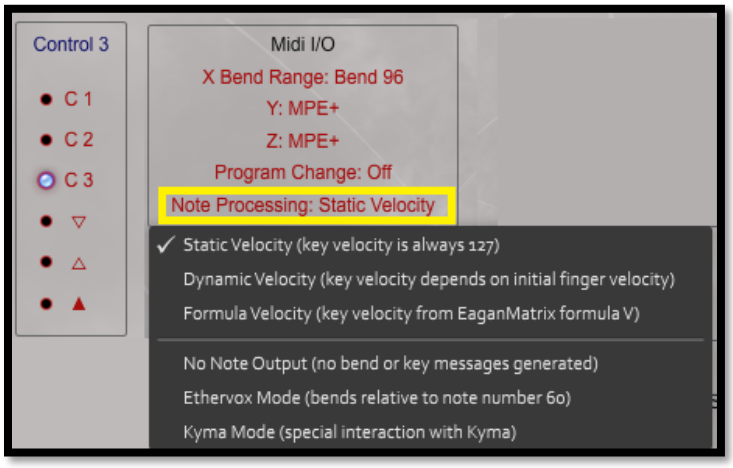
10.9. Z Control



Found in Midi IO section in Control Panel 3. The continuous controller number that Z (finger pressure) sends through the Midi output. The most common choices are: 127 for MPE encoding (channel pressure), or controller 7 for "channel volume" or controller 11 for "expression". In some synthesis situations 7-bit accuracy is not adequate for finger pressure; for these situations the Continuum Fingerboard can use 14-bit MPE Encoding.

Z Control	
0	Off (no controller information sent).
1-4, 7,11	Continuous controller number generated by the Z position (11 is default in MPE mode). When Y is set to non-MPE mode, MIDI is output on channels 1 to N instead of 2 to N+1 in MPE/MPE+ modes.
70 (MPE+)	Use MPE+ Encoding: This is Haken Audio's enhancement to MPE Encoding; please see the Haken Audio web site for more information on MPE+. Encoding of MPE+ Z value with 14 bits of accuracy: The 7 LSBs are encoded with cc87 (LSBs are 0 if no cc87 is present). When cc87 is followed by Channel Pressure, the cc87 bits are appended as LSBs to the Channel Pressure data bits, for a synchronous 14-bit update.
127 (MPE)	Use MPE encoding. This will encode Z position as Channel Pressure. In addition, Controller 127 on channel 1 specifies polyphony, RPN 0 on channel 2 specifies pitch bend range. NB: As per MPE standard, the Continuum will encode notes starting on channel 2, up to channel P+1 (where P is polyphony).

10.10. Midi Note Processing



Found in Midi IO section in Control Panel 3. Midi key velocity can either be static (always at 127) or dynamic (a value generated by calculating finger velocity when the surface is touched). The static setting is usually preferable and is the default.

Midi Note Processing (Options)	
0	Static: Midi key velocity is always 127
1	Dynamic: Midi key velocity depends on initial finger velocity.
2	Formula: Midi key velocity is computed by EaganMatrix formula V. Use this only with an EaganMatrix preset that has formula V specially designed for velocity values. The value of Formula V must be in the range 1..127, normally Quantized 1 as it maps to a Key Velocity in that range (output may be close but not exact). When this is set, only the first DSP is used and the Polyphony will be allocated as if the Continuum was a 1x DSP model (thus overall Polyphony will be reduced from what is expected in multiple DSP models)
3	No Note Output: The Continuum does not output Midi Note and Pitch Bend information.
4	External Note Mode: For EaganMatrix sounds designed for use with Midi keyboards or sequencers. Such EaganMatrix sounds process notes coming in on Midi Channel 1 and add continuous control using the Continuum's Touch Area. A Formula Blend control (see the EaganMatrix User Guide) allows specialized processing for notes coming from Midi channel 1 vs. notes from the Continuum's playing surface, to adjust for the coarse aftertouch and limited pitch abilities of Midi keyboards and sequencers.
5	Ethervox Mode: Always uses 60 for the Midi key number, and all bends are referenced from Middle C. This is the type of encoding used by the Moog Ethervox Theremin.

Midi Note Processing (Options)	
6	Kyma Mode: Special Midi handling for Symbolic Sound Corporation's Kyma. This transmits a Midi message once per second to let Kyma know a Continuum Fingerboard is present. Kyma will automatically update the Continuum Fingerboard when sounds are loaded and changed inside Kyma. Kyma-controlled Continuum Fingerboard parameters include Polyphony, X Bend, Y Controller, Z Controller, and Splits. ◉ All affected Kyma parameters will have blue text in the Haken Editor. Technical details: The Continuum Fingerboard will use controller 74 to encode Y, controller 11 for Z, and 96 for the pitch bend range. Splits in Kyma override the Continuum Fingerboard's split. In this special Kyma mode, Continuum notes are transmitted on high-numbered Midi channels starting with channel 16.
	To connect both a Midi Keyboard and Continuum Fingerboard to Kyma at the same time: The Haken Editor must be running, it must have the Midi keyboard as its ExtDevice input, the Keyboard must transmit on Midi channel 1, and the Midi Routing in the Continuum must pass Midi In to Midi Out. Technical detail: The Editor routes the ExtDevice to the Continuum, and the Continuum moves channel 1 KeyOn/KeyOff messages to high-numbered Midi channels, one note per channel.

10.11. Middle C

Middle C is notated on the Surface display using a red inverted T shape. This can be dragged by half-step either lower (to transpose up) or higher (to transpose down). For example if you set Middle C to be an octave lower, playing the actual middle C position on the fingerboard will now play one octave higher, etc. Using the Overlay strip, you may select a transposition of the playing surface in half-step increments by specifying a midi note number for the Middle C position.



Middle C	
0 to 127	The specified Midi note number is the new pitch for the "Middle C" position. For instance, a value 60 is no transposition, value 48 transposes down one octave, and a value of 72 transposes up one octave.
◉	Drag the red triangle to adjust Middle C.

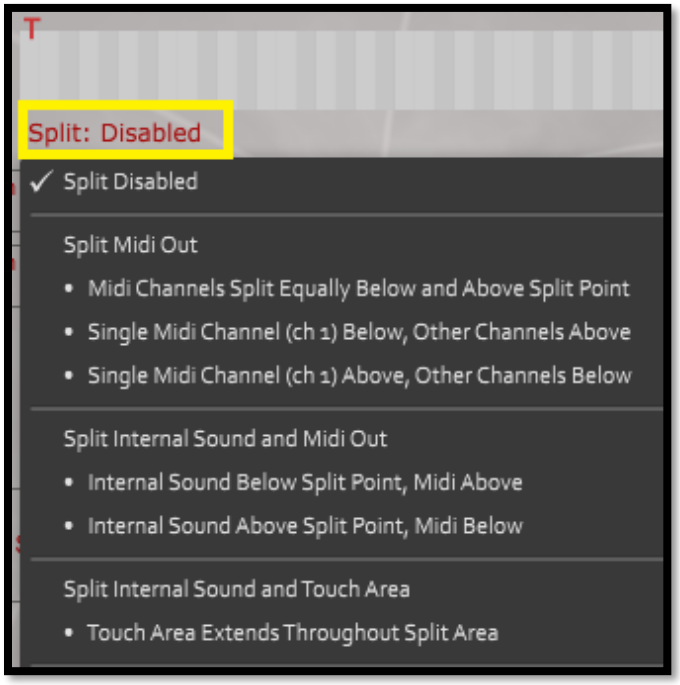
10.12. Split Point and Split Mode

ContinuuMini and EaganMatrix Module players may wish to skip this section, as it is specific to the Full-size, Half-size and Slim Continuum Fingerboards.

Note: The split point for "Slim" model Continuum Fingerboards currently must be set using the Haken Editor. Surface Display must be on.

Found in the Split option under the display You may select a playing surface split point. For the split point to have effect, you must also select a split mode. The split mode together with your polyphony configuration determines how many simultaneous notes you can play above and below the split point and if you desire some notes to only output through MIDI and not through the sound engine. The split mode can also be used for Combination Presets, to split notes between the three DSPs in a Continuum Fingerboard with greater than 2x DSP processing power.

The split point can be set in the Haken editor by turning the Surface Display On and going to the Split menu and selecting one of the non-combination split options.



The split point will be displayed on the Surface display. It can be dragged to a new location if desired.



Split Point	
Surface position	Division point for the split. For instance, moving the split point in the Editor "Slim" models or touching the surface in models supporting the overlay strip at Middle C will create a split point at Middle C.

All Continuum Fingerboards except the ContinuuMini support the following:

Split Mode		Notes
0	Split is deactivated/disabled.	
1	Split into two polyphonic ranges. All pitches below the split point will be encoded on the first half of your Midi channels, and pitches above the split point will be encoded with the remaining Midi channels.	Split modes 1-3 treat Midi, CVC, and internal sounds all the same. See note after this table.
2	Split into a monophonic low range and polyphonic high range. All pitches below the split point will be encoded on Midi channel 1, and the pitches above the split point will be encoded with the remaining Midi channels.	Split modes 1-3 treat Midi, CVC, and internal sounds all the same. See note after this table.
3	Split into a monophonic high range and polyphonic low range. All pitches above the split point will be encoded on Midi channel 1, and the pitches below the split point will be encoded with the remaining Midi channels.	Split modes 1-3 treat Midi, CVC, and internal sounds all the same. See note after this table.
4	Split into internal synthesizer low range and external synthesizer (and CVC if connected) high range. All pitches below the split point will be played by the internal synthesizer and not sent to Midi Out, and the pitches above the split point will be sent to Midi Out and CVC but not played internally.	The full polyphony will be used for the external synthesizer and/or CVC, and the full polyphony will be used for the internal synthesizer. **For example**: With a polyphony of 4, 8 total notes are possible: 4 from Midi or CVC, and 4 from the internal synth.
5	Split the playing surface into internal synthesizer high range and external synthesizer (and CVC if connected) low range. All pitches above the split point will be played by the internal synthesizer and not sent to Midi Out, and the pitches below the split point will be sent to Midi Out and CVC but not played internally.	
6	Option allow the Touch Area to extend through the split area, otherwise the Touch Area will be limited to the current split area it resides in.	
7	Combination of Two Presets: First preset plays notes below the split point, second plays notes above the split. First preset uses DPSs 1&2. Second Preset uses DSP 3.	These split modes split are exclusively for use with CEE Combination Presets; see details in Section 8.9.
8	Combination of Two Presets: First preset plays notes above the split point, second plays notes below the split. First Preset sues DSPs 1 and 2. Second Preset uses DSP 3.	

Split Mode		Notes
9	Combination of Two Presets: First Preset uses finger data. Second preset processes the first. First Preset sues DSPs 1 and 2. Second Preset uses DSP 3. No split is used.	
10	Combination of Two Presets: Both presets use finger data. Second preset layers with the first. First Preset sues DSPs 1 and 2. Second Preset uses DSP 3. No split is used.	
11	Combination of Three Presets: All notes are played by all three presets; all three presets layer with each other. Teach preset uses its own DSP. No split is used.	

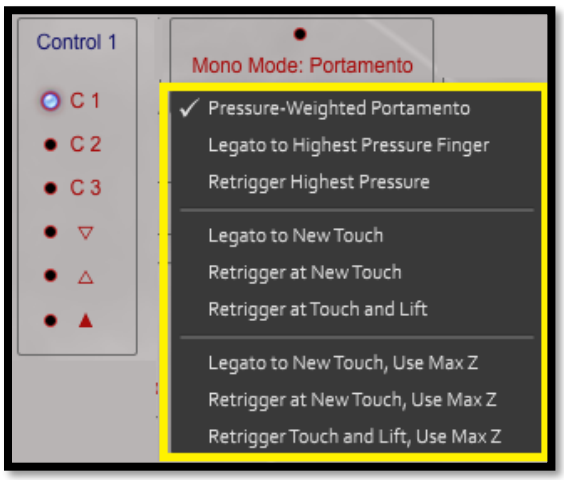
Notes:
If you want a monophonic CVC range and a polyphonic Midi range on different side of the split, use mode 2 or 3. Then use the first 4 outputs on the CVC and ignore the other outputs. For Midi, use channels 2, 3, 4, 5, 6, etc. but ignore channel 1. (For an additional way to control Midi channel usage, see Section 10.6.)

A multi-split mechanism is available for use by third-party software, but it is neither saved in presets nor is it displayed in the Editor. Technical details: Controllers 88 and 89 on Midi channels 1-16 override the split normally used in the Continuum Fingerboard; cc 88 specifies the lowest note number allowed on the Midi channel; cc 89 specifies the highest note number allowed on the Midi channel.

The split information is stored in the preset if saved. Disable split on any preset you want to save in its original state. If you save a preset that has been split and restore it to a user location or load it as a user defined preset, it will retain its split information.

10.13. Mono Function and Mono Interval

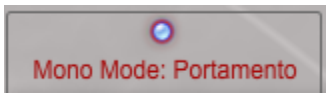
ContinuuMini and EaganMatrix Module players may wish to skip this section, as it is specific to the Full-size, Half-size and Slim Continuum Fingerboards.



Found in Control Panel 1. The Mono function allows single-note lines to be performed with legato, retrigger, or portamento transitions between notes; transitions can be pressure-based or time-based (see Section 6.3 for

details). The Mono Function (MonSW) lets you select what kind of transitions to use. (Mono can also be used for other purposes, see Section 6.3.) It has no effect unless it is activated (Active LED will be on).

Select the LED to turn on the current Mono setting:

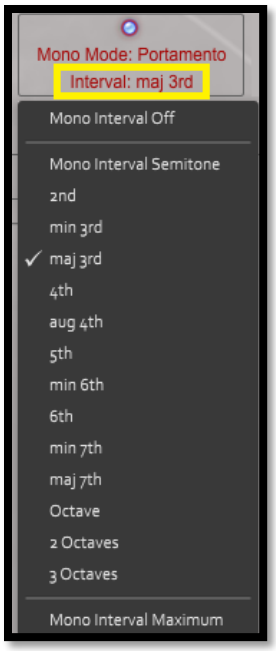


Mono Function	
0	Portamento - smooth pitch transitions, based on the relative Z values of fingers
1	Legato Z - smooth amplitude transitions, max Z finger is played (Legato means it does not retrigger; the sound has to be designed to take advantage of it)
2	Retrigger Z - retrigger at transitions, max Z finger is played
3	Legato T - legato to new touch, no retriggering during transition
4	Retrig T - retrigger at new touch
5	Retrig TL - retrigger at new touch and at finger lift
6	Legato TZ - legato to new touch, no retriggering during transition, use max Z of all fingers
7	Retrig TZ - retrigger at new touch, use max Z of all fingers
8	Retrig TLZ - retrigger at new touch and at finger lift, use max Z of all fingers

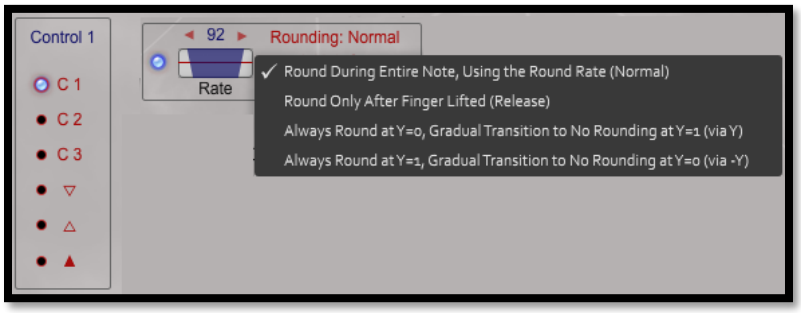
The Mono Interval allows you to play single-note lines when the Continuum Fingerboard is configured with polyphony greater than 1. If you play two notes within the Mono Interval, a legato, retrigger, or portamento transition will be used, as selected by the Mono Function. You can set any number of half steps for the Mono Interval by touching "Mono Interval" and then a value corresponding to the number of half steps. If you select value 0 or if the Mono Switch is off, the Mono Interval function will be disabled.

Mono Interval	
0	Disabled.
1 to 127	Sets the range in half steps of the mono interval.
◉	The Haken Editor has a reduced selection set comprised of the most useful values. Also, the Mono Function can be enabled and disabled via the switch in 10.13 in the Editor Legend.

If Mono Interval is turned on (set to a nonzero Mono Interval) you can activate and deactivate that interval using the Mono Switch (which can be assigned to a pedal), as described in Section 14.3, or via the Editor as described above.

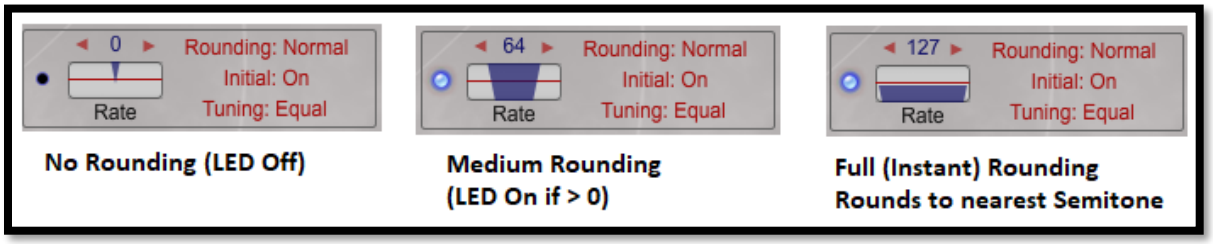


10.14. Round Initial, Normal Rounding, Release Rounding, Rounding via Y

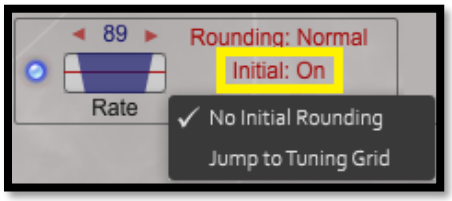


Found in Control Panel 1. The Continuum Fingerboard's "Finger Position Rounding" features help a performer sound in tune, when the performer cannot place fingers for proper intonation. Please thoughtfully consider the pros and cons of rounding finger position in Section 6.4 before using the "Finger Position Rounding" feature.

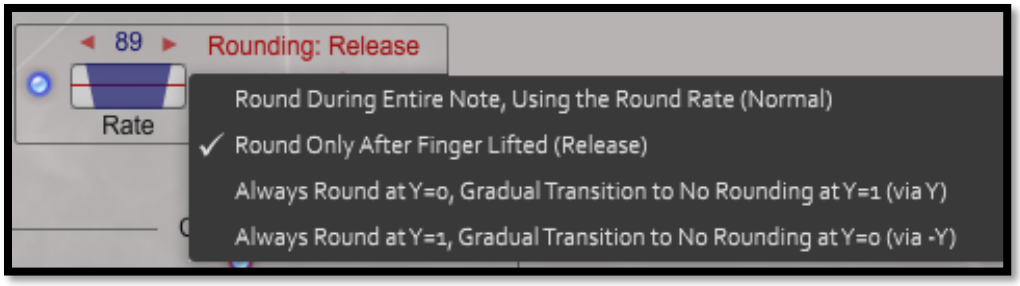
Normal Rounding: The Round Rate pitch correction (Section 10.15) will automatically round finger positions to the nearest half step any time during a note and after the finger is lifted. The degree of rounding applied is controlled by the Rate control. If Rate is zero, no rounding will be applied and the Rounding LED is turned off. If the Rate is set > 0 the LED will be turned on and more and more rounding will be applied until the maximum of 127 is set which indicates an instant rounding to the nearest semitone.



Round Initial: Found in Rounding section in Control Panel 2. When Round Initial is selected, the Continuum Fingerboard and ContinuuMini correct the finger position each time a finger first touches the surface. This aids a player in creating equal temperament pitches and intervals, or pitches and intervals in alternate tunings (see Sections 6.4 and 10.16). Subsequent vibrato and glissando finger moves are interpreted at full micro-pitch resolution until a new note is sounded.



After the finger first touches the surface, several additional options are available for rounding as long as Rounding Rate is set to a non-zero value (not set Off):



Release Rounding: The Round Rate pitch correction (Section 10.15) occurs when a note is still sounding after the finger is lifted from the surface, but not during sustained notes. With Release Rounding, the Round Rate takes effect only after a finger is lifted. See Section 6.4 for details.

Rounding via Y Position: When the ***finger position is at Y=0***, the pitch is the nearest half step. A vibrato effect can be achieved by rocking the finger right and left. (Technically, this vibrato-like pitch variation is based on the finger's X derivative.) When the ***finger position is at Y=1***, the "Normal Rounding" occurs. Thus, if the Round Rate is zero (Section 10.15), no rounding occurs at Y=1. If the Round Rate is a medium value (for example, 70), mild rounding occurs at Y=1. When the ***finger position is between Y=0 and 1***, then a combination of the Y=0 and Y=1 pitch correction methods is used.

Rounding via Y-Reversed: This is the same as "Rounding via Y Position", for the reverse of Y.

Round Initial, Release Rounding, and Rounding Via Y (using Overlay Strip)	
0	Normal Rounding enabled (using Round Rate value), Round Initial disabled.
1	Normal Rounding enabled, Round Initial enabled.
2	Release Rounding enabled, Round Initial disabled.
3	Release Rounding and Round Initial enabled.
4	Rounding via Y enabled, Round Initial disabled.

Round Initial, Release Rounding, and Rounding Via Y (using Overlay Strip)	
5	Rounding via Y and Round Initial enabled.
6	Rounding via Y-Reversed enabled, Round Initial disabled.
7	Rounding via Y-Reversed and Round Initial enabled.

10.15. Round Rate

Found in Rounding section in Control Panel 2. If set to a non-zero value (not set Off), the Round Rate will automatically round finger positions to the nearest half step any time during a note and after the finger is lifted. The greater the value set, the more rounding will be applied until the max value of 127, total rounding (complete quantization to the half-step) will be applied. After you complete a glissando, it can automatically correct your pitch. If you are playing vibrato the average finger position will be rounded so that the vibrato will be centered at the nearest half step. Please thoughtfully consider the pros and cons of rounding finger position in Section 6.4 before using this feature.

Round Rate	
0	No Rounding (default setting).
1 to 127	Small Round Rates cause a slow drift to half-step finger positions; larger rates round more quickly. The maximum Round Rate of 127 causes immediate rounding; with this rate you will get a piano-style glissando when you slide a finger over several half steps.

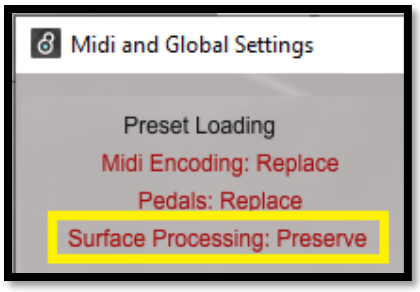
Notes:

(1) The Round Rate mechanism is a separate feature from Round Initial (Section 10.14), and it may be used with or without Round Initial.

(2) You can limit the Round Rate to have effect only after a finger is lifted using the Release Rounding feature (Section 10.14).

(3) You can use foot pedals to influence the round rate as you play; see details in Section 14.

A common desire is to retain the current round rate when moving between presets that may have a different or no rate. This can be achieved by going into Midi and Global settings through the cogwheel and set Surface Processing from the default "Replace" to "Preserve". Any Round Rate control setting you set while in the current preset will be retained after selecting any new preset.



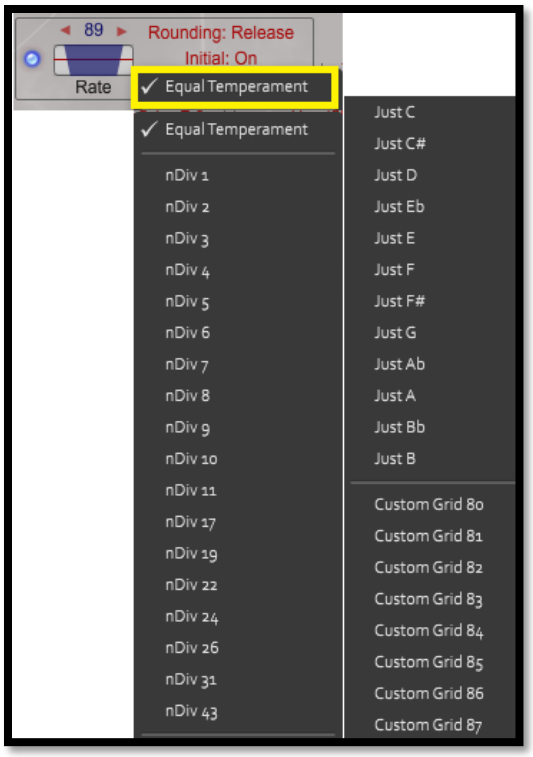
Note: The EaganMatrix will apply Rounding to CV pitch inputs. This can be a useful function when using sequencers for example that have not been exactly tuned to desired equal temperament tones.

Tuning (Select Pitch Table)

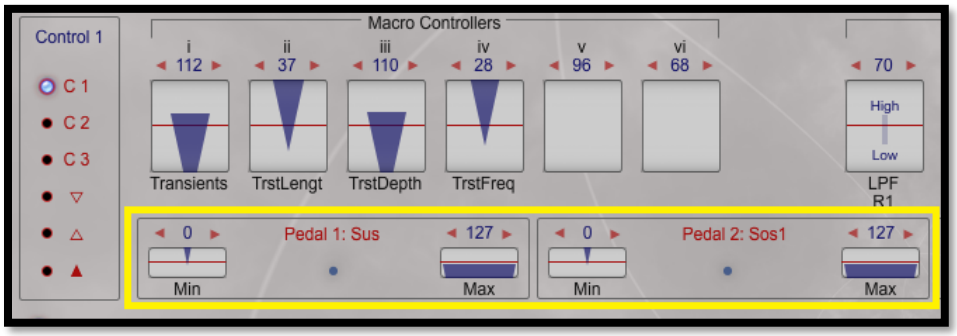
The Continuum Fingerboard allows you to select Pitch Tables, for use with rounding (Sections 10.14 and 10.15) or for radical pitch transformations of the playing surface (Section 6.4).

Tuning (Select Pitch Table) – Overlay Strip	
0 Equal Temperament	12-tone equal tempered tuning (default setting).
1 to 50	N-tone Equal tuning, where N is a number from 1 to 50. (Labelled nDiv in Editor)
60 to 71	Twelve Just tuning tonic centers. You will notice that the value "0" lines up with Middle C, so if you touch "Tuning", then "60+", then middle C, the Just C tuning (value 60) will be selected; the C#, Just C# tuning (value 61) will be selected; etc. In this Just tuning, any of the major triads (I, IV, V) will have perfect 4:5:6 frequency ratios in the rounded finger position, and the ii and vi minor triads will have perfect 10:12:15 frequency ratios.
80 to 87	Eight downloadable custom Pitch Tables (Custom Grid b0..B7 in the Editor). A graphical Pitch Table Editor, and its User Guide, are available in the cogwheel menu (see Sections 6.4 and 10.22).

In the editor a slightly smaller number of options are selectable under the Rounding section in Control Panel 1.



10.16. Pedal 1 and Pedal 2 Assignments



Pedal settings found in Control Panel 1. Note that the ContinuuMini only supports the Pedal 1 input. The EaganMatrix module does not have Pedal input support and you need to use a Pedal controller such as the Doepfer A177-2 Foot Controller which you can apply to a Macro Controller. All other Continuum models support two pedal inputs. All assume a TRS connection for normal pedal usage. Either switched or Continuous pedals can be used.

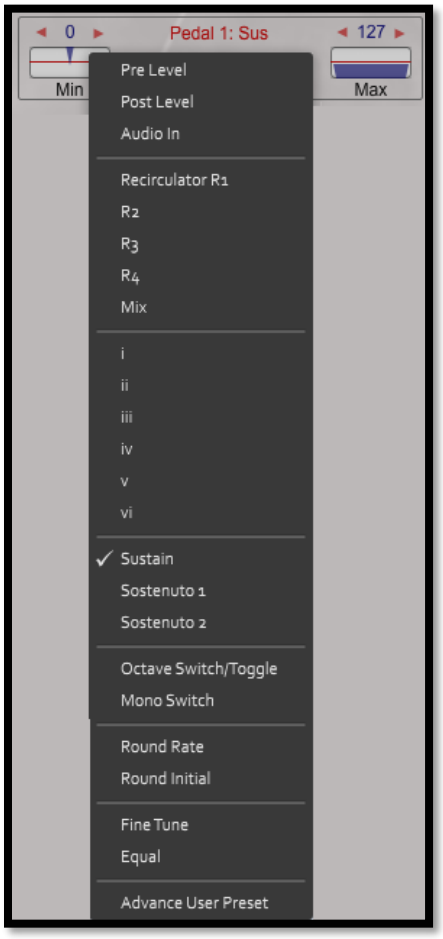
Use Pedal 1 and Pedal 2 to select a Midi controller (cc) for the pedal jacks (Section 6.5). The pedal jack data values are truncated to 7 bits for Midi, but the EaganMatrix and the CVC use the exact pedal data values (no truncation).

Pedal 1 and Pedal 2 must be assigned one of the performance controller numbers that has special meaning to the Continuum Fingerboard. For example, 64 is Sustain, 66 is Sostenuto, 69 is a second Sostenuto, 8 is Octave Shift (works with the Tri-Value Pedal), 9 is Mono Switch, 20 through 24 are Recirculator controls for the Internal Sound, and 31 is the Advance pedal. See Section 14.3 for a complete pedal listing.

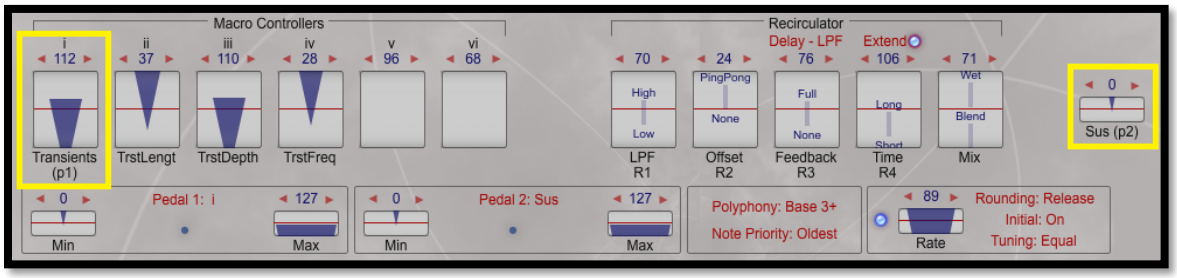
The ContinuuMini has only the first pedal jack, so only the Pedal 1 setting is used with the ContinuuMini.

Pedal 1 and Pedal 2	
9-10,12-31, 64-69, 80-83	Continuous controller number (cc) for pedal 1 or pedal 2. Note: ContinuuMini only supports Pedal 1.
◉	A subrange of data values can be created using the Min and Max controls in the Editor (see below).

In the Editor Pedals can be assigned a controlled by name in the pulldown list selection (Select the "Pedal 1" text in this example):



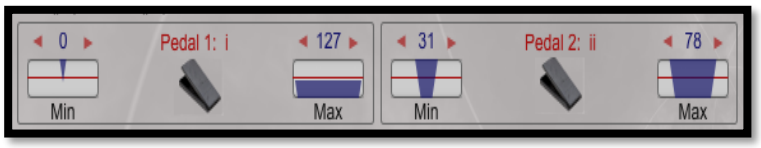
When the Pedal is assigned to a control, a "(p1)" or "(p2)" indication will appear beneath or beside the affected control. In this example Pedal1 is assigned to the first Macro Controller and Pedal2 is assigned to Sustain.



10.17. **Pedals Min and Max Range**

Min and Max values are used to set the output range of the pedal jacks. This allows for fine control of subranges of parameters. For the EaganMatrix and the CVC, reducing the pedal range does not reduce accuracy. The pedal range can be set starting at zero or at any other value. The range can also be set for reverse operation.

For switch pedals, Min specifies the value when the pedal is at rest, and Max when the pedal is pressed.



Pedal 1 above is assigned to Macro Controller I with a default range of 1-127 and Pedal 2 is assigned to Macro Controller ii with a range of 31-78..

These are two sided sliders allowing the user to set a low and high value from the same slider. TO use the pedals sliders to set range:

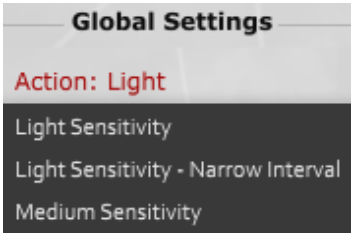
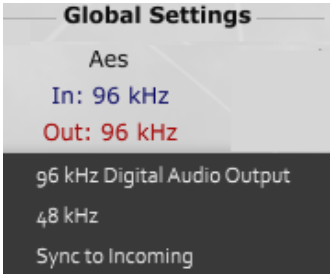
- Drag over the slider area to set low and high point at one time or use the triangle controls.
- Shift-drag nearer to one side of the slider to change ONLY that end.
- Ctrl (command) and drag to offset both sides of the range.
- Alt (option) and drag to expand/contract the range.
- Use the increment/decrement triangles to fine tune each end.

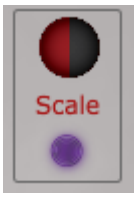
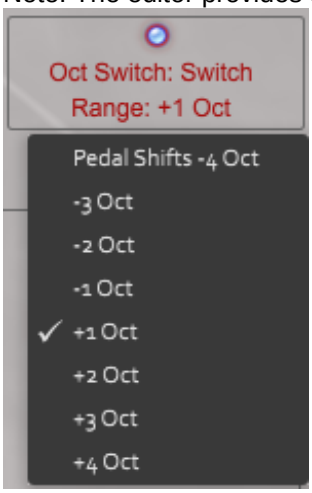
The Range control can be selected to **Reverse** the direction of values when pressing the pedal from its **Normal** default setting. The following example reverse pedal values starting at 114 and diminishes to 20 as the pedal is increased. This is a ContinuuMini example so no Pedal 2 is available.

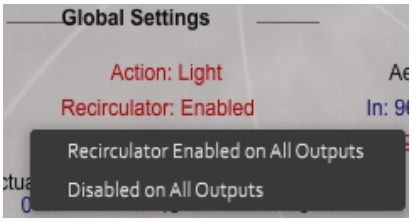


10.18. Options

Less frequently used Continuum Fingerboard configuration choices are grouped under Options. For a more detailed explanation of what each of these options does, refer to the text after the table below. Options 8, 9, and 127 are not available in the Editor where they occur in their respective controls.

Options	
0	This will disable any of the Options below that were previously enabled.
1	Medium Action. ◉ In "Midi and Global Settings" (in the cogwheel menu) an additional option, "Light Action - Narrow" is Light Action optimized for narrow intervals. Note: In the Editor, Action defaults to light for all models that support it. 
2	Digital audio output syncs to digital audio input. "Slim" Model Continuums use SPDIF digital jacks. Half-size and Full-Size continuums use XLR AES connections. The ContinuuMini does not support digital audio. ◉ AES options are in "Midi and Global Settings" (in the cogwheel menu). Note: The AES Input should be detected and assigned automatically to the input rate (typically 96KHz or 48 KHz). If it is unassigned (set to "None"), check your AD/DA converter settings and make sure you don't have your digital cables swapped. This option does not apply to the ContinuuMini (has no audio input) or EaganMatrix Module (which has Analog Audio input only), however the Analog inputs are treated the same as the AES digital inputs in the EaganMatrix.
3	Digital audio output rate (typically 96Khz or 48Khz). Must be set manually. ◉ AES options are in "Midi and Global Settings" (in the cogwheel menu).  Note if Sync is lost when expected the Continuum's LED will turn a solid Pink/Purple color along with the Editor's LED if open. Try and re-establish sync

Options	
	 This may occur if you set AES to "Sync to Incoming" and no signal is present.
4	Make octave foot switch transpose multiple octaves up or down if control (LED) is set instead of one octave. ◉ 4.18 Note: The editor provides up to four octave foot switch transposition in either direction.  This will take affect after setting and also has three modes: Switch, Toggle and Immediate. 
5	Make octave foot switch transpose four octaves instead of one octave. ◉ 4.18b Editor: See note above.
6	Direction Reverse X (pitch) inverts the laying direction so the lower notes are to the right and the higher notes to the left. ◉ 4.18a. This is available in the Playing Surface section in Control Panel 2. 
7	Enables/Disables Continuum Fingerboard's recirculator. Useful if you prefer an external reverb. ◉ This option is in "Midi and Global Settings.

Options	
	
8	Limit Continuum Fingerboard's Midi transmission to 8% of the Midi bandwidth (200 Byte/sec).
9	Limit Continuum Fingerboard's Midi transmission to 5% of the Midi bandwidths (150 Byte/sec).
10	Load User Preset Slots with "Demo Assortment." ◉ This option is in the Group menu. Note: The demo assortment may change from release to release.
127	Factory reset.

See additional text for certain options below.

Option 1: Continuum Fingerboards built after 2012 are capable of Light Action, responding to lighter finger pressure than the Classic Action of older Continuum Fingerboards. Choosing Medium Action makes a newer Continuum's action equivalent to the Classic Action.

Option 2: Use external clock sync from the AES3 input. The Continuum Fingerboard's Led while shine purple (pinkinsh) if this option is selected and no valid digital sync is present at the AES3 input. The led will switch to blue when sync is present.

Option 3: Causes the external digital audio output to transmit at 48 kHz instead of the default rate of 96 kHz.

Options 4 and 5: Additional transposition values are available using the Haken Editor. Settings can range from +/- 4 octaves in one octave increments.

Option 8 and 9: This data rate is much too slow for Continuum playing, but convenient for configuration with wireless Continuum Remote apps. See Section 15.7.

Option 127: Factory reset sets all presets (the current configuration as well as Internal User Preset Slots 1-16) and the Global options to factory default.

10.19. Send

Send	
1	Transmit current configuration via Midi, using the messages described in Section 15.

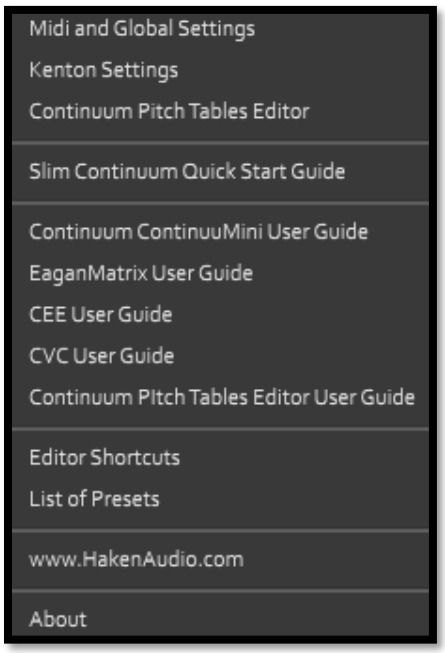
10.20. Load and Store (User Preset Slots)

Load	
1 to 128 (stored in banks of 16 presets)	This will load from the selected Internal User Preset Slot. **A single-touch alternative** is available for loading user presets from the surface: Press the red button and then press the playing surface on the opposite side of the Overlay Strip, at the desired user preset number. This saves the intermediate step of pressing "load". **Hardware alternatives** are also available for loading user presets, see Sections 6.6, 6.7, and 6.8.
◉	Select one of 8 banks of 16 User presets and then click on one of the 16 Internal User Presets to load the current configuration from it (Section 8.5).

Store	
1 to 16	This will store into the selected Internal User Preset Slot. It will also store the Global settings internally.
◉	Shift-click on one of the 16 Internal User Presets to store the current configuration into it, or drag a preset file from the Finder (Mac) or Explorer (Windows) and drop it onto one of the Internal User Presets (Section 8.6).

10.21. Cogwheel Menu

 When selected, the Cogwheel Menu contains a number of useful Haken Editor Utilities:



Cogwheel Menu: Midi and Global Setting	
◉	Select USB-Midi connections for the Editor (Section 8.1), and set Global settings: Recirculator Enable, Light Action, Preserve Parameters (see below), and AES Digital Audio Rates. Shortcut: Command+G (Mac) or Control+G (Windows).

Preserve Parameters (in Midi and Global Settings): When a preset is opened from your Mac or Windows computer, or when a preset is loaded from an Internal User Preset Slot, you may globally preserve the existing values of certain sets of parameters as follows:

- **Midi Encoding**: X Bend, Y Controller, Z Controller, Midi Note Processing, Midi Program, Midi Routing, CVC Standard CV Definition (Note: use to preserve MPE+MPE modes between presets).
- **Pedal**: Pedal Assignments, Pedal Min/Max, Octave Shift Effect
- **Surface Processing**: Channel Priority, Reverse, Split, Transpose, Mono Switch, Mono Interval, Mono Function, Round Rate, Pitch Table

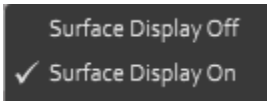
Cogwheel Menu: Kenton Settings	
◉	View and customize functionality of Kenton Mini Controller. Separate Kenton Settings are stored for each preset (see Section 6.6). Shortcut: Command+K (Mac) or Control+K (Win).
Cogwheel Menu: Pitch Tables Editor	
◉	A graphical editor for creating custom downloadable Pitch Tables, written by Pablo De La Loza (see Section 6.4, and the Pitch Tables Editor User Guide in the Cogwheel menu).
Cogwheel Menu: User Guides	
◉	Select "Continuum User Guide," "EaganMatrix User Guide," "CEE User Guide," "CVC User Guide," or "Pitch Tables Editor User Guide" to launch a window showing the Guide. The User Guide pdf files are located in the User Guides folder inside your Haken Editor folder.
Cogwheel Menu: Editor Shortcuts	
◉	A reference list of keyboard shortcuts and mouse drags available in the Haken Editor.
Cogwheel Menu: Deprecated: Barrel Styles	
	Note. The old "Barrel/Bespoke Styles" selections from the Cogwheel are no longer supported. Barrels are now called Macro Controllers. A new set of styles is used and set directly from the "Control Text" section at the bottom left hand corner of the Editor screen. A full help display is available by clicking the "Edit" text. Any Control text is visible next to the Edit function. 
Cogwheel Menu: List of System Presets	
◉	Displays a text list of all stored System Presets. You can copy and paste the preset list into your favorite word processor for formatting or printing. The list includes the system preset numbers required for loading presets using the Overlay Strip (Section 10.2).

Cogwheel Menu: Kenton Settings	
Cogwheel Menu: About	
◉	Select "About" to see the Editor version, as well as information on the Editor authors Edmund Eagan and Lippold Haken.

10.22. Surface Display

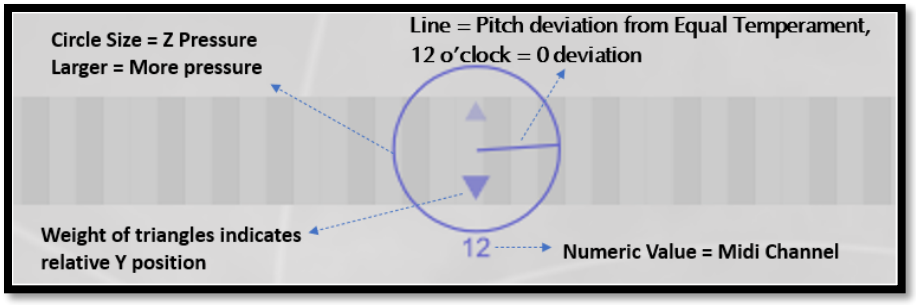


A detailed visual display of finger activity on the Continuum Fingerboard can be activated by clicking on the "Surface" Control text and setting Display to On.



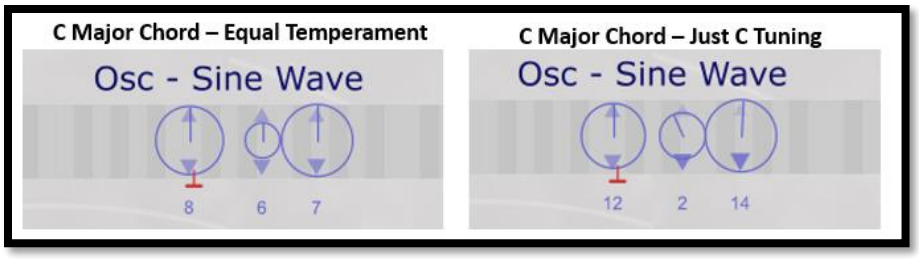
When the Surface Display is turned on, finger activity from the Continuum Fingerboard's playing surface will be displayed on on-screen Continuum surface. Each new note played will display as a combination of a circle, line, number, and a pair of triangles:

- Circle diameter: Pressure (Z) value, larger diameter means more pressure.
- Circle placement: Centre of circle reflects the left-to-right (X) position.
- Line: Deviation left-to-right from vertical reflects the pitch deviation from nearest equal temperament pitch.
- Triangle Pair (Y position): The lower triangle gets darker as finger is towards the front; upper triangle gets darker as finger is towards the back.
- Numerical: The Midi channel of the note.



The Surface Display showing symbol interpretation

For the same finger position, if you change tunings you will see the resulting pitch deviation in the surface display.



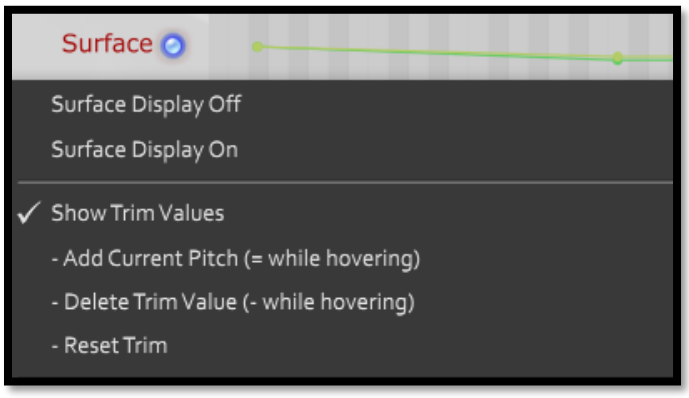
The Surface Display showing C Major Chord fully rounded. Note the third in the Just tuning is noticeably flat. Variations in pressure and Y position are also noticeable.

10.23. Pitch Trim

Editor Only:

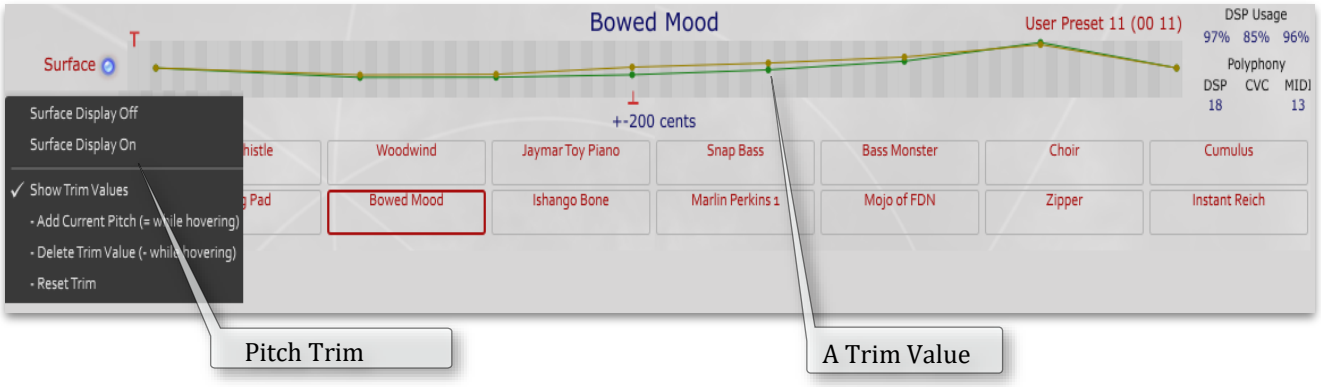
Some algorithms for sound generation, such as physical models that use delays, generate pitches that are sharp or flat over parts of their pitch range. The Pitch Trim functionality provides a way for the preset designer to correct for this. The Pitch Trim consists of two user-definable graphs, overlaid onto the Surface Display (see Section 10.23).

To see and edit the pitch trim values make sure Surface Display is On and Trim Values are displayed.



The blue pitch graph is for Y=0 Pitch Trim, and the red pitch graph is for Y=1 Pitch Trim. The Pitch Trim is particular to each preset and will be stored with the preset.

To see the Pitch Trim graphs, select Pitch Trim from the Surface Display menu. Each Pitch Trim graph can specify a trim value at half-octave positions; these half-octave positions are indicated with vertical colored lines (Yellow =



Y0, Green = Y1) on the Pitch Trim display.

To add a trim value to the Pitch Trim graph, place a finger on the surface at Y=0 (to add to the Y=0 graph) or Y=1 (to add to the Y=1 graph) at one of the half-octave positions. Then move the finger until the pitch generated is correct for that half-octave position and choose "Add Current Pitch" from the Surface Display menu (or type "=").

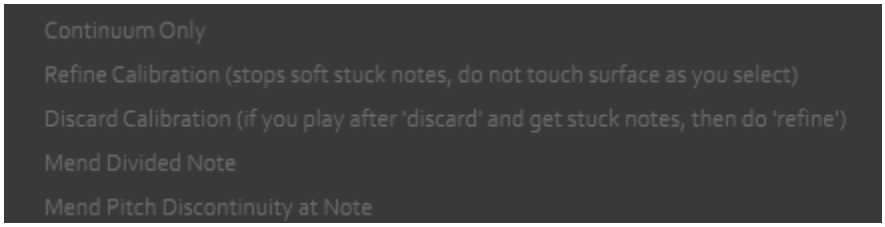
To remove a trim value you added previously, place a finger on the surface at Y=0 (to remove from the Y=0 graph) or Y=1 (to remove from the Y=1 graph) at the half-octave point, and choose "Delete Trim Value" from the Surface Display menu (or type "-").

The remove all pitch trim values, choose "Reset Trim" from the Surface Display menu.

The Pitch Trim functionality should not be confused with the Pitch Table Editor, which is available in the Cogwheel menu (see Section 6.4 for more about Pitch Tables).

Pitch trim range is indicated under the graph. It defaults to -/+ 100 cents and more extreme trim adjustments will increase the range, up to +/-300 cents.

10.24. Additional Options



The Continuum supports additional options:

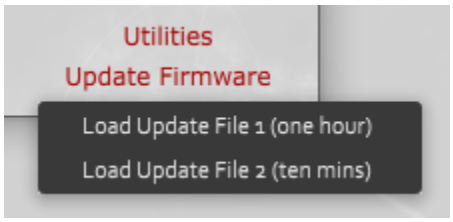
- Refine Calibration – If fingerboard is not responding as expected (else see factory recalibration)
- Disregard Calibration – Sometimes recommended before refining calibration as a secondary set to fix surface response issues.
- Mend Divided Note – Try this if you get multiple notes playing on a single press
- Mend Pitch Continuity at Note – Corrects some pitch issues (contact Haken Audio).

11. Updating Firmware into Continuum, ContinuuMini or EaganMatrix Module

Note: If you are running firmware older than 8.5 on half-size and full-size continuums, you will have to update in stages. Please contact Haken Audio for that procedure. **Always directly connect your Slim Continuum, ContinuuMini or EaganMatrix Module to your computer with the appropriate USB cable when updating firmware over USB (do not use a hub or a dongle that is hub based).** All models expect ContinuuMini can also be updated over DIN Midi interfaces using the Roland UM-One Midi Interface.

New firmware is supplied from Haken Audio integrated into the Editor. If you have presets you previously created and stored in your Continuum's Internal User Preset Slots, please save those presets to a unique directory (using your previous version of the Editor) to your Mac or PC before updating firmware as they will be overwritten on firmware update). Then, to update the firmware as follows:

1. Run the new Haken Editor (available in the Resources area at www.HakenAudio.com). Make sure the Editor is communicating with your Continuum Fingerboard as outlined in Section 8.1. Also make sure you are running the right version of the editor for the given firmware (for example, don't try and upgrade a 9.5x firmware version with a 9.0 version editor). Then go to the Haken Editor's Midi and Global Settings window (from the Cogwheel). At the bottom right hand corner of the window a Utilities / Update Firmware selection is available:



2. Select "Load Update File 1" from the Update Firmware menu. If the Update procedure does not start please take a screen shot of the Midi and Global Settings page please contact Haken Audio. File1 updates the firmware on the Continuum. The yellow status line in the editor will display % complete as the firmware update progresses and the LED will also change to yellowish indicating firmware download is in progress.



3. When Update File 1 finishes, you may be asked to repower/restart the continuum and wait 30 seconds. The Editor may also have to be restarted if it does not display the solid blue LED. You should then see a message asking for File 2 as below. Then select "Update File 2" which updates the System presets. Presets may start scrolling on the screen as they load into the Continuum.

   After File 2 loads, the LED on the "Slim" model continuums might change from a yellowish-green to green and then maybe blink pink for a bit, possibly blinking blue for a few seconds after that and should eventually go to solid blue indicating that File 2 has completed and User Preset 00 01 should normally be displayed.

   When Update File 2 finishes your instrument has been updated to the desired firmware version which will be displayed on the "Slim" Continuum's LED panel when it boots up.



Note: Continuum firmware updates MUST be done with a Roland UM-ONE interface for half-size and full-size models. "Slim" model Continuum fingerboards and ContinuuMinis can be updated through the USB interface. "Slim" model continuums also can use the UM-ONE for Midi direct update if desired. If the USB interface does not update correctly, try the direct Midi interface. The times noted for update in the Update Firmware menu may change depending on your model.

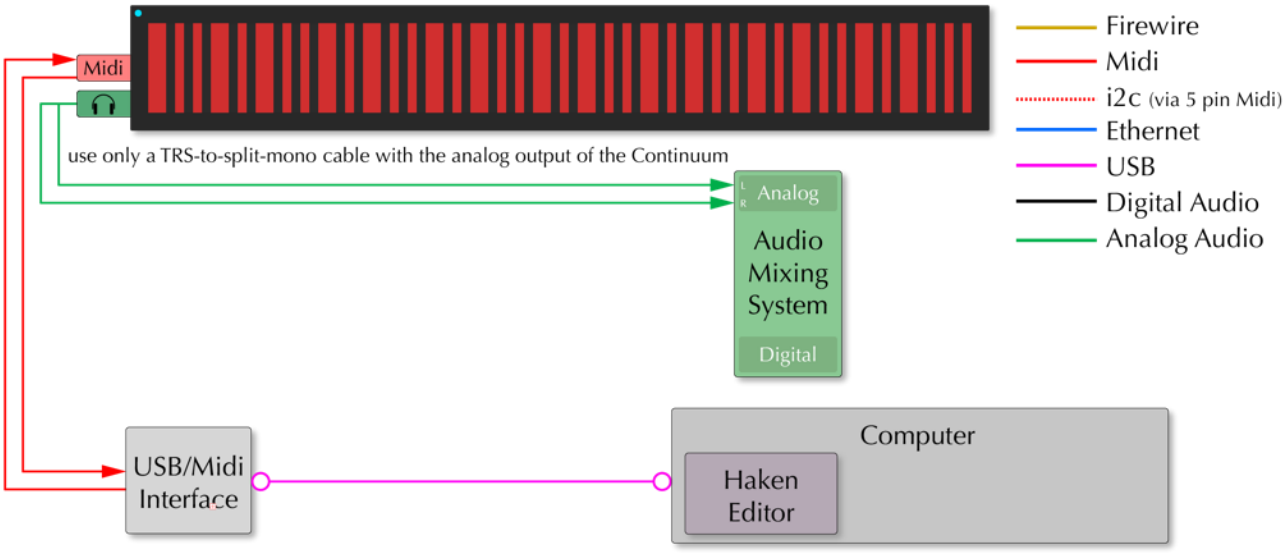
If you have trouble with your USB-Midi cable:
(1) Try resetting the USB-Midi cable by unplugging and replugging its USB connector.
(2) If you continue to have problems, try connecting your USB-Midi cable through a **powered USB hub**.

If the % indicator does not update after a few minutes:
(1) Make sure you are running the right version of the editor for the firmware version desired.

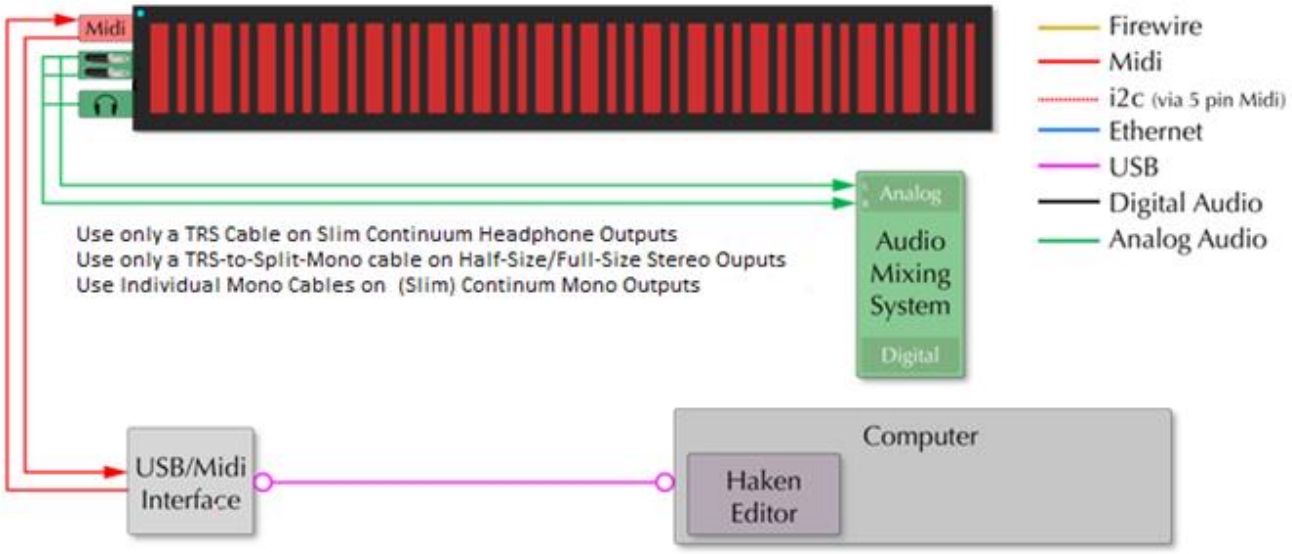
(2) If this never updates or your update is taking more than one hour, please contact Haken Audio.

12. Connecting to External Hardware and the Editor

The following are a number of recommended configurations for connecting the Continuum Fingerboard and its accessories to external hardware. Also shown where appropriate is the settings for the Haken Editor's "Midi and Global" page (Section 8.1).



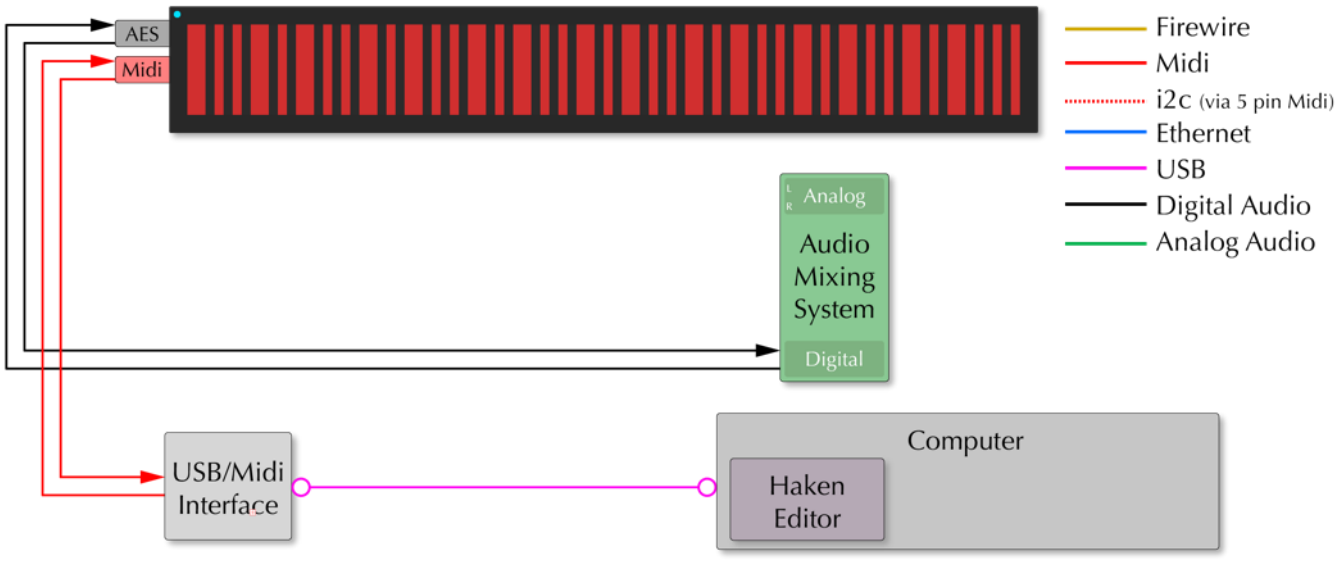
12.1. Analog Audio Only ("Slim" and Half-Size/Full-Size Models)



Analog Audio: The Continuum's analog headphone output is connected to an external audio mixer. It is important not to mono sum the audio signals from the Continuum; a TRS-to-split-mono cable must be used. The same applies to the ContinuuMini Stereo output jack. "Slim" model Continuums support individual Mono outputs. The "Slim" Continuum's Headphone jack still requires a TRS connection, but it is now intended specifically for headphones.

Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor. "Slim" model Continuums also support a direct USB-A connection.

12.2. Digital Audio Output ("Slim" and Half-Size/Full-Size Models)



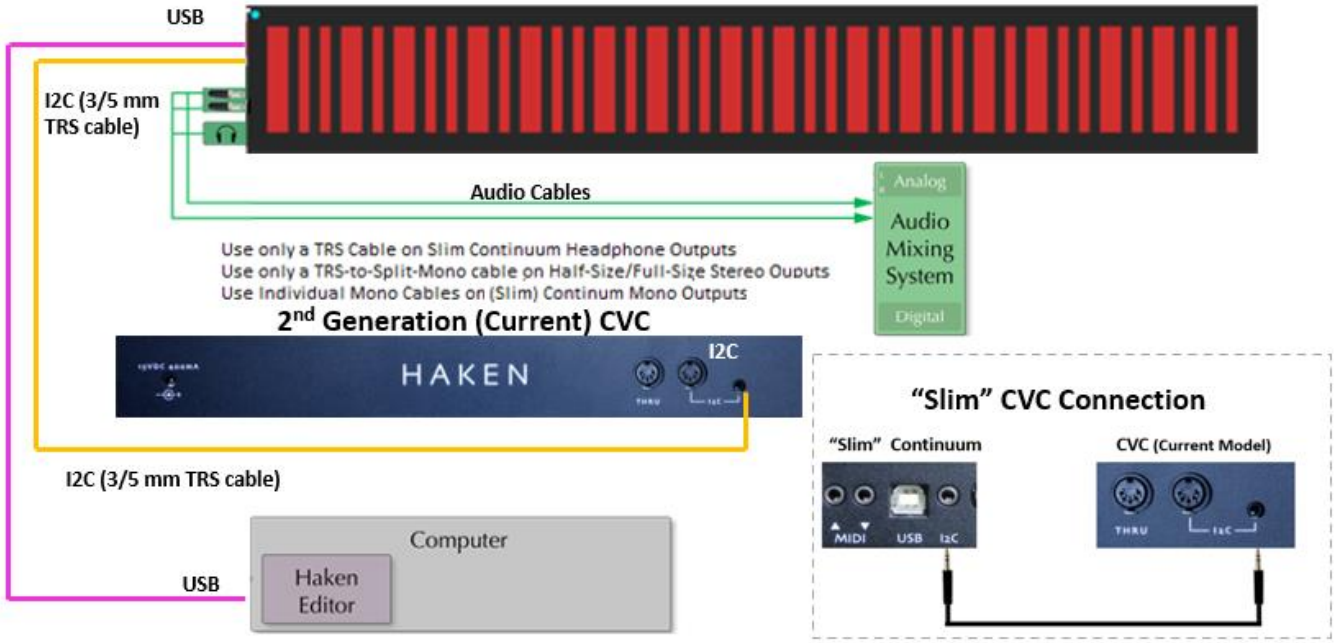
Digital Audio: The Continuum's digital output is connected to an external audio mixer. A digital signal is fed back to the Continuum so that the Continuum can optionally sync to the AES signal supplied by the external source. Notice that the Sync out in the Editor has been set to "sync to incoming", so that the Continuum can sync to that digital signal. Successful digital clocking will report "Sync". "Slim" model Continuums use RCA-type SPDIF AES connectors. The Half-Size and Full-Size models require an XLR AES connection. In both cases a cable specifically designed for digital audio should be used for best performance.

Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor. "Slim" model Continuums also support a direct USB-A connection.

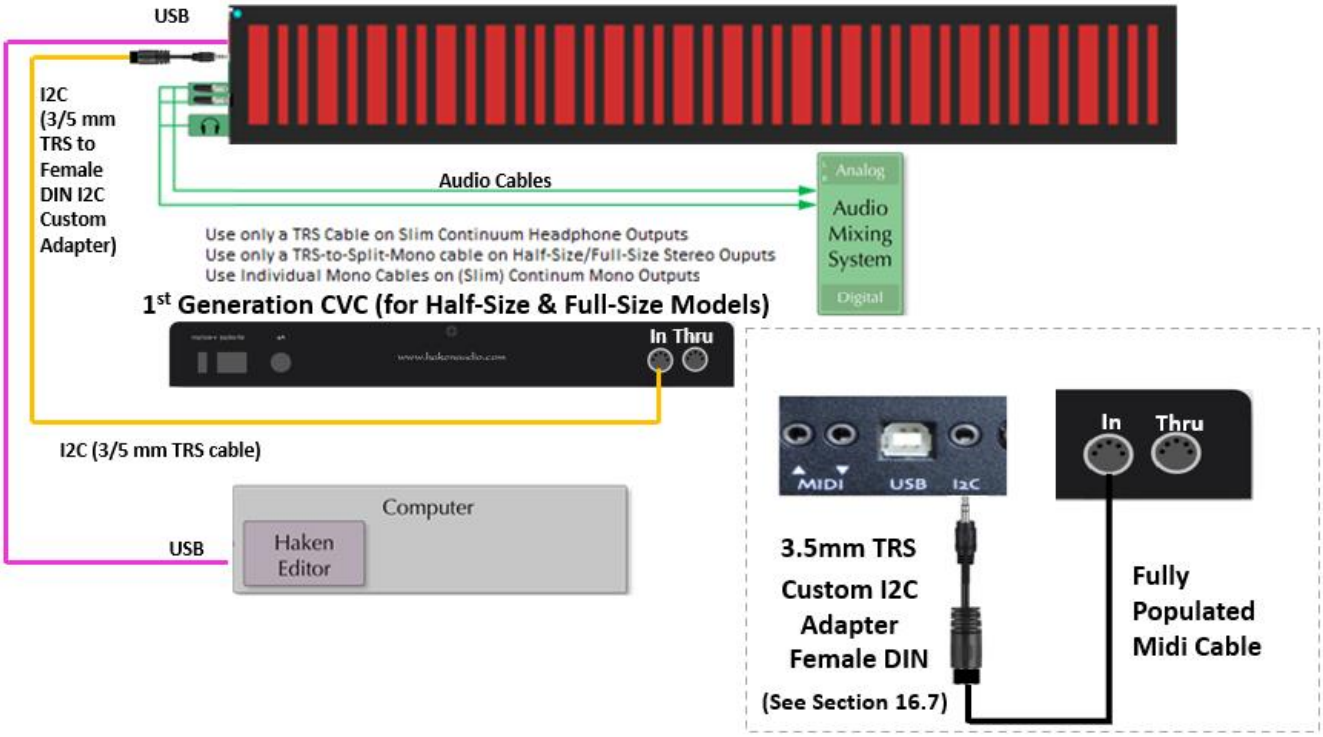
Note: When designing presets that take digital audio and manipulate it, make sure you have the Control Panel 2 / "Audio In" control turned up.

12.3. Connecting "Slim" Continuums to Generation 1 and Generation 2 CVCs

The "Slim" Continuum uses the I2C port to connect to the CVC through the 3.5mm port using a standard 3.5mm TRS cable. If connecting to the Generation 1 CVC model designed for Half-Size and Full-Size models it requires a custom 3.5mm TRS-to-I2C DIN adapter (same as used on ContinuuMini) as noted below (a fully populated Midi cable must be used to connect the adapter to the CVC in the latter case). See section 16.7 for information on the I2C pinouts.

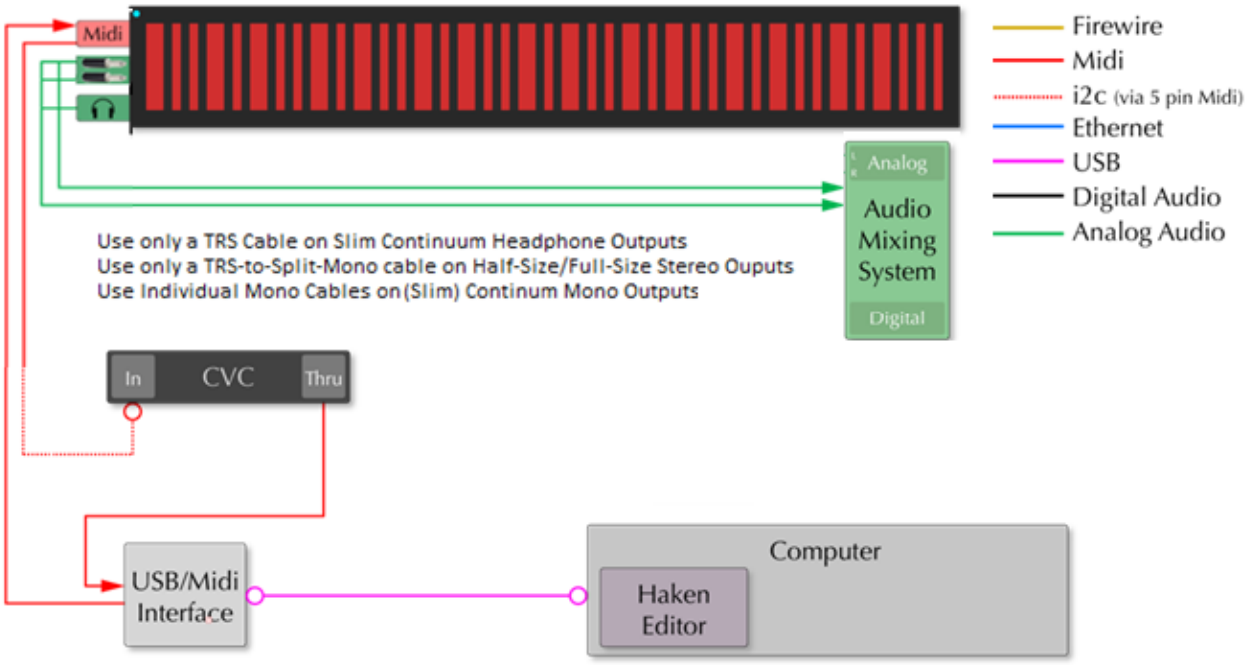


Connecting "Slim" Continuum to Generation 2 CVC



Connecting "Slim" Continuum to Generation 1 CVC Designed for Half-Size and Full-Size Models

12.4. Analog Audio and CVC



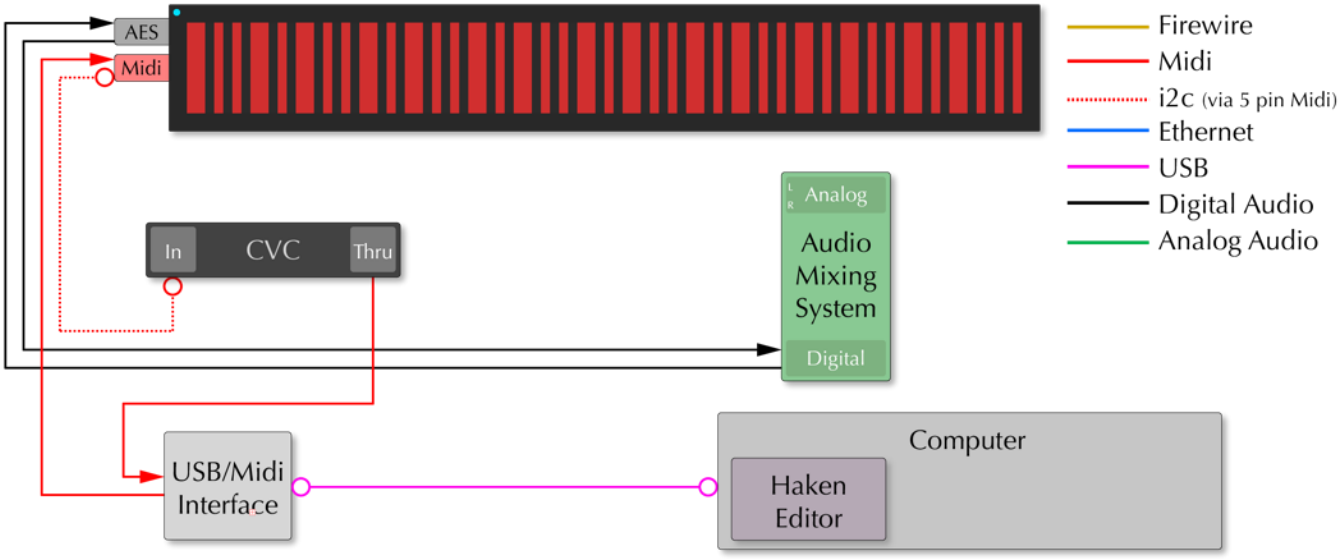
Analog Audio: The Continuum's analog headphone output is connected to an external audio mixer. It is important not to mono sum the audio signals from the Continuum; a TRS-to-split-mono cable must be used.

CVC: The CVC is connected to the Continuum via the i2c information that is carried through the unused pins of the Midi cable. The i2c cable is a high quality Midi cable with all 5 pins connected. It connects the Midi Out of the Continuum to the In on the CVC. A new model CVC is available that in addition to the standard MIDI DIN connections also supports a Mini Midi connection for use with "Slim" model continuums. If you have an older CVC that only supports Midi DIN inputs you should use a Midi Din-to-Mini Midi adapter (see section 12.3).

Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor. "Slim" model Continuums also support a direct USB-A connection.

12.5. Digital Audio and CVC

Digital Audio: The Continuum's digital output is connected to an external audio mixer. A digital signal is fed back

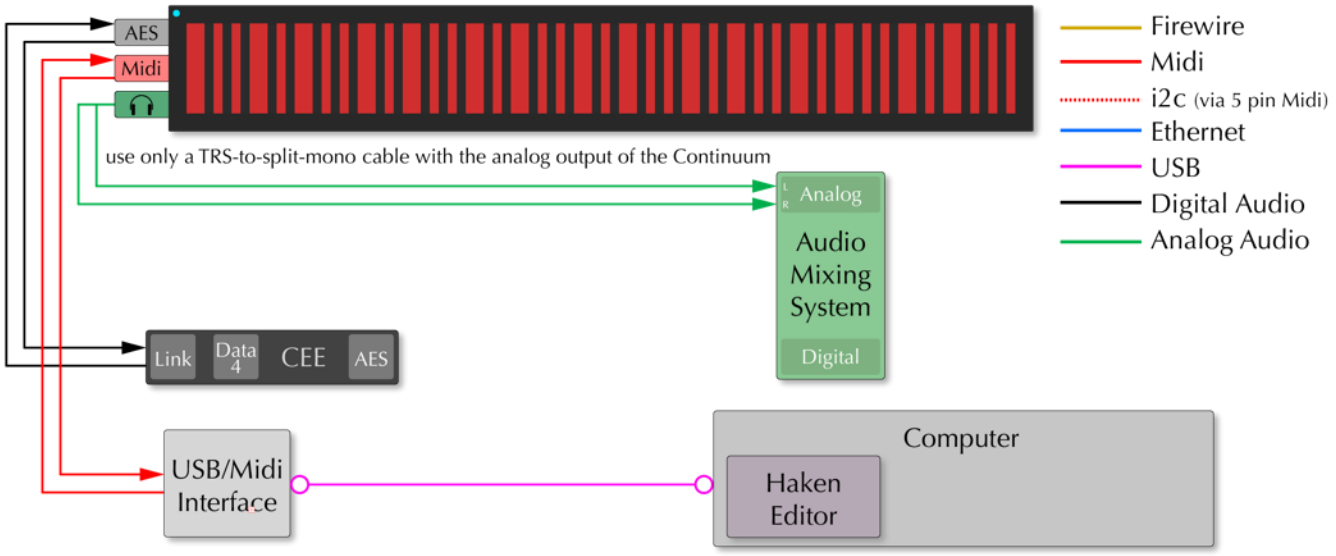


to the Continuum so that the Continuum can optionally sync to the AES signal supplied by the external source. Notice that the Sync out in the Editor has been set to "sync to incoming", so that the Continuum can sync to that digital signal. Successful digital clocking will report "Sync".

CVC: The CVC is connected to the Continuum via the i2c information that is carried through the unused pins of the Midi cable. The i2c cable is a high quality Midi cable with all 5 pins connected. It connects the Midi Out of the Continuum to the In on the CVC. For "Slim" Continuum CVC connections see section 12.3.

Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor. "Slim" model Continuums also support a direct USB-A connection.

12.6. Analog Audio and CEE (For Half-Size/Full-Size + CEE Owners Only)



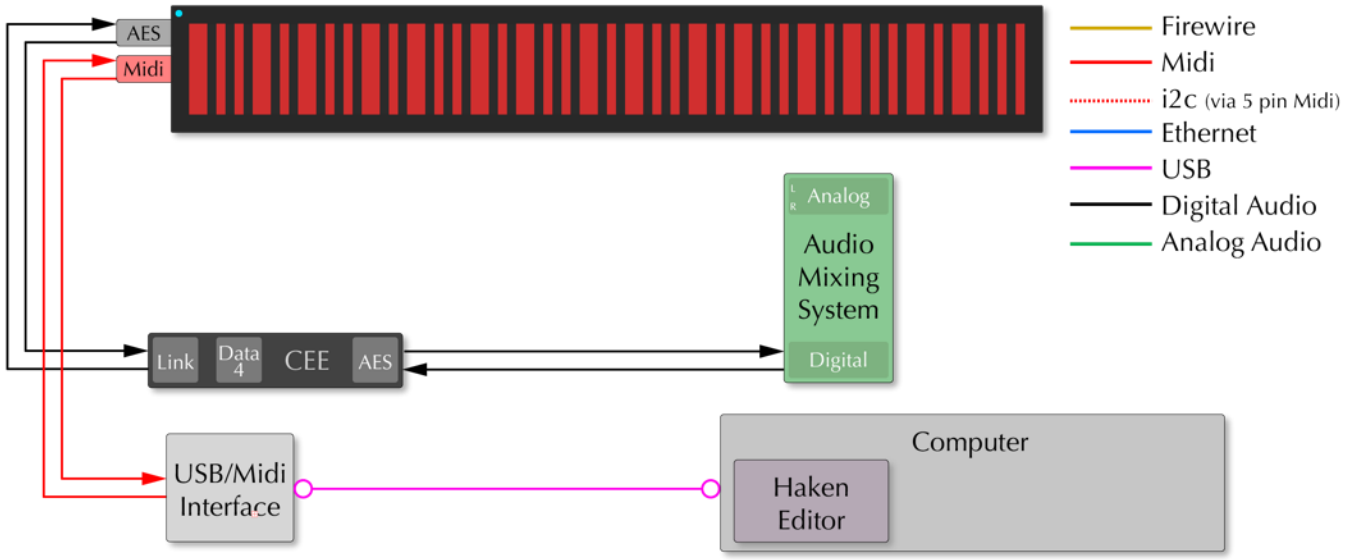
Note: Note: The Continuum EaganMatrix Expander (CEE) is no longer available. This section is included for those who own the unit with Half-Size or Full-Size Continuum Models. "Slim" model Continuums are all 6x processing models and require no expansion.

Analog Audio: The Continuum's analog headphone output is connected to an external audio mixer. It is important not to mono sum the audio signals from the Continuum; a TRS-to-split-mono cable must be used.

CEE: The CEE is connected to the Continuum via a bidirectional connection via the AES on the Continuum to the Link on the CEE. Using analog "mic" cables instead of proper digital audio cables for this connection may compromise performance.

Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor.

12.7. Digital Audio and CEE (For Half-Size/Full-Size + CEE Owners Only)



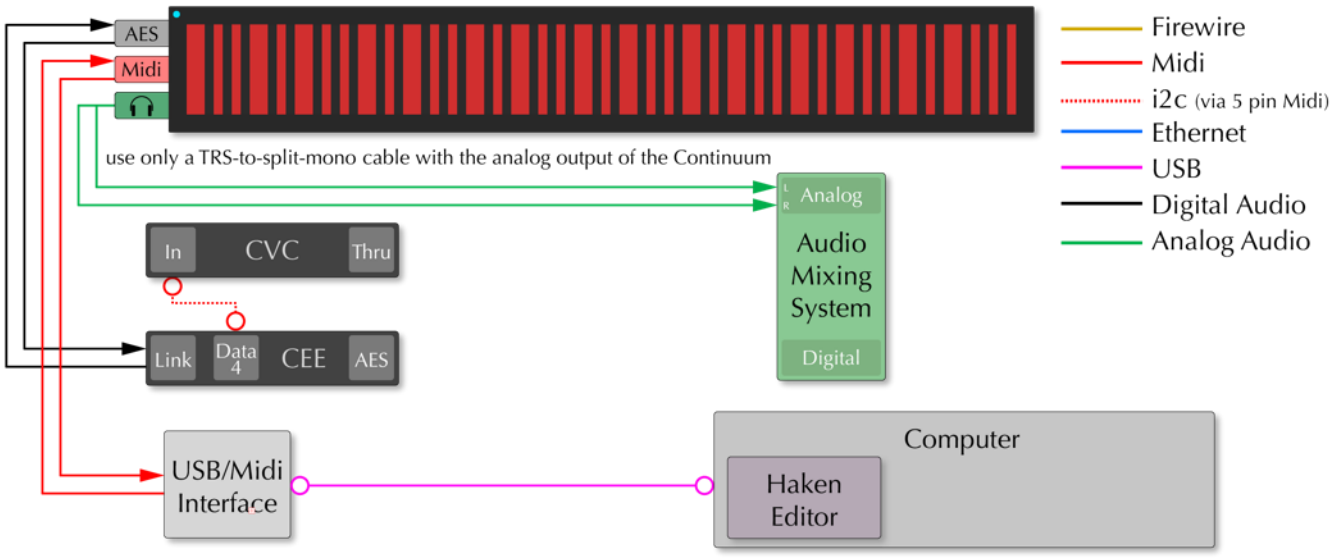
Note: Note: The Continuum EaganMatrix Expander (CEE) is no longer available. This section is included for those who own the unit with Half-Size or Full-Size Continuum Models. "Slim" model Continuums are all 6x processing models and require no expansion. They use SPDIF AES connections direct to the appropriate D/A converter.

Digital Audio: The CEE's digital audio output is connected to an external audio mixer. Using analog "mic" cables instead of proper digital audio cables for this connection may compromise performance. A digital signal is fed back to the CEE so that the Continuum and CEE can optionally sync to the AES signal supplied by the external source. Notice that the Sync out in the Editor has been set to "sync to incoming", so that the Continuum and CEE can sync to that digital signal. Successful digital clocking will report "Sync".

CEE: The CEE is connected to the Continuum via a bidirectional connection via the AES on the Continuum to the Link on the CEE. Using analog "mic" cables instead of proper digital audio cables for this connection may compromise performance.

Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor.

12.8. Analog Audio, CVC and CEE (For Half-Size/Full-Size + CEE Owners Only)



Note: Note: The Continuum EaganMatrix Expander (CEE) is no longer available. This section is included for those who own the unit with Half-Size or Full-Size Continuum Models. "Slim" model Continuums are all 6x processing models and require no expansion. They use SPDIF AES connections direct to the appropriate D/A converter.

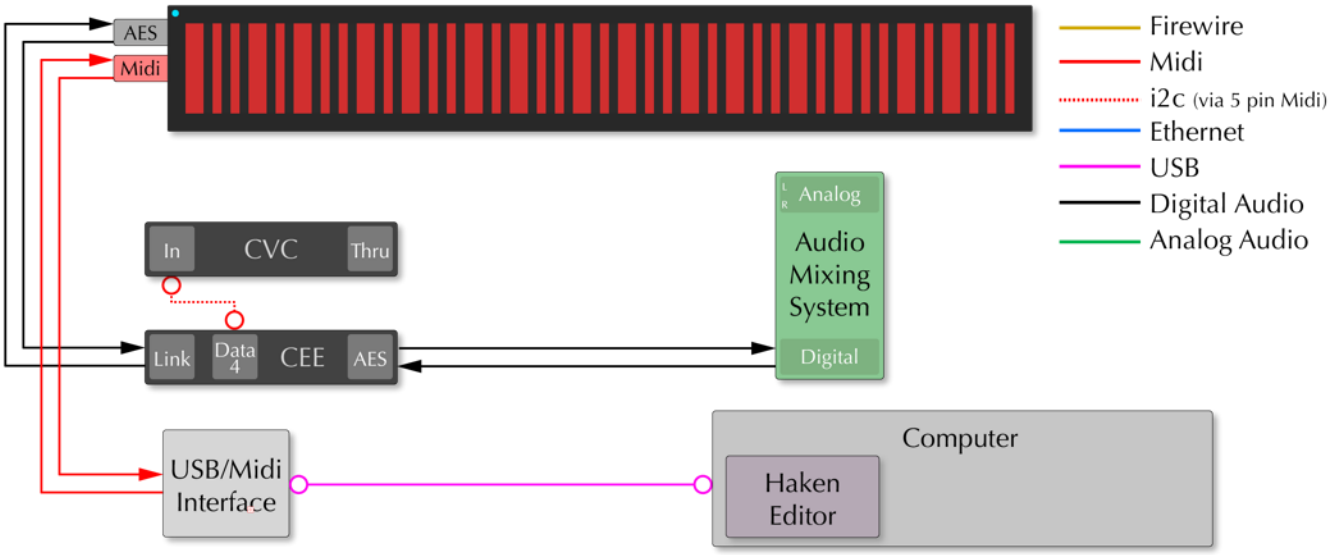
Analog Audio: The Continuum's analog headphone output is connected to an external audio mixer. It is important not to mono sum the audio signals from the Continuum; a TRS-to-split-mono cable must be used.

CEE: The CEE is connected to the Continuum via a bidirectional connection via the AES on the Continuum to the Link on the CEE. Using analog "mic" cables instead of proper digital audio cables for this connection may compromise performance.

CVC: The CVC is connected to the CEE using i2c. The i2c cable is a high quality Midi cable with all 5 pins connected. It connects the Data 4 port of the CEE to the In on the CVC. For "Slim" Continuum CVC connections see section 12.3.

Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor.

12.9. Digital Audio, CVC and CEE (For Half-Size/Full-Size + CEE Owners Only)



Note: Note: The Continuum EaganMatrix Expander (CEE) is no longer available. This section is included for those who own the unit with Half-Size or Full-Size Continuum Models. "Slim" model Continuums are all 6x processing models and require no expansion. They use SPDIF AES connections direct to the appropriate D/A converter.

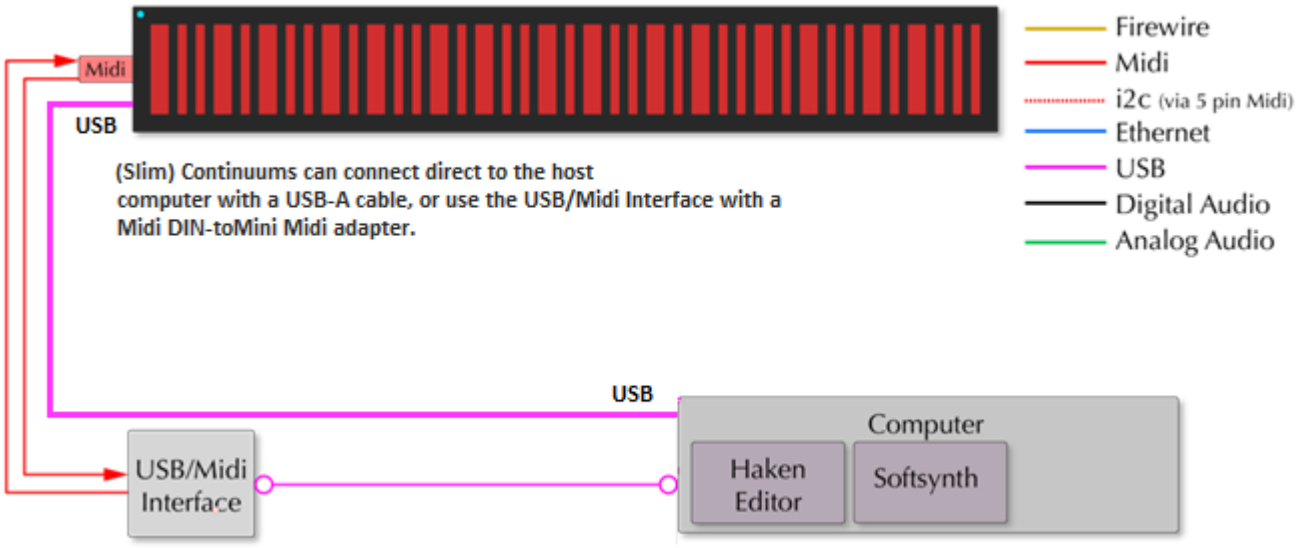
Digital Audio: The CEE's digital audio output is connected to an external audio mixer. Using analog "mic" cables instead of proper digital audio cables for this connection may compromise performance. A digital signal is fed back to the CEE so that the Continuum and CEE can optionally sync to the AES signal supplied by the external source. Notice that the Sync out in the Editor has been set to "sync to incoming", so that the Continuum and CEE can sync to that digital signal. Successful digital clocking will report "Sync".

CEE: The CEE is connected to the Continuum via a bidirectional connection via the AES on the Continuum to the Link on the CEE. Using analog "mic" cables instead of proper digital audio cables for this connection may compromise performance.

CVC: The CVC is connected to the CEE using i2c. The i2c cable is a high quality Midi cable with all 5 pins connected. It connects the Data 4 port of the CEE to the In on the CVC. For "Slim" Continuum CVC connections see section 12.3.

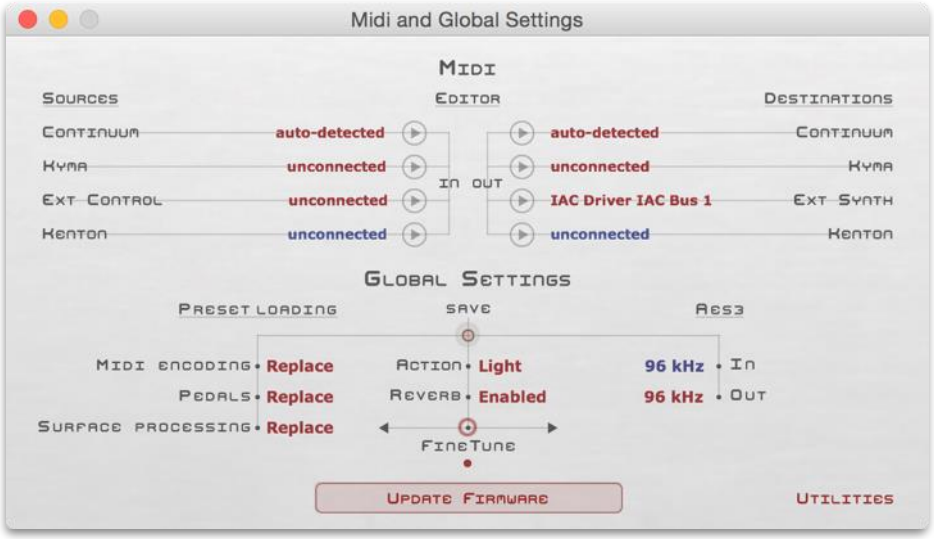
Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor.

12.10. Connecting a Softsynth

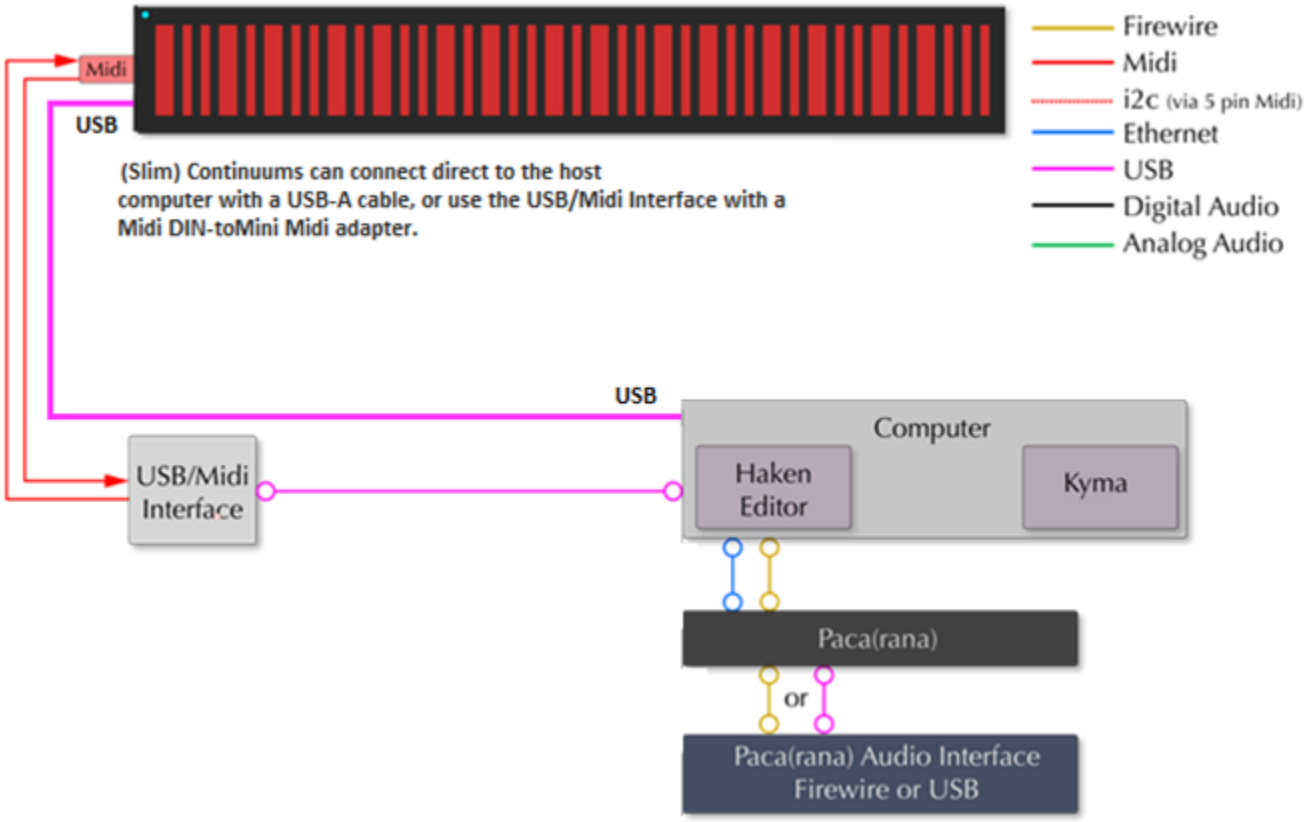


Note: "Slim" Model continuums can use either standard Midi (though a DIN-to Mini Midi adapter) or a direct USB interface to the host computer. USB is preferred.

Softsynth: A Midi connection to a soft synth running on the same computer as the Haken Editor is established by creating a virtual Midi bus, in this case labeled IAC Driver IAC Bus 1**.**



12.11. Connecting to Kyma (Mac)



Note: "Slim" model Continuums can use either standard Midi (though a DIN-to Mini Midi adapter) or a direct USB interface to the host computer. USB is preferred.

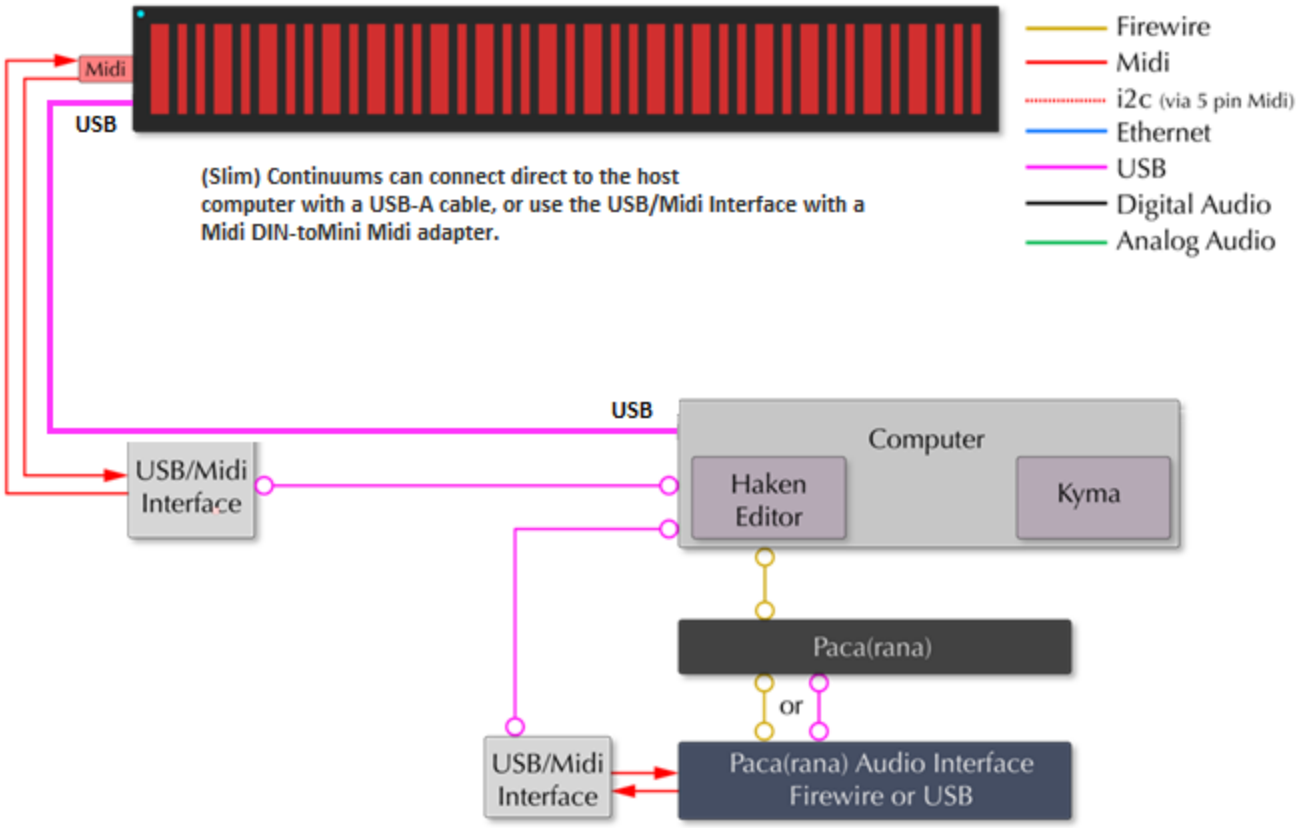
Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor. "slim" model Continuums also support a direct USB-A connection.

Kyma: A Midi connection to the Paca(rana) and Kyma running on the same computer as the Haken Editor is established by using Delora Software's Kyma Connect via a virtual Midi bus via ethernet called vPacarana. See Section 10.10 for a necessary Kyma-specific configuration setting.

Paca(rana): A data connection to the Paca(rana) and the computer is established via Firewire.

Paca(rana) Audio Interface: A data connection to the Paca(rana) and the Interface is either Firewire or USB, depending on the interface.

12.12. Connecting to Kyma (PC)



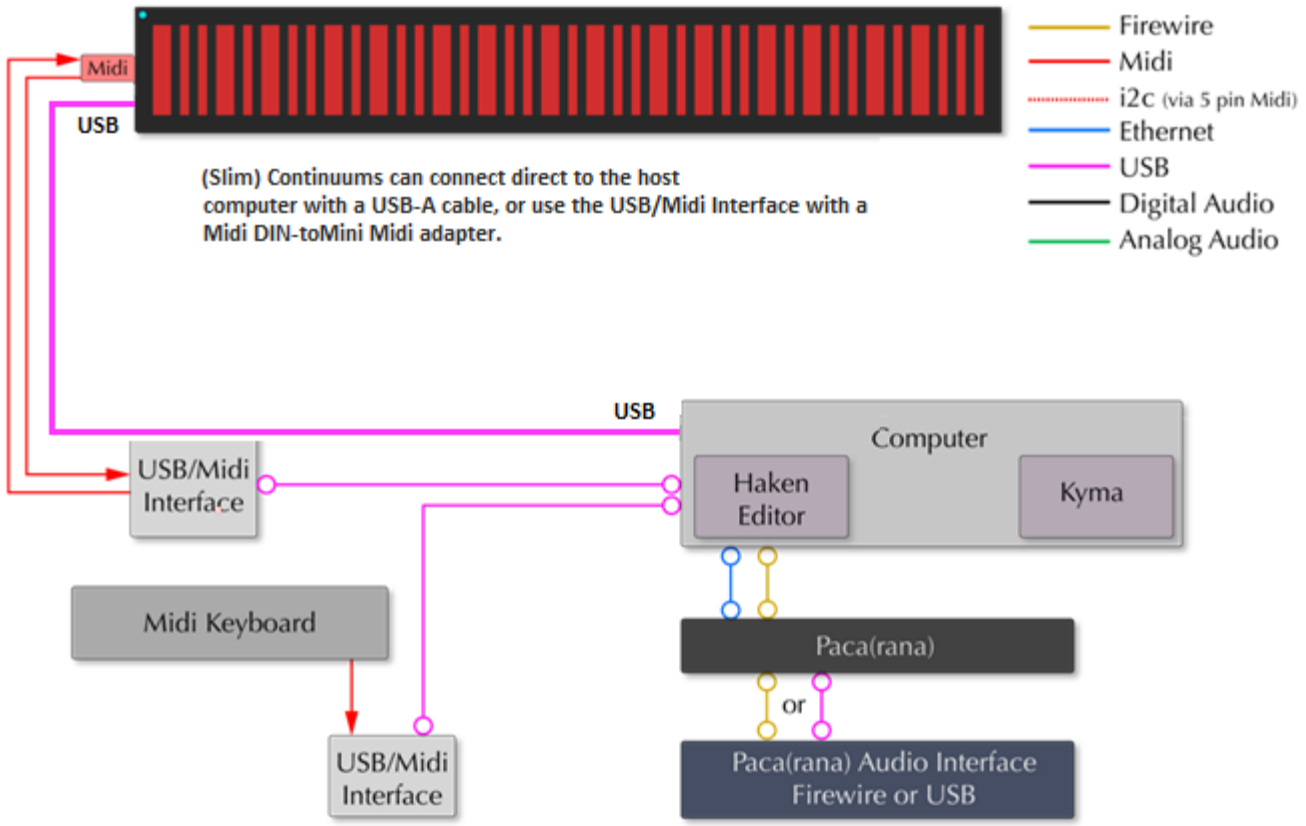
Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor. "Slim" model Continuums also support a direct USB-A connection.

Kyma: A Midi connection to the Paca(rana) and Kyma running on the same computer as the Haken Editor is established by using a USB Midi connection. In this case the "Midi and Global Settings" page this connection is labeled UM-1. See Section 10.10 for a necessary Kyma-specific configuration setting.

Paca(rana): A data connection to the Paca(rana) and the computer is established via Firewire.

Paca(rana) Audio Interface: A data connection to the Paca(rana) and the Interface is either Firewire or USB, depending on the interface.

12.13. Connecting Midi Keyboard, Continuum and Kyma (Mac)



Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor**.** "Slim" model Continuums also support a direct USB-A connection.

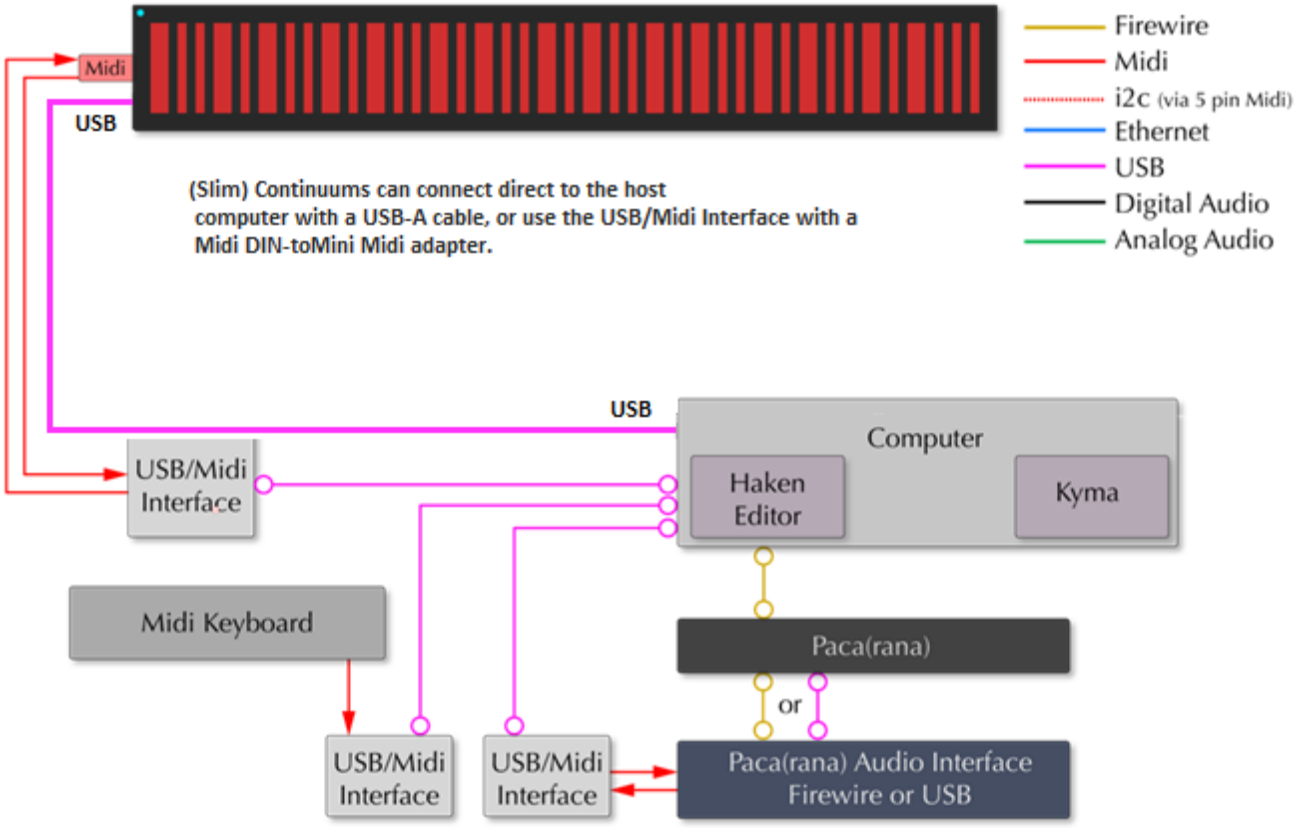
Kyma: A Midi connection to the Paca(rana) and Kyma running on the same computer as the Haken Editor is established by using Delora Software's Kyma Connect via a virtual Midi bus via ethernet called vPacarana. See Section 10.10 for a necessary Kyma-specific configuration setting.

Paca(rana): A data connection to the Paca(rana) and the computer is established via Firewire.

Paca(rana) Audio Interface: A data connection to the Paca(rana) and the Interface is either Firewire or USB, depending on the interface.

Midi Keyboard: A connection is made via Midi/USB, in this case labeled UM-1 in the Midi and Global Settings. **CME xKey** keyboards are often used with the Continuum and ContinuuMini. Certain presets are set up for the xKey, explicitly combining MPE+ "Channel 1 Data" with playing surface data from the Continuum or ContinuuMini. For this to work properly, configure the xKey with **First Aftertouch** value is derived from Velocity.

12.14. Connecting Midi Keyboard, Continuum and Kyma (PC)



Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor. "Slim" model Continuums also support a direct USB-A connection.

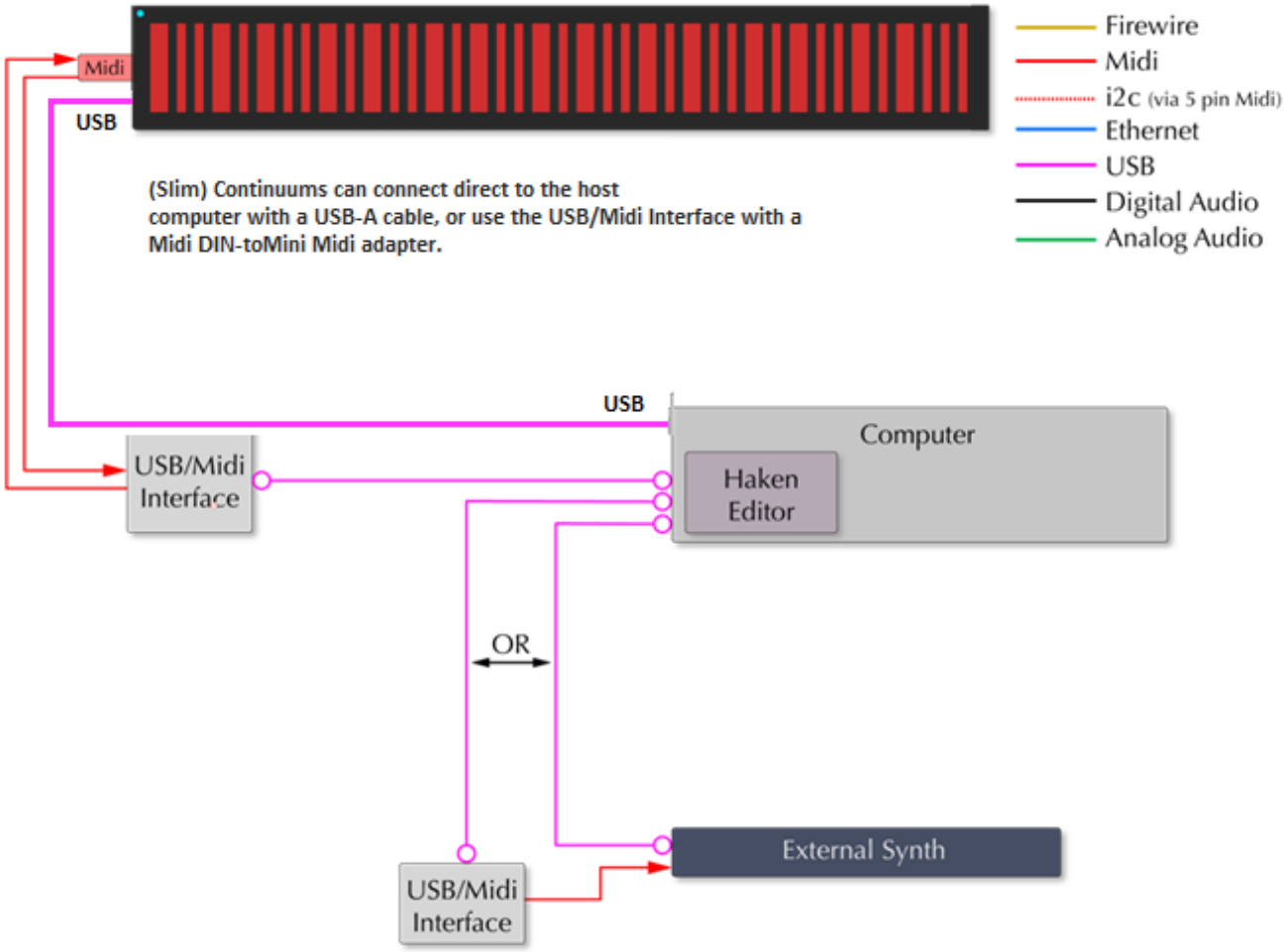
Kyma: A Midi connection to the Paca(rana) and Kyma running on the same computer as the Haken Editor is established by using a USB Midi connection. In this case the "Midi and Global Settings" page this connection is labeled UM-1. See Section 10.10 for a necessary Kyma-specific configuration setting.

Paca(rana): A data connection to the Paca(rana) and the computer is established via Firewire.

Paca(rana) Audio Interface: A data connection to the Paca(rana) and the Interface is either Firewire or USB, depending on the interface.

Midi Keyboard: A connection is made via Midi/USB, in this case labeled Vmidi 1 in the Midi and Global Settings. **CME xKey** keyboards are often used with the Continuum and ContinuuMini. Certain presets are set up for the xKey, explicitly combining MPE+ "Channel 1 Data" with playing surface data from the Continuum or ContinuuMini. For this to work properly, configure the xKey with **First Aftertouch** value is derived from Velocity.

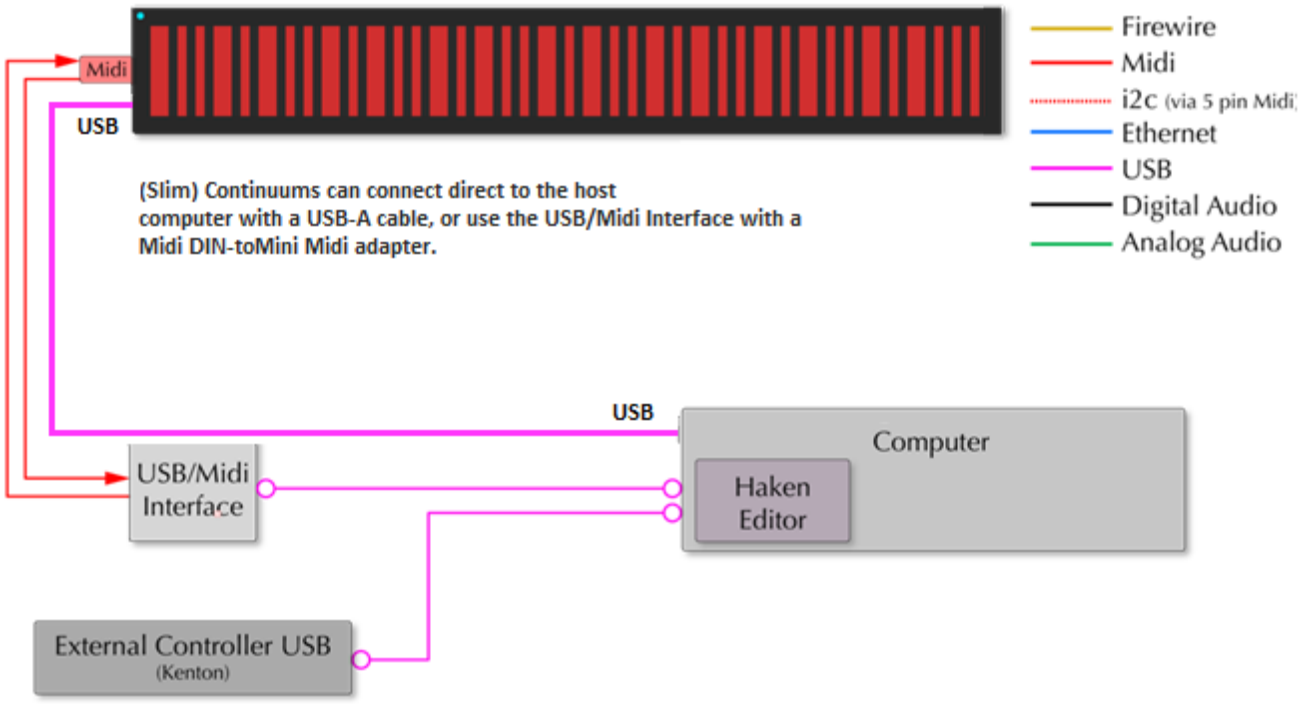
12.15. Connecting to External Midi Synthesizer through Haken Editor



Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor**.** "Slim" model Continuums also support a direct USB-A connection.

External Synth: A connection is made via Midi/USB, in this case labeled UM-1 in the Midi and Global Settings.

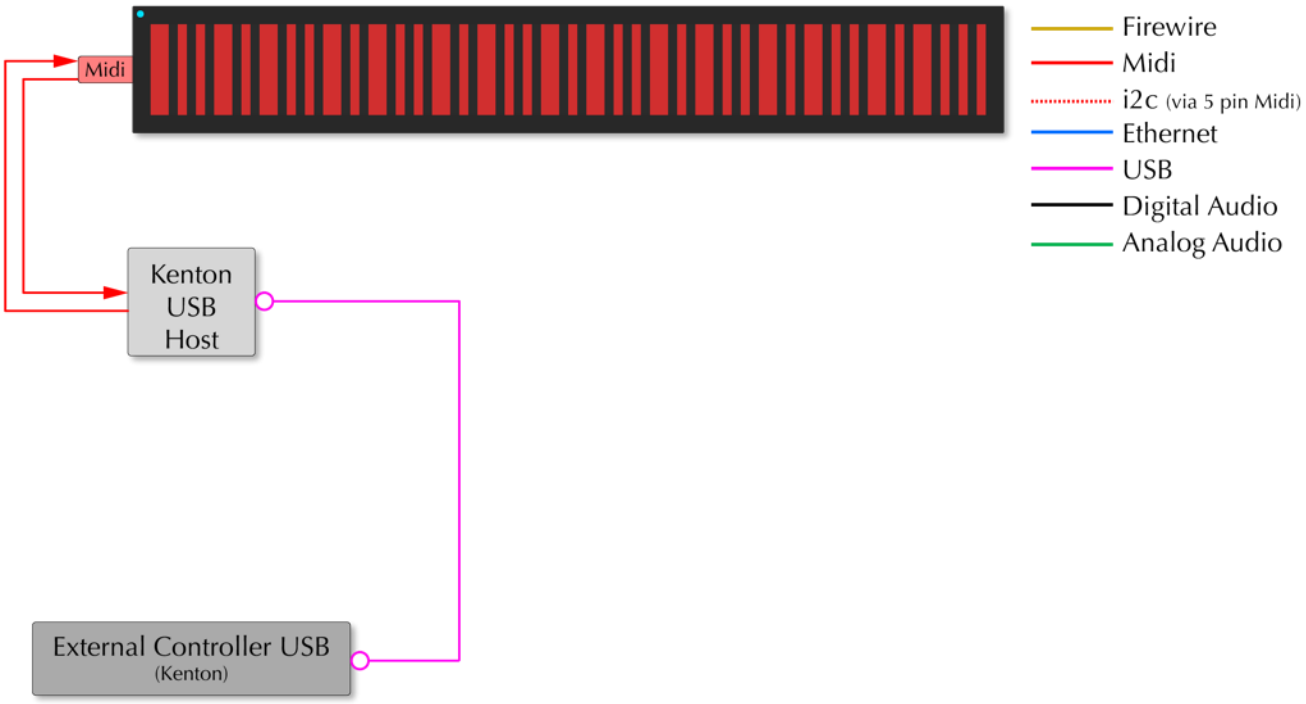
12.16. Connecting a Kenton Controller with Computer



Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE USB connection, which is auto-detected and shows up in the "Midi and Global Settings" page of the Editor**.** "Slim" model Continuums also support a direct USB-A connection.

Kenton Controller: A connection is made via USB, and the Kenton is auto-recognized as shown in the Midi and Global Settings.

12.17. Connecting a Kenton (or other) Controller Standalone (No Computer)



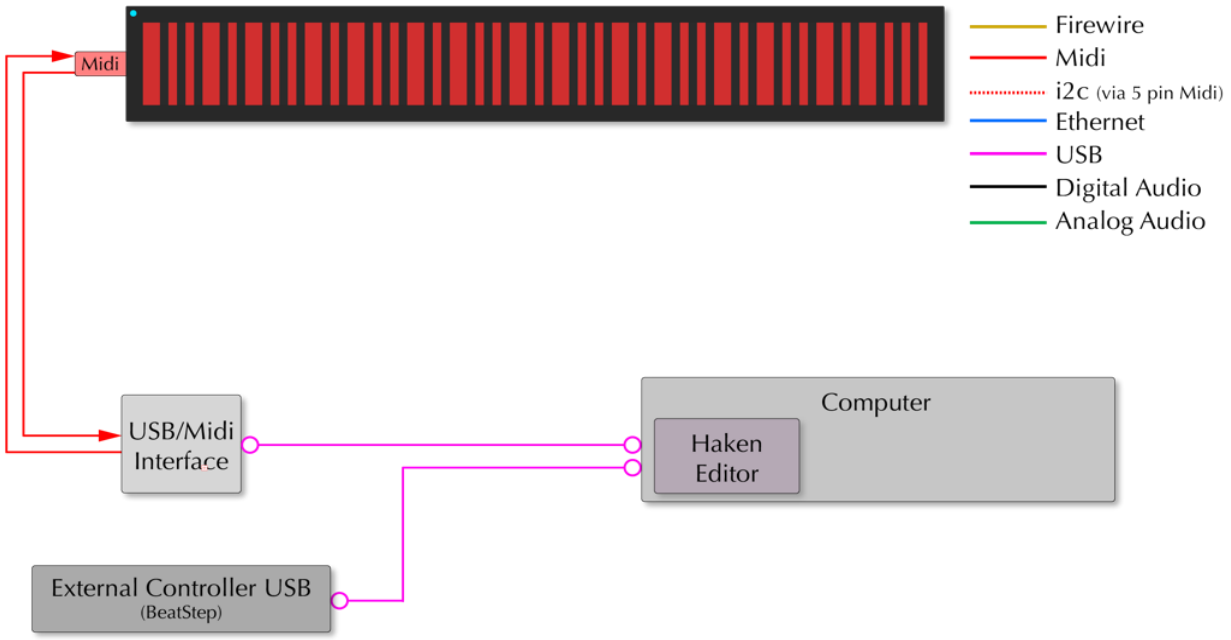
Note: This Diagram applies to Half-Size and Full-Size Continuums or a "Slim" Continuum model that is using its Midi (not USB) connection through Midi DIM-to-Mini Midi adapters.

Kenton USB Host: A bidirectional Midi connection is made between the Kenton Midi Host and the Continuum. Other Midi Hosts may also be used, for example IConnectivity MIO XM (if more than one MIDI host port is required).

Kenton Controller: A connection is made via USB to the Kenton USB Host. The Kenton Controller is directly integrated into the Haken Editor (see section 6.6).

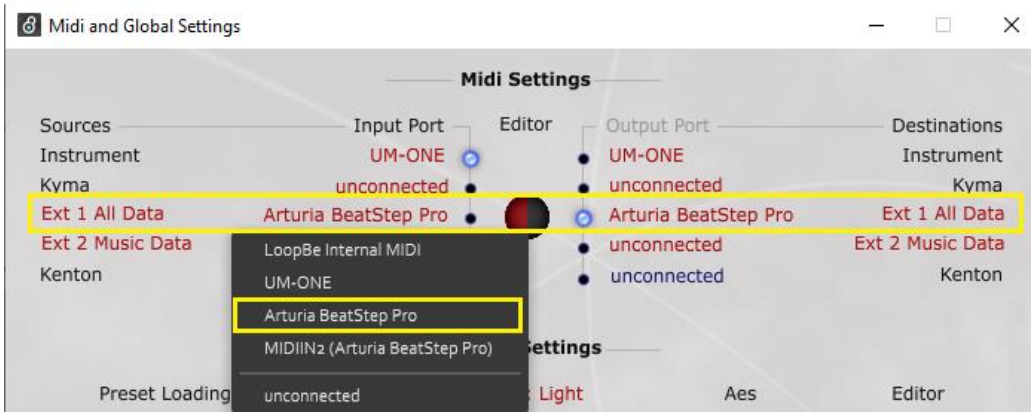
12.18. Using a BeatStep or BeatStep Pro with Computer

Haken Editor: Connections to the Editor on an external computer are made through the supplied Roland UM-ONE



USB connection, which is auto-detected and shows up in the Midi and Global Settings page of the Editor**. This connection assumes direct Midi Connection to the Continuum (not the "Slim" USB connection). Make sure you connect the external Midi Controller to the computer before you launch the Haken Editor or it will not be recognized.**

BeatStep or BeatStep Pro Controller: A connection is made via USB, and "Arturia BeatStep" is chosen as the Ext 1 (with "Config Data" or "All Data" selected) in Midi and Global Settings. "Config Data" will only allow you to change presets. "All Data" will allow the BeatStep to play notes and change presets.



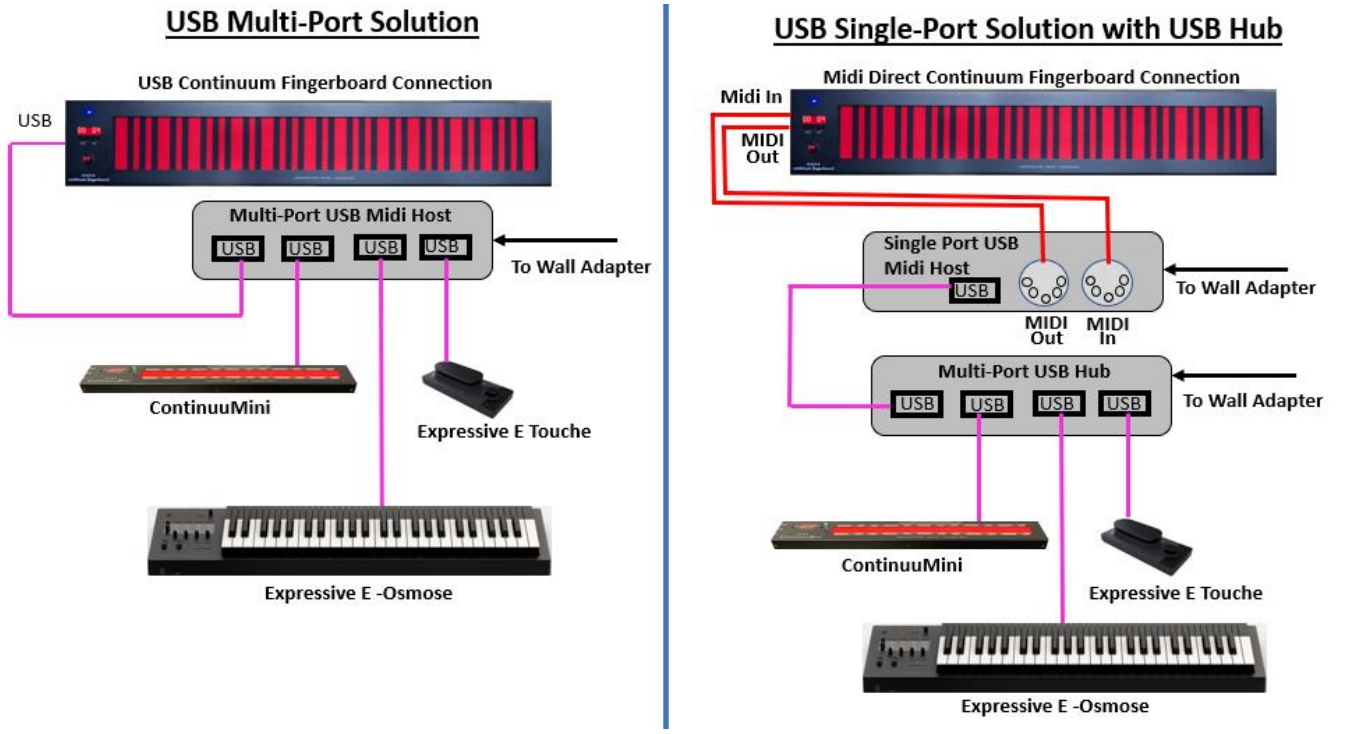
12.19. Connecting a BeatStep Standalone (No Computer)



BeatStep Controller: A connection is made via the BeatStep's or BeatStep Pro's direct Mini Midi Out. Note that in this configuration the BeatStep will require external USB power. For Full-Size and Half-Size Continuums a Mini Midi-to Midi DIN adapter is required. The "Slim" model Continuum uses a Mini Midi connection supported on the BeatStep so only a 3.5mm TRS cable is required.

Templates for BeatStep and BeatStep Pro for controlling the Continuum are available from Haken Audio and some are included in the firmware release in the Arturia BeatStep directory in the "Third Party Support" folder.

12.20. Connecting Multiple USB Controllers Standalone (No Computer)

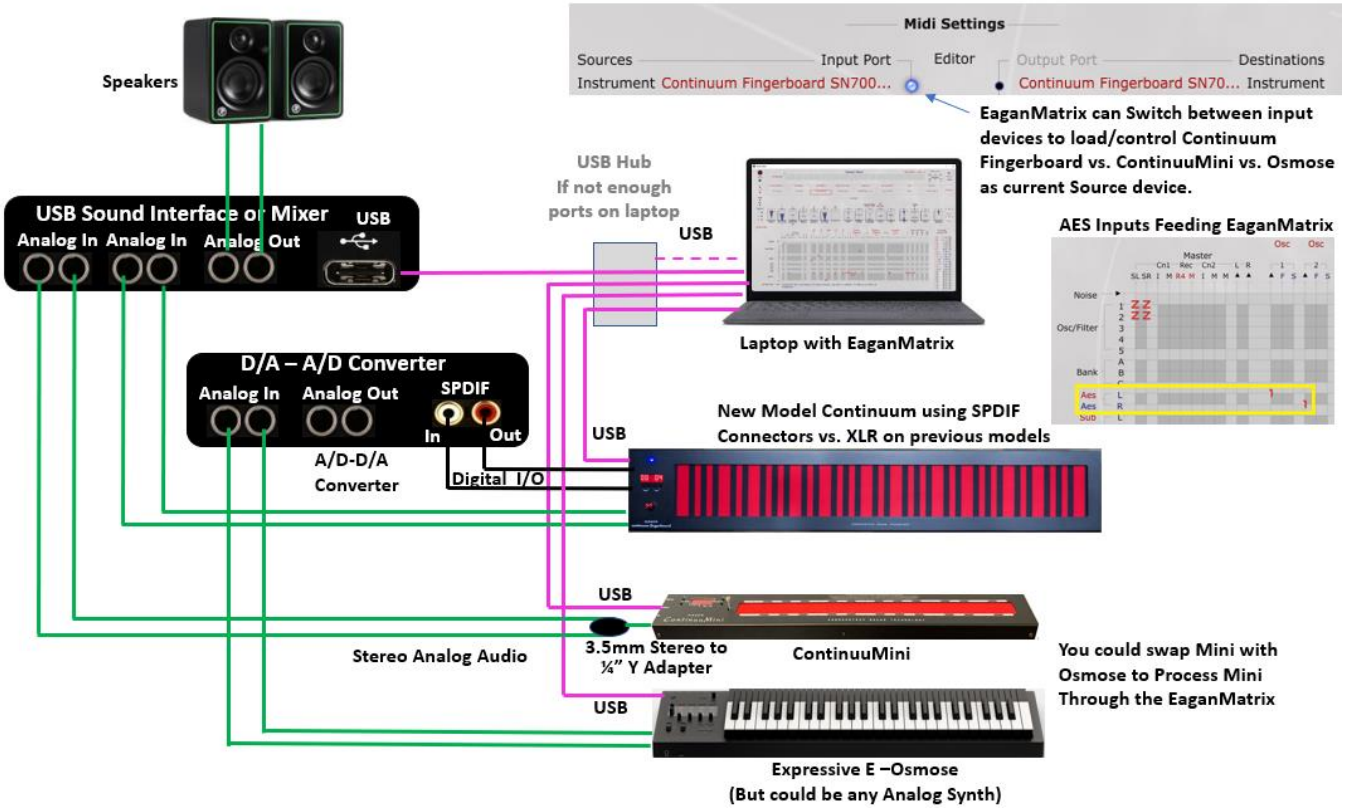


USB Controller or External USB Keyboard: This can be a variety of USB controllers that output MIDI though their USB connection such as a ContinuuMini, Expressive E Touche or Osmose (when available), Linnstrument, Keith McMillen Bop Pad or SoftStep 2, Roli Rise or Block, etc.

USB Midi Host: This can be an number of USB Midi Hosts available such as iConnectivity MIO XM (4 host ports) or LX (10 host ports) or a single Midi Host device. Ideally a powered multi-port host device is preferred for most reliable use. However if you want to connect multiple USB devices to the Continuum a powered USB hub will be required if you have a single USB host device. In some cases the powered hub may not work well in this setup.

USB Hub: This must be a powered Midi Hub without enough output power on the USB line to power all devices connected to it that will be USB-powered. If a single USB port Midi Host is used, a USB hub is required to connect all devices.

12.21. Processing Digital Sound (AES) Through Continuum/EaganMatrix

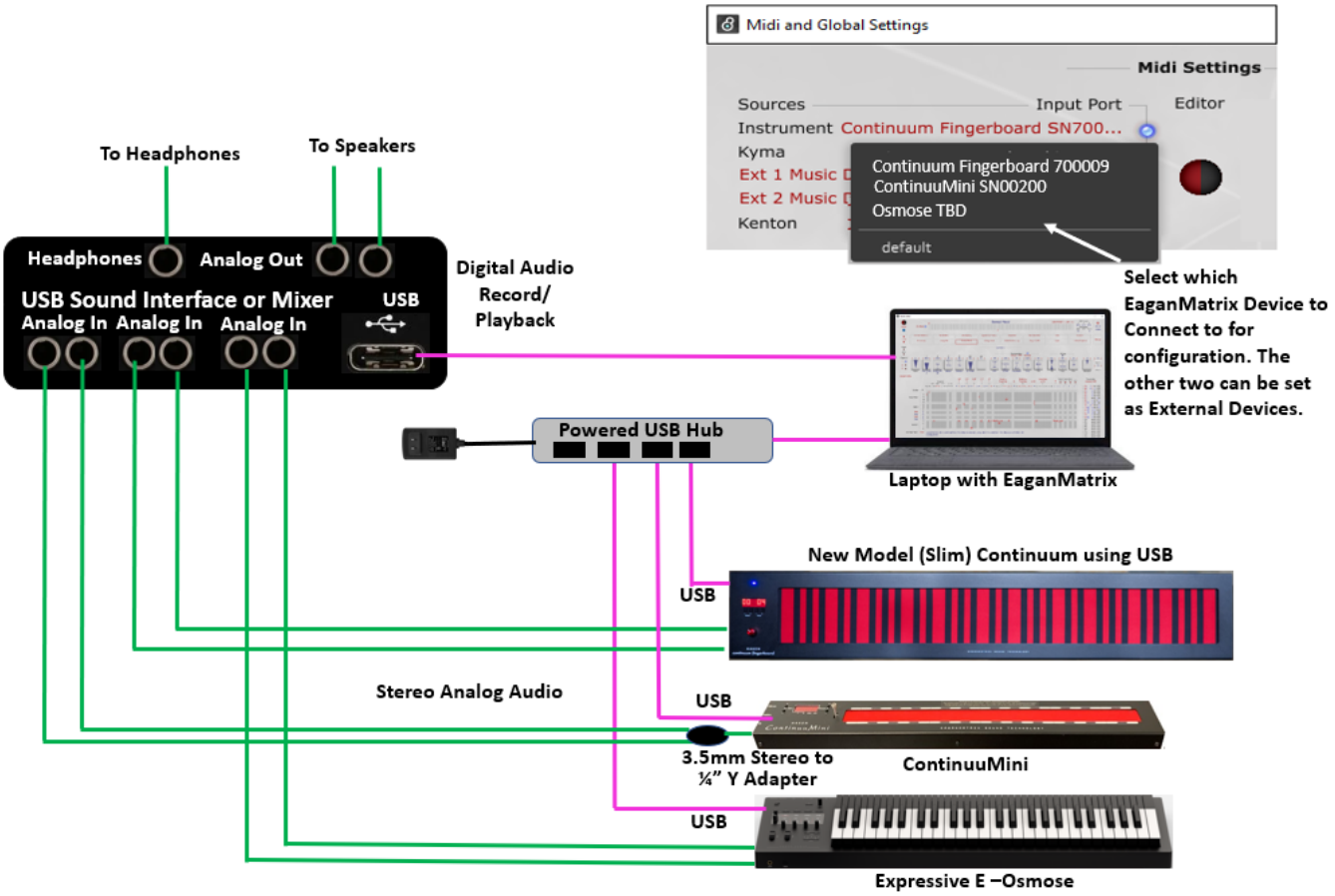


The EaganMatrix allows digital IOS (Audio AES Inputs) to be fed into the matrix for processing by other EaganMatrix functions. The most common application will be to use an AD/DA converter to take an external sound source and convert to the SPDIF or AES data stream needed to feed the Continuum. Note that you may only have XLR AES connections on your converter, in which case an XLR-AES to SPDIF converter can be used in the signal chain.

External USB Keyboard with analog outs: This can be a variety of devices such as a ContinuuMini or Expressive E Osmose that have analog outputs that will be fed into the A/D converter.

AD/DA converter: Required for convert the analog signal to digital that will be sent to the Continuum through the SPDIF (or EAS inputs).

12.22. Using Multiple EaganMatrix Instruments with Editor

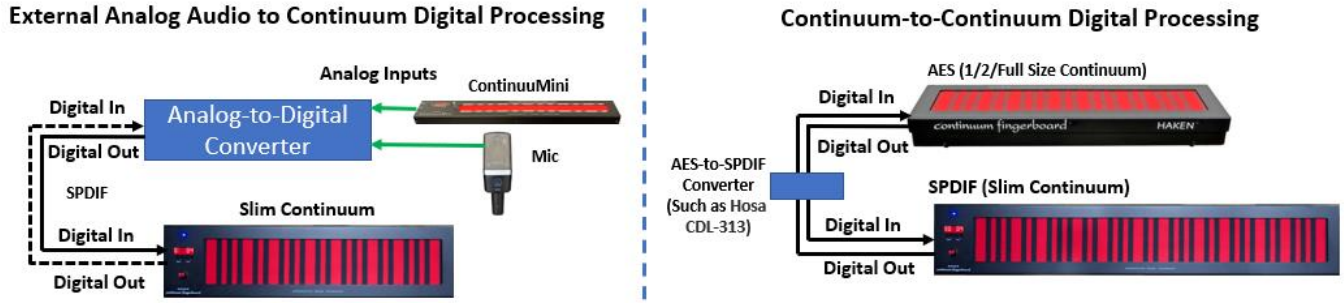


Typically the EaganMatrix can only run one version on a computer at a time. It may be possible try and install multiple copies into separate directories, but the more common use will be to connect one version of the editor to multiple devices through a USB hub (powered if ContinuuMini is being used) if there are not enough USB ports on the host computer to attach to all devices. Analog output of all instruments can be sent to a sound interface or mixer to be recorded and processed as desired.

In this configuration, you can go to Midi and Global Settings under the Cogwheel and select which EaganMatrix Device is the input and output device. You can also select the other devices as External 1 and or External 2 inputs (Music, Data or Both) if for example you want to play the Continuum using the Osmose through the EaganMatrix interface. Just be careful to select the right setting as if you set the External Input for Control, you may change presets on all EaganMatrix devices to unwanted settings. Typically the "Music" option is used if you just want to play one EaganMatrix device from the other. In this case also make sure you use MPE or MPE+ presets and does not transmit control information on Channel 1 or again multiple instruments may be affected.

Remember that the USB connection in all cases is only for Midi. It is not a USB audio connection. The instruments must be connected to an audio interface or mixer for recording and playback.

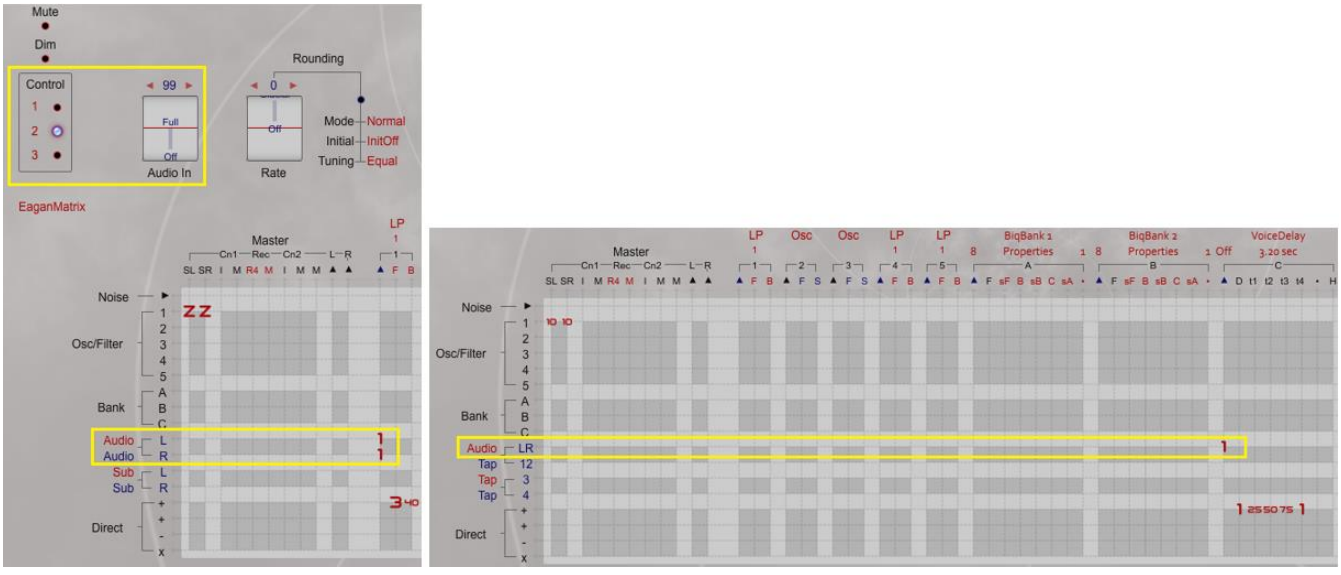
12.23. Using Continuum as a DSP Processor



The Continuum or EaganMatrix Module can be used as an External DSP processor when specifically programmed in the EaganMatrix to take Digital Inputs: AES (Audio) in the Half Size / Full Size models, SPDIF when using the Slim Continuum and Analog Audio inputs when using the EaganMatrix Module. For example, you can connect a microphone to an A/D converter and connect that to the Continuum's digital inputs or connect any analog source to the EaganMatrix module. You can then route the AES inputs in an EaganMatrix preset to be a DSP processor, or you can take the AES input and integrate it into a preset that also uses Continuum Sound modelling in combination. With the exception of the ContinuuMini that does not support digital I/O, you can also connect one Continuum's digital I/O directly to another if you want to process the digital output from on as the digital input to another.

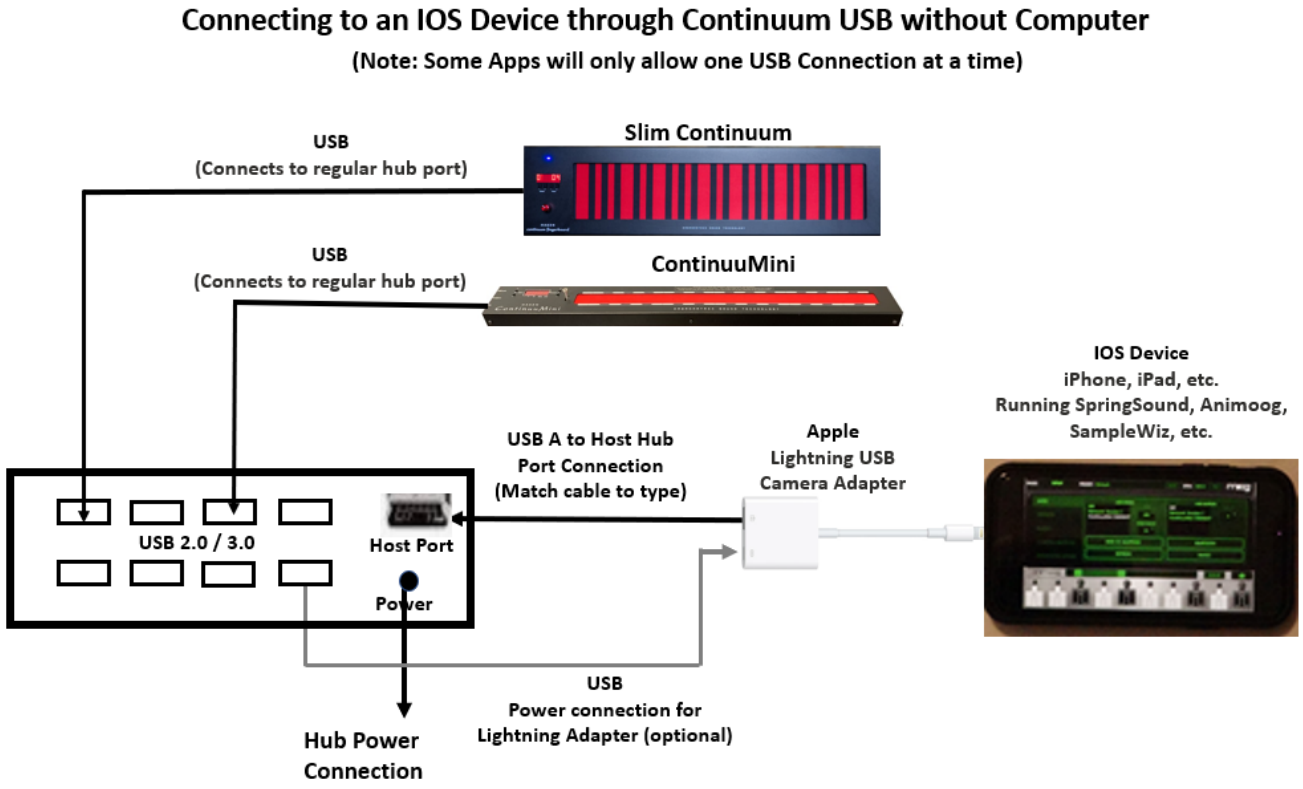
Make sure you turn up the Control Panel 2 "Audio In" on the Continuum that processes the audio input. A simple preset example follows (left side of the two). Note it turns up the "Audio In" and sends Stereo AES inputs (labelled Audio L/R in 9.7 firmware and later) into a Low Pass filter that are then routed to outputs using the standard Z pressure function. Any EaganMatrix component that processes audio input can be used to create a wide variety of real time audio DSP and sound processing options (including the Live from Delay Harman/ModMan functions if you send the external audio into a delay).

Note that if you are only processing a single digital channel (for example Audio L that is connected to a microphone) you will not use both AES inputs into the Matrix. If you want to use all Taps in addition to AES inputs, a second option is available in the matrix to allow both to be programmed. The right side preset below takes a microphone input and sends it into a tapped VoiceDelay allowing multiple delay percentages to be output on each tap. No fingerboard use is assumed – it's a simple stand-alone DSP processor. As you can see, there is a world of DSP processing possibilities for manipulating external audio either as a stand-alone external processor or in combination with other preset functions.



12.24. Connecting an IOS App to ContinuuMini (USB Host based Continuum Connection)

Many may want to play the SpringSound app or perhaps Animoog Z, SampleWIz or some other sound app from the ContinuuMini without a computer. The following setup should allow you to do that. Note that these application also can often support Bluetooth Midi and RPT Networked Midi interfaces, but this example assumes a simple Apple Camera Adapter interface (and a lightning connector).



Note that there are other IOS connection options such as using iConnectivity Midi Host connections on MIOXM. XL or Audio 4+ devices in addition to other Midi host connection options.

12.25. Connecting an IOS App to Half or Full Size Continuum through Bluetooth Interface

Many may want to play an IOS app such as Animoog through a Bluetooth interface assuming the app supports it. The Yamaha MD-BT01 has been tested and works for this use case. The SpringSound app has also been tested to work with Continuum using this interface. The connection diagram follows:

Connecting to an IOS Device to Half/Full Size Continuum with Bluetooth (without Computer)



1. Turn off Continuum
2. Plug the Yamaha MD-BT01 into the Midi Din ports (In to In, Out to Out)
3. Turn On Continuum, light on MD-BT01 should start blinking



4. On your IOS device bring up app supporting Bluetooth
5. Select the MD-BT01 interface and pair. Light on MD-BT01 should go solid red
6. Set App to use the interface and set app MIDI parameters as desired (pitch bend, MPE or Omni mode, etc)
7. Continuum Should not be able to play the app

Note: There are other Bluetooth Midi interfaces you can try, but this one has been tested to work with Continuum

12.26. Connecting an IOS App to ContinuuMini or Slim Continuum through Bluetooth Interface

Many may want to play an IOS app such as Animoog through a Bluetooth interface assuming the app supports it. The Yamaha MD-BT01 has been tested and works for this use case in the following setup. Because this is a Midi Bluetooth interface that requires a Midi DIN connection, a Midi USB Host Routing device that also uses Midi DIN ports needs to be used. The iConnectivity MIO XM or XL Midi host interfaces are ideal for this use case. The following Diagram illustrates how to do this:

Connecting to an IOS Device with ContinuuMini or Slim Continuum with Bluetooth (without Computer – using Yamaha MD-BT01 and iConnectivity MIO XM)





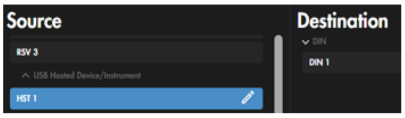
USB





1. Connect Mio XM's USB cable to Computer and turn on
2. Plug the Yamaha MD-BT01 into a Mio XM Midi DIN Port – support DIN 1)
3. Plug the ContinuuMini or Slim Continuum USB cable into a spare host port on the Mio XM. Remember the HST port on XM will be in the order plugged in unless a Host reservation has been made. In this case, it will be HST1.
4. Turn On/Power Mio, light on MD-BT01 should start blinking.
5. Run the iConnectivity Auricle app and route HST1 to DIN1 (DIN1 also should route to itself). Once configured Computer can be removed.

iConnectivity Auricle Application (on PC or MAC)





6. On your IOS device bring up app supporting Bluetooth
7. Select the MD-BT01 interface and pair. Light on MD-BT01 should go solid red
8. Set App to use the interface and set app MIDI parameters as desired (pitch bend, MPE or Omni mode, etc)
9. Continuum Should not be able to play the app

Note: There are other Bluetooth Midi interfaces you can try, but this one has been tested to work with Continuum. The Slim connection would be the same as the ContinuuMini (only one might be supported by the app at a time)

12.27. Connecting a ContinuuMini to Evaton Technologies uCVC

The Evaton Technologies uCVC is ideal for connecting the ContinuuMini to a modular for those who use Eurorack. The uCVC is available from Evaton Technologies. Order the proper cable for ContinuuMini as it will also work with a Continuum. The uCVC is a monophonic Eurorack card, however you can daisy chain up to two of them which will allow you to support the full two voice output of the ContinuuMini. Note: The CVC will also work with the ContinuuMini using the correct cable detailed in ContinuuMini section of this manual. The Setup for using the uCVC with the ContinuuMini follows:

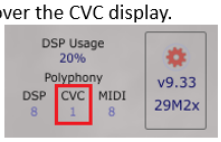
Using the Evaton Technologies uCVC with ContinuuMini





Haken Editor will display CVC=1 in stats if it is detected and CVC device will display if you hover over the CVC display.

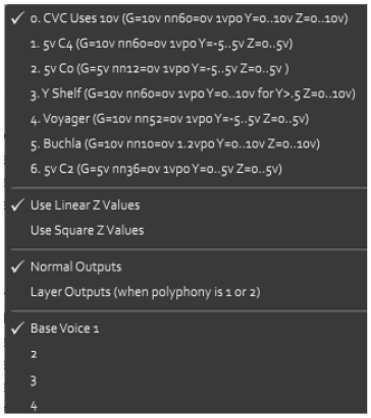




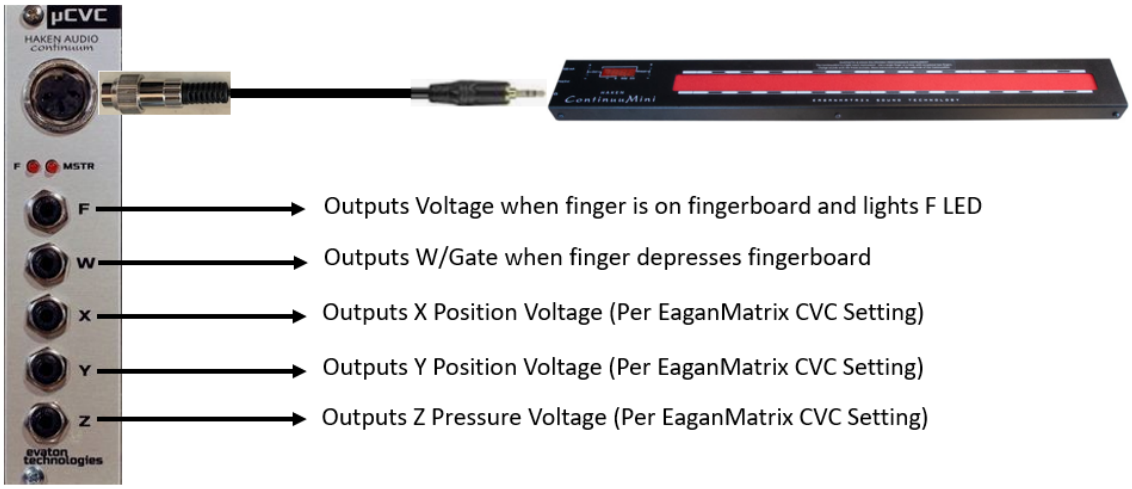
Steps

1. Connect uCVC Cable to uCVC and Ped/Ext Input on ContinuuMini (when ordering uCVC specify ContinuuMini or Continuum to get the proper cable).
2. Oct +/- to Enter Menu System and set ContinuuMini i2C setting to 1 (from default 0 pedal setting). Then Oct +/- to Exit Menu System
3. Connect the uCVC outputs as desired
4. Bring up Haken Editor (after uCVC is connected and powered). Verify CVC is connected
5. Set CVC settings as required for the device you are connecting to in CVC settings (in Control Panel 3).
6. Play ContinuuMini and uCVC will output
7. Note: You can chain two uCVCs together to play two voice polyphony. See Evaton Technologies documentation. If you only have one uCVC, it's best to set your EaganMatrix ContinuuMini preset to Polyphony 1 – so you don't have to worry about dropped notes if you mistakenly play polyphonically. If you are not playing along with ContinuuMini analog output, just set an Empty preset to Polyphony 1. If properly connected the Editor will display the CVC as active.

EaganMatrix CVC Options
(Match to your device)



uCVC Operation



F → Outputs Voltage when finger is on fingerboard and lights F LED

W → Outputs W/Gate when finger depresses fingerboard

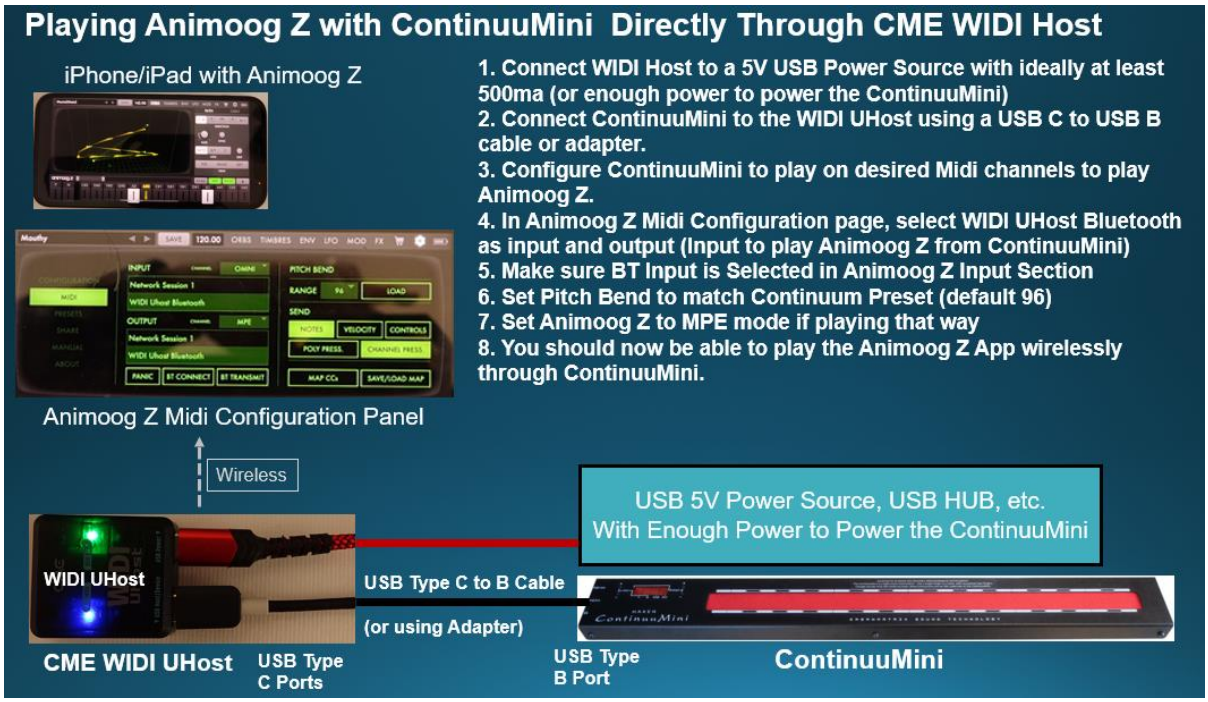
X → Outputs X Position Voltage (Per EaganMatrix CVC Setting)

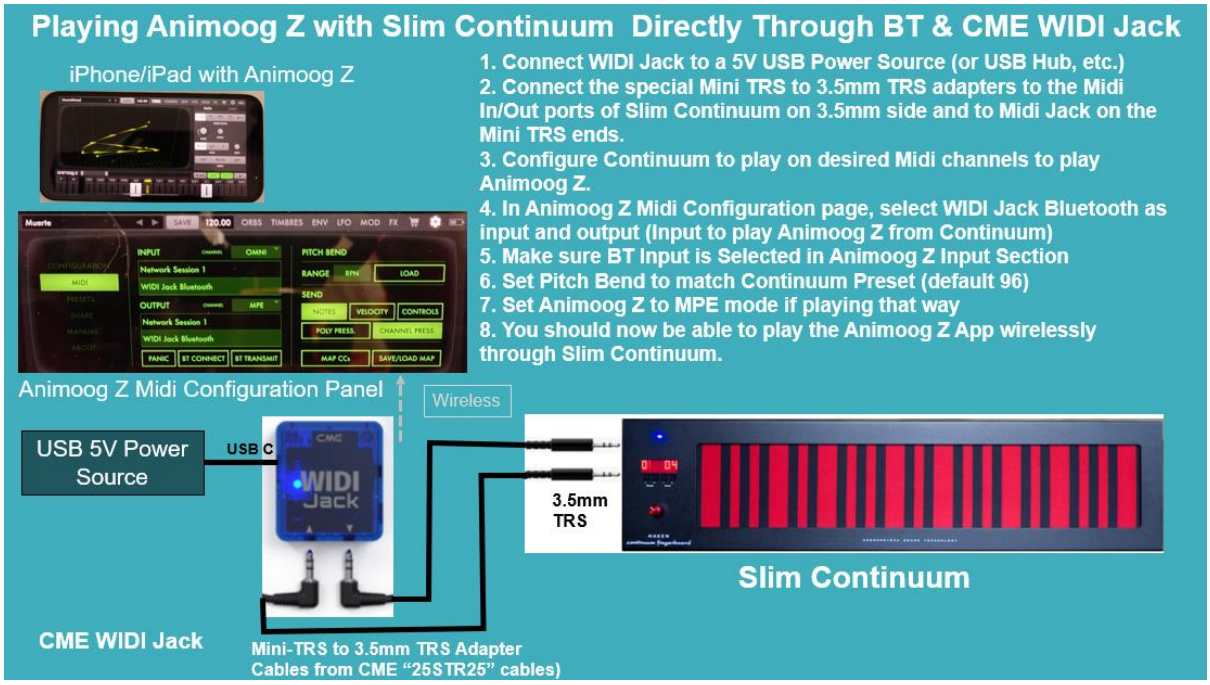
Y → Outputs Y Position Voltage (Per EaganMatrix CVC Setting)

Z → Outputs Z Pressure Voltage (Per EaganMatrix CVC Setting)

12.28. Playing Animoog Z (or other Bluetooth Connected Application) with CME WIDI UHost or WIDI Jack

The Bluetooth **CME WIDI UHost** can be used to interface the ContinuuMini to applications that support Bluetooth Midi connections without use of a computer. The following setup uses the CME WIDI UHost to connect to Moog's Animoog Z app running on an iPhone or iPad. A similar wireless connection can be made using the **CME WIDI Jack** connecting to the MIDI TRS ports of the Slim Continuum. The WIDI Jack can also be used to play the EaganMatrix Module over BT or use the module as a wireless BT CV-Midi or Midi-CV converter.

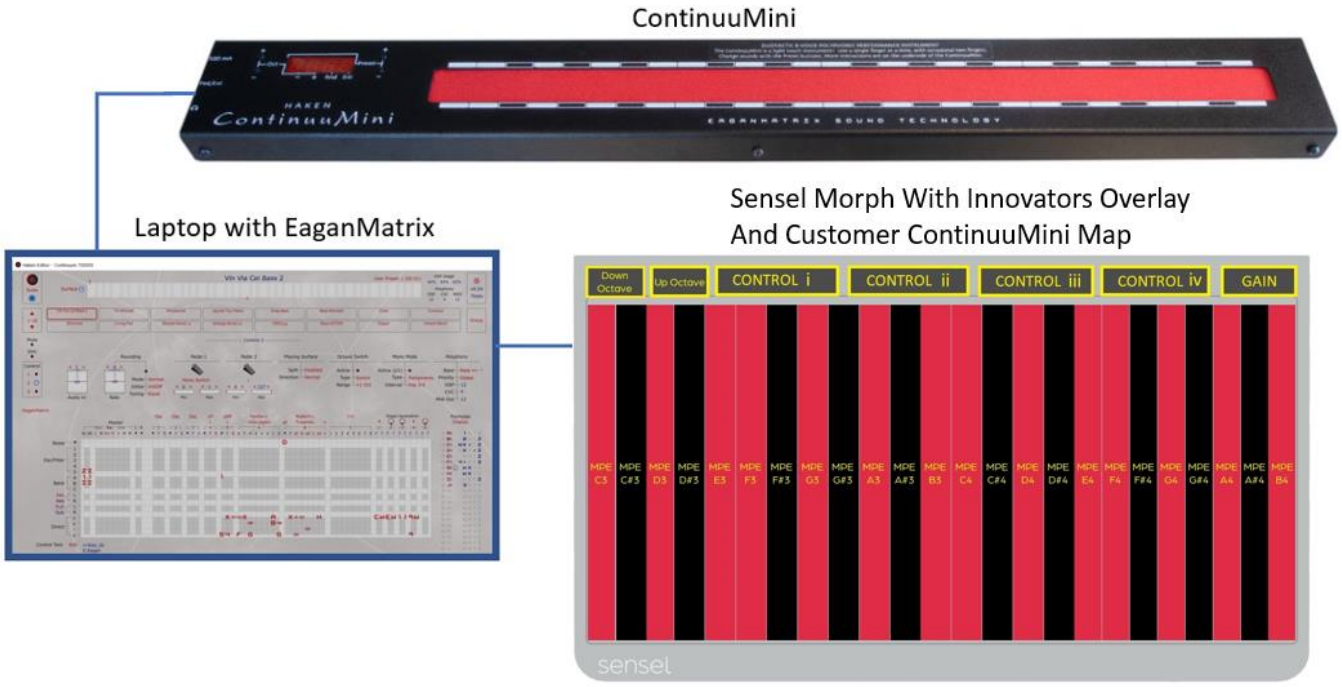




12.29. Using Sensel Morph with ContinuuMini (or Continuum)

The Sensel Morph (paired with the Innovator's Overlay that allows you to create a custom graphic map to emulate the fingerboard) allows you to create an emulation to the ContinuuMini playing technique and as a bonus gives you an expanded Y area almost identical in width to the Continuum. Because the Morph does not allow dynamic Pitch bend scaling, the map has to use the scaling of the Morph's Piano keyboard overlay which requires the fingerboard note widths to be less than the width on the ContinuuMini, but it is still playable and a very nice adjunct to the ContinuuMini fingerboard for those who want expanded Y control. You can also add support for Macro Controllers and other functions. It can be used like any USB Midi Controller either connected as an external input in the Haken Editor or as a stand-alone controller used with a Midi Host.

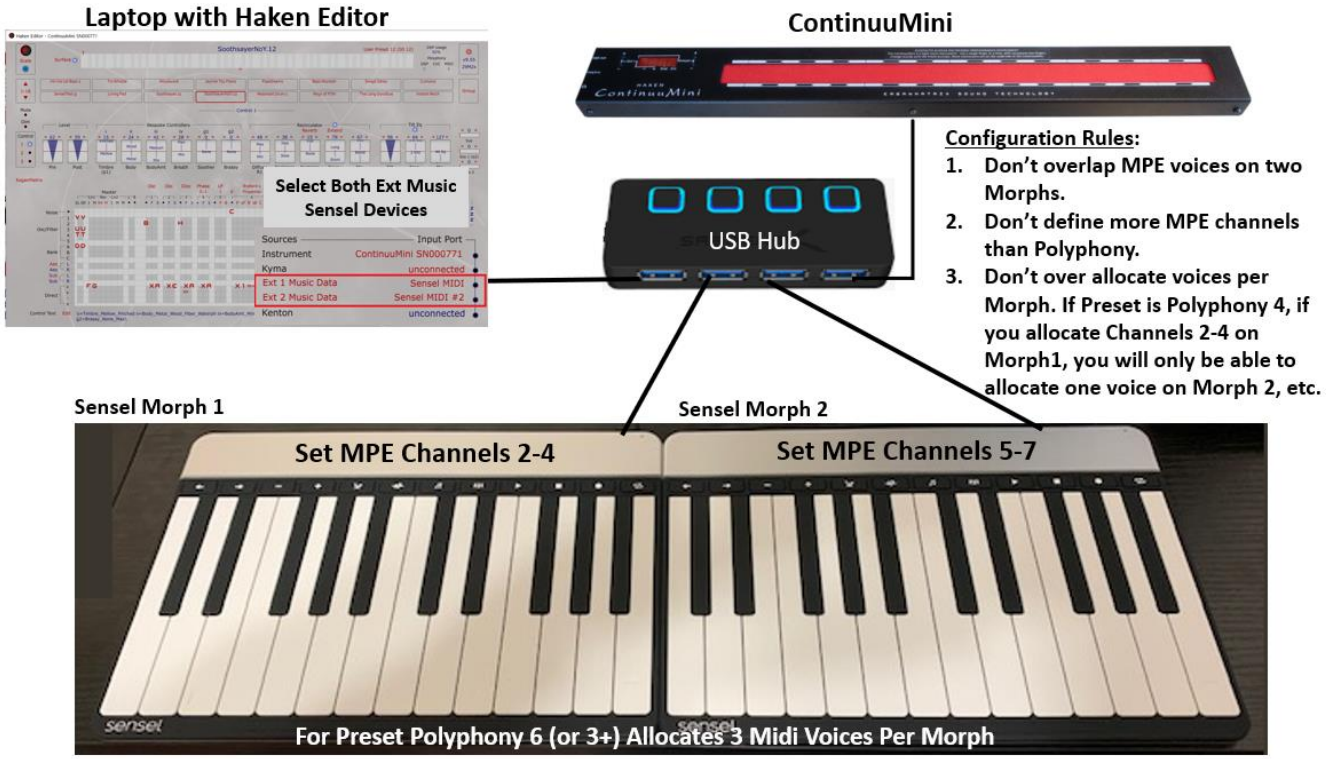
The Morph editor allows you to assign MPE XYZ blocks to create a fingerboard that will send Midi on Channels 2-Max Polyphony you play. Aftertouch and Y=CC74 are supported. You can also add Octave Up/Down buttons and CC sliding controls, Pre/Post Level, etc. A Morph generic map for ContinuuMini has been created shown below that allows for pitch bend through the octave (if using this map, set Pitch bend in your preset to 12). YOU even customize a special control interface for specific presets that can be used in conjunction with the ContinuuMini or Continuum.



12.30. Using Multiple MPE External Controllers (i.e. two Sensel Morphs) with ContinuuMini

You can connect two External Midi USB devices as External Music inputs to the Haken Editor (or directly using a USB Midi Host). The example here is using two Sensel Morphs to create an extended range keyboard-like controller for the ContinuuMini, basically turning it into a "Slim-47". In these multiple MPE-based external music controller configurations you need to be mindful of a few things:

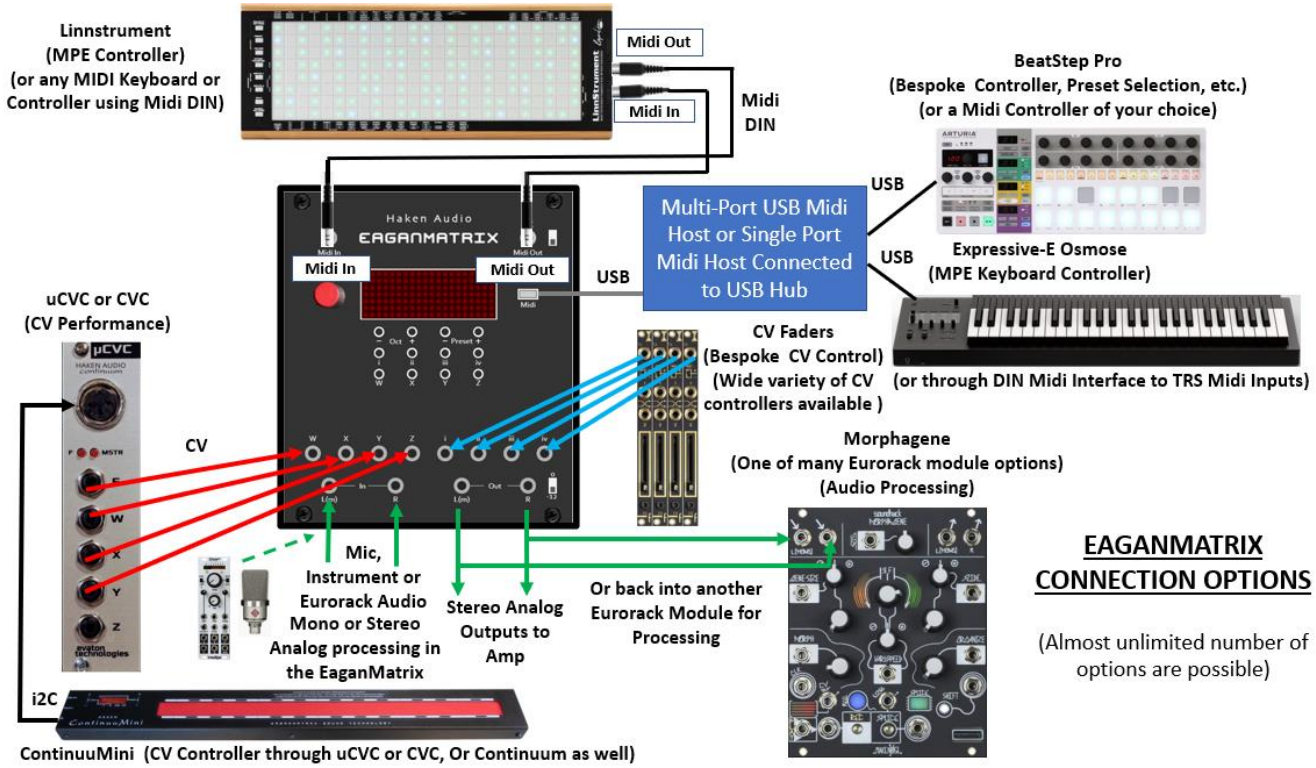
1. Do not allocate more MPE voices between your multiple MPE instruments than Polyphony available the preset being played. You can get Midi channel dropouts if you play on More MPE channels than the preset expects. For example if the preset is set to Polyphony 4 on the ContinuuMini and 4 Midi channels are displayed. You should only play on Channels 2-5. Set your Min and max MPE channel output accordingly.
2. Do not play the same MPE channel simultaneously on two MPE controllers. You can get dropouts or erratic output. If you assign MPE channel 2 to one device, you should not allow channel 2 to be output on the second device. It's best to always use Low Priority so you can track what channels are being output (the Morph uses Low Priority).
3. Make sure you allocate Channels for best playing without overallocation. If you have Polyphony 6, for example, if you configure and play on channels 2-5 on the first MPE device, you will only be able to play on two channels (6 & 7) on the other. In this case it may be best to split three channels on one controller (2-4) and the remaining three channels (5-7) on the other. This can be a challenge on some presets that have low Polyphony (like VlnVlaVlcBass presets) that only allow 3 Midi channels in the default preset. Try adding ore polyphony in this case until the preset does not play as expected if you want to play with more polyphony on the Morphs.



12.31. Using the EaganMatrix Module without Computer Connection

See Section 19 for connection use cases for the EaganMatrix module.

In general the EaganMatrix module can be used and connected identically to the ContinuuMini when using the USB Type B connector. The EaganMatrix module can also connect to a Midi controller directly through Midi DIN connections using the included DIN-to-TRS adapters. While you can connect and use both at the same time, it is suggested that you only play the module over Midi through either the TRS or USB connection. If you want to connect using USB directly to a USB controller or keyboard without computer a Midi Host is required. You can also play the EaganMatrix module directly through CV, either through a uCVC or CVC if using a Continuum or ContinuuMini, or you can connect any Eurorack CV source to W, X< Y and Z to play the module without need for any of the other Midi connections. Or they all can be used together, but in this case you need to guard against overlapping midi data on the same channels or you can get sonic discontinuities.

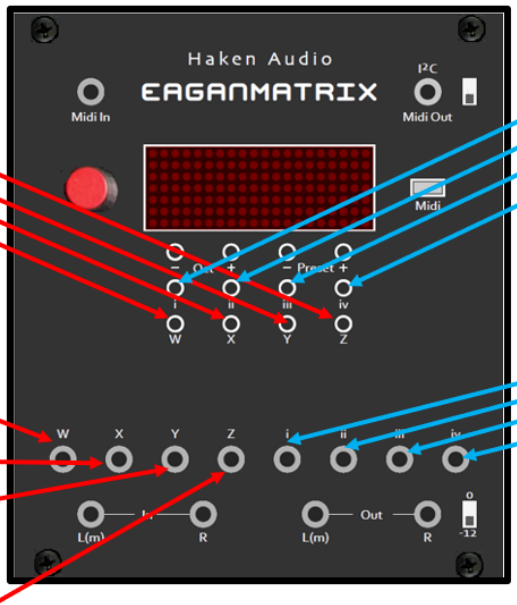


12.32. Using the EaganMatrix Module Solely Through Eurorack CV Control

See Section 19 for connection use cases for the EaganMatrix module.

The EaganMatrix module does not require any external equipment outside of your Eurorack setup if you desire to use the module as a Complex Sound Source. In this case connect it through the

EaganMatrix Module – CV Control Only



- W, X, Y and Z Offsets
  Set W > 1V if you don't want to Gate each note on

  X mostly used for coarse and fine Tuning

- Gate (> 1 V)
  (Always gate notes on)

- 1 Volt/Octave CV
  (Perhaps from Sequencer or arpeggiator, etc.)

- CV Source for Y Control
  (in Configured Voltage Range)

- CV Source for Z Control
  (Envelope Generator Output, VCA Output or any CV source in configured voltage range):
  0V..+5V, 0V..+10V or -5V..+5V

- Bespoke Control Offsets
  (map to current Bespoke settings for preset when loaded)

- CV Controller Source for Bespoke Control
  (Fader, Knob, Touch Control, Joystick, or any CV source in configured voltage range):
  0V..+5V, 0V..+10V or -5V..+5V

13. Hardware Maintenance for the Continuum Fingerboard

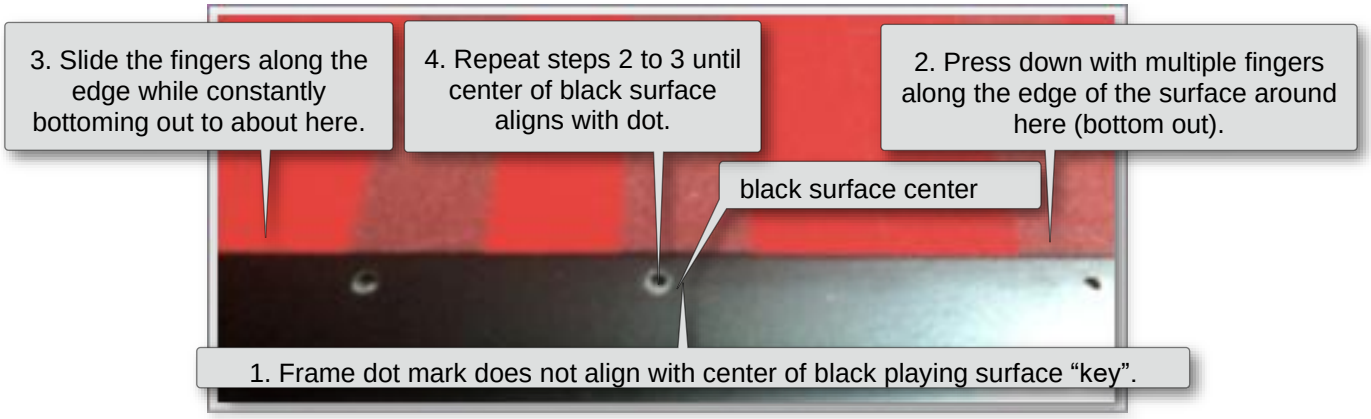
ContinuuMini players may wish to skip to section 14, as the next sections are specific to the Full-size and Half-size Continuum Fingerboard.

13.1. Cleaning

The Continuum Fingerboard can be treated much like any modern electronic device. If you feel the Continuum Fingerboard playing surface or body requires cleaning, wipe with a slightly damp cloth. If necessary, you can use a cleaning agent like Windex. Never spray a cleaning material directly on the Continuum Fingerboard. As with any electronic device avoid all accidental liquid spills.

13.2. Surface Alignment (Half-Size and Full-Size Models Only)

A Continuum Fingerboard with a plain (unmarked) playing surface does not have surface alignment problems. But Continuum Fingerboards that have reference markings on the playing surface must have the marked areas on the playing surface aligned with the precise dot markings on the frame around the playing surface. The playing surface may eventually come out of alignment, sometimes due to overly vigorous playing. To correct this surface alignment problem, press multiple fingers on the playing surface and move it into position. Refer to the step-by-step



instructions in the diagram below.

Depending on the model of your hardware, your Continuum Fingerboard may have screws on the sides of the top frame, as shown in the images below. A half-size of this design will have 6 such screws, a full-size will have 8.





Loosening these screws by **a single turn** may make it easier to adjust the surface. After you have done the adjustment, tighten the screws with **a single turn** — do not over-tighten the screws.

If you have trouble getting good surface alignment, please contact Haken Audio. Please do not open up your Continuum Fingerboard without instructions from Haken Audio; hundreds of springs may come out of position in the playing surface unless the proper procedure is followed.

13.3. Continuum Fingerboard Hardware Problems

Applies to Half-Size and Full-Size Continuums only.

If you suspect your Continuum Fingerboard is not functioning properly, please try the following:

If you have trouble with your USB-Midi cable:
(1) Try resetting the USB-Midi cable by unplugging and re-plugging its USB connector.
(2) If you continue to have problems, try connecting your USB-Midi cable through a **powered USB hub**.

If you are using an external synthesizer, reset and test your synthesizer:
Power cycle and do a full reset on your synthesizer, then test the synthesizer with a standard Midi keyboard, to ensure the synthesizer is in a known working configuration.

Discard Calibration:
Discard the calibration, then follow the calibration procedure described in Section 7.

Try the built-in synthesizer:
Connect headphones and play internal sounds. If this works, then you probably have a Midi configuration problem.

Discard all Internal User Presets and reconfigure:
Discard all the presets using Options then 127, as outlined in Section 10.19. Use Section 10 to guide you in reconfiguring your Midi encoding.

Perform the Factory Calibration:
Please contact technical support before you resort to this. The Factory Calibration is described in Section 13.7.

Boot in "Safe Mode":
Please contact technical support before you resort to this. If you suspect problems with your firmware, you can revert to the factory-programmed firmware. Turn off power, press and hold the Red Button, then turn on the power as you keep the button pressed. Wait until power-up completes and the light flashes dim blue before you release the button. The light will continue to flash all the time, indicating a Safe Mode boot. You will need to recalibrate and set configuration options.

Other things to try:
If you are still having problems, please contact technical support. It may be that new firmware will correct the problem you are seeing. If it is a hardware problem, the procedures below may be effective in hiding the problem, but it is important to inform tech support so that any necessary repairs can be made as soon as possible. You can have Haken Audio make repairs, or (for most repairs) you can obtain instructions from Haken Audio to make the repairs yourself.

13.4. Sensor Stuck On, or Sensor Intermittently Turn On

Applies to Half-Size and Full-Size Continuums only.

The Continuum Fingerboard has hundreds of Hall-Effect sensors. In the unlikely event that a sensor has a hardware failure, this can cause a sensor to be stuck on, or intermittently turn on, causing spurious notes. To quiet such a sensor, press and release the Red Button, then touch "Calibrate", then value "1". This will set the at-rest threshold for the sensors and should quiet any sensor that was active while you first pressed the button. This procedure is necessary even if there is no hardware problem, if you have Light Action (Section 10.19) selected.

13.5. Sensor Stuck Off – Scan File

If a normalized sensor value is stuck off, this can cause gross discontinuities in pitch (more than 40 cent jumps) on the Continuum Fingerboard's playing surface, or it can cause two notes to sound (with pitches about 85 cents apart) for a single finger. Please contact technical support to discuss the situation and verify the cause of the problems – pitch discontinuities and note doubling can be caused by Midi problems and other problems as well. If the problem is due to misbehaving sensors, Haken Audio e can provide a customized Scan File for your Continuum, which will resolve the issues

13.6. Factory Calibration of the Continuum Fingerboard

At the end of a Continuum Fingerboard's manufacturing process, a Factory Calibration is done. Factory Calibration is a one-time procedure and need not be repeated. Continuum Fingerboard owners need to know how to refine calibration and discard calibration (Section 7), but this three-step Factory Calibration is only described here for completeness. Do not undertake it without first contacting Haken Audio support.

13.7.1 Factory Calibration of "Slim" Continuum Fingerboards

This procedure only applies to "Slim" Continuum Fingerboards.

1. Enter the "Cal" option in the Menu system
2. Press "Preset –". The LED Panel will show "Discard"
3. Then **simultaneously** press "Octave –" with "Preset –" and hold for a few seconds until "FACtRY" appears on the LED panel.
4. Run the fingers up and down front and back, near and far side, all the way under left and right ends, at forte pressure. Maybe use back of finger's fingernail surface to slide easily. Be sure to include all the way under the left and right end at the arrowheads with your finger – many people lift up their finger early and do not get the very ends.



5. Press Rotary to exit Factory Calibration procedure.
6. In "Cal" menu, press "Preset –" twice to discard calibration. Holding the "discard" labelled button down for a second or two each time is recommended (makes it collect new data for longer)
7. Exit System Menu ("Octave –" together with "Octave +")
8. You should not need this step, but if there are any "stuck notes" when playing after the procedure, enter "Cal" menu again and Refine Calibration (in the Cal Menu Press **Preset +**) then exit the Menu System.
9. Also look at Actuation for additional surface refinement in Firmware 9.40 and later (though this is not part of factory calibration)

13.7.2 Factory Calibration of Half-Size and Full-Size Continuum Fingerboards

This procedure only applies to Half-Size and Full-Size Continuum Fingerboards.

1. Make sure nothing is pressing on the Continuum Fingerboard (no fingers or other objects on the playing surface or frame). Press and release the Red Button, then touch at "Calibrate" then "120+", then "7". Now the Continuum's LED should shine bright white, and (if the Haken Editor is running) the Editor will display a special message for Factory Calibration.
2. Slowly drag the back of a fingernail (to minimize friction) horizontally across the whole span of the playing surface (from one end all the way to the other) several times, using a forte finger pressure. Do this a few times next to the front edge of the playing surface, and also next to the back edge of the playing surface. Be sure to include the very ends of the surface.
3. Next, make sure nothing is pressing on the Continuum Fingerboard (no fingers or other objects on the playing surface or frame), then press and release the Red Button. The LED will now shine dim blue, indicating normal operation.

13.7. Factory Alignment of the "Slim" Continuum Fingerboard

Note: This procedure only applies to "Slim" Continuum Fingerboards, not the Half-Size and Full-Size models. It should not be needed but is included for completeness. Please contact Haken Audio to determine if you should perform it.

Surface alignment is performed at the factory and should not be required, however, at times, particularly after shipping or possibly on a firmware upgrade you may notice that pitch is not consistent across the fingerboard surface. This procedure changes the alignment in software, so that the surface stays physically the same but the alignment procedure fixes the offsets.

Note that your fingerboard may be consistently out of tune across the fingerboard. This typically is caused by the Fine Tune adjustment in Midi and Global Settings being set to a non-zero offset value. If that is your problem the alignment procedure is not required and will not solve the issue.

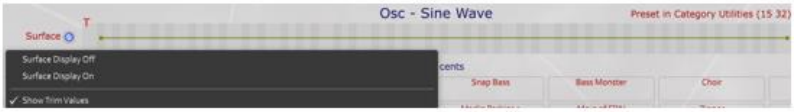
Warning: Do not try and open up the Continuum or physically readjust the fingerboard surface. Please contact Haken Audio if you think your Continuum needs factory calibration or alignment readjustment.

To perform a firmware alignment of the fingerboard surface:

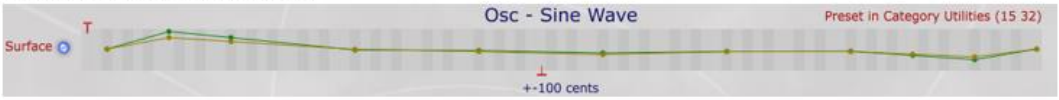
1. In the Editor, under Surface at the top left, turn on the trim graph: Select "Show Trim Values".
2. Choose a Preset that does not use the trim graph, so the trim graph is clear (as the trim graph will give you visual feedback that it is updating alignment points.) Suggestion: "Utilities/OSC Sine Wave" preset. You should see a straight trim line across the surface area.
3. On the Continuum, bring up the Menu System navigate to the Calibration ("Cal") menu.
4. Hold down the "Preset –" button, and while holding it down press **Preset +** (Note: Not simultaneous, "Preset –" first and then while holding hat **Preset +**). The display should change to "ALIGN" (If you pressed together it will enter factory calibration mode).
5. Use a capped sharpie pen (ONLY THE BUTT END) or some implement that can act as a "thin" finger, but nothing too sharp that will damage the playing surface.
6. At Y=0, press the implement into the center of an F#, and as holding it down press the **Preset +** button. The trim graph should reflect the offset, if any.
7. Repeat for all F#s and the highest C, making sure you move your body each time to look at the note straight on, to avoid any errors from a parallax viewing point. Record each point by pressing the **Preset +** button each time.
8. Now repeat for all F#s and high C for Y=1.
9. If everything finishes correctly, you should see that the graph extrapolates off the far ends (left and right).
10. When all done, hit "Preset –", and the trim graph will return to normal and store the Surface Alignment. Exit Menu System (**Oct +** with **Oct –**)

Factory Alignment Procedure – Should not be needed (performed at the factory)

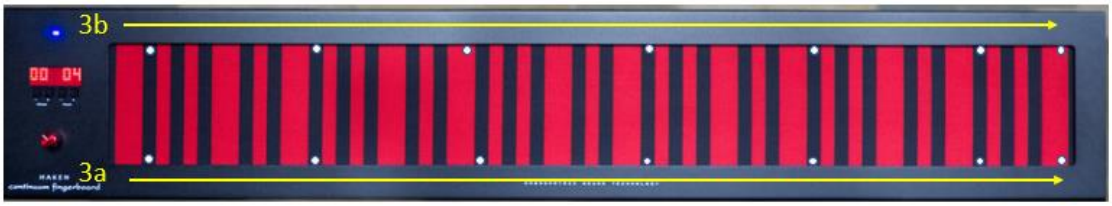
Step 1 – Display Trim values. In Haken Editor turn surface display on and Show Trim Values. Pick a preset with flat trim (like Sine Wave)



Step 2 – **Enter ALIGN MODE**. Enter Menu System ("Octave +" together with "Octave –"). Navigate to "Cal". Press "Preset –" and then while holding that press "Preset + to enter ALIGN mode. LED screen should say "ALIGN". Trim alignment map should appear on surface display.



Step 3a – Perform Alignment Process. Take a small but **blunt** tip object so you don't damage the fingerboard surface (like a Sharpie butt end or ¼ cable tip) and press at Y0 of the lowest F# in the center of the note and then press "Preset +" to store alignment value and trim on screen may change.
Step 3b - Repeat for All F#s. Then do the same on the highest C. Now repeat at Y1. Press the lowest F# in center of note and then press "Preset +". Repeat for All F#s. Then do the same on the highest C.



Example using "Slim" 70 half-step model. 46 Half-Step model procedure is the same – only less notes to push to align.

Step 4 – Exit ALIGN Mode back to playing mode. Press "Preset –" to exit ALIGN mode back to "Cal" menu. You should see the flat trim line you started with. Exit Menu System ("Octave +" together with "Octave –").

Factory Alignment Procedure Sequence

13.8. Do - It - Yourself Repairs and Adjustments (Contact Haken Audio)

Applies to Half-Size and Full-Size Continuums only.

If you loosen the screws in the Continuum Fingerboard, hundreds of springs inside your Continuum Fingerboard may slide out of position, causing serious damage to your instrument. If you wish to perform modifications or repairs on your Continuum Fingerboard, please discuss your situation with Haken Audio technical support and obtain an up-to-date Continuum Fingerboard Repair Manual. After you read the repair manual, you can decide if you would rather have Haken Audio do the repairs for you.

14. Performance Controller Assignments

Midi controller data sent to the Continuum Fingerboard and ContinuuMini on Midi channels 1 and 2 has special functionality. This functionality allows external Midi controller of performance parameters that are normally available as pedal performance controls on the Continuum and ContinuuMini.

14.1. Sending Midi Performance Values to the Continuum Fingerboard

Use the tables below to control the Continuum, ContinuuMini or EaganMatrix module from an external Midi controller on the indicated Midi channels.

You can either connect your device directly to the Continuum Fingerboard's or EaganMatrix Module's Midi In jack, or, if the Haken Editor is running, over USB Midi connect via the External Device ("Ext") controls in Midi and Global Settings (with "Music Data" or "All Data" selected) in the "Midi and Global Settings" (see Section 12 for examples).

The ContinuuMini, EaganMatrix and Slim Continuum module require a Midi Host to be played over USB without a computer.

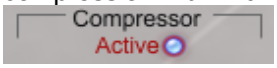
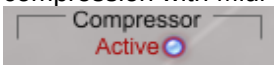
14.2. Receiving Midi Performance values from the Continuum Fingerboard

If you want third-party software (or a device) to receive performance pedal values from the Continuum Fingerboard, connect it via the "Ext Synth" connection (with "Config Data" or "All Data" selected) in "Midi and Global Settings" (see Section 12). The performance pedals will be encoded with the cc numbers from the table below on channel 1, and the data value will be absolute from 0 to 127.

14.3. Midi CC Assignments

Channel 1 (Control Messages)	
cc 8 Octave Shift	Shift the playing surface by one octave down (value 48) or one octave up (value 72), or no octave shift (value 60). Regular switch pedals, as well as the Tri-Value pedal, can generate cc 8. The shift values generated by may be configured to shift a different number of octaves (see cc 54 in Section 15.1, and Section 10.19).
cc 9 Mono Switch	The Mono Switch enables single-note lines when Polyphony is greater than 1, for notes that are within the Mono Interval (see cc 48 below, and Sections 6.3 and 10.13).
cc 10 Fine Tune	Fine Tune control, in cents. 64 is normal, 63 is one cent flat, 65 is one cent sharp.
cc 12 i	The Continuum Fingerboard's internal sound parameter "i" – maps to Macro Controller "i". This may also be set using the Continuum Menu System or on Half and Full size models the Overlay Strip's "i".
cc 13 ii	The Continuum Fingerboard's internal sound parameter "ii" - – maps to Macro Controller "ii". This may also be set using the Continuum Menu System or on Half and Full size models the Overlay Strip's "ii".
cc 14 iii	The Continuum Fingerboard's internal sound parameter "iii" - – maps to Macro Controller "iii". This may also be set using the Continuum Menu System or on Half and Full size models the Overlay Strip's "iii".

Channel 1 (Control Messages)	
cc 15 iv	The Continuum Fingerboard's internal sound parameter "iv" - – maps to Macro Controller "iv". This may also be set using the Continuum Menu System or on Half and Full size models the Overlay Strip's "iv".
cc 16 iv	The Continuum Fingerboard's internal sound parameter "v" - – maps to Macro Controller "iv". This may also be set using the Continuum Menu System or on Half and Full size models the Overlay Strip's "iv". Note: This used to be called Gen1 and then later g1 if you are using 9.55 and earlier firmware.
cc 17 iv	The Continuum Fingerboard's internal sound parameter "vi" - – maps to Macro Controller "iv". This may also be set using the Continuum Menu System or on Half and Full size models the Overlay Strip's "iv". Note: This used to be called Gen2 and then later g2 if you are using 9.55 and earlier firmware.
cc 18 Level (Post)	Output post Master Section level of the internal sound. (Previous Gain control) See Section 10.1.
cc 19 Audio Input Level	Level for AES/SPDIF digital input on Continuum or Audio Input on EaganMatrix Module. Not supported on ContinuuMini or Osmose.
cc 20 R1	Recirculator control R1, 0 (minimum) to 127 (maximum). The EaganMatrix's Master Section can provide an offset to the cc 20 value, scaled 0..1. Depending on the setting this controls Diffuse, ModDepth, Noise, LPF or HPF).
cc 21 R2	Recirculator control R2, 0 (minimum) to 127 (maximum). The EaganMatrix's Master Section can provide an offset to the cc 21 value, scaled 0..1. Depending on the setting this controls Damping, ModRate, or Offset.
cc 22 R3	Recirculator control R3, 0 (minimum) to 127 (maximum). The EaganMatrix's Master Section can provide an offset to the cc 22 value, scaled 0..1. Depending on the setting this controls Darkness or Feedback.
cc 23 R4	Recirculator control R4, 0 (minimum) to 127 (maximum). The EaganMatrix's Master Section can provide an offset to the cc 23 value, scaled 0..1. Depending on the setting this controls Decay or Time. Note: Controls "EfT" in Continuum Menu System.
cc 24 Recirculator Mix	Mix between recirculator output and dry signal. 0 = 100% dry, 127 = 100% recirculator. The EaganMatrix's Master Section can provide an offset to the cc 24 value, scaled 0..1. Note: Controls "EfL" in Continuum Menu System.
cc 25 Round Rate	Sets the rate for the Continuum Fingerboard's finger position rounding feature (see Sections 6.4 and 10.15). Note: Controls "RrT" in Continuum Menu System.
cc 26 Level (Pre)	Pre Master Section Level Control (new to firmware 9.53)
cc 27 Attenuation	Controls output attenuation. Value can be set from 0 (-24dB) to 127 (0dB). Note: Equivalent to turning attenuation knob on "Slim" continuums. Not supported on half-size, full-size continuums or ContinuuMini. Note: If this value is sent from an external Midi source it will attenuate the volume on your EaganMatrix based device
cc 28 Round Initial	Round initial finger positions to nearest half step (or nearest point in the current Pitch Table). Note: Controls "RIn" in Continuum Menu System.
cc 31 Advance	Advance to next User Preset (value 127, also called "Full Advance"), or to next preset within a Combination Preset (value 64, also called "Half Advance"; see Section 8.9). *The ideal Advance pedal is a Tri-Value pedal, which does both Full Advance and Half Advance (see Section 6.5). A Yamaha switch pedal by default does only Full Advance but can be changed to Half Advance by setting Pedal Max to 64 (see Section 10.18).*

Channel 1 (Control Messages)	
cc 65 Equal	This is used to temporarily disable rounding, and to temporarily ignore the selected Pitch Table. Value 0 ignores rounding; value 64 does the rounding specified by the preset; value 127 does rounding but uses the Equal scale (ignores the preset's Pitch Table).
cc 64 Sustain cc 66 Sostenuto 1 cc 69 Sostenuto 2	The Continuum Fingerboard supports one sustain and two sostenuto pedals. These pedals are dynamic: if the pedal's data value is 127, the sustain or sostenuto will be at full volume; smaller pedal values can be used for lower volume (if you use a continuous-valued pedal as opposed to a switch pedal). The Continuum Fingerboard will wait until the sustain or sostenuto pedal is released before it sends Midi Note Off. If you use a continuous-valued pedal and release it gradually, the sustained notes will fade out. If you use the two sostenuto pedals at the same time, you can control two sets of sostenuto notes.
cc81	Compression Rate Control. 0 = Off. 127 = Max Note: The preset must set and store the compression control as active for the preset to control compression with Midi CCs using an external controller. 
cc82	Compression Time Control.0 = Fastest. 127 = Slowest. Note: The preset must set and store the compression control as active for the preset to control compression with Midi CCs using an external controller. 
cc 83 Eq Tilt	This is used to set the Eq Tilt value. Sets the Eq balance between lower frequencies and higher frequencies. Can be set from 0 to 127. A value of 64 sets the balance to be flat. The further one goes to each extreme, the sharper the eq slope is. In this way in can be used for subtle shaping or major shaping.
cc 84 Eq Frequency	This is used to set the Eq Frequency crossover point between the filters. Can be set to a value from 0 (120Hz) to 127 (15Khz).
cc 85 Eq Mix (Level)	This is used to set the Eq wet/dry Mix ratio. A value of 0 means EQ is bypassed, 64 means half-filtered half-dry, 127 means all EQ.

15. Configuration Controller Midi Encoding Assignments

15.1. Load, Store, and List Presets – Midi Encoding

Channel 16		
cc 0 (category) cc 32 (preset) Load Preset	**Firmware 8.5 to 9.0** Select Category with cc 0; first preset in Category will be activated. Select Preset Within Category using cc 32. Alternative method for loading preset: cc 81 and cc 82 (see below). **Firmware 9.1-9.55** Note: For firmware versions 9.1 and later, the User Preset Category (Category 0, cc0=0) is expanded to allow for storage of up to 128 presets. To set User presets send cc0=0 followed by cc32 = 0-127 to load the desired user preset. To Load System presets, send cc=1 to max categories, cc32=preset within category. Categories: 0 = User Presets 1 = Bass 2 = Keyboard, etc. (See preset list at end of this manual for all categories (noting ContinuuMini does not have all Touch Area or Processors categories) **Firmware 9.85 And Later** On Midi Channel 16, the Program Change (PC) message can be used to switch presets and Bank Select (CC0) used to set Category. If more than 128 presets are used in a category, CC32 is used to address the additional presets in the bank. **Channel 16 cc0** (Bank Select) – category number – 0 is user presets, 1+ is other categories by number (Slim, ContinuuMini. Osmose & EM Module): 0 = User Presets (1-128, 1-16 for 1x Models) 1 = Strings 2 = Winds 3 = Vocal 4 = Keyboard 5 = Classic 6 = Other 7 = Percussion 8 = Tuned Percussion 9 = Processor (DSP presets) 10 = Drone Presets 11 = Midi Presets 12 = Control Voltage (CVC) presets	Category and Preset within Category

Channel 16		
	13 = Utility (Example presets) **Channel 16 cc32** – high 7 bits of preset within the category (no need to send this if value is 0). Used when there are more than 128 presets in a CC0 bank/category. CC32=1 will access the next set of 128 presets (if available) in the bank currently specified by CC0. If the value exceeds the number of presets in the bank, the highest preset in the bank will be set/displayed. Setting CC32 in a bank/category that contains less than 129 presets will have no effect. For example: The Other OT category has > 128 presets. If you want to access preset OT 129 you would send: PC=0, CC0=6, CC32=1. At this setting if you change PC=1, it will change to OT 130, etc. PC=127, CC0=6, CC32=1 would access OT 256 (if it exists). Preset OT 257 would then be accessed as PC=0, CC0=6, CC32=2. (However the OT category as of now contains less than 257 presets so it will only be accessed as CC32 = 0 or CC32 =1). **Channel 16 Patch (Preset) Chang**e – low 7 bits of preset within category (this actually loads presets 1-128 (specified 0-127) in the current bank/category specification. When you send the Patch Change, it loads the specified preset in the current bank/category setting, that is it uses the most recent values of cc0 and cc32 it has received. Thus, you do not have to send cc0 and cc32 before Patch Change if cc0 and cc32 are already the value you desire. Note: When you start up your Continuum/Mini/Osmose, cc0 has an assumed value 0; you have to send it a cc0 if you want something besides user presets. When you send a cc0, it stores that value for cc0 and automagically defaults cc32 to 0 as well. So there is no need to send cc32 unless it is nonzero. For User Presets, cc32 is always 0, as it is for most of the categories – since most categories have less than 128 presets in them. **Note:** On the Slim, you will see a two-letter abbreviation of the current category selection [instead of the 9.55 category number]. If you hold down Octave-, it will scroll the full name of the category in addition to showing its two-letter abbreviation. [If you tap Octave- it just changes octave as expected]. Similarly, if you hold down Octave+, it will scroll the full name of the preset in addition to showing its number.	
cc 81 (lsb) cc 82 (msb) Load Preset (deprecated in 9.85 and later firmware)	**For Firmware 9.55 and Earlier Only (See above for 9.7 and later)** Note: This option will only load 16 user presets, then start loading system presets. This configuration will apply to 1x Continuums that cannot support the extended user presets or can be used on 2x and greater Continuums if you do not need User Presets 17-128. Load User Preset Slot (Section 8.6) with values 1-16. Load System Preset with values 17-575 (add 17 to system preset #) Load System Preset with values 17-Max presets (see table below) The 7 LSBs (cc 81) *must always be* followed by the MSBs (cc 82). cc81=0-16, cc82=0 (User Presets 1-16)	Absolute preset number: Load User Presets 1-16 and System Presets (17-max)

Channel 16		
	cc81=17-127, cc82=0 (System Presets 1-110) cc81=0-127, cc82=1 (System Presets 111-238) cc81=0-127, cc82=2 (System Presets 239-366) cc81=0-127, cc82=3 (System Presets 367-494) cc81=0-127, cc82=4 (System Presets 495-622) Note: Max presets end at 575 for 9.55 firmware.	
cc 109 Store Config	Store current configuration and store global settings to flash.	8 store config
cc 57 (lsb) cc 58 (msb) Store Preset	Store User Preset Slot (Section 8.6) with values 1-16. Store System Preset with values 17-511 (*for Editor use only*). The 7 LSBs (cc 57) *must always be* followed by the MSBs (cc 58).	Absolute preset number: 1-16 Store User Preset, 17-511 System Presets
cc 109 Demo Setup	Load 16 demo presets into User Preset Slots and transmit names of the 16 demo presets using cc 56 Text (see below).	39 demo setup
cc 109 Transmit Config	Transmit the current configuration on its Midi Out jack, using the same Midi messages used to download the configuration.	16 transmit config
cc 55, bit 0 Transmit Updates	The Continuum Fingerboard will automatically transmit the current configuration whenever the configuration changes, using the same Midi messages used to download configurations.	0 no updates (default), 1 transmit updates
cc 109 Transmit Names	Transmit names of 16 User Preset Slots and all System Presets, using cc 56 Text (see below). Category names will be included.	32 transmit names
cc 56 Text	Identifies the Ascii text that follows; included in the Continuum Fingerboard's response to Transmit Config, Transmit Updates, and Transmit Names (see above). Ascii data is transmitted as channel 16 channel pressure, terminated by value 127. Finally, if text is a preset name, cc 57 and 58 (see above) identify the preset number.	0 preset name, 1 preset text, 8 category name

15.2. Midi Device Compatibility – Midi Encoding

Channel 16		
cc 61, bit 3 Kyma Mode	Communicate with Symbolic Sound's Kyma; automatically update polyphony and multi-split as Sounds are loaded within Kyma; if the Haken Editor is running and has a Midi keyboard as ExtDevice, the Continuum will channelize the keyboard data (one note per Midi channel) allowing both keyboard and Continuum.	1 to activate, 0 is default
cc 109 Low Power Bluetooth	Use 5% of Midi Data Rate, for Low Power Bluetooth Midi. This data rate is much too slow for Continuum playing, but convenient for configuration with wireless Continuum Remote apps.	38 5% Midi rate, 37 33% Midi rate, 36 100% Midi rate

Channel 16		
cc 117 Loopback Detect	When receiving Midi input, the Continuum outputs cc 117 once per second to test for Midi loopback. Both Channel 16 and Channel 1 are checked with this mechanism.	0-127 random data

15.3. X, Y, and Z Midi Encoding

Channel 16		
cc 44 Middle C	Midi note number corresponding to middle C position.	0-127 60 is default
cc 54 Octave Shift Configuration	Midi note number corresponding to middle C position while the Octave Shift is active. This value and 60 minus this value will be encoded in the Octave Shift (cc 8) if the Tri-Value pedal is used.	0-127, 48 is -1 octave, 72 is +1 octave
cc 40 X Bend Range	Number of half steps for Midi Pitch Bends. Values > 96 indicate MPE+ bend range of 96, with ch1 input bend range = Value-95.	1-96 bend range >96 MPE+ ch1 range
cc 41 Y Controller Assignment	Controller assignment for finger Y position (front-back). No value is transmitted for Y if the controller assignment is 0. Controller assignment 127 will transmit using cc 74, without shelving at the extremes of the Y range.	1-127, 74 is default, 0 no output
cc 42 Z Controller Assignment	Controller assignment for finger Z position (pressure). Special value 127 selects MPE encoding: Channel Pressure for Z, ch 1 cc 127 for polyphony, ch 2 RPN 0 for pitch bend range (see Section 10.9). No value is transmitted for Z if the controller assignment is 0. Value 70 selects MPE+ Encoding (see Section 10.9 for details).	1-69 to select Z cc, 70 MPE+ (default), 127 MPE, 0 no output
cc 43, bits 0-2 Midi Note Processing	A value of 0 sets the Note On velocity to a constant maximum (127). A value of 1 encodes initial finger velocity in the Note On velocity byte. Value 2 encodes Note On velocity computed by EaganMatrix formula V. Value 3 avoids transmitting any Note On, Note Off, or Pitch Bend messages. Value 4 makes the Continuum act as a 3-d ribbon controller, providing pitch bends for an external Midi keyboard. Value 5 always uses 60 for the Midi key number, and all bends are referenced from Middle C. Value 6 enables special Kyma processing. See Section 10.10 for details.	0 constant 127, 1 velocity, 2 formula, 3 no note output, 4 External Note mode, 5 Ethervox mode, 6 Kyma mode

15.4. Rounding and Pitch Table Midi Encoding

See Section 14.3 for the Round Rate controller. The following configuration affects how Round Rate is used.

Channel 16		
cc 61, bit 1 Release Only	Round rate has effect only after finger is lifted from surface (during release portion of note).	1 to activate, 0 is default
cc 51 Select Pitch Table	Select Pitch Table for Round Initial, Round Rate, and surface pitch warping. 60..71 for Just tuning with C..B tonic center. 1..50 for n-tone Equal tuning, with n divisions per octave. 80..87 for a user-defined downloadable Pitch Tables (see Section 6.4)	1-50 n-tone Equal, 60-71 Just, 80-87 custom, 0 is default
cc 61, bit 0 Reverse Pitches	Reverse X so that high pitches are to the left and lower pitches are to the right.	1 to activate, 0 is default

15.5. Polyphony, Routing, and Split Midi Encoding

Channel 16		
cc 39 Polyphony	Base polyphony, and two flags: Allow Increased Sample Computation Rate and Allow Expanded Polyphony.	1-16, +32 Increased Rate, +64 Allow Expand Poly
cc 49, bits 2-4 Channel Priority	Select how new notes get assigned to Midi channels: Oldest (assign the new note to the Least Recently Used channel), Same (assign to channel that played the same pitch), or Lowest (assign to the lowest channel number that is available). Select High 1, High 2, High 3, or High 4 to restrict notes from the playing surface to the highest Midi channel(s) within the polyphony (see Section 10.6).	0 Oldest, 1 Same, 2 Lowest, 3-6 High 1 to 4
cc 36, bits 0-2 Surface Routing	The Continuum Fingerboard's surface activity may be merged to any or all of the following: Midi Out, Continuum Voltage Converter (CVC), and Internal Sound.	bit 0 for Midi Out, bit 1 for Internal, bit 2 for CVC
cc 36, bits 3-5 Midi In Routing	The Continuum Fingerboard's Midi In may be merged to any or all of the following: Midi Out, Continuum Voltage Converter (CVC), and Internal Sound.	bit 3 for Midi Out, bit 4 for Internal, bit 5 for CVC
cc 45 Split Point	Note number for split point.	0-127, 60 is default
cc 43, bits 3-5 Split Mode	Select split mode (see Section 10.12). An alternative split mechanism, Multi-Split, is described in Section 10.12.	0 off, 1 polyphonic, 2,3 single below/above, 4,5 internal b/a, 6-8 CEE Combination, 9-10 CEE triple

15.6. Pedals (see also Section 14) Midi Encoding

Channel 16		
cc 52 Pedal1 Jack	Midi controller assignment for Pedal 1 Jack.	See Section 14, 64 is default
cc 76 Pedal1 Min	Minimum data value for Pedal 1.	0-127, 0 is default
cc 77 Pedal1 Max	Maximum data value for Pedal 1.	0-127, 127 is default
cc 53 Pedal2 Jack	Midi controller assignment for Pedal 2 Jack.	See Section 14ß, 66 is default
cc 78 Pedal2 Min	Minimum data value for Pedal 2.	0-127, 0 is default
cc 79 Pedal2 Max	Maximum data value for Pedal 2.	0-127, 127 is default

15.7. Mono Function Midi Encoding

Channel 16		
cc 46 Mono Function Configuration	Select between portamento, legato, and retrigger in single note lines. Transitions can be pressure-based or time-based. See Section 6.3 and Section 10.13.	0 Portamento (default), 1 Legato Z, 2 Retrigger Z, 3 Legato T, 4,5 Retrig New/All
cc 48 Mono Interval	Sequential notes played within the Mono Interval will be performed as single-note lines. The Mono Switch (see Section 14.3) can be used to enable and disable effect of the Mono Interval during a performance.	0 disables this, 1-96 interval, 0 is default

15.8. Firmware Version and CVC Serial Number Midi Encoding

Channel 16		
cc 102 Firmware Version cc 103	High 7 bits of firmware version. This is included in the Continuum Fingerboard's response to Transmit Config and Transmit Updates.	0-127
	Low 7 bits of firmware version.	0-127
cc 104 CVC Serial	Bits 15-14 of 16-bit CVC serial number. The is included in the Continuum Fingerboard's response to Transmit Config and Transmit Updates (see above).	0-3 high bits serial number

Channel 16		
cc 105	Bits 13-7 of 16-bit CVC serial number.	0-127 medium bits serial number
cc 106	Bits 6-0 of 16-bit CVC serial number.	0-127 low bits serial number

15.9. Other Configuration Controller Midi CC Assignments

Channel 16		
cc 35 Midi Program	Transmit Midi program change on each Midi channel used by the Continuum Fingerboard. The Midi program change will be transmitted immediately, and whenever this preset is loaded.	0 disabled, 1-20 Midi program
cc 33, bits 3-4 Aes3 Options	Select the AES3 output sample rate. This rate can be internally generated or slaved to the AES3 input sample rate.	0 96 kHz, 1 Slave, 2 48 kHz
cc 91 Tweak	When the Haken Editor is running, this will modify (tweak) the mouseover parameter in the Editor. Note: Removed version post 9.55	0-127
cc 109 Calibration	Refine calibration, and discard calibration (see Section 7).	35 refine, 34 discard

16. Using the ContinuuMini

ContinuuMini Specific Information

Now that you have your new ContinuuMini, how do you connect, configure and use it to its full potential? This section will get you on your way.

Note: in this section when the term "Continuum" is used, it refers to the half or full-size Haken Continuum, not the ContinuuMini.

Additional Equipment You Might Consider Useful:

All you need to start using your ContinuuMini is a USB power supply (for example your laptop), a USB MINI-B cable (provided) and a 1/8" (3.5mm) TRS stereo cable to connect to your mixer, amplifier or possibly DAW (or a compatible set of headphones). You might also consider purchasing one or more of the following items (or similar items) depending on your needs.

- Mobile Power: APC 3400mAh Mobile Power Pack - APC M3PMBK - or similar (for battery-powered playing). Add a pair of headphones or earbuds and you can play your ContinuuMini anywhere, anytime.
- Pedal Connection: HOSA MHE-100.5 Right Angle 1/8" TRS to 1/4" TRS Adapter. The ContinuuMini supports a single pedal which can be a switched pedal, Continuous pedal or the tri-octave pedal available from Haken Audio. Depending on the preset, you may want to invest in both a switched (perhaps for a sustain) and continuous (perhaps for Controller i, ii, etc.]) pedal.
- RCA Connection: Stereo mini to RCA cable - HOSA CMR-206 - for connection to RCA connections on amplifier
- Carrying Case: A nice solution is the 25" Clear 2 ID Alvin Ice Tube – Model: MT25-CL (also comes in a variety of colors).

Firmware Download

One of the first things you may need to do after receiving your ContinuuMini is update the firmware. See firmware download section (Chapter 11). The ContinuuMini downloads firmware identically to the Continuum once it is connected to your computer, however, make sure to download the ContinuuMini firmware versus the Continuum firmware. If you download firmware and the Menu System seems strange, make sure you have not downloaded Continuum firmware by mistake. You can always redownload at any time.

16.1. Connecting Up

The ContinuuMini is simple to set up and use right out of the box with no computer involvement. This may in fact be the way you want to play it much of the time either for pleasure or perhaps on stage. You only need to do three things to start.

1. Connect your ContinuuMini's USB port (labelled "500 mA") to a USB source using the provided MINI-B USB cable or a longer one of your own if you wish. This source could be a USB port on your computer, a USB charger or even a battery powered USB device. Windows and Mac computers will automatically recognize the USB connection and you can then also bring up the EaganMatrix Editor as well if you like. Once powered, the ContinuuMini will boot up almost instantly and be ready to play once you see the LEDs on the 7 Segment Display (front LED panel) show a non-blinking preset number. If the Display shows "ERRP", the USB host or other device you are using to power the ContinuuMini is not providing the required 500 milliamps. On first boot, you should see a "001" (User Preset 1) in the LED display - or the last preset number set if you are powering up from a previous playing session. If you see an "ERRL" message, you have a MIDI loop – check your MIDI connections. Note: The ContinuuMini performs a self-calibration when booting. It is important not to touch the surface during this time or you will receive an ERRF error message.

If you get this message, simply depower and repower the instrument through its USB connection making sure not to touch the playing surface while booting.

2. Connect the audio headphone output using a mini stereo TRS cable to the desired source (mixer, amplifier, sound system, headphones, etc.) If you hear hum and suspect a ground loop, you can try a ground loop noise isolator such as that provided by www.*besign-tech.com* (which comes with the ContinuuMini Kickstarter units). Connect this to the headphone port and then connect your stereo TRS cable to the isolator. You can also connect a 3.5mm to 1/8" headphone adaptor to the isolator if you wish to connect to a stereo mixer, amp or headphone. As with the continuum, always use a stereo audio cable for this connection.

   Ground Loop Isolator Note: You will never need the isolator when you have headphones plugged into your ContinuuMini. But when you connect your ContinuuMini to your home stereo (using cables like HOSA CMR-206), or a studio amplifier, or an A/D converter to your DAW – then you might need the Isolator. Only use the Isolator if you need it – try the connection first without Isolator – if it sounds good, great! If you hear noise, then insert the Ground Loop Isolator. You want one and only one ground connection between the ContinuuMini and whatever you connect it to. For headphones and battery-powered speakers, the audio cable provides this one ground connection. But in a home or studio setup, there might be multiple ground paths. While USB connections are convenient, they are not ground-isolated like traditional DIN-5 Midi, so it is easy to get ground loops. If you hear ground loop noise, it is easy to fix - use the Isolator. The Isolator referenced above has two matched transformers inside, one for the right channel audio and one for the left channel audio.

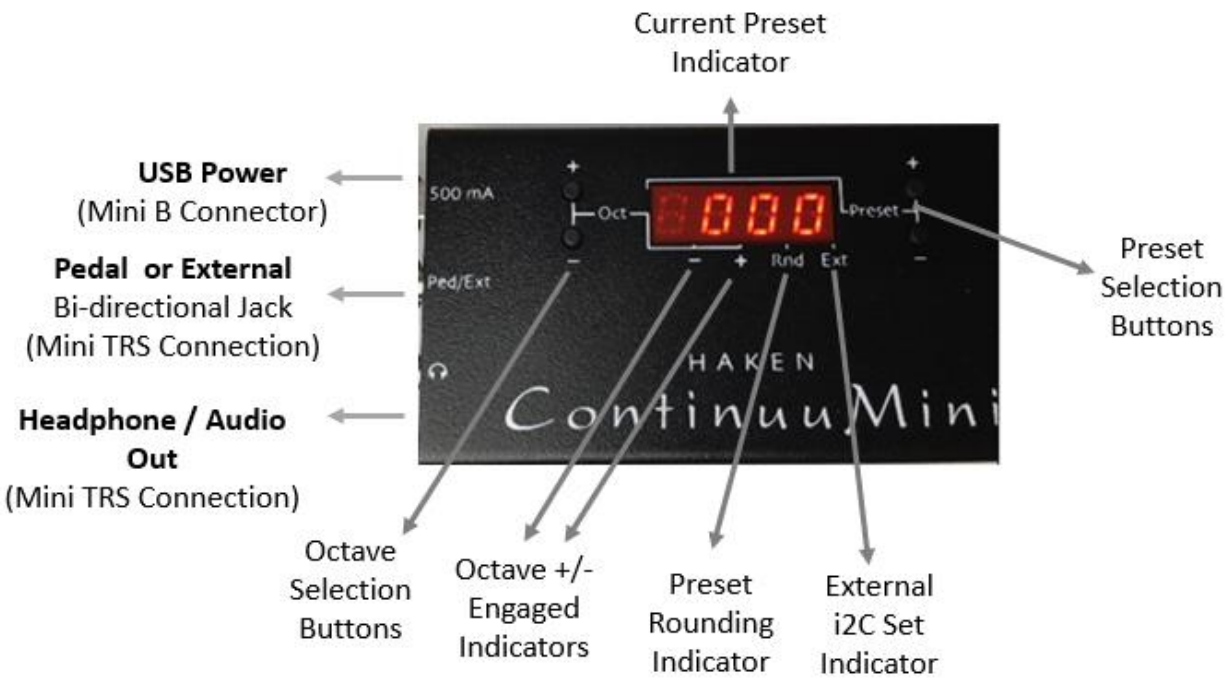
3. Finally, if you wish to use a switched or continuous pedal (depending on the needs of your presets) or perhaps the Tri-Value pedal. Connect it to the Ped/Ext bi-directional port using a 3.5mm to 1/4" stereo adapter as recommended above. See the Pedal Jacks section of this manual for pedal recommendations. Note that certain presets assume the pedal has specific EaganMatrix programmed functions pertaining to one or more aspects of the preset. You can assign the pedal to various ContinuuMini functions of any preset using the ContinuuMini display or the EaganMatrix. The Ped/Ext port is also used to connect to a Haken Audio Continuum Voltage Converter or Evaton Technologies uCVC (Eurorack) using a custom cable allowing you to interface (send CV outputs) to a modular synthesis system. A special CV cable as detailed below is also available to allow CV inputs to be sent directly into the ContinuuMini using the same pedal port.

Now simply use the **Preset +** and **Preset –** buttons to scroll through the hundreds of presets stored on the ContinuuMini (more on this in a bit). We suggest you start by turning down the volume/(pre/post) level and bring it up gradually as you press the playing surface – especially if you are connecting a set of headphones. The ContinuuMini is preset to "dim" the audio in case you start by plugging in a headphone and play too loud. This can be removed through the display function described below. Consult the "Continuum Mini Presets" .PDF file in the EaganMatrix Editor (or Editor directory) for a full catalog of all presets in the current firmware release.

These "factory" system presets will always be available from the internal storage of the ContinuuMini without need for an external computer, however you can load any user created preset using the EaganMatrix Editor and store that in a user defined preset if you wish (just like on the Continuum).

Cycle through a few presets to get the feel of playing the instrument. Have fun!

16.2. The ContinuuMini Seven Segment Display



The ContinuuMini 7 Segment Display allows you to perform the following functions that will be explained in greater detail below.

- Displays the storage code for the present preset (you will need the EaganMatrix to see the text associated with each preset code).
- Allows you to scroll through presets and preset categories
- Allows you to store a currently displayed preset in one of the 16 user defined preset locations
- Displays how close you are to being in tune while playing
- Displays if rounding is set for a preset
- Displays if the external (Ext) port is activated for a pedal or I2C mode (for CVC or uCVC connection)
- Allows you to change octave – up to two octaves up or down
- Displays if octave up or octave down is engaged (applies to pedal octave control as well)
- Allows you to enter the Menu System and display and edit various settings
- Displays error code

16.3 ContinuuMini Lever

Current models of the ContinuuMini are in every way identical to the original version, however they include a metal lever that can be screwed into a lever socket to provide an alternate volume control manipulated with the left hand as you play normally with your right hand. The Lever allows for a bit more Y control at the ends of the ContinuuMini and in some ways acts similar to the Touch Area of the Continuum Fingerboards. If the Level is not screwed on, the ContinuuMini acts identically to models without it.



16.4 Preset Display

The initial release of ContinuuMini firmware contains 350+ System Presets arranged into 15 categories accessed by category number (for example **1**01, **3**09 or **13**02). Presets 0..016 are reserved for User Presets that can be set to any system or user created preset. The ContinuuMini system preset categories are:

1. **Bass** (1xx) – A few different bass synth sounds
2. **Keyboard** (2xx) – Presets that emulate keyboard and tine sounds (but note the continuum is not a sampler and the intent is not to try and exactly duplicate acoustic instruments such as a piano).
3. **Looping** (3xx) – Presets that contain internal looping elements
4. **Morphing** (4xx) – Presets that morph between sounds in various ways
5. **Percussion** (5xx) – Pitched and non-pitched percussion presets
6. **Plucked** (6xx) – A separate set of presets for plucked sounds
7. **Sound Design** (7xx) – A set of presets that show off the many sound design capabilities of the EaganMatrix.
8. **String** (8xx) – String presets – bowed, plucked and struck
9. **Synth** (9xx) – Various presets emulating different synthesizer sounds
10. **Vocal** (10xx) – Presets using the EaganMatrix formant generator to create all kinds of vocal sounds
11. **Wind** (11xx) – Presets that emulate wind instrument both real and fantastic
12. **Midi** (12xx) – These are for playing external MIDI devices and create no sound
13. **CVC** (13xx) – These are for connecting to the Continuum Voltage Converter or Evaton Technologies uCVC. They create different voltage outputs based on the requirements of various popular modular and CV controlled devices.
14. **Drones** (14xx) – These are presets that play themselves without touching the fingerboard. They concentrate on the use of Shape Generators (see EaganMatrix Manual).
15. **Utilities** (15xx) – Various presets that are used to create noise for calibrating speakers perhaps, and simple presets for demonstrating EaganMatrix basics. If you are interested in programming your own presets, start with these examples.

More presets and sound design features will be coming in future releases and you can load presets you or others in the Continuum and ContinuuMini community create using the EaganMatrix at any time. Note that the categories in the Continuum are slightly different due to some functions in the Continuum that are not supported by the ContinuuMini.

Any Continuum preset can be loaded into the ContinuuMini (and vice versa), however many ContinuuMini presets have been optimized for the Mini's playing surface versus the Continuum and some Continuum presets use functions not available on the ContinuuMini. Otherwise the sound engine and method of preset creation is identical for Continuum and ContinuuMini.

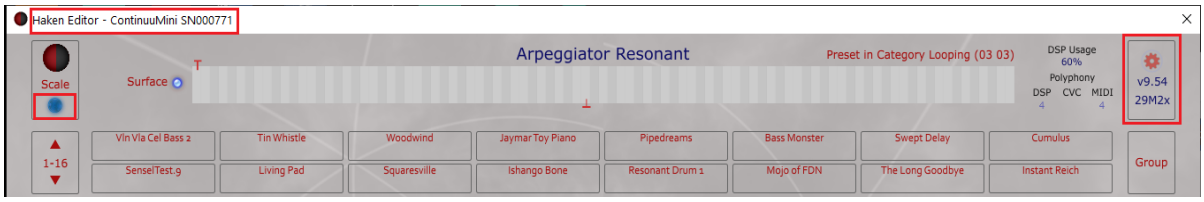
16.4. Connecting to the EaganMatrix (Haken Editor)

Connection to the EaganMatrix editor can be of great assistance when using the ContinuuMini as it lets you easily access presets and most features you have available on the seven segment display. It also is required for the following:

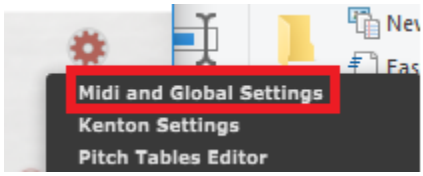
- Updating ContinuuMini firmware
- Programming and making changes to EaganMatrix presets
- Loading user created presets to user preset locations
- Easily interfacing external MIDI-host based keyboards and other MIDI controllers to the Mini - especially if you want to use more than one MIDI host device, as it is hard to find stand-alone MIDI host interfaces supporting more than one MIDI host.

Assuming you have installed the ContinuuMini firmware, which includes the EaganMatrix application, do the following:

1. Connect the ContinuuMini to the computer's USB port (or USB hub if you are using one). The Mini should be autodetected by your computer.
2. Make sure the ContinuuMini boots and displays its current preset (normally 001 when first starting).
3. Bring up the EaganMatrix program by clicking on its icon (it will be labelled "Haken Editor" in the top level Firmware directory.
4. Wait for the program to load and detect the ContinuuMini. This could take a few seconds. Initially the top right hand corner of the screen may display a Version 0.00 until the actual firmware is detected and displayed in the upper righthand corner of the screen.
5. Eventually the version should change to the current firmware release installed and you should see the type of Continuum listed as **M2x** for the Mini. You should also see the active LED icon on the left side of the screen turn blue. The top left notice should also display Haken Editor text with the ContinuuMini Device in parentheses (ContinuuMini SN00nnnn)".



6. If the Blue LED icon does not light, the ContinuuMini is not being detected properly. In this case go to the top right Cogwheel and bring up the "MIDI and Global Settings" window:



7. From there, make sure the Sources/Continuum and Destinations/Continuum selections are set to your ContinuuMini device. If you have the Mini connected before you bring up the editor it should be automatically recognized and placed in the Continuum Source and Destination slots. If you also have a continuum and use the same computer to bring up the editor, the continuum device may have previously been set instead of the Mini. In this case always check that the correct device is being detected in the EaganMatrix. You cannot connect to both devices at the same time using a single instance of the EaganMatrix.



8. Also note that the Blue triangle icons on the Continuum line should be blinking indicating the ContinuuMini is connected to the editor. From here please consult the EaganMatrix manual for details on its operations and preset programming. If the ContinuuMini is not listed as the Source and Destination or the blue triangles are not blinking make sure you do not have another copy of the Haken Editor running or another program running that has already connected to the ContinuuMini's USB interface (such as a DAW).

16.5. Playing the ContinuuMini

Here are a few tips to getting the most out of playing the instrument:

1. The ContinuuMini's surface is not a soft neoprene bed like the Continuum. It is a very sensitive plate that can be depressed and slightly rocked inwards as you play from the bottom to the top of the surface. Its sensors can detect very slight pressure changes in the Pitch (left to right direction - X), Volume (pressure - Z) and to a lesser extent front to back motion (Y). Try gently rocking your finger left-to-right on a pitched preset that does not have the Rnd (Rounding) indicator lit such as "VlnVlaCelBass2". You should be able to get a very expressive vibrato similar to what you would achieve playing a string instrument. Try playing individually articulated notes and glissandi up and down the fingerboard. Note that some presets are static and do not change with Y motion, others do, especially as you approach the top of the playing surface. For those that own continuums, the playing surface of the ContinuuMini uses the same fabric, however it feels quite different due to the harder surface on the Mini. So while the ContinuuMini retains many of the expressive fundamentals of the Continuum, it is in other ways a different instrument that requires its own playing techniques to be mastered.

2. As indicated on the instrument, the ContinuuMini is duo-tactic. This means you can play up to two notes at a time (unless the preset only supports monophonic playing). Most of the time you will be playing with one finger and one internal voice. The most common use of using two voices is either playing a drone in one hand and some melodic line with it in the other or playing some interval in one hand, perhaps as a glissando. Internally, the instrument can play up to eight voices. For example, one note can be sustained as another is triggered to build up layers of polyphony even though only two voices can be played at any time. See the online videos that will be more instructive to demonstrate the various ContinuuMini playing techniques.

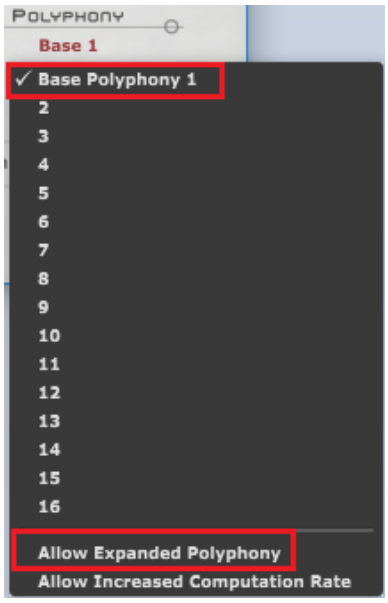
   Note that not all presets react the same to duo-tactic playing. Presets that are highly dependent on pressure changes in formulas may not respond well when two fingers are playing at the same time. You may find the volume of the second finger increases dramatically in some presets when playing duo-tactically, especially those involving Shape Generator envelope control of noise inputs to formulas (for example Karplus Basic and other Waveguide based formulas). These presets are best played monophonically. Take care when articulating to not overlap fingers which may create a breaking sound if you are not careful when articulating - if two fingers touch the surface at once when you expect monophonic output. In general, it will take a while to get used to developing ContinuuMini playing technique, but it should not take that much time to become attuned to the instrument. If you are a Continuum owner, don't expect the Mini to respond exactly like the Continuum. They are two different instruments even though they share a number of basic performance characteristics and have a common sound engine.

3. A special note on playing front to back (Y): Obviously there is limited range in Y on the playing surface, however, Y itself has certain performance characteristics that you should be aware of. The range sensitivity of Y is most pronounced in the middle two thirds of the playing surface. Here Y will respond from min to max (default values 0..1) depending on how you place your finger on the playing surface. However, the range of Y reduces towards the ends of the playing surface. If you want to make use of Y to its fullest, play in the center two thirds of the fingerboard.



4. If you notice a preset does not respond well to duo-tactic playing or you are getting unwanted transitions between notes because two fingers slightly overlap and you desire to set it to purely monophonic mode (as may be the case with many solo instrument presets such as a sax or trumpet), you can go into the EaganMatrix for that preset and set "Base Polyphony" to 1, making sure the "Allow Expanded Polyphony" option is not checked. You can tell if this is set correctly if the Preset displays Polyphony as "Base 1". If it displays "Base1+", you have "Allow Expanded Polyphony" checked. Be aware that some presets assume

higher polyphony for sound design. If you set a preset to Base 1 from a higher polyphony and it does not sound right, that preset may have to be kept at its original polyphony setting.



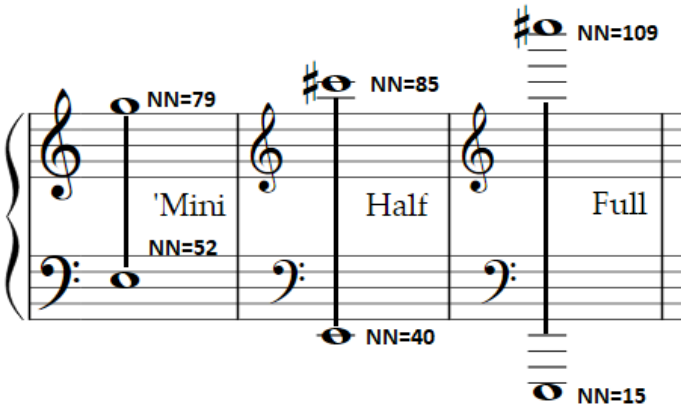
16.6 Octave Buttons and ContinuuMini Range

The **Oct +** and **Oct –** buttons can be pressed at any time to raise and lower the current pitch by up to two octaves (press once for one octave and twice for two octaves). The "+" or "-" octave indicator (".") will be lit if you have raised or lowered the default octave setting. Note that you cannot raise or lower an octave while you are playing a pitch. You must press the octave buttons before the note comes in you want to shift. The new octave setting will remain until changed. On resetting the ContinuuMini the default octave setting will be applied.

You can also change octaves with a pedal and the display's octave indicators will respond as expected.

Range Comparison

The ContinuuMini (without octave transposition engaged) has a range of 28 notes, MIDI Note Numbers 52..79. This compares to the half and full size Continuums as follows:



16.6. Menu System Options and Preset Selection

Consult the template on the back of your ContinuuMini for a summary of configuration operations.

If the two Octave buttons are pressed simultaneously, the front panel enters the Menu System and blinks. From there you can press either the **Oct +** or **Oct –** buttons to scroll through the ContinuuMini's menu options and use the **Preset +** or **Preset –** buttons to select values for the current option.

Menu settings are retained if you turn the ContinuuMini off and on.

16.6.1. Menu Option 1: Preset Category and Preset Selection and Storage.

The default Menu option displays the preset number. Press both octave buttons together when the preset is displayed and you will enter Category selection mode. The leftmost digit in the preset will blink. Select either the **Preset +** or **Preset –** buttons to scroll through the Preset categories: 001 (user preset) to 1501 (Utilities category). When you reach a desired category, once again press the **Oct +** and **Oct –** buttons simultaneously to exit the Menu System. Now you can use the **Preset +** or **Preset –** buttons to scroll forward and backward through the current category's presets. You can in this manner continue to scroll to the next or previous category's presets as well.

The quickest way to traverse presets is to bring up the EaganMatrix editor which allows you to easily select them from the "Category" and "System Preset" pull downs – the same as with the continuum.

After selecting preset values 1..15 (User Presets), if you power the ContinuuMini off and on, the last selected User Preset will be maintained.



Storing a User Preset Using the 7 Segment Display

If you want to store the current preset being played to a user preset (be it a System Preset or one you loaded from disk to current preset storage using the EaganMatrix), when out of the Menu System, press the **Oct +** and **Preset +** buttons simultaneously. "**to**nn" will be displayed. While continuing to hold down the **Oct +** button scroll to the desired user preset location ("to01"..."to16") you want to store the preset to using the **Preset +** or **Preset –** buttons and then release the **Oct +** button. The System or loaded preset will be stored to that user location and if the EaganMatrix is connected, the name of the newly stored preset will appear in the user preset display.

Fast Preset Increment/Decrement

If you press the "+" button and then press "+" and "-' together you will fast increment through the presets to the max preset as you continue to hold both buttons. If you press the "-" button and then press "+" and "-' together you will fast decrement through the presets to the min preset (001).

16.6.2. Menu Option 2: Audio Dim

The second menu option is the audio dimming setting ("**di** n"). This allows for eight levels of audio attenuation where n can range from 0..7. The zero setting is unity level (no added attenuation). The default setting is 4. This function was included to guard against connecting headphones without realizing a preset may be set to a volume level that could be distressing. This also can be helpful when you are creating EaganMatrix presets and want to set max dim in case you program a sound that generates a massive burst of sound (easily done if you are new to EaganMatrix programming). Default = 3 (Maximum audio dimming). Minimum = 0 (full volume). Note that the EaganMatrix has an additional dim function that works independently from the ContinuuMini dim.

If you power the ContinuuMini off and on, the last Dim value set will be retained. Future firmware release will add additional Dim options.

16.6.3. Menu Option 3: Gain Setting

This sets the current preset's output gain that can also be adjusted in the EaganMatrix ("**ga** nn"). If you set the gain in the 7 Segment Display, the EaganMatrix gain dial will change accordingly, and vice versa.

As in the preset selection, press **Preset +** or **Preset –** to increment or decrement the gain and press both Preset buttons simultaneously to fast increment or decrement (depending on whether you last pressed the "+" or "-" button.

Note that there are only four values displayed and two are taken for display of "ga". If you go past 99, values 100..127 will be displayed as ".00" through ".27". Other options use this display code.

As always, press both Oct buttons simultaneously to exit the Menu System and retain the last Gain value set. Minimum value = 0, maximum value = 127. Default = 52.

16.6.4. Menu Option 4: Round Rate

This option sets the round rate (pitch quantization) of the preset ("**rr** nn"). If "rr" is greater than 0, the "RND" indicator in the 7 Segment Display will be lit (".). The round rate ranges from 0 (no rounding) to 127 (full rounding). At full rounding, pitches on the fingerboard will change in increments of a semitone (unless programmed differently in the EaganMatrix).

As you change values in the 7 Segment Display, the associated rounding dial in the EaganMatrix will be changed in tandem. Changes in the EaganMatrix Round Rate dial will be reflected in the ContinuuMini 7 Segment Display.

Note that a round rate of 1 has a special meaning (glacial rounding – see section 6.4). Minimum value = 0, maximum value = 127.

16.6.5. Menu Option 5: Round Initial

This menu option sets initial rounding ("**ri** n"). This allows you to instantly move to the closet semitone you press on the fingerboard, but after that the rounding will be determine by the round rate (from none to full). Default = 0 (Initial Rounding = Off), 1 = Initial Rounding is On.

16.6.6. Menu Options 5-8: Setting Controls i, ii, ii, iv

This menu option ("**b[1..4**] nn") allows you to set the designated Control to a value. In practice, using the EaganMatrix or an external MIDI controller will be a much better and faster way to dynamically change Control settings during performance or set the pedal to control a desired Control. Minimum value = 0, maximum value = 127.

Examples:

"b110" indicates Macro Controller i is set to MIDI value 10

"b237" indicates Macro Controller ii is set to MIDI value 37

"b3 0" indicates Macro Controller iii is set to MIDI value 0 (minimum)

"B4.27" indicates Macro Controller iv is set to MIDI value 127 (maximum)

16.6.7. Menu Option 9: Effect Level

This menu option ("**EL** nn") allows you to set the Recirculator Mix level (amount) control from 0 (no Recirculator effect) to 127 (Max Recirculator effect). The associated EaganMatrix dial is affected and that dial also sets the 7 Segment Display effect level.

16.6.8. Menu Option 10: Effect Time

This menu option ("**Et** nn") allows you to set the Recirculator Time from 0 (none) to 127 (max reverb time). The associated EaganMatrix dial is affected and that dial also sets the 7 Segment Display recirculator time.

16.6.9. Menu Option 11: Pedal Setting

This menu option ("**PEd** n") allows you to set the Pedal control association. Values are:

- 0 = Octave control (default)
- 1 = Macro Controller i
- 2 = Macro Controller ii
- 3 = Macro Controller iii
- 4 = Macro Controller iv
- 5 = Output Level
- 6 = Sustain
- 7 = Sostenuto
- 8 = Advance Preset

The associated EaganMatrix control is enabled when setting through the ContinuuMini's display and setting the control in the EaganMatrix will set the appropriate pedal setting on the ContinuuMini. Note that the EaganMatrix contains more pedal options than are supported in the 7 Segment Display. If any of the unsupported pedal options are set in the EaganMatrix, the ContinuuMini's Pedal option will be defaulted, normally to 6 (Sustain).

16.6.10. Menu Option 12: i2C Setting

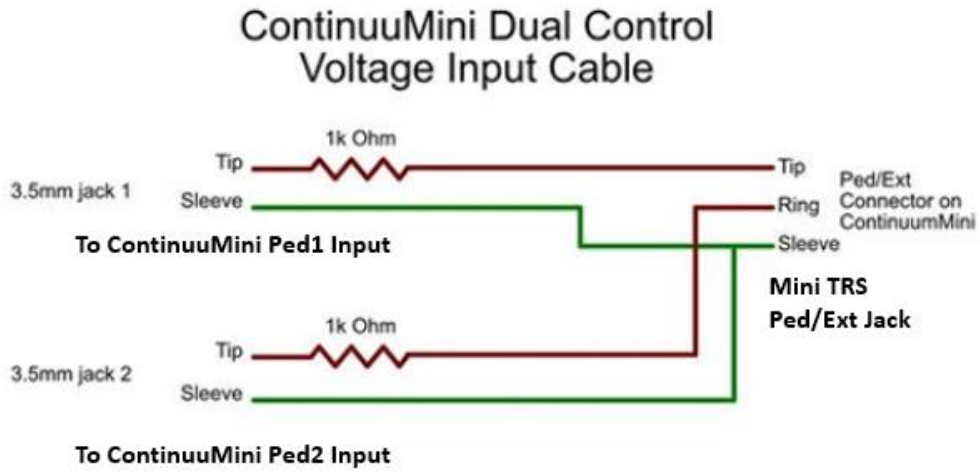
This menu option ("**i2c** n") sets the Ped/Ext jack setting. Values are:

- 0 - Jack is for a pedal. Yamaha pedals, and ones that are electrically equivalent, are autodetected (See Pedal Jack section)
- 1 - Jack is for i2c. For now CVC or uCVC and possibly more devices in the future. See CVC connection information below.
- 2 - Jack allows two non-audio rate control voltage (CV) inputs to be used by the ContinuuMini for controlling certain parameters of a preset, at this time through Ped1 and Ped2 control. Requires a custom made dual CV cable which can be purchased from Haken Audio or you can make your own (see below). This cv-in-cable allows you to use a Eurorack (or other format) sequencer or LFO to control timbre changes or do other things you would otherwise do with an expression pedal or a damper pedal. Ideally scale your input voltage in the +/- 2.5V range, though the circuit has headroom up to +/- 3V. Try and avoid higher voltages (for example you can use a mixer to scale a +/- 5V or +/-10V CV signal into the desired range). You may also need to offset a unipolar CV signal depending on the sound design programmed).

Note: The "Ext" indicator will be lit in the display if "ic2" is set greater than zero. If you set "ic2=1" and do not connect to a CVC through the "Ped/Ext" jack, the EaganMatrix will issue a "Turn on CVC or Disconnect it" warning:

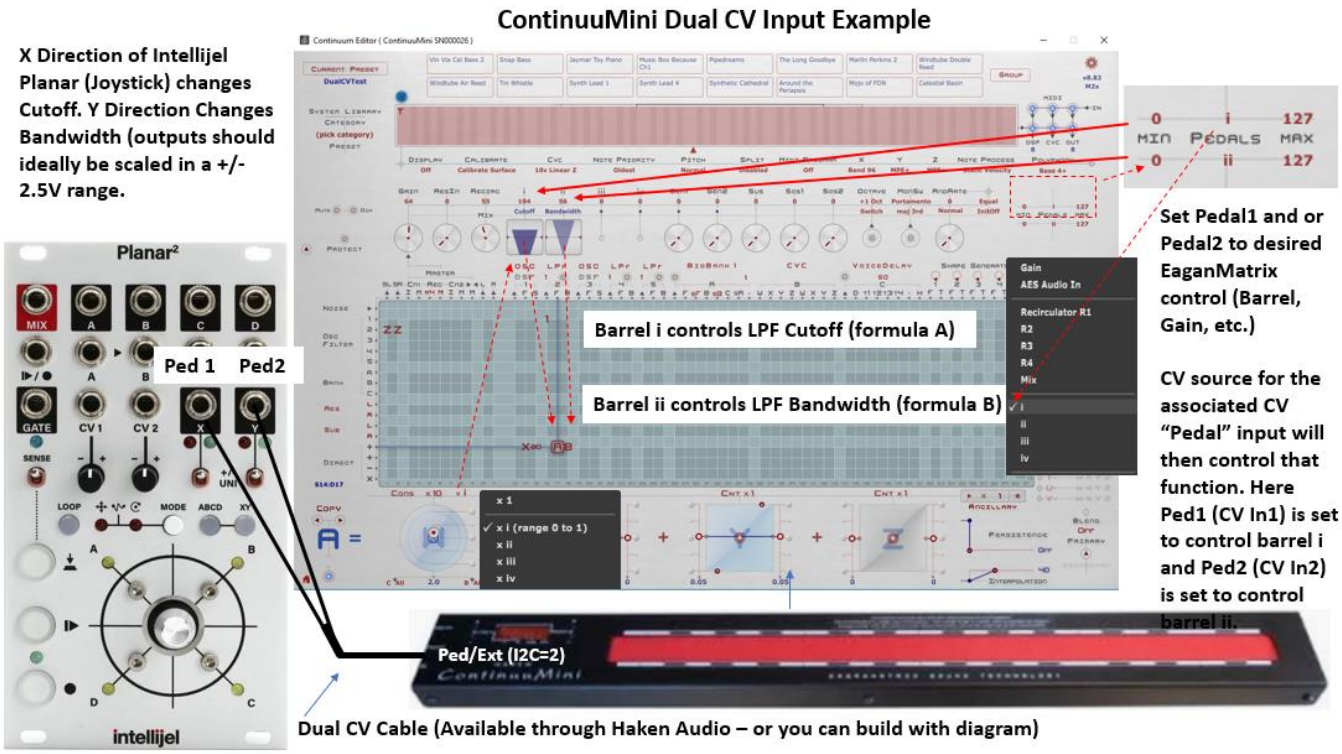


If you do not want to order a dual CV cable through Haken Audio, the specification for the custom cable to connect two CV inputs to the Ped/Ext jack is as follows. This diagram assumes standard Eurorack connectors but two 1/4" to Mini TRS is also an option.



Once connected and the i2C setting is set to "2", the EaganMatrix Ped1 and Ped2 controls can be used as they normally would in an EaganMatrix program, only now they might be associated with a CV controller input. Remember, when I2C is set to "0", a Yamaha pedal (or other as previously defined here) is assumed to be connected to the Ped/Ext jack and in this case only Ped1 is active in the EaganMatrix.

Here's an example of how the Dual CV input control might be used in practice. Perhaps I want to use an Intellijel Planar(2) Joystick to have the X axis and Y axis control respectively the cutoff frequency and bandwidth of an OSC fed Low Pass Filter, programmed in the EaganMatrix. You would connect the CV outputs from the Planar (ideally scaled +/- 2.5V) using the dual CV custom cable to the Ped/Ext input jack of your ContinuuMini which has the Ped/Ext setting set to I2C="2" (this setting was not used in earlier ContinuuMini releases). Then you would assign Ped1 and Ped2 to Controls (i, ii, etc.) using the pedal pulldown options. Then set formulas tied to those Controls and perhaps associate those formulas with filter cutoff and bandwidth of the LPF. If things are set up right, you can then play the ContinuuMini with one hand and manipulate the joystick with the other to dynamically change your filter settings through Eurorack CV control. Note that this function is intended for CV control signals, not audio rate signals (which will not harm anything but will alias) . This lets you have direct control of pedal associated EaganMatrix functions through CV.



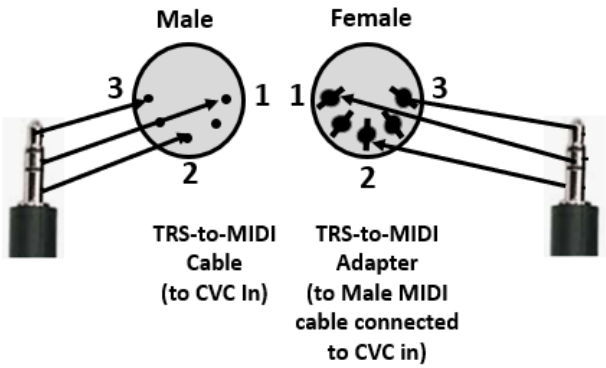
16.6.11. Menu Options 12: 7 Segment Display Brightness Setting

This menu option ("**brt** n") sets the brightness of the 7 Segment Display from 0 (min) to 3 (max). On powering the ContinuuMini off and back on, the previous brightness setting will be retained. The default setting is 3 (max brightness).

16.7. CVC Connection and Setup (Used with "I2C" setting = 1)

The CVC connection requires a special cable or adapter which you can make or purchase from Haken Audio.

If you want to make your own CVC cable or connection adapter, which you will connect to your CVC with a 5 pin populated male-to-male MIDI cable. The CVC uses unused MIDI pins 1 and 3 for I²C connections in addition to reusing the MIDI shield (Pin2). Here are the Mini TRS to DIN wiring connections:



In one case you can use a Mini TRS to Female MIDI DIN connector to create the adaptor. The adaptor is useful if you already have a Continuum and you want to easily switch the CVC connection from one to the other by just changing the MIDI cable from Continuum to ContinuuMini adaptor. It will be used as follows with the ContinuuMini:

Custom ContinuuMini CVC Cable Adaptor



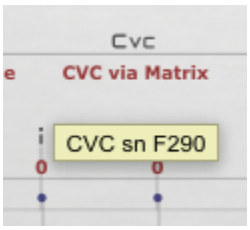
If you desire you can also use the same pinouts (1-3 reversed for Male connection) to create a cable that will connect directly from your ContinuuMini to the CVC Input. In this case you will use a MINI TRS on one end of the cable and a Male MIDI DIN on the other. The cable you create should be no more than 10 feet long.

Custom ContinuuMini CVC Cable

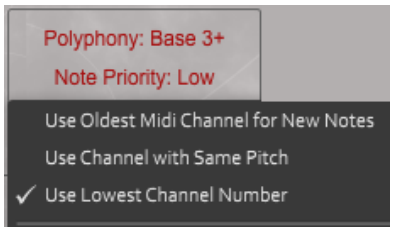


To test the CVC setup:

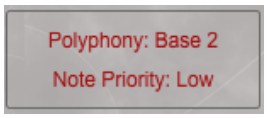
- Set the "i2c" menu option = 1
- Connect a MIDI cable from CVC out to the ContinuuMini's custom cable's Female DIN output connection. The MIDI cable you use must contain all five pins terminated (as some MIDI cables only connect the pins MIDI requires (2, 3 and 4), but the CVC uses pins 1, 2 and 5.
- Connect the TRS end of the customer cable to the Ped/Ext port of the ContinuuMini
- In the EaganMatrix, select preset CVC: "CVC 10V Linear Z" (assuming you are connecting to a Eurorack modular system. See other settings if you are connecting to a Buchla or Voyager, etc.
- Verify that the EaganMatrix sees the CVC by hovering your mouse over the CVC section. I should display a message indicating the CVC is connected or not. If the CVC is connected properly, a message similar to the following will be displayed:



- It is suggested that you set the Note Priority (also referred to as Channel Priority in this manual) to Low to test (Use Lowest Channel Number). The ContinuuMini can only play two notes at a time but it will cycle through all MPE channels to max polyphony of the preset if you set a Note Priority to Oldest.



- If you want to play duo-phonically and send two CVC channels to your modular make sure your preset is not set to Polyphony Base 1. It must be set greater than 1 for sending two CVC channels (though it will only send a max of two channels regardless of how much higher you set polyphony).



- Connect up the CVC WXYZ outputs as you desire for channels 1 and 2 (the setup above will only play duo-phonically on two channels). Note for example that if you kept the default Note Priority Oldest setting in the EaganMatrix and set polyphony of the preset to 4, all four channels of the CVC would output as you play (but only two channels at any time).
- Play your ContinuuMini and you should both see the lights on your CVC activate and the appropriate channels engage and the WXYZ CV outputs should be controlling your modular or other CV controlled device as you expect. Note that Y changes very quickly from 0V to 10V (with the test setting described here). When you lift your finger, Y will remain at whatever voltage output setting it was at when you broke contact with the playing surface. Z will always return to zero when you lift your finger (unless you have programmed Y and Z to do other things in the EaganMatrix for a preset).

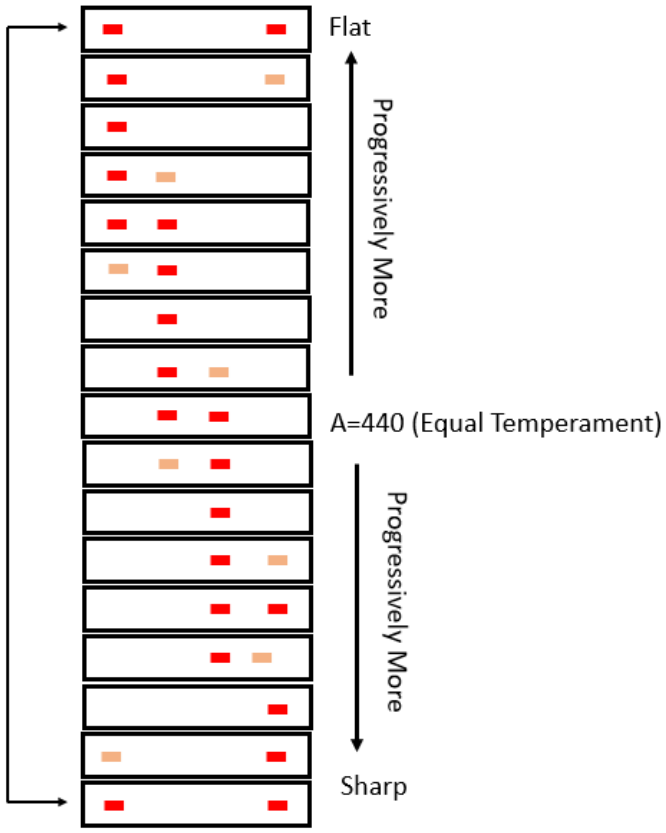
16.8. Pitch Reference

Once you start playing the ContinuuMini, the display changes from showing the current preset to pitch display mode. A series of hashes are displayed indicating how true the finger placement is to "correct" pitch. If you are playing monophonically the pitch display will appear in the middle of the display. If you are playing two voices, the pitch display of the lower voice will appear at the bottom of the seven segment display and the pitch of the upper voice will appear up top.

The pitch display is interpreted as follows:

Two bright hashes in the middle of the display indicate the tone is perfectly in tune to Equal Temperament, A=440 Hz. The reference dashes are in absolute cents (where 4900 cents are A440, or if you prefer Midi note numbers over cents units, 49.00 is the Midi note number for A 440).

The hashes move to the left or right progressively dimming and brightening following the following scheme as you slide from note to note, basically giving you 1/8 of a semitone resolution on each side of the note's center. This example assumes the second A from bottom on the MINI is being played, A=440 Hz (MIDI note 49, which internally maps to 4900 Cents from MIDI 0).



The display is most useful when playing slowly to get accustomed to the playing surface. If you set rounding to full, you will notice that you get a consistent set of bright hashes in the middle as pitches are always corrected from note to note, not matter where you press in the note's X axis.

A "note" template is stenciled on the ContinuuMini for assisting in playing. Some may choose to ignore this and just concentrate on the playing surface, especially if you are interested in microtonal performance. Pianists will need to get used to this a bit as each note on the Mini is the same distance from the last/next.

16.9. Continuum vs. ContinuuMini Presets and Usage

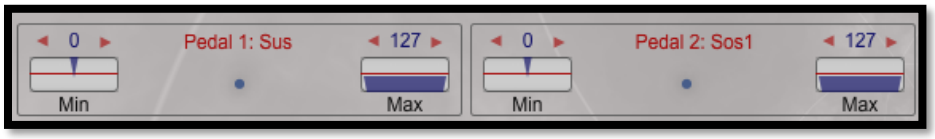
Almost all of the system presets that are part of the ContinuuMini's firmware release are also part of the Continuum's firmware. However a number of these have been optimized for use on the ContinuuMini, for example adjusting Y due to its reduced range of motion versus that available on the Continuum. If you have a Continuum and a Mini, you may notice that not all presets sound exactly the same on the two instruments. This is usually due to differences in how Y shapes a sound. On the ContinuuMini, because the range of motion is compressed, you may hear that changes in timbre (or other parameters based on Y) occur much quicker. You may want to go into the EaganMatrix for some presets and adjust Y motion to best suit your ear.

Another difference between the ContinuuMini and the Continuum is that the Continuum has more precise sensing technology. If you are comparing how the same preset responds to touch, you may perceive that the articulation profile of the Continuum is slightly different than that of the Mini. Nothing is wrong. These are two different instruments with different playing techniques and different response.

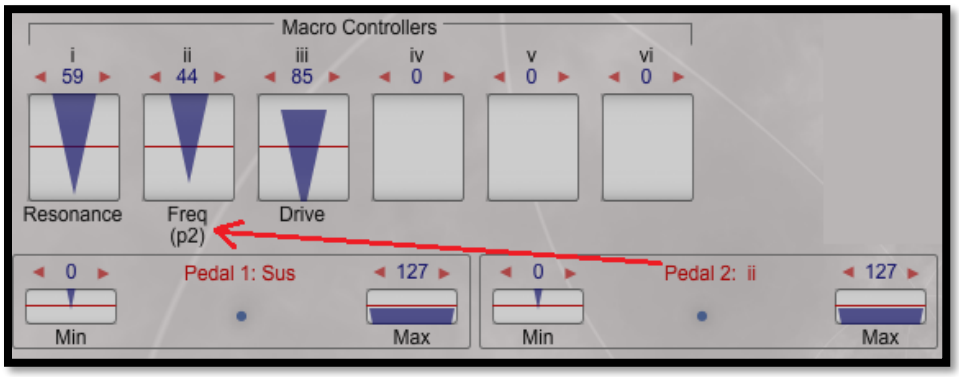
16.10. Use of Pedals and System Presets on the ContinuuMini

The ContinuuMini supports a single pedal jack whereas the Continuum supports two. Because the ContinuuMini presets are based on Continuum versions, you will often see two pedal assignments defined.

The default pedal assignment used in the "Utilities/Empty" preset assigns Pedal#1 to Sustain (Sus) and Pedal #2 to Sostenuto1 (Sos1). You can set the first pedal to some other control if you like (for example Control i) but setting Pedal2 will have no effect on the ContinuuMini.



Many presets will define a control for Pedal #2 as they are carried over from Continuum definitions. You will have to decide which control you will assign to Pedal #1. For example, the following preset "Utilities/TheLadder" defines Pedal #1 as the default Sustain and Pedal #2 is set to Macro Controller ii (defined in this preset as "Freq").



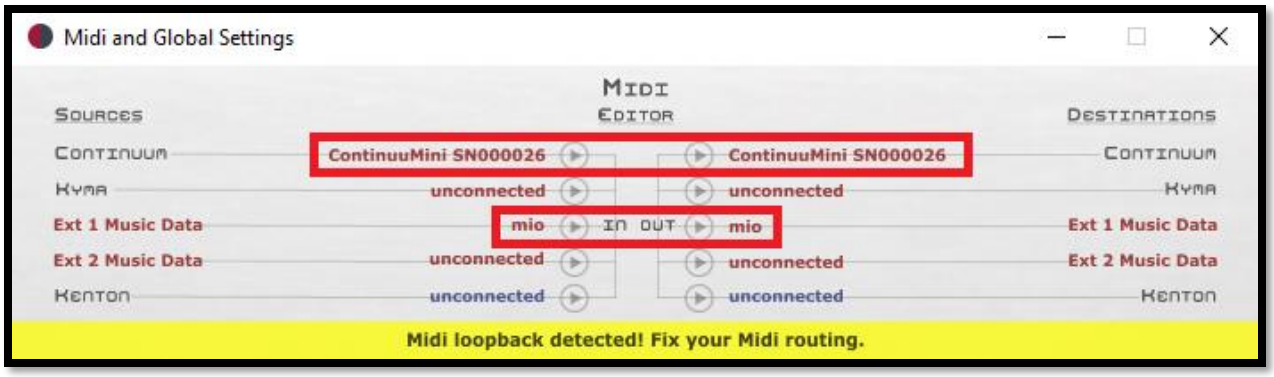
If you prefer to use your pedal to set Macro Controller ii and not sustain, you can set it to Ped1 with a pedal option or go into the EaganMatrix and make the assignment.

16.11. Error Codes

The ContinuuMini can display a few error codes that are valuable to know for troubleshooting:

ERRP – This indicates that the USB device you are using to power the ContinuuMini does not put out enough power. It must supply at least 500 milliamperes.

ERRL- MIDI loopback detected. Check your MIDI setup to make sure you are not creating a MIDI loop. If you are using a Continuum with the ContinuuMini, make sure you do not have them both set as Continuum and External devices as below. This example, where the Mio is the MIDI interface connected to the continuum, will cause an ERRL Midi loop – and the EaganMatrix will also create the warning:



ERRF – A finger has been detected on the playing surface during power up. Make sure when you power the ContinuuMini that it completes its bootup and the preset number is visible before playing.

Other Codes – If you receive any other error codes, it likely indicates an unexpected problem. Note the code and contact Haken Audio if resetting the ContinuuMini does not solve the problem.

16.11.1. Factory Reset / Restoration

Note: This operation should only be performed if there is an issue with the ContinuuMini that indicates a factory reset is required. Please consult Haken Audio before performing a factory reset.

If the ContinuuMini does not upgrade firmware correctly and appears to be hung on repowering (possibly displaying a "0") or in an unexpected state, a Factory Reset may be required. To restore the ContinuuMini to its default Factory configuration

- Remove USB power from the ContinuuMini
- Exist the Editor if it is running
- Depress the **Oct +** button and while depressed reconnect USB power to the instrument
- Try Reconnecting to the editor. Hopefully you will connect and get the solid blue LED in the editor. Note the firmware version.
- At this point the ContinuuMini will likely be restored to a previous firmware version and will require an upgrade to the current desired version using the normal upgrade process. Never try and restore a ContinuuMini to a firmware version before 8.71.
- After restoration to the desire firmware version, Factory Recalibration may be required if the instrument does not perform as expected (for example you play a note and hear two notes).

16.12. Using the ContinuuMini in Parallel with a Half or Full Size Continuum

You can have a Continuum and a ContinuuMini connected to your computer at the same time but the EaganMatrix will only detect one. If you have both connected, the ContinuuMini will be defaulted as the connected device unless it was previously manually set to detect the Continuum.

You cannot at this time without a special configuration procedure (that may not work for all MIDI interfaces) run two separate instances of the EaganMatrix on a single computer, one connected to the Continuum and the other to the Mini. You can, however, easily switch the EaganMatrix between the two instruments for control and programming.

Assuming you are connected to the ContinuuMini and want to switch to connect to the Continuum, bring up the "Midi and Global Settings" window and in the Source and Destination fields replace the ContinuuMini device with the MIDI device you have connected to your Continuum (in this case a "MIO" interface).



In a few seconds the EaganMatrix firmware version will change to that supported by the Continuum (which for some releases may be the same as for the ContinuuMini). Any operations you perform in the EaganMatrix at this point will now be recognized and performed on by the Continuum.

Once manually switched to the Continuum device in this manner, the editor will thereafter default to the Continuum. To switch back to editing the ContinuuMini, go back to the "Midi and Global Settings" window and replace the Continuum MIDI device with your ContinuuMini device. In a few seconds the version should change back to the ContinuuMini version and you are back to editing the Mini.



16.13 Playing the ContinuuMini from an External MIDI Controller Through EaganMatrix

If you would like the play the ContinuuMini either with an External MIDI controller/keyboard (or even along with another MIDI controller) and you are connected to the EaganMatrix perform the following steps.

1. Make sure your ContinuuMini is connected to your computer's USB port (or USB hub if you are using one).
2. Exit the EaganMatrix if it is running (the EaganMatrix will not recognize new MIDI controllers added to your system while it is running).
3. Connect your MIDI USB controller/keyboard to the PC's USB connection (or USB Hub if you are using one). Verify the device is seen by your computer and any drivers are loaded that might be required. In this example we will use a Linnstrument, which is autodetected.
4. Bring up the EaganMatrix.
5. Go to the Cogwheel at the top right of the screen and select the "Midi and Global Settings" pull down option.
6. Up to two External device connections are allowed ("Ext1" and "Ext2"). These will initially be defined as "Unconnected" if they were not previously set to a device.



7. Select the USB device you have connected from the pull down list for Source, Destination or both depending on if you want to pass MIDI data to the ContinuuMini (source) or have the ContinuuMini pass data to your device (Destination) or both. If you just want to play the Mini from an external controller, only the Source field is required.



8. Select an external data type. Each external control supports three data filtering options.
    a. **Music Data** – This allows Music data to pass to/from the selected device. This is normally data affecting the MIDI notes and durations you will be playing, pitch bend data, pedal data, octave transposition and even Controls (i, ii, etc.). If you only want to play the Mini's sound engine from your external source and do not want to risk changing presets, choose this option.
    b. **Config Data** – This allows EaganMatrix specific configuration data to be sent to/from the ContinuuMini along with other configuration information such as preset selection. If you only want to connect an external controller to change presets, choose this option.
    c. **All Data** - This allows both Music data and Config data to pass through to/from the external device. If you want to use both MIDI note and MINI configuration information choose this option. If you want full Continuum control, choose this option.

9. From here you will want to determine what kind of external MIDI controller/device you are using. Does it need to be defined on Channel 1 only? Is it an MPE device? Will you need to set up the EaganMatrix to use CC74 for Y detection or Channel 11 for Z, etc. Read the Section below for more information. You will want to match the MIDI configuration of the ContinuuMini to the MIDI device you are attaching for control

10. Finally remember the ContinuuMini is limited to 8 voices. In MPE/MPE+ mode it accepts data on Midi Channels 2 to 9. In non-MPE modes (for example Z is set to CC7), it accepts data on Midi Channels 1 to 8. Also if you set Polyphony to less than 8 (or 4+), you will have to limit the midi channels you send to match the polyphony.

16.14. Monophonic vs. Duophonic vs. Polyphonic MPE ContinuuMini Operation

If you have never owned an MPE MIDI instrument there are a few things you need to know to understand how the ContinuuMini is receiving (for using an external MIDI controller) and transmitting MIDI data (for controlling other MIDI instruments or recording in a DAW).

The ContinuuMini can never transmit on more than two MIDI channels at a time when played, however, depending on the polyphony set for the current preset it can receive and transmit on up to eight MIDI channels. The Continuum for example can transmit eight simultaneous MIDI channels if set to Base Polyphony 8 if you press eight fingers at the same time. No matter how many fingers you press on the ContinuuMini, it will only transmit a maximum of two MIDI channels (if polyphony is set greater than 1). However, if you connect an external MIDI keyboard to the Mini, it is possible to play up to eight simultaneous notes using the Mini's sound engine depending on the polyphony set.

The ContinuuMini uses a 2x DSP processor and will display M2x under the Cogwheel. It will support Base Polyphony and Expanded Polyphony with the following limitations as it cannot be further expanded.

ContinuuMINI Preset Polyphony	Max Number of MIDI Input Channels Accepted and Output Channels Processed	MIDI Input/Output Channels (Channel #) Processed	Number of Sound Engine Voices Played (complex presets may force reduced polyphony to be set)	Max Number of ContinuuMini Voices Playable on the Mini
Base 1	1	1 (or 2 MPE)	1	1
Base 1+	2	1-2 (or 2-3 MPE)	2	2
Base 2	2	1-2 (or 2-3 MPE)	2	2
Base 2+	4	1-4 (or 2-5 MPE)	4	2
Base 3	3	1-3 (or 2-4 MPE)	3	2
Base 3+	6	1-6 (or 2-7 MPE)	6	2
Base 4	4	1-4 (or 2-5 MPE)	4	2
Base 4+	8	1-8 (or 2-9 MPE)	8	2
Base 5	5	1-5 (or 2-6 MPE)	5	2
Base 5+	8	1-8 (or 2-9 MPE)	8	2
Base 6	6	1-6 (or 2-7 MPE)	6	2
Base 6+	8	1-8 (or 2-9 MPE)	8	2
Base 7	7	1-7 (or 2-8 MPE)	7	2
Base 7+	8	1-8 (or 2-9 MPE)	8	2
Base 8	8	1-8 (or 2-9 MPE)	8	2
Base 8+	8	1-8 (or 2-9 MPE)	8	2

A plus sign after the Base Polyphony numeral indicates expanded polyphony is set for that preset which doubles the polyphony.



While a Continuum can support up to 24 voices on fully expanded unit, the ContinuuMini supports a maximum of 8 MIDI channels. Thus, a "Base 1+" preset will allow you to send data in on two MIDI channels and the Mini will play duo-phonically outputting on up to two MIDI channels. "Base 2+" will process on up to four MIDI channels, etc.

MPE instruments normally expect MIDI input channels to start on Channel 2 (Channel 1 being reserved) and will start outputting MIDI data on Channel 2. The ContinuuMini is an MPE instrument and will operate in this mode. However, the Mini's MPE modes also will accept polyphonic MIDI input data on Channel 1 (Channel 1 mode). This allows a standard MIDI keyboard that does not support MPE to be used with the ContinuuMini. In this case, all polyphony should be transmitted on Channel 1 with the following assumptions:

- MPE/MPE+ Channel 1 operation assumes Polyphonic Pressure is sent for Z pressure if the controller supports it but it will process standard MIDI keyboard velocity. It will support up to eight channels/voices based on the Base polyphony setting. When playing, MPE mode will always output Aftertouch and MPE+ mode will output Polyphonic Pressure. Output will always be on channels 2..Max Polyphony+1 even though polyphonic input is accepted on channel 1. Note Process should be set to "Dynamic" if you are recording the ContinuuMini MIDI data and you cannot process aftertouch or polyphonic pressure. If note process is set to its default of "Static", the output MIDI velocity of all notes will be set to 127.
- If MPE is not set and Y/Z are set to explicit CC values (defaulting Y=CC74, Z = CC11), the pressure CC specified (default CC11) should be used and the MIDI channels processed start on one, not two. For example if you set "Base Polyphony 1+", the ContinuuMini will play two incoming voices on channels 1 and 2 but will not recognize polyphonic input on Channel 1.

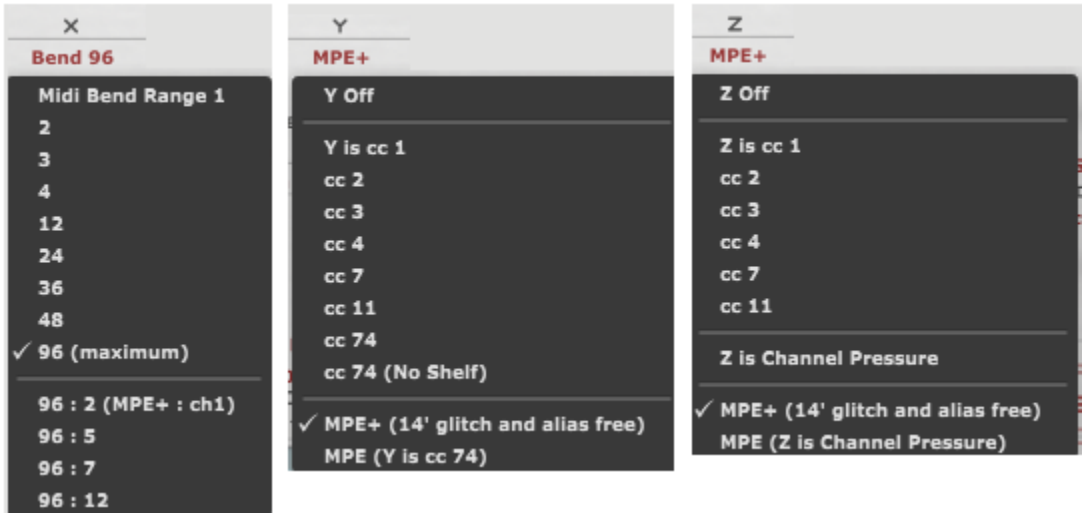
16.14.1. Note Priority

Because the ContinuuMini plays a maximum of two notes, it is advisable to set Note Priority to "Low" if you are recording in a DAW. Depending on if you are playing monophonically or duo-phonically, MIDI output will always be on channels 1 and 2 (if X/Y set to a CC value) or 2 and 3 (if X/Y is set to MPE/MPE+). You can thus predict the channels you are outputting on. If you set Note Priority to its default of "Oldest" you will cycle through channels every time you play a note through your maximum polyphony and you will not be able to predict what channels you are playing on. See section 10.6.

16.14.2. Configuring Bend, Timbre (Y) and Pressure (Z) Control

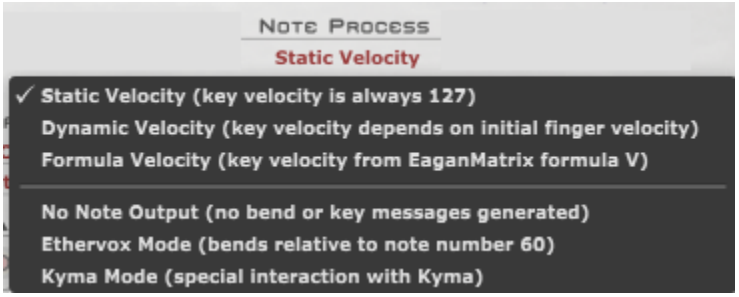
X (Bend), Y (front to back) and Z (pressure) configuration works as follows:

Bend can be set independently from the X or Y settings. If MPE or MPE+ mode is set for Y/Z bend is limited to 12, 24 36, 48 or 96 semitones assuming the MPE device playing the ContinuuMini is set to the same bend value. If Y/Z are set to a specific CC value (for example: Y=74/CC=11), all Bend range selections are then available. If MPE/MPE+ is set and you are playing the ContinuuMini with a Midi controller in Channel 1 mode, the 96:2, 96:5, 96:7 and 96:12 options should be used to map to your bend device. If ether Y or Z are set to MPE+ or MPE mode, both will be set to that value. If either Y or Z are set to a specific MIDI channel, the other will be set to its CC default (Default Y=CC74, Default Z=CC11) – though they can be set to specific values at this point as noted in the option list.



Polyphony for the ContinuuMini presets you create should be set from 1 to 8 without expanded polyphony or 1 to 4 with expanded polyphony (as max polyphony is 8). Also note that if MPE+ or MPE is set for Y/Z, channels 2 through max polyphony +1 will be used. Channel 1 in this case is reserved for control use. If Y/Z are set to specific CCs (Y=CC74, Z=CC11 for example), midi channels 1 through max base polyphony will be used.

Finally MIDI operation is also influenced by the EaganMatrix Note Process Setting:



As noted, if you are using MPE.MPE+ Channel 1 playing mode and your device is not an MPE device, you likely want to set Note Process to Dynamic to allow the ContinuuMini to process Midi Velocity as expected.

16.14.2. Channel and Priority Processing Preservation on Preset Loading



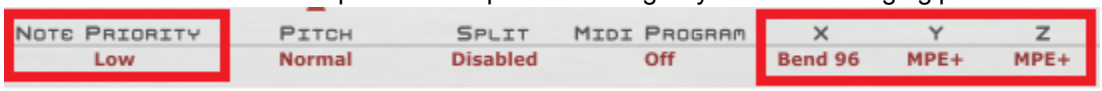
Normally, the X/Y MPE/MPE+ setting and Channel priority (as well as other settings such as rounding) are stored per preset. If you go to Midi and Global Settings in the Cogwheel options, you can set the Preset Loading option from the default of "Replace" to "Preserve". Replace will replace the options using whatever values are stored with the preset.

This option is very useful if you are using Channel 1 processing mode (Y/Z set to MPE+ or MPE) and you want to quickly move between presets and insure you are always going to stay in that mode (use "Preserve Midi Encoding"). Use "Preserve Surface Processing" to preserve Note Process. This is detailed above in section 10.22.

16.15. Playing the ContinuuMini from the Continuum (or another MPE controller)

While the ContinuuMini cannot be used as a Continuum DSP extension (like an iCEE or xCEE) it is easy to play the ContinuuMini from the full or half size continuum with up to 8 voice polyphony. This will allow you to use the ContinuuMini to augment your presets with other presets that will play with them if you mix the outputs of both instruments. Follow these steps for use with EaganMatrix:

- Bring up the EaganMatrix connected to the Continuum. Select the preset you wish to play on the Continuum along with a preset you will play on the ContinuuMini (if you only want to play the Mini from the Continuum, it is suggested you select the Empty preset so no sound will be generated from the Continuum).
- In the Continuum preset, set Y/Z to MPE+ and Bend to 96 and Select a desired Note Priority (you can set Midi and Global "Preserve" options to keep these settings if you will be changing presets on the continuum).



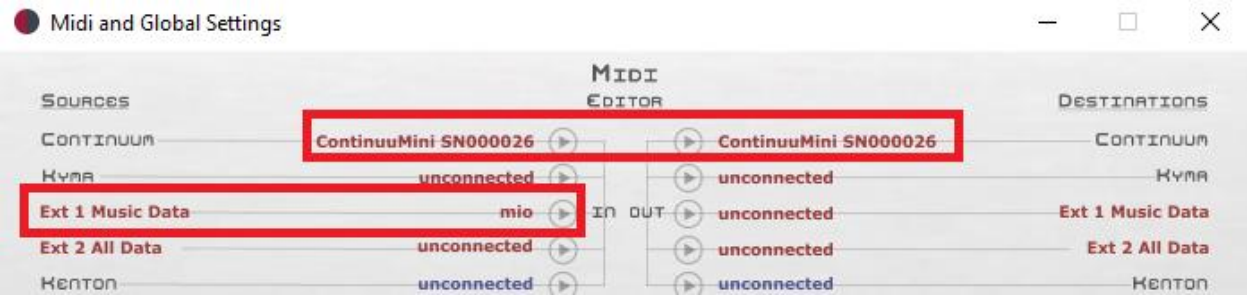
- Match polyphony as best you can. Select a polyphony for the preset you wish to play on the ContinuuMini. Here is where there may be a conflict. You are setting the preset for play from the Continuum, but you also want to play the ContinuuMini. If you have a preset of Base 4 set on the Continuum for example, you will only be able to play four of the eight possible voices on the preset you are playing on the Mini. Be aware of this if you are playing and you do not hear the number of voices you expect being played on the ContinuuMini.

- Save that preset to a user position on the Continuum if you like for recall later so you do not have to make any more modifications.

- Exit the editor for the Continuum (if you are using the old editor) or change the input source to be the ContinuuMini if you are using the new integrated editor.

- Make sure the ContinuuMini is connected to the editor (blue dot on).

- Go to MIDI and Global Settings and select the Continuum's MIDI controller as the External Source and make sure it is set to Music Data (as you do not want to pass Continuum configuration data to the ContinuuMini). In the case below, the MIO interface is the Continuum's interface:



- Select a preset on the ContinuuMini you want to play on the Continuum and make sure that is also set to Y/Z MPE+, Bend=96 and to be safe set that preset to the same Note Priority you set in your Continuum controlling preset.

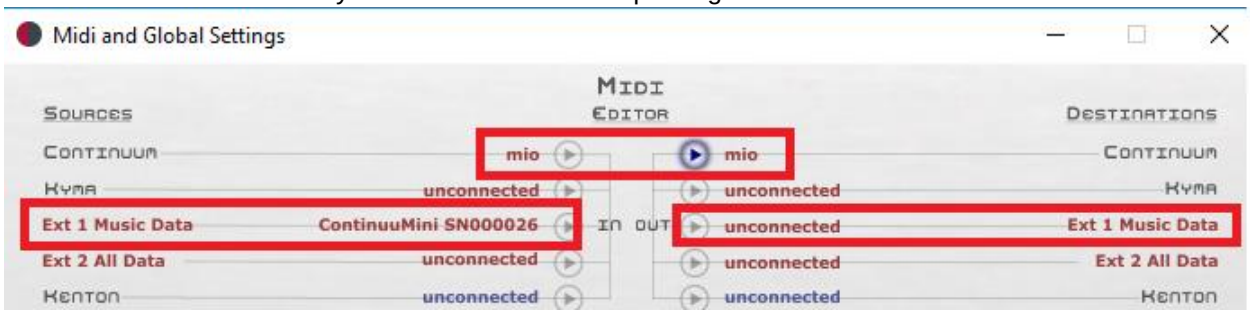
- You should now be able to play the ContinuuMini from the Continuum, however the Mini is now a "satellite" of the Continuum and for best effect, you should not try and play the ContinuuMini while you are playing the Continuum controlling the MINI or notes may cut out or distort as they are both playing on the same channels.

- Note that the Continuum will output on Midi channels greater than 9 if Polyphony I set higher and you are in default Priority=Oldest mode. This will cause cutouts in the sound when playing the ContinuuMini as it can only accept data on channels 2-9 in MPE/MPE+ mode or channel 1-8 in non-MPE mode (for example Z is set to CC7 or CC11). In this case it is best to set the Continuum to Priority=Low. This will guarantee you send on channels 2-9 or 1-8 (depending on MPE mode) as long as you play with Polyphony 8 or less (most do not use more than 8 finger polyphony when playing). Of course if your preset is set to a lower polyphony, you will have to adjust the Continuum output to match the max polyphony of the Mini or you will get cutouts in the sound. The same holds true when playing from any other MPE controller like Linnstrument or Roli.

16.16. Playing the Continuum from the ContinuuMini

It is possible to play the Continuum from the ContinuuMini, though likely if you have them both you will be playing the Mini from the Continuum as described above. To play the Continuum from the Mini:

- Bring up the Haken Editor by replacing the ContinuuMini Source/Destination with the interface of your Continuum (MIO in this case).
- Select a preset on the Continuum you want to play. Set Y/Z to MPE+.
- In the External Data Source select your ContinuuMini as Source device – but make sure to leave the Destination unconnected or you will create a MIDI loop and get an error:



- Make sure your ContinuuMini is playing a preset that sets Y/Z to MPE+ and bend is set to whatever will be set in the Continuum preset being played, likely 96. Set the Continuum preset to match.
- You should now be able to play the Continuum from the Mini.

16.17. Playing the ContinuuMini from Other MPE/non-MPE MIDI Controllers through the EaganMatrix

Here are some use cases for MIDI operation that might be useful if you are trying to use the ContinuuMini with external Devices and DAWS:

Use Case 1: Using a Non MPE-based MIDI Controller/Instrument to play the ContinuuMini (Standard UBS MIDI keyboard for example).

- Connect MIDI instrument to computer USB port
- Verify it is recognized by your operating system (if not a class compliant USB interface and drivers need to be loaded)
- Bring up EaganMatrix
- Select the Device in MIDI and Global Settings as External Source (set as "Music" if you just want to control notes or "All" if you also want to control preset functions with knobs or dials)
- Set MIDI Instrument to play on Channel 1
- Set EaganMatrix Preset's Y/Z to "MPE+" (if you set Y or Z to a CC you will not be able to play polyphonically). Set Midi and Global Setting Preset Loading to "Midi Encoding Preserve" if you want to guarantee you preserve Channel 1 processing as you change presets.
- Set EaganMatrix Preset's Bend = 96:N, where N=2, 5, 7, or 12 semitones. A standard MIDI keyboard's bend wheel will go to the max bend you set, so if you set 12 you will be able to bend up/down an octave, etc. If your MIDI controller has a bend setting, set to the same value.
- If possible set your modulation wheel to CC74 (or some other control you might have for that purpose if you want to control Y while you play). However, the EaganMatrix will interpret the default CC1 as Y if you do not set to 74 (but the EaganMatrix will not display Y changing in the latter case).
- You should now be able to play the ContinuuMini polyphonically using standard MIDI Velocity for dynamic control.
- If you have any dials or push buttons that can be set to CCs, consult Chapter 15 for proper settings to be able to control preset functions such as Macro Controllers (i,ii,iii,iv,v,vi), Recirculator, etc.

Use Case 2: Using a Semi MPE-based MIDI Instrument to play the ContinuuMini (that supports Aftertouch but perhaps not MPE Channel per Note operation – such as the CME XKey37).

- Connect MIDI instrument to computer USB port
- Verify it is recognized (MIDI class compliant devices should be recognized automatically)
- If your device needs configuring in a software tool do that first as you may not be able to run the tool once the device is connected to the EaganMatrix.
- Set Aftertouch to Polyphonic Key Pressure (so each key can react independently to pressure)
- Set other aftertouch and key sensitivity, velocity curves, etc. as desired if you can. In the XKey37 case, set "First Aftertouch value is derived from Velocity".
- Save setting to your MIDI controller.
- Bring up EaganMatrix
- Select the Device in MIDI and Global Settings as External Source (set as "Music" if you just want to control notes or "All" if you also want to control preset functions with knobs or dials)
- Set MIDI Instrument to play on Channel 1
- Set EaganMatrix Y/Z to "MPE+"
- Set EaganMatrix Bend = 96:N, where N=2, 5, 7, or 12.
- You should now be able to play with Polyphonic Aftertouch on Channel 1

Use Case 3: Using an MPE-based MIDI Instrument to play the ContinuuMini (such as Linnstrument or Roli Rise as examples of settings to use for other MPE controllers).

- Connect MIDI instrument to computer USB port
- Verify it is recognized (MIDI class compliant devices should be recognized automatically)
- If your device needs configuring in a software tool do that first as you may not be able to run the tool once the device is connected to the EaganMatrix (for example the Roli Rise the Roli Dashboard for configuration as the Linnstrument can be set manually on the fly at any time).
    - On Linnstrument:
        - Set Midi Mode = Channel Per Note
        - Set View = Per Note Channels
        - Set Channels = 2..Max Polyphony+1 (as set in your desired Mini preset)
        - Set Pitch = On
        - Set Timbre/Y=C74
        - Set Loudness (Pressure) Z = Chan Pres (Channel Pressure)
        - Set X Bend = 12, 24, 36, 48 or 96 (suggest 24)
    - Roli Rise:
        - Bring up Roli Dashboard
        - Set MIDI Channel Mode = Multi
        - Set MPE = On
        - Set Range = 2..Max Polyphony+1 (as set in your desired Mini preset)
        - Set Glide and Slice Tracking = Last Note Played (default)
        - Set Press Tracking (Z) = Last Note Played (default)
        - Set Pitch Bend Range = 96 (or less if you don't need large bend – just match ContinuuMini setting)
        - Set Octave setting to match your desired range of ContinuuMini output (normally this would be down one octave on Rise).
        - If using a pedal, set that to desired CC (see CC control section in this manual). IN this case make sure EaganMatrix is set to receive "All" Midi data, not just "Music" data.
    - On ContinuuMini:
        - Set Y/Z= "MPE" for desired preset ("MPE+" will work too)
        - Set Z/Bend = 12, 24, 36, 48 or 96 (whatever you set your MIDI instrument to)

16.18. Playing the ContinuuMini Directly from Another Source

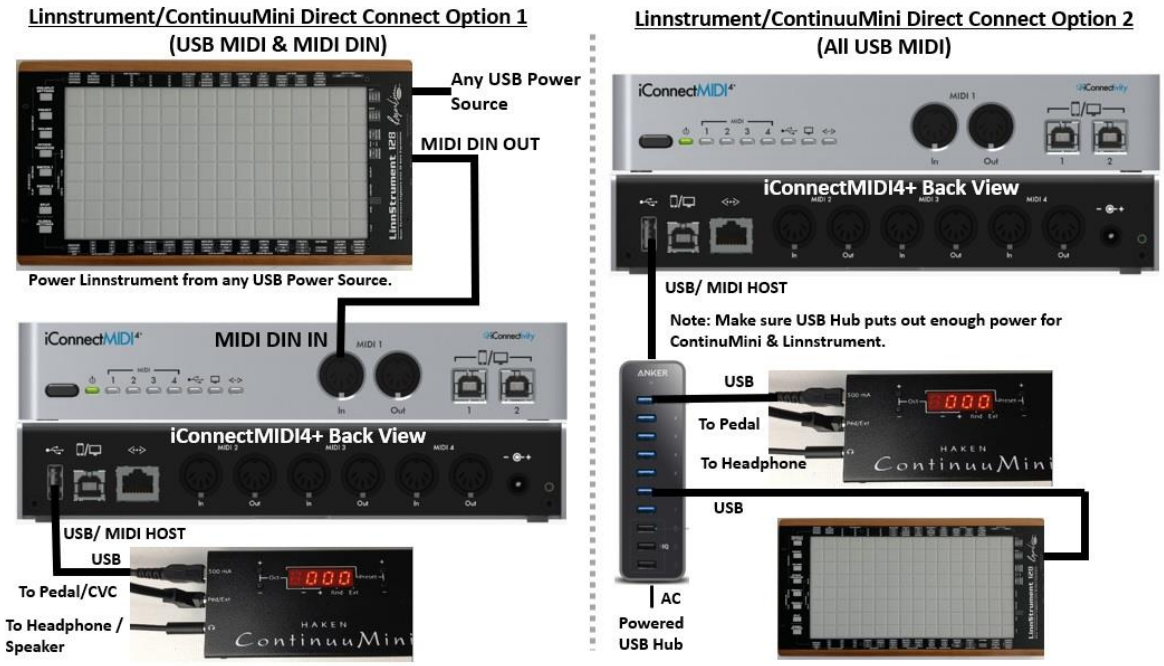
If you wish to play the ContinuuMini directly from another MPE or Standard MIDI controller without interfacing to a computer, a MIDI interface with a host connection port will be required. In cases where you want to connect two instruments that use a host MIDI connection (such as ContinuuMini and Linnstrument) you will need a way to connect multiple host ports through a USB/MIDI hub configuration of some sort.

Perhaps the controller has a MIDI DIN port or perhaps a MIDI USB port or as in the case of the Linnstrument or XKey37 they have both MIDI output options. Here are two configuration options that can be used. This example uses an iConnectMIDI4+ MIDI interface, but any similar device that can support a MIDI USB host port with DIN inputs should also work.

The first uses a USB host connection to a MIDI interface and then MIDI DIN Linnstrument output to the MIDI interface. The second uses a secondary USB hub to connect to the MIDI interface host port and then everything gets connected over USB (but you have to make sure the hub has enough port power for your devices). The Linnstrument is an example in the diagram below. Other MIDI controllers could be substituted in its place.

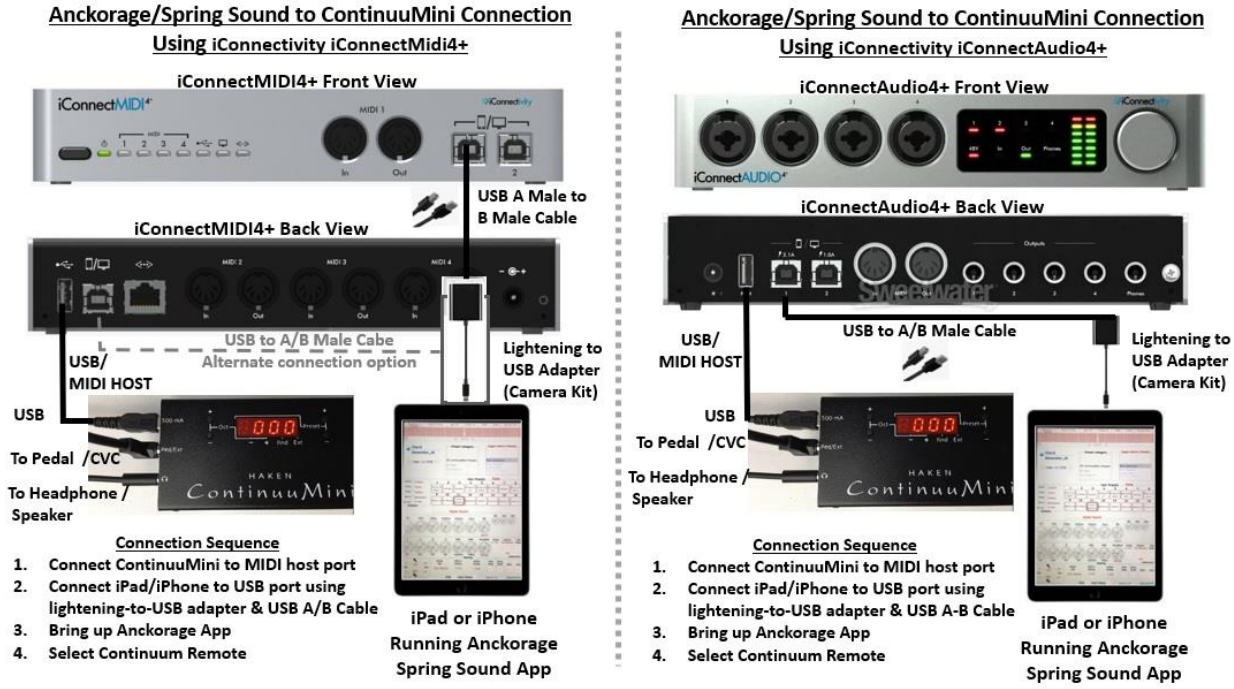
Note: We have found that some hub combinations do not put out enough voltage (5V) for a stable ContinuuMini connection, especially if other things are attached. This is particularly true using the latest Kenton USB Midi Hosts. A direct USB host connection is preferred to a hub. If more than one USB device requiring a USB host is required,

the more reliable option is to use a multiple port USB host (not many are available but iConnectivity MIO XM or XL has been tested successfully).



16.19 Connecting the Anckorage Spring Sound App to the ContinuuMini

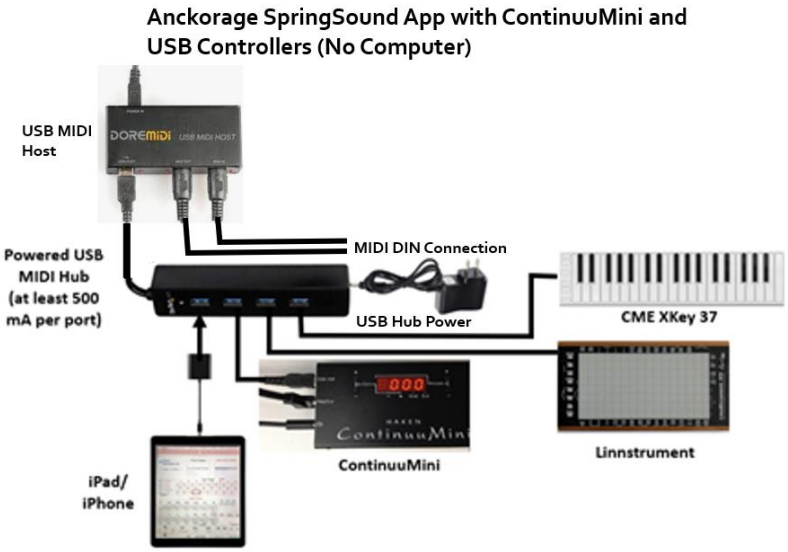
If you plan on using the Continuum Remote function in the Anckorage Spring Sound app with your ContinuuMini running an iPad or iPhone, you will need to connect the Mini to the USB host port of a MIDI interface such as the iConnectivity iConnectMidi4+ or iConnectAudio4+ interfaces and then with a Lightening-to-USB adapter (the Apple camera adapter can be used or a generic alternative) connected to the IOS device, connect to the USB port of the Midi interface. In the iConnectivity device case, this will require a USB A-male to USB B-male cable.



16.20 Connecting without Computer - Reliably

Many wish to connect a ContinuuMini to a USB controller for performance without a computer. A USB Midi Host must be used in this case. Note:

An alternative if your MIDI interface has a USB MIDI host port but no extra USB ports (such as the DoReMidi interface) is to connect a powered USB hub capable of supporting the ContinuuMini (5V and 500mA) to the host port of your MIDI interface and connect the iPads or iPhone to that using a Micro USB to USB-A cable from the Lightening-to-USB adapter. In this configuration you can also connect other external controllers like a Linnstrument, Sensel Morph, XKey37, etc. if you wish.



NOTE: Many have found this hub based connection with the Kenton MK2 Midi Host does not work reliably with the ContinuuMini. The better option is to use a multi-port USB Host – see below. Others have found the single port DoReMidi Host to work with the ContinuuMini.

If you wish to use multiple USB devices that require a MIDI host, the preferred solution is to use a multiple USB Midi Host interface such as the iConnectivity MIO XM or XL. This allows you to connect and route multiple class compliant USB Midi devices that need host connections (in addition to standard Midi Devices as well).



16.21. Recording the ContinuuMini with a DAW for processing and playback

Not many DAWs support MPE operation. Bitwig does and Traction, Reaper and Cubase to some degree, but any DAW can be used to record ContinuuMini MIDI data, though you may need to edit CCs for best operation. Here are some tips for general DAW use:

- Set up the ContinuuMini as you desire and exit the EaganMatrix prior to bringing up your DAW as it may not see your Mini device if the Editor is still connected to it.
- When recording the ContinuuMini in your DAW it recommended that you avoid setting both the Input and Output device as the Mini as in some default DAW configurations this can set up a Midi loop (specific DAW configurations may get around this but that is beyond the scope of this manual). If recording the Mini, set the output device to your normal MIDI controller (or its current setting). When you are ready to play, set the input device to something other than the ContinuuMini and set ContinuuMini as the output device (if you are planning to play back from the Mini).
- If you only want to record monophonically, set the EaganMatrix preset you are on to Base 1. In this case, it doesn't matter what Note Priority you set. Everything will be recorded on Channel1 (if Y/X is set to a specific CC value) or channel 2 (if Y/X is set to MPE/MPE+). This will make it easier to play back Mini data if you want to do this on a non MPE compliant MIDI instrument or instrument plugin (else you may have to duplicate sample plugin channels for example to process all MPE outputs).
- If you set anything other than polyphony Base 1 and you play duo-phonically, you will always be recording on more than one MIDI channels.
- Always look at your MIDI data stream after recording the Mini to have a better idea of what it has output, as it may not be recording what you expect if you don't fully understand Note Priority and duo-tactic voice assignments.
- Remember based on your Y/Z setting (specific CCs set, "MPE" or "MPE+") you will be generating different MIDI Data channel outputs:
    - MIDI Velocity will always be set to 127 if Note Process for the current preset is set to the default "Static Velocity". For DAW input and playback expecting Velocity, the preset should be set to "Dynamic Velocity" (initial finger velocity) which will create a better default playback if you are not going to record/process Z data.
    - If Y and Z are set to specific CC values, those will be generated in the MIDI output stream for example defaults: Y=CC74 (brightness), Z=CC11 (expression). MIDI will be output between channels 1 and max polyphony set in your preset depending on the Note Priority used.
    - IF MPE mode is set, Aftertouch will be output for Z along with CC74
    - If MPE+ is set Aftertouch plus CC 87 will be output for Z along with CC74
    - Pitch Bend information is always sent on the current channel played/output (even if 96:NN is set – as that is for receiving bend information).
- Note Priority will affect how MIDI Channels are output. If you are recording multiple times, the channel that you last played will be the last in the Note Priority sequence for the next recording. This will make it impossible for you to really know what channel is being recorded to for some Note Priorities (Oldest and Same Pitch for example). If you need predictability in what channels are output, set to Base 1 so you can predict Channel 1 (or 2) or use "Lowest Channel Number" or one of the "Highest" options. For example, if you set Base polyphony to Base 4 and Note Priority to "Lowest", because you can play a maximum of two notes on the ContinuuMini, you know you will always be recording channels 1 and 2 if Y/Z are set to a CC value or recording channels 2 and 3 if you are set to MPE or MPE+ mode.
- If you want to record the ContinuuMini on a specific MIDI channel, set Note Priority to "Highest Channel Within Polyphony" and then set Base Polyphony to the Channel you want to record (if YZ are set to a specific CC) or to Base Polyphony +1 (if you are using MPE/MPE+ mode). This will have the effect of setting you to Base 1 as only the highest channel in the polyphony you set will be recorded even if you play duo-phonically (last finger pressed will be the note sent). Note that you can set the Polyphony higher than 8 in this case if you want to record to channels 9-16 but that should be avoided. Remember to take the Expanded Polyphony setting into account when determining the highest voice in the polyphony. Here's a

table that will let you predict what channel you will be recording monophonically on if you use the "Highest Channel Within Polyphony" setting and MPE/MPE+ mode.

Base Min Polyphony	Highest Channel within Polyphony Output (Y=CC74,Z=CC11 / MPE or MPE+)	Base Mini Polyphony	Highest Channel within Polyphony Output (Y=CC74,Z=CC11 / MPE or MPE+)
1	1 / 2	1+	2 / 3
2	2 / 3	2+	4 / 5
3	3 / 4	3+	6 / 7
4	4 / 5	4+	8 / 9
5	5 / 6	5+	8/ 9
6	6 / 7	6+	8/ 9
7	7 / 8	7+	8 / 9
8	8 / 9	8+	8/ 9

16.22. ContinuuMini Troubleshooting Use Cases

Here is a representative list of possible issues you may experience and suggested solutions:

Case 1: Low Volume

I connect my ContinuuMini to a sound system, but the output seems much lower in volume than expected.

Check: Is your Gain menu setting too low?

Check: Do you have the Dim setting at a high value?

Check: Is Dim in the EaganMatrix selected?

Case 2: No EaganMatrix Connection

The ContinuuMini will not connect to the Haken Editor/EaganMatrix. I don't get the expected Blue connection LED displayed.

Check: Are you running a compatible version of the editor. YOU must run Version 8.71 or later and version 9.0 is the current official version. Never run a version of the editor that is older than the version of firmware on the ContinuuMini. Always upgrade with the editor version that you want to upgrade to. For example if you ae running 8.85 and you want to upgrade to 9.0, run the 9.0 version of the editor and then upgrade.

Check: Is your Source and Destination in Midi and Global Settings set to a ContinuuMini device?

Check: Do you have a proper USB connection to your computer

Check: Did you disconnect and reconnect the ContinuuMini to your computer? For example, if you unplugged your ContinuuMini from a USB port on a Windows computer and reinserted the cable into a different port. On Windows, when you plug into a different port, Windows changes the name of the device (it appends numbers) -- so that you can have several of the "identical" device at once. It is normally a nice convenience, but in this case, restart the EaganMatrix editor.

Check: Do you have another device connected to the ContinuuMini? For example are you connected to it in your DAW or some other MIDI controller or MIDI program? Exit the DAW and then bring up the editor and see if it now connects to the Mini.

Case 3: ContinuuMini Presets Sound Different than on Continuum

I'm playing presets on my ContinuuMini but they don't sound exactly the same as on my Continuum.

Check: Does the preset make use of the Y parameter in very noticeable ways. Y has a much greater range of motion on the continuum. On the Mini you more use a rocking motion for engaging Y and some presets that are highly dependent on Y may not sound exactly the same as Y will be engaged much quicker from min to max. You may want to experiment altering Y control in the EaganMatrix to tweak some presets to your liking.

Check: Did you reset the Polyphony of the preset on the Mini? Certain presets make assumptions on base polyphony and if you set it lower than expected the sound may not be what you expect.

Case 4: ERRF Message

I just applied power to my ContinuuMini and it is displaying ERRF?

Check: Make sure when you booted the ContinuuMini your finger was not on the playing surface. The device needs to initialize when starting up and a finger on the surface will interfere with this process.

Case 5: Pedal Doesn't Work

I just connected a pedal but it does not seem to work

Check: That the preset you are playing has Pedal 1 set to control the expected parameter you assume the pedal will trigger (for example sustain).

Check: That the EaganMatrix if you have it up displays the expected pedal icon. If not check you pedal type compatibility and possibly pedal adapter.

Check: That the "I2C" setting is set to 0 (pedal mode) and not 1 or 2 (CVC and external input modes).

Case 6: No Sound for Preset

I set the ContinuuMini to a preset number but no sound is coming out.

Check: Your audio output is properly connected

Check: That you did not load a preset that is meant for playing CVC (12nn) or MIDI (13nn). These presets are not programmed to output a sound but instead to control external devices.

Check: The Empty preset is not set as it creates no sound and it is meant as a blank EaganMatrix template to use as a starting point to create your own presets.

Check: The presets are loaded correctly. Does the ContinuuMini say "load File 2". Sometimes you can send a stream of Midi data to the Mini and it will invalidate presets. At times you may not see the "Load File 2" message.

Check: You did not plug a Mono cord into the audio jack that requires TRS/Stereo cable. You can damage the audio circuit by doing this.

Case 7: External Controller Doesn't Work with EaganMatrix

I plug an external MIDI controller into my computer to use with the ContinuuMini but the EaganMatrix does not see it to select it for External Music Data Control in the Midi and Global Settings window.

Check: Did you connect the device while the Editor was running? The EaganMatrix editor should be exited and restarted if you attach a USB device while it is running. Then it should see the new external device for selection.

Case 8:Duophonic Playing Doesn't Work

I can't seem to play two voices at the same time for a preset.

Check: Check that the preset is not set to Polyphony Base 1 in the EaganMatrix. For two voice playing this must be set to Base 2 or above (though you will only be able to play a maximum of two voices at the same time, but you can build up a higher layer of internal polyphony using sustain).

Case 9: Duo-Phonic Playing Not What I Expect

I can play two voices at the same time for some presets but they are not as independent as I would like.

Check: The ContinuuMini is not 100% independently polyphonic from the playing surface. If you have one finger down, that will control some of the characteristics of the sound if you press a second finger. For example, the dynamic level of your polyphony is based on the highest pressure level played on either finger. You can however play minor second intervals on the ContinuuMini without any problems (that can be a challenge on the Continuum). The best use of two voice playing is to use one voice as a pedal tone and play the second along with that or play intervals, perhaps in glissando.

Case 10: CVC (or uCVC) Doesn't Play as Expected

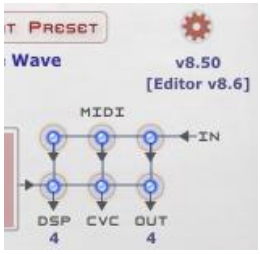
I've connected by ContinuuMini up to my CVC and set i2C=1 on the Mini and it seems to be doing something, but it does not play as I expect it to. Notes cut out.

Check: Remember that the CVC follows the Note Priority setting, that defaults to Oldest (MIDI channel used for new notes). Depending on what your polyphony setting is this means that any of the four CV sets of parameters may be playing. If you are set to Polyphony Base 2 and Oldest Priority, the CVC channels will alternate between the first 2 channels. Because the ContinuuMini can only play a max of two voices, you likely will get the most desired CVC results by setting Polyphony to "Lowest".

Case 11: Can't Switch Between Continuum and ContinuuMini in Editor

I have a Continuum and ContinuuMini and can't seem to switch back and forth in the EaganMatrix Editor.

Check: In Midi and Global Settings make sure you have the Source and Destination set to the MIDI device connected to your Continuum or Mini and 2) Make sure you are set to MPE+ and the routing indicators are all lit for In and Out.



Case 12: Unknown Error Code is Displayed

My ContinuuMini is displaying a strange error code (not ERRP, ERRL or ERRF).

Check: Write down the code and simply unplug the ContinuuMini from USB and reconnect. The error code will likely disappear and you are back to normal playing mode. If this happens again please contact Haken Audio.

Case 13: Trouble Recording in a DAW

I've connected up a MIDI device to control the ContinuuMini or a DAW (for example Cubase) to record or control, however I don't seem to be able to use the DAW properly but it sees the Mini as an input source (for example, the DAW will not record ContinuuMini MIDI information).

Check: If Windows: Is the EaganMatrix editor running and connected before you brought up the DAW and connected it? The EaganMatrix should be closed out if you want to perform certain operations that use the ContinuuMini USB interface with other connections. The EaganMatrix Editor can normally be left up if you are using a device that sends information to the Mini through the Editor (by selecting the device in the Editor

MIDI controls). Note: this is not an issue on the MAC where multiple devices can grab the ContinuuMini device.

Check: This may be data stream issues as ContinuuMini Output a huge amount of data the DAW may not handle or it may be MPE related. You can try these options in any order and any combination until you find out if its MPE channels or data stream issues.

1. Set rounding to full (this will greatly limit the amount of data output - basically eliminating pitch bend messages (that are half of the huge data stream with pressure messages). If that works then bring up rounding until it breaks. You likely don't need and can't hear full rounding anyway.

2. Set MPE mode vs. MPE+. This will eliminate the 14 bit high resolution Z & Y data that outputs on CC87.

3. Always set Priority to Low so you don't cycle through all your MPE channels. On Mini that means you will always output on Channels 2 and 3 (3 if playing polyphonically).

4. Set Z = CC11 or CC7 to test. (Takes things out of MPE mode). This will remove Aftertouch output. Again Set Priority to Low. This will Output on Channels 1 and 2.

5. Set Z=CC11 or CC7. Set Polyphony to 1. Set Priority to Low. This will always output on Channel 1.

6. If in Windows make sure you do not have the Editor up and then attach your Mini device to Ableton for record. Windows might grab the device first for Editor. So try recording without editor if that has been up.

Suggest you watch this to learn about how the ContinuuMini (and Continuum) deal with Midi.
https://www.youtube.com/watch?v=kR4xEBQ3v2k&t=1617s

Case 14: ContinuuMini Doesn't Play as Expected from Continuum

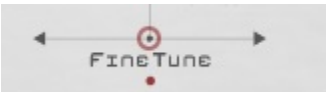
I'm trying to play the ContinuuMini from my Continuum and it plays but I get notes that cut out and bend does not seem to work.

Check: Make sure that you have set both to Y/Z = MPE+ with bend 96 and that the External Source when you have the ContinuuMini connected to the EaganMatrix is set to the MIDI interface you use to connect your Continuum to the EaganMatrix.

Case 15: ContinuuMini Seems out of Tune

When running the Haken Editor, turning on the surface display and then pressing down on the surface, the tracking is shown to be slightly off in the x-direction. In addition, the ContinuuMini plays out of expected tune.

Check: When you go to MIDI and Global Settings in Cogwheel, is the Fine Tune setting set to no pitch offset (exactly in the middle)?



Case 16: Recirculator/Reverb Does Not seem to Work

The Recirculator (reverb) functions do not appear to work. None of the reverb options do anything to the sound.

Check: When you go to MIDI and Global Settings in Cogwheel, is the Recirculator (Recirc) option set to Enabled?



Case 17: I want to use the ContinuuMini as a MIDI Ribbon Controller but can't seem to get it to output on a single channel

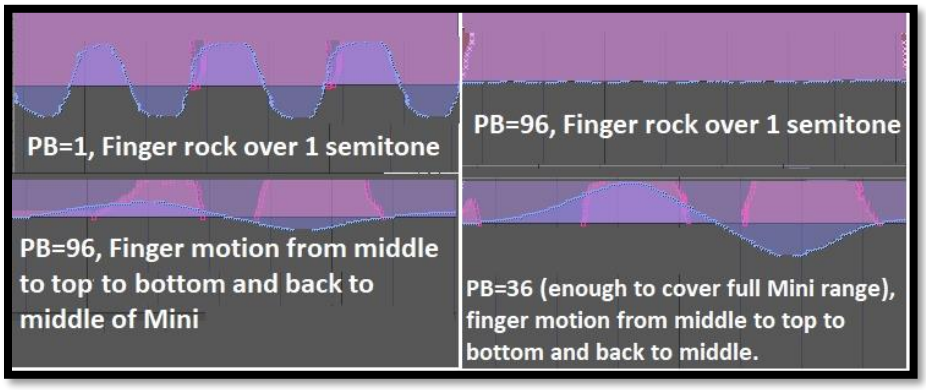
Remember you will change MIDI output channels if polyphony is > 1 every time you play a new note. In MPE modes, the output channel starts at 2 and will cycle through channels 2..9 depending on the polyphony set. If you set Y=74 (or any non MPE setting) then MIDI output channels start at 1 and you will cycle through channels 1..8 (if max polyphony is set to 8 or 4+). So if you want to use the Mini as a MIDI ribbon sending output to a single channel (CH1), set Y=74 and Polyphony=1 (not 1+) for your preset. If you set to MPE/MPE+ only channel 2 will be output in this setting. And you can turn MIDI routing off to the DSP if you don't want the Mini to play on pressing. Note: On Pitch Bend input to the Mini on Channel 1, there are four new options: 96:2, 96:5, 96:7, 96:12. These let you set incoming PB range when you are sending data to the Mini on channel 1 - which you would likely do for most external keyboard/controller or sequencing applications for example. (Also Applies for Continuum)

Case 18: Pitch Bend magnitude when recording to my DAW is lower than I expect

The pitch bend range you set will affect the magnitude of the pitch bend messages. This may be important to you if you are recoding the pitch bend into a DAW and cannot easily scale it to your desired range. There is normally no reason to set the ContinuuMini to PB=96 range as the normal playing range of the Mini is 28 notes without using octave keys or octave scaling. The following MIDI input examples of a DAW recording give you an example of what the pitch bend magnitude scaling is for min and max settings. It is suggested if you want to use the ContinuuMini as a pitch bend recorder, set to Y-74 and then set your desired PB range. In MPE modes, the minimum range allowed is 12. If Y=74 (or some non-MPE setting) the EaganMatrix has lower settings. (Also Applies for Continuum)



You can set anything up to 96 in this case if you are programming it through MIDI. The Editor choices are limited. The Pitch Bend data is the blue graph in the following. See how PB magnitude is affected based on the bend range set.



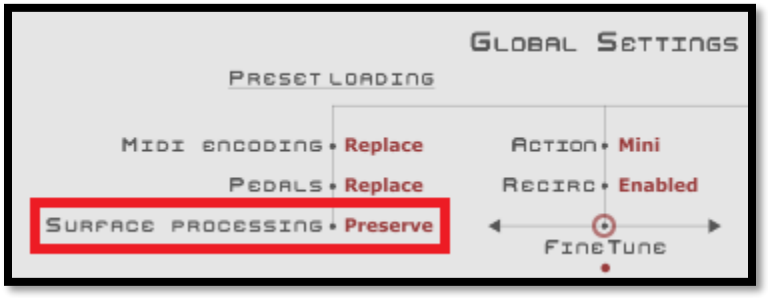
Case 19: I want the Pitch Bend amount to stay the same from preset to preset but it keeps changing

In the MIDI and Global Settings page, set MIDI ENCODING to "Preserve". All preset selections will then maintain the MIDI encoding until you set the option back to its default value of "Replace". (Also applies for Continuum)



Case 20: I want the Rounding Rate to stay the same from preset to preset but it keeps changing

In the MIDI and Global Settings page, set SURFACE PROCESSING to "Preserve". All preset selections will then maintain the MIDI encoding until you set the option back to its default value of "Replace". (Also Applies for Continuum)



Case 21: I Get ERRP Messages

This message means the ContinuuMini is not getting enough power or voltage.
Check: Are you outputting 500mA (0.5 Amps) from your USB connection. Actually the ContinuuMini should power ok with even 0.25 A.
Check: Are you outputting at least 5V from your USB source. This is normally the reason for this message. Most computer ports put out at least a steady 5V, but hubs may not, especially if you have other devices plussed into the hub. It is recommended that you connect the Mini directly to your computer's USB port and not use a hub.
Check: Are you using a Kenton USB Midi Host. The newer models seem to output less than 5V we powered by a hub for example. Always power the Kenton Midi Host directly from a USB adapter connected to the wall socket. It is suggested that you get a USB voltage/power monitor for debugging this kind of problem. They are available online for around $10.

Note: If you have issues where you are not getting 5V from a Kenton USB Midi Host or some other power source and the ContinuuMini constantly puts out ERRP messages (more likely this will be voltage related than power) you might try a USB Y cable that will allow you to power the Mini directly from a USB source connected to the wall and connect the data interface to the desired source (Kenton USB MIDI Host for example that has shown not to put out 5V in some cases, especially if powered from a hub):



Case 22: My Haken Editor keeps disconnecting from the ContinuuMini over USB
Check: Make sure USB port is active. Try another port.
Check: On MACs always try and use the same port connecting to the Continuum, especially if you have more than one Continuum or ContinuuMini as ports can become fixed on a USB device and will think the new Continuum device is the old one.
Check: Try different and possibly shorter USB cable.
Check: Remove any hubs between the Continuum and the computer. Some hubs cause connection issues in the real time handshaking between Continuum and computer.

Case 23: I can't load new firmware or things are strange after loading new firmware
Check: First make sure the editor you are using to load the firmware is correct for the firmware you are trying to load. Many people bring up an older editor to try and load new firmware. The Version of the editor displayed at the top right of the Editor screen should be no older in version than the version of firmware it says is on the ContinuuMini. You often will of course run a version of the editor that is newer than the current firmware version – as you are trying to update to that new version.
Check: The ContinuuMini requires version 8.71 of the editor or later. Version 9.0 is the current version most will be running. You should be able to update from any version after 8.71 to a 9.x version. Do not use version 8.5 or earlier to do anything with a ContinuuMini.
Check: You must have the solid blue LED in the top left of the editor active to load firmware. Also go to Midi and Global Settings and make sure the Source and Destination indicators are flashing. If neither of these are true, check your USB connection.

Case 24: I seem to be getting double notes played when I am only playing one note

The Surface display might also show double notes when pressing a single note:



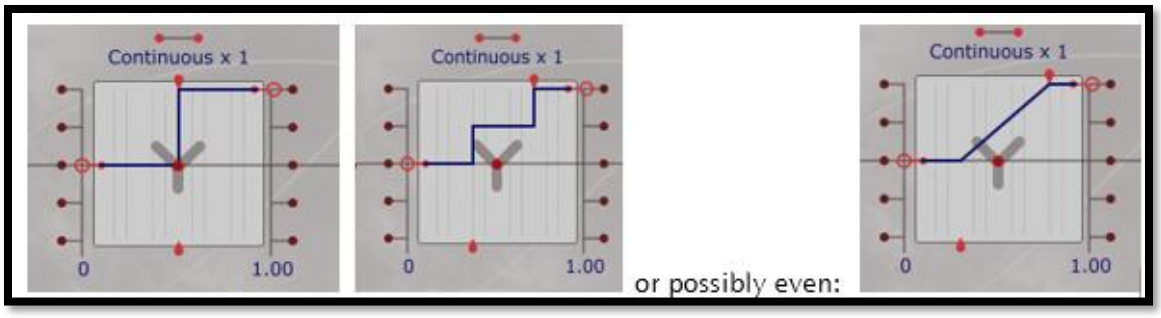
Check: You might try Refine Calibration but this may not work. This double note effect often indicates the ContinuuMini needs new factory calibration. It may also be an indication that the ribbon has a problem. Try repowering. Set to the Utilities Sine Wave Preset and then set that to Polyphony 1 (not 1+). If you still have the issue, this is likely a calibration or hardware issue and please contact Haken Audio support before trying the following factory calibration procedure below (section 16.23).

Case 25: When playing sometimes I get some notes that seem to explode in volume

Check: Check the Polyphony of your preset. Some presets are constructed in such a way that a duo-tone (second polyphonic note played) will sound at a volume much higher than the first due to the ContinuuMini's pressure polyphonic pressure sensing algorithm. In this case, you need to be very careful to play monophonically with no polyphonic overlapping tones, even for a split second. One way to solve the problem is to set the polyphony to 1 (not 1+) that will avoid the possibility of polyphonic overlaps. However, in some cases setting polyphony to 1 can affect the sound of the preset itself and in this case this operation may not produce acceptable results.

Case 26: Some presets when played seem distorted or overly noisy especially in the middle of the fingerboard

Check: Does the preset make use of Y changes in formulas, especially more than one formula and do those formulas have a stepping Y function? Even a relatively smooth Y function can be an issue here.



Because most presets are originally designed for the Continuum that has a very large Y range in comparison to the ContinuuMini, changes in Y of this nature can create discontinuities in some presets as the finger on the ContinuuMini can very quickly traverse a wide Y ranges and you might hear a cracking or break up int eh sound when playing in the mid area of the fingerboard. Sometimes playing with a lighter pressure can help, but if the discontinuity is too bothersome, the solution is to go into the preset and adjust Y so that it has less of an effect, in some cases setting to a fixed Y value you like instead of dynamic Y motion.

Case 27: My ContinuuMini does not seem to work with USB hubs or seems to disconnect from the Editor

Check: Are you running firmware 9.55 or later? Versions of ContinuuMini firmware before 9.33 had issues using USB hubs that is now fixed. USB in general is also more stable and has performance improvements over 8.71 and 9.0 (that some may still be using). It is recommended that all ContinuuMini users update to the current firmware release if they are experiencing USB issues.

Case 28: My ContinuuMini for some presets shows a strange number like "1'2"

Non-Issue: Nothing is wrong. The ContinuuMini's display now uses an apostrophe to indicate the number 2 in User preset display such as "122" = "1'2". This allows three digits to fit into two.

Case 29: Pedal Preserve option in Midi and Global Settings does not seem to work outside of Editor

Check: Nothing is wrong. Make sure you have the Preserve option set on the Pedal option you desire (i.e. Sos1 or Sustain, etc.). Then when powering the ContinuuMini make sure pedal is attached before powering.

Case 30: Spring like twang with power off when playing ContinuuMini

Check: Quickly depress and release the fingerboard a bottom of Y and top of Y over its range. You should hear a flapping sound as the fingerboard pops up back into contact with the metal perimeter. This is normal. At bottom of Y, between the two Cs, you may hear a slightly different more high pitched sound. But if you can hear a sound that sound like a spring releasing and coming to rest over a short time, the instrument may need to be repaired. Please contact Haken Audio support.

Case 31: On Windows I can't use Haken Editor and DAW at the same time.

Check: See Similar issue with Slim troubleshooting (section 17.6)

16.23. ContinuuMini Factory Calibration

Normally, the ContinuuMini needs no calibration once shipped. Occasionally the unit might be dropped or otherwise exhibits some unusual playing behavior, most notably two notes being sounded when only one is

played. This section will detail the factory calibration procedure which normally should be performed only when Haken Audio support confirms it is indicated.

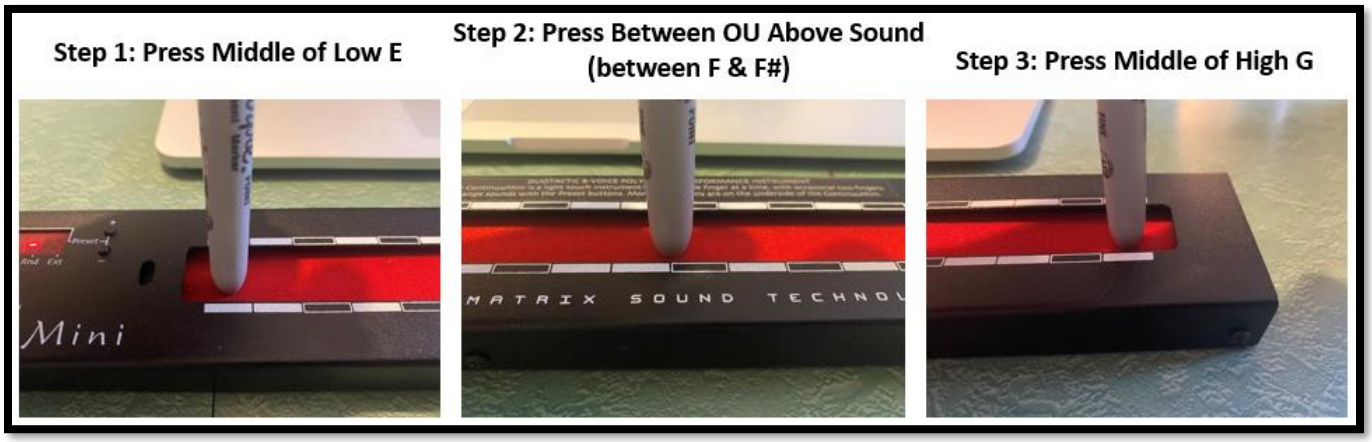
1. After your ContinuuMini has powered on, press the **Oct +** and **Oct -** buttons simultaneously. The first digit on the screen should begin blinking - this means you have entered the menu system.



2. Press **Oct -** to move to the Brightness menu entry. The screen should show "brt" along with the current brightness value you have set.

3. At this point, calibrate the surface by playing in 3 spots as follows.

   Using a blunt but rather pointed object that will not harm the fingerboard – we recommend the back of a permanent marker as it allows for more accuracy while calibrating: Press each of the pictured spots in the middle of the fingerboard at full pressure - the very first note, the middle of the playing surface (between the "O" and "U" of "SOUND"), and the very last note.



4. Now press the **Oct -** and **Preset -** buttons at the same time. You will see all the text on the screen begin to blink - you will need to hold these buttons for 3 seconds after the text begins blinking. After 3 seconds you can release.



5. You can now press **Oct +** and **Oct -** simultaneously again to exit the menu system and return to normal playing mode.

6. Set a sound for testing. The Utilities/Sine preset is a good choice. Test all black keys to ensure one note is played. Play each black key directly in the center. On the ContinuuMini's display, you should see the tuning display. If you see two solid bright dashes next to each other while playing the note, in the middle of the seven segment display, that signifies that the playing surface is registering your finger correctly and you are playing exactly in tune (see section 16.8 for pitch reference information).



7. Finally check for expected pressure sensitivity. Ensure that each note sounds even in volume, and that the pressure sensitivity responds as you would expect. You can do this either via listening to the audio out and/or viewing the Surface Display in the Haken Editor.

17. "Slim" Continuum Trouble Shooting

Note: While most of this section is intended for the "Slim" Continuum, much of it will apply to all models.

17.1 Powering Issues & Booting

There is no power switch on the "Slim" model. It requires the included 110/220V power adapter that will power the Continuum as soon as it is connected and plugged in. On powering the firmware version will appear for a couple of seconds before the firmware finishes booting. The last preset that was set in the editor or manually with the Preset Buttons should be displayed. After a firmware upgrade the display will show "00 00".

It is normal for the LED to blink green and red for a short time when powering/booting, This Continuum shout boot in a few seconds. if the Continuum displays a constant "DSP" message on the LED screen, or the LED is blinking and not in the expected constant Blue State, the firmware has not properly booted or possibly has not been properly upgraded or there may be some other issue. Try repowering.

If the unit does not boot into the constant blue LED state, turning the power off and powering again while pressing the red button will boot into SAFE mode. This can be useful for recovering if something goes wrong when botting – however it is suggested that you always contact Haken Audio support if your Continuum does not boot as expected.

Although the Continuum uses a 5V input, do not try to power if from a USB source as you can the ContinuuMini. Always power the "Slim" Continuum using the power adapter that is included with the instrument.

If possibly make sure your Continuum is connected to an appropriate Surge Protector to protect your investment in the case of sudden power outage or a lightning strike, etc. Running off an isolate power supply is always a good idea if you have one.

17.2 Haken Editor will not connect or does not display as expected

1. Do not use an earlier Haken Editor that is meant for Continuum firmware - 9.0 and earlier. These will not work with the "Slim" model. Note the firmware version when booting on the LED panel. The version of firmware you use should be at least that version or later. If you have not updated firmware in a while always run the latest version of the editor (which may be later than your firmware version of course) and update your firmware using that newer version.

2. Always connect the Continuum to your computer before running the editor. It is suggested you use the USB connection to connect to the "Slim" model however you can connect to the MIDI DIN ports if desired using a MIDI DIN-to-USB adapter. You can connect both at the same time, but the editor will only use one connection. You could use the other perhaps to connect a MIDI controller directly to the DIN ports while you use the USB connection for the editor.

3. The Haken Editor "look and feel" has been redesigned after firmware 9.0. The editor defaults to a "dark" template. A few other choices are available in Midi and Global Settings. If you want the lighter "Classic" display that can be set there. On rebooting the last screen template set will be used.

4. Make sure the editor did not crash and another copy can't run. Check your process list and kill the MAX process if in the list and the editor GUI is not being displayed

17.3 Presets do not display Categories as Expected after firmware Upgrade

1. After upgrading the main firmware file (File 1), you must then upgrade File2 that sets up the presets. Your Continuum and Editor should prompt you for this. Occasionally you may get a message to repower after upgrading File 1. There should be no issues doing that. After repowering, the "File 2" message should be displayed.

2. There are two File2 files in the firmware distribution – one for the Continuum and one for the ContinuuMini. Make sure you do not load the File2 for the ContinuuMini by mistake or presets may not display as expected. You can always reload File2 without reloading the Main firmware file.

3. Also note that the Preset display method for post 9.0 Haken editors is totally different that in earlier editors. You now select "System Preset/EaganMatrix" toggle to display the preset selection panel or EaganMatrix in the bottom half of the screen.

17.4 I cannot record Audio through the USB MIDI Interface

Yes you cannot. The USB interface on the Continuum is not a USB Audio interface. It is used for MIDI connection only. If you wish to record audio from the Continuum (same with all models) you need to use a USB audio interface connected to the L/R Mono outputs or a digital recording interface if you have one that will connect to the SPDIF ports.

17.5 I can't figure out how to get my CVC (or uCVC) to work.

Like the ContinuuMini, the "Slim" continuum does not connect to the CVC (or uCVC) through the Midi port. Generation 2 CVCs have a mini 3.5mm jack to connect a standard 3.5mm TRS cable from the "Slim" Continuum's dedicated 3.5mmm CV port. This is for CVC output only.

If you have a Generation 1 CVC, it only has a MIDI Input port (and through port if you want to pass through the Midi Stream). IN this case, assuming you are using the Continuum's USB port to connect to your computer, you will need to either build or order the special cable/adapter required to send I2C data to the CVC. This is exactly the same pinout used for the CVC connection on the ContinuuMini (see section 16.7).

If you are using the uCVC or considering ordering one, ask for the same cable interface that is used for the ContinuuMini.

If connected the CVC indicator will show you the number of active channels. This will normally be 4, but if polyphony for a preset is set less than that, the number of CVC channels will match:

Polyphony		
DSP	CVC	MIDI
1	1	1

Polyphony		
DSP	CVC	MIDI
12	4	12

17.6 I can't get the Continuum to work with my DAW as expected (especially on Windows PC)

1. If you are using the USB interface, on Windows, you may not be able to run both the Haken Editor and a DAW if they both connect to the Continuum's USB port for data (this is because the generic Windows USB MIDI driver for class compliant USB hardware devices is only able to support one application to open any one MIDI-port at the same time). The second application trying to instantiate that port will get an error. A multi-client USB driver may solve this. The same may apply to any two external USB interfaces that try to connect to the Continuum's USB port. If the DAW is not recording properly, try disconnecting the editor and rerunning the DAW, or possibly try connecting the MIDI DIN ports to the computer using a separate USB-MIDI interface. See Chapter 12 for Connection diagrams that may be useful.

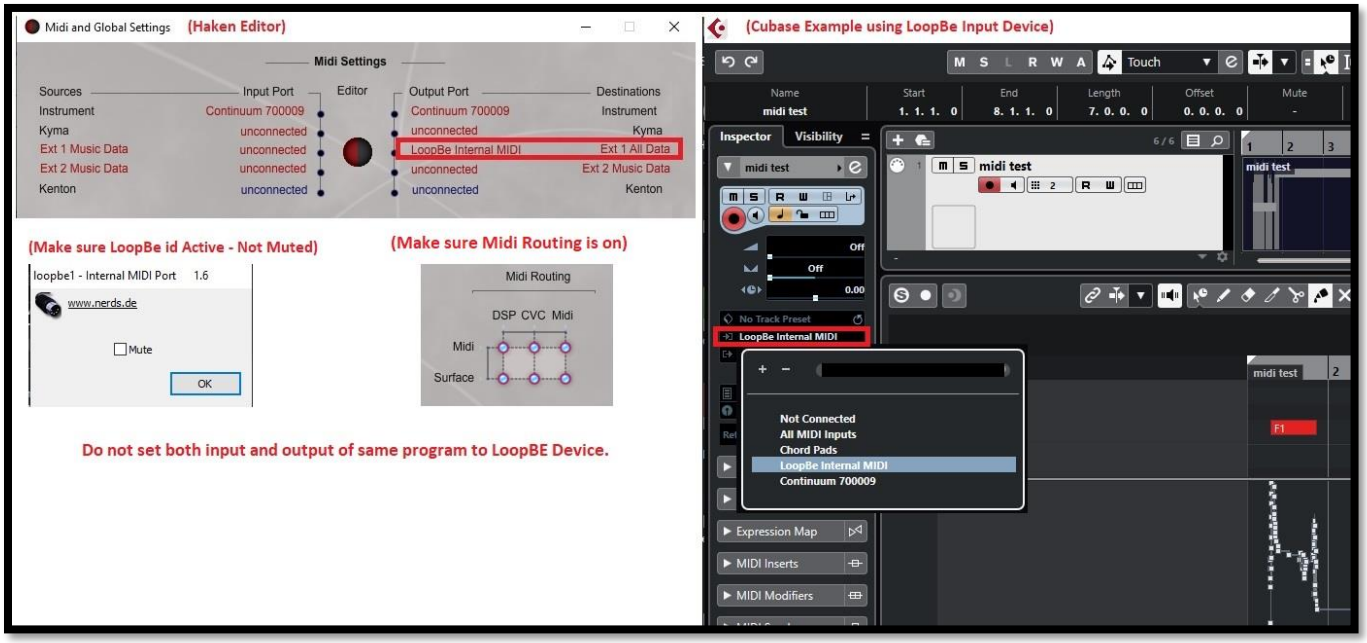
Another option is to use a Virtual Midi interface like Open Source "LoopBe" (there are others) that allows you to route Midi between multiple applications. For example, if LoopBe is installed and Midi through that interface is

unmuted (active), you can bring up the Haken Editor and route External Output from the Editor to that interface. Then in your second program use the "LoopBe" Midi interface as the input, not the Continuum or ContinuuMini's USB interface. In this way midi can be routed between programs as if a multi-client Midi interface was active.

For example, When the Haken Editor is run on Windows10 connected to Slim Continuum (or ContinuuMini) USB device, a second application (here using Cubase as an example) cannot be connected to the Continuum USB device as DAW input (Though this will be fine if Editor is not running, though you should avoid setting Continuum USB device in this case as both input and output at the same time to avoid Midi Loops).

However, if LoopBe virtual Midi interface is installed and activated (unmuted), the Haken Editor can be configured redirect output to the LoopBe interface through one (or both) of the two external outputs specified in Midi and Global Settings (don't set the LoopBe device as both input and output on the same External line as that can create Midi Loops). Then Cubase can be set to use the LoopBe Midi interface (assuming it has been activated in Cubase in device manager) instead of the Continuum USB interface and then the DAW connects to the Continuum's Midi output stream for recording. Multiple clients can connect to this LoopBe interface Haken Editor and some other interface can also be added into the mix, again using the LoopBe Midi Input, not Continuum USB device (see LoopBe manual). Make sure you do not set both the input and output devices in Editor or another connected client application to LoopBe or Midi loops can be created. Set either input or output.

Note: If you want to send DAW data to your Continuum while using the editor do the opposite. Make sure the Haken Editor is assigned its Ext Input as LoopBe and remove LoopBe from Ext output. Then in your DAW you can do the same - make LoopBe the midi output and remove it from DAW Midi Input.

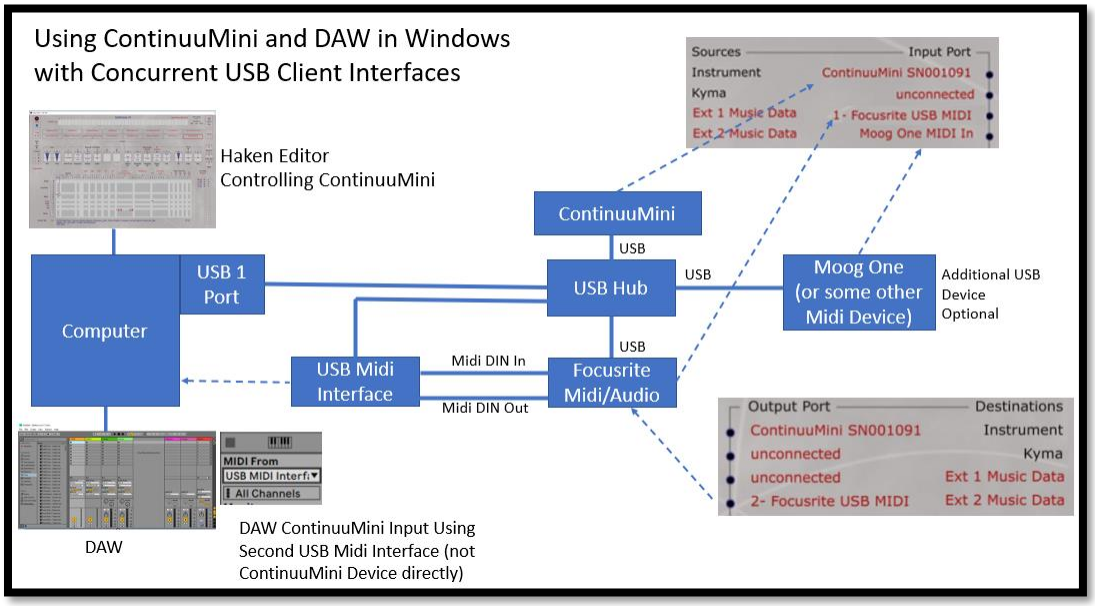


2. Another way to get around the Windows limitation of one active USB client connection at a time to simultaneously run both the Haken Editor and a DAW (or other program connected to the Slim or ContinuuMini) is to use a second USB interface and route that as the Haken Editor's External Midi Input and Output in Midi and Global Settings. You can set this to "All Data" option, but if you have issues and you know you are only sending receiving Midi data, try "Music Data". Note the Input and output are set to two different External Midi connections in the example below to avoid Midi loops (but you may only need the External Output if the goal is to record ContinuuMini in DAW only).

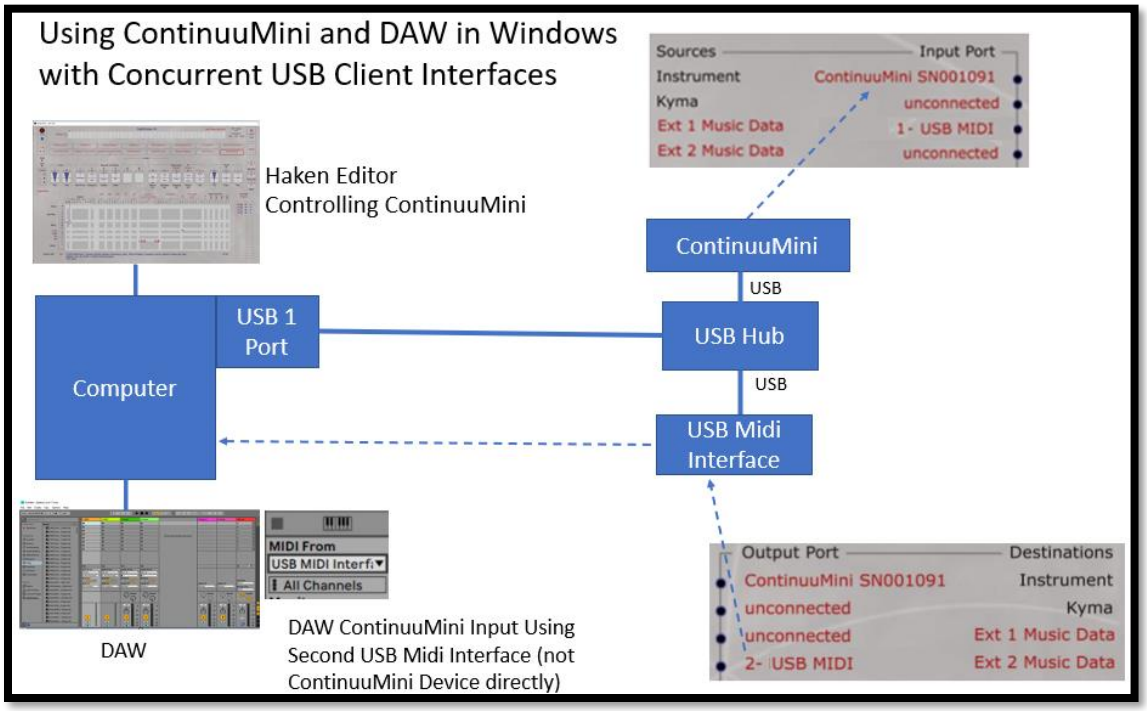
You can mix and route Midi through the Editor in this manner adding a second input if desired (here a Moog interface).Note that in this case a Focusrite Audio/Midi interface is used to connect Midi DIN to the second USB Interface. You could have used the second USB Midi interface as the External midi device as well as long as you did not set it up to create a Midi Loop. A USB hub can be used to connect all USB interfaces including the

ContinuuMini, or they can be directly connected to the computer's USB ports (make sure you are running at least 9.55 firmware in this case).

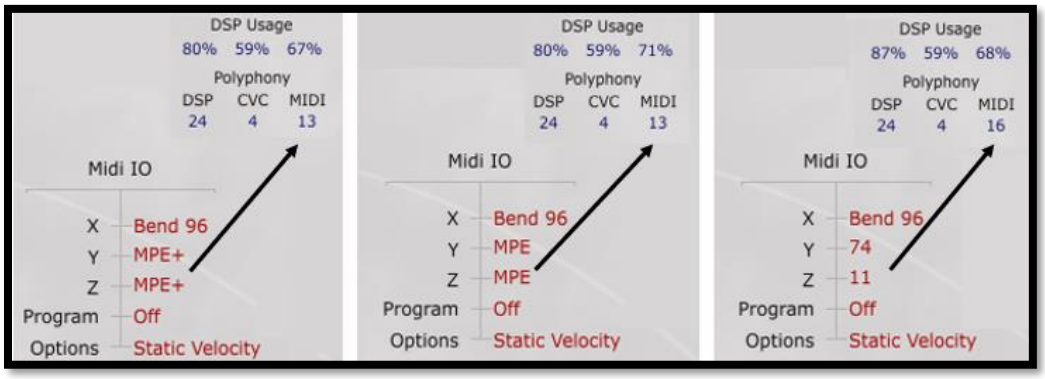
Option1:



Option 2:



3. Remember the Continuum will never output on Channel 1 if the current preset is set to MPE/MPE+ mode. Depending on the Polyphony set, the Continuum will output on Channels 2-14 for MPE/MPE+ mode and channels 1-16 if set to a Y/Z is set to a CC (non-MPE mode).



4. Also remember most DAWS do not support MPE operation which may give you unexpected results. You should record MIDI from the Continuum in a mode that will record all the possible Midi channels the Continuum will output on. When playing back it is expected that the DAW will play back on the same channels it was recorded on.

4. If you are playing back the Midi data recorded by the Continuum into another Midi instrument be aware that the Continuum outputs a tremendous amount of pitch pend and aftertouch data. Many Midi instruments cannot handle this data stream. If you get into this situation turning down rounding may decrease the Midi stream. Also many Midi instruments will not process aftertouch/channel pressure data. If your intent is to record continuum and play it back on some other Midi instrument you should take the following things into account.

- Always match the Continuum's Pitch Bend to the max pitch bend you have set on the external Midi instrument. Likely that instrument will not support the default of 96.
- If your external Midi instrument does not support Aftertouch, the default Velocity output of the Continuum is the Static Velocity (127) for all notes. Set your Midi IO Option to Dynamic velocity.
- If you have a controller that is using CC74 (brightness), remember that will be defaulting to Y position unless you set Y to some other value (doing so will bring you out of MPE modes.
- If you are set MPE+ mode, CC 87 will be used for increased resolution on Z and Y. Make sure you are not using that for anything (same for CCs 111, 117 and 118 if you are using the Haken Editor as those are used for editor communication/handshaking to the Continuum).
- If your instrument seems to have trouble dealing with the MIDI stream, try a combination of setting Rounding Off, reducing pitch bend and setting CC to 11 (normal expression) for testing. This will drastically limit the Continuum's normal Midi output and if thing then work as expected you can start to increase the settings to get a best data fit.

17.7 My Kenton "KillaMix" USB Controller does not work

The Kenton Controller is integrated into the Editor. Connect it before bringing up the editor and it should show up in Midi and Global Settings as "Connected". Use the "Kenton Settings" Utility under the Cog Wheel to change the default Control settings. If you intend to use the Kenton controller without a computer you must use it with a Midi host as described below.

17.8 My BeatStep (or other USB Controller) does not work

A common tool for changing presets and activating Controls is to use the Arturia BeatStep or BeatStep Pro. Here are some tips.

1. If using the BeatStep or BeatStep Pro with the Haken Editor, connect it to your computer's USB port (or USB hub if you are using one) before bringing up the Editor. Once in the Editor go to Midi and Global Settings and you should be able to select it as an Ext 1 or Ext2 input. Set it for "All Data" input if you want to both manipulate Controls and change presets (as the former will be done on Channel 1 on the latter on channel 16). Make sure you load the appropriate template for use with the Continuum that should be in the "Third Party Support" folder and also available from Haken Audio.
2. If you want to connect the BeatStep or Beastep Pro (or any other USB Midi Controller) to the Continuum without a computer, a Midi Host must be used such as the Kenton or if you wish to connect multiple USB devices perhaps the IConnectivity MIO XM or XL. YOU might be able to connect the Midi Host to a USB Hub and connect multiple controllers that way, but we have found that the most reliable solution for multiple connections is to use a multi-USB Host interface.
3. See Chapter 12 for connection diagrams that may be useful.

17.9 How do I connect a Linnstrument to my Continuum

See the similar information in the ContinuuMini section 16.7 (Use Case #3) as the Linnstrument will connect in the same fashion, with the main difference being the Continuum will support more Midi channels than the ContinuuMini.

17.10 The Continuum surface does not respond as expected

1. All Continuums are calibrated at the factory and should need no surface adjusting other than normal "Refine". It may be possible that things got shifted a bit during shipping. In this case, after contacting Haken Audio, you may be instructed to perform a factory calibration or surface alignment. NEVER TRY AND OPEN UP THE INSTRUMENT WITHOUT DIRECTIONS FROM HAKEN AUDIO.

Other things to remember:

2. Remember some presets are fully rounded and will not produce portamento if you are always expecting it.

3. Not all presets use Y if you are expecting to hear a change in sound based on Y in all presets.

4. There are also settings that will send MIDI out on a part of the fingerboard but not play

5. Some presets using the Touch Area do not make sound if pressing in that area.

17.11 The LED display looks like I am playing it but I am not

There may be a stuck note or it may be possible that the Editor connection to the Continuum died and the Continuum displays unexpected operation (such as the LED screen looking like it is being played when it is not).

1. Try running your fingers across the full length of the fingerboard around the perimeter to see if the LED screen returns to displaying a preset when you are not playing.

2. At times the Red Button may stick a bit if pressed, try pulling up on very slightly and see if the preset display returns.

3. Try repowering and see if everything is back to normal. If not please contact Haken Audio.

17.12 The Continuum makes no sound or sounds very faint.

1. ALWAYS MAKE SURE YOU NEVER PLUG A MONO CORD INTO THE STEREO HEADPHONE JACK. This could damage the circuitry and cause no sound to be output.

2. Make sure you have the audio outputs connected to a sounds source that is active. If you are not sure plus in a pairs of stereo headphones and see if you can hear anything. Make sure the Attenuation knob is at least to the middle position.

3. If you are using Digital IO, you may not have you AD/DA converter settings matching what is expected on the Continuum. Use headphones to validate.

4. Make sure you have a preset loaded. Not all User Presets are set when firmware is loaded (higher user banks may be empty).

5. Make sure you are not on the Empty preset. Always good idea to load the Utilities/Sine preset for simple preset validation.

6. Make sure the Dim LED is not on in your preset and Rotary is not set to minimum ("- Infinity").

7. If everything seems ok, try repowering the Continuum.

8. Sometimes File 2 becomes invalidated. You will normally get a message to that effect to "Load File 2". Sometimes not. If you connect headphones and move through presets and Rotary is up and no sound, try reloading File 2.

9. You might also try performing a factory recalibration. This is especially indicated if you have firmware issues that forced you to do a Factory Restore. Also this is indicated in situations where you find that when you press the fingerboard you do not get the pitch tracking indicator but just stay on a preset name (i.e. your fingers do not seem to be detected).

10. If these suggestions do not fix the issue please contact Haken Audio for support.

17.13 The Digital Audio I/O does not work

1. Make sure you are set to match the Continuum's expected settings.

2. Set the AES Output to the rate you set on your converter (normally 96 KHz or possibly 48 KHz)

3. AES Input should automatically set to your AD/DA rate

4. Set your converter to S/PDIF. If only AES inputs are available, you will need a SPDIF/AES converter for your setup (HOSA Model CDL-313 Coaxial-AES/EBU Link has been tested and works – other options are also available).

5. Set bit rate as appropriate (24 bits).

6. You may have to set PLL Lock / Digital In, etc. Check your converter documentation.

17.14 After Loading New Firmware my custom presets are gone

1. Make sure you always store your custom presets in a different directory than the Haken Editor directory as it will be overwritten if you use the same file name. Reloading firmware will overwrite your current User presets with the defaults.

17.15 I Do Not Seem to be Getting the Stereo Separation I Expect

1. This could be due to a number of things. First the recirculator will mix channels. Try setting the Recirculator Mix to 100% Dry and see if you get more expected Stereo. IF you want totally unprocessed stereo separation you can use the L/R master section outputs in conjunction with the Master section Mix next to it to set an unprocessed/processed master output section ratio. Just note that many presets rely on the Recirculator for the effect.

2. If you are experiencing unexpected stereo results on the digital audio output, be sure you have set things to the matching SPDIF/digital matching rates with your converting interface. Some interfaces may sum the channels making it sound like a mono mix. To test this you can load the "Noise - Out of Phase" preset. If digital summing is being done, the preset will produce no noise as the channels cancel each other out. From there you can look into your converter settings.

17.16 I Can't Connect my Expressive-E Touche Controller to the Slim without a Computer

1. If trying to connect using the USB interface a USB host will be required. Same will apply if you want to use this on the ContinuuMini here. Best to use the TRS Midi out port if this is not working reliably.

3. If you want to connect both USB ports without using a computer, the Kenton MK2 MIDI Host is not recommended. A multiport Midi Host interface (like iConnectivity MIO XM) is recommended in this case.

17.17 I Can't Seem to Upgrade my Slim using my Mac

1. The very first thing is to **precisely** follow the installation instructions. If not the notarize/quarantine security features of the Mac will prevent from launching the Editor. And if something was done wrong, restart from the very beginning and don't try to find a work around.

2. Old Macs can't read recent DMG files .... so for these old Macs we created a specific Zip file (where also, the security level is different since previous MacOS version were not so strict on security... a Zip is not possible anymore for example). Contact Haken Audio for support here.

3. If you have not used the Midi interface in a long time and it does not appear to be working correctly, it is good to 1) unplug it 2) remove it (all possible instances, there are sometime several) from the *Audio and Midi Configuration* (Midi window of course) 3) re-plug it in.

17.18 My Editor keeps disconnecting from the Continuum over USB

1. Make sure USB port is active. Try another port.
2. On MACs always try and use the same port connecting to the Continuum, especially if you have more than one Continuum or ContinuuMini as ports can become fixed on a USB device and will think the new Continuum device is the old one.
3. Try different and possibly shorter USB cable.
4. Remove any hubs between the Continuum and the computer. Some hubs cause connection issues in the real time handshaking between Continuum and computer.

17.19 Firmware starts loading but never finishes or aborts with an error message

1. Make sure USB port is active and connection stable. Try another port. Assume you have constant USB connection before downloading.
2. If you are using a hub, try connecting directly to the Continuum for firmware download.
3. Sometimes the update will occur but you will need to repower. If you repower and it asks for File2, the update probably was ok. Proceed to load File2 in this case.
4.Make sure you are using the right editor for the firmware you are downloading. Never use an editor version earlier than the version you are trying to download for firmware update.
5. You might try connecting and downloading using the MIDI port vs. UDB port if you have a Roland UM-ONE USB interface, but the USB port should work for all firmware download and editor operations.
6. If nothing works and you can't download, please contact Haken Audio support.

17.20 Audio (AES) Inputs do not seem to work in the Matrix for Continuum

1. Make sure your D/A converter matches the Continuums settings in Midi & Global Settings.
2. Make sure you are processing inputs from the Audio (AES) rows in the Matrix
3. Make sure Control Panel 2 "Audio In" is turned up or you will get no sound.
4. Make sure you are processing the audio in the EaganMatrix as an audio input
5. If you are using a Mono digital input, make sure you have the correct Audio (AES) channel routed into the Matrix

17.21 My Kenton USB Midi Host is not Working as Expected

This device has issues if powered off of a USB hub. Always power it directly from the wall as it does not put out the expected 5V when powered from a hub we have found in testing. It also may have issues when its USB data interface is connected to a hub. It is best used for the simple application of connecting a single MIDI DIN instrument to your Slim Continuum or ContinuuMini without the need for a computer. A multi-port USB host if suggested if you wish to connect multiple class compliant USB devices to control your Continuum through USB. Others have found that the Kenton MK2 USB Midi Host does not work reliably with the ContinuuMini.

17.22 Can I use a MIDI-CV Converter with the Slim instead of a CVC?

Yes but there will be limitations as no MIDI-CV converter can do this of this to provide totally smooth analog conversion. If you want to try and used a MIDI-CV converter for more than standard Note On/Note Off and Velocity translation it must:
1. Be able to deal with MPE data as channels will change with every polyphonic note, etc.
2. Handle the Continuums massive amount of Pitch Bend data (that you may have to reduce to match your converter's max capability)
3. Be able to deal with Translating aftertouch as Velocity is not useful in replicating the fingerboard's expression.
4. Also be able to Handle smooth CC74 conversion
You will certainly have hiccups, discontinuities, etc. from most converters. In short you will get notes played but likely lose all the magic of the Continuum. Nothing currently known will get as smooth conversion as the CVC.

17.23 I can't seem to get rid of Noise or Hum from the Audio Output Port

1. This is most likely grounding issues and not the Continuum
2. Is the Hum there or lessened if you use headphones versus the audio outputs? This is an indicator of noise.
3. If you have your PC/MAC laptop connected and powered from the wall, remove the wall power and run on battery. If better again likely grounding noise issues.
4. Use Short, High Quality audio cables
5. Make sure there are no appliances, fluorescent lights or light dimmers on the same circuit.
Never plug a two prong cable into a 3 prong adapter.
6. Try not to put large pieces of audio gear next to each other that can pick up hum from each other.
7. Try and run everything from the same circuit using a protected power strip.
8. Try and use a passive (unpowered) ground loop eliminator (isolation transformer) (these are common for 1/8" TRS but not so common for 1/4" TRS connections). On Slim you have separate mono outputs and you can find 1/4" dual channel isolators (from Radial and ART as examples).
9. Try a powered Hum Ground loop eliminator that plugs into the wall (for example Ebtech Hum Eliminator).
10. Try and Opto-isolated transformer – running everything from that or a power strip connected to it

17.24 I tried upgrading to 9.x or later from 8.x or earlier and my Continuum doesn't work now

As noted, never try and install release 9.0 or earlier on a Slim continuum, however those with half and full size models might be running an earlier release than 9.0 and want to upgrade to 9.0 or Post 9.0 releases. Depending on the release you have installed, this might have to be done in stages. This only applies to half and full size continuums as all Slim Continuums are shipped with a post 9.0 release. You must upgrade to 9.1 or later on a full or half size continuum from 9.0. If you are running a release earlier than 9.0 you must upgrade in steps. Contact Haken Audio if you do not have the older firmware releases required.

1. If running 8.x, go to the Haken Audio site and download the 9.0 release and upgrade to that using normal instructions. Then Install the post 9.0 release per User Guide Instruction.
2. If running a 7.6 release, go to the Haken Audio site and download the 9.0 release and upgrade to that using normal instructions. Then Install the post 9.0 release per User Guide Instruction. If running a 7.x release below 7.6, upgrade to 7.6 first and then go to 9.0.
3. If running a 6.x release, Contact Haken audio to get a 7.x release to install (File 1 only) then install the 9.0 release. Then Install the post 9.0 release per User Guide Instruction.
4. If running a 5.x release, Contact Haken audio to get a 6.x release and a 7.x release. Install 6.x (File1 only) and then install (File 1 only) then install the 9.0 release. Then Install the post 9.0 release per User Guide Instruction.

17.25 I have stuck notes after upgrading firmware on my Slim model

1. Try Refine Calibration.
2. If that does not work try adjusting the "Actuation" setting in Midi and Global Settings (see section 7.5).

17.26 I Keep Getting DSP Messages and Possibly Can't connect Editor

1. DSP messages on the SLIM LED panel indicate the instrument is not in a normal state. First try disconnecting power, wait 30 seconds and then reapply power.
2. This could be an indication that the firmware was loaded incorrectly. Try disconnecting USB and any Midi DIN connection you might have and repower as above.
3. At times if you get a constant DSP message, even on repowering, try pressing the Preset buttons a few times. This sometimes gets back to normal playing state.
4. If the problem persists, contact Haken Audio support.

17.27 Some Presets Sound Distorted

1. Many presets will create some kind of distorted sound if you press too hard. The continuum rarely should require you r press more than half-way into the fingerboard. Pressing fully to the bottom of the fingerboard will likely create distortion. You can hear this if you bring up the Utilities/Sinewave. If you press too hard, you will get a distorted signal. So learn how to play with a light touch as many presets will give you fine sonic variations in the first 1/4 of Z.
2. Turning down the gain/Levels can help as can in some cases turning up the gain/Levels and playing very lightly to optimize your playing within a limited Z range.

17.28 I get "Something is Fishy" Messages when updating firmware

1. This indicates that the update procedure detected something unexpected, normally it is displayed after File1 loads.
2. Sometimes this message will disappear and then be replaced with "Load File 2" message. If the firmware version has not updated in the top right corner of the editor you can try repowering the continuum and reentering the editor to see if the firmware version has updated. If the firmware version displays as expected, you likely will be asked for File2, in which case you can select that option in the "Update Firmware" selection. Never update

File2, if the firmware version has not updated as expected after File1 load or you will likely corrupt the preset configuration and have to reload File 1.
3. If after repowering and rerunning the editor the firmware version remains on the original version number, try reloading File 1 again. If that also fails, please contact Haken Audio support.

17.29 Presets don't seem to be displayed correctly or Preset Categories are Missing

1. Exit the Haken Editor. Recycle power on the continuum. Rerun the editor. At times the editor may not start up correctly and this procedure often clears things and displays presets as expected.
2. If your preset categories are still missing (totally or in part) or if system presets in a category seem missing, try reloading File 2. Often midi Loops or sending expected Midi to the Continuum (from a DAW for example) can reset presets. Reloading File 2 should never be an issue, just remember to always save your customer presets to a directory outside the normal Firmware folder as reloading firmware will overwrite it.

17.30 When recording Y in a DAW I get unexpected curves

1. Y does not have the resolution of Z and if you press too hard to too lightly, you may see that the expect smooth curve (if you moved up and down Y smoothly) appears distorted, perhaps with unexpected jumps or backtracking in the Y data. If you want to record Y, make sure to set your preset to MPE or Y-74 (non-MPE) mode, not MPE+. Also use a pressure in the medium range (not too light or deeply depressed) to get best Y output results. If you must have Y output as a smooth curve at all times we recommend you use a controller such as Expressive E Touche or Sensel Morph, or you can fix up the data if it was distorted in your DAW with a controller drawing editor that most DAWs have.

17.31 When working on big presets in EaganMatrix I can't type in any more values

1. The editor allows a fixed number of matrix entries to try and maintain backwards compatibility with older models that do not have the same processing space. This allows all Continuum users to use a common set of presets. Typically you will run out of formulas before you run out of matrix inputs, but if this happens think about how to rearrange your formulas to use less Matrix inputs or if you have a 6X processing Continuum perhaps think about splitting up your preset into multiple presets using one of the Combination preset modes.

17.32 The Slim USB connection sometimes disconnects with the Haken Editor

1. Are you running Version 9.55 or later. Earlier versions of the Slim firmware had USB connection issues that were solved in version 9.33 and later. It is recommended that Slim owners always upgrade to the latest firmware version during the beta software release cycle.

17.33 My fingers do not Seem to be detected when playing the Slim Fingerboard

1. Does the editor correctly detect your Continuum and display the right firmware version? On powering is the preset number displayed and ad you can change presets but now sound is output and no pitch tracking indicators are displayed when playing. This is usually a sign that you need to perform a Factory Calibration.

17.34 Can't run two Haken Editors at the same time

1. I would like to run my ContinuuMini and Continuum Editors on the same computer to use at the same time through USB connections. Unfortunately at preset only one version of the editor can run on a computer at a time. If you try and bring up two versions of the editor, one will not connect. Even if you copy the editor to a separate directory and try and run each from its own directory tree there will still be issues. On Windows if you connect two ContinuuMini Devices they will show up as USB device_name and device_name#2 (and the device name will be the last Continuum or ContinuuMini you connected). You might have a UM-ONE Midi Interface for a Continuum and a direct USB interface for ContinuuMini or Slim Continuum. No combination of two continuum at this point will be able to be connected to two copies of the Haken Editor running on one machine.

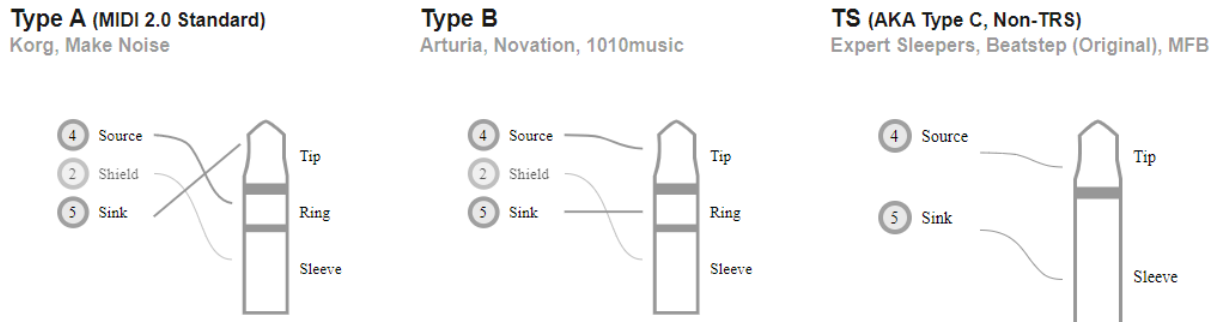
17.35 TRS Mini Midi Jacks not outputting as expected to external Synth or Eurorack

1. In addition to USB Midi, the Slim Continuum uses TRS B configuration for output and TRS A or TRS B for input. Make sure you have the right Mini TRS adapter (A, B or TS) for your equipment. This may not be well documented in vendors manuals. You may need a converter from TRS B to TRS A pinouts. See minimidiworld.com for more information like the following:

Type A (now the MIDI 2.0 standard)
e.g.: Korg, Make Noise, Hydrasynth

Type B
e.g.: Arturia, Novation, 1010 Music

TS sometimes called **Type C** or **Non-TRS**
e.g.: Expert Sleepers, Beatstep (Original), MFB



17.36 Connecting two computers to ContinuuMini (or Slim Continuum) USB for Midi Control

1. Perhaps you want to run the Haken Editor on one computer and use another to run a DAW and have both send Midi data to the ContinuuMini or Slim Continuum. On PC you can't have two computers trying to attach to the same USB device.
2. One suggestion, at least on MAC. In MacOS, in Audio Midi setup, you can send Midi streams between networked connected computers. It's the Midi Network Setup. You set up a "Session" and look for it advertised on other Mac computers. Then you send/receive to that connection. Also used to send MidiTimeCode from one computer to another to synchronize video playing on an external MacMini from a computer running for example ProTools/Logic. In this manner the computer tunning the DAW communicates with the computer connected to the Haken Editor, so only one USN connection to the ContinuuMini is actually created.
3. If you don't have your computers networked together, you'll need to set up that network. it can be WiFi or wired, I'd strongly suggest doing a wired setup for stability. This can be independent (or not) of how you connect to the internet. You can connect two computers together directly, via what's called a crossover cable, but you are better of getting a network switch. This solution may also work for networking two PCs so only one connection is set up to the ContinuuMini USB device.

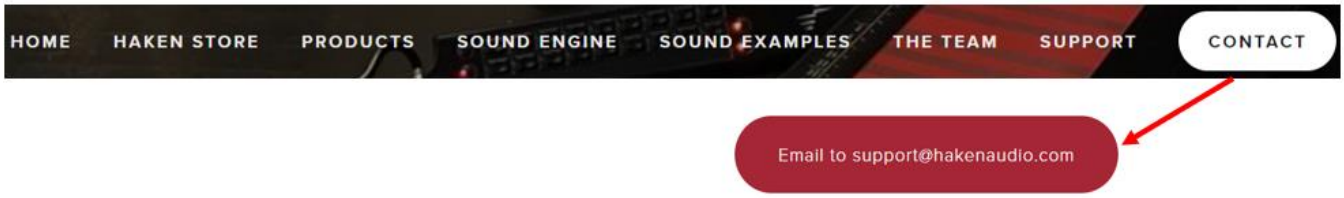
17.37 Editor comes up with blank screen – Especially on Upgrading MAC OS

A blank screen showing firmware version 0.00 is an indication the editor cannot connect to the Continuum. Check the following:

1. Your Midi interface to the Continuum is connected properly
2. You have installed the right drivers for your Midi interface (or if UM-ONE make sure it is in class compliant mode).
3. Have you been using more than one Continuum Product. Perhaps you connected an EaganMatrix Module to a USB port that you just had a Continuum or ContinuuMini on? Especially on MAC, the computer may think it's using the old device. You may have to reset your USB port (especially on MAC).
4. Try removing the USB cable connected to your Continuum (or ContinuuMini or EaganMatrix Module), wait a few seconds and then connect it again. At times connection might be lost
5. Finally the editor may think it's using the previous Continuum device if you have more than one. Go into Midi and Global Settings and manually select the desired source/destination device if it is not set correctly.

18. Support and Creating Debug Files for Support

Support for all Haken Audio products is available at Hakenaudio.com. You can select the Contact option and then email your support request.



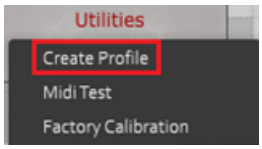
At times when contacting Haken Audio support you may be asked to send a Max Console Hardware Log and/or a Continuum Profile for your instrument. This section explains how to create those files.

18.1 Creating a Max Console Hardware Log

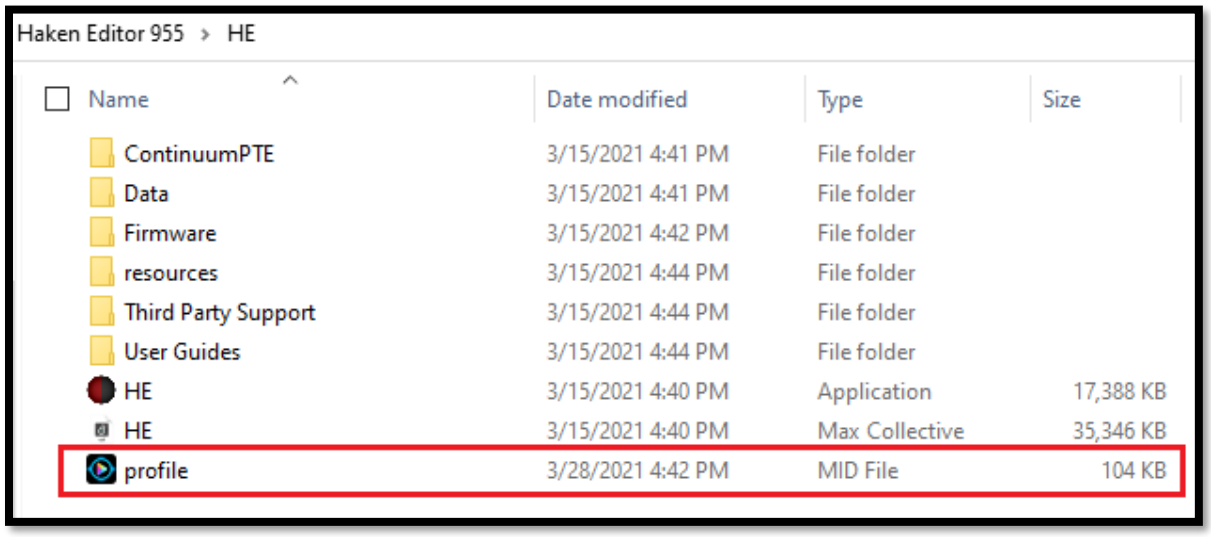
- Connect your editor so it has the "blue dot" solid and is communicating properly with the Continuum
- Make the Max Console window show itself, by pressing Command-M (mac) or Control-Shift-M (PC). In Midi and Global Options
- Go to the Utilities menu and choose "Hardware Log On".
- Bring Max Console to the front
- Do Command-A (Control-A PC) to select all text then Command-X (Control-X) to copy it all
- Save that text in a text file called "MaxLog".
- Go back into Utilities and turn off the log "Hardware Log Off"

18.2 Creating a Continuum Profile

- Go to "Midi and Global Settings" and then Utilities menu



- Select "Create Profile". When you choose that option it will take around 30 seconds to a minute
- When it is done (it could take about a minute and your Continuum will display green LED), look for a "profile.mid" file inside the Firmware's HE folder.



18.3 Scan Files (Continuum and Slim Continuum Only)

At times you may experience hearing a double note played when you are only playing one and possibly see two notes in the Surface display in the editor. Haken Audio will normally ask you to send a profile file (see procedure in the previous section). If indicated Haken Audio will create a Scan file for you to load to solve the issue. Scan Files are special preset files prepared by Haken Audio for your particular Continuum containing information about "abnormal" sensors in your playing surface.

There are two different situations with "abnormal" Continuum sensors: sensors that are not responsive, and sensors that have a reduced range. The scan files identify sensors that are within one of these two categories allowing the firmware to treat them specially. The reduced range sensors (as long as they are identified) still have very high accuracy. The full range is 14 bits of data but if range is reduced, 13 bits stills works fine. Until a few years ago all Light Action continuums used 12 bits and nobody noticed the change to 14 bits. So sensors that are slightly reduced in this manner will have no perceptible difference in sound to the user.

The sensors that are not responsive at all are a different issue – they are (spline) interpolated from neighbors. In Continuums, it is not unusual to have a few sensors that are not responsive or have a reduced range. Hall effect sensors are very accurate but also very sensitive to mechanical stresses so developing a non-responsive sensor is not unusual. The Continuum firmware uses 12 sensors when tracking a finger (3 to left of finger, 3 to right of finger, both front and back sensors), and can use 11 sensors (or in the case of reduced range, 11.5 sensors) to very accurately track fingers in a manner that the user will not tell or hear any perceptible difference. It is a bit like disk drives – all disk drives have some bad sectors, but a disk is not considered defective unless the number of bad sectors is large.

If Haken Audio provides you with a Scan File for your Continuum, it will load like any other preset. You only need only load the scan file once. Upon loading, special information is copied to a permanent flash area. You do not need to keep the scan file in your user presets, nor do you need to keep the file on your computer.

19 EaganMatrix (Eurorack) Module

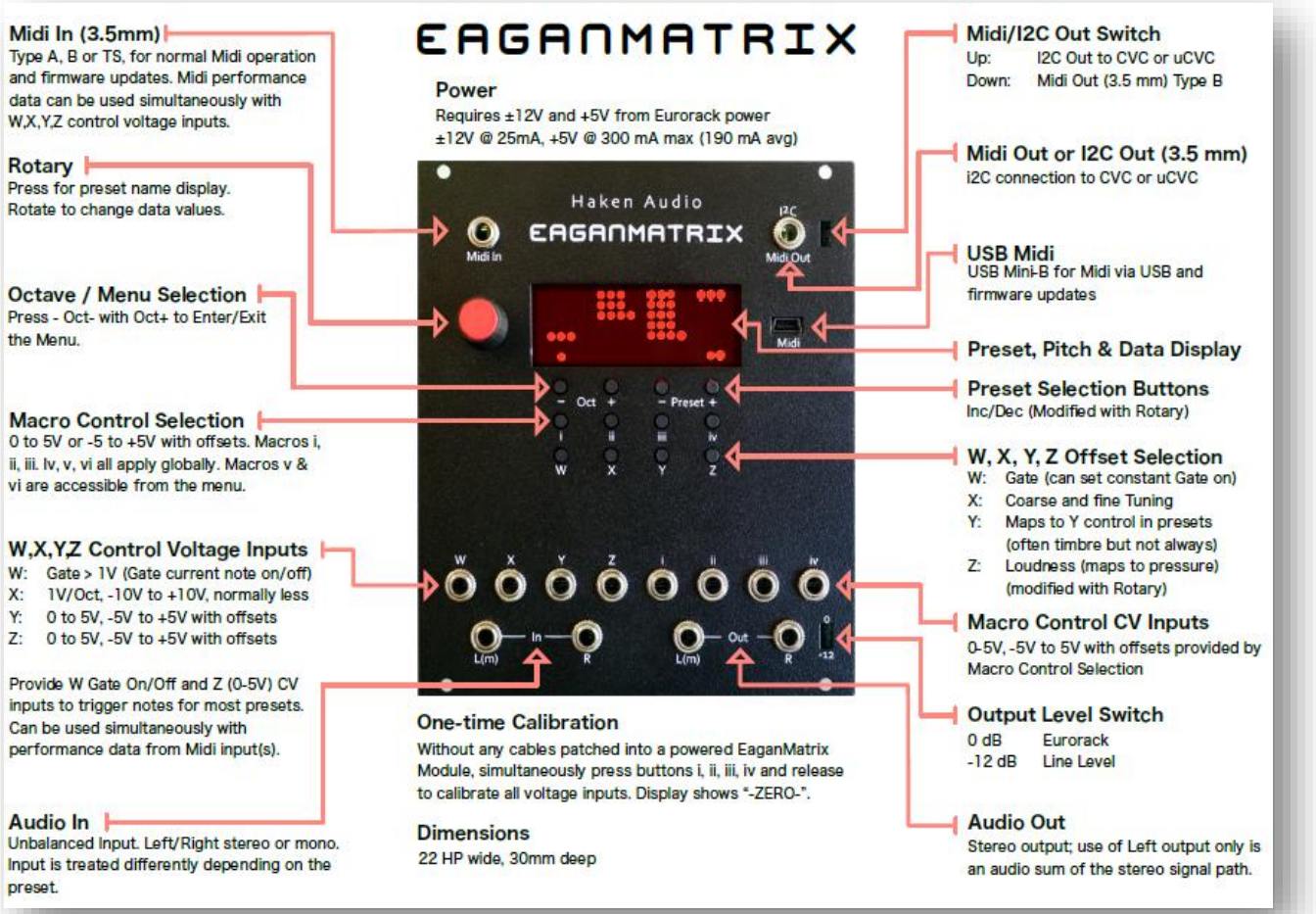
The following section describes the EaganMatrix Eurorack Module available from Haken Audio.

19.1 EaganMatrix Module Overview and Connections

The EaganMatrix Module is a Eurorack implementation of the EaganMatrix functions available in a 2X processing Haken Continuum, such as the ContinuuMini. It allows Eurorack systems to take advantage of the numerous physical modelling capabilities available to Continuum and Osmose users replacing the Continuum Fingerboard or Osmose keyboard inputs with CV inputs from any Eurorack or CV based controller as well as identical Midi control supported by the Continuum/ContinuuMini.

As with Continuum, the EaganMatrix module supports preset configuration, control and editing through the Haken Editor that runs on PC or MAC. A computer is not needed to use the EaganMatrix module if you do not wish to create or edit EaganMatrix presets. The module also supports the same Midi input and control functions described in this manual, either directly through a TRS Midi connection or through a USB port (Note: if you want to control the EaganMatrix Module through USB without a computer you will need a USB Midi Host which is not needed if you want to use the TRS connections).

Controls and connections for the EaganMatrix Eurorack Module include:



19.2 Connecting and Powering your EaganMatrix Module

1. Observe proper electrostatic precautions when handling your EaganMatrix module.

2. Before plugging the module into your Eurorack setup and powering it, make sure the included ribbon cable is correctly connected to the EaganMatrix Module. The circuit board has a clear minus 12V label on it. The colored stripe side of the ribbon cable connector should be under that "-12V" label. It should be shipped connected to the module, but if it is loose gently press the connector on the pins so it is firmly attached.



3. With the power of your Eurorack case or enclosure **turned off**, connect the other end of the ribbon cable to the power connector so that the -12V side is oriented correctly for your system. The connector has a guide that should allow it to only be plugged in the correct way on most enclosures, however some may allow the connector to be inserted in either direction, so it is always best to make sure you know which side of your encloser's power connectors is the -12V side. ELECTROCUTION HAZARD: NEVER TOUCH ANY ELECTIC TERMINALS WHEN ATTACHING THE POWER CABLE TO YOUR BUS BOARD.



4. Screw the EaganMatrix module to your enclosure or rack using the provided screws or M3 screw of your choice. Four are included with the module.

5. We suggest before powering you connect the Audio Outputs of the module to your desired Eurorack output module, mixer or amplifier. Note that there is a switch on the lower right of the EaganMatrix Module that sets 0dB Eurorack output level (if you are sending the output to other Eurorack modules) or -12dB (if you are sending to a line level input). If your output appears way louder or software than expected check this switch or the current Attenuation which will be described below.

6. Connect up other inputs and outputs to the EaganMatrix module as desired (Midi connections, CV connections or Audio Connections).

7. Turn on the enclosure's power when all Eurorack Slots are either fully populated with cards or blank panels. After a few seconds the module will complete booting and display the current firmware version installed before going into performance mode where it is ready to take a CV and/or Midi input. If you discover you are not running the latest firmware available on the Haken Audio web site, you should install the latest editor and download the current firmware to the module. The firmware upgrade process is identical to that used on the Slim Continuum or ContinuuMini described in this manual.

19.3 Initial Setup and Use

1. Once powered, the EaganMatrix module is ready to play with 400+ System Presets (fixed in flash) available for selection as well as storage for 128 User presets (8 banks of 16) that can be any of the System Presets, possibly altered for your needs or presets you create or share with the EaganMatrix community. The module is shipped with the first 16 user presets populated with a selection of system presets. Presets from Haken Continuum, ContinuuMini and Osmose can run without alteration on the EaganMatrix module, but many presets require optimizations for best use on each of these instruments. This section will cover the basics of EaganMatrix Module operation and the primary use case setups. Note: Some use the term patch to denote an EaganMatrix preset. The two terms can be used interchangeably, however, preset is the term used in all Haken Audio documentation.

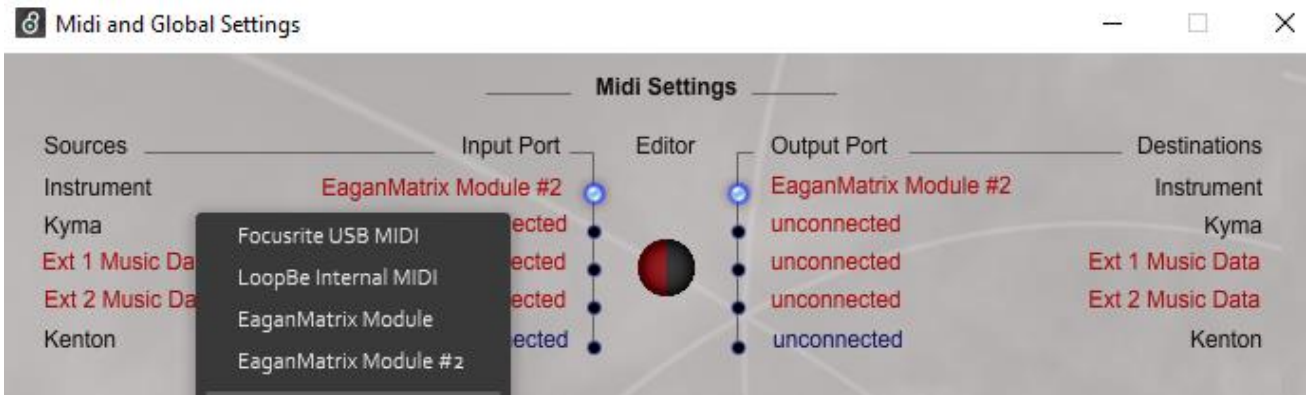
2. After powering and basic audio output connection, you can start playing the module through CV inputs alone and/or MPE, MPE+ or standard Midi inputs. Note: Midi 2.0 is not currently supported. See information below on use case suggestions for playing the module.

3. The Haken Editor is not required to use the EaganMatrix module but it is required if you want to a) create or alter presets, b) set/control some of the configuration parameters that are not available from the EaganMatrix Module's front panel or 3) update firmware. In addition, most all EaganMatrix parameters can be controlled through Midi controllers sending the appropriate CCs, such as BeatStep Pro, Kenton Killamix, etc. (see Section 15). The module supports CV inputs for Gate (W), Pitch (X), Loudness (Z) and an arbitrary control (Y) that maps to front to back motion on a Continuum. CV inputs are also available for the first four Macro Controllers. Provide Gate to W, 1V/Oct Pitch to X and a volume envelope to Z to play most presets.

4. The editor is also required to load new firmware into the module. The first thing you will want to do is load the current version of the editor from the Haken Audio web site (www.hakenaudio.com: Support) if the version on your EaganMatrix module is older than the current distribution and then update the firmware on your module. After downloading the editor, follow instructions for installation (either for PC/Windows10/11 or MAC).

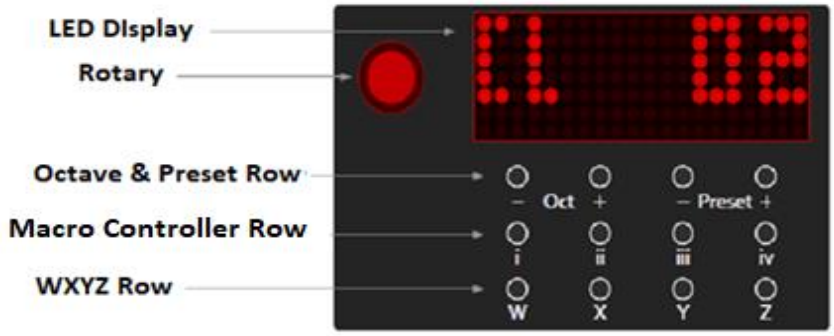
5. The Haken Editor will respond visually to EaganMatrix Module CV inputs if connected as it does to Continuum fingerboard inputs. The editor is also useful when connected to the module for supporting up to two external Midi controllers without need for USB Midi Host.

Note: The first EaganMatrix Module will show up as "EaganMatrix Module" USB device if connected to USB. In the Haken editor it will be differentiated as "EaganMatrix Module #N" if you have multiple modules connected.

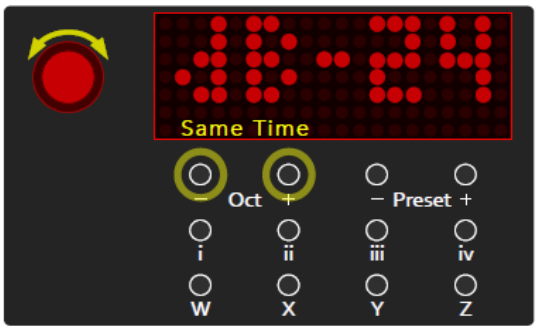


19.4 EaganMatrix Module Control and Display Functions

The EaganMatrix modules contains a LED display similar to that used on the Slim Continuum with many of the same functions assigned to Octave and Preset buttons. The EaganMatrix module contains additional controls and inputs specifically designed for interfacing to and controlling the module from a standard Eurorack setup. This section details the control and display functions of the module:



19.4.1 Menu Mode



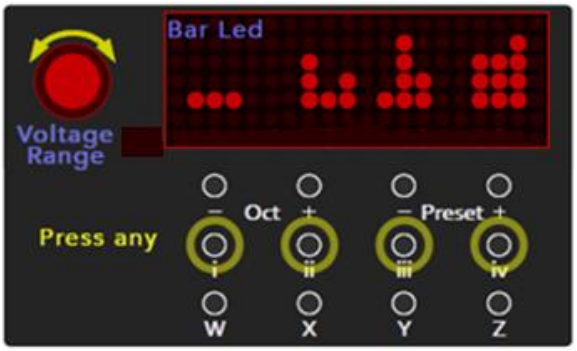
Pressing the **Oct +** and **Oct –** buttons together will enter the Menu mode.
Pressing the **Oct +** and **Oct –** buttons together a second time will exit Menu mode.
Pressing either **Oct +** or **Oct-** individually at that point navigates through the menu system options.
The Rotary or **Preset +/-** buttons can be used in Menu mode to change values of the current menu option displayed. Values will be retained on exiting the menu mode. If you have the editor connected, values associated with the current option will change as you change in the Menu system, and vice versa.

Available menu options are (see section 19.16 below for more detailed explanations)

- **dB** Global Attenuation (value 0—48dB, -Infinity)
- **Ain** Audio Input Level (Value 0-127).
- **RRt** Round Rate (value 0-127).
- **RIn** Round Initial (value Y/N).
- **v** Macro Controller v (value 0-127)
- **vi** Macro Controller vi (value 0-127)
- **EfL** Recirculator/Reverb/Echo Effect Mix Level (value 0-127).
- **EfT** Recirculator/Reverb/Echo Effect Delay Time (value 0-127).
- **EqT** EQ Tilt (value 0-12).
- **EqF** EQ Frequency (value 0-127).
- **EqL** EQ Level (value 0-127).

Note: Except for Global Attenuation, these value are preset specific. If you like a change you have made save the preset as the values will default back to those of the next preset loaded.

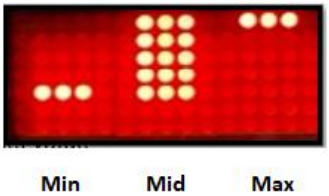
19.4.2 Bar LED Display - Macro Controllers



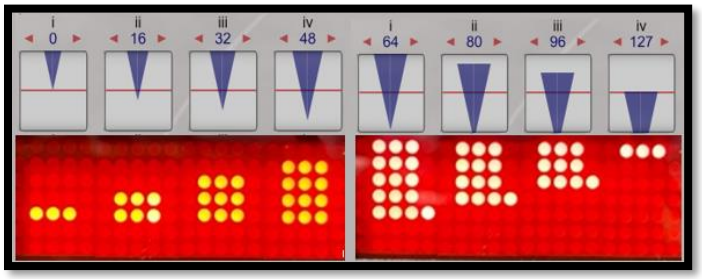
Note: "Macro Controller" is the new name for the older "Bespoke Control" and before that "Barrel and Gen".

Press any of these four Macro Controller buttons (i, ii, ii, iv) to display the bar LED values which represent their current value (sum of the controller offset and any CV input). Whichever controller button is pressed becomes the active control for Rotary input. Use the Rotary to change the Macro Controller offset value for that controller. The Bar Led will respond accordingly. Any voltage applied to the associated CV input will be added to the current value and the bars will change to reflect the new sum. If you are applying dynamic voltage these bars will change and "dance" in real time to display the approximate value as the higher resolution internal voltage associated with the controller maps to a 7 bit Midi value displayed in the editor above the control.

A minimum value (0) is reflected with the bottom bar displaying three LEDS on. A maximum value (127) is reflected with the top bar displaying three LEDs. A nearly mid value (62) is represented with all LED rows displayed. As you turn the rotary you will see how the values add to the bar settings as you increase and decrease: Sets of four columns of LEDs are used to create the bar pattern.



The LED Pattern represents internal Midi 7-bit values from 0 to 127, even though the input voltages are processed at a finer resolution. Although you can determine the exact 7-bit value represented by the LED pattern, it is best to think of it in relative terms. The actual values increase from 0 to 127 shown here for increments of 16 (with associated default editor value graphics):



Macro Controller Offset And CV Input Display

Each one of the four Macro controllers has the same default voltage range: 0..5V. The value displayed represents the sum of the Macro Controller Offset and the applied voltage at the CV input. The default Macro Controller value set in any preset represents the lowest value the Macro controller can take unless you apply negative voltage. For example, if the current preset sets Macro Controller ii to 63 (midpoint) as the default, you can apply 0 to ca. 2.5 Volts to its CV input to increase it to the maximum value, however you will need to apply minus 2.5 volts to the CV input to get the value to move to its minimum zero setting (unless you set it explicitly lower using he rotary, in the editor or through a Midi controller, all of which can change the offset value). If the default offset for the controller in a preset is set to the max value, you will need to apply ca. minus 5V to its CV input to get the value to move to its minimum zero setting. We advise against trying to set Macro Controller offset values in the editor while setting them through CV on the module, though this is possible if you wish.

Remember that the Bar LEDs represent a lower quantized representation of a finer internal voltage resolution.

19.4.3 Bar LED Display – W, X, Y, Z



Press any of these four buttons to view the LED Displays for WXYZ. Whichever button is pressed becomes the active control for offset modification. Use the. Rotary to change the current offset value. The Bar LED will respond accordingly in the same manner as used in Macro Controllers above. As with the Macro Controllers the Bar LED is a summation of the Rotary offset setting and external CV input voltage. These functions are described in more detail below.

Note: It is suggested that you always apply Gate (W), 1V/Oct Pitch (X) and Loudness (Z) when attempting to trigger all sounds. Not all sounds require all three CV inputs, but most will not play as desired unless you supply W, X and

Z. Y may or may not be used in any particular preset. Consult the Help file for any preset to determine which Macro Controllers are used, if Y is used and in some cases how Gate and Loudness Z should be applied.

Remember that most presets are designed to be played on EM Module, Continuum, ContinuuMini and even Osmose. Each have slight differences in how W, X, Y and Z control the sound but in general presets can be played on each of these instrument without alteration, though they might have slightly different playing characteristics and sound because of differences in W, X, Y and Z input/control methods.

19.5 W, X, Y, Z Buttons

19.5.1 W (Gate) Offset Button

W is used as a gate value that triggers at >= 1 volt (internal scaled value). Most preset sounds need to be gated on the EaganMatrix Module (even if they do not use W in the preset's formula construction). W is normally used in two use cases:

- Set W offset to zero through the Rotary to apply normal gate through the W CV input (assuming W is not offset in some manner in the preset). This will be the normal use case, gating preset through triggers, pulses or longer on/off gate sequences. Typically a note will be generated based on Gate On and end on Gate Off. Internally, a Midi Note On/Note Off message is generated in response to the gate On/Off ad sent out the Midi port if you want to use the module as a CV to Midi converter.

- Turn the W value offset with Rotary past 1V to apply a constant gate. This can be useful if you want to only use the Z CV input to trigger sounds even, though Midi note off will not be generated until gate is set beneath 1V.

The W Button can be used to view and set the current W offset value. It can be manually triggered using the Rotary if desired. Turning W quickly right and left an thus gate sound on/off as a playing option.

19.5.2 X (Pitch) Offset Button (Fine and Coarse Tuning the Module)

The X pitch offset button is primarily used to tune the module or set a transposition. Both a gross and fine tune mode are supported.

The **X** CV input is interpreted as a 1 volt per octave voltage in the range -10V to +10V, though a more common range would be -8V to +8V. The "NN.X" value displayed on the LED panel when pressing the X button represents a Midi note number followed by a decimal value indicating how many 10ths of a cent the pitch is from the base Midi note pitch. For example **48.0** represents exactly C3 and **48.5** is 50 cents above C3. The Rotary is used to change base pitch offset as follows:

- Press and release the X button and then turn the Rotary to change the base pitch (as determined from the X CV input) by one half step. The Midi note value will increase and decrease as you turn Rotary right and left.
- Hold down the X button while turning the rotary to fine tune the pitch in 10^{ths} of a semitone (10 cents).

The module tracks internal tuning in this manner as it will generate Midi notes with appropriate pitch bend offsets to match the current X pitch value. In this sense it is different from a free running oscillator where you don't know the exact pitch. You can think of this operation as a built in equal temperament tuner defaulting to A4=440 (though tuning and temperament can be changed using the Pitch table editor and default Just tuning options).

A number of different tuning use cases are supported.

Tuning to An External Pitch Reference

The EaganMatrix module will often be using in combination with Eurorack oscillators that need to be tuned to some pitch reference. One tuning use case is to match the output of the EaganMatrix module's pitch when X CV input is applied to some external reference pitch source, perhaps tuning to some other oscillator that you are using. Unless a different tuning grid is loaded, perhaps through the Continuum Pitch Tables Editor or perhaps a just intonation grid, 1V/Octave equal temperament ratios will be applied in this case.

- Bring up the Utilities/Gated Sine Tone preset to make tuning easier.
- Set your reference tone
- Gate on the Sine Tone (either through W Gate or by turning up W using the rotary past 1V to apply gate on). The Sine tone will play based on X CV in.
- Apply your X CV input that is assumed to match the reference tone you want to tune to.
- Press and Release the X Button. Using the Rotary gross tune by semitone to get close to the reference pitch
- Press and Hold the X button while turning rotary to fine tune to the desired reference pitch (possibly using tuner).
- Release X button and you should be tuned to your reference for the desired CV input..

Note: If you bring up the Utility A=440 preset, a constant tone will be output that you can use as a tuning reference for other modules.

Calibrating a CV Controller Pitch to a Midi Note Number (For example C3/Midi Note 48)

Unlike some standard Eurorack Oscillators, as noted above, the EaganMatrix module is at heart a Midi based synthesizer and to that end you can always calibrate any CV input to a specific pitch based on Midi Note number.

Connect your CV pitch controller to the X CV input, such as an Arturia KeyStep keyboard, or any arbitrary 1V/Octave CV input you wish to calibrate. You can easily "tune" that CV voltage to the pitch (say C3) by turning the rotary until you see the expected Midi note (in this case "48.n"). Fine tune to "NN.0" if needed. This in effect calibrates your 1V/Octave CV input voltage to the desired Midi pitch. You only need the X CV input connected to do this using the LED display. It functions like a built in tuner in this case.

In this manner, for example if you connect an Arturia Keystep's CV pitch output to the X CV input of the EM Module and play C3, if the X display is not 48.0, set it to that value with the rotary using gross and fine X Offset adjustments as needed and you will be playing C3. If you like you can set X to some other Midi note number if you want to set a transposition. You can even add some fine tuning offset if you like if you are trying to match an instrument or audio source that is slightly out of tune.

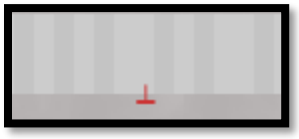
Because you only need X connected to do this, you can tune in silence in this manner as you do not need to hear a tone. You only need to know what Midi note you are calibrating to (see chart below where C3 is highlighted for reference). You can look up similar tables on the internet that map frequencies to these Midi notes as well if desired.

Octave	MIDI Note Numbers											
	C	C#	D	D#	E	F	F#	G	G#	A	A#	B
-1	0	1	2	3	4	5	6	7	8	9	10	11
0	12	13	14	15	16	17	18	19	20	21	22	23
1	24	25	26	27	28	29	30	31	32	33	34	35
2	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59
4	60	61	62	63	64	65	66	67	68	69	70	71
5	72	73	74	75	76	77	78	79	80	81	82	83
6	84	85	86	87	88	89	90	91	92	93	94	95
7	96	97	98	99	100	101	102	103	104	105	106	107
8	108	109	110	111	112	113	114	115	116	117	118	119
9	120	121	122	123	124	125	126	127				

Global X Pitch Offset

If you remove the X CV input, the X display will display its base pitch offset. This can be set down to Midi note 15, which is beneath playable notes on the piano (19.45 Hz). It can be set up to 108 (C8), A normal setting will be 24 or 48 to map things to middle C. This value can be changed by the rotary at any time to transpose by semitone per rotary "tweak". Normally you are not concerned with this offset if you are mapping your calibration to the Midi note displayed.

This is similar to changing the placement of Middle C in the editor with the Transposing indicator:



Midi and Tuning

When played through Midi the EaganMatrix module outputs the Midi Note numbers it receives, regardless of what the X display reads for CV use.

19.5.3 Y Offset Button

Y maps to the front to back motion on a Continuum or ContinuuMini which has no meaning on the EaganMatrix module unless you are playing from a Continuum or ContinuuMini over Midi or through a CVC or uCVC. After pressing the Y button you can change its offset with the Rotary or tweak its value during performance if desired.



Many presets use Y in EaganMatrix preset formulas and you can use the Y offset value in combination with Y CV input to control Y functions in presets. Often Y is used for timbre or filter cutoff control, but it can be programmed to affect EaganMatrix formulas in many ways. Not all presets use Y.

Think of it as an extra control that can be applied to a preset. See Help information on any particular preset to determine the effect the Y parameter has on that preset. It is globally applied to all instances of Y used in the preset.

Y scales 0 to 5V, however like Macro Controllers if a Y offset is set > 0, you can apply negative Y CV input voltage to reduce the value beneath the current offset setting. If you apply no Y CV input, the Y value will be whatever is set as the Y offset, either through the Y button and Rotary (or **Preset +/-** buttons).

19.5.4 Z (Loudness/Pressure/Aftertouch) Offset Button

Z is Loudness which maps to pressure (and most often dynamic volume control) on a Continuum. For the EM Module think of it as a static or dynamic envelope you can apply. Most presets assume that the

fingerboard is being pressed and if you gate a preset and get no sound, it is likely because it also requires Z to be set. A common use case it to use an Envelope Generator with VCA to apply a dynamic Z shape.

Set Z to apply an offset to the Z CV input. This maps to Aftertouch Midi output if a preset is set to MPE or MPE+ or CC output if the preset is set to a CC mode - say CC11 for output). Typically this should be set to zero so that complete dynamic control can be applied through the Z input (for example by an envelope generator).

For most presets, Z alone will not have any effect ules you also gate with W.

19.6 W, X, Y and Z CV Inputs

These four CV inputs are used to control/play the module in real time using control voltage sources. Standard mono Eurorack cables are assumed.

19.6.1 W CV Input (Gate and Preset Control functions)

Assuming the W offset is set to 0, the W CV input, if > 1 V (internal scaling) triggers a W gate in the current EaganMatrix preset as if you have pressed the fingerboard on a Continuum to play a note. Its value will be offset by the W button value. The W offset should normally be set to minimum (0) so gate functions as expected through CV input, but W offset can be set to always have gate on and if the preset does not use gate for anything specific (like Envelope or SG control) , Z alone can typically be used for volume control with no W CV input. Note in this case you will not get expected Midi Note On/Note Off outputs as that is dependent on W gating.

W CV input does not affect W when used as a constant in presets.

It's always suggested that you connect W, X, Y and Z when initially experimenting with the EaganMatrix module to have best chance of generating the audio output you expect from presets. Once you learn what parameters control that preset (W, X, Y, Z, I, ii, iii and iv) you can be more selective on your approach to CV input control.

In addition to gating notes on and off, W can be used for other internal control operations in a preset.

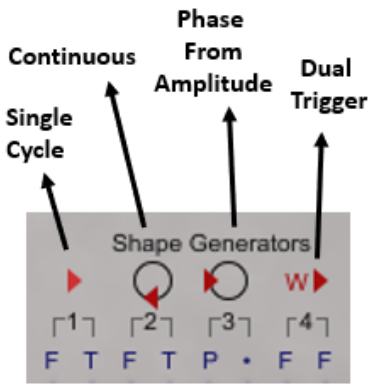
- Shape Generator Control
- On/Off Switching/triggering of internal preset components
- Direct output as a 0 / 1 (Unity) amount
- CVC/uCVC Gate mapping

This does not apply to presets that use W as constants in formulas. Those values are not affected by CV W or offset changes.

W Function (Shape Generator Control)

A common use of W gate function in EaganMatrix presets is to either trigger a shape generator for envelope control (often using a single cycle SG) or to impart some repetitive element (most often involving continuous shape generators). While SGs can be set to be free running, they are most often triggered on/off by a W gate either in a single cycle or continuous mode. Shape Generators also support Phase from amplitude and Dual trigger options that can be W controlled, but these are infrequently used compared to the other two SG options (see Shape Generators for more information).

Shape Generator Modes: Single Cycle, Continuous, Phase from Amplitude, Dual Trigger:



Care should be taken when using a Eurorack envelope generator on presets that already use a shape generator based envelope. If you are triggering a preset with a W Gate and connecting the output of an envelope generator to the Z CV input and you do not get expected results, consult the help information on the preset to determine if you might be creating a second order envelope effect (trying to impart an envelope when one is already present when the preset is gated). Then again you might create some interesting effects this way not possible from the Continuum Fingerboard.

Some EM Module presets are designed to constantly output a steady timbre, like a standard Eurorack Oscillator. In this case you can apply normal Envelop or shape functions through Z.

W Midi Output and Note Priority

When W gate is applied a Midi Note On Message will be generated and when gate is removed a Midi Note Off message will be generated in the Midi outputs stream. The Midi channel associated with the Note is determined by the MPE and Note Priority setting. The two most common priority settings are Oldest Midi Channel and Lowest Midi Channel (see the Continuum manual for details on all Priority settings). The Midi output may also contain Z based Aftertouch and X based Pitch bend information.

- **Note Priority Oldest (Default)**: Successive note gating will output midi notes cycling through channels 2..Max Polyphony defined for that preset + 1. Max polyphony for the EaganMatrix Module is 8, but a preset can be set lower than that.
- **Note Priority Lowest**: Successive note gating will output midi notes on the lowest channel. For MPE/MPE+ presets this will be channel 2. Because EaganMatrix module CV input is monophonic, we suggest you set your presets to Priority=Lowest so you can always predict your output will be on a specific channel. Note that is you are also using Midi input in addition to CV input, you may not be able then to predict CV channel.

19.6.2 X CV Input

The X CV input almost always maps to 1V/Octave pitch in a preset (but does not have to). Tune/calibrate X CV input and offset using the X button as described above. When gate is on, X CV input will generate Midi Note and Pitch Bend output unless the preset is set to a totally rounded (semitone quantized) state.

X in EaganMatrix presets often does more than simply control pitch output as would be expected in a standard Eurorack oscillator. X is also used in various ways to scale pitch and possibly control other pitch and non-pitch related parameters. These additional functions should be considered if a preset does not perform as expected in terms of pitch input/output in addition to checking the X (button) offset value to make sure you have not offset your pitch in some unexpected manner.

X CV Input and Rounding: The Rounding setting will automatically scale X CV input. If your current preset is set to be fully rounded (Instant), X input will increment by half step unless EaganMatrix programming or scale support maps that in some other way (such as quarter tone or even whole tone change, etc.). If you want a preset to respond to continuous and smooth dynamic pitch and output appears to be quantized, check in the Menu system or editor if Rounding Rate is set to "Instant" or some other high value. Note: Rounding Rate (RRt) and Round Initial (RIn) can be set in the EaganMatrix

module's Menu. Setting these values in the Menu system will change the associated values in the Haken editor if it is connected.

Fully rounded/Quantized (Instant):



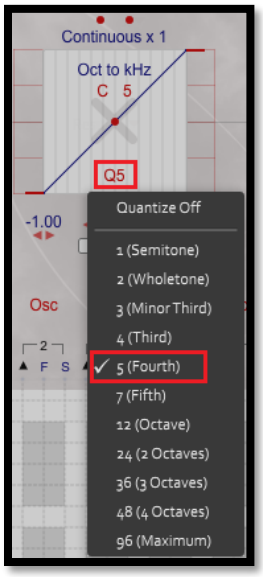
Turn this off if you want smooth continuous pitch based on X input to the highest resolution, however, note that some presets are programmed to be quantized for best effect and other presets have different degrees of default routing applied.



You can also set Rounding Initial from default off state to jump to a tuning map if you desired (see Haken Continuum manual for more information).



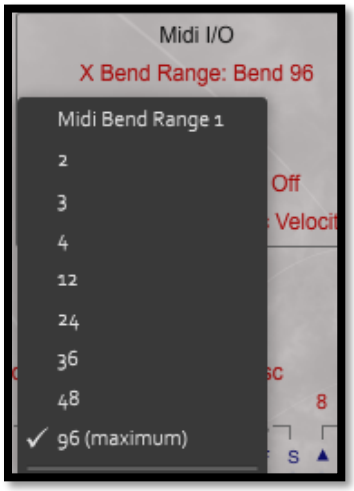
Finally, if you set Rounding Rate to Off and you still have quantized pitch motion when applying the X CV input to a preset, check that the preset's formulas that affect X are not setting quantization – which can be set to a number of options as below.



Note: The majority of presets do not apply internal quantization and it's suggested you keep Rounding Off unless you explicitly want rounding effects.

Midi Pitch Bend Setting

The Midi I/O Pitch Bend setting can limit the amount of Midi Pitch Bend (PB) information that will be output based on X CV input. This defaults for most presets to 96, which will output an enormous amount of data. You can set the bend lower to limit this output down to PB=1 if you wish. Also if you are playing your EaganMatrix Module through a Midi Controller and not using CV input, you will want to match the pitch bend value of your controller to the value set for your preset (see Continuum Manual).



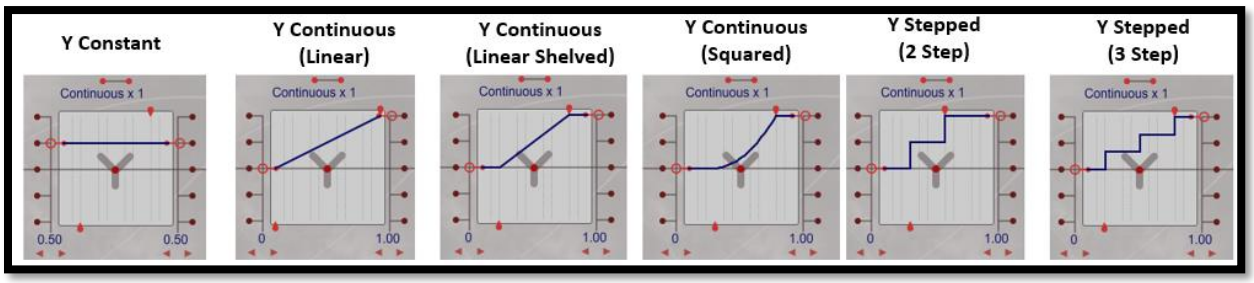
19.6.3 Y CV Input

Y CV input is used to control non-constant (see below) Y formulas in a preset offset by the Y button value. Y maps to front to back motion on the Continuum fingerboard, but in this context is mapped to any voltage sent to the Y input, possibly from a controller, LFO or other CV source. Y input is often used to alter timbre of the preset in one way or another (Spectral Balance, Filter cutoff, etc.), most often using a continuous function, but also possibly a stepped function. A stepped Y function will change Y if the CV voltage exceeds the current step threshold.

If the preset is set MPE+, Y input will generate a constant stream of CC74 and CC87 Midi output
If the preset is set MPE, Y will generate a constant stream of CC74 output.
If preset is set to use CCs on Y and Z, Y will generate a constant stream of the specified CC output.

With the exception of Y constant formulas, Y CV input will map to Y formula function. Don't worry about this. It's best to just experiment with the preset using Y CV input and read the help associated with each preset to determine how Y is used. That's all you need to know to use Y effectively, though not all presets use Y and in that case Y CV input will have no effect

Possible Y functions:.



19.6.4 Z CV Input

Almost all presets (except for Drones) use Z as dynamic volume/loudness control (mapping to Continuum fingerboard pressure). The Z CV input, offset by any Z button value, typically creates a dynamic amplitude envelope, almost always as noted upon W gating. Since the EaganMatrix module does not have a fingerboard (unless Continuum or ContinuuMini is connected through CV or Midi) an envelope or pattern generator of some type is typically used as a Z CV input.

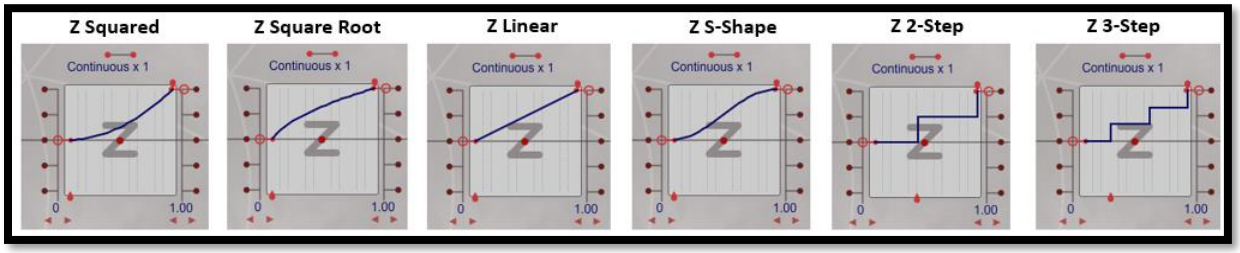
If you are not interested in dynamic repose, simply connect a copy (mult) of W Gate to the Z CV input. Another common option would be to use a sequencer and gate a preset with W and send Velocity (or its Midi-to-CV conversion) into the Z CV input.

If a gate is applied, Z will control volume and also output continuous Aftertouch Midi data if the preset is set to MPE or MPE+, otherwise it will output the CC value set:

Z CV input is scaled in relation to a number of predefined Z pressure/Loudness functions (like Y above). If a continuous ramping voltage is applied to Z, it's rate of change will be mapped to the associated transfer function used in its preset formulas as seen in the table below. Note that Z used as a constant in a formula will map to the default Squared function. Most presets use the default squared mapping function but if the output dynamics of a preset do not seem to be what you expect, it could be because a non-Squared function is being used. Eurorack users are used to squared and linear mappings. The EaganMatrix allows you must greater flexibility.

Don't worry about this too much to start. Just experiment sending Z CV into a preset and hear what happens. Applying a smooth LFO shape to Z can help to understand how Z controls volume shaping for a preset (though Z can be applied to other parameters besides loudness in a preset). Not many will want to reprogram presets, but this is always possible if you desire to change one of these Z mappings.

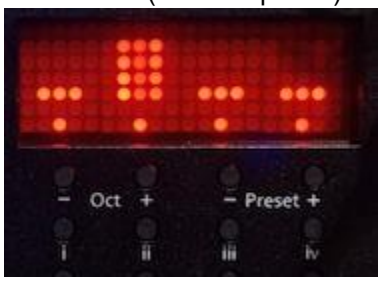
Possible Z functions:



Again, always apply W gate to be safe when using Z CV input. You can set W to output a voltage > 1V using the W button and rotary and then play many presets only using X and Z CV inputs, but there are so many things in a preset that might also use W gate, it is safest to connect W, X, Y and Z CV inputs to start until you understand how the particular preset you are using responds to the inputs. And remember you can also use Midi input in conjunction or instead of CV inputs.

19.7 Macro Controller Offset Buttons (i, ii, iii, iv)

These all work the same way. If you press any of these buttons and release it, that Macro controller's offset value (for example "ii") can be changed using the rotary from its default value set in the preset.



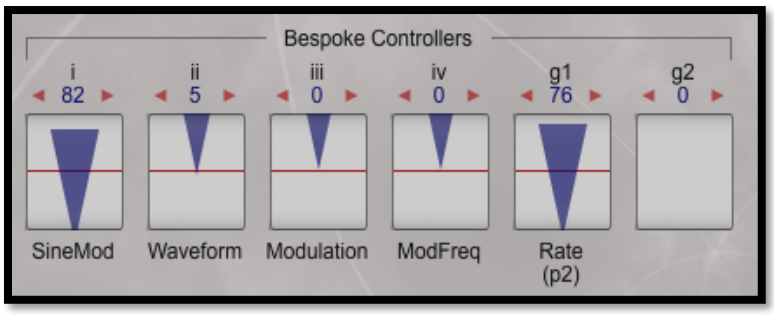
This value will be added to any value that is present on the associated Macro Controller's CV input.

You can use this as the sole Macro Controller if there is no CV input real-time through rotary control - a normal use case for Eurorack knob lovers. Many presets have predefined Macro Controller values that when changed alter some aspect of the preset's sound (perhaps waveform/timbre, filter shape, range of modulation, recirculator reverb or echo amount, delay time, convolution Body setting, Shape Generator frequency, etc.). Not all presets use Macro Controllers.

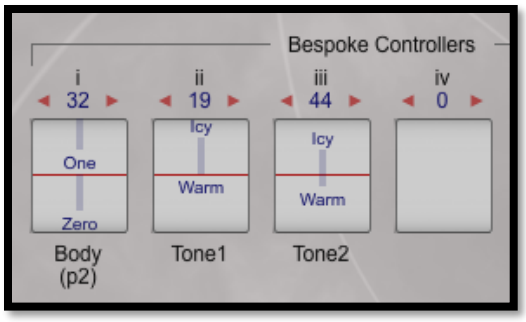
Any combination of Macro Controllers can be used in any particular preset. For example a preset might only use controllers ii and iv. Some presets use no Macro Controllers. In that case changing these offset values either through CV input or through the offset value will have no effect. Consult the help information on each preset to determine what Macro Controllers apply and what their effect is.

Note: Some presets use Macro Controllers v and vi (the old Gen1/g1 and Gen2/g2 controls). You must access controllers v and vi from the EaganMatrix Module's Menu system and adjust with the rotary or adjust them from the Haken Editor or through external Midi Control (see CC table below).

Note that any change you make on the module to one of the Macro Controller values will dynamically be reflected in the Haken Editor display and any change you make in the Haken editor will be displayed on the EaganMatrix Module's display.



The editor lets you assign names to these controls as well as define an arbitrary set of string that will be displayed for the range of the control in addition to range graphics as seen above.



Macro Name Display

If you press and hold one of the Macro Controller buttons, the programmed name of the controller is displayed. The internal ranges are not displayed on the EaganMatrix Module.



Macro Controller values (including v and vi) can also be changed externally through Midi CCs using a Midi controller such as an Arturia Beatstep/Beatstep Pro, Kenton KillaMix or any number of other controllers that can change CCs. The CCs used to do this are:

- Controller i = CC12
- Controller ii = CC13
- Controller iii = CC14
- Controller iv = CC15
- Controller v = CC16
- Controller vi = CC17

It is possible to create some very interesting interactions of these controls affecting the sound in very complex and sometimes unpredictable ways if you control them through multiple sources (say CV input in addition to control from a DAW over Midi), but in general this should be avoided so you can predict control of your output.

Using the Haken Editor you can change how these Macro Controllers affect a System Preset, add additional controls to a System Preset (if you have free controls) and of course use them as you see fit in presets you create.

Also note that most presets set Macro Controllers at some predefined starting point, not zero. If you are used to playing a preset on the Continuum, ContinuuMini or Osmose and you load that preset into the EaganMatrix Module, it might not sound the same to you if you are applying some Macro Controller CV offset or CV input that is different from the preset's default value.

One very common method of playing a preset on the EaganMatrix module is to play a preset from a controller in one hand while manipulating Macro Controller offsets with the rotary or through CV controllers in the other.

19.8 Macro Controller CV inputs (i, ii, iii, iv)

These inputs all work the same way. You can apply a CV voltage that will be added to the Macro value offset. As noted above, if the Macro Controller button is pressed, a bar LED range pattern will be displayed to indicate the current setting. Also, if you bring up the editor you can see exactly what Midi converted value is set. Note that the voltage will scale internally to a Midi value 0..127 which is applied according to the preset programming.

The Macro Controller inputs do not have to be static values. Often LFOs and other dynamic voltage changes are used to create interesting effects. The Macro Controller inputs are intended as low frequency non-audio inputs, ideally 20Hz or less if using as LFO inputs, however they can realistically go as high as 80-100Hz before they are likely not that useful.

Voltage Scaling: The overall range of the Macro Controllers is 0-5V. If the current Macro Controller offset value is > 0, either as a preset default setting or set through the Macro Controller buttons or external Midi, negative voltage must be applied to reduce the control value beneath its current setting.

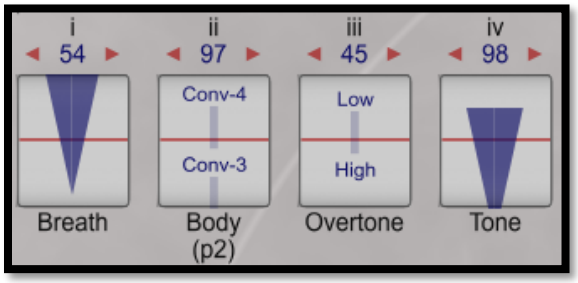
The current input voltage setting is indicated by a dot pattern under the Macro Controller Range LED pattern (see above).

Note: If you apply voltage out of the defined input range, the values will clip to the current min/max range. There is no danger in applying a full -10 to +10V range on these inputs.

Default Macro CV Offsets

To ensure that presets play as intended across all Haken audio products, when a system preset loads on the EaganMatrix module, its default Macro Controller CV offsets will be set to the default values set in the preset (same values that will appear in the Editor).

For example on loading the Tin Whistle preset, the default Macro Controllers are set as follows:



As noted above, if you want to reduce any of these values from their default settings (i=54, ii=97, iii=45, iv=98), you must apply the appropriate negative voltage to scale them down to the desired level. Positive CV inputs will only increase their values from the set defaults.

19.8.1 Connecting and Unterminated Cable to CV inputs

The Macro Controller CV inputs are A/D sampled at a much lower rate than the audio inputs. You may notice that connecting an unterminated (floating) cable to any of the CV inputs (W, X, Y, Z, I, ii, iii and iv) changes the LED display and associated value. There is no harm to the module, but this can alter the expected output. Always terminate all EM Module CV inputs to a desired CV output if connected.

19.9 Preset Selection and Display

The EaganMatrix Module (as all 2 DSP processing and greater Continuums) supports 128 User Presets that are stored in Category 0 (**usr** category) and then over 500 (TBD) fixed System Presets arranged in categories:

CL: Classic	**OT: Other**	**UT: Utility**
CV: CVC	**PE: Percussion**	**VO: Vocal**
DO: Drone	**PR: Processor**	**WI: Winds**
KY: Keyboard	**PT: Perc Tuned**	
MD: Midi	**ST: String**	

User presets can be changed by the user on the EM Module, in the Haken Editor and are arranged in 8 banks of 16 presets in the Editor. The EaganMatrix Module will display them numerically from "**usr 01**" to "**usr 128**" when selecting a Preset button. Empty presets will be passed over as you increment or decrement presets manually with the Preset buttons.

If you push the Rotary, the Preset's name will scrolled on the LED display.

If you are in a Macro Controller or W, X, Y, Z Offset display, pressing the **Oct -** of **Oct +** buttons will return to Preset display mode.

If you load a preset directly from disk using the Haken editor, it will be displayed as "**usr 00**". This can be saved to any of the User Preset slots if desired (see below).

Note: Changes to a user preset will remain as long as the preset has not been changed. If you repower the module, it will reload the current settings for the current preset. If you want to save changes you have made to a preset either save them in the Haken Editor or save the changes to a User Position (which can be the same User position you are working on). You must save a preset to retain any changes you make to it.

Preset Selection Methods

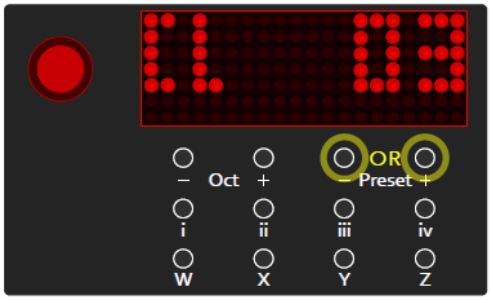
Presets can be selecting in various ways(similar to preset selection on the Slim Continuum):

- Using the **Preset +** and **Preset –** buttons on the module (see modes below)
- Using the new Haken Editor Preset category/filtering selection interface
- Using the Editor clicking on a User Preset
- Hold Oct – and turn Rotary to change Category. Hold **Oct +** and turn Rotary to change preset in current category
- Using an external controller that can send the appropriate CC and Program Change messages to change presets (for example from a Beatstep Pro controller).
- Loading a preset from disk from the Editor

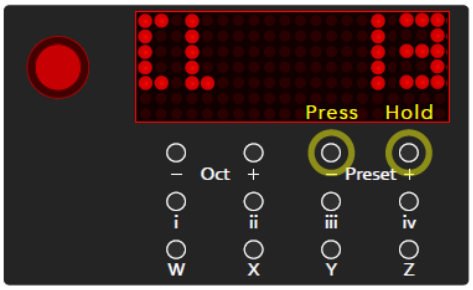
Preset Button & Rotary operation on the EaganMatrix Module

- **Preset + (increment) button:** Press to increase preset number in ascending numerical order. The preset Category and preset within category will be displayed. You can always press the rotary to see your current preset name. Presets will move through the User Presets and then continue into System Presets until the max System preset is reached. Note that if a User Preset slot is empty, the preset increment will move to the next populated preset position in the sequence up or down. A single press will increment to the next preset. Holding the **Preset +** button down will autoincrement presets until you release the button.

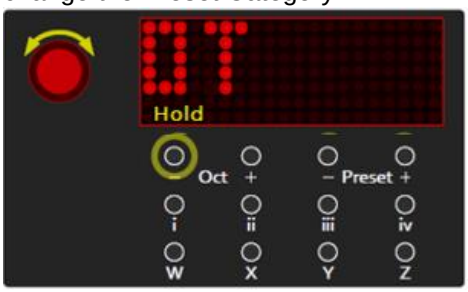
- **Preset – (decrement) button:** Press to decrease preset number. You can always press the rotary to see your current preset name. When the first User Preset is reached, the preset decrement will then cycle to the highest System Preset and then continue decrementing. A single press will decrement to the previous preset. Holding the "Preset –" button down will autodecrement presets until you release the button.



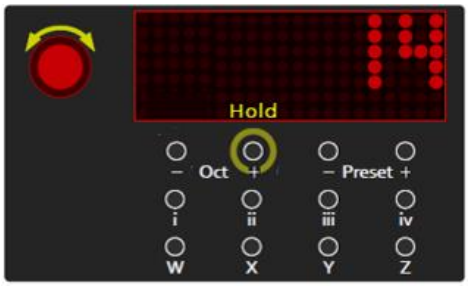
- **Preset Increment in 10s:** Hold **Preset +** and then while holding press **Preset –** to increment presets by 10s. You can singly press **Preset -** to do the operation once or hold it down to move in sets of 10.
- **Preset decrement in 10s:** Hold **Preset -** and then while holding press **Preset +** to increment presets by 10s. You can singly press **Preset +** to do the operation once or hold it down to move in sets of 10.



- **Preset Category Selection with Rotary:** While holding down the "Oct –" button turn the rotary to change the Preset Category.



- **Preset Selection within Category with Rotary:** While holding down the **Oct +** button turn the rotary to change the Preset number within the current Category.



- **Preset Name Display:** When the Category and Preset number are displayed, press the Rotary by itself to scroll the name of the current preset. Release Rotary and the 2 Character Preset Category and preset number in that category will return. Here Wind (WI) preset #1 is "Bagpipe".



19.10 Saving Current Preset to a User Preset Position on the Module

Use the following button sequence to store any of the System Presets or the current preset (which could be on you just loaded from disk) into one of the User Preset positions. (Note: this is the same procedure used on the Slim Continuum):

- Load from disk or navigate to a System Preset to make it the current preset you wish to store in one of the User Positions.
- Press and hold the Octave increment ("+") button and then press either the Preset increment ("+") or Preset decrement ("-") button (you can also press them together).
- The display should change to show "**to nnn**", where "nnn" is the **usr** preset position to which you want to store your preset.
- While continuing to hold down the octave increment button use the Preset increment or decrement buttons to move to a user preset position of your choice noting it may have a user preset already stored in it, which will be overwritten.
- While holding **Oct +** during this operation you can press **Preset +** and while holding that press **Preset -** to increment user preset positions by 10. Holding "Preset –" while pressing **Preset +** will decrement by 10. You can easily move through the entire 128 user preset positions to select the slot you want to store in.
- Release all buttons and the current preset should now be stored in the desired user preset "nnn") location you selected. Scroll to preset "usr nnn" to confirm or display that in the editor.

19.11 Saving Current Preset Using the Haken Editor

You can also use the Haken Editor to store System Presets you may have edited or presets of your own creation in one of the 128 User Preset positions (preferred method if you have the editor connected).

- Navigate to the desired User Preset bank you want to store in.
- Shift-Click on the desired User Position to store the current preset (which you may have modified) to that position
- You can also drag a preset file from the disk to the desired User Preset position

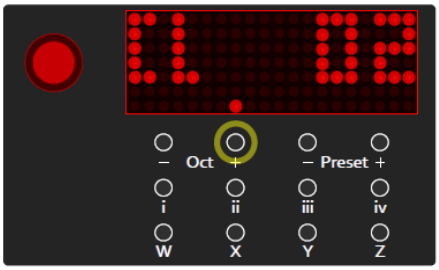
19.12 Octave Shifting

Press the **Oct +** button to raise pitch by an octave. Press again to raise by two octaves.
Press the **Oct -** button to lower pitch by an octave. Press again to lower by two octaves.

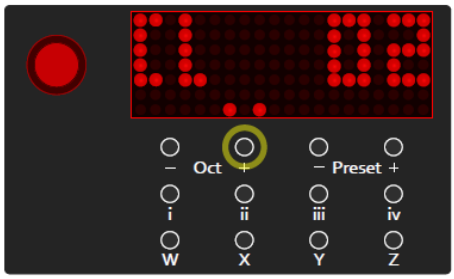
Note that you must re-gate to hear the octave shift.

The current octave is indicated in the performance mode by dots on the bottom left corner of the LED screen

- No dots = No octave transposition in effect
- One dot to the left = Octave down
- Two dots to the left = Two octaves down
- One dot to the right = Octave up
- Two dots to the right = Two Octaves up



Pressing the **Oct +** (plus) button once will transpose the pitch up one octave. An octave LED indicator appears over the **Oct +** button.



Another press will transpose two octaves up and a second indicator appears over the **Oct +** button. No octave indicators present represents the module is in default concert pitch mode.

Oct – (minus) functions in the same way, except the pitch is transposed down by octaves and the octave transposition indicators appear above the **Oct -** button.

So possible pitch ranges via the octave buttons are: -2 oct, -1 oct, concert, +1 oct, +2 oct.

19.13 Performance Mode Pitch Display

The default display of the EaganMatrix module is the current Preset Category and Preset within that category. Here Preset 41 in the Utility Category.



However if you play notes the display will change to Performance mode.

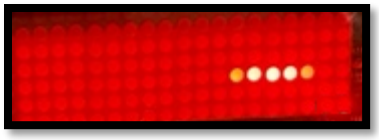
In Performance Mode (normal state of LED panel when nothing is being pushed by notes are played), the LED panel will display a 4-dot pitch tuning indicator in the middle (in addition to possible dots on the bottom row indicating octave transposition on the left and rounding modes on the right).

As X changes, either through X CV input or through Midi note input with Pitch Bend applied, the four LED pattern will move to the left to indicate incoming pitch is flatter than the closest Midi note related to the X frequency input or right to indicate it is sharper than the closest Midi note.

If you are playing a Midi keyboard (either through Midi or if CV was calibrated to a Midi tone), pitch should always be centered for a static pitch input as would be generated from a midi keyboard.



However if you are playing using a continuous controller that is applying pitch bend, pitch could be flat or sharp in relation to the closest Midi note and the indicator could move around. This will be the case if you use a Mod wheel that applies pitch bend.



This function is very useful for zeroing in on center pitch when playing the EaganMatrix Module with a Continuum Fingerboard (possibly through CVC/uCVC) or perhaps a from Doepfer ribbon controller, or any dynamic pitch input.

19.14 Rounding Display

In normal playing mode, dots on the lower right corner of the LED display indicate the rounding mode set. These indicate:

- **Normal Rounding mode is On. Set When Rounding Rate is > 0** (which can be set in the Menu Configuration Mode as well as Haken Editor or through Midi CC 25). This will constantly round the 1V/Oct pitch input according to the round rate from no rounding (Rate = 0) to full semitone quantization (Rate = 127). Some presets have Rounding enabled and other don't. Round Rate can be set in the Menu controls.

  If pitch voltage is applied to X CV in, hat voltage will be rounded and pitches will possibly not play the notes you expect if you are not aware of the rounding being active. When rounding is set to its maximum value (127), semi-tone quantization will occur.

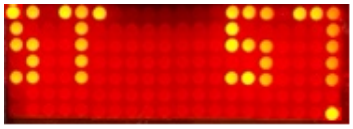
  Round Rate > 0 displays two LEDs on in the bottom right row.



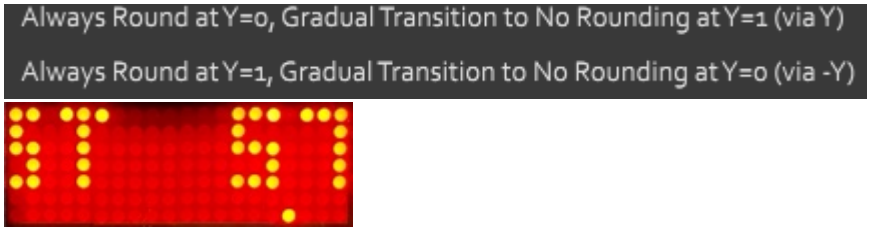
- **Initial Rounding On.** This will cause the X CV input to jump to the current tuning grid and then any rounding if preset will take effect. The third LED from the bottom right indicated initial rounding is active:



- **Rounding After Finger Lifted.** This is intended for Continuums when lifting fingers. Notes will be rounded on the lift – or in the EM Module case when Z voltage is removed. It is debatable how useful this is for the module. A single dot on the bottom right row indicates this function when Round Rate > 0



- **Y Rounding Options** - Two options to round according to Y value are more intended for Continuum fingerboard use. This is indicated by the fourth LED to the left on bottom right row.

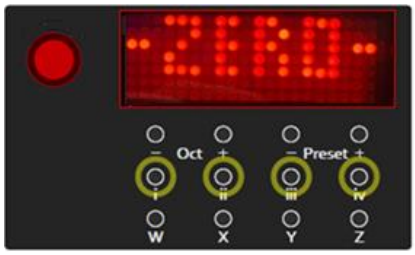


Different combinations of rounding will create the expected LED pattern on the bottom row based on the LED operation above, for example Normal Rounding combined with Initial Rounding:



19.15 CV Input Voltage Calibration A/D (Analog to Digital Converter)

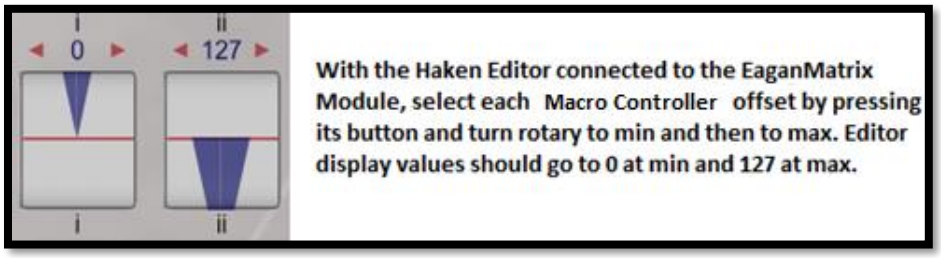
If you press all four Macro Controller buttons simultaneously and hold, "ZERO" is displayed on the LED screen and after you release, the Macro Controller inputs will be recalibrated: the A/D converter recalibrates what voltage corresponds to 0V on each input. This operation should be performed with no CV inputs connected. When applying a voltage of 0V to a Macro CV input, the current rotary offset will be displayed, else the rotary offset will be added to the input voltage and the LED graphic will change to the new value.



When to Recalibrate Input Voltage

This calibration procedure is recommended to be performed the first time you use your EaganMatrix module or when sending control voltages into the Macro inputs the display does not seem to reach min and max for your expected voltage scalings. Note you can expect, as with most Eurorack modules, some small percentage tolerance error on voltage scaling.

You may also notice when the Haken editor is connected with no CV inputs connected to the Macro Controllers, when you select a controller offset and turn the rotary from min to max, the editor does not reach its expected 0 and 127 values. **This can be an indication that you should recalibrate.**



19.16 EaganMatrix Module Configuration (Menu System)

The EaganMatrix Module contains a configuration mode accessed from the front panel by pressing the **Oct +** and **Oct –** buttons together (and exited by pressing them together again or any other EaganMatrix Module button).

Once in the configuration mode, use the **Preset +** or **Preset –** buttons to scroll through the configuration options. The rotary can also be used to change values.

The Menu System functions allow you to edit/change the value of a number of EaganMatrix Module Preset parameters and controls (such as Macro controllers, rounding, recirculation etc.). The Menu System is almost identical to that used in the Slim Continuum.

Note: You can move back and forth between parameters in the Menu System setting them to values as you wish and they will be retained after exiting the Menu. These parameter changes will typically only apply to the current preset being edited. When you load a new preset, its default values take effect. If you move to another preset and come back to the one you have changed but not stored, the original setting of that preset will be restored. If you make changes you like and store that preset to a User preset, the changes will be retained. However, in this case make sure you also store that preset to your computer from the EaganMatrix editor if you want to retain those changes as they will be overwritten the next time you store something to that User Preset location.

The values of the parameters displayed in the Menu System will also change on the LED display if altered in the Haken Editor or some other external MIDI controller programed to change these values. With the exception of the Global Attenuation setting, loading a new preset will change the values of the Menu settings unless Midi and Global Settings Preserve is set (see Replace and Preserve options).

19.16.1 Attenuation Control

An attenuation value is display that can be set with the Rotary or Preset buttons. Values range from minus Infinity (no output) to 0dB (max output). Set this to a value that is right for you. Always set this to a low output volume when editing presets, especially if you are new to EaganMatrix programming as you can easily do something in the Matrix that will create a very loud burst of sound. For this reason, also never edit presets with headphones on in case you create a sonic explosion. Setting Pre and Post Gain Levels in Control Panel 2 of the Editor also will adjust volume on any preset.



Note: The Output attenuation display/control in Haken Editor maps to attenuation setting on the EaganMatrix module. If either is set, the other display will change to the same value.

In the editor click on the attenuation value and hold while dragging up and down to change he value.



19.16.2 Audio Input Level ("AIn")

This control sets the Audio input level. Applies to both L and R inputs. Can be set in the range 0 (Off) to 127 (Max Level). This has no effect for presets that do not use Audio input, and in those cases should be set to 0 to be safe in case you attach and input by mistake and output it.

To set the Audio output level (along with all other EaganMatrix component outputs) use the Attenuation Control and also Pre and Post Gain controls in the editor.

19.16.3 Round Rate ("RRt nnn") and Rounding Indicators

This control changes the rounding rate of the current preset for all notes played (the Normal setting in EaganMatrix – Round during the entire note using the specified round rate). A value of zero means no rounding is applied. You can set this from a value of 1 (minimum rounding) to 127 (full rounding/totally quantized).

If Round Rate is set greater than zero it is active. This is indicated by the two rightmost LEDs being on in the bottom row. If Round Initial is off (See below), two LEDs will be displayed.



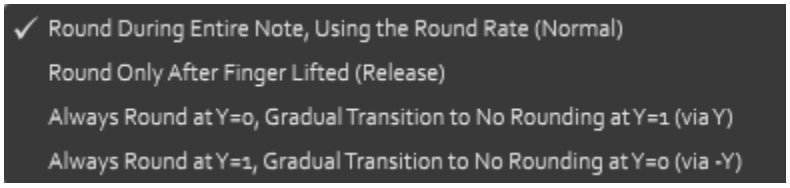
If Round Initial is ON, three LEDs will be displayed:



The leftmost of the two LEDs indicate that rounding will be applied when playing a note. The rightmost indicator indicates that rounding will be applied when releasing a note. This is the default (Normal) setting for Round Rate, however, in the Haken Editor, Round Rate during the note can be disabled and only rounding on release can be set if desired. In this case only the rightmost LED will be preset. Of course there is no fingerboard on the EaganMatrix module, so in this cause "Rounding On Release" means rounding when gate is removed.



Note: Rounding options can also be set in the Haken Editor Control Panel 2.



19.16.4 Round Initial ("RIn Y/N")

This control changes the preset to use Round Initial Mode or not. It can be used in conjunction with the Round Rate control or set by itself if Round Rate is set to zero.

Press the **Preset +** button to set Round Initial to YES ("Y") if it is set to No ("N"). Press the **Preset -** button to change Round Initial to NO ("N") if it is set to YES ("Y").

The LED indication for Round Initial set is the third LED on the bottom row from the right set to on.

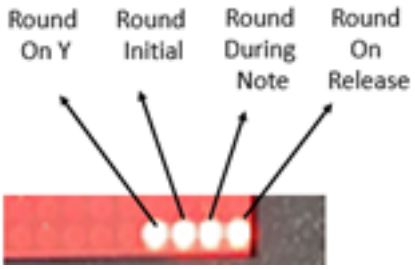


If Round Initial is set with Normal Round rate greater than 0, three LEDs will bet set to on.



Note: The Haken Editor allows for two additional rounding modes on Y (Round Max from Y=0 to no rounding at top of Y and Round Max at Y=1 no rounding at bottom of Y) that are not used that often, but if set in the EaganMatrix for a preset will be indicated by the fourth LED from the right on the bottom row being enabled.

Here is the full LED indicator key for determining rounding mode in the LED display:

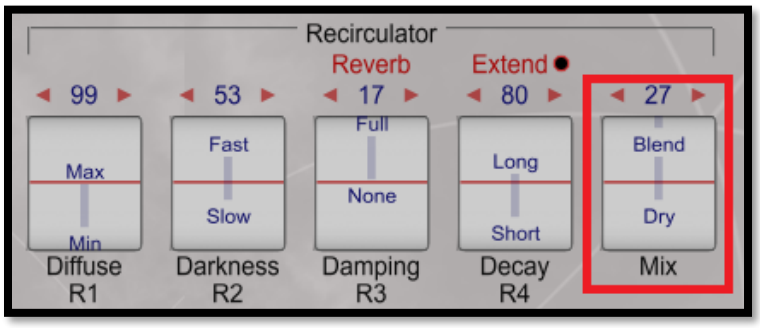


19.16.5 Effects (Mix) Level ("EfL nnn")

Sets the Recirculator Mix to a value from 0 (Recirculator Off – 100% Dry) to 127 (Max Effect Level – 100% Wet). The Preset increment and decrement buttons can be used to change the value.

The Rotary can also be used to change the value but it must "capture" the current value by rotating past first and then values will change.

This maps to the Recirculator Mix control in the editor also controlled through Midi CC 24:

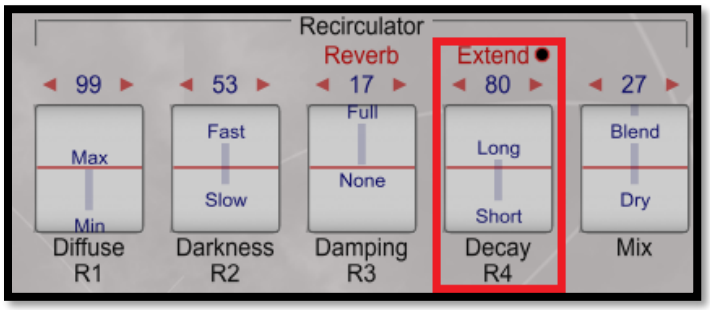


19.16.6 Effects Time ("EfT nnn")

Sets the Recirculator Time to a value from 0 (Off) to 127 (Max). The Preset increment and decrement buttons can be used to change the value.

The Rotary can also be used to change the value but it must "capture" the current value by rotating past first and then values will change.

This maps to the Recirculator Delay/Time control in the editor also controlled through Midi CC23:



Note: The other Recirculator parameters are not controllable from the EaganMatrix module unless they are programmed in the Matrix to react to a Macro Controller (which will be referenced in the Help information associated with each preset). They can also be controlled through Midi CCs: R1=CC20, R2=CC21 and R3=CC22.

19.16.7 EQ Tilt ("EqT nnn")

EqT refers to a parameter in the master equalization filter section added to the EaganMatrix stereo output processing. This can be applied to any preset. It is a general eq based on a stereo pair of shelving filters with separate controllable low and high frequency components in the range 120Hz to 15KHz. The Eq settings can shape the sound either subtly or drastically "brighter" or "darker".

This maps to the "Tilt EQ Tilt" control in the editor, which can also be set through Midi CC83.

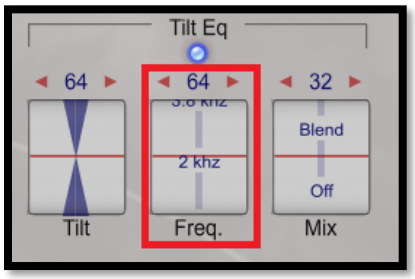


EQ Tilt sets the balance between the lower frequency and higher frequency filters. The further one goes to each extreme, the sharper the eq slope (tilt) is. In this way it can be used for subtle or major tonal shaping.

19.16.8 EQ Frequency ("EqF nnn")

EqF refers to a parameter in the master equalization filter section added to the EaganMatrix stereo output processing (See above).

This maps to the "Tilt Eq Freq" control in the editor, which can also be set through Midi CC84.



EQ Frequency defines the crossover point between the two shelving filters. It thus has little effect when Eq Tilt is set to flat. The larger the tilt, the great effect this will have.

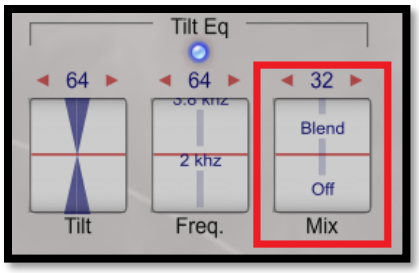
19.16.9 EQ (Mix) Level ("EqL nnn")

EqL refers to a parameter in the master equalization filter section added to the EaganMatrix stereo output processing (See above).

EQ Mix (Level) sets the dry/wet blend/mix of the Eq control. 0 means EQ is bypassed, 64 means half-filtered half-dry, 127 means all EQ.

This maps to the "Tilt Eq Mix" control in the editor, which can also be set through Midi CC85.

Note: This value must be set > 0 (Off) for the Tilt Eq function to become active.



19.17 EaganMatrix Module Use Cases

Following are a sampling of high level use cases for the EaganMatrix Module which can function as:

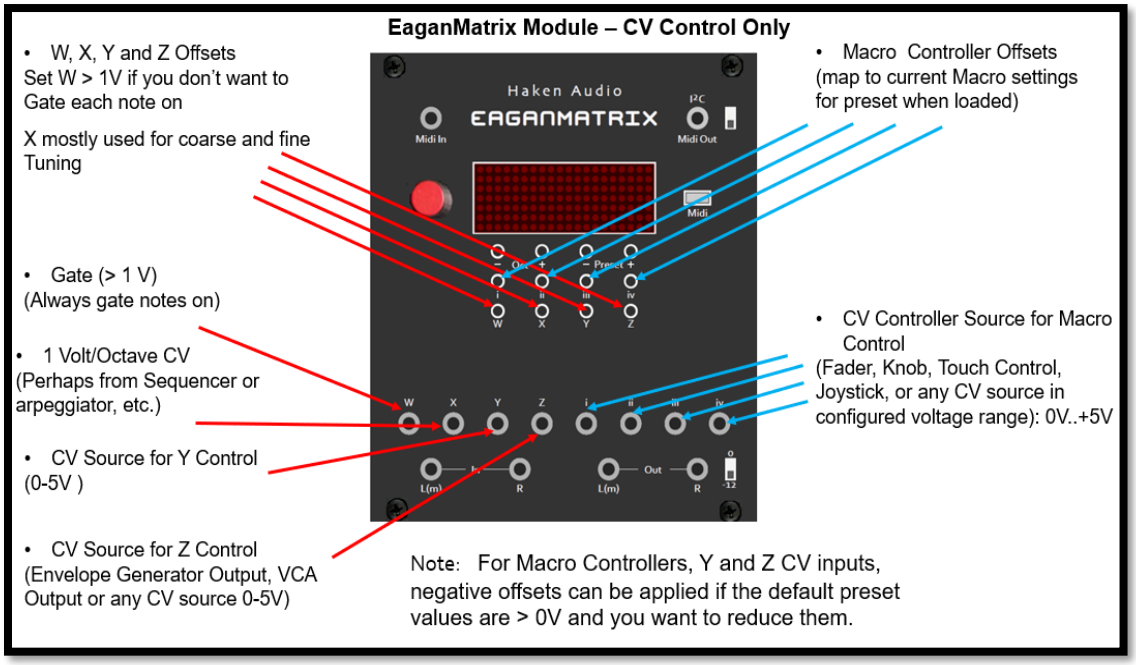
- Stand-alone CV Controlled Eurorack Synthesizer (No need for Midi if you don't want to use it)
- Midi MPE Controlled Eurorack synth
- CV-to-Midi Converter
- Midi-to-CV Converter (with CVC or uCVC)
- DSP Processor (Reverbs, Echoes, Delays and Convolution)
- External Audio and/or Vocal Processor
- Any combination of the above

The EaganMatrix Module supports many types of sound synthesis and physical modeling. Depending on he preset you be any combination of the following at any given moment. The best thing you can do when you start using your EM Module is to scroll through the presets with W, X, Y, and Z CV inputs connected and play away to get a feel for what the module can do.

- Simple Oscillators (DSF, Integrated, Phase Generator)
- Complex Oscillators (Square, Triangle, Sawtooth, Le Caine Wave Banks, Sine Bank, Sine Spray)
- Random Noise Generator and Noise from Seed
- Sample and Hold Generation (of noise or other EaganMatrix inputs)
- Jenny Oscillator
- Simple Filters (1, 2, 3, 4 pole, HP, LP, BP, AP, Shelving LP, HP)
- Complex Filters (Biquadratic filter)
- Vocal Format Filter (BiqMouth)
- Harmonic Manipulator (on fixed spectral sets or a Live input – using Band filtering options)
- Modal Manipulator (on fixed spectral sets or a Live input – using Band and spectral filtering options)
- Ring Modulator (through audio multiplication)
- Granular Processor (Through Harman and ModMan)
- Physical Modelling Processor (Kinetic Spring models among other options)
- Karplus Strong and Waveguide/Feedback Delay Network (FDN) modeling
- Additive Processor (using Additive sets of your own design or the default Mahling set) – Requires special conversion tool for using your own "sample" sets)
- Pitch Shifter (of sorts)
- Digital Delay with Taps
- CV Quantization (Rounding control)
- Shape/Envelope Generator
- Gate Generator (through CVC or uCVC)
- Stereo Effect Processor
- Saturation Processing
- Simple EQ Processor

19.17.1 Use Case 1: Using the EaganMatrix Module with CV Only Control

The EaganMatrix module does not require any external equipment outside of your Eurorack setup if you desire to use the module as a Complex Sound Source or DSP Processor with no Midi or External computing interfaces (though you will need a PC or MAC running the Haken Editor for upgrading firmware on the module).



This will normally play the module as a monophonic synth, unless you have a preset geared for outputting polyphonic voices in some way. Sub-Use cases for playing the module should be discussed:

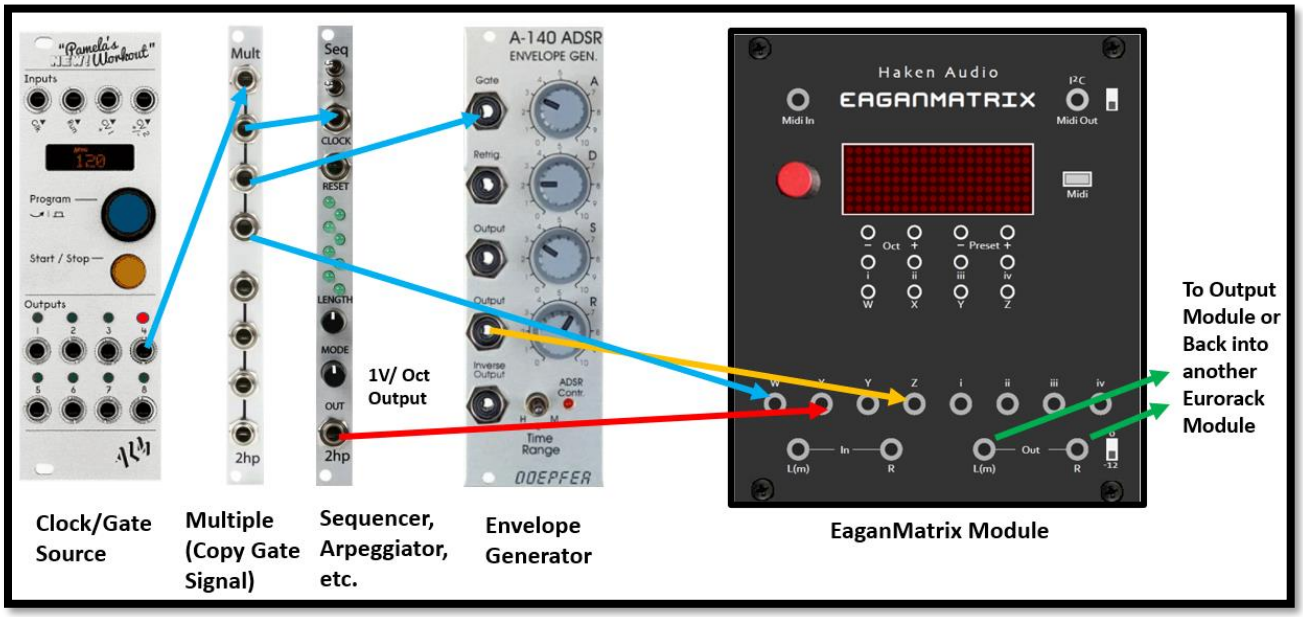
Use Case 1A - Playing EaganMatrix Specific preset that send sound direct to output (without assuming Gating and Z Pressure Control)

- These presets output constant sound when loaded like a standard Eurorack Oscillator might, and they can have one or more Macro Controllers defined to do various thing. Most Drone presets act the same way.
- Treat them like Oscillators where you will send output into a VCA and control with an Envelope generator
- Use 1v/Octave X input if they require pitch control (as most do).
- Control with Macro CV inputs and/or Y with 0-5V with negative Voltage offset if default value > 0.

Use Case 1B - Playing System Presets that Assume Gating and Z Pressure Control

- Most System Presets are derived from presets for Continuum that assume fingerboard pressure control for generating sound. Almost all of these can be played through CV on the EaganMatrix Module as follows:
- Gate the Sound on with W input > 1 V for as long as you want the sound to last. This will not make a sound if Z is used to pressure control (most system presets).
- Apply voltage on the Z CV input 0-5V. This will map to a Z pressure as if played on the Continuum. This can be an envelope, CV keyboard velocity or any CV value mapping to pressure/volume. This will also be output as Midi Aftertouch in the Midi translation with Note On applied when Gate on W is set and Note Off applied when Gate is removed.
- Use Standard 1V/Octave pitch input on X.
- Control with Macro CV inputs and/or Y CV input with 0-5V with negative Voltage offset if default value > 0.

19.17.2 Use Case 2: Playing the EaganMatrix Module From CV Sequencer or Arpeggiator



As an extension of Use Case 1, a wide variety of CV based controllers are now available that can be used to play the module. Many will want to play the module using a standard Eurorack Sequencer along with perhaps an envelope generator. Of course the variety of options here is almost endless as long as for use case 1B above you send Gate to WCV in, 1V/Octave pitch to X CV in and some form of expressive volume control (i.e. envelope or even just a copy of Gate depending on desired voltage/volume) to Z CV in. Apply any desired CV control to associated Macro Controller CV inputs and/or Y CV input.

<u>One possible connection scheme for playing a System Preset</u>:

- Use a clock source to trigger your sequencer if it has no internal trigger/gating capability. Use a Multiple (Mult) to also connect that trigger as a gate to the W CV input of the EaganMatrix Module (assuming it is > 1 V). This will gate notes on for the module, but then you also will for most presets need to apply a velocity/pressure (Z) input as well. Gate longer for longer notes or shorter for more staccato, etc.
- Also Mult the Gate to your envelope generator if using it for Z volume input control.
- Connect 1V/Oct pitch source from Sequencer (or perhaps this is an arpeggiator) to the X CV input
- Connect the Envelope Generators (simulated pressure) output to the Z input possibly through VCA.
- If the preset uses Y or Macro Controllers, you can connect a dynamic or possibly static CV source to them (perhaps an LFO in some cases or a Pressure Points or other finger based controller) but typically these are not necessary to produce sound from the EaganMatrix module for almost all presets. See the help file for each preset in the editor for information on what all controls do for that preset. Some presets use no extra controls other than W (gate), X (pitch) and Z (Volume).

Note: Numerous EaganMatrix presets use a Shape Generator to impart an envelope to the preset when gated from the Continuum fingerboard. A W CV input gate will trigger a similar envelope in conjunction with pitch on these presets. You may notice some unexpected effects if you attempt to use an envelope generator in conjunction with those presets. See the preset list and associated help information in the editor that accompanies each EaganMatrix release to determine if a preset imparts its own envelope through gating vs. fingerboard pressure. This list will also indicate if rounding is used and what Macro Controllers are used in that preset. This information will be useful in determining what CV inputs to control for any given preset.

19.17.3 Use Case 3: Using the EaganMatrix Module as a Midi Controlled Synth

As opposed to Use Cases 1 and 2, you can also play the EaganMatrix module as an MPE-based 8 voice polyphonic synth without using any CV Control. In this case connect your midi keyboard or other desired controller to either directly to the module's TRS Midi I/O ports (using the provided Din-to-TRS adapters if needed) or to the USB Mini B port using a Midi host or directly to your computer if desired.

A few things to note:

- The EaganMatrix Module will support MPE input on channels 2 to Max Polyphony of the current preset, up to 8 voices (Midi channels 2 to 9). In this case it is assumed you are sending monophonic Midi data on each channel.
- The module can also be sent polyphonic standard Midi 1.0 data on Channel 1 up to 8 voices.
- Be careful not to send more than 8 voices total. Remember the number of voices output is also limited by the polyphony of the preset, so if you want 8 voices output your preset must be set to Polyphony 8 or Polyphony 4+ (since the EaganMatrix Module is a 2X DSP Continuum processor, you will not be able to set past this). If your preset is set higher than this, the voices output will be limited to 8, just like on the ContinuuMini.
- The Midi coming in will normally be routed to Midi out as well, unless routing in the preset is set otherwise.
- Avoid playing the module with both TRS Midi In and USB Midi In at the same time. While, possible the likelihood over overlapping notes especially on MPE channels is high which will cause all kinds of unexpected sonic discontinuities. Maxing out polyphony also may occur without you realizing it. If you want to do this, it is suggested that you play monophonically only on channel 1 from one Midi source and polyphonically on MPE channels up to max polyphony of the preset on the other Midi source.

19.17.4 Use Case 4: Using the EaganMatrix Module with CV and Midi Simultaneously

It is possible to both play the module with CV and Midi at the same time but you will have to make sure you are not overlapping notes which can cause sonic discontinuities as mentioned in Use Case 2. In this case you are still limited to 8 voice polyphony and it is best to do the following:

- Set your preset to Note Priority to Low. This will guarantee that the CV input always is output on the lowest channel (either channel 2 if preset is set MPE/MPE+ or Channel 1 if the Preset is set to CC mode).
- Play your Midi input on channel 3 to Max Polyphony +1 if set MPE/MPE+ or channel 2 if set to CC mode.

Note that it will be common for many people to have the Haken editor connected while only playing with CV, primarily to easily change presets. The editor uses some high Midi CCs for handshaking but will not interfere with CV playing and should not interfere with Midi input as long as you do not use CCs 111, 117 and 118.

19.17.5 Use Case 5: Using the EaganMatrix Module as a CV-to-MPE Midi Converter

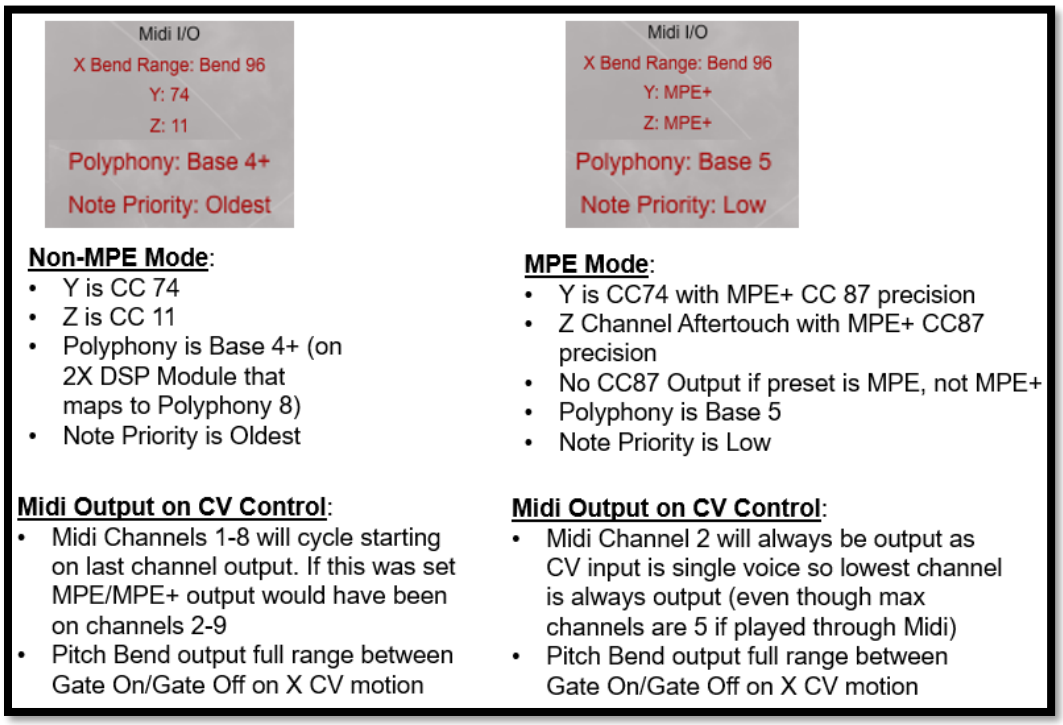
When gating notes with CV and 1V/Octave X input and applying any X portamento also possibly with Z volume control plus any Y input you send, the appropriate Midi translation will appear at the Midi TRS output or be sent to USB Midi out. MPE priority per the current set polyphony will apply. In this manner, you can use the EaganMatrix module as a CV-to-MPE midi converter.

- Gate On/Gate Off map to Midi Note On/Note Off
- X Maps to both initial Midi Note value also will be translated to pitch bend on the given MPE output channel.
- Z will be output as Channel Aftertouch if the preset played is set to MPE or MPE+ else Z will output as whatever CC is defined for that preset, normally CC7 or CC11
- Y will normally be output as CC 74.

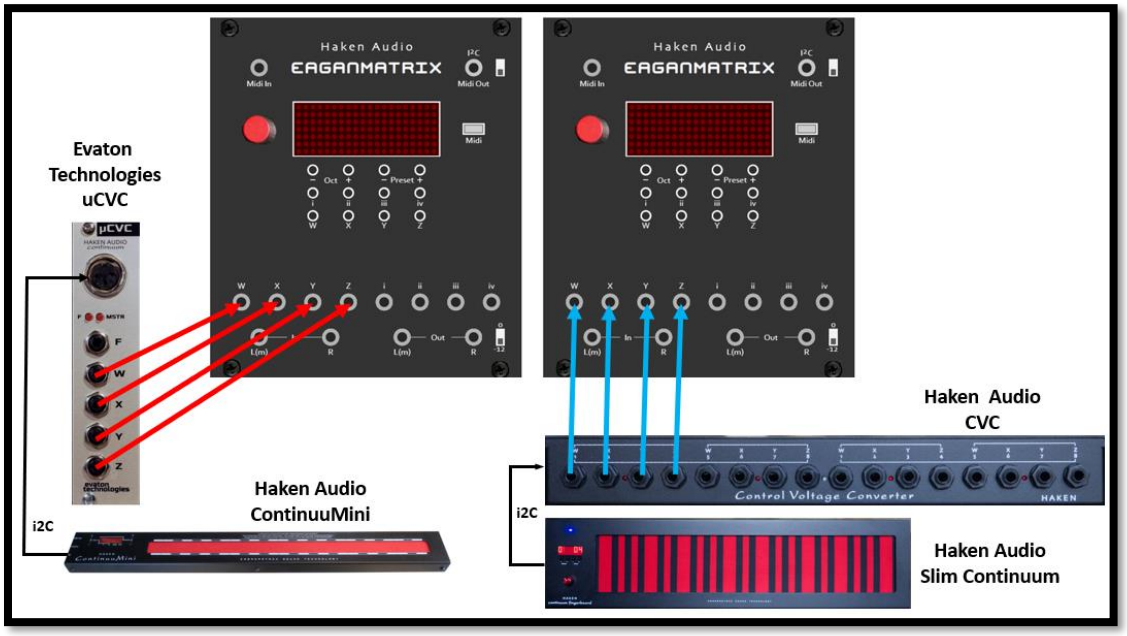
19.17.6 Use Case 6: Using the EaganMatrix Module as a CV-to-Midi Converter

When notes are gated through CV on the module, internally MPE midi output is also generated. Gate On/Off translates to Midi Note On/Note Off. If MPE/MPE+ mode is set for a preset, Z values will generate Channel Aftertouch messages. CV pitch input is translated into Midi notes (and of course if you are sending in microtonal input the Midi note translations may not be exactly as expected. In addition CV X movement between Gate On and Gate off will be translated into pitch bend messages related to the current Pitch Bend setting (which typically defaults to 96 to give you full bend range. MPE Note priority is also maintained. So even though you may be playing monophonically on the module through CV input, the Midi notes will be translated according to the Note Priority and current Polyphony of the Preset.

Since Continuum MPE does not sue Channel 1 and the maximum polyphony for the EaganMatrix module is 8, if the preset polyphony is set to 8, and Note Priority is set to the default Oldest, every time you gate a note, the Midi channel will cycle from Channel 2 to 9, though you will not be able to predict where it starts. For this reason if you want to use the Midi Output (perhaps record the Midi output of CV input into a DAW), it is best to set Priority to Low so that you will always be outputting in channel 2 (as the CV input will typically be monophonic). If you set the preset out of MPE Mode (in the Midi IO panel set Y or Z to a CC), you will then output on channel 1 if priority is set Low. In this way, you can use the EaganMatrix module as a CV to MPE Midi converter. The MPE output will be sent to both the USB and TRS Midi outputs.



19.17.7 Use Case 7: Playing the EaganMatrix Module through CVC or uCVC



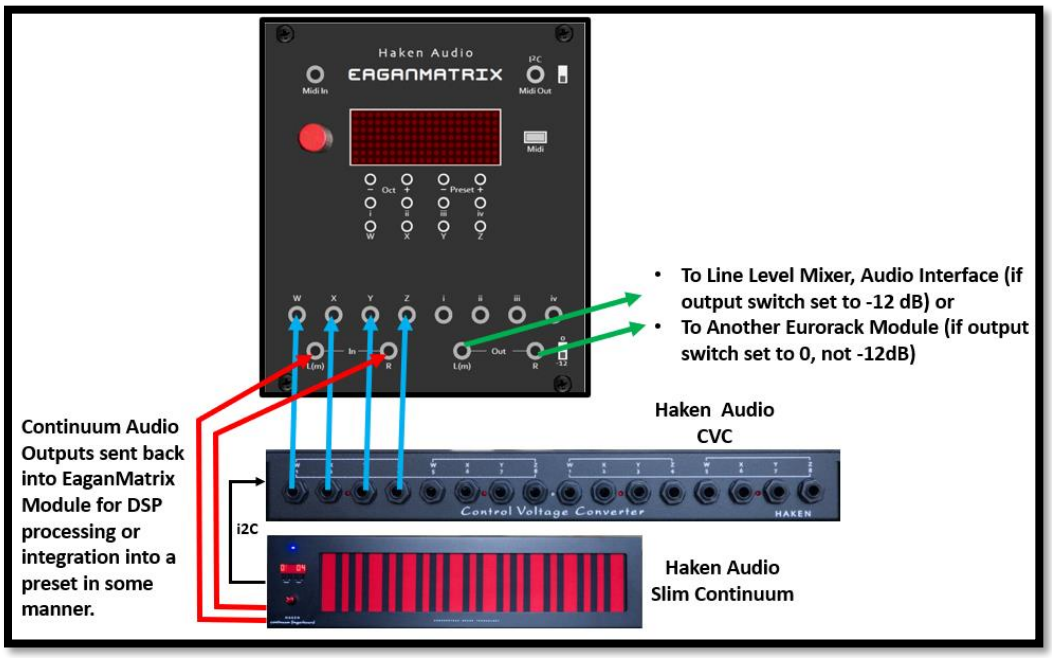
If you have a Slim Continuum, Continuum or ContinuuMini and a Haken Audio Control Voltage Converter (CVC) or Evaton Technologies uCVC Eurorack module and you want to play the EaganMatrix module monophonically through CV using those interfaces, we recommend you do the following:

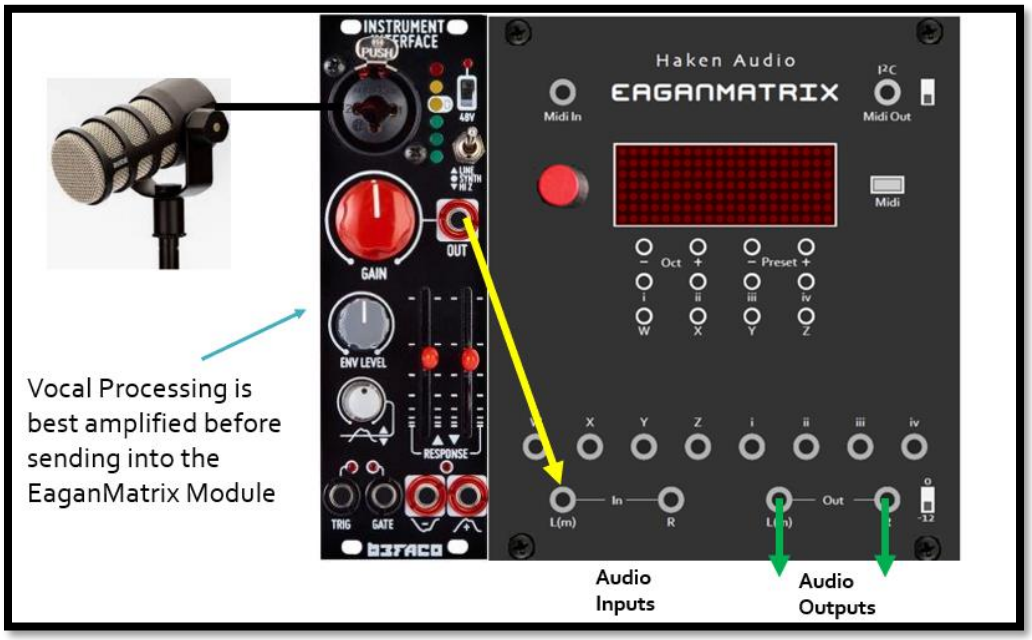
- Set your preset to Lowest Priority and Polyphony 1 in the Haken Editor. This way you will be guaranteed to only output on the first CVC channel when playing monophonically. It is assumed you are not concerned about playing polyphonically. The uCVC only supports one channel unless you have two daisy chained. If you are playing polyphonically you may want to try using a Mult to combine the CVC signals to connect to the EaganMatrix Module W, X, Y and Z single inputs.
- Connect CVC channel 1 outputs (leftmost set of W, X, Y and Z outputs) to the corresponding EaganMatrix Module W, X, Y and Z CV inputs using 1/4" to 3.5mm cables (these are available from Hosa and a number of other manufacturers in a variety of lengths).
- While not all EaganMatrix Presets use all four CV inputs, its best to simply connect them all to make sure you will play every preset as intended over CV (some presets do not use Y and W inputs, but most all use X and Z). But you must always gate each preset with W CV input or by setting W offset > 1V manually using the W button.
- With this setup and the EaganMatrix module outputs connected, you should be able to play most presets as if you were playing them directly on your Continuum or ContinuuMini.

19.17.8 Use Case 8: Using the EaganMatrix Module as an Audio DSP processor

Note that an option that is only available on the EaganMatrix module is to also connect the analog audio output of any Eurorack Module or even the output of the Continuum or ContinuuMini to the EaganMatrix module's audio inputs and process that audio either by itself or in combination with EaganMatrix processing (see some of the new Processor category options that are primarily intended for EaganMatrix module use).

Of course you can send in any audio to be processed in this manner, though you may need to raise the input signal to modular levels for best results, especially if you are sending in a voice to be processed.





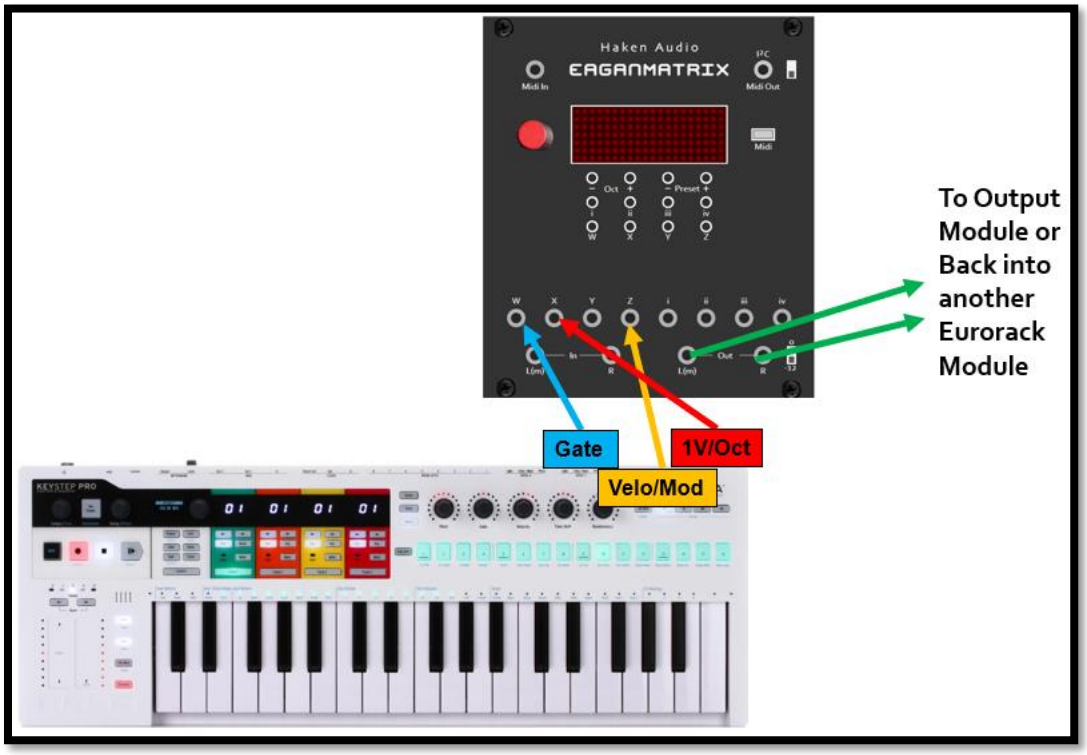
Note that a number of PR processing presets assume either Stereo or Mono analog inputs. The help information on each preset will define all the inputs and outputs.

19.17.9 Use Case 9: Playing the EaganMatrix Module with a CV Keyboard

A common method of playing the EaganMatrix module will be to use a Midi keyboard that has CV output capabilities, especially one that has aftertouch to CV capability, such as an Arturia KeyStep Pro. In this case, do the following:

- Connect keyboard Gate output to W CV Input
- Connect keyboard Velocity or Modulation output to the Z CV Input
- Connect the 1 V/Octave Pitch CV output to the X CV Input
- If the Keyboard has a secondary CV output, like front to back motion, connect that to Y CV input

On the EaganMatrix Module, press the W, Y and Z buttons and zero them all out unless you want to apply a secondary offset.

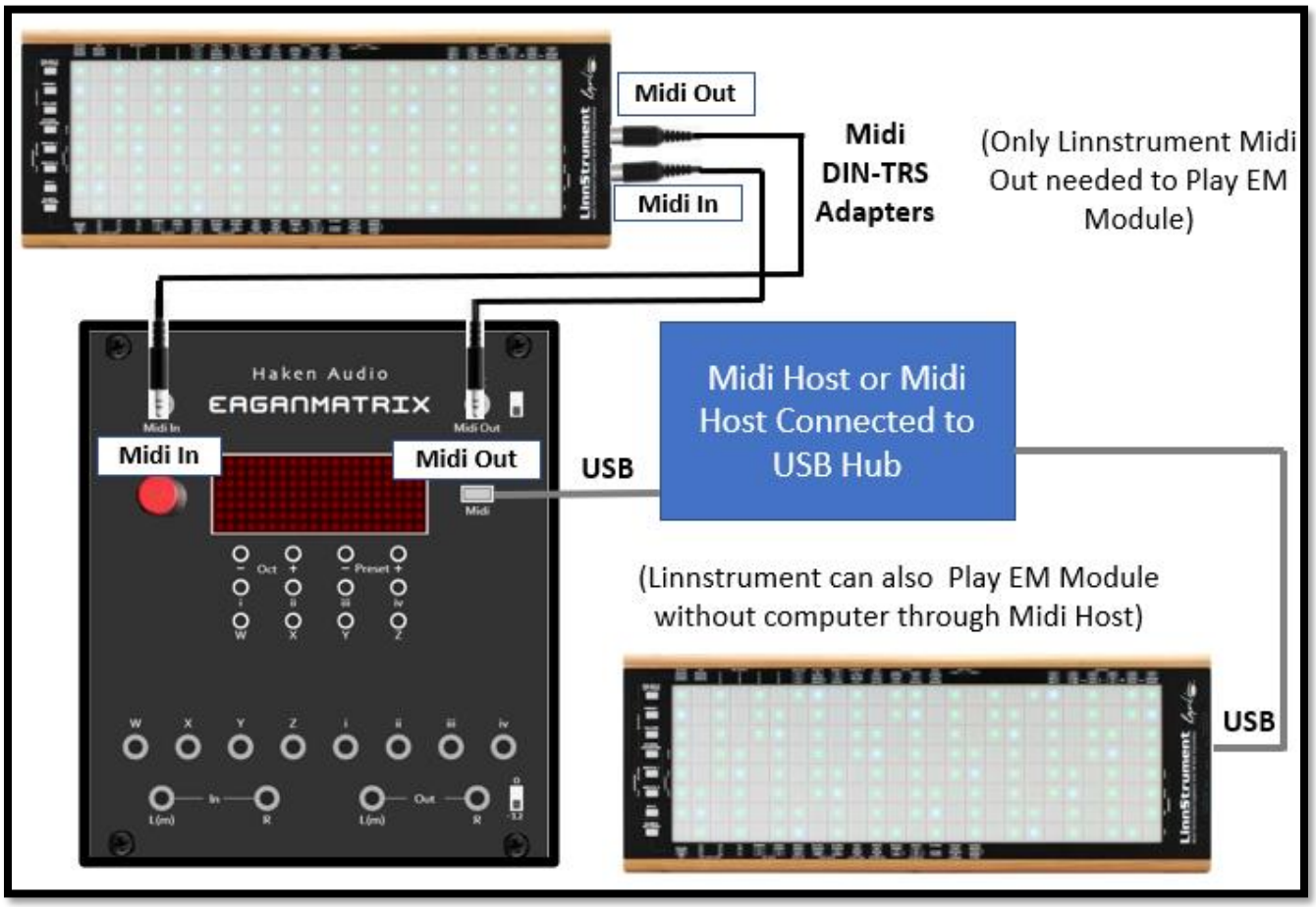


19.17.10 Use Case 10: Play the EaganMatrix Module from Linnstrument w/o Computer

Playing the EaganMatrix module from a Linnstrument over Midi is done in a same manner as playing the Continuum or ContinuuMini. Note this could also be a Midi Keyboard (with or without MPE support). You can bring up the Haken Editor connected to the EaganMatrix module and attach the Linnstrument as an External Midi input in Midi and Global Settings to play over USB (assuming your Linnstrument is set to USB output mode).

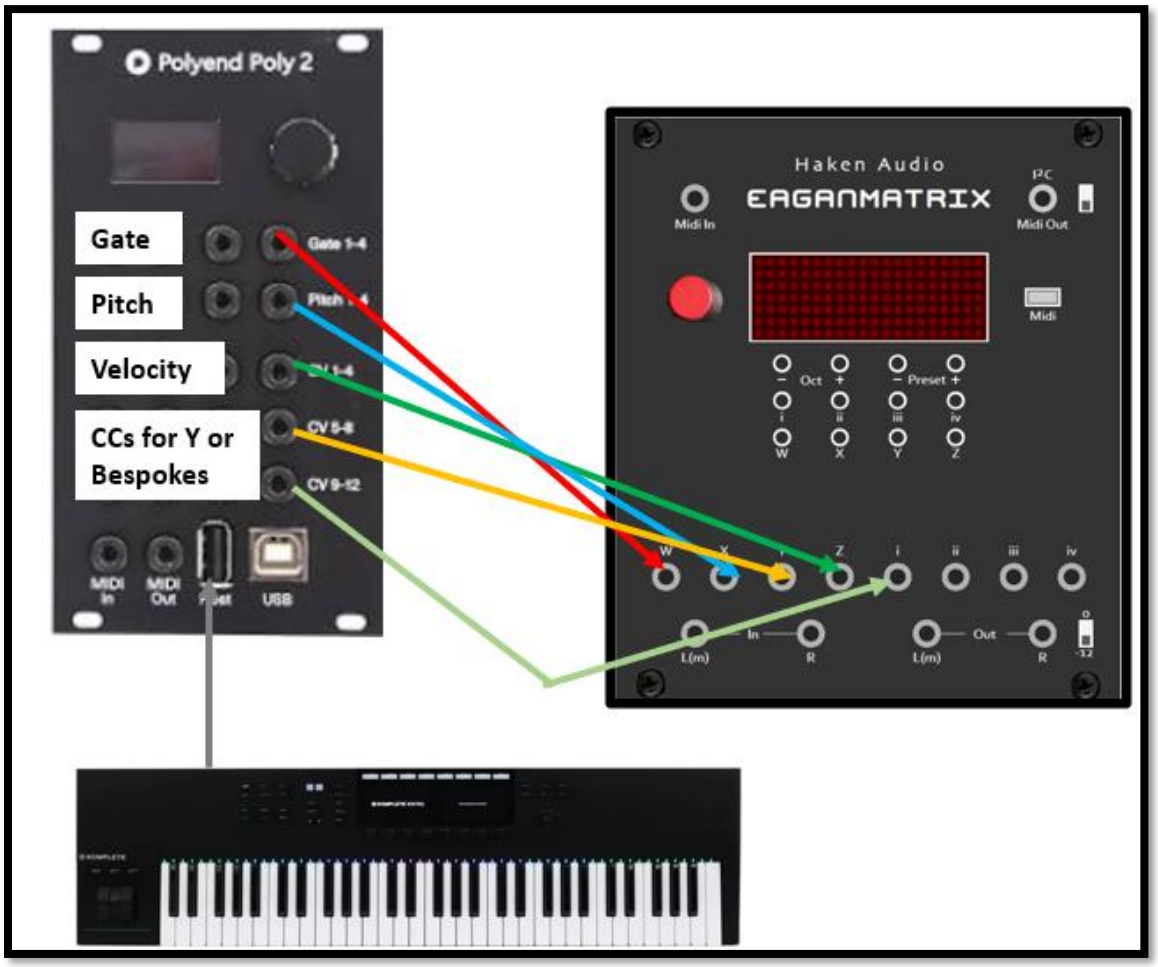
Many will want to play the EaganMatrix module directly without the use of a computer. This is easy to do. Set your Linnstrument up to output on the Midi DIN port and using one of the Midi DIN to 3.5mm TRS adapters that come with the module, connect the Linnstrument to the module's TRS Mini In port. Set your Linnstrument for the appropriate MPE channels (typically 2 .. Max polyphony +1) for the preset's polyphony. You also can play the module in non-MPE mode on Midi Channel 1.

If you prefer to play the EaganMatrix module with your Linnstrument on USB without computer, you will require a USB Midi host. Inly Midi In TRS connection is required to just play the module from an external MIDI source.



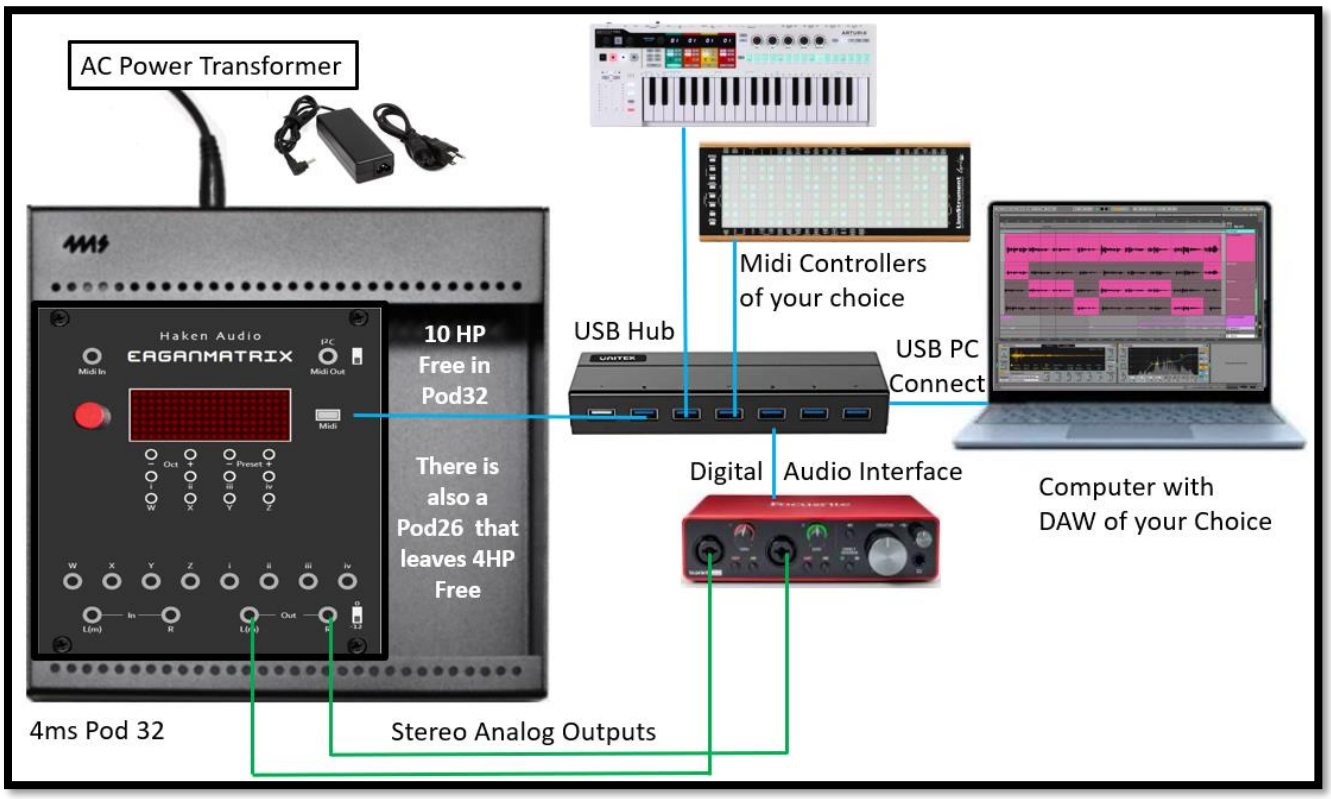
19.17.11 Use Case 11: Playing with CV Using Midi-to-CV Converter

Many will already be playing their Eurorack Oscillators through Midi using a CV-to-Midi converter available from a wide variety of Eurorack vendors. The EM Module can easily be played through CV in a similar manner. Just send it a Gate into W, 1V/Octave pitch control into X (tuning the module as desired with X button and rotary) and either Midi Velocity CV or Aftertouch/Channel Pressure (if your Midi controller supports it) into W. Of course you can also send Gate or a VCA/Envelope Generator shape for expressive dynamics into W, as well, if you like. If the Midi controller does not support an additional CC for CV conversion for Y, Y might be supplied through another CV source if desired, but many keyboard controllers also have programmable knobs and sliders that can be converted and used for this and also to convert Macro CCs (CC12, 13, 14 & 15) that can be connected to the Macro CV inputs. There are a few MPE compliant Midi-to-CV converter modules (such as the Polyend Poly2) as well that could be useful if your Midi Controller supports MPE.



19.17.12 Use Case 12: EaganMatrix Module as Stand-Alone USB-Based Synth

Some may want to use the EM Module as a stand-alone synthesizer, connecting to it through Midi as referenced above. This is easily done by putting the module in a small case or skiff and powering it as though it were a stand-alone instrument. The 4ms Pod 32 is ideal for this as the module is shallow enough to fit in the enclosure leaving 10HP space available for perhaps an output module, though the EM Module can be set to Line level output and connected right up to a mixer or amplifier in this setup. A Pod 26 is also available that would leave 4 HP space (the EM Module takes 22HP).



19.17.13 Use Case 13: Playing with Continuum, ContinuuMini or Osmose over USB

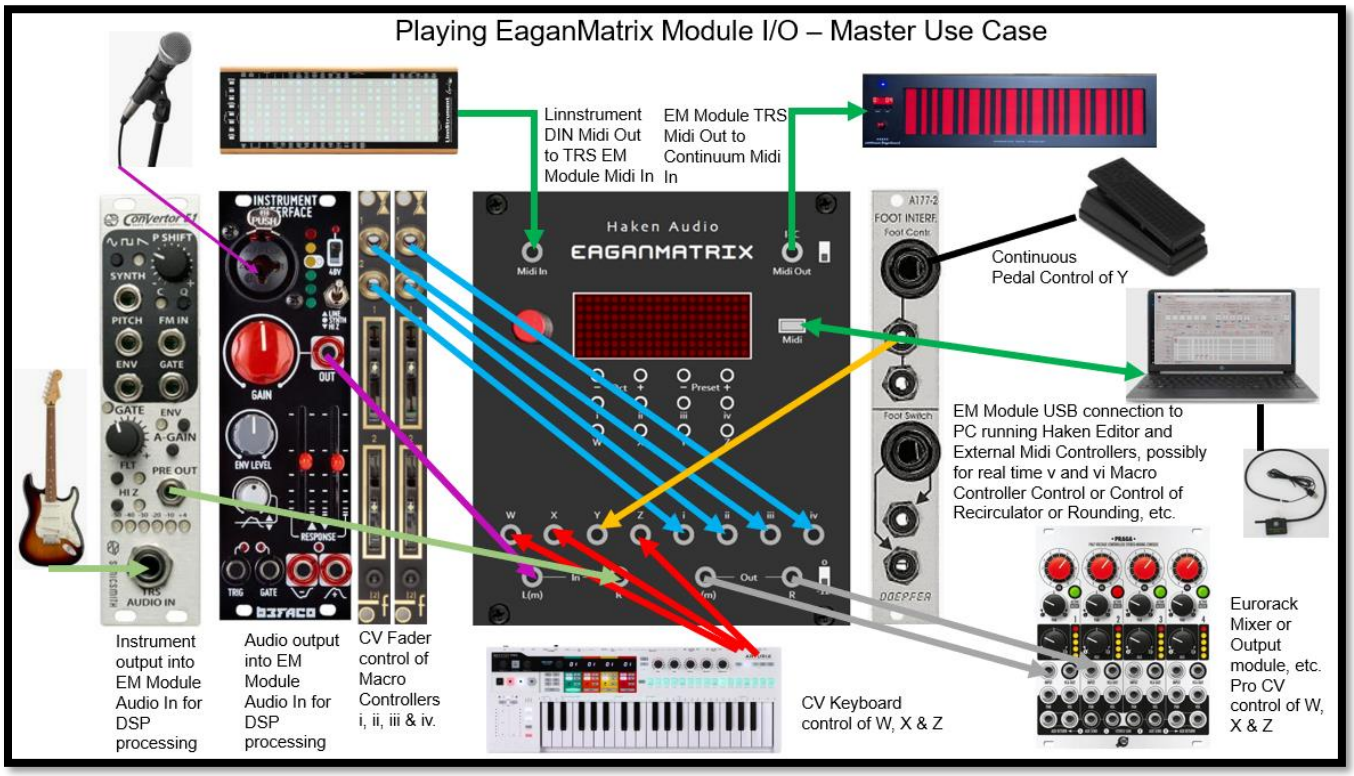
If you want to play the EaganMatrix module without a computer through the USB Midi port, a USB host is required (similar to playing the Slim Continuum or ContinuuMini through the USB port without use of a computer). As opposed to playing through CV, the EaganMatrix module supports 8 voice polyphony over MPE Midi, similar to the ContinuuMini. The same holds true if you want to attach a Midi Controller over USB, perhaps to change Macro Controllers with a Beatstep or Beatstep Pro. See section 12 for USB connection options.

See Section 12.30.

19.17.14 Use Case 14: Playing with All I/O Connections

There are many ways you can connect multiple I/O interfaces to the EaganMatrix module for simultaneous use with an almost unlimited number of I/O possibilities. Here's just one example where all these interfaces can be used together (depending of course on the EM module preset you are using).

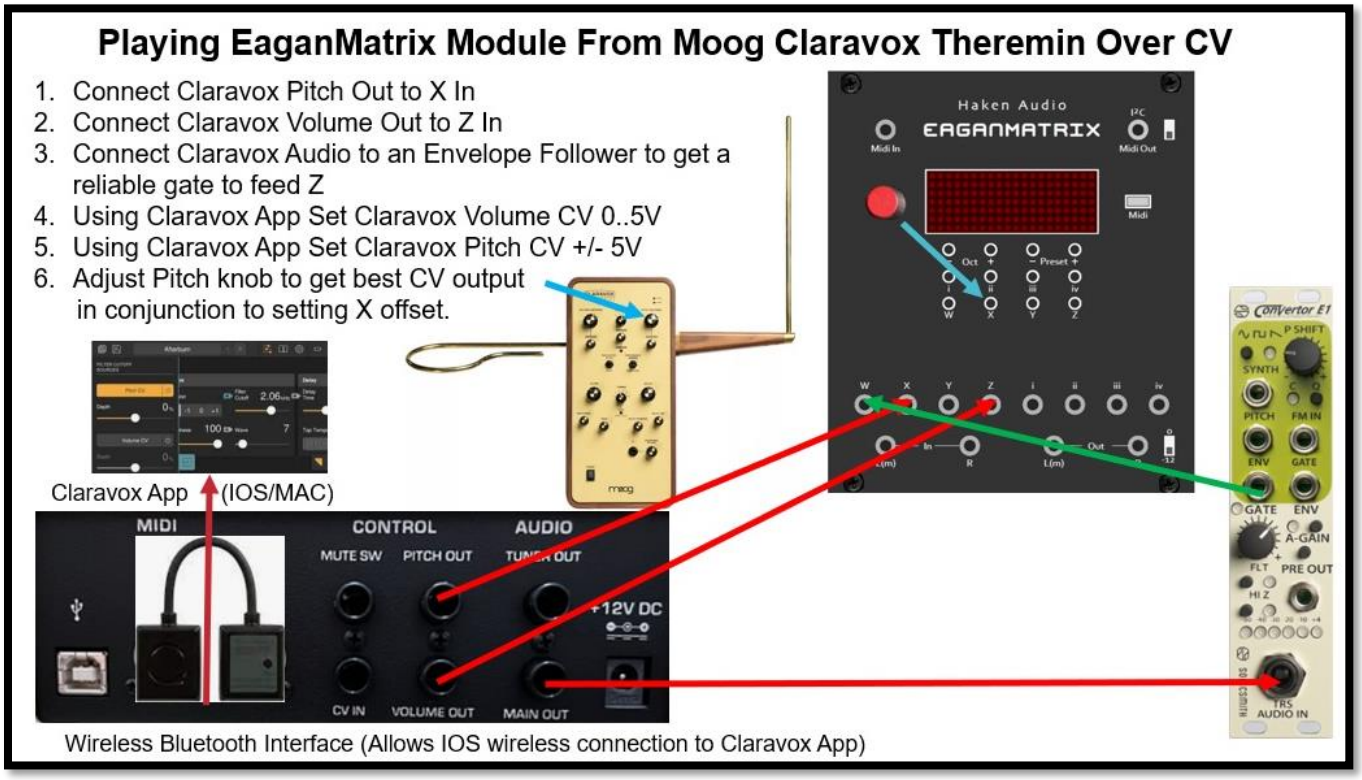
- USB connected to computer running Haken Editor with a Breath Controller for Macro Controller v and vi inputs.
- Plays module over CV from an Arturia Keystep Pro (Gate, Velocity/Mod & Pitch CV sent to module)
- Instruo Dual CV sliders set 0..5V for Macro Controller i, ii, iii and iv control.
- A Doepfer Foot Controller module connected to a Continuous pedal for real time control of Y.
- Linnstrument DIN Midi output connected to EM Module TRS Midi in using DIN-TRS adapters
- EM Module (MPE) TRS Midi output (from playing CV inputs) sent to a Continuum's TRS Midi input (can play a second preset on Continuum in parallel with one played on the EM module over CV in this manner)
- A Shure microphone connected to a Befaco Instrument Interface that sends Audio output into the EM Modules Left Audio input channel for processing.
- A Fender guitar sent though a SonicSmith Converter E1 module - in this case sending its Pre output into the Right EM Module Audio channel for audio processing.
- Audio output of the EM module sent into a XAOC Praga Eurorack mixer for mixing with other Eurorack module outputs.



19.17.15 Use Case 15: Playing EaganMatrix Module with a Claravox Theremin over CV

Playing the EaganMatrix Module from a Moog Claravox theremin over CV. So far this is the most reliable method I have found.

- Since Moog unfortunately decided not to include a CV Gate Out (as they did include with Etherwave Plus), for best playing of the EaganMatrix module you need to run the audio output of the Claravox into an envelope follower or some module that will generate a reliable gate which you then can send into the W input (I use a SonicSmith Convertor E1 but there are many options).
- Send Claravox Audio CV into Z (scaled 0 to 5V in the Claravox App).
- Send Claravox Pitch CV into X. The best pitch scaling seems to be +/- 5V (use Claravox app to set it) for the module which you then need to adjust with Claravox Pitch known to get a usable X range in conjunction with setting the EaganMatrix Module's X offset. Claravox Modern mode seems the best option here.
- I connected a wireless Bluetooth adapter to the Claravox Midi DIN ports so I can run the Claravox app wireless to my iPhone (that works well with my QuiccoSound adapter (or you can use Yamaha or CME adapter too).
- Finally experiment with Modern versus Traditional mode and setting pitch antenna configuration again while adjusting EaganMatrix module X offset to try and find an optimal X scaling that works for the preset you are playing.
- Note: Of course another option is to play the Claravox directly into the L(m) audio input of the EaganMatrix module and use Processor presets as an effect processor and not try and play the module over CV. This of course applies to any theremin, not just Claravox..



20 EaganMatrix Module Troubleshooting

Here are some troubleshooting tips that may come in useful for the EM Module.

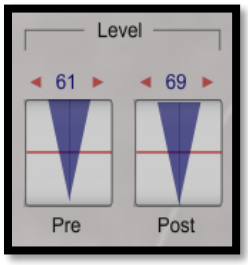
20.1 The volume output by the EM Module seems too low

Check the following:

- The base module Attenuation is not set too low. Press **Oct -** with **Oct +** to enter the Menu system. The default option displayed is current attenuation that can be set from -Infinity (mute) to -1dB with the Rotary. Set to the desired value and press **Oct -** with **Oct +** to exit back to performance mode.
- The output mode switch at the bottom left of the module may be set to -12dB line level when you are expecting a higher Eurorack level. Set the switch to 0dB to output Eurorack level. The switch can be set while the module is powered.
- Make sure you don't have Dim set in the editor:



- Check that the levels set in the editor for the preset are not set too low. Most presets have these set in the mid 60s, but you can change both pre and post levels.



- Finally check that you don't have the output of the EM Module attenuated by some other module in your setup.

20.2 I don't get sound as expected when connecting CV to W, X, Y and Z

Check the following:

- Most System Presets assume triggering by a Continuum Fingerboard of some type or Osmose. In this case W gate may not be used explicitly in the EaganMatrix preset. However, W gate should always be sent in when trying to play the EM Module even though Z might be the main factor controlling volume. Gate is a value > 1 V.
- In addition, just sending W Gate in by itself with X may not produce a sound if Z is actually used in the preset for expression (as is the case for most presets). In this case, send in an appropriate Z CV envelope along with W Gate. In fact you can keep W raised > 1V and then trigger successive pitch/envelope combinations to get sound out of most presets.
- Note that some presets use a Shape Generator to create their own envelope based on Z and sometimes just W. If you don't seem to get the envelope you expect, it may be because that preset always has an envelope imposed internally. In this case play around with CV input to Z until you get an expression output you desire.
- Both Y and Z can be set to a fixed value using the Offset buttons and Rotary. This may impose an initial value to Y and Z that is not assumed in the original preset. If you don't get the expected sound when

bringing up a preset and playing it, try making sure Y and Z offsets are set to zero before applying input CV to them.

- Make sure you are not trying to play notes from CV and Midi at the same time. You can do this, but you may get unexpected results. Also when playing through CV you will be playing monophonically whereas you can play polyphonically over MPE through Midi input.

20.3 Editor Macro Controllers don't work when using the EM Module

Check the following:

- It is common for presets to use one or more Macro Controllers to change the preset's sound in real time in various ways. The CV inputs for Macro Controllers also get reflected in the Editor Macro settings. The default Macro Offset settings are those set in the preset when loaded. If you are applying CV to Macro Controller inputs, you may not be able to change the values as expected in the editor because CV is being applied through the Eurorack system.
- If using an external Controller to change Macro Controllers, such as a BeatStep or Kenton KillaMix connected to the Editor over Midi, you can once again get unexpected results if you are also changing the Macro Controllers in real tie through the CV inputs. Usually if sending CV into the Macro Controllers, you will not want to manually adjust in the editor to avoid this confusion.

20.4 External Audio processing using PR presets does not seem to work

Check the following:

- You must make sure the Audio input gain in Control Panel 2 is turned up if you want to process analog audio through the EM Module's L and or R inputs. This affects both Left and Right input channels.



- Consult the help material on the preset in question as it may rely on Macro Controllers for setting input volume and other parameters that can affect the audio processing.
- Make sure the preset is not assuming a specific L and or R input, which you may not have connected.

20.5 Control Voltage Input does not work as expected

Check the following:

- Make sure the CV you are sending in matches the scaling set for Y, Z, and Macro Controller inputs (0-5V). However you can send negative voltage offsets of the default values of Macro Controllers are >0. To reduce them from the default value they have when loaded or if previously changed in Editor or through Midi you must send negative voltage.
- Make sure CV Offsets are not adding to your input voltage creating a value that is different than expected.

20.6 Unexpected Operation when Midi Connected

Check the following:

- Do you have both the USB and TRS Midi ports connected to your computer. This may create Midi conflicts and loops. We suggest you eight connect one or the other to your computer.
- The USB port must connect to a USB Midi Host if you want to play the EM Module from a USB Midi controller without the use of a computer.
- Make sure you have the Midi Routing set as expected for normal operation in Control Panel 3.
- Note that the EM Module will output MPE midi on the Midi ports in response to CV triggered notes. If you are trying to play the module through Midi and CV you can get unexpected Midi output. Even though the EM Module will play monophonically through CV inputs, it still will output Midi per the MPE Priority and Polyphony configured.

20.7 Can't Connect to DAW and Editor at the Same Time through USB Midi

Check the following:

- Like the ContinuuMini, Windows only supports one USB client connection to the same device at a time. If you set your DAW for EM Module device for Midi recording, you will not be able to connect the Haken Editor at the same time (and vice versa). See section 17.6 for more information.

20.8 Can't Figure Out How to Play Two Sounds at Once (Polytimbral Splits)

The EaganMatrix Module supports 2DSP processing and does not support the following:

- Splits (if you connect an external Keyboard or Controller)
- Combination presets (allowing you to combine multiple presets)
- A Max of 8 voice MPE output if playing through Midi on the current preset sound

20.9 The Module is Out of Tune

Check the following:

- If playing through CV, you will have to tune the module like any other Eurorack Oscillator. Press X Button and turn rotary for coarse tuning by step. Hold X button down and turn rotary to fine tune.
- Make sure you are not playing a note through Midi and CV X input at the same time as you can get unexpected pitch output.
- Make sure you do not set an X Button Offset once you have tuned the module if playing through CV.
- Check the preset. Some of them are effects based and may not play at your expected pitch.
- Check that tuning offset is not adjusted in Midi and Global Settings, especially if playing through Midi as Midi note playback will be independent of CV X tuning (though of course normally you will want to tune CV to match Midi output if you are playing both). For example you can connect a Linnstrument and playback through Midi on channels 2 to max polyphony +1 in MPE mode and also play through CV. Avoid overlapping notes however if you do this or you can get discontinuities.

20.9 Blank Editor Screen or Problems using EaganMatrix Module with Continuum & USB

Check the following:

- The Haken editor currently assumes you have one Continuum device attached at a time. If you have multiple USB based Continuum devices (Slim Continuum, ContinuuMini, EaganMatrix Module or Osmose) connected to your USB network. The editor may not select the desired device or it may try and attach to a previous device you had connected that is no longer attached. IN this case go into Midi and Global Settings and verify it is connected to your desired source/destination device and set it appropriately if it is not.
- If connected through USB, especially on MACs, the computer may think a previous device connected to a port is still there even though you have a different continuum device there now. You may need to reset the USB port or connect to a different port.

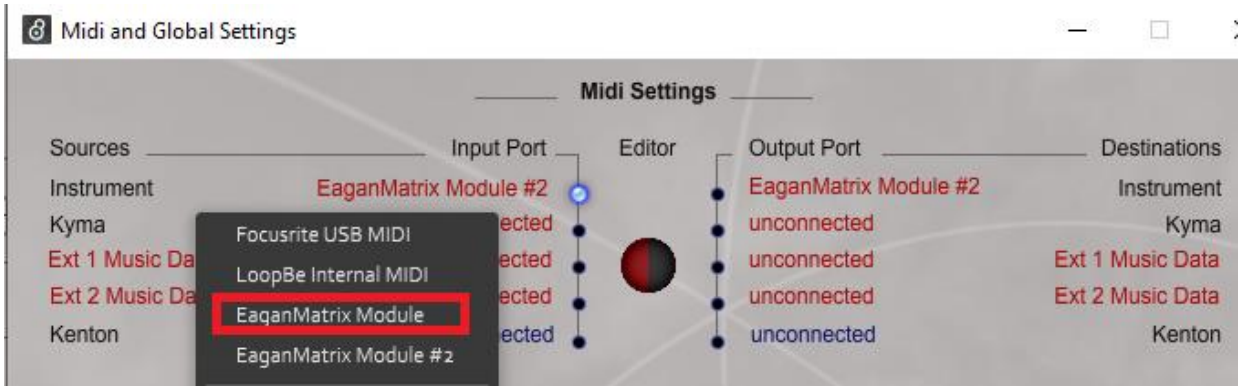
20.10 I have Firmware Loading Issues with Two EaganMatrix modules

If you have 2 EaganMatrix modules and want to upgrade firmware, we suggest you do it in this order:

- Disconnect the USB of the module that is not being upgraded. Bring up editor and it will see the module as "EaganMatrix module" (as it will find only one). Download the firmware and get the module to its normal operating state.
- Exit editor. Disconnect USB from the module just upgraded and connect the second module to USB. Then bring up editor. It will again see module as "EaganMatrix Module". Upgrade that as before and get to the normal operating state. Exit the editor.
- Disconnect the USB for that module. Then reconnect USB cables to your computer or USB for both modules and bring up the editor. The editor should now see two EaganMatrix devices "EaganMatrix Module" and "EaganMatrix Module #2" as it did before the upgrade procedure. Note that either module may be the one that defaults in the editor. See below to switch between them.

20.11 I Can't Seem to Switch between Two EaganMatrix Modules in the Editor

To change the editor to the other module bring up Midi and Global Settings and select the desired EaganMatrix Module device for both Source and Destination on the Instrument line. The editor should disconnect for a few seconds and then reconnect with "Blue LED" as normal to the desired device. Currently you cannot run two versions of the editor on the same machine connected to different devices.



Note that this would be the same procedure if you have one EaganMatrix Module and a Slim Continuum or ContinuuMini connected through USB.

When upgrading firmware always disconnect one module and upgrade the other.

If you can't bring up the editor, try one of these two things:

- Reboot your computer as if you have multiple modules it may get confused which device is current when loading the editor.
- Get out of the editor. In the Firmware directory, rename the file "Haken Editor x.xx/HE/Data/Components/Midiports", to some other file name then start the editor. If it loads successfully you can delete the renamed file you created. The iidiPorts fille be automatically recreated by the system.

20.12 The Haken Editor does not come up correctly (you get blue LED connection)

If the Haken editor does not load as expected when connected to the EaganMatrix module try the following:

- Exit editor
- Reboot/repower the EM Module and then try loading editor
- If you still can not load the editor, in the Firmware directory, rename the file "Haken Editor x.xx/HE/Data/Components/MidiPorts", to some other file name then start the editor. If it loads successfully you can delete the renamed file you created. The MidiPorts fille be automatically recreated by the system.
- If that fails exit editor and try rebooting your computer and try bringing up the editor again.
- If that fails please create a ticket at HakenAudio.com.

20.13 The Mahling Phrase and Additive Bank Data Seems Corrupted or Missing

If the Mahling Phrase or Additive data set suddenly sounds garbled, possibly incomplete or not even playing try the following:

Step 1

- First play a note (C4) on an external controller and Press the X button. Verify the problem is not that X is set way too high. If it is set high, set the X offset to the appropriate Midi note (for example 60). If things now sound fine you are done. If everything sounds corrupted still you may want to try the following procedure after contacting Haken Audio.

Step 2

- If it does not seem to be X related, in the Haken Editor's **Midi and Global Settings/Utilities** menu pulldown, select the "Remake QSPI" option and wait for a couple minutes to be safe (no indication is given about progress here).

Step 3 (only do this step after first raising a ticket at HakenAudio.com)

- In Midi and Global Settings / Update Firmware, try updating Firmware 3 (or you can locate this in the "HakenEditor 9.8x/HE/Firmware" directory and drag it to the Group icon.
- Wait for that to complete. This can take a while.
- In the Midi and Global Settings/Utilities pulldown, select the "Remake QSPI" option and wait for a couple minutes to be safe (no indication is given about progress here).
- That should restore the Mahling data set. If it does not try repowering the EaganMatrix module
- On repowering, if the problem persists please raise a trouble ticket at HakenAudio.com support.

20.15 I loaded the wrong firmware on EaganMatrix module (pre 9.8x) and its shows "DSP"

Only firmware 9.8x and greater should be loaded on the EaganMatrix module. If you loaded an early version by mistake from the website, its best to raise a ticket at HakenAudio.com, however the following procedure ill likely allow you to recover and load the correct firmware:

1. Disconnect the Module from the computer. Quit the Editor.

2. Power off the module and then hold down the red button while you turn the power back on. It should say "File 1".

3. Keep the module on with its screen saying File 1. Don't connect USB to computer yet.

4. Launch the 98x Editor.

5. In the cogwheel menu in the upper right choose Midi and Global settings.

6. On the Input Port of the Sources - Instrument it should say "unspecified"

7. Connect up your EaganMatrix Module via USB and in the drop down menu under "unspecified" choose "default/refresh"

8. After a few seconds the Editor should be connecting to the Module and you will see "EaganMatrix Module"

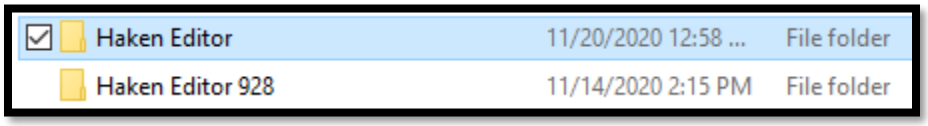
9. In the Update Firmware Menu on this page (lower right corner) choose "Update File 1".

10. When that completes choose "Update file 2"

21 Connecting the Haken Editor & Firmware Update

The EaganMatrix module can connect directly to your computer using the supplied USB cable. You can also use the TRS Midi ports to connect the editor, perhaps using a Roland UM-ONE USB Midi interface cable. The preferred method will be to use the USB connection.

1. Your computer should automatically recognize the class compliant EaganMatrix USB device. Bring up the editor. Note that if you have a USB connection to your EaganMatrix module already connected, the editor may not load correctly (will not display the expected Blue LED connection indicator at the upper left of the Haken editor screen).
2. Download the latest Continuum Release from the Haken Audio web site. The file will be named "Haken Editor.zip" and inside the Editor will be located in the "Haken Editor" folder when expanded on your computer.
3. We recommend you rename the last editor you have on the computer just in case a new release has issues and you need to downgrade to an earlier release. Never store presets you create or edit to the "Haken Editor" folder, as it will be over-written on your next upgrade.



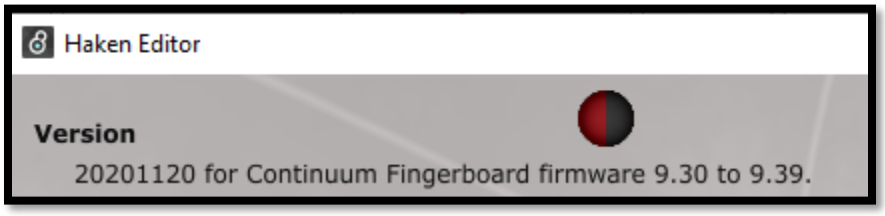
4. Connect the USB cable from Continuum directly to a USB port on your computer. Never use a Midi hub when you want to download software for most reliable connection (though you can use a Midi hub for

general operation). If you are using a MAC, we recommend you always connect to the same USB port on your computer.

5. Run the Editor. If on a PC, make sure you do not have some other program already connected to the Continuum USB device (for example a BeatStep editor). The editor version you run should be the same or later version than the firmware on the Continuum. The current firmware version installed on the Continuum is noted when you bring up the editor in the upper right corner of the screen along with the model of your Continuum:



The Editor version can be seen in Midi & Global Settings / About option. **Always use the editor version you want to upgrade to for upgrading firmware.**



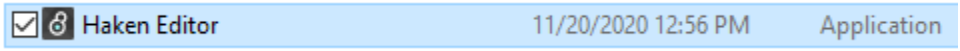
6. Follow the instructions in the new firmware post on the Google Group for updating (or in an email if that is how you received them). Make sure to read carefully as there may be additional instructions and requests for that particular beta release version. Mac users must download MAXMSP components before running the editor. An example of the beta firmware release notes:

> To run on a Mac:
> Max components here:
>
> (See link in actual update post)
>
> This requires MaxMsp to run. Launch MaxMsp and then open the Haken Editor.maxpat in Haken Editor 9xx > Data > components > Haken Editor.maxpat
> Your Continuum needs to be connected to your computer before you launch the Editor.
>
> Windows Build here:
>
> (See link in actual update post)
>
> Your Continuum needs to be connected to your computer before you launch the Editor.
>
> ---
>
> Once the Editor is running:
>
> a. It is recommended to become familiar with the latest supplied Continuum User Guide. In the upper right corner of the main Editor window is a cogwheel menu, where you can find a link to the User Guide.
>
> b. It is **highly recommended** you update your Continuum to the latest firmware:
>
> Cogwheel Menu > Mid and Global Settings > Update Firmware > Update File 1

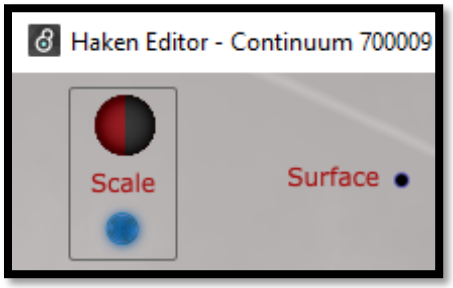
- The menu says one hour but it actuality this one takes 5 minutes or so.
- When prompted, then do Update File 2

21.1 Firmware Update Procedure in Haken Editor:

Once you have loaded the firmware onto your computer (and have MAXMSP components installed if running MAC), and have your Continuum connected through the USB cable directly to your computer, click on the editor icon to run the editor application.
On PC, for example:



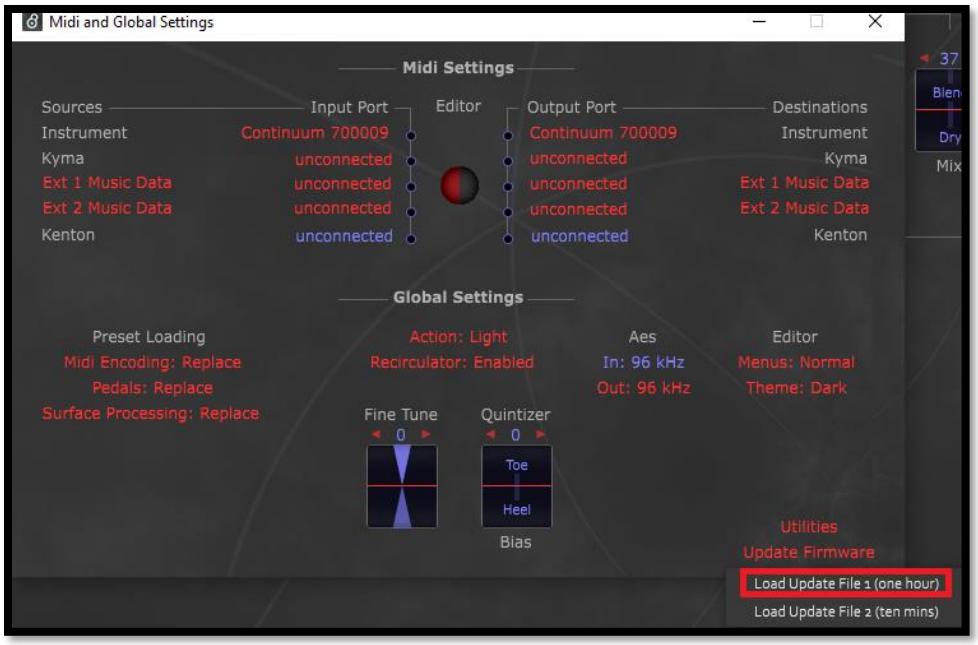
The editor may take a minute or so to load and it may flash a few times before loading. If loaded correctly the constant blue LED icon will be lit at the top left of the editor and your continuum device should be listed (here "Continuum 700009").



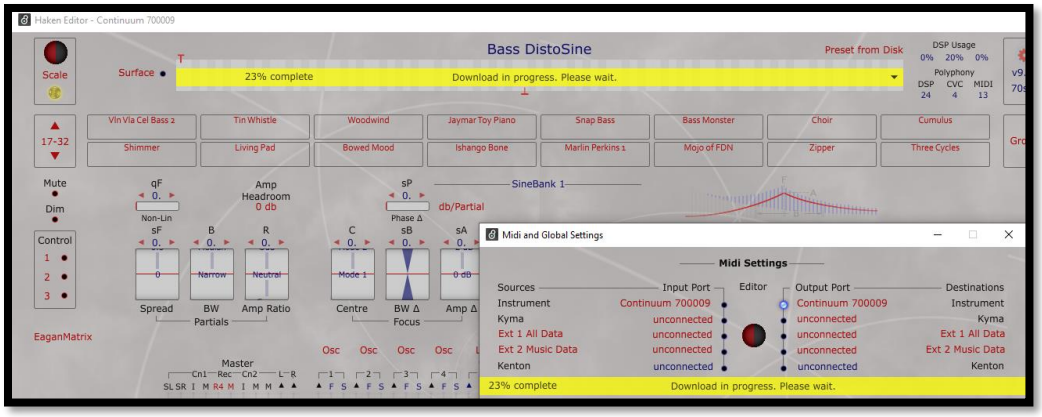
If the LED icon is gray, you do not have proper connection to the Continuum. Check the following:

1. The continuum did not have a solid blue LED showing before running the editor. This should be the case when booting the Continuum without computer connection (if not contact support).
2. You connected the continuum to your computer before bringing up the editor. Also connect Continuum before running the editor.
3. Your USB cable may be bad, try another
4. Your USB interface on your computer may have issues. If you had another Continuum connected and you connect a new one and running a MAC, you should reset your USB port. On a MAC always connect the Continuum to the same USB port.
5. You have some other device already connected to the Continuum (on Windows). If for example you connected your Continuum to your DAW and associated it as input device, the Editor may not get connection as Windows has already grabbed the device. Always make sure no other device is connected to the Continuum before you bring up the editor on a PC. On Mac this should not be an issue as it handles USB devices differently (but still a good idea to follow if you intend to upgrade firmware).

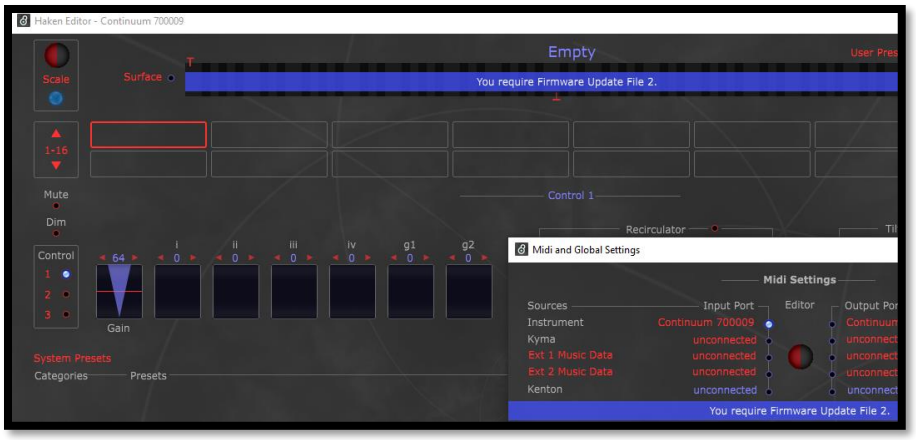
Go to Midi and Global Settings and at the bottom Select "Load Update File 1". It says it will take an hour, but it should only take 5-10 minutes.



On firmware update you will see a yellow message in the main editor and in Midi and Global Settings informing you of progress and the Yellow LED should be on the continuum with the LED screen scrolling an update pattern of dots. After it reaches 100%, the firmware fill finalize, the Continuum's LED will go green for a short time and then should be on before going blue.



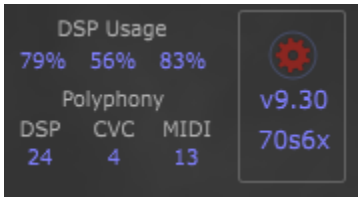
After File 1 (the firmware) finishes, the default dark Theme will appear (if you had another theme active) and you should get a message asking for File 2 (the preset installation).



If so, proceed with loading File 2 in Midi and Global Settings.



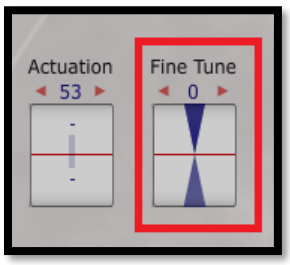
You may get a message to repower or after the File 1 firmware reaches 100%, you may get a DSP message. If File 2 is not requested, recycle power, wait until the Continuum boots and it likely will be asked for. If not, try reloading File 1 and going through the procedure – and make sure you are directly connected to your computer running the Editor. When done, you should see the new firmware listed at the top right corner of the editor next to the processing statistics.



7. Read the manual – especially the Slim section that will explain operation. This should be loaded in the User Manual section of the firmware and also available in Midi & Global Settings from the Cog Wheel as an option. A sectional also details the new features vs. the 9.0 version.

21.2 Fine Tune Editor Control (Check after Firmware Update)

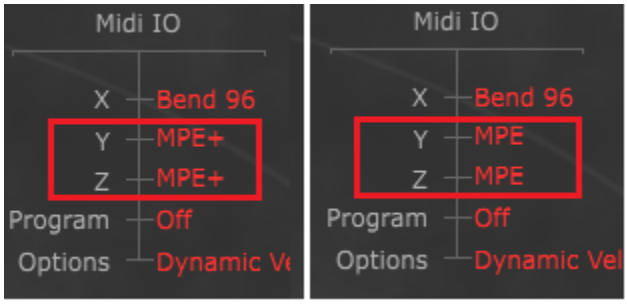
After firmware download, at times your Fine Tune setting may be set to a non-zero value making your X input seem out of tune, sometimes by as much as a half step. After firmware download check that the Midi and Global Settings "Fine Tune" control is set to zero (most users will assume it is set this way as a default).



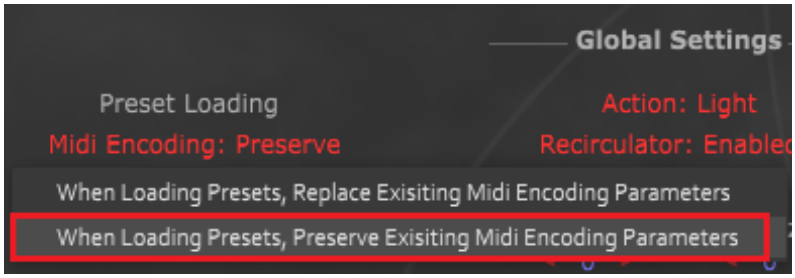
22 Playing to/from External Midi Controllers and Plugins/DAWs

While the main reason for the Continuum's being is a stand-alone instrument capable of incredible expression on its own, some have desired to also use it as a Midi Controller. A few tips that may be of use to you are listed below. Everyone can benefit from knowing this information.

- If you want to directly connect to a MIDI DIN device, use the TRS Midi ports and a MIDI TRS-to-DIN adapter, else use the USB port for connection to DAWs.
- Make sure you do not have the editor running if you intend to connect the Continuum as a USB input device to a DAW on Windows.
- You should see the Continuum device in your DAW's input list: "Continuum 700009" for example.
- The USB interface is only a Midi interface. It is not a USB audio interface. You must record Continuum audio to an analog source if using the L/R mono outputs or you can connect using the SPDIF digital IO if your system supports it.
- The Continuum will always output polyphonically as a MPE device, no matter what setting you use. If your preset is set as MPE or MPE+ the continuum will output on channels 2 to Max Polyphony +1. Remember there is no such things as MPE or MPE+ mode. The mode is set based on what is set for Y and Z in the MIDI IO section of the preset. The defaults for all presets if MPE or MPE+. MPE plus presets output additional information on Channel 87. Also if you have the editor connected additional CCs will be used on some high CCs. Few devices or plugins will support MPE+ mode (other than the upcoming Osmose) so if you are outputting to an MPE device, set your preset from MPE+ mode to MPE mode in Control Panel 3.



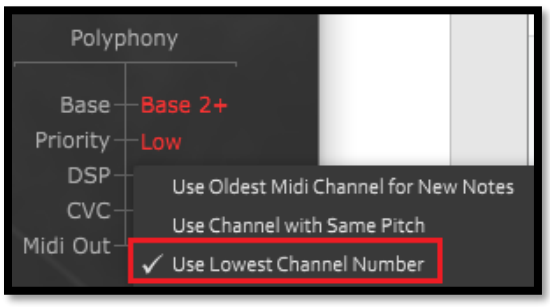
- To make sure you always use MPE mode instead of MPE+ mode when changing presets, go to Midi & Global Settings and change the Surface Processing to Preserve:



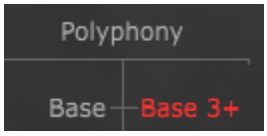
- For some plugins you may want to use CC7 or CC11 as expression for volume control on Z. In the Midi IO section (Control Panel 3) you can set Z to CC11. This will default Y to CC74. The Continuum will still output on multiple channels – in this case on channels 1 to Max Polyphony.



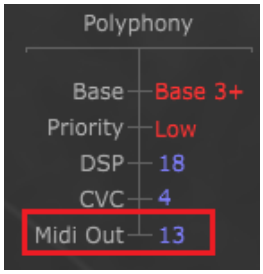
- It is suggested you set Priority to Lowest as that will help you predict what midi channels you are outputting on. This is set in Control Panel 2. The lowest Midi Channel (2 in MPE modes) will always be the first channel output when pressing the fingerboard. Successive fingers will then come in on channel 3, 4, etc. when playing polyphonically. If you use "Oldest" setting, channel will cycle through the full range of Polyphony.



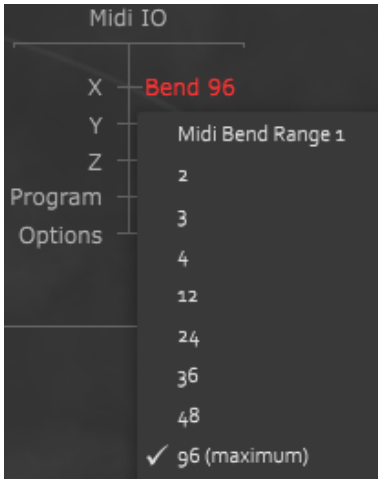
- Also remember the Slim is a 6x DSP processing continuum, so Polyphony for most all presets as loaded in the editor will use at least 12 Midi channels as most all preset use expanded polyphony – noted with a + next to the Polyphony number). On a Slim Continuum, Expanded polyphony will support 6 times the voices of the polyphony number. Base 3+ will support 18 voices and Base 4+ will support 24 voices.



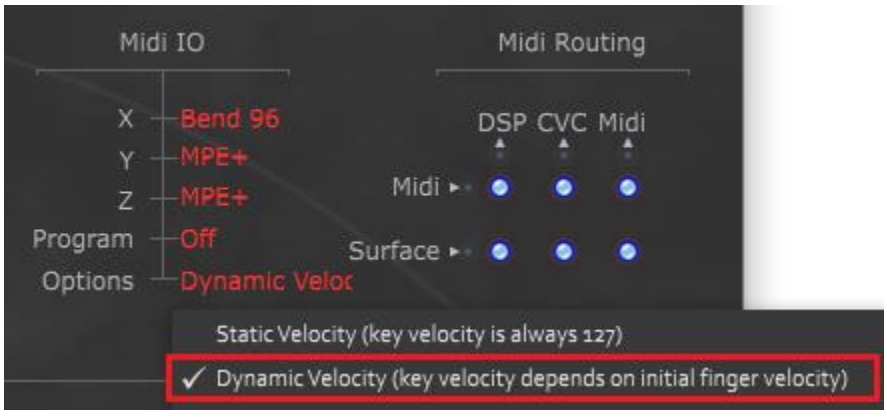
- You may find that when playing you get "Reduce Polyphony" messages on the Slim continuum. In this case simply go in and change the polyphony from 4+ for example to 3+. Some 4+ presets will require this, especially if you try and add anything to them in the EaganMatrix.
- The MIDI Out parameter of the Polyphony section will tell you the number of Midi channels your preset will output on. This is in Control panel 2.



- Make sure you match the Pitch Bend of your destination device to the setting on the Continuum. Many Midi devices cannot accept a pitch bend of 96 (+/- 48). This is set in the Midi IO section in Control Panel 3.



- The continuum will output an enormous amount of Midi data when played. Pitch Bend, Aftertouch and CC74 Y position data. Many plugins will not be able to deal with this data stream.
- This link explains more about how the Continuum processes Midi (note it uses the previous editor version): https://www.youtube.com/watch?v=kR4xEBQ3v2k&t=82s
- The continuum will default to outputting Velocity at full 127 value if your program is not using Aftertouch data. IF you are expecting Velocity data in your destination device or plugin, set the output to Dynamic in Control Panel 3:

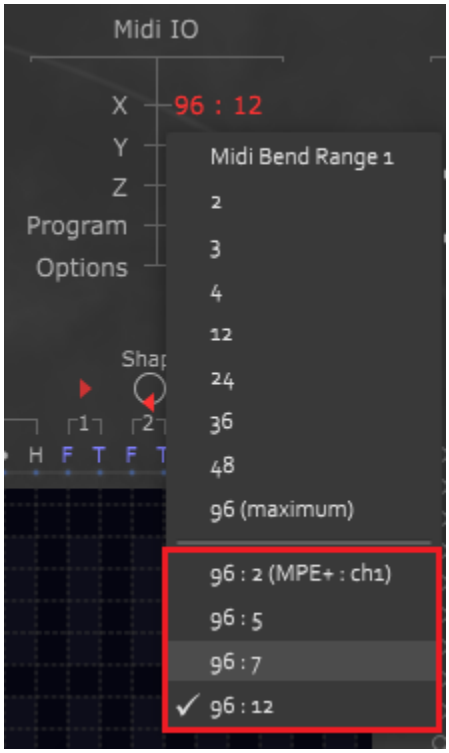


- Remember you will be outputting even a single line on multiple channels if you are set to the default Priority. Your destination may not be able to deal with this. If it is not an MPR device or plugin, you likely will have to set it to receive in Midi Omni mode.

- You can send MPE data to the Continuum on multiple channels or send polyphonic Midi data to the continuum on Channel 1 in MPE/MPE+ mode. The Continuum does not use Channel 1 as MPE control. It

uses channel 16. Some software programs expect MPE control data on channel 1. In this case you will have to make reassignments in your destination plugin, etc.

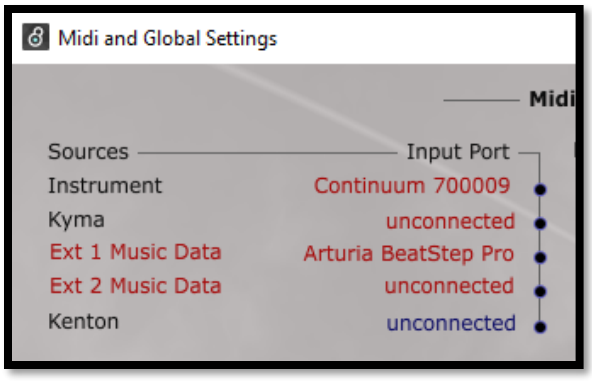
- When sending Midi data to the Continuum on Channel 1, a few pitch bend options are supported that would commonly be found on non-MPE devices. Set these accordingly in Control Panel 3 in the MIDI IO section:



- If you have a previous Continuum or ContinuuMini and get a Slim and connect them through Midi be careful not to send Control data from one instrument to another as it could in some cases invalidate the firmware it will have to be reloaded. If you connect through the Editor's External inputs make sure you only use "Music Data" as input/output to Continuum devices.
- Lastly, remember, the Continuum is not expressly meant to be a Midi controller as its primary use case and you may not get the results you expect if you are used to using a standard keyboard Midi controller and your destination is expecting standard (not MPE) Midi data.

22.1 Playing with USB Controllers without a Computer Connection

When using the Haken Editor, you can always connect up to two external USB devices (Such as BeatStep Pro) to your computer (or through hub) in the Haken Editor's Midi & Global Settings to route the data to the Continuum through the editor and select the type of data you want to pass through – Music (Midi notes, PB, Aftertouch, etc.) , Control (Preset selection, etc.) or All (both).



However, many owners desire to play the Continuum with a BeatStep or other USB controller and no computer. For this you will need a Midi USB Host unless you can directly use the TRS Midi ports on the Slim with a DIN Midi adapter instead of USB connection for your application.

- There are not that many Midi Hosts. Some only have one port, in which case you will need a hub and then there may be additional issues. Here are some options (noting that not all of these have been tested with a Continuum and not sure about availability):
    - **Kenton MK2 Midi Host.** This is not recommended for use with ContinuuMini. Some have seen connection issues.
    - **CME Midi and Wireless WIDI hosts.** The WIDI products have been tested with Continuum and ContinuuMini and work well.
    - **iConnectivity MIO XM or XL**. These have multiple USB host ports (4 and 10 respectively and can be fully configured in many ways to support any possible configuration). Although the most expensive option, it supports the most host ports without a hub and is the most flexible.
    - **MidiPlus USB Host**. Similar port configuration to Kenton.
    - **Raspberry Pi**. Although actually a small computer, it can easily be configured as USB host with multiple ports as long as ASLA software is installed. Still, it's one of the cheaper USB host options. The web has a number of videos describing how to configure and use – one even for Continuum.
    - **RK-005 Standalone USB Midi Host**. Will require hub for multiple USB devices.
    - **DOREMI USB Midi Host**. Similar port configuration to the Kenton.

23 Appendix 1 - Current EaganMatrix Presets as of Firmware TBD

Here is the current EaganMatrix preset list, color coded as to when a preset was added by release with numbering by Continuum type. Half and Full size modes use the “Num” numbering.

To be added at a later date for 9.8x (or 10.x).