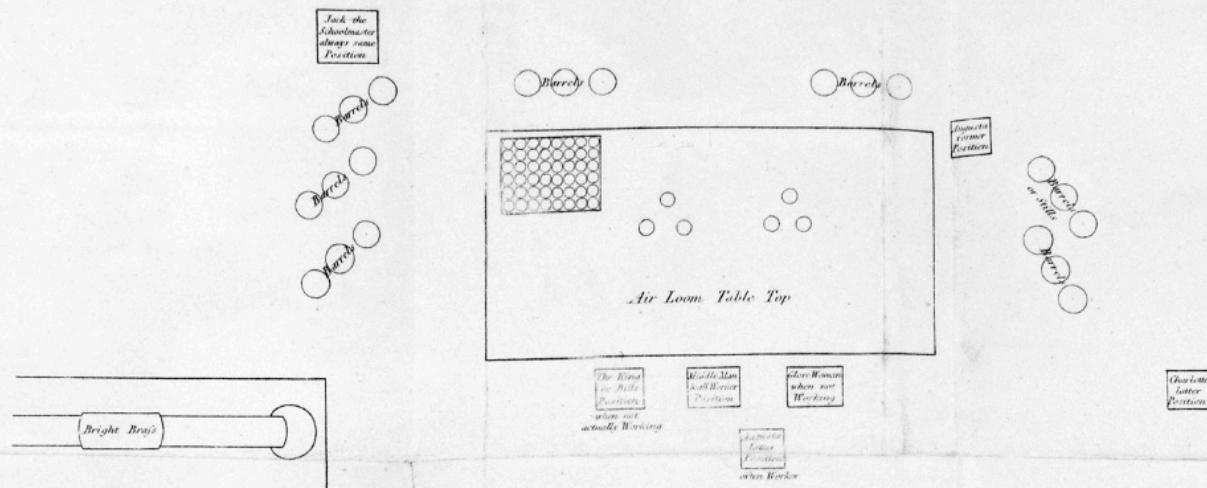


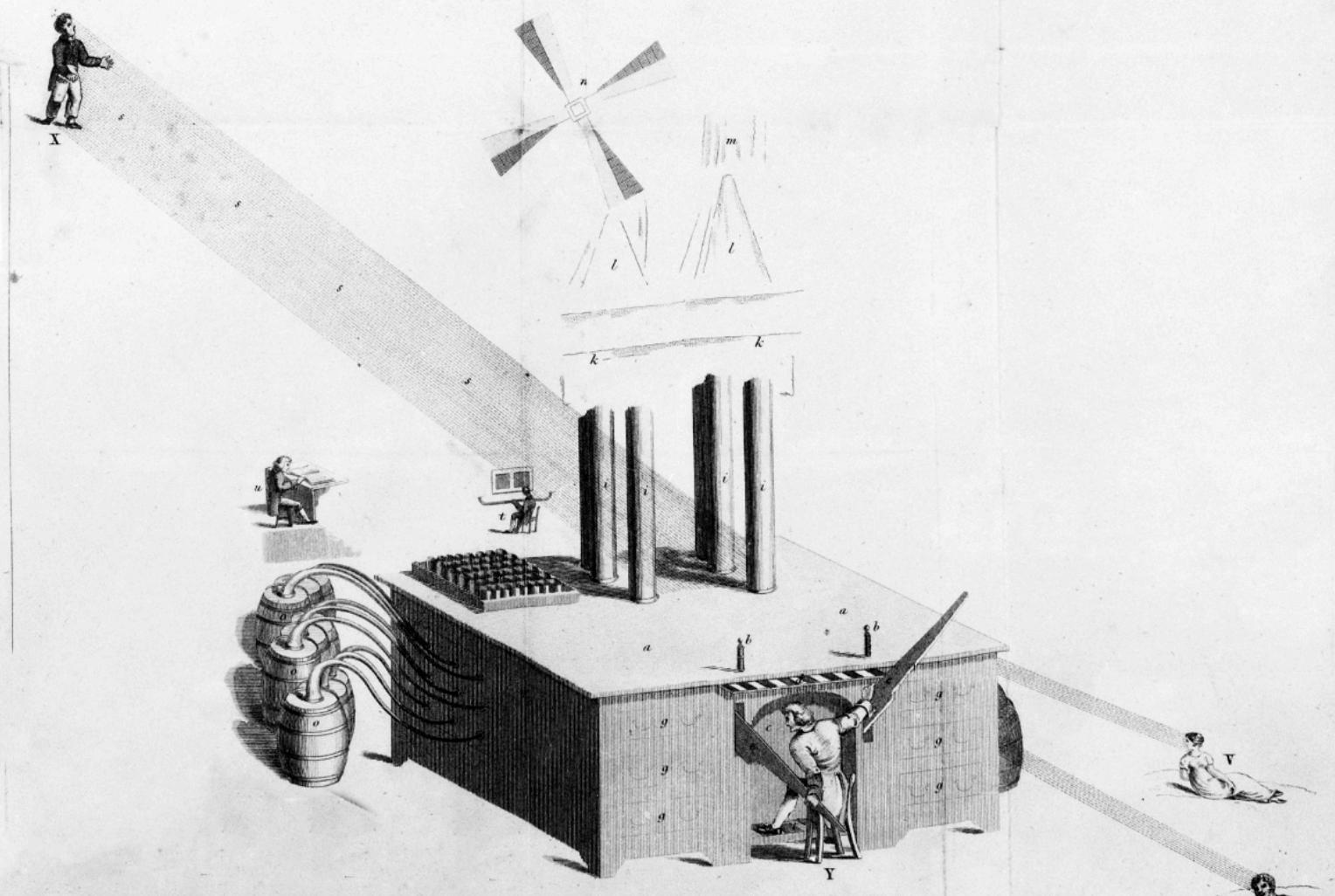
their Apparatus's Relative Positions, as it has at all times appeared to Me by the Sympathetic Perception.

Reposess Bar



TELAR

A dynamic MIDI mapper for Sensel Morph's Thunder Overlay
User Guide



ABOUT TELAR

Telar is a dynamic MIDI mapper for Sensel Morph's Thunder Overlay.

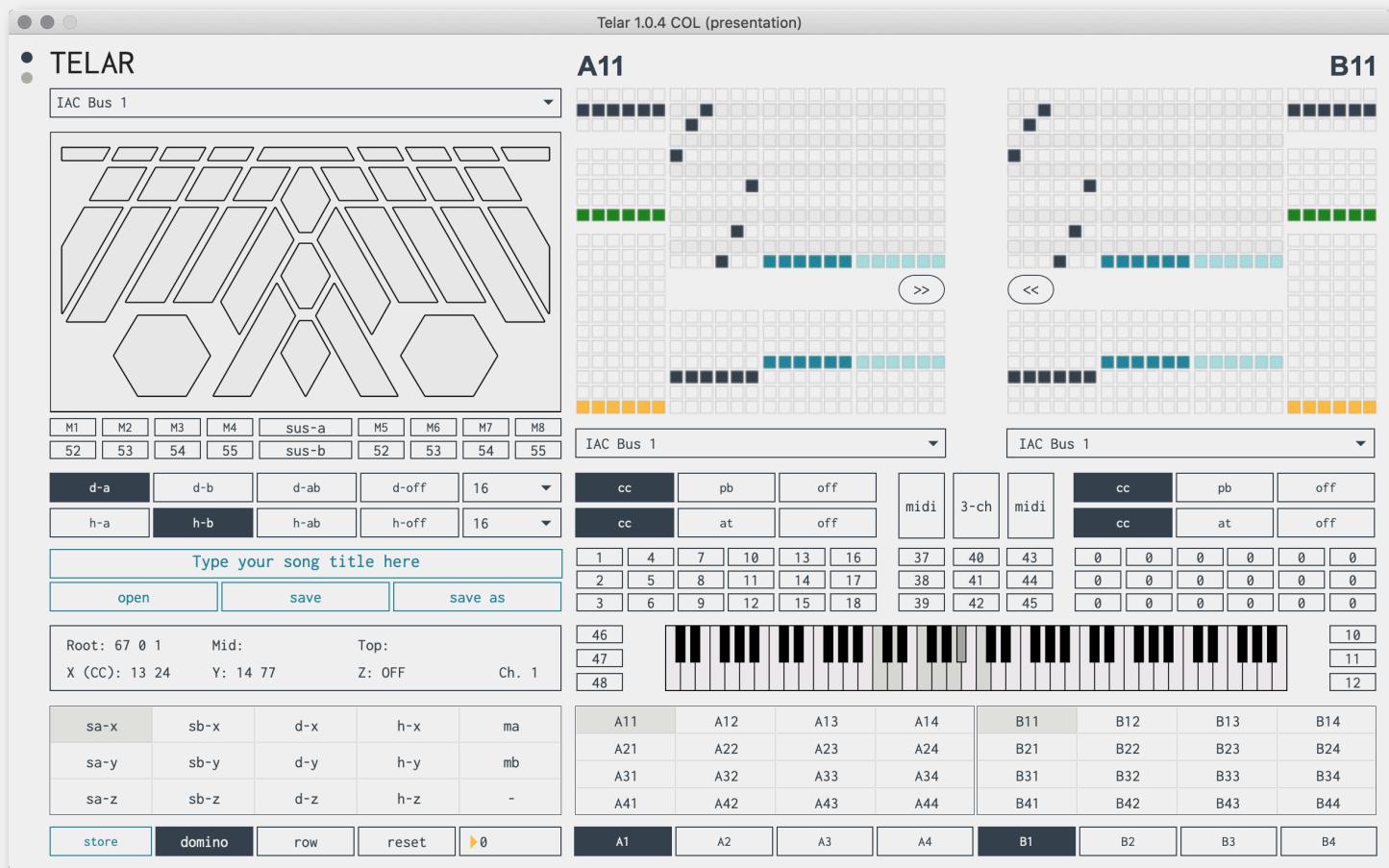
Thunder's controls are split into a simple symmetric setup and an intuitive structure.

It also features a sophisticated preset system, designed with live performance in mind.

Each slider can be mapped to any one note (or chord), XYZ control or MIDI channel.

For additional licensing information please go to:

<https://flaviogaete.info/license>

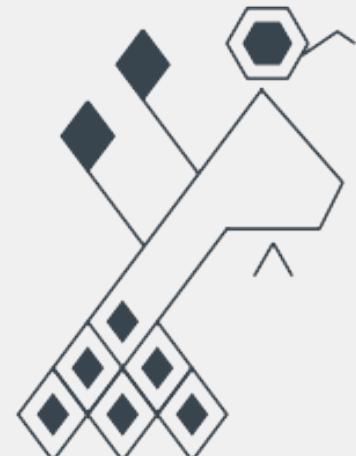


Front Page:

Detail from James Tilly Matthews' "Air Loom" – "Illustrations of Madness" by John Haslam, 1810.

Opposite:

Folk Mayan art from the town Santa Catarina Palopó, Guatemala.

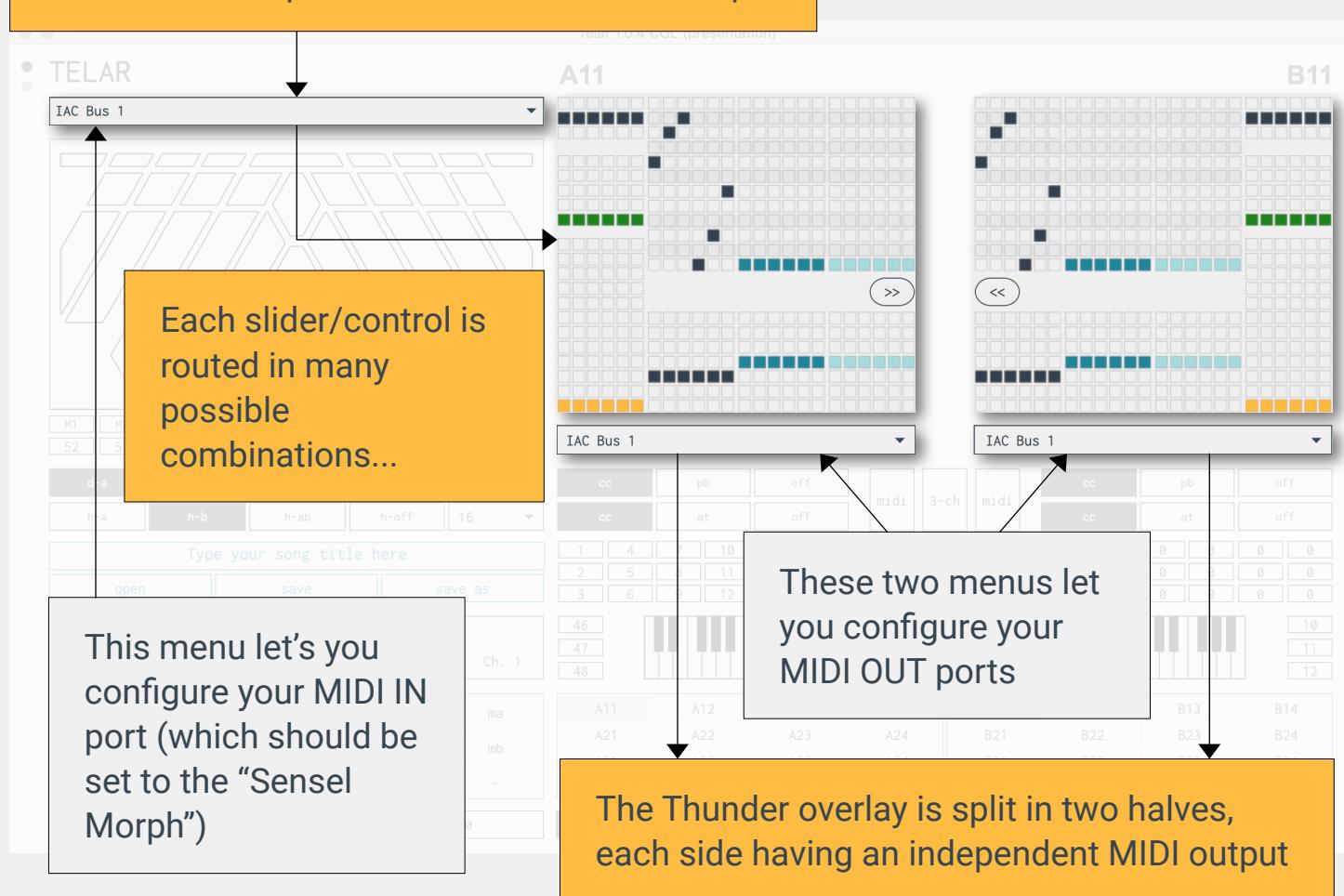


MIDI ROUTING

Telar's MIDI signal flow works as follows: the Sensel is connected to the computer (via USB or Bluetooth), then into Telar. Inside Telar, the signal is distributed to symmetrical sets of note matrices and CC control assignments, which correspond to each of the slider-buttons in Thunder (except the 8 program buttons – we will look at the layout soon). These assignments are then routed so that each side of the Thunder is sent out of an independent MIDI port – the diamonds, hexagons and ‘meta buttons’ at top are routed globally (also, we'll look at these details later on down the manual). The MIDI ports should point to either your MIDI interface or some kind of inter-application MIDI bus.



The Sensel Morph is routed to Telar's MIDI input



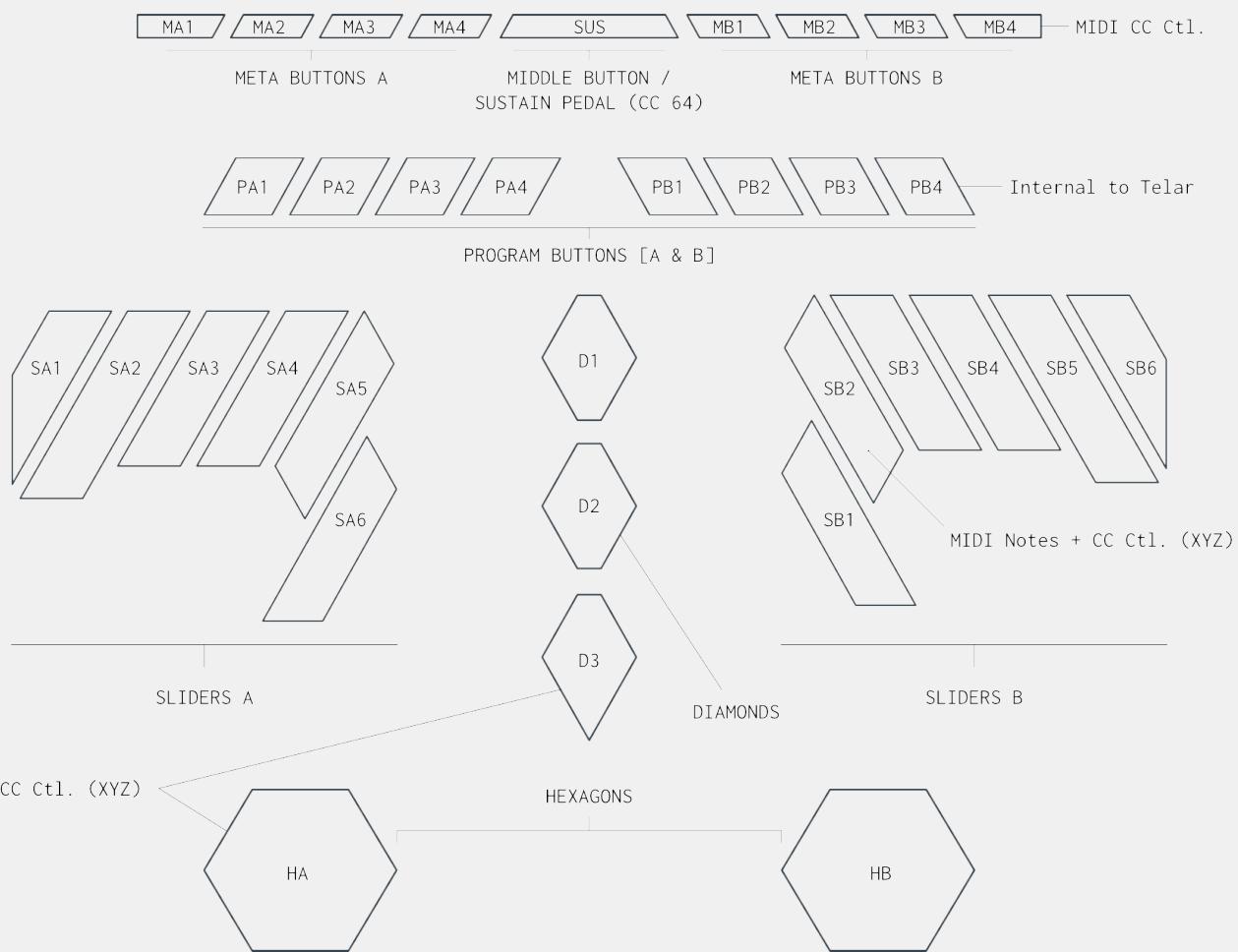
OVERVIEW

The layout of the Thunder can be broken down as follows:

- The top layer of buttons are called **Meta Buttons** (except the center button which is reserved as a **sustain pedal**), meant to, say, trigger a clip in Live, etc.
- The next layer down (the square buttons) are **Program Buttons**: they provide a combination of 32 presets in total that you can recall in real time (each preset will consist of an independent routing configuration of all the other controls).
- The **Sliders** are reserved for note and CC performance data.
- The three **Diamonds** and two **Hexagons** are reserved for global CC data.



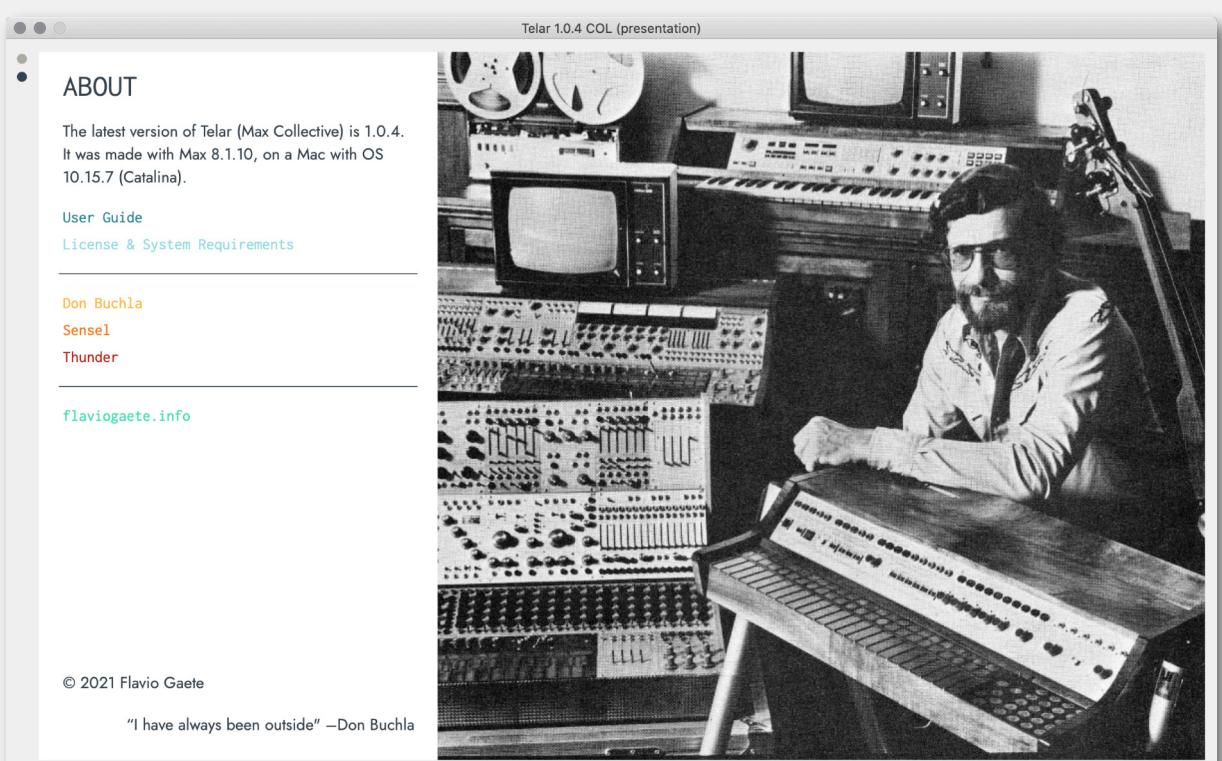
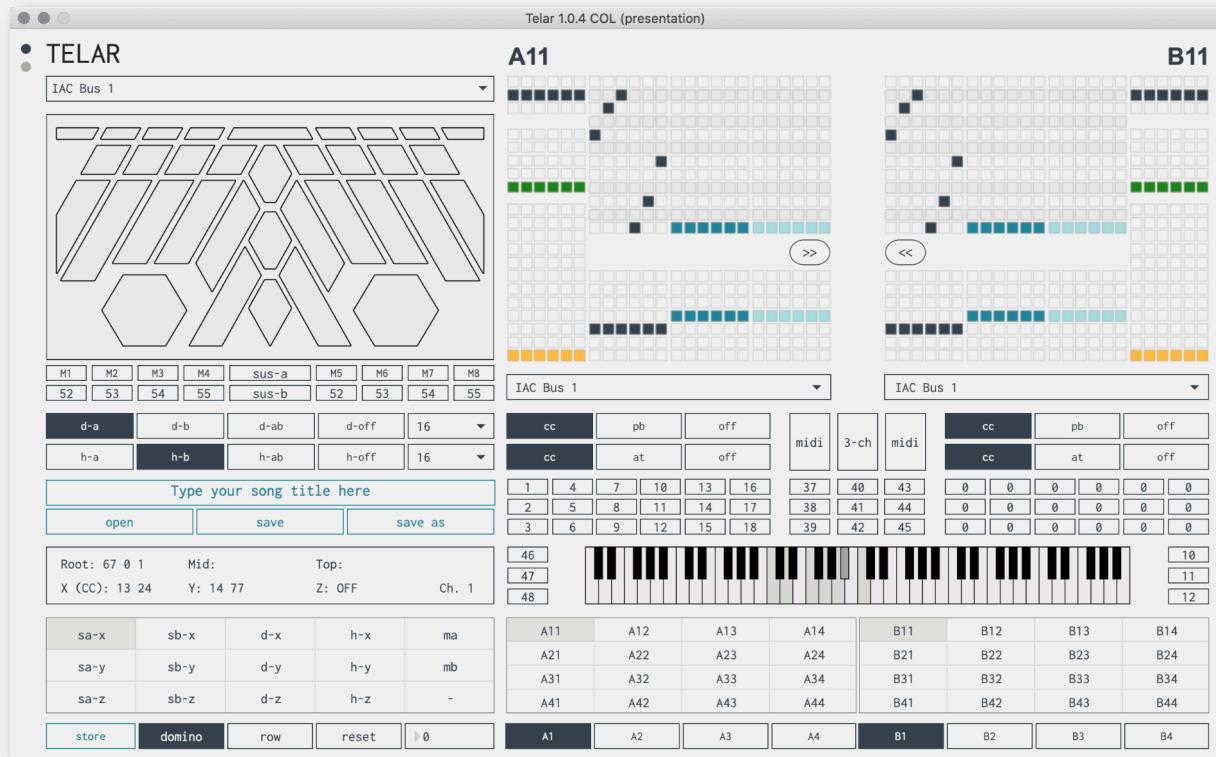
In general, the layout is considered as a **symmetrical setup**, so the left side (A) can work independently from the right side (B) – for the left and right hands respectively – so for example, the four program buttons on the left affect the left sliders, and so on).



Control Type	Data Sent	Description	Special Functions
META BUTTONS: MA1-MA4 SUS MB1-MB4	MIDI CC (as buttons)	Meant for 'extra' musical operations, e.g. to record a MIDI clip, bypass an effect, etc. The middle button is the Sustain Pedal.	<ul style="list-style-type: none"> • SUS + MA1 = Side A Sustain ON/OFF. • SUS + MA2 = Side B Sustain ON/OFF.
PROGRAM BUTTONS: PA1 - PA4 PB1 - PB4	Internal to Telar	Each side features an independent preset system w/ 4 banks of 4 presets each (16 for each side), labeled A11-A14, A21-A24...B41 - B44.	Examples: PA1 + PB1 = B11 PB2 + PA4 = A24
BUTTON-SLIDERS: SA1 - SA6 SB1 - SB6	MIDI Notes MIDI CC (XYZ) Pitch Bend (X) After Touch (Z)	Each slider can play a MIDI note and a combination of 3 controls for XYZ. Additionally, there are special modes where each slider can play octaves of the same note, or chords (up to a triad).	<ul style="list-style-type: none"> • When PB is enabled, X sends Pitch Bend. • When AT is enabled, Z sends After Touch.
DIAMONDS: D1 - D3	MIDI CC (XYZ)	Meant to send global MIDI CC control.	-
HEXAGONS: HA, HB	MIDI CC (XYZ)	Meant to send global MIDI CC control.	-

TELAR'S PANEL

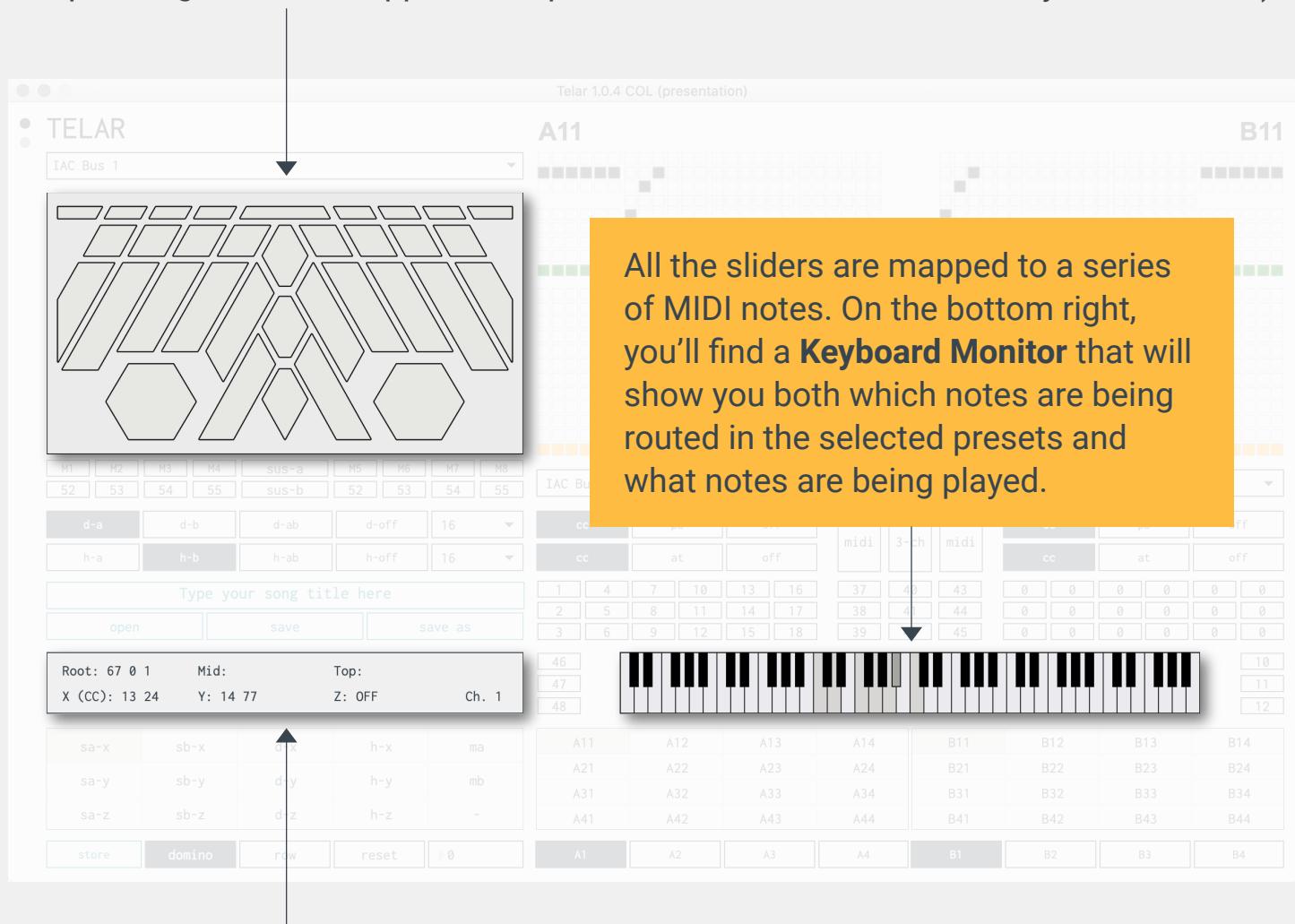
It's divided in two parts, the **Editor** proper, which is what you see as soon as you open the editor, and the **About** page (click on the radio buttons on the top-left corner of the device), where you have a number of web links that give you additional related information (e.g. a link to this manual, articles about Don Buchla, the Thunder, etc.)



The **Editor** is made up of various sections, which are covered below...

Monitoring Panels

On the top left corner you'll find a miniature version of the Thunder that will display incoming data from the Sensel Morph (make sure to have selected the appropriate MIDI input beforehand, and also to have sent the appropriate **Telar Sensel Map** to the Morph using the Sensel app; this map will be included with the rest of your download).



Towards the bottom of the editor panel, on the left side, you'll find a **MIDI Monitor Panel** that will show you the MIDI data going *out* of Telar.

On the top row you'll read note information for each layer of a (potential) chord (root, middle note, top note), the first number is the note number, the second velocity and the third that note's MIDI channel.

On the bottom row you'll read CC information for the latest slider that you play, on the X, Y & Z controls respectively; the fourth item is the slider's MIDI channel.

CC Value Assignments

As discussed before, Telar's layout is split into a number of layers, of which, the following can send CC data:

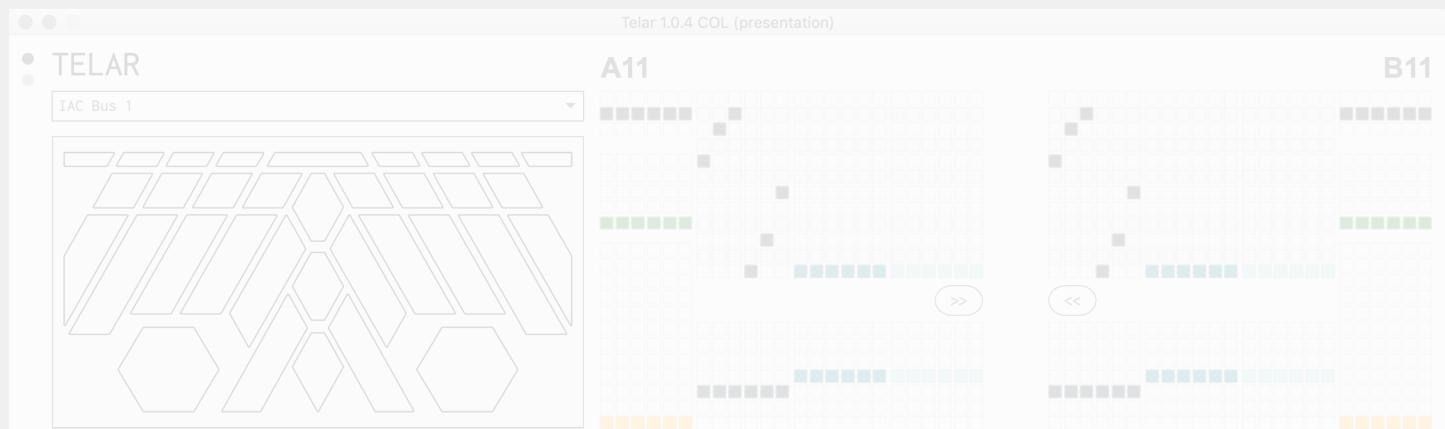
- Meta Buttons
- Sliders
- Diamonds
- Hexagons

These two sets of CC value assignments correspond to **Sliders A & B**. There are six sliders for each hand, each with the ability to send X/Y/Z controls

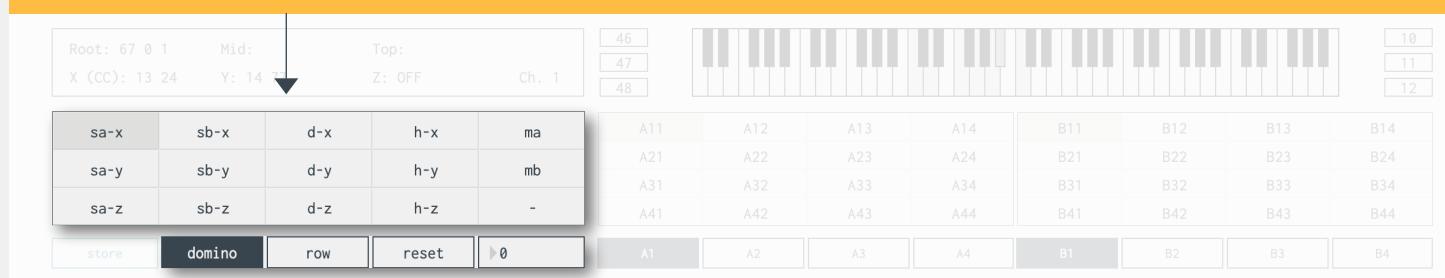
The screenshot shows the Telar 1.0.4 COL (presentation) software interface. On the left, a yellow box contains the text: "Here you can assign the CC control numbers for each one of your **Meta Buttons**". Below this is a grid of 8x8 boxes labeled M1 through M8, with values ranging from 52 to 55. Further down are dropdown menus for "d-a", "d-b", "d-ab", "d-off" and "h-a", "h-b", "h-ab", "h-off", both set to 16. A text input field says "Type your song title here". At the bottom are buttons for "open", "save", and "save as". A status bar at the bottom shows "Root: 67 0 1", "Mid: X (CC): 13 24", "Top: Y: 14 77", "Z: OFF", and "Ch. 1". On the right, another yellow box contains the text: "These are the CC values for the three **Diamond Sliders** (each layer represents the X/Y/Z controls respectively)". It shows a 3x6 grid of boxes labeled 1 through 48. Below this is a keyboard with numbered keys 1 through 48. To the right of the keyboard are two sets of 4x4 grids labeled A11/A12/A13/A14 and B11/B12/B13/B14, with sub-labels A11/A21/A31/A41, A12/A22/A32/A42, A13/A23/A33/A43, and A14/A24/A34/A44. At the very bottom are buttons for "store", "domino", "row", "reset", and "0".

These two sets of CC value assignments correspond to **Hexagons A & B**. Each hexagon has the ability to send X/Y/Z controls.

In addition to being able to assign a CC value to each particular control in Telar, there are various shortcuts for assigning either **consecutive values** to all the controls, **or** to assign **the same value** to a particular row.



The **Row Matrix** at the bottom left corner of the Editor lets you select row sets for the various controls, e.g. you can adjust the values of just the X axis on the A Sliders.



The **number box** is used in conjunction with the domino or row modes for assigning multiple CC values at once.

The **Reset button** normalizes all the controls in Telar.

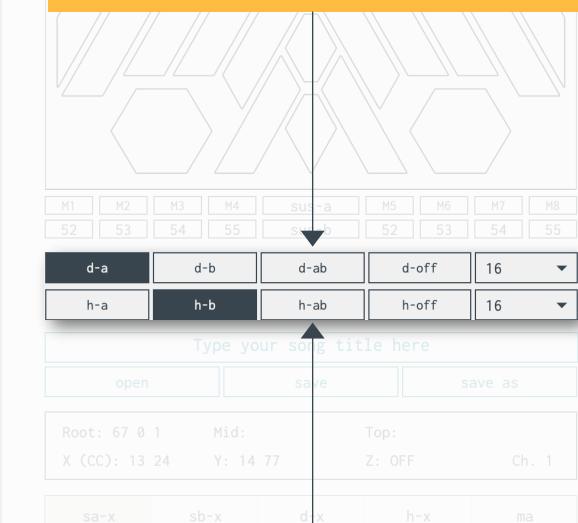
If you'd like to assign the same value to a row of sliders (for example, if you wanted to use Thunder as a 'MIDI mixer' and have all the Y controls of the SA & SB sliders set to CC7), you can: 1) click on the **Row Button** (to activate 'row mode'), 2) click on the **Row Matrix** above, on a particular row set you're interested in (e.g. **sa-x**), and 3) type the desired CC value on the number box (to the right of the Reset Button). Then, all the X values for sliders SA1 - SA6 will be set to that number.

In order to assign each individual control to a consecutive CC value in one go, you need to select the **Domino Button** and type in a number on the right. Then, all the values will be assigned consecutively (counting from the number you typed in – if this 'domino effect' goes over the highest MIDI value of 127, it will cycle through and continue with CC1 and onwards). The domino assignments happen in the following order: Sliders A, Sliders B, Diamonds, Hexagons, Meta Buttons.

Global CC Controls, CC Modes, MIDI Outs

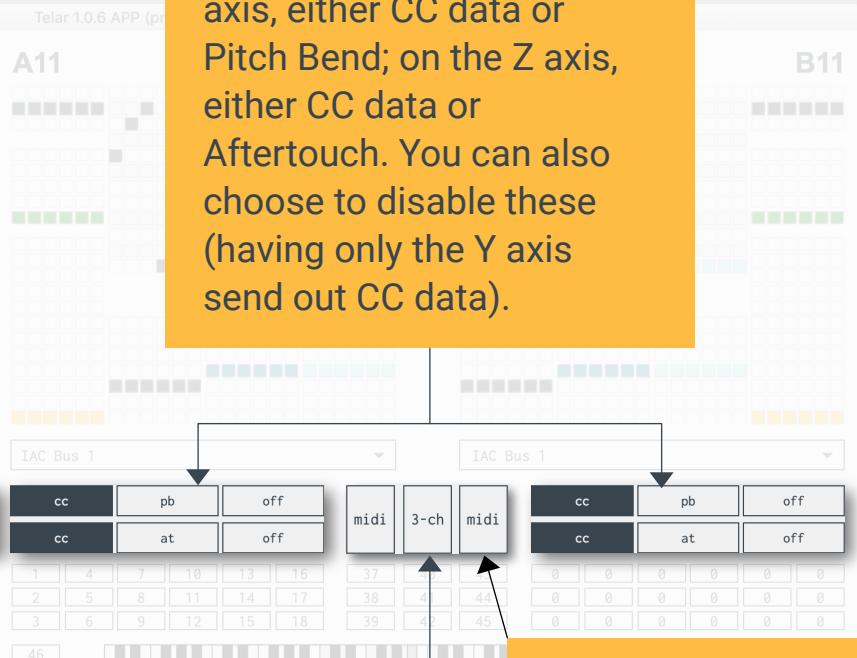
Some of the CC data sent out of Telar have alternative ways of operating. These 'special modes' are outlined below, but before we take a look at these, it's important to emphasize that, in general, Telar splits the Thunder layout in two halves (left & right), so the sliders on the left side of the controller can work independently of the sliders on the right.

You can have the **diamonds** send out CC data out of **side A**, or **side B**, or both. Or you can choose to disable them if you're not using them (just to gain a little bit more CPU real estate).



Likewise, you can assign the **hexagon** controls to either side, or both sides, or you can turn them off. Additionally, you can choose what MIDI channel they send their data through.

The **performance sliders** (A & B) can send, on the X axis, either CC data or Pitch Bend; on the Z axis, either CC data or Aftertouch. You can also choose to disable these (having only the Y axis send out CC data).



Each side of the Thunder can send either regular MIDI or MPE-formatted output

We will cover MIDI note routing soon, but for now: there's a mode where each slider can send, beyond a single note, a triad. In that case, you can have each note of the chord be sent out of a consecutive MIDI channel (vs. having all three notes on the same channel).

Sustain Pedals

To toggle the Sustain Pedal ON / OFF (for either side A or B):

1. Press & hold the Sustain Button
2. Press MA1/MA2

The middle Meta Button works like a **Sustain Pedal**, in conjunction with Meta Buttons MA1 & MA2 (each side of the Thunder has independent sustain control).

MIDI Note Routing

On the right side of the editor panel, you will see a number of matrices, laid out symmetrically (for the left and right Sliders, respectively).

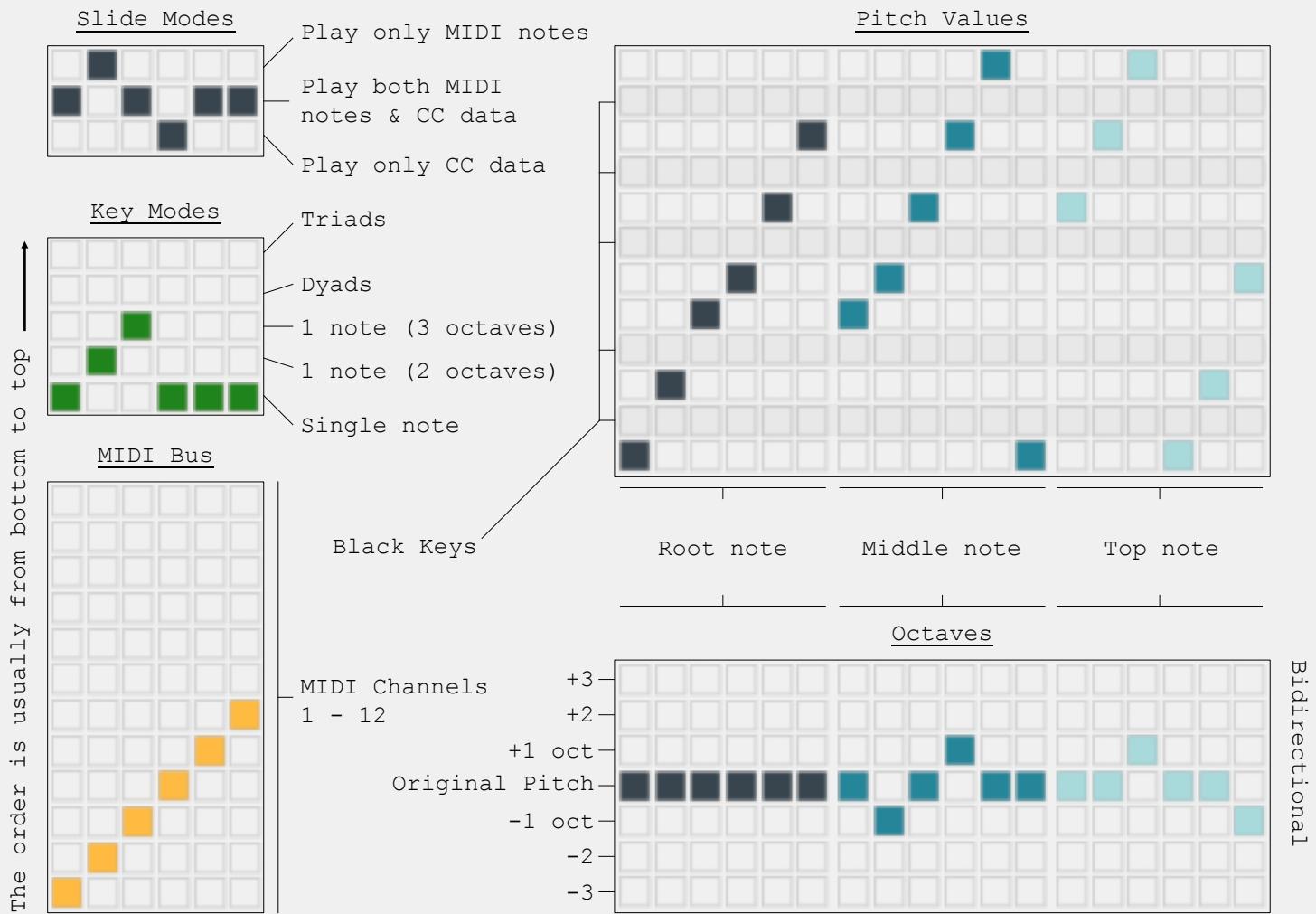
Each side of the **Sliders** counts with the following matrices (explained on the next page):

- Slide Modes
- Key Modes
- MIDI Bus
- Pitches (bottom, middle, top)
- Octaves

The Note Matrices

Note: the values of the matrices are laid out as follows:

- Horizontally, from left to right: sliders 1 through 6.
- Vertically, **from bottom to top**: modes 1 through n ; busses 1 through 12 (which correspond to MIDI Ch. 2 through 13 – Ch. 1 is reserved for global sends), pitches in ascending order from C to B; the octave matrix is an exception: **the middle row** is the center octave, spreading up and down in a range of three octaves in each direction.



1. Slide Modes:

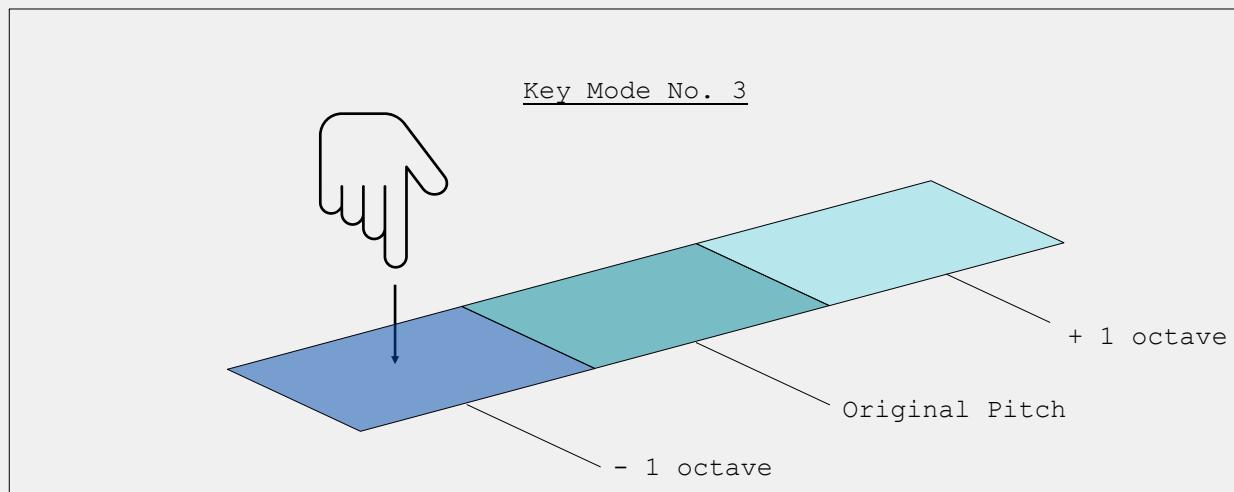
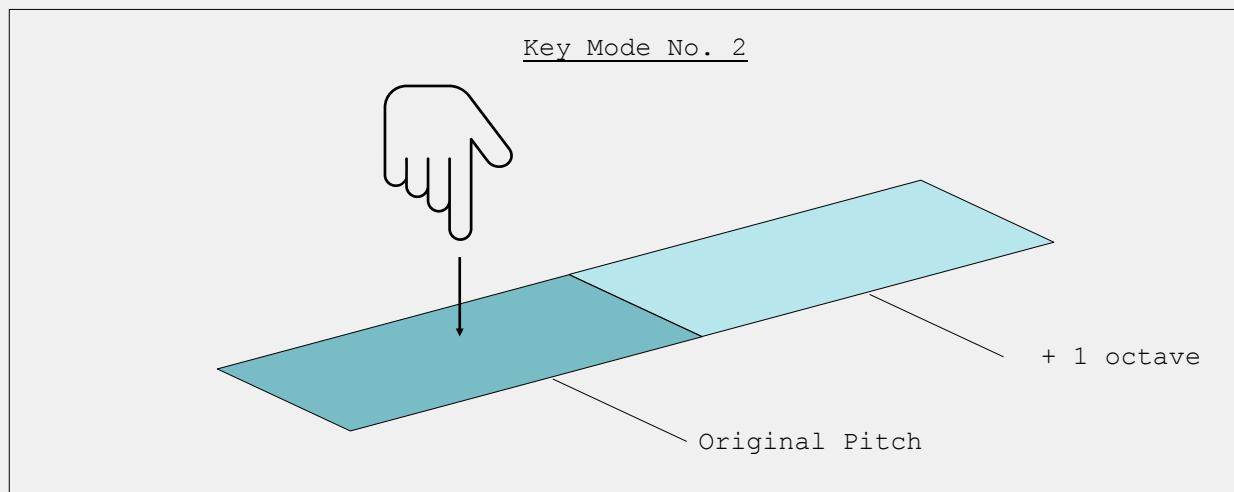
The first matrix on the top left (and top right, in dark blue) let's you enable/disable the different types of data, as follows:

- The bottom row will send **only CC data**.
- The middle row will send **both MIDI notes and CC data**.
- The top row means the sliders will send **only MIDI note data**.

2. Key Modes:

The next matrix below (in green) changes the behaviour of the slider itself:

- Row 1 (bottom) sends out a single note.
- Row 2 splits the slider in two: the bottom half plays the original pitch, the top half plays an octave above.
- Row 3 splits the slider in three: the middle portion plays the original pitch, the top and bottom play an octave above and below respectively.
- Row 4 plays a dyad (it utilizes the first and second pitch matrices).
- Row 5 plays a triad (all three pitch matrices are utilized).



3. MIDI Busses

The matrix at the bottom left & right (in yellow) assigns a discrete MIDI channel for each note being played. The bottom row routes to MIDI channel 1, the last, top row to channel 12.

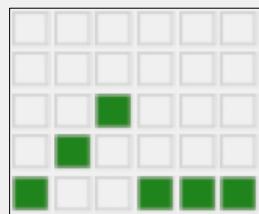
Note: When the **3-Ch Button** is turned on, and a slider is set to play a chord, the notes in the chord will be spread to subsequent MIDI channels. Otherwise, all the notes in the chord will come out of the same channel.

4. Pitches

There are three pitch matrices (in different shades of blue), in case the sliders are set to play either dyads or triads, they assign a note value to each slider (laid out chromatically in a vertical, ascending order).

5. Octaves

Likewise, there are three octave matrices, which modify the pitch values set in the matrices above. Any slider can play any note within a 6 octave range, the middle octave being C3 - B3.

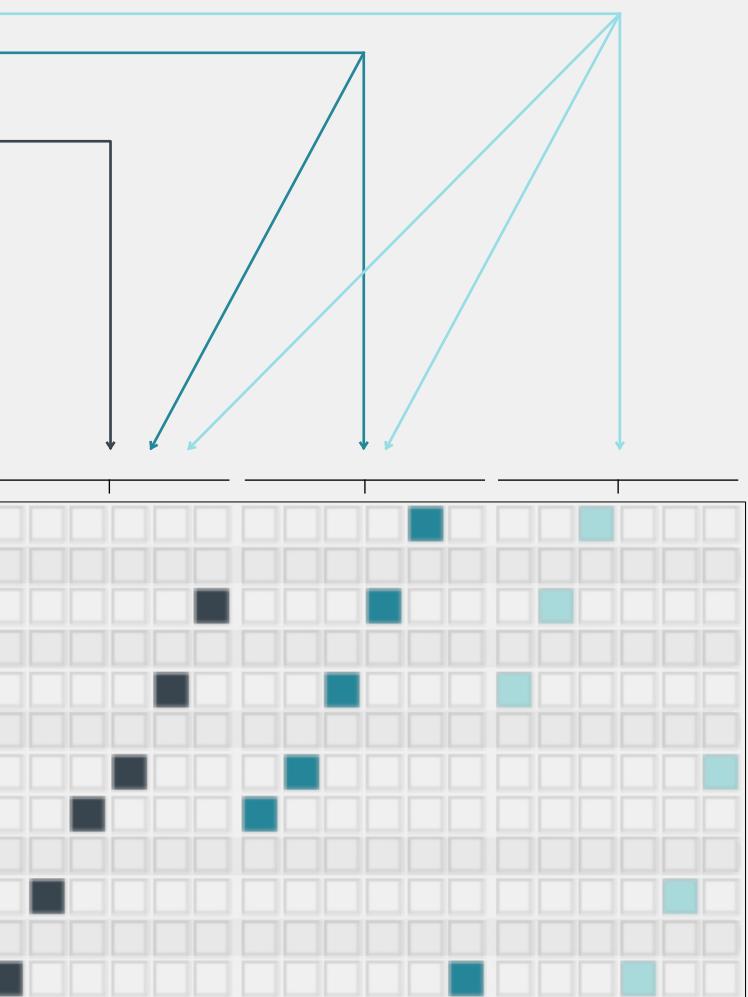


Each slider in Thunder can play up to three notes simultaneously.

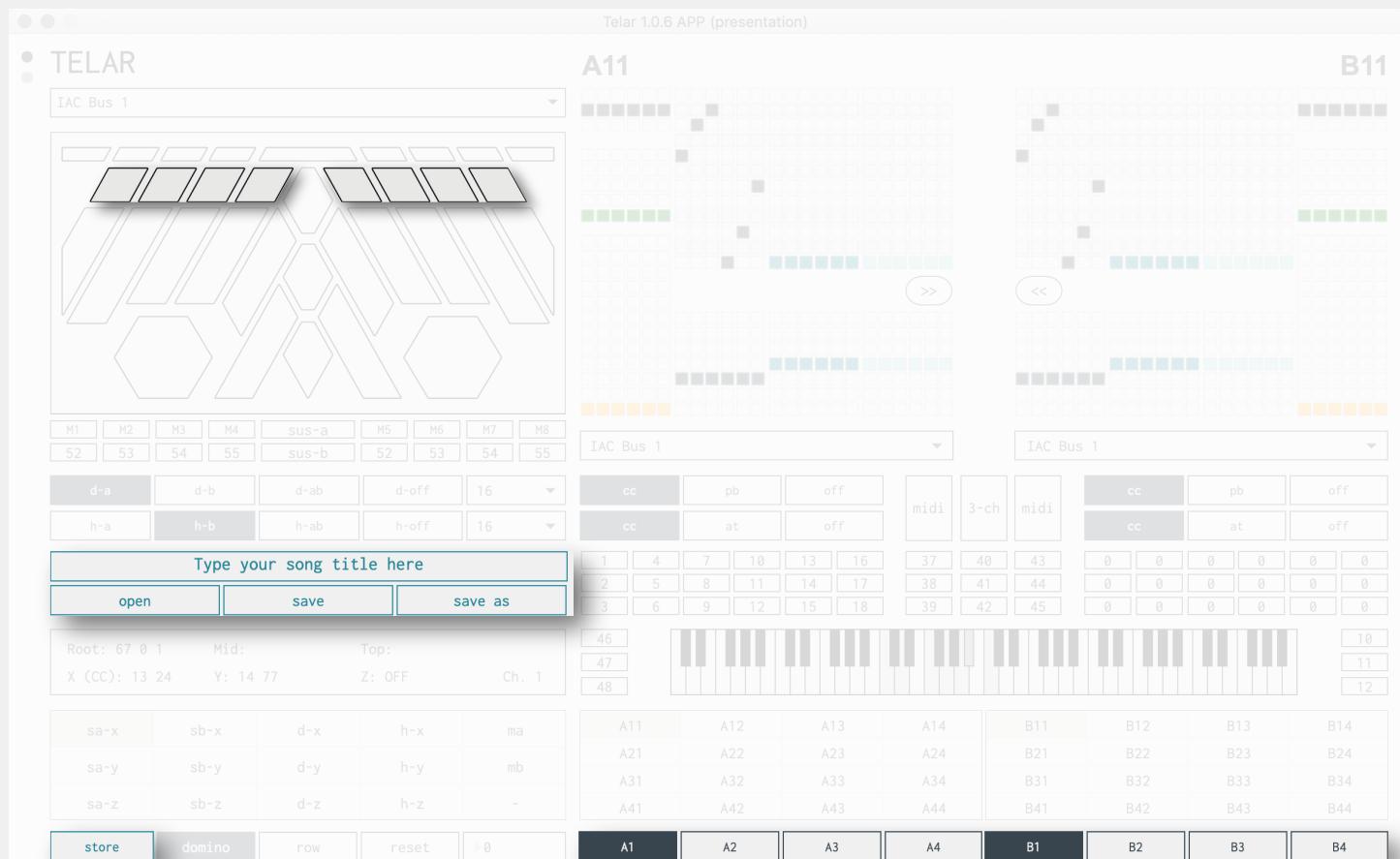
The first three key modes play only one note at a time, so only the first note matrix is used.

Key Mode No. 4 lets you play a dyad (a chord or interval of two notes).

Key Mode No. 5 lets you play a triad, effectively using all three note matrices.



The Preset System



You can copy your settings to any other preset (of the same side) by pressing the **Store Button**, then clicking on a destination you'd like to save to on the preset matrix.

There are three places that give you feedback as to the selected & active presets.

You can use the program buttons symbiotically to select any of the 32 available presets:

- To select any 'A' preset: first hold any button from PB1 - PB4 to select a bank, then press any button from PA1 - PA4 (e.g., holding PB3 and then pressing PA2 will select preset A32).
- To select any 'B' preset, do exactly the reverse (hold a 'PA' button to select a bank, then press any 'PB' button).

SENSEL MAP & MIDI IMPLEMENTATION CHART

The following pages will provide the MIDI mapping configuration used for the Thunder Overlay, should you for any reason lose the Sensel map that came with your download (or if you'd like to experiment with another Sensel overlay or MIDI controller). Please refer to the [Overview](#) in this manual to follow the nomenclature used for each control.

Control	PA1	PA2	PA3	PA4	PB1	PB2	PB3	PB4
Control Type					MIDI CC Button			
Button Type					Momentary			
MIDI Ch.					1			
CC No.	10	11	12	13	14	15	16	17
Aftertouch					OFF			
Threshold					0			
LED					OFF			

Control	SA1	SA2	SA3	SA4	SA5	SA6
Control Type	MIDI XYZ Pad					
MIDI Note	C3	C#3	D3	D#3	E3	F3
Note No.	60	61	62	63	64	65
CC No. X	18	21	24	27	30	33
CC No. Y	19	22	25	28	31	34
CC No. Z	20	23	26	29	32	35
MIDI Ch.	1					
Threshold	0					
Absolute X	Yes					
Absolute Y	Yes					
LED	OFF					
14-bit CC	OFF					
Recenter CC	OFF					

Control	SB1	SB2	SB3	SB4	SB5	SB6
Control Type	MIDI XYZ Pad					
MIDI Note	F#3	G3	G#3	A3	A#3	B3
Note No.	66	67	68	69	70	71
CC No. X	36	39	42	45	48	51
CC No. Y	37	40	43	46	49	52
CC No. Z	38	41	44	47	50	53
MIDI Ch.	1					
Threshold	0					
Absolute X	Yes					
Absolute Y	Yes					
LED	OFF					
14-bit CC	OFF					
Recenter CC	OFF					

Control	D1	D2	D3	HA	HB
Control Type	MIDI XYZ Pad				
MIDI Note	C4	C#4	D4	D#4	E4
Note No.	72	73	74	75	76
CC No. X	54	57	60	63	66
CC No. Y	55	58	61	64	67
CC No. Z	56	59	62	65	68
MIDI Ch.	1				
Threshold	0				
Absolute X	Yes				
Absolute Y	Yes				
LED	OFF				
14-bit CC	OFF				
Recenter CC	OFF				

GENERAL INFO

Don Buchla & the Thunder:

<https://buchla.com/history/>

https://en.wikipedia.org/wiki/Buchla_Thunder

Sensel Morph:

<https://morph.sensel.com/>

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