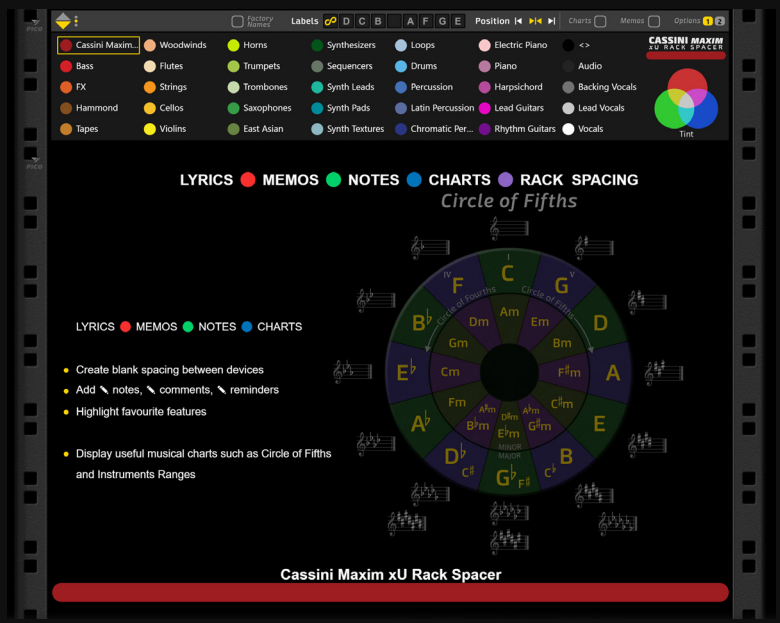
CASSINI MAXIM
xU RACK SPACER



v1.0

Produced and Designed by Matt Black

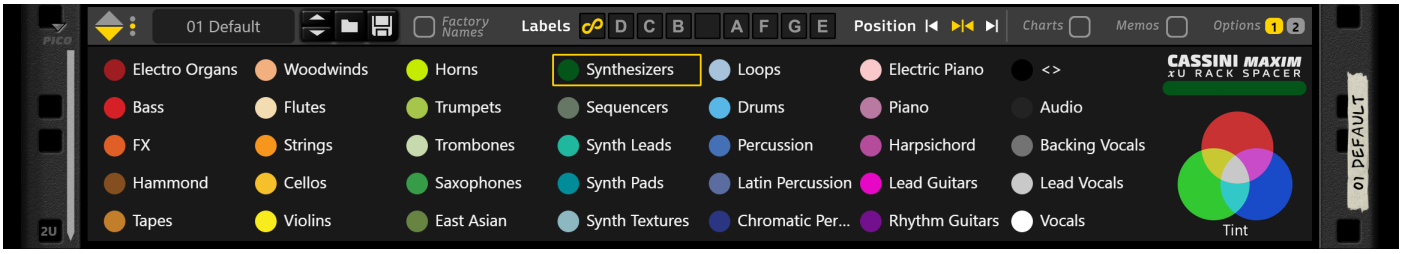
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Cassini Maxim xU Utility Spacer is an advanced rack spacer for Reason utilising a custom display that can be adjusted from 2U to the full Reason device height of 9U. It is designed to effectively break up complex racks, aid accessibility and navigation, and provide improved labelling, user-editable notes, and even provide helpful musical charts.

Cassini Maxim displays a text label and a styled block of colour we call the **Division Bar**. It includes several built-in text presets, colour and style options, with the flexibility to freely adjust colours and labels to best fit your workflow and your individual projects. It includes ***Cassini Pico*** for a compact 0.4U front folded view.

On the default 3U *Maxim* layout you'll see the grey backdrop of the **Options** menu bar at the top, including the Patch Browser and the "Labels" and "Position" buttons, and below all the available colours and their associated text labels in the dark Selection area.

Cassini Maxim has three "Pages", selected by the Up/Down arrow, or directly via the index buttons to the right of it, in the top left of the device panel.

By default, *Cassini Maxim* starts in the **Selection** page, as show in image at the top of the page.



1. **Division Page** (click up)
2. **Selection Page**
3. **Label Edit Page** (click down)

We'll go through the individual pages and functions in detail later, but we'll begin with a **Quick-Start** guide, the most basic top-level device set up.

Two important aspects to note before we start. In Reasons 10, 11, 12 and 13, you can freely position *Maxim*. Typically, this might be above your instrument or Mix Channel, or between blocks of parallel effects or in a Combinator. For Reason 14 this is more complicated, as you will also need to ensure Auto-Grouping is disabled by going to Options>Rack Settings>No Grouping. Sadly, non-Player devices are no longer allowed to be Grouped above Instruments in Reason.

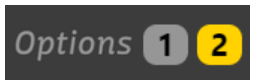
The second point to note is that *Cassini Maxim* makes use of multiple levels of drawing provide several functions. The z-order means that activation some functions will prevent adjustment of functions that work below. We'll cover z-order in more detail at the end when we go through the Charts and Memos functions.

Quick-Start: a 6-step plan in 5 steps

1. Create an instance of *Cassini Maxim*.
2. In the **Options** menu bar at the top select from the text presets you want with the **Labels** selector JPS to E. The text labels displayed below will update to the new selection. The blank middle option, **Cassini Division**, defaults to no text should you want no labels on display.



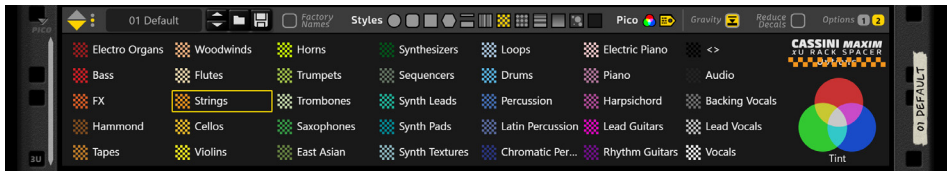
3. Press **Options 2** on right of the menu bar to switch from "Labels" options to the "Styles" options page



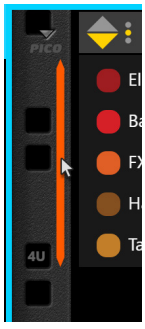
4. Select one of the twelve **Styles** to use for the **Division Bar,** from **Rounded** though to **Free Space** (a blank icon, you can use this to have no colour bar). The shape of the colours below will update to the new selection, as will the preview on the right, between the *Cassini Maxim* logo and the **Tint** colour wheels



5. In the main Selection area, click on the Colour/Label you want from the 35 selections. The current selection is indicated by a surrounding box of sunshine yellow.
   You can use **Shift** + Click to select it and go straight to the **Division Page**, skipping step 6!



6. Assuming you didn't Shift-click at Step 5, when you're ready click the Page Up arrow or the top hamburger circle to manually switch to **Division Page**



7. **Adjust the Device Height using the arrow on the left of the rack!** The arrow lights up white when you mouse-over it, and turns orange when you click and drag up and down. The **Device Height** function is available on the back panel as well.

Advanced Controls (Selection & Label Edit Pages)

Having tried the *Quick Start*, here are the additional functions you can apply to refine your spacer.

Available in both the **Selection Page** and **Label Edit Page:**

Options Page 1



Labels: Inspired by the rings of Saturn, the following Division Label Presets are available:

1. **JPS**: JP's own default mix of organs, synths, guitars, drums, and orchestral labels; a versatile set for a wide range of rock/pop/electronic/R&B arrangements
2. **D**: A mixed modern production; a broad mix suitable for modern productions. 808s, chops, and risers oh my!
3. **C**: A vintage multi-track set up for rock/pop productions
4. **B**: Straight-up Electronic / Dance with sub bass, plucks and loops
5. **Cassini Division**: Blank labels (but denoted in the edit views with "<>"). If creating your own label set, we recommend using this selection
6. **A**: For R&B and Hip-Hop, a broad palette including loops and vinyl
7. **F**: The top 25 VST synthesizer instruments (probably)
8. **G**: First-party Reason instruments, both native and RE
9. **E**: A genre-neutral mix template, including stems

Position

Set the justification of the **Division Label** to left, centre, or right-align.

Charts

You can turn the **Charts** function off or on from this button. Use Shift-click to switch straight to the **Division Page**. See the section on Charts below for more details on this feature.

Memos

You can turn the **Memos** function off or on from this button. Use Shift-click to switch straight to the **Division Page**. See the section on Memos below for more details on this feature.

Options Page 2:



Styles

Chose from twelve styles:

1. **Rounded:** a thick line with rounded ends
2. **Soft Square:** a square/rectangle with gently rounded corners
3. **Squared:** a straight square/rectangle
4. **Hexagon:** a six-sided polygon
5. **Dual Lines:** a thin line above, and thick line below the **Label Text**
6. **Saturnian 78rpm:** random vertical lines
7. **Checkerboard:** a small check pattern
8. **Diamonds:** a small diamond pattern
9. **Perspective:** spaced horizontal lines reducing in the length
    - If you Shift + Left-click **Perspective**, you can additionally adjust the curve via four pop-up presets:
        i. **Beehive**
        ii. **Pyramid**
        iii. **Stairs**
        iv. **Aspire**
10. **Gradient:** a graduated block with graduated margins
11. **Planets:** random circles
12. **Free Space:** an invisible black bar

Pico



You can disable the **Division Bar** and/or the **Division Label** in **Pico** view by clicking the mini-colour wheel and label icon respectively. See below for more information on Pico.



Gravity

This feature allows the **Division Bar** to track the bottom edge of the device when **Division Height** is greater than 2U. When disabled, it is always drawn in the 2U region. It has no effect when the device is set to 2U.

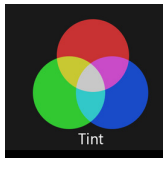
Reduce Decals

You can reduce unwanted device furniture by selecting **Reduce Decals**. This is a multi-level ability.

1. When off, nothing is hidden
2. Left-click to fade the Patch Browser and Device Tape, and slightly fade other UI elements in the **Division Page**
3. Shift + Left-click to hide the Patch Browser and Device Tape entirely, but leave *Maxim* UI functions like **Page View** buttons visible in the **Division Page** mode, albeit more faded
4. Alt + Left-click to ***hide all UI options*** in the **Division Page**

Because the last option hides pretty much the whole user interface for the cleanest rack spacing possible, it does make it hard to navigate certain functions later. So, this is designed to be explicitly set with key-presses to avoid being accidentally set by, for example, mis-clicking a pop-up menu. It must be an intentional selection. Only use Alt-click on **Reduce Decals** when you know you're not making further changes, at least until you're familiar with the positions of the invisible layout. You can apply **Reduce Decals** both from **Styles Options** and from **Division Options**.

Tint



Colours in columns 1-5 can be adjusted using the Tint colour wheels. The Red (top), Green (left) and Blue (right) regions adjust the RGB values respectively. The white middle section can also be used to adjust the alpha for further shades. Click and hold to show the value, dragging the cursor up and down to change it. Hold Shift as well for finer value adjustment. You can Ctrl-click anywhere in the colour wheel to reset the colour values of the selected preset to the default.

Or you can Alt-click the Red, Green, Blue or Alpha regions specifically to reset only that respective value.

Remember to save a patch with any new colour scheme you'd like to recall later!

The sixth column, the monochrome range, can't be edited. While Graphite grey is a Reason colour, it was deemed more practical to keep this one as a fixed shade in this block.

Functions available on the **Selection Page** only:

Factory Names

When clicked and held, this momentary button in the Options menu bar will display Reason's standard colour names instead of the current Preset or edited Labels.

Reset Colour

If you edit a colour, you can use Ctrl-click on the selection area of that label to reset it to the default colour values.

Switch to Label Edit Page

You can also Alt-click a selection to switch to the **Label Edit Page**, although unfortunately we can't auto-open the label edit window itself, you'll still need to double-click there to edit specific **Division Label** texts.

Label text longer than the preview space will have "…" appended.

Functions available on the **Label Edit Page** only:

Enter the **Label Edit Page** by clicking the **Page View** down button or hitting the bottom index icon next to it, or via Alt-click of a label selection from **Selection Page**. The background changes to a light grey to clearly distinguish this page from the previous. The two **Options** menus, and the colour/shape previews are still available, but it's here you can edit the text labels.

Edit Label

Double-click a text box to bring up Reason's standard text label input to edit it. You can use regular or extended ASCII, and standard Emoji etc. Do note that OS-level behaviours and available typefaces and fonts may alter the style and colour of text or Emoji the device displays. We can't guarantee consistency from one system to another.

Text labels can be up to 100 characters long. Be aware that Reason silently rejects attempts to add more, or to copy in text longer than 100 characters from another source.

You can leave text labels entirely blank, but for the purposes of accessibility we've allowed "<>" to be displayed as a visual indicator for no text in the Edit pages. "<>" renders as blank both in the *Maxim*'s **Division Page** and in **Pico**.

Select and return

You can still select any colour by clicking the colour preview shape *next* to the label, which will be marked with a surround of sunshine yellow, then return to **Selection** or **Division Page** through the **Page View** arrows, or by Shift-clicking the preview shape to switch directly to the **Division Page**.

Reset colour

If you edit a colour, you can also reset it here: use Ctrl-click just on the preview shape to revert to the default values.

Factory Names is disabled in this view, as we can't dynamically update editable text boxes

Division Page

In the **Division Page** view, the menu bar turns black. If **Reduce Decals** is not already in fully hidden mode, you'll see the **Divisions Options** menu along the top:



Charts

Enable or disable the **Charts** functions. To right of the **Charts** off/on button are the six charts currently available in *Maxim*. More details on these below.

Memos & Bullets

Enable or disable the **Memos** function, and choose your preferred style of bullets, including none, with this pop-up selector. More details on these below.

Bar

Click this to turn the **Division Bar** off or on. This does *not* affect the **Division Bar** in **Pico** mode.

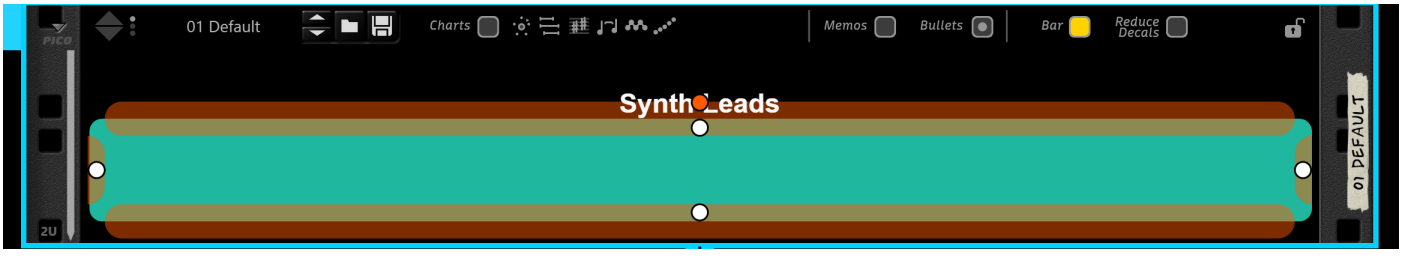
Reduce Decals

Another place to set the decal visibility amount, using the modifiers as described above.

Lock

Enable **Lock** to disable any accidental mouse input into the **Division Bar** or **Charts**. It is not applied to functions in any of the **Options** menus, or the **Selection** or **Label Edit Pages**.

Division Bar



If you click and hold anywhere in the internal area of the **Division Bar,** you'll see white positional grab-handles for the Top, Bottom, Left and Right sides of the bar, and an orange position handle for the **Division Label**. Grab and drag these with your mouse to resize or reposition elements of the Division Bar. Add a Shift modifier for fine position adjustment.

Ctrl-click a *specific* handle to reset it to the default position, or Ctrl-click *between* the handles to reset all values.

You can adjust other values too by dragging the region between the handles: click and drag up/down with no modifiers to cycle between the available preset colours and their current labels, and use Alt-drag to cycle between the **Shape** options.

Note that if left/right or top/bottom positions are too close together, you will not have a hitbox big enough to adjust global **Division Bar** values, in which case reposition a handle enough create a hitbox size you can use

Cassini Pico 0.4U Rack Spacer



Hit Reason's ***Fold/Unfold Device*** icon in the top left to enter/exit **Pico** mode.

This mini mode tracks the **Division Bar** width and **Text Label** positions, and the label/style selection. They can't be directly repositioned from here, but you can adjust the colour and shape selection clicking on and then using **Shift**+ or **Alt**+ modifiers as before. Pico also displays the **Title Memo** on the left, where a title has been entered in **Memo** mode.

As described above, you can disable the mini-**Division Bar** and **Division Label** individually in **Styles Options** (**Options 2**) to apply a very small amount of totally empty rack space with no distracting UI furniture.

Pico mode is particularly useful for a modicum of tiny spacing in Combinators, or for times you want to recover some rack real estate but will want to keep some demarcation.

Maxim Charts

Charts have been designed with the **Device Height** expected to be set at 6U, in our view the best trade-off in terms of screen space across multiple resolutions and screen-sizes. Some **Charts** do have additional content below this; however, we have tried to make the 6U area the only part you'll typically need.

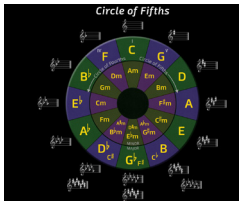
Some **Charts** are interactive and dynamic, making use of a **Root Note Selector** keyboard, where you can select any note. If



selecting a black note, also choose whether you want the display to shift the root to the ♯ (**sharp**) or ♭ (**flat**). These settings are applied across *all* the interactive charts. To set a root note simply click a note on the keyboard in the top right, when featured.

The Charts:

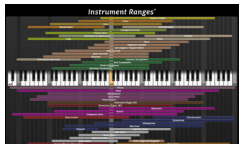
Circle of Fifths (and Fourths)



A standard Circle of Fifths wheel, with major chords on the outer wheel, and minor chords on the inner. For any given segment that is the Tonic (i.e. your root key), I, the segment clockwise is the Dominant, V, and the segment anticlockwise is the Pre-Dominant, IV.

This chart has been offset to the right to allow room for you to add **Memos** on the left.

Instrument Ranges



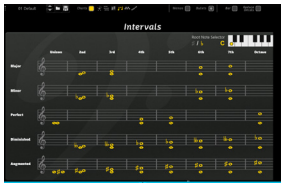
This chart shows typical note ranges of classical and modern instruments, from <A0 to C8, with middle C as C4. However, do remember many DAWs, including Reason use C3 as middle C, which can be confusing.

The default 6U area should cover most of your day-to-day needs, including keyboards, guitars, orchestral and vocal ranges. An additional extended 3U range adds a diverse, but by no means intended to be definitive, collection of world instruments. The ranges themselves are also not intended to be definitive, as they can vary according to different tunings, instrument design, and performer ability.

Key Signatures

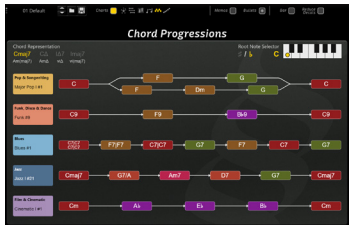
This chart simply displays the notes used in the twelve Western keys.

Intervals



This interactive chart uses the **Root Note Selector** in the top right to show you the Major, Minor, Perfect, Diminished and Augmented notes for Unison, 2nd, 3rd, 4th, 5th, 6th, 7th and Octave intervals for the given root.

Chord Progressions



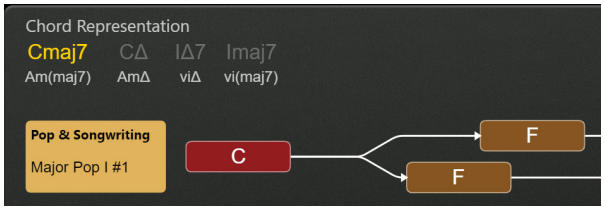
On opening this **Chart**, you'll see five rows of Chord Progressions. On the left of each row is a large box with the name of current Genre/Chord Progression Preset # that sits in that slot. Click this box to change the **Progression Preset #** (see below).

To the right you'll see the chords in the current progression. These can have anything from 2 to 8 chords, and some have an optional branch line. Most start and end with the tonic. It displays a wide variety of chords, including some chords using slash-bass (e.g. G7/A as in a Jazz preset shown opposite).

Chord Representation

The chord display is dynamically updated not only for the selected root note, but you can also view them in different formats. Using the selector in the top left corner of the Chord Progressions chart area you can choose to display the chords as:

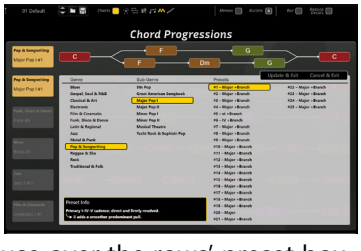
1. Standard text notation, e.g. Cmaj7 / Am(maj7)
2. Jazz symbol notation, e.g. CΔ / AmΔ
3. Roman + Jazz, IΔ7 / viΔ
4. Roman + Text, Imaj7 / vi(maj7]



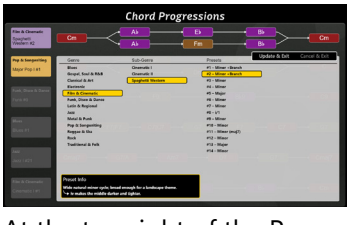
Chords are also colour-coded. The Chord Types **legend** is available below the main chart area in the 7U extension.

If you hover your mouse over a row, text will appear above, or, if it has a branch, above and below the chord boxes with a basic description of the chord progression.

Progression Preset



To change the **Progression Preset #**, click that rows' Genre/Preset# box on the left. The Progression Preset pop-up window will appear. From there you can choose from nearly 800 distinct progressions across 60 sub-genres. The other rows' boxes will be greyed out. Above the Progression Preset window is a preview row – it will initially show the current active selection.



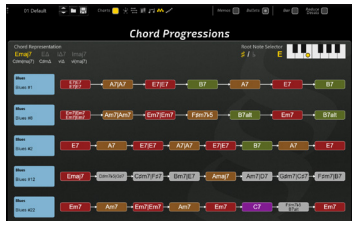
Clicking a different Preset updates the preview at the top to display that new interim selection. If you hover your mouse over the rows' preset box again, the current active selection will be shown instead, so you can quickly flick between the active and interim selections to compare them.

In the bottom left of the Progression Preset window is the text description of the interim selection.

At the top right of the Progression Preset window, you can then update to the interim progression by clicking "Update & Exit" (alternatively click on the Selector Box). Or you can reject it and return to the original progression by clicking "Cancel & Exit".

The Preset list names contain some additional basic information: it starts with the preset number (#), then tells you whether it is for a "**Major**" or "**Minor**" progression (or indeed starts with neither, e.g. it begins on a pre-dominant or tonic substitute), and whether it has an optional branch line ("**+Branch**").

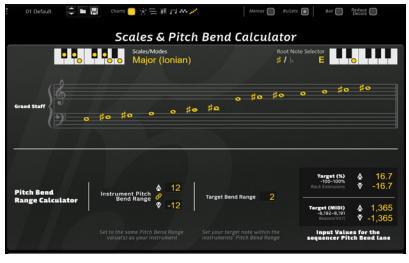
12-bar Blues: Blues progressions in *Cassini Maxim* can combine multiple chords into their boxes to make up specific 12-bar progressions. Within the box, bars are demarcated by **|** (bar) or a new line. There's more to blues than just the classic 12-bar form, of course, but it's a good starting point from which to experiment with other lengths.



Of course, there are too many progressions to realistically include in a device like *Cassini*. We had to draw a line somewhere, so please don't be upset if your favourite progression can't be found! These are a few helpful starting ideas, and you can go in any direction you want! Don't be constrained by any progression being defined by and limited to the genre it's listed in, though. Progressions associated with one "genre" can be used in different genres entirely if you voice it differently or change the rhythms and cadences. And there are plenty of oddities in the way chords work: sheet music could label a chord one thing, but it sounds completely different due to the way it's voiced, or if the bass behaves unexpectedly and so on. Remember too, that notes in chords don't have to be played by the same instrument at once: unless using a polyphonic instrument like a piano, guitar or polysynth, build chords up across multiple monophonic or duophonic sources playing only a part of it.

Scales & Pitch Bend Calculator

This page has *two* functions.

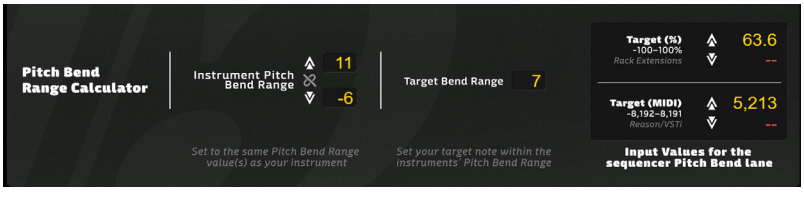


The top half displays **Scales & Modes** on a Grand Staff, based on your set root note. You can select alternative scales using the **Scale/Modes** pop-up, which includes a diverse range of 90 scales.

Using a seletion from within the Major and Minor Keys subgroups in **Scales/Modes** dynamically updates the **Root Note Selector**, and vice-versa.

The bottom half has a **Pitch Bend Range Calculator**, to allow you to quickly determine what value you need to draw in a sequencer track to hit a target note within a larger instrument-set bend range.

For example, if your instrument Pitch Bend Range is set to 12 but you want to bend it by just 2 notes at a specific point, set the **Instrument Pitch Bend Range** to 12, and the **Target Bend Range** to 2. To the right you'll see the plus or minus values you need to enter into your sequencer's pitch bend automation track in both % and MIDI values. In our example, it will show +/-16.7 for %, and +/-1,365 for MIDI.



And this value format distinction is important as VST instruments and native old Reason instruments properly used MIDI value, (-8,192 to +8,191), while Rack Extensions helpfully switched to a -100% to +100% format to ensure reduced consistency.

Some instruments, like our own JPS Harmonic Synthesizer, allow separate Up and Down pitch bend ranges to be set. You can unlink or relink the Up/Down ranges by clicking the **Link/Unlink** icon in the middle, so you can adjust them individually or together as appropriate.

Range values that result in **Target Input Values** that are out of scope of the ranges set will be marked red

About pitch bend ranges: MIDI 1.0 vs MIDI 2.0/MPE

The standard MIDI pitch bend range is 24 notes. The MIDI 2.0 specification, based on MPE, provides resolution for a

range of 96 notes. Even though Reason itself can't use this at the time of writing, we've allowed the **Pitch Bend Range Calculator** to provide that full coverage so you can use it as a calculator in the Reason Plugin for other instruments that may support it. And perhaps Reason will add it someday, in which case it's already available in *Maxim*![1]

Z-ordering

Cassini Maxim uses multiple draw methods to allow multiple functions to be displayed at once. Other than intentionally offsetting the Circle of Fifths chart with **Memos** in mind, combo draws aren't generally considered the intended use-case, which is selecting *one* of the primary features per instance as required. But nonetheless multiple layers with the ability to extend the **Device Height** can be useful provided you're aware of the limitations of this approach, as activating features that are drawn above other functions can prevent those below from being edited.

If you do stack the main functions, disable those drawn above when you need to make changes. Here is the draw order from top to bottom:

1. **Options Menus:** always at the top of the device; no other functions are drawn in this region so these do not clash with anything
2. **Memos:** pretty much prevent anything *below* being adjusted, so disable this in the **Options** menu.
3. **Selection/Label Pages:** Always draws in the top 2U, above **Division Bar** and **Charts**
4. **Division Bar:** will draw over **Charts** and **Bullets** unless **Device Height** is more than 6U (or 7U for Progression, but always over part of the Instrument Ranges), so disable **Bar** as required
5. **Bullets:** These draw below the **Memos** and the **Division Bar** as they use the same layer as **Charts**, but they don't intefere with those before further to the left
6. **Charts:** also at the bottom, so doe not prevent access to anything



If you disable **Memos** and *still* can't change property values in the **Division Bar**, or **Charts**, then you have the **Lock** function enabled!

The **Division Bar** is locked from automation due to its ability to cross the streams and break the device.
We haven't yet figured out a way to effectively clamp every single scenario so that *Cassini Maxim* can't ever crash because Top/Bottom or Left/Right positions end up overlapping

Version history

1.0.0

- **Initial release**

1 But to prevent further backward compatibility with Helpers, as part of their ongoing commitment to reducing UI clarity, Reason Studios would naturally be forced to change the sequencer Pitch Bend format to only use base-96.