

# Calamus UI Specification

## Composition Tab

Version 1.0 — December 2025

### Overview

The Composition Tab is where music is written. When this tab is active, the Canvas Window displays the Score Canvas — horizontal scale lines with note curves, phrase containers, and gesture data.

The Control Panel provides phrase/note/gesture inspection and editing, pen configuration, and scale display. The Canvas provides the visual score and is the primary drawing surface.

### Key Concepts

#### Phrases

A phrase is a container for notes and gestures. Phrases have their own properties (transpose, envelopes, easing, physics) that affect all contents.

Aspect	Specification
Visual shape	Contour following notes — hull/halo with consistent width around note curves
Color	Matches track/sounit color
Name display	Inspector only — no clutter on canvas
Selection	Click the boundary to select phrase
Creation	Draw notes first → group afterward (right-click, 'P' shortcut, or toolbar)
Nesting	Phrases can contain other phrases, up to full composition as top-level phrase

#### Notes

Notes are the atomic compositional elements. Each note captures pen gesture data and has an embedded vibrato container (inactive by default).

- Click a note curve to select it
- Short notes: attack is primary concern, limited envelope time
- Long notes: benefit most from gesture/envelope definition

#### Gestures

A gesture is 6-dimensional captured input from the Wacom pen, carrying expressive information beyond a simple curve.

Dimension	Typical Mapping
X position	Time
Y position	Pitch (for notes) or primary parameter (for gestures)
Pressure	Dynamics / Intensity (visual: line thickness)
Tilt X	Brightness (visual: transparency)
Tilt Y	Breath

Dimension	Typical Mapping
Rotation	Vibrato depth (visual: edge shape)

### Gesture Lifecycle:

- Can be captured as a note (performance data embedded)
- Can be captured as standalone gesture (reusable modifier)
- Can be promoted from note to library for reuse
- Can function as multi-dimensional envelope
- Auto-named, renameable, saveable to Gesture Library

## Modulation and Scale System

### Note Naming: Numeric Degrees

Calamus uses numeric note names (1, 2, 3, 4, 5, 6, 7...) rather than letter names. This unifies all tuning traditions — Western (ABCDEFG), French (do ré mi...), Persian, Indian, Chinese — under a single, intuitive system.

The number IS the function. Note 3 is the third degree. No separate learning of "E is the third of C major." The name carries its meaning.

### Scale Definition

Every composition begins with a Scale Definition. Three components:

Component	Description
Tonal Center	Note number serving as "home" (e.g., 1, or 5 after modulation)
Tuning System	Intervallic ratios (Just Intonation, Pythagorean, 12-TET, Maqam Rast, etc.)
Base Frequency	Hz value for note 1 (the reference frequency for all pitches)

The Base Frequency is the lowest frequency across all registers in the score. It appears at the left edge of the staff, with other scale degree frequencies labeled on their respective lines.

## Modulation

A modulation changes any component of the Scale Definition at a specific point in time.

### Setting a Modulation:

Two workflows, same result:

1. **During composition:** Change any Scale Definition value in the Composition Tab → modulation inserted at current "now" marker position
2. **Intentional placement:** Position "now" marker at desired moment → change Scale Definition → modulation starts there

## Modulation Behavior:

Aspect	Specification
Timing	Instantaneous — occurs at precise time point
Notes spanning boundary	Split into two notes at modulation point
Transitions	None automatic — preparation and resolution are composed
Stacking	Multiple modulations can occur; each is independent

## Visual Effect at Modulation Point:

Element	Change
Staff line colors	Shift to reflect new harmonic functions
Staff line spacing	Adjust to new intervallic ratios
Hz labels	Update to new frequencies
Background color	Changes to indicate new tonal center

The modulation is immediately visible as a vertical moment where the staff transforms.

## Modulation Within vs. Between Systems

**Within same tuning system:** New tonal center is a ratio relative to the original Base Frequency. Example: In Just Intonation starting at 220 Hz, modulating to note 5 as tonal center — the new "home" frequency is  $220 \times 3/2 = 330$  Hz, but the original 220 Hz remains the reference.

**Between tuning systems:** New tonal center with entirely different intervallic DNA. Example: Moving from Just Intonation to Maqam Rast. The Base Frequency may be kept or changed (composer's choice in Scale Settings).

## Vibrato

Vibrato lives in the composition layer (not sound engine). Every note has an embedded vibrato container, inactive by default.

### Vibrato Parameters:

- active (boolean, default: false)
- rate — speed of oscillation
- pitchDepth — how much pitch varies
- intensityDepth — how much loudness varies
- breathDepth — how much breath varies

- onset — when vibrato starts (% into note)
- development — how vibrato grows over note lifetime
- regularity — physics variation (0 = mechanical, 1 = organic)

Each parameter can be assigned an envelope, easing, or mass modifier. Phrase-level vibrato applies to all notes; note-level vibrato provides full override.

## Control Panel Layout

### Phrase Selector

Top of control panel. Provides quick access to all phrases in the composition.

- Dropdown listing all phrases by name
- Selecting from dropdown: selects phrase AND navigates canvas to show it
- [Load] button — import .phrase file
- [Save] button — export selected phrase

### Track List / Sounit Selector

Colored vertical bars representing each track. Mirrored on both Control Panel and Canvas (left edge).

- Bar height = register range
- Bar color = track/sounit color
- Active track = solid, others = ghosted
- Click to select track
- Drag to reorder

### Tabbed Inspectors

Inspector area uses tabs based on selection. Full space available for active tab content.

Selection	Tabs Shown	Note
Note selected	Note   Gesture	Gesture tab if note has gestures
Phrase selected	Phrase   Gesture	Gesture tab if phrase has gestures
Nothing selected	(blank)	No tabs, empty space

### Phrase Inspector

Field	Description
Name	Phrase identifier (editable)
Transpose	Mode dropdown (Diatonic, Relative to tonic, Hz, Cents) + value
Parameter Envelopes	List of parameter → envelope assignments, [+ Add] button
Easing Assignments	List of segment → easing assignments, [+ Add] button
Vibrato	Preset selector, applies to all notes in phrase
Comment	Notes field (editable)

### Note Inspector

Field	Description
Position	Start time, duration, base pitch
Parameter Curves	Thumbnail previews of captured pen data, [Edit...] opens Envelope Library
Envelope Assignments	List of parameter → envelope, [+ Add] button

Field	Description
Easing Assignments	List of segment → easing, [+ Add] button
Vibrato	Active toggle, preset selector, [Edit] opens Vibrato Editor
Physics	Mass value for note's parameters
Comment	Notes field (editable)

**Note:** Note-level vibrato provides full override of phrase-level vibrato.

## Gesture Inspector

Appears as a tab when selected note or phrase contains gestures. Includes navigation for multiple gestures.

Field	Description
Navigation	[◀] 1 of 3 [▶] — arrows when multiple gestures
Name	Gesture identifier (editable)
Preview	Visual of gesture shape with thickness/transparency variations
Parameter Assignments	Each dimension (Y, Pressure, TiltX, TiltY, Rotation) → parameter dropdown
Actions	[Save to Library] [Remove]

## Pen Settings

Configuration for Wacom pen input. Pressure curve adjustment handled in Wacom app (not duplicated here).

Setting	Options
Mode	Draw   Select   Edit (radio buttons)
Draw Type	Notes   Gesture (visible only in Draw mode)
Parameter Mapping	Dropdowns: Pressure→[param], TiltX→[param], TiltY→[param], Rotation→[param]

### Pen Modes:

- **Draw:** Create notes or gestures on canvas
- **Select:** Lasso selection, or single-click to select note/phrase/gesture
- **Edit:** Existing gestures become bezier curves with manipulable control points

### Pen Buttons:

- Top shaft button: Right-click (configured in Wacom app)
- Bottom shaft button: Double-click (configured in Wacom app)
- Pen tip: Single click
- Reverse side: Erase

## Scale Display

Read-only summary with quick access to Scale Settings dialog. Minimal — no clutter.

- Shows: Tonal Center + Tuning system + Base Frequency
- Example: "1 · Just Intonation · 220 Hz"
- [Edit] button opens Scale Settings dialog
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## Canvas Elements

The Score Canvas displays the composition with minimal chrome.

Element	Description
Timeline	Top — tick marks for time position, click to set 'now' marker
Track Selector	Left edge — colored vertical bars (mirrored from Control Panel)
Scale Lines	Horizontal colored lines representing scale degrees
Phrases	Contour shapes following notes, track-colored, click boundary to select
Notes	Curved lines with variable thickness/transparency from gesture data
Transport	Bottom — Play, Stop, Rewind, Forward, etc.
Status Bar	Bottom — cursor time, pitch at cursor, selection info

## Related Dialogs

Dialogs opened from the Composition Tab or Compose menu:

Dialog	Purpose	Opened From
Scale Settings	Define scale, tuning, key	Compose menu, Scale Display [Edit]
Vibrato Library	Create/select/save vibrato presets	Compose menu
Vibrato Editor	Edit note's vibrato parameters	Note Inspector [Edit]
Gesture Library	Create/select/save gestures	Compose menu
Envelope Library	Create/edit curves (also used for curve editing)	Sound menu, Note Inspector [Edit...]

## Scale Settings Dialog

Field	Description
Tonal Center	Note number dropdown (1-7 or extended for larger scales)
Scale	Scale pattern selection
Tuning System	Dropdown with tuning system options
Base Frequency	Hz value input (with A=440 and other standard reference buttons)

## Compose Menu — Updated

Based on new features discovered during specification:

- New Track
- Delete Track
- —
- New Phrase
- Group into Phrase (shortcut: P)
- Load Phrase...
- Save Phrase As...

- —
- Scale Settings...
- Vibrato Library...
- Gesture Library...
- —
- Assign Sounit to Track...