

Swiss Army Meter

User Manual • Version 6.0

A Max for Live audio analysis device for loudness, dynamics, stereo image, BPM timing, and pitch conversion.



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1. Overview and Key Features

General description

Swiss Army Meter is a Max for Live audio analysis device for Ableton Live. It combines loudness, peak, RMS, stereo, phase, dynamics, BPM timing, and pitch conversion tools in one device.

It is an analysis-only device. It reads the audio passing through the track, return, group, or master channel where it is loaded, but it does not process, color, widen, limit, or route the sound.

Key features

- Assignable readout slots for loudness, peak, RMS, PSR, PLR, LRA, true peak, and max peak, plus a dedicated Correlation Meter.
- Loudness Graph with Short Term LUFS history, target reference, axis zooming, and true peak overage markers.
- Dynamics Meter for PSR and PLR history, showing the relationship between peak level and loudness over time.
- Stereoscope with Lissajous display, width ribbon, balance tick, recent balance range, and phase-correlation feedback.
- BPM and Pitch Converter for note divisions, milliseconds, hertz, samples, note frequency, period, and sample wavelength.
- Pop-out modules and CPU-aware module behavior for large metering views without unnecessary processing.

What is new in version 6

Version 6 is a complete redesign with a redesigned interface, improved CPU behavior, a new Stereoscope, Loudness Graph, and Dynamics Meter, new RMS/PSR/PLR readouts, and updated BPM / Pitch tools.



2. Installation and Requirements

System requirements

- Ableton Live 11 or later. Ableton Live 12 is recommended.
- Max for Live. This is included with Ableton Live Suite and available as an add-on for some Live editions.
- An audio-capable track, return track, group track, or master channel where the device can read the signal. MIDI tracks need an instrument or audio path before an audio meter can show signal.

Installing on macOS

Copy Swiss Army Meter.amxd to your Ableton User Library or any folder visible in Live's browser. A common example is User Library/Presets/Audio Effects/Max Audio Effect, but the exact location depends on where you keep Max for Live devices.

Installing on Windows

If the device was downloaded as a ZIP file, extract it first. Copy Swiss Army Meter.amxd to your Ableton User Library or to a folder added to Live's Places sidebar.

In Ableton Live, locate the AMXD file in the browser and drag it onto an audio-capable track, return track, group track, or master channel. If Live does not show the file immediately, rescan the folder or drag the AMXD file directly from Explorer into the Live set.

3. Interface and Global Behavior

Navigation bar

The navigation bar runs along the left side of the device. Each module icon controls one visual meter view. Click an active module icon to show that module in the large display area; click a module icon again to toggle that module off. At least one module always stays active.

The active module controls the large visual display while readout slots stay assignable.

Meter modules

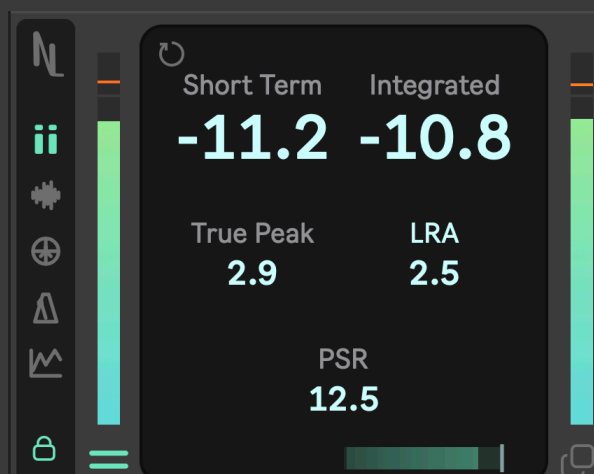
Multimeter
Loudness readout slots and the dedicated Correlation Meter.

Loudness Graph
Short Term LUFS over time with true peak overage markers.

Dynamics Meter
PSR and PLR history showing peak-to-loudness distance.

Stereoscope
Stereo field scope with width, balance, Lissajous shape, and phase feedback.

BPM / Pitch
Musical timing and note-to-frequency conversion tools.



Display slots

The readout slots below the active module can be customized independently. Click a slot title to open its selection menu and choose a different measurement. Standard Mode shows up to four slots. Extended Mode expands the device width and allows up to six slots.



Slot assignments, visible slot count, module order, module enabled states, and pop-out window bounds are saved with the device state in the Live set.

Hover near the bottom of the slot area to reveal the small dot row. Click a dot to set the number of visible slots: one to four in Standard Mode, or up to six in Extended Mode.

Toggle, solo, reorder, and pop out

Click a module icon to toggle that module on or off. At least one module always stays active. Shift-click a module icon to solo that module. Drag module icons up or down to reorder active modules inside that instance. Use a module pop-out control to open that module in a resizable floating window.



4. Loudness Readouts

A quick note on loudness terms

LUFS, LRA, and true peak were created to describe audio level in a way that better reflects loudness over time. Peak and RMS meters are still useful, but they mostly describe signal level. A short transient and a sustained sound can reach similar peak levels while feeling very different in loudness.

LUFS means Loudness Units relative to Full Scale. LUFS measurements use a standardized loudness model based on ITU-R BS.1770. The signal is filtered with K-weighting, then measured over defined time windows.

Available readouts

Short Term

LUFS over the most recent 3-second sliding window.

Integrated LUFS

EBU R128 gated loudness average over the current measurement pass. Cleared by global reset or transport-synced reset behavior, not by clicking an individual readout value.

LUFS Momentary Max

Highest momentary LUFS detected since the last reset.

LRA

Loudness Range, a statistical spread of loudness variation in LU. Cleared by global reset or transport-synced reset behavior.

True Peak

Estimated inter-sample peak level in dBTP. This stored maximum can be reset individually.

Max Peak

Highest detected sample peak since reset, shown in dBFS. This stored maximum can be reset individually.

RMS Momentary

Current momentary RMS level in dBFS. This readout can be reset individually when assigned to a resettable slot.

RMS Integrated

Long-term Integrated LUFS RMS level.

RMS Max

Highest RMS value detected since reset, shown in dBFS. This stored maximum can be reset individually.

PSR

Peak-to-Short Term Ratio, shown in dB/LU-style peak-to-loudness distance.

PLR

Peak-to-Long Term Ratio, shown in dB/LU-style peak-to-loudness distance. This value uses the stored peak relationship and can be reset individually when assigned to a resettable slot.

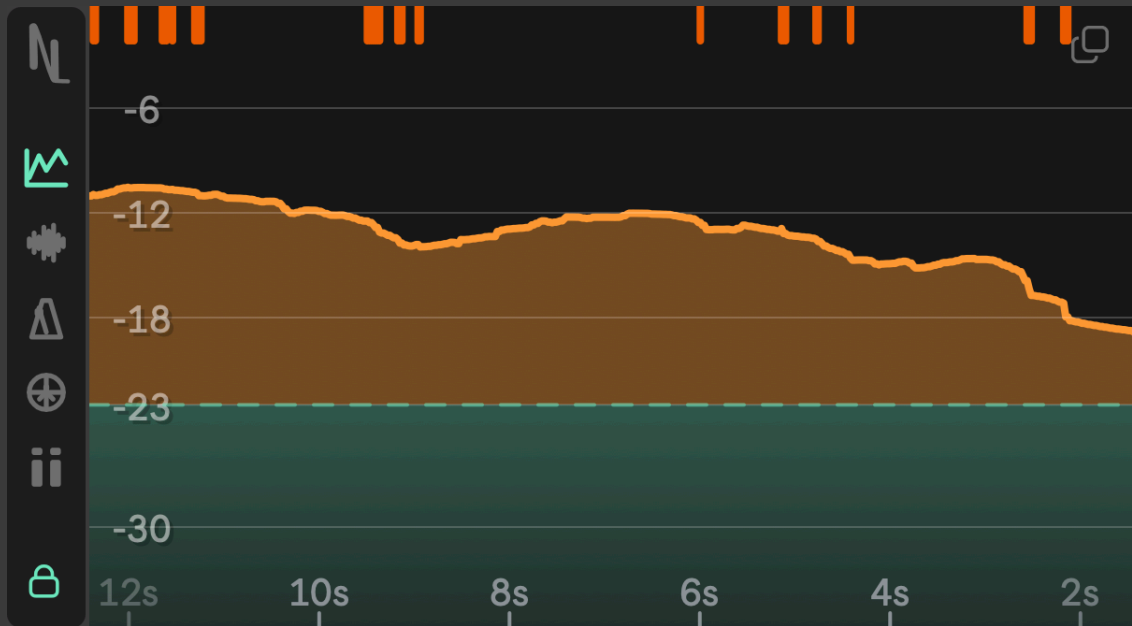


Standards note

Loudness, LRA, and true-peak readings follow EBU R128 and ITU-R BS.1770-style measurement behavior and were tested against EBU / BS.1770 calibration material during development. Treat the readouts as a practical in-device reference unless your delivery workflow requires a separately certified compliance meter.

5. Loudness Graph

Short Term LUFS history, reference line, and true peak overages.



What it shows

The Loudness Graph displays Short Term LUFS over time. True peak values above 0 dBTP appear as overage markers at the top of the meter. This lets you see perceived loudness movement and peak events in the same view.

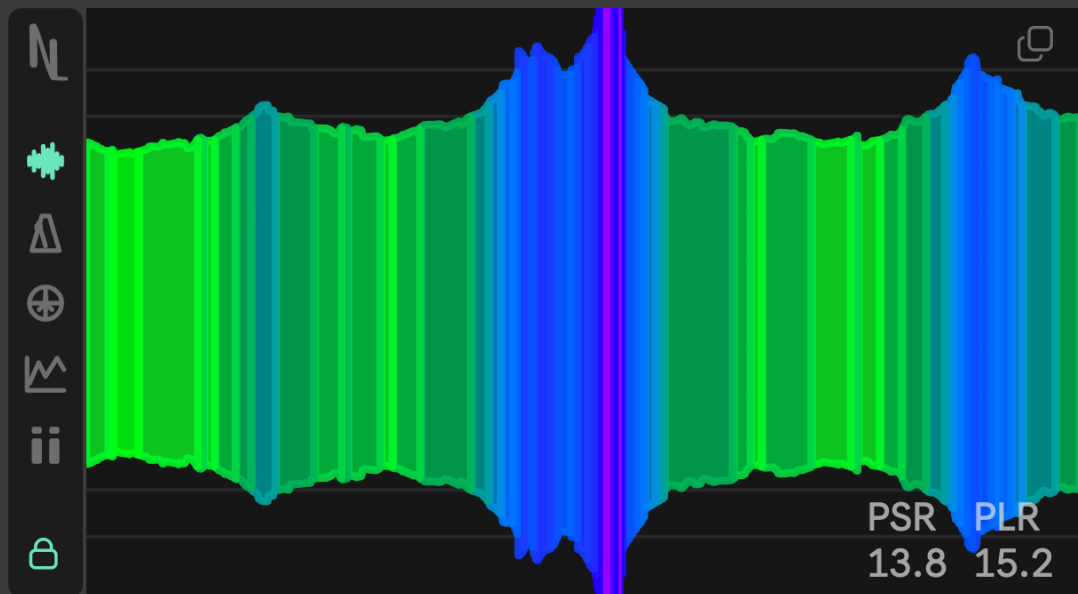
Controls

- Drag the target line or type a value in the textbox to adjust the visual reference level.
- Double-click the target line to return it to the default value of -23 LUFS.
- Drag the Y-axis area to move the visible loudness range.
- Drag the X-axis to adjust the visible time range.
- Double-click the Y-axis or X-axis area to reset that view. Double-click the bottom-left corner to reset both axes. The Loudness Graph resets to a 0 to -40 LUFS vertical view and the default visible history window.

The target line is a visual reference only. Moving it does not change the measured loudness value. The target can be typed from the textbox or dragged on the graph; the editable range is clamped by the device so it remains inside the useful loudness display.

6. Dynamics Meter

PSR, PLR, and peak-to-loudness distance over time.



What it shows

The Dynamics Meter focuses on the space between peak level and loudness. Larger values mean more peak-to-loudness distance; smaller values mean the peaks and loudness body are closer together. The display describes meter behavior, not a pass/fail target.

PSR and PLR








PSR compares the current peak level against Short Term LUFS, so it responds to local changes. PLR compares the session's maximum peak level against Integrated LUFS, giving a longer-term peak-to-loudness relationship.

Swiss Army Meter calculates PSR using sample peak with a controlled decay envelope rather than inter-sample true peak. This follows the AES e-Brief 373 approach for PSR and keeps the reading focused on sample-level transient movement instead of inter-sample reconstruction artifacts.



Color and scale

PSR and PLR use the same reference scale. The colors describe the amount of peak-to-loudness distance, not a pass/fail target or mastering recommendation.

Color scale		
	20+	Very open or transient-heavy material with lots of peak space.
	16-20	Punchy, dynamic mix with clear transient movement.
	12-16	Balanced material with moderate compression.
	10-12	Dense, controlled mix with reduced transient space.
	8-10	Compressed or limited material with low peak space.
	6-8	Very dense loud master where transients are flattened.
	< 6	Extremely limited material or possible clipping-style density.

7. Stereoscope

Stereo shape, width, balance, and phase behavior.



Center display

The center display is a goniometer, also called a Lissajous display. It draws the left and right channels against each other as a moving shape. Identical left and right signal appears mostly vertical. Wider stereo material spreads left and right. Negative correlation or out-of-phase left/right content moves the trace toward the horizontal axis. During silence or very low-level input, the trace may shrink, hold briefly, or fade rather than snap abruptly to center.

Top meter

The top meter shows where the stereo image sits and how wide it feels. The width display appears as a ribbon along the meter. It follows signal balance, so a wide sound leaning right opens around the right side instead of always opening from exact center. The balance tick marks the current image center, while the recent balance range shows short-term balance movement.

Bottom correlation meter

The bottom meter mirrors phase correlation inside the Stereoscope view. Orange is used only for negative correlation, so ordinary stereo width is visually separated from negative phase movement. Width and correlation should be read together: a wide signal is not automatically a mono-compatibility problem unless the correlation



Indicator layers

- Instantaneous Needle: fast marker showing the current correlation value.
- Smoothed Average Bar: damped bar showing short-term averaged correlation.
- Sticky Peak Marker: marker that holds the maximum negative value until global reset or correlation-range reset behavior clears it.

Scale

+1.0

Identical left and right signal; practically, a fully mono-compatible center image.

+0.5 to +1.0

Positive stereo correlation, usually mono-compatible but not necessarily narrow.

0.0

Uncorrelated left/right signal.

-0.5 to 0.0

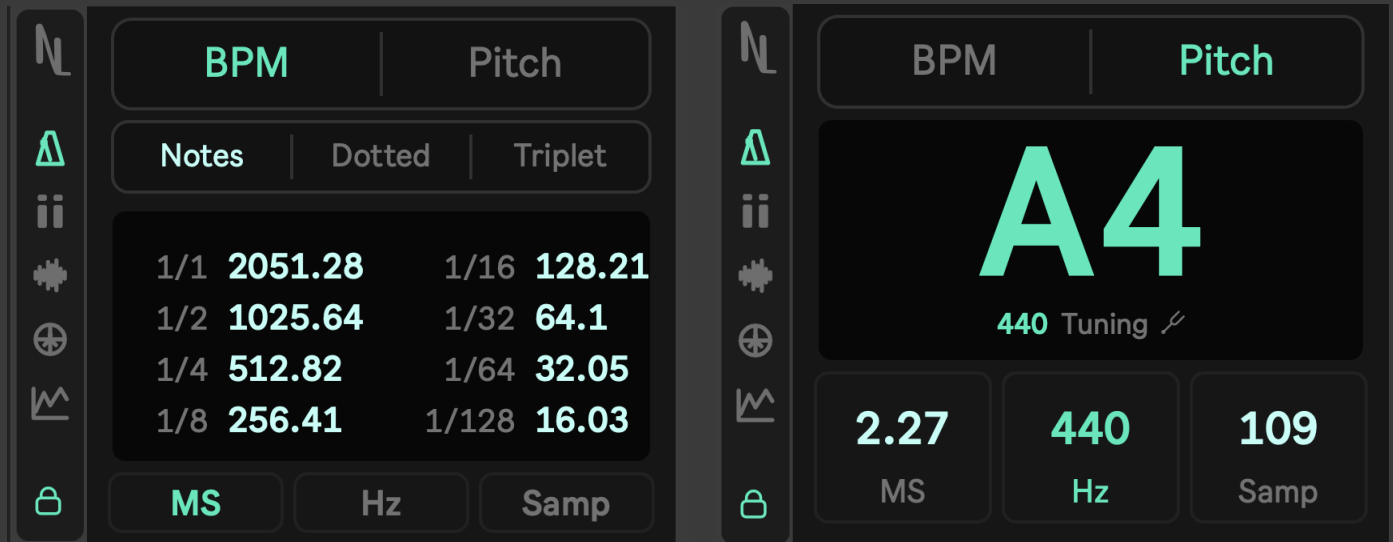
Negative correlation where mono summing may reduce some content.

-1.0

Perfect anti-phase where matching left/right content can cancel severely in mono.

9. BPM and Pitch Converter

Timing, frequency, period, and sample-length conversion. This module is a reference converter; it does not detect the tempo or pitch of incoming audio.



The image shows two screenshots of the Swiss Army Meter BPM and Pitch Converter interface. The left screenshot displays the BPM mode, and the right screenshot displays the Pitch mode.

BPM Mode: The interface is divided into two main sections: BPM and Pitch. Under BPM, there are three columns: Notes, Dotted, and Triplet. The table below shows the timing values for various note divisions.

Notes	Dotted	Triplet	
1/1	2051.28	1/16	128.21
1/2	1025.64	1/32	64.1
1/4	512.82	1/64	32.05
1/8	256.41	1/128	16.03

At the bottom, there are three buttons: MS, Hz, and Samp.

Pitch Mode: The interface is divided into two main sections: BPM and Pitch. The Pitch section is active, showing a large note field (A4) and a tuning reference (440 Hz). Below the note field, there are three buttons: 2.27 MS, 440 Hz, and 109 Samp.

BPM mode

BPM mode maps note divisions to timing values at the current project tempo. The division grid shows straight, dotted, and triplet note values from 1/1 through 1/128. The same division can display delay time in milliseconds, modulation frequency in hertz, or sample duration in samples depending on the selected unit.

Pitch mode

Pitch mode maps musical notes to frequency in hertz, period in milliseconds, and wavelength in samples for one cycle at the current sample rate. The full MIDI note range is C-1 through G9. The tuning reference sets A4 from 420 Hz to 450 Hz, with 440 Hz as the default.

Controls

- Drag the note field or use the mouse wheel to change notes.
- Click the note field and type a note name or MIDI number, then press Return to apply it; Escape cancels the edit. Click the Hz field and type a frequency, then press Return to tune the note to that frequency.
- Drag the tuning reference to adjust A4, double-click the note or Hz field to reset to A4, and double-click the tuning reference to reset to A=440 Hz.

10. Reset, Transport, CPU, and Troubleshooting

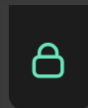
Individual reset

Click the value of any resettable readout to clear just that stored value. True Peak, Max Peak, LUFS Momentary Max, RMS Momentary, RMS Integrated, RMS Max, and PLR can be reset individually when they appear in a resettable slot. Integrated LUFS and LRA are cleared by global reset or transport-synced reset behavior rather than by clicking their value. The value restarts accumulation immediately, and a brief flash confirms the reset was applied.

Global reset



Global reset clears all accumulated measurements and graph history, including Integrated LUFS LUFS history, LRA accumulation, maximum values, correlation sticky markers, Loudness Graph history, and Dynamics Meter history.



Transport Sync and Transport Lock

Transport Sync is controlled from the device's navigation bar. In Transport Sync, time-based and accumulated measurements run only while Live's transport is playing. In Transport Lock, Swiss Army Meter continues measuring whenever audio passes through it, regardless of Live's transport state.

CPU behavior

Swiss Army Meter only keeps active or popped-out modules fully running. When you move on to a different channel and the meter isn't visible or popped out, it dynamically disables processing. This way you can use a lot more instances of Swiss Army Meter without the CPU hit.

Troubleshooting

- If Live does not show the device, confirm the AMXD file is in a folder visible in Live's browser or drag it directly into the Live set.
- If there is no visible signal, make sure the device is on an audio-capable track or after an instrument on a MIDI track, and that the track is actually passing audio.
- If history views are not moving, check whether Transport Sync is waiting for Live's transport to play, and confirm that audio is reaching the device after any instruments or effects in the track chain.
- If a popped-out module is not updating, bring the module back into focus or close and reopen the pop-out window.



- If the BPM/Pitch converter does not match what you expect, confirm that Live tempo and sample rate are set correctly. BPM mode converts note divisions from tempo; Pitch mode converts note names and frequencies from tuning and sample rate.
- If values look frozen, confirm audio is passing through the track, confirm the relevant module is active or popped out, check the current transport mode, then use individual or global reset intentionally to start a fresh measurement pass.