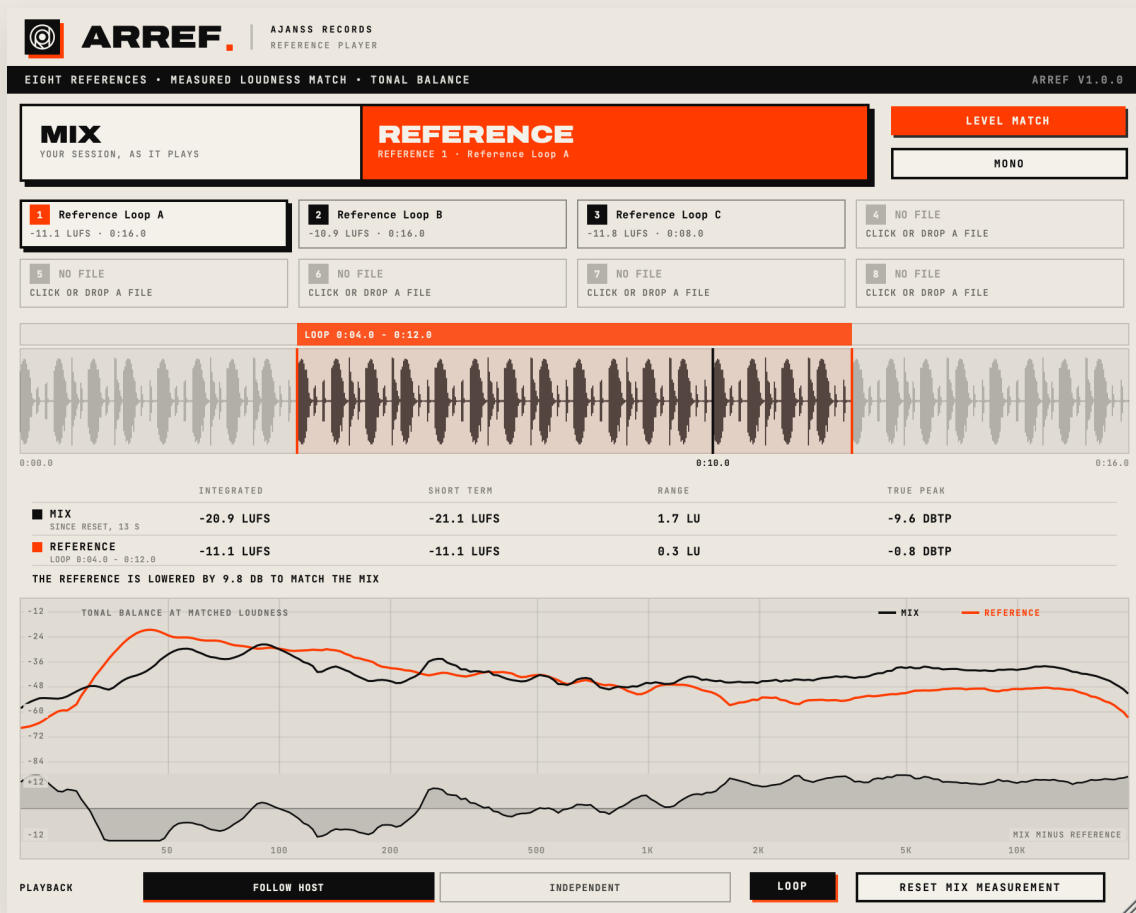


ARREF

REFERENCE PLAYER



VERSION

1.0.0

FORMATS

AU • VST3

PLATFORMS

macOS • WINDOWS

DOCUMENT

USER GUIDE

01 WHAT IT DOES

ARREF plays finished records next to your mix so you can compare them. Load up to **eight reference files**, put ARREF last on your master bus, and switch between **MIX** and **REFERENCE** with one click. Both keep playing all the time; only what you hear changes, so every switch lands on the same moment.

The comparison is only fair at the same loudness. A louder track sounds better to almost everyone, so ARREF measures both with the **ITU-R BS.1770** integrated loudness and **lowers whichever is louder** until they match. Nothing is ever turned up, so matching can never make anything clip.

Below the switch it shows the two side by side: integrated loudness, short term loudness, loudness range and true peak, and the **tonal balance** of each at the matched level, with the difference drawn underneath.

02 INSTALLING

macOS: open the package and choose the formats you want. Windows: run the installer; the VST3 goes to the common VST3 folder. Rescan plugins in your DAW afterwards. ARREF adds **no latency**.

Put it on the master bus, after everything else. When you listen to the mix with LEVEL MATCH off, the mix passes through untouched – the output is the input, sample for sample.

03 LOADING REFERENCES

Click an empty slot to choose a file, or drop audio files on a slot. Several files dropped at once fill the slots one after another; files dropped anywhere else in the window go to the first empty slots. Click a loaded slot to make it the active reference. Right click a slot to replace or remove its file.

Readable files: **WAV, AIFF, FLAC, OGG and MP3** on both systems, and **M4A / AAC on macOS**. A mono file plays on both sides; a file with more than two channels plays its first two. An MP3 starts with a short silence added by its encoder: macOS removes it when reading, the Windows decoder keeps it, so on Windows an MP3 reference sits about 24 ms late against the timeline.

SAMPLE RATE

A reference at the session's sample rate is played **exactly as it is in the file**. One at another rate is converted once, when it loads, with a windowed sinc filter; the audio thread then only reads the converted copy. If you change the session's sample rate, the references are converted again.

WHAT IS SAVED

The session stores the **path** of each file and its loop, not the audio. If a file has moved, its slot says FILE NOT FOUND and keeps the path; click it to point it at the file again.

MEMORY

All references together can use up to 1.5 GB, which is about 70 minutes of stereo audio at 48 kHz. A file that would pass the limit is not loaded and its slot says so.

04 LEVEL MATCH

The mix is measured from the moment you last pressed **RESET MIX MEASUREMENT**, the reference over its loop region. Both use the integrated loudness of BS.1770: 400 ms blocks, an absolute gate at -70 LUFS and a relative gate 10 LU below. The difference is applied to the louder side.

The match waits until the mix has been measured for **3 seconds** above the gate; the line under the readings says so while it waits. A match made from a single moment would drift as the song goes on.

For the fairest comparison, press **RESET MIX MEASUREMENT**, set the reference loop to the matching section of the record, and play that section of your mix.

THE LINE UNDER THE READINGS

It always says what is happening: that the match is off, what it is waiting for, or which side is lowered and by how much.

05 PLAYBACK AND LOOP

FOLLOW HOST plays the reference at your session's position: the first sample of the file sits at the start of the timeline. Move the playhead and the reference moves with it. **INDEPENDENT** gives each reference its own playhead that runs while the host plays; click the waveform to play from there.

Drag along the strip above the waveform to set a loop, drag its edges to move them, double click it to go back to the whole file. With **LOOP** on the region repeats; with it off the file plays on to its end. Every jump, loop return, stop and start crossfades over 10 ms, and switching between mix and reference or between slots over 20 ms, so none of them click.

06 THE READINGS

INTEGRATED	Gated BS.1770 loudness. For the mix, since the last reset; for the reference, over its loop region.
SHORT TERM	The last 3 seconds, as they play. The reference column shows the reference's own level, before any matching.
RANGE	Loudness range, EBU Tech 3342: the spread between the quieter and louder parts, in LU.
TRUE PEAK	The highest peak between samples, measured with four times oversampling. For the mix, since the last reset.

TONAL BALANCE

Each curve is the power in sixth octave bands, averaged over about four seconds. On this scale pink noise is a flat line, so a curve that falls to the right is darker than pink noise and one that rises is brighter. Both curves are drawn **after** the level match, so they sit at the same loudness. The strip underneath is the mix minus the reference: above the line your mix has more in that band, below it less. When the audio stops, the last balance stays on screen.

MONO

Sums both sides to one channel for whatever you are hearing. Use it to check that your mix keeps its balance in mono the way the reference does.

07 MEASURED

Every number here comes from the plugin's own test suite at 48 kHz
(Tests/ARREFTest in SOURCE).

PLAYBACK	Reference at the session rate: 0 samples differ from the file after the 10 ms start, in both playback modes and at block sizes of 64 to 1024.
MIX PATH	Mix heard, match on, reference louder: 0 samples differ from the input.
LOUDNESS	EBU Tech 3341 cases 1 to 5 read within 0.02 LU of their expected value; EBU Tech 3342 range cases 1 to 4 read exactly 10, 5, 20 and 15 LU.
TRUE PEAK	A sine whose peak falls between samples, samples at -3.01 dBFS: reads -0.001 dBTP (expected 0).
MATCH	Measured independently afterwards, the two matched sides differ by 0.007 LU and 0.006 LU ; the output peak never rose above the input's.
CONVERSION	44.1 to 48 kHz: flat within 0.0001 dB from 20 Hz to 19.8 kHz, distortion and noise 113 dB down. 96 to 48 kHz: a 30 kHz tone is left 114 dB down. A click at 1.000 s lands on sample 48000.0000.
SWITCHING	Largest sample step while switching, looping, changing slot or stopping: the same as the signal's own largest step.
LOADING	A 4 minute 44.1 kHz file, converted and measured: 0.76 s on an Apple silicon Mac, on a background thread.
TONAL SCALE	Pink noise lies flat within 0.74 dB from 50 Hz to 15 kHz; a full scale sine reads 0.00 dB in its band.
PROCESSOR	0.15 % of one core with a reference playing and matched.

08 CONTROLS

MIX / REFERENCE	What you hear. Default MIX.
REFERENCE 1 TO 8	The active slot. Default 1.
LEVEL MATCH	Lower the louder side to the same integrated loudness. Default on.
MONO	Hear both sides summed. Default off.
PLAYBACK	FOLLOW HOST or INDEPENDENT. Default FOLLOW HOST.
LOOP	Repeat the loop region. Default on.
RESET MIX MEASUREMENT	Start measuring the mix again.

09 SUPPORT

Instagram @ajanssrecords.