

# Trinnov Optimizer

the loudspeaker processor that maximizes mix translation

## Maximal

The challenge of every sound engineer is to create a mix that sounds great not only in the studio, but for a *majority* of listeners. Whether it's mixing music, film, radio or TV material, *accurate* monitoring is half the job.

## Mix

Trinnov's Optimizer uses state-of-the-art phase and frequency response optimization algorithms, so we feel confident that what we hear comes from the *mix*, not from the *room*.

## Translation

The Optimizer allows you to meet our industry *standards* with unmatched precision. Optimal sound reproduction accuracy means *maximal translation of mixes* across a majority of rooms.



# Trinnov Optimizer

trinnov's approach to sound system optimization

The room's problems have been identified, and are taken into account while recording or mixing. But *as long as the room's acoustics are distorting the mix, how will it translate in other rooms?* Trinnov has applied the results of breakthrough research in the area of loudspeaker/room acoustics to create a new generation of loudspeaker processors, setting a new benchmark for accurate sound reproduction. The Trinnov Optimizer takes *mix translation* to the next level.

## Modern Acoustic Measurements

The Optimizer uses MLS signals to measure the full *impulse response* of every loudspeaker in the room. This adds the time dimension to the frequency response, and enables the Optimizer to see the *full picture* of the loudspeaker's behavior in the room. In multichannel setups the Trinnov's unique cal mic identifies the real positions of the loudspeakers in *3D*.

## Exclusive Acoustic Analysis

Trinnov's state-of-the art *time-frequency* analysis algorithms identify room modes, first reflections and late reverberation. Every acoustic aspect is analyzed and compensated with a specific technique. All the subtlety of the Optimizer resides in knowing which defects can be corrected with *acoustic transparency*.

## Powerful Equalization

The Optimizer's intelligent acoustic analysis engine *automatically* computes FIR and IIR filters to dramatically improve the consistency of *direct sound* against *late reverberation*. Full-phase, time domain techniques are applied compensating for the loudspeaker's *group delay* and for very early reflections (deconvolution), while later reflections are left untouched.

## High flexibility

Manual FIR, parametric and graphic EQs are included to *fine-tune* the results to *target curves*, personal or project requirements. The integrated acoustic analysis tools provide insight on the measurements as well as access to the parameters of the optimization algorithms. Your ears have the final word.

### Applications

### Benefits

Broadcast control rooms

the acoustics of control rooms are rarely ideal. In such difficult acoustic conditions the Optimizer often provides spectacular results in terms of *tonal balance* and *soundstage*, thereby ensuring proper recording and mixing conditions.

Post-production studios

in film and TV post facilities, the Optimizer ensures mix translation *across multiple rooms*, from premixing to screening. For *studio compliance*, the calibration and verification process is easier and more reliable.

Live sound

house system alignment is much *faster* with more *consistent* results from one venue to another. A single Optimizer MC can drive up to 16 AES outputs or 24 MADI outputs.

Installed sound

the Optimizer exceeds the requirements of the most demanding clients for concert halls, theatres, *cinemas*, and homes (*home-theatres* and hifi).

## Improves Phase Response

The Optimizer improves the frequency response of the loudspeakers, both in *amplitude and phase*. Trinnov corrects the tonal balance to obtain a neutral timbre for every speaker, working in the time domain to achieve a high resolution stereophonic image with well-focused phantom sources. The loudspeaker's sound (including the *early reflections*) and the room (*energy response*) are separately equalized, opening up the listening window.

## Meets Your Target Curve

The Optimizer automatically defines the filters that will achieve the required frequency response defined by your target curve. This is particularly useful in post-production studios in order to *comply* with SMPTE standards (*X-Curve*). Phase and group delay targets can also be defined, making the Optimizer a unique tool for sound system designers.

## Intelligent Crossover Alignment

The Optimizer takes a complex task and *simplifies* it with a better result: individual driver and system measurements are acquired and analyzed, including the impulse response, delays and gains of every driver. The Optimizer's calibration engine computes the ideal filters, finding the best compromise to improve *flatness*, directivity and attack in the *overlapping* frequency region.

## All-in-one Solution

The Optimizer is a full-featured loudspeaker processor that complies with, and *goes beyond* current audio reproduction standards. Trinnov combines *automatic* processes with *flexible* fine-tuning tools that allow the sound system designer to reach the best results, while making the whole process *easier* and faster.

### Optimizer ST



*stereo* loudspeaker processor

- 2 analog, AES, ADAT and SPDIF i/o
- 4 additional analog outputs option
- supports all stereo arrangements, multiple sub woofers,
- biamp / triamp operation,
- 1.2U rack mount.

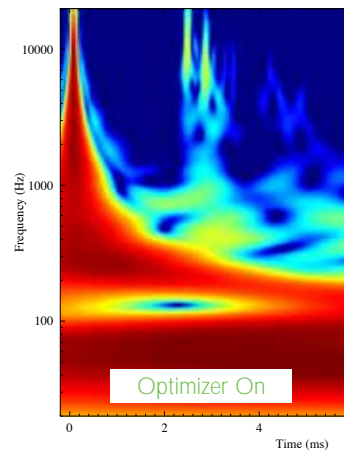
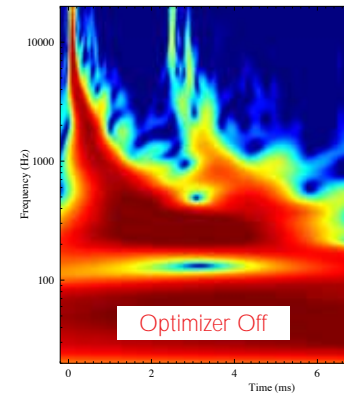
### Optimizer MC



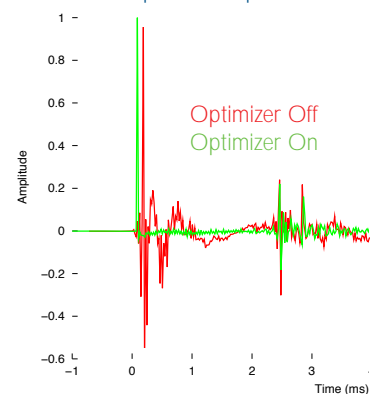
*multichannel* loudspeaker processor

- up to 10 Analog, 12 ADAT, 16 AES or 24 MADI i/o
- supports all formats, from stereo to 22.2, on any loudspeaker arrangement,
- biamp / triamp / quadriamp operation,
- 2U, 3U or 4U rack mount,
- touchscreen option.

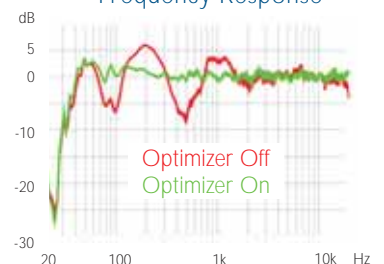
Time-Frequency analysis (wavelet)



Impulse Response



Frequency Response



## Testimonials

"The Optimizer complements the newly built acoustics to achieve further improvements in tonal balance, precise phantom images and very accurate bass. We can now align our control room for mixing in stereo, 5.1 ITU or 5.1 SMPTE simply by switching presets."

*Tom Korr, Leader of the sound department, Cineplus, Berlin, Germany*

"Our monitoring has improved, and the broadcast sound has also improved. This was confirmed to us by the journalists and by those who check the live broadcast. It's obvious on the timbre and on the balance: I find them back exactly as I mixed them. It's translatable."

*Philippe Vaidie, Senior sound mixer, France 3 TV, Paris, France*

"Our final results got way better since we are using the Optimizer. Its benefits include: fast and efficient removal of feedback frequencies - there are hardly any left; accurate tonal matching of each loudspeaker - they all sound pretty much the same; less inconvenience for the rest of the crew, as the measurement process is faster."

*Philipp Kaetel, Chief engineer, IES GmbH, Munich, Germany*

	Trinnov Optimizer	Other Processors
<i>Acoustic measurements &amp; analysis</i>	<ul style="list-style-type: none"> <li>integrated, automatic <i>impulse response</i> measurements of all loudspeakers and drivers</li> <li>integrated, automatic <i>time-frequency</i> analysis: direct sound and late reverberation are analyzed separately</li> <li>graphic display of amplitude &amp; phase response</li> <li>10 seconds per channel.</li> </ul>	<ul style="list-style-type: none"> <li>external, third party measurement tools</li> <li>pink noise can't make the difference between the loudspeaker's sound and the room's response.</li> </ul>
Room equalization	<ul style="list-style-type: none"> <li>automatic optimization of amplitude and <i>phase</i> response according to <i>target curves</i></li> <li>the <i>loudspeaker</i> and the <i>room</i> are separately equalized</li> <li>automatic alignment of delays and gains for every loudspeaker</li> <li>Fine-tuning via FIR, parametric and graphic EQs.</li> </ul>	<ul style="list-style-type: none"> <li>manual adjustment of parametric and graphic EQs according to the interpretation of the measurements.</li> </ul>
<i>Crossover alignment</i>	<ul style="list-style-type: none"> <li>optimizes <i>directivity</i> and <i>attack</i>.</li> <li>automatic alignment of delays and gains for every driver</li> <li>graphic display of filters, amplitude &amp; impulse response</li> <li>manual fine-tuning.</li> </ul>	<ul style="list-style-type: none"> <li>manual, time-consuming process.</li> </ul>
Bass management	<ul style="list-style-type: none"> <li>automatic alignment of the subwoofer's gain</li> <li>optimizes the <i>overlapping</i> frequency region</li> <li>separate subwoofers for L&amp;R channels are supported.</li> </ul>	<ul style="list-style-type: none"> <li>manual adjustment of the subwoofer's gain and phase.</li> </ul>
<i>Processing platform</i>	<ul style="list-style-type: none"> <li><i>standard</i> linux-intel architecture</li> <li>64-bit floating point precision</li> <li><i>real-time</i> control via monitor &amp; mouse or through the network via a standard VNC client (PC or Mac)</li> <li>optional touchscreen.</li> </ul>	<ul style="list-style-type: none"> <li>proprietary dsp architecture</li> <li>32-bit (floating / fixed point)</li> <li>offline control via proprietary software.</li> </ul>
Results	<ul style="list-style-type: none"> <li><i>maximal translation</i> of the mix for a majority of listeners and across multiple rooms.</li> </ul>	<ul style="list-style-type: none"> <li>highly dependent on know-how about acoustic measurements.</li> </ul>



Request a demo from a Trinnov partner near you:

Headquarters: 2 Avenue de l'Europe, 94360 Bry-sur-Marne France. T: +33 147 06 61 37

USA Operations: Curt Hoyt, Huntington Beach, CA 92649 USA. T: +1 714 840 10 65

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