

Desert Moon Audio

OPTOTRON

O T - 2 A

Electro-Optical Leveling Amplifier



Optotron is an electro-optical leveling amplifier in the lineage of the most recorded compressor ever built: a lamp, a photocell, and a tube make-up amp, with no attack knob, no release knob, and no threshold — just Gain, Peak Reduction, and the way light behaves. Three switchable units live on one chassis, each with its own electronics and its own faceplate.

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TWO THINGS WORTH KNOWING FIRST

The needle resting on 0 is not a fault. In Gain Reduction mode the meter sits at 0 VU and swings *down* the scale as the unit works, exactly like the hardware. If you want to read programme level instead, switch the meter to one of the Output positions.

There is no threshold control anywhere. Peak Reduction sets how hard the programme drives the optical cell; the knee, the ratio and the timing all come out of the cell itself. Turn it until the needle moves the way you like.



One meter, three jobs: gain reduction, or programme level at +4 or +10 calibration. The movement is a modelled moving-coil instrument, ballistics and all.

1.1 What Gets Installed

FORMAT	LOCATION
Audio Unit	~/Library/Audio/Plug-Ins/Components/Optotron.component
VST3	~/Library/Audio/Plug-Ins/VST3/Optotron.vst3
AAX	/Library/Application Support/Avid/Audio/Plug-Ins/Optotron.aaxplugin

Universal binary, Apple Silicon and Intel. The plug-in appears under **Desert Moon Audio** in your host's manufacturer list.

1.2 Trial and Licensing

Optotron runs fully featured for 14 days from first launch. After the trial, audio passes through dry until a licence is entered — nothing is ever silenced or degraded behind your back. Click the strip along the bottom edge to paste your licence key; it is a plain offline key with no server, no activation count and no machine lock.

2 Quick Start

- **Insert Optotron on a vocal.** The Gray unit and the Limit position are already selected — that is the classic setting.
- **Turn PEAK REDUCTION up** until the needle swings 3–6 dB on the loudest phrases.
- **Turn GAIN** to bring the level back. The centre of the dial is unity make-up — or press **AUTO** on the rail and let the unit ride its own make-up at matched loudness.
- **Try the other two units** from the rail: SILVER is cleaner and quicker, OT-2 slower and more coloured. The whole faceplate changes with the electronics.
- **Flick POWER** to compare against the untouched signal. With AUTO engaged the comparison is loudness-honest.

WHERE IS THE ATTACK KNOB?

There isn't one, and that is the entire point of this compressor. The T4 optical cell answers in about 10 ms, gives half of its reduction back in under 100 ms, and holds the rest for seconds — longer the harder and longer you push it. Programme-dependence is the instrument.



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|--|---|
| <p>1 LIMIT / COMP — rearranges the sidechain: firm knee or gentle ~3:1.</p> <p>2 EMPHASIS — screwdriver trim tilting the sidechain toward the highs.</p> <p>3 GAIN — the tube make-up amplifier. Centre of the dial is unity.</p> <p>4 VU METER — gain reduction or output, selected by the rotary (6).</p> <p>5 PEAK REDUCTION — how hard the programme drives the optical cell.</p> | <p>6 METER FUNCTION — Gain Reduction, Output +10, Output +4.</p> <p>7 POWER — true bypass, ramped so it never clicks.</p> <p>8 UNIT BANK — Silver, Gray or OT-2; the pressed key is the one sounding.</p> <p>9 RAIL KNOBS — MIX, sidechain high-pass, and the cell's AGE.</p> <p>10 RAIL KEYS — stereo LINK, EXTERNAL key, SC audition, AUTO gain.</p> |
|--|---|

Above the plate sits the preset bar: step keys, undo and redo, A/B compare, the preset name window, and save / revert / menu keys. Everything on it is covered in section 8.

THE PANEL IS THE STATE

Every control is a host-automatable parameter with the same name you see on the plate. Double-click any knob to return it to its default.

The unit bank swaps the entire instrument — optical cell, tube stage, transformer and faceplate. These are three generations of the same idea, not three presets of one model.



SILVER — the modern reissue. The cleanest electronics of the three: extended bandwidth, tight low end, the quickest opto recovery, and a sidechain that leans slightly into the highs. Busses, acoustic instruments, anything that should stay pristine while it breathes.



GRAY — the vintage classic and the reference voicing. The famous two-stage programme-dependent release, warm push-pull tube midrange, audible but polite transformer character. The vocal compressor.



OT-2 — the original. Slowest and most coloured: a deeper slow release that blooms after heavy reduction, stronger second harmonic, narrower bandwidth, and a sidechain that leans into the low mids. Its plate is its own: meter selector under the glass, jewelled power lamp, no Limit/Comp switch on the front.

UNIT	ATTACK (63%)	CHARACTER	TOP END
SILVER	~3 ms	Cleanest — THD in the thousandths at 0 VU	−1 dB at 15 kHz
GRAY	~4 ms	Warm — low-order tube harmonics	−2 dB at 15 kHz
OT-2	~6 ms	Coloured — strong second harmonic, deep bloom	−4 dB at 15 kHz

PEAK REDUCTION

0 – 100

Sets how hard the programme drives the electroluminescent panel inside the T4 cell. Low settings barely wake the lamp; past halfway it digs in the way an audio-taper pot does. The sidechain listens to the unit's *own output* — a feedback design — which is where the gentle, self-stabilising knee comes from.

GAIN

0 – 100 · centre = unity

The tube make-up amplifier, after the cell. It is inside the feedback loop, exactly as on the hardware, so extreme settings interact slightly with the compression — part of the sound, not a bug. With AUTO engaged (section 7) you can leave GAIN at centre and forget it.

METER FUNCTION

GR · +10 · +4

Gain Reduction rests the needle on 0 VU and swings it down the scale as the cell works. The **Output** positions read programme level, with 0 VU calibrated to +4 dBu (–18 dBFS) or +10. On the OT-2 the same choice is the lever under the glass.



POWER

on / bypass

True bypass, ramped over 30 ms so switching never clicks. The meter lamp goes dark and the needle falls to rest, the way a real unit dies when you pull its mains. Latency-aligned, so the bypassed signal is sample-accurate against the processed one.

READING GAIN REDUCTION

The needle's ballistics in GR mode are the cell's own physics, not a meter standard: the fast fall on a transient and the slow crawl home afterwards are exactly what the audio is doing.

LIMIT / COMP

toggle

Limit keeps the full sidechain loop gain: a firm knee that measures around 4.5:1 above 0 VU and keeps flattening as you push. **Compress** bleeds most of the loop away for a very soft ~2:1 that starts earlier and never grabs. On the OT-2 there is no front-panel switch — like the original — but the parameter is still there for your host's automation lane.

EMPHASIS

0 – 100

The screwdriver trim the hardware hides on its side panel, brought to the front. It tilts the sidechain toward the high frequencies: opened up, the unit leans on bright material sooner — a de-esser by physics rather than by algorithm. At zero the sidechain is the stock unit's.

SC HPF (rail)

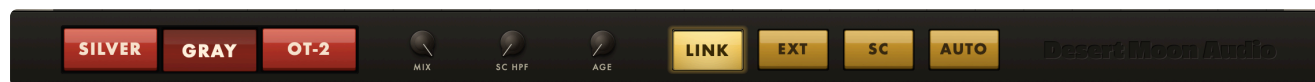
20 – 500 Hz

A rumble filter ahead of the detector that the hardware never had and every engineer strapping one across a bass-heavy source has wished for. At the bottom of its travel it is out of the way; raised, it stops the low E pumping the whole mix. It filters only what the cell hears — never the audio.



HEAR WHAT THE CELL HEARS

Hold the **SC** key on the rail to audition the sidechain — Emphasis tilt, rumble filter and all. Set Emphasis and SC HPF by ear with the key held, then let go; the compressor keeps running underneath the whole time.

**MIX**

0 – 100 %

Parallel compression on the unit itself: the dry path is latency-aligned with the wet one, so any blend is phase-clean.

AGE

0 – 100

The T4 cell's life on the meter. At 0 it is fresh from the crate. At 100 it has decades of programme through it: the traps fill sooner and hold far longer — measured at nearly four times the hang of a fresh cell — the grab comes a shade slower, and a little sensitivity is gone. This scales the cell's real physical constants; a worn cell *hangs* in a way no preset can.

LINK

latching

Stereo link. Engaged, both channels' lamps see the same programme and the image cannot tilt with one loud side. Released, the two cells run independently — dual-mono, vintage-style.

EXT

latching

External sidechain. Route a key signal to Optotron's sidechain input in your host and the detector listens to *that* — through the same Emphasis and rumble filters — instead of its own output. Duck a bass under a kick, a pad under a vocal. With nothing routed, EXT safely does nothing.

SC

momentary

Hold to audition the sidechain; release to return. The switch is crossfaded and click-free, and the compressor keeps working underneath, so letting go lands mid-programme.

AUTO

latching

Loudness-honest make-up. A follower far slower than any musical envelope rides out the *average* reduction, so toggling POWER or moving PEAK REDUCTION compares at matched loudness — and the make-up itself can never pump. Disengaged, it eases home in a quarter of a second.

Judging With Your Ears Louder always sounds better — for about thirty seconds. AUTO exists so that when you decide how much of this compressor a track needs, loudness is out of the vote.

The bar above the plate carries the whole preset system: arrow keys step through the list, the disk saves, the ring reverts unsaved edits, and the menu key opens the full list — factory bank plus everything you have saved. A dot beside the name means the panel has moved since the preset loaded. Your own presets live as files in ~/Library/Application Support/Desert Moon Audio/Optotron/Presets and appear in every session and every host.

A/B holds two complete panel states; the key shows which one is sounding. **Undo / redo** track every change, with knob drags coalesced into sensible steps.

The Factory Bank

Reference

The unit as it comes: moderate reduction, unity make-up.
GRAY · PR 40 · LIMIT

Lead Vocal

The job it is famous for. A little Emphasis keeps esses honest.
GRAY · PR 55 · LIMIT · EMPH 15

Silver Vocal

The reissue's sheen for a vocal that must stay modern and open.
SILVER · PR 50 · LIMIT · EMPH 30

Electric Bass

DI bass into the Gray; the rumble filter stops the low E pumping.
GRAY · PR 60 · LIMIT · HPF 45 HZ

OT-2 Bass Glue

The original's bloom on a bass-heavy source, leaning gently.
OT-2 · PR 45 · COMPRESS · HPF 80 HZ

Parallel Drums

Slammed, then folded back under the dry kit.
GRAY · PR 85 · LIMIT · MIX 40 %

Mix Bus Kiss

Compress mode, barely a needle's width of reduction on the 2-bus.
SILVER · PR 25 · COMPRESS

Acoustic Guitar

Acoustic instruments ride better with the gentle curve.
SILVER · PR 40 · COMPRESS · EMPH 10

OT-2 Character

The original working hard, for colour as much as control.
OT-2 · PR 65 · LIMIT

Lead Vocal

Gray, Limit, LINK on. Raise PEAK REDUCTION until the loudest phrases draw 4–6 dB and ordinary lines barely move the needle — the cell's release does the riding between them. If essses poke through, open EMPHASIS until they sit; if breaths pump the unit, a touch of SC HPF calms it. Engage AUTO, then decide how much with POWER flicks.

Electric Bass

Gray or OT-2, Limit, SC HPF around 50–80 Hz so the fundamental stops driving the cell. PR until the needle breathes 2–4 dB with the groove. The OT-2's low-mid sidechain lean and bloom flatter simple parts; the Gray keeps busy parts articulate.

Parallel Drums

Any unit, PR at 80+, MIX down to 30–50 %. Because the dry path is latency-aligned inside the plug-in, the blend is phase-clean at any setting. AGE at 60+ makes the crushed layer hang gloriously between hits.

Ducking With The External Key

Route the kick (or the vocal) to Optotron's sidechain input in your host, press EXT, and set PR for the depth of the duck. The Emphasis and SC HPF trims shape the *key*, so you can duck to the kick's beater rather than its boom. Hold SC to hear exactly what the cell is keying from.

The Worn-Cell Trick

On sparse ballads, push AGE toward 100 and lean the unit 6–8 dB into a phrase. The reduction takes seconds to let go — the level swells back like a hand slowly opening on a fader. This is the sound engineers chase old T4 cells for, and here it is a knob.

SILVER, GRAY OR OT-2?

When in doubt: Gray for the middle of the mix, Silver for the top of it, OT-2 for anything that should sound like a memory of a record.

PARAMETER	RANGE	DEFAULT	NOTES
Unit	Silver / Gray / OT-2	Gray	Swaps electronics and faceplate
Gain	0 – 100	50	Make-up amp; centre is unity
Peak Reduction	0 – 100	40	Sidechain drive into the cell
Limit / Compress	Limit / Compress	Limit	Sidechain network
Emphasis	0 – 100	0	Sidechain HF tilt (R37)
Meter	GR / +4 / +10	GR	Meter function
Sidechain HPF	20 – 500 Hz	20 Hz	Detector only, never the audio
Stereo Link	on / off	on	Off = dual mono
Cell Age	0 – 100	0	Scales the T4's physics
External Sidechain	on / off	off	Detector keys from the sidechain bus
Sidechain Listen	momentary	off	Audition the detector path
Auto Gain	on / off	off	Loudness-matched make-up
Mix	0 – 100 %	100 %	Latency-aligned parallel blend
Power	on / bypass	on	Ramped true bypass; host bypass drives it too

NOT IN PRESETS

Power, Sidechain Listen and External Sidechain are deliberately excluded from presets: one is a bypass, one is momentary, and one is a routing decision that belongs to the session, not the sound.

Optotron's engine is a physical model — a feedback loop around a lamp law, a two-population photoresistor, a tube stage and an output transformer — and every figure below is *measured from the compiled engine* by the project's own bench, which fails the build if any of them drifts.

MEASUREMENT	VALUE
Topology	Feedback; electroluminescent panel → photoresistor (T4 model)
Attack (63% of final GR)	~3 ms Silver · ~4 ms Gray · ~6 ms OT-2
Release, first stage	50 % of reduction in ~80 ms
Release, tail	1.7 s after a brief hit → 4 s after a long lean (programme-dependent)
Worn cell (AGE 100)	~4× the hang of a fresh cell
Ratio	Limit ~4.5:1 · Compress ~2:1, both progressive
Maximum reduction	~40 dB (the lamp saturates, as the hardware's does)
THD at 0 VU, no reduction	0.007 % Silver · 0.09 % Gray · 0.4 % OT-2
Operating level	0 VU = −18 dBFS (+4 dBu)
Processing	4× oversampled through the entire nonlinear path
Latency	6 samples at 48 kHz, reported to the host
Channels	Mono or stereo, plus an optional sidechain input
Formats	AU · VST3 · AAX — macOS universal binary

Updates

Once a day the plug-in checks the Desert Moon Audio release manifest. When a newer version exists, a slim notice appears along the bottom edge; clicking it opens the download page. Nothing is installed behind your back, no identifying data leaves the machine, and setting `DMA_NO_UPDATE_CHECK=1` in the environment disables the check entirely.

Support

info@desertmoonaudio.com — include your host, OS version, and what the needle was doing at the time.