

RMS 201

A mastering compressor and true-peak limiter with an RMS detector: smooth, programme-led control, an open top end and a ceiling that holds.

A Lab plug-in. The Lab is where new GFX plug-ins are built in the open: they may change sound or controls between versions.



Overview

RMS 201 is a stereo processor for the master, in the spirit of a classic 1970s broadcast and mastering limiter whose detector followed the average (RMS) level rather than every peak: fast enough to control a mix, but smooth and transparent, with a musical knee. The signal goes through the input TRIM, the COMPRESSOR, the LIMITER and the optional COLOUR stage; last of all, a CEILING stage keeps anything the colour adds under the limit.

The compressor listens through its own DETECTOR: an RMS level, a side-chain high-pass so the kick and bass don't pump the mix, and a Mid / Side balance. TILT COMP is the new part: when the lows are driving the compression, the highs get less of it, so the top stays open instead of ducking with every bass note. AUTO gives a release that adapts to the music: quick after sparse hits, slower on dense, sustained material, and quick again in the gaps.

The limiter looks ahead 1.5 ms and, with TRUE PEAK lit, watches the peaks between the samples too, so a master stays under its ceiling after conversion and streaming encoders. COLOUR (TAPE, TUBE or DIODE) comes after the limiter, runs oversampled (OS key: 1x, 2x or 4x) and keeps its level matched as you drive it.

Every key crossfades and every knob glides, so nothing clicks, including preset changes. There is no DRIFT: a mastering unit should do the same thing every time.

Reach for it for

- Mastering: 1 - 3 dB of smooth compression and a safe, true-peak ceiling
- Loud masters that keep their top end open (TILT COMP)
- Dense mixes that breathe or pump with a fixed release (AUTO)
- A touch of tape, valve or solid-state colour on the whole mix
- Riding a broadcast or stream feed to an even level

Controls

The header

PRESETS	Click it for the preset list.
◀ / ▶	Steps to the previous or next preset, wrapping round.
Preset display	Shows the preset's name. Click it for the list too.
BYPASS	Lit: you hear the untouched input, kept in time with the rest of the project. It crossfades in and out, so it never clicks: use it rather than REAPER's on / off switch to compare.
OS	Click to step through 1x, 2x and 4x (default 2x): the rate the COLOUR stage runs at. 2x is clean for nearly everything; 4x is for heavy DRIVE on bright material; 1x saves CPU and latency. Changing it dips the sound for 5 ms.
S / M / L / ?	The panel size, and the credits with a link to this manual.

Every knob shows its value while you hover over it or turn it. Double-click a knob to return it to its default; hold Shift while dragging for fine moves.

DETECTOR

SC HPF	20 - 300 Hz (default 60), 12 dB per octave. Takes the lows out of what the compressor hears, so the kick and bass stop pumping the mix. They are still in the sound; only the detector stops reacting to them.
SC M/S	-100 to +100 % (default 0, marked 0). What the detector listens to: towards M it hears the middle of the mix (vocals, kick, bass), towards S the sides (wide guitars, reverbs, ambience); 0 hears left and right as they are.
TILT	TILT COMP, 0 - 100 % (default 0). The compressor splits at 800 Hz and leans its gain reduction towards the end of the spectrum that is carrying the energy. With a bass-heavy passage driving it, the lows get more compression and the highs less (at 100 %, half as much), so the top stays bright. At 0 % it is one flat compressor. The TILT bar under the GR meters shows which way it is leaning.
RMS TIME	Click the box for the list: AUTO (default), 3, 10, 30 or 50 ms. How long the detector averages over. AUTO ties it to ATTACK (twice the attack, 3 - 40 ms). Short times are tighter and catch more of the transients; long ones are smoother and ride the body of the mix.
LINK	Lit (default): one gain for both sides, so the stereo image stays put. Dark: each side has its own detector (dual mono). Switching glides.

COMPRESSOR

IN	Switches the compressor in or out (crossfaded).
THRESHOLD	-40 to 0 dBFS (default -18, marked 0, which is 0 VU). The level where compression starts. A steady tone compresses at the same setting as it would with a peak detector.
RATIO	1 : 1 to 10 : 1 (default 2 : 1). How firmly the level is held above the threshold.
KNEE	0 - 18 dB (default 6). How gradually compression starts: 0 is a hard corner, high settings ease in over a wide range (the

	musical end).
ATTACK	0.1 - 100 ms (default 10). Slow settings let the front of each hit through.
RELEASE	20 ms - 2.5 s (default 250 ms). With AUTO lit it scales the adaptive release instead.
AUTO	The adaptive ("ghost") release. It counts how busy the transients are: after sparse hits it lets go quickly so the punch comes back, on dense, busy material it lets go more slowly so the level doesn't flutter. Under long, sustained compression a slow release builds up underneath, so the mix doesn't breathe. In the gaps, when the music drops well under the threshold, everything recovers three times faster, so the next phrase starts fresh.
MAKE-UP	0 - 20 dB (default 0). Gain after the compressor; push it to drive the limiter for loudness.
MIX	0 - 100 % (default 100). Below 100 % the uncompressed signal comes in under the compressed one: parallel compression.

LIMITER

IN	Switches the limiter (and the CEILING stage after COLOUR) in or out. Default in.
CEILING	-12 to 0 dB (default -1). The highest level the output reaches.
RELEASE	5 ms - 1 s (default 60 ms). How quickly the limiter lets go.
AUTO	Lit: the release slows down while the limiting is sustained (smoother on dense, loud material) and speeds up in the gaps.
TRUE PEAK	Lit (default): the limiter also watches the peaks between the samples (8x interpolated), so the master stays under the ceiling after conversion and encoding. Dark: sample peaks only. The latency is the same either way.

The limiter looks ahead 1.5 ms, so the gain is already down when a peak arrives. The latency is reported to REAPER (so the project stays in time) and shown under the keys.

COLOUR

IN	Switches COLOUR in or out (default out, crossfaded).
TYPE	Click the box for the list, or step through it with the ◀ ▶ keys either side: TAPE (soft and symmetrical, mostly 3rd harmonic: warmth and a rounder top), TUBE (asymmetrical, mostly 2nd harmonic: fullness and glow) or DIODE (a harder, solid-state knee: brighter, edgier odd harmonics). Changing type crossfades.
DRIVE	0 - 100 % (default 30). How hard the colour is pushed. The curve is set against the CEILING, so quiet passages pass untouched and the loud ones pick up the harmonics; the level stays matched as you turn it up.
BLEND	0 - 100 % (default 50). The coloured signal against the clean one.

COLOUR comes after the limiter, as on a mastering chain where the saturation is the last character stage. Saturation can push a few peaks up, so with the limiter in, a short look-ahead CEILING stage after COLOUR keeps them under the limit.

The meters

TRIM	-24 to +12 dB (default 0). The input level.
GUARD	Lit: brings a hot input down towards -18 dBFS (it never boosts).
IN L / R	The input of each side after TRIM, -42 to +3 dBFS, with a floating peak hold.
TRANSFER	The compressor's curve: input across, output up, both -48 to 0 dB. It follows THRESHOLD, RATIO, KNEE, MIX and MAKE-UP; the amber line is the CEILING (with the limiter in), and a dot rides the curve at the level the detector hears.
GAIN REDUCTION	COMP (red) and LIMIT (amber: the limiter and the CEILING stage together), 0 - 20 dB.
TILT	Where TILT COMP is leaning: towards LOWS when the bass is driving the compression (the highs are being spared), towards

HIGHS the other way.

OUT L / R

The output level of each side, -42 to +3 dBFS, with a floating peak hold. The figure beside them is the highest peak; click a meter to clear it.

Presets

Presets leave TRIM, GUARD and OS as they are. Their MAKE-UP is set for a typical mix around -20 dBFS RMS: the gentle ones come out about 2 - 4 dB louder, Loud and Open, Punchy Pop, Dense Rock and Broadcast Ride 6 - 8 dB louder. Adjust MAKE-UP (or TRIM) to suit your mix.

Init	The defaults: 2 : 1 at -18 dB with a 6 dB knee, AUTO RMS time, SC HPF 60 Hz, the true-peak limiter at -1 dB, COLOUR out.
Gentle Glue	1.5 : 1 with a wide 12 dB knee, a slow attack and AUTO release: 1 - 2 dB of glue.
Transparent Master	1.8 : 1, slow release, SC HPF 120 Hz, a little TILT and the limiter on AUTO.
Loud and Open	2.5 : 1 with AUTO release and TILT at 60 % pushed hard into the limiter: loud, with the top kept open.
Punchy Pop	3 : 1 with a 25 ms attack to let the drums through, a fairly quick release and some TILT.
Dense Rock	4 : 1 with a fast attack and AUTO release, MIX 70 %, and TUBE colour at 40 %.
Acoustic Air	Very gentle, a wide knee, the SC HPF at 150 Hz, TILT at 80 % and the detector leaning to the middle.
Low End Hold	The SC HPF up at 200 Hz so the bass never drives the compressor, AUTO release and TILT at 50 %.
Tape Master	2 : 1 with AUTO release and TAPE colour at 60 % BLEND.
Tube Glow	1.8 : 1 with AUTO release and TUBE colour pushed to 55 %.

Diode Edge	2.5 : 1, some TILT and a touch of DIODE colour for bite.
Broadcast Ride	4 : 1 from -26 dB with a short RMS time and AUTO release, TILT 50 % and the limiter at -0.5 dB: an even, dense level for streams and broadcast.

Tips

- Start with 1 - 3 dB on the red COMP bar and 1 - 3 dB on the amber LIMIT bar: let each stage do a little.
- If the master pumps with the kick, raise the SC HPF; if the top end ducks with the bass, bring in TILT.
- Use AUTO when a fixed release either pumps (too fast) or holds the mix down (too slow).
- Keep TRUE PEAK lit for anything going to streaming or a lossy format; -1 dB is a safe ceiling.
- COLOUR is easiest to judge with BYPASS: set DRIVE and BLEND so you miss it when it's gone, not so you notice it when it's there.
- RMS 201 is a stereo unit: it processes channels 1 and 2 only. Any other channels pass through untouched, kept in time with the latency.

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