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RANE G4 Quad Gate

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The Washington-based Rane Corporation has been making solid, affordable audio gear for nearly 25 years. The company's well-built products are staples in countless sound-system and broadcast racks, but tend to have a lower profile in the studio market. That sleeper status may change, however, once recordists get their hands on the new G4 Quad Gate.

Admittedly, noise gates don't have the sex appeal of microphone technology, compressors, and the like. That may be because gates are (or should be) an invisible part of the process when they work as intended to control and reduce unwanted noise or acoustic leakage. In addition, gating technology — like the mousetrap — worked well when it was developed in the 1980s and has seen few refinements since.

But the audio world, or at least the part of it that's hip to the complexities of gating, may beat a path to Rane's door to find out if this company has indeed built a better noise trap. Using 24-bit digital "look-ahead" signal processing to improve triggering functions, and including four channels of every possible control parameter for gating, ducking, expansion, and external sidechain integration, the full-featured G4 is worthy of close scrutiny.

THE FACE OF THINGS

With more knobs, switches, and lights than a densely packed airplane instrument panel (see **Fig. 1**), the two-rack-space G4 has four identical sets of gating controls. Channels 1 and 2 can be stereo-linked, as can channels 3 and 4, using switches conveniently located at the top of the front panel between channel pairs.

At the top of each control section are two multicolored horizontal LED meters. The top, 11-segment meter shows the sidechain input level in decibels relative to threshold (dBr). As input level increases, LED colors change from green (for -24 to -1 dBr) to amber (for 0 dB, or threshold) to green (for +1 to +12 dBr) to red for overload.

The lower, 7-segment meter indicates the amount of gain reduction, with a red LED at the far left showing closed status, amber lights corresponding to the -24 to -1 dB levels in the row above, and a green open LED directly beneath the sidechain's threshold indicator.

Two rows of four knobs each take up the bulk of each channel section. The black and gray knobs are rubber-coated for a sure grip, and each has a broad white stripe that is easy to see against the faceplate's gray-on-black lettering. All controls are continuously adjustable over a broad range of values appropriate for studio or live sound.

On the far left, the gray Threshold pot is larger than the others and ranges from -60 to +20 dBu. Next to it are the Attack (0 to 250 ms) and Release (25 ms to 2 seconds) controls. A black Hold knob allows the user to dial in an open gate interval (0 to 3 seconds) between the specified attack and release times. This useful feature keeps the gate from flickering on and off in response to sustained dynamics of the sort that are typically produced by electric bass and keyboards.

The bottom row of black dials begins with the Depth control (80 to 0 dB). This sets the amount of gain reduction that occurs once the gate is closed, and is a handy problem solver when gating signals with a small dynamic range or high levels of background sound. To the right of the Depth control is a Ratio knob (1:1 to 8:1), which functions only when the channel is in

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expander mode. An expander, or downward expansion circuit, is a gentler form of noise gate. Technically, expansion works like compression in reverse, by using RMS detection to reduce the gain on an audio signal as the signal gets quieter. The result is a gradual decay that can trace the dynamics of the original signal over a long period of time. This mode is most appropriate for decay or noise control in sustained sounds produced by a keyboard, a bass guitar, or an electric guitar.

The final two knobs add useful sidechain-EQ control to the G4's generous feature set. The Low-Cut (20 Hz to 5 kHz) and High-Cut (200 Hz to 20 kHz) dials enable fine-tuning of the gate's triggering signal. This sidechain-EQ function has several potential uses, such as keeping a loud cymbal hit from opening the gate on a tom track. You'd normally accomplish such tasks by multing the signal to be gated through an outboard equalizer and then feeding it to a gate's external sidechain input.

Sidechain EQ could also be used to filter out a strong bass note that might otherwise cause a "false trigger" of the gate applied to a flute track. Special dynamics effects and creative remix tricks can be accomplished with this sidechain control as well, and its inclusion adds value to the unit by cutting down on the time and trouble associated with making outboard sidechain connections.

At the bottom of each control section are four small toggle switches, each with its own multicolored status light. From left to right, these let you select Active or Bypass (for the gating circuit), Internal or External (sidechain-signal selection), Normal or Listen (to audition a sidechain signal), and Gate, Duck, or Expander mode. (Ducking is a process used mostly in the broadcast world — where the sidechain signal is typically an announcer's vocal — to automatically "duck," or reduce, the gain of background music. Some rock engineers use ducking to bring down the level of loud guitars or keyboards in a mix when the lead vocal is present.)

The unit does not have an AC-power switch. A small amber LED on the front panel's far right lights when the unit is receiving power.

BEHIND THE SCENES

Four sidechain inputs (¼-inch TRS) are clustered on the back panel, along with an array of XLR and ¼-inch balanced TRS inputs and outputs for each of the four channels (see **Fig. 2**). Although there is no printed indication of the reference level for the ¼-inch jacks, both input types are professional +4 dBu level, and there is no provision for -10 dBV signals. The back panel also contains a standard IEC power connector.

The G4's chassis is made entirely out of metal and has numerous ventilation holes on the top and bottom for cooling the multiple microprocessors inside. The unit gets warm to the touch and needs adequate ventilation when mounted in a rack.

The G4's exceedingly thorough manual provides textbook explanations of all functions, as well as a useful primer on basic sound-system connection and wiring principles. One minor flaw in the documentation is that color-coding is mentioned for the purpose of deciphering oscilloscope chart displays, but all graphics are printed in black and white. Rane says that this flaw has been corrected.

The G4 uses carefully selected DSP chips to convert and process the analog audio at 24-bit depth and a sampling frequency of 48 kHz. The main advantage of digital A/D/A conversion, which is performed on the audio and the sidechain-input signals of each channel, is that look-ahead detection can be used to anticipate transient attacks in advance of the audio output. That allows for truly instantaneous triggering, so percussive attacks are never cut off or jumpy. Latency through the unit is only 1.6 ms.

SHOWTIME

The G4 Quad Gate saw a lot of use at my studio, Guerrilla Recording, during a month of tracking and mixing. On toms, kick drum, amplified instruments, and vocals, the unit was always quick to adjust and generally inaudible once set properly. I also threw some unusual challenges at the G4.

The toughest job for the G4 was on a prerecorded track of bassoonist Sara Schoenbeck, who was part of a 12-piece Anthony Braxton ensemble

recorded live. Schoenbeck's instrument is especially quiet, and her custom miking system did not reject much sound from the saxes and trumpets positioned near her. After a brief period of fiddling with the Attack and Depth controls, I was able to get the G4 to work a gating miracle: attenuating the surrounding horns by 15 dB most of the time while keeping the breathy bassoon attacks tight and smooth without ever clicking or "cutting in."

The G4's immediate attack time deserves special mention. For years I've been tweaking attack times to avoid clicks or radical reshaping of transients, especially on wind instruments, so it felt like a luxury to be able to set the attack at zero and leave it there to work flawlessly on a wide range of sources.

The G4 faced another intriguing trial during a soundtrack-recording session with multi-instrumentalist Mark Growden. One of Mark's motifs for the score was the sound of musical notes created by blowing on a series of tuned bottles. A click track in the headphones and the delicate and breathy nature of the bottle sounds combined to make yet another set of tough gating challenges.

As expected, attacks were smooth, and carefully adjusting the G4's depth, release, and hold settings was very effective for achieving a smooth decay with barely audible click-track bleed. I noticed no buildup of coloration or degradation in rough mixes of five or six bottle tracks recorded to analog tape using the G4.

I had two major concerns about the innovative process of A/D/A conversion used in the G4: latency-induced phase cancellation and tonal coloration. A series of studio tests allayed these worries and left me highly impressed with the unit's transparency. In normal usage — on toms or vocals, for example — the unit's latency was never a problem.

During my tests, the only time the inherent delay of the G4 electronics caused phase cancellation was when just one channel of a stereo pair was run through the gate. Of course, the need to gate one side of a drum set or piano would be rare, and processing both stereo tracks through the G4 would eliminate the anomaly.

When A/B testing stereo mixes through the G4 (circuitry active, with no gating), I listened carefully for minor timbral changes and any diminution in ambience, depth, or width that could be a by-product of A/D/A processing. The G4's converters did extremely well. Only in some big-sounding mixes with layered vocal harmonies did I hear evidence of any coloration, with a barely noticeable attenuation of high-frequency airiness. This level of fidelity shows a dedication to quality circuit design that would be laudable even in costly mastering gear.

GOLDEN GATE

The G4 Quad Gate is truly a best-of-both-worlds hybrid. With its potent combination of every imaginable analog control and top-notch digital processing, the G4 looks like the hardware gate to beat for the 21st century. Its logical layout, helpful metering, and generous range of parameters on each knob also make the G4 a delight to use. Thanks to its instantaneous attack time and look-ahead triggering, the G4 is as close as a gate can get to being a set-it-and-forget-it device.

The audio quality and implementation of Rane's innovative digital processing is also worthy of note. In fact, my only misgiving about this unit is that it doesn't offer computer-based studios access to its superb converters through digital I/O. But digital I/O is not free (yet), and it's quite remarkable that the G4's price remains competitive with the few other 4-channel gates out there. Rane tells me that a digital hardware gate is in the works. After that, perhaps the company will perfect the mousetrap as well! As it is, the G4 gets my highest recommendation. It's not only an excellent product, but it's also a tool that I intend to purchase and use regularly in my own studio.

Myles Boisen is the head gatekeeper, janitor, and group therapist at *Guerrilla Recording* and *The Headless Buddha Mastering Lab* in Oakland, California.

G4 Specifications

Inputs	(4) XLR; (4) ¼" balanced TRS; (4) ¼" TRS sidechain
Outputs	(4) XLR; (4) ¼" balanced TRS
Maximum Input Level	+22 dBu
Maximum Output Level	+22 dBu
Frequency Response	15 Hz-20 kHz
Distortion (THD + Noise) at 0 dB Input	0.02% (20 Hz-20 kHz); 0.006% (1 kHz)
Threshold	-60 to +20 dBu
Attack Time	0-250 ms
Hold Time	0-3 sec.
Release Time	25 ms-2 sec.
Range of Attenuation	-80 dB to 0 dB
Low-Frequency Filter	20 Hz-5 kHz
High-Frequency Filter	200 Hz-20 kHz
Dimensions	2U × 5.25" (D)
Weight	7.3 lb.

PRODUCT SUMMARY

Rane

G4 Quad Gate
quad gate/ducker/expander
\$999


FEATURES	4.5
EASE OF USE	5.0
AUDIO QUALITY	5.0
VALUE	5.0
RATING PRODUCTS FROM 1 TO 5	

PROS: Complete selection of control functions for gating, ducking, and expanding. Generous range of control parameters. Top-notch 24-bit, 48 kHz internal digital processing. Look-ahead triggering for instantaneous attack time. Clear metering. Logical, easy-to-read layout. Highly informative manual. Competitive price.

CONS: No provision for -10 dBV-level operation. No digital I/O.

Manufacturer

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