

General Description

The C4 Quad Compressor/Limiter presents matchless feature, performance and ergonomic value. Rounding out Rane's popular series of analog-controlled digital products for live sound applications, the C4 offers four feature-packed channels of compression and limiting in a 2U package. Internal and external side-chain options offer a fully adjustable parametric EQ for frequency-dependent compression or de-essing. The oversampled brick wall limiter determines the maximum output level and operates independent of the compressor. Adjacent channels link in a master/slave arrangement to ensure accurate tracking of stereo inputs. Intuitive meters show side-chain level relative to Threshold, gain reduction and complete dynamic range at a glance.

For details on what the C4 can do for your sound, see the *RaneNote Dynamics Processors — Technology & Application Tips* available at the Rane website.

Analog-Controlled Digital

Analog controls (knobs, sliders) allow a performer or sound engineer to make precise adjustments, in real time. Digital signal processing (DSP) provides a degree of accuracy, consistency and flexibility that simply cannot be matched with a traditional analog design.

The C4 combines the best of both worlds by using analog controls and high performance digital processing to achieve an unprecedented feature set. Benefits of this approach:

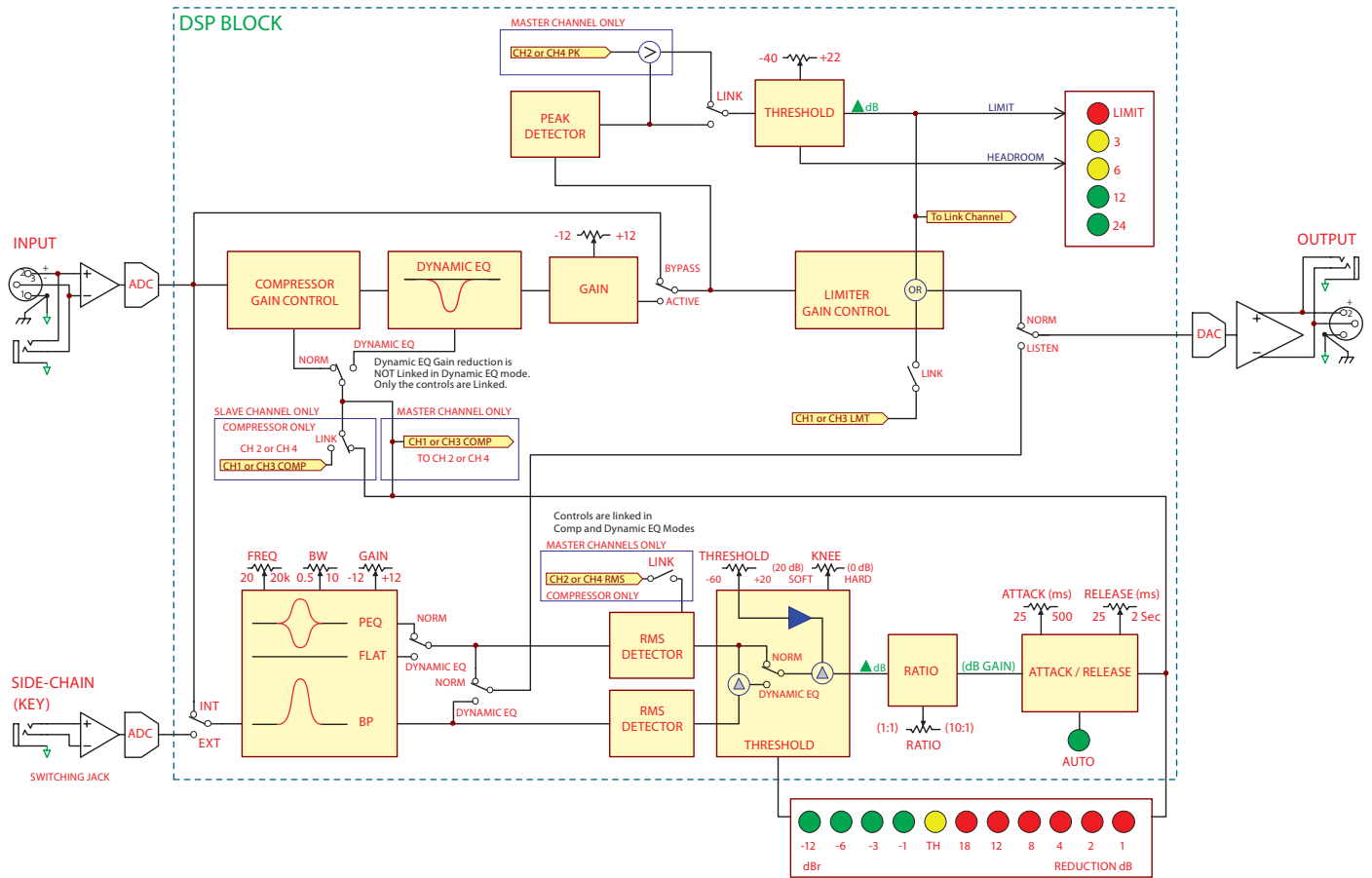
- Advanced compression and dynamic EQ techniques, difficult or costly to implement in traditional analog designs.
- Improved accuracy and repeatability.
- Immunity to RF and electromagnetic interference.
- Lower cost per channel.

Features

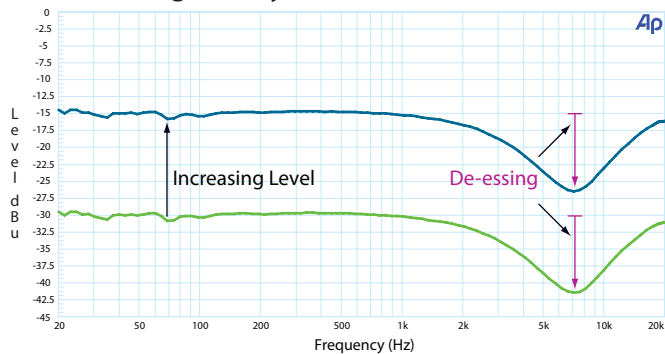
- Independent Compressor / Dynamic EQ / Limiter per channel.
- Relative-threshold Dynamic EQ remains calibrated for all levels.
- Auto mode for fast setup of Attack and Release.
- External side-chain with balanced / unbalanced ¼" TRS input.
- Side-chain includes a parametric EQ with Compress, Dynamic EQ and Listen modes.
- Adjustable soft or hard knee compression.
- Independent Metering: Side-chain level, Threshold indicator, Gain reduction and Limiter headroom.
- Stereo Link between channels 1 and 2 or 3 and 4.
- XLR and ¼" TRS input/output connectors.
- Universal internal switching power supply (100-240V).

Parameter	Specification	Limit	Units	Conditions/Comments
Inputs: Type	Active Balanced			Auto balanced/unbalanced
.....Maximum Input	+22	1	dBu	1 kHz
.....Common Mode Rejection	60	typ.	dB	1 kHz
.....Input Impedance	10k	1%	Ω	Each leg to ground @ 1 kHz
.....Main Input Connectors	XLR, ¼" TRS			XLR pin 2 hot per AES standards
.....Side-Chain In Connectors	¼" TRS			Tip = hot, ring = negative
Digital Processing				
Converters: Sample Rate	48		kHz	24-bit
.....Dynamic Range	106	typ.	dB	A-weighted (input to output); unity
.....Propagation Delay	1.2	typ.	ms	Converter delay
.....Fixed-Point DSP	48-bit double precision			
Dynamics Processing	Compress/Dynamic EQ/Limit			LED mode indicators
Side-chain detect	PEQ rms, Bandpass rms			True rms, 50 ms average RC
Dynamics Controls				All pots 8-bit resolution or 256 steps
.....Bypass	toggle switch			Active/Bypass LED indicators
.....Threshold Range	+20 to -40	1	dB	Before Limiter
.....Ratio	1:1 to 10:1			
.....Gain	-12 to +12	1	dB	0 dB gain detent
.....Attack	25 to 500		ms	Settle to 85% of final value
.....Release	0.025 to 2.0		Sec.	For 10 dB step
.....Knee	0 to 10		dB	Span
.....Limit Threshold	+22 to -40		Peak dBu	Oversampled brick wall
Side-Chain PEQ: Gain	± 12		dB	
.....Frequency	20 to 20k		Hz	
.....Bandwidth	0.5 to 10		oct.	
.....Internal / External	Auto Cable Detect			
.....Normal / Listen	Toggle switch			LED indicator (listen to side-chain)
Link Channels	1 & 2, 3 & 4			Switchable
Meter: Gain Reduction	-12, -6, -3, -1, Threshold		dB	Each channel
.....Side-chain level	Relative to Threshold setting		dBr	4-segment, relative to Threshold
.....Headroom	Relative to Limit setting		Peak dBr	5-segment
Outputs:	Active Balanced			Auto balanced/unbalanced
.....Connectors	XLR, ¼" TRS			XLR pin 2 hot per AES standards
.....Impedance	100	1%	Ω	Each leg to ground
.....Maximum Output	+22	1	dBu	600 Ω or greater
EMI Filters	Yes			Inputs and Outputs
Frequency Response	15 Hz to 20 kHz	+0/-3	dB	
THD+Noise	.02	typ.	%	+4 dBu, 20-20 kHz, 20 kHz BW
THD+Noise	.006	typ.	%	+4 dBu, 1 kHz, 20 kHz BW
Crosstalk	<-100	typ.	dB	2 kHz
Power Supply Requirement				100 to 240 VAC, 50/60 Hz, 20 W
Unit: Conformity	FCC, cULus			
Unit: Construction	All Steel			
.....Size	3.5" H x 19" W x 8.25" D (2U)			(8.9 cm x 48.3 cm x 21 cm)
.....Weight	7.3 lb			(3.3 kg)
.....Shipping: Size	4.5" x 20.3" x 13.75"			(11.5 cm x 52 cm x 35 cm)
.....Weight	12 lb			(5.5 kg)
Note: 0 dBu=0.775 Vrms				

Block Diagram

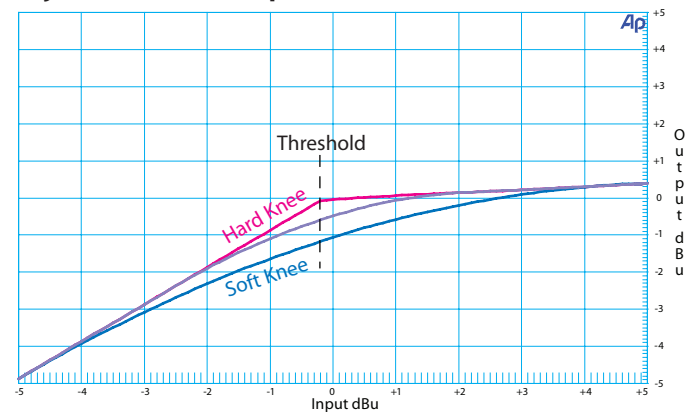


True De-essing with Dynamic EQ



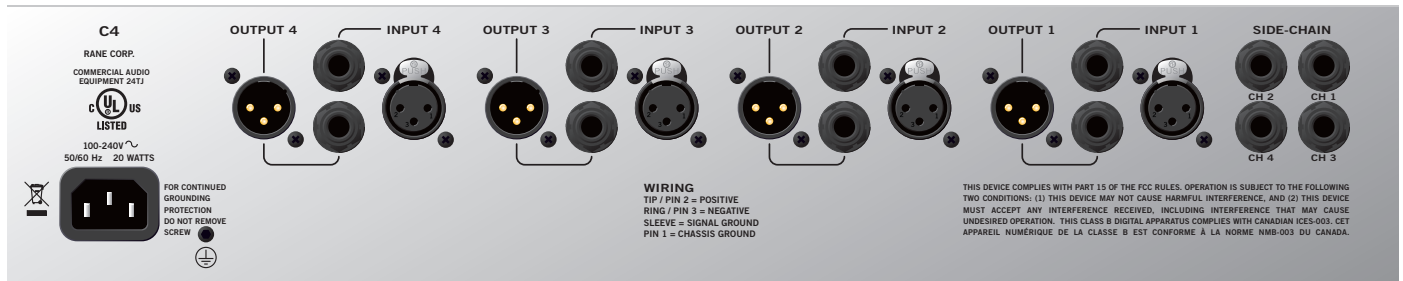
The C4 uses a relative threshold approach to dynamic EQ to ensure precise, predictable performance. Unlike traditional de-essers, which simply use an EQ boost in the side-chain to increase the compressor's sensitivity to high frequencies, the C4 actually determines the amount of sibilance present in the program material and compares it to the overall signal content. The benefit to this approach is that de-essing depends only on the relationship between sibilant sound and the broadband (full-range) sound, and is not affected by changes in absolute level. The result: sizzly sounds are successfully subdued during soft or strident sections. A de-essing 'preset' in each channel is found by aligning the controls to the triangles ▼.

Adjustable Knee Compression

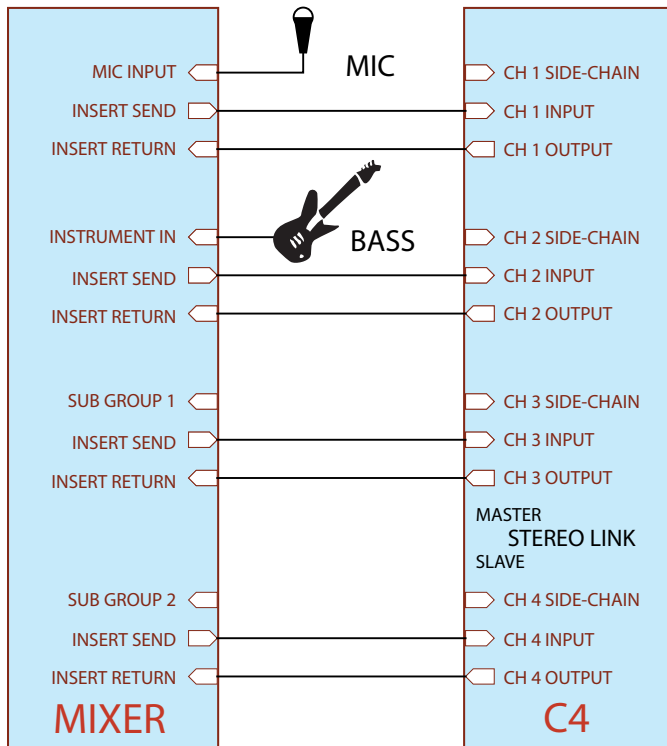


The adjustable KNEE setting provides full control over how the compressor transitions from unity gain to maximum compression. Softer knee settings are preferred when compressing vocals or an overall music mix, while harder knee settings work better for bass and drums, for instance.

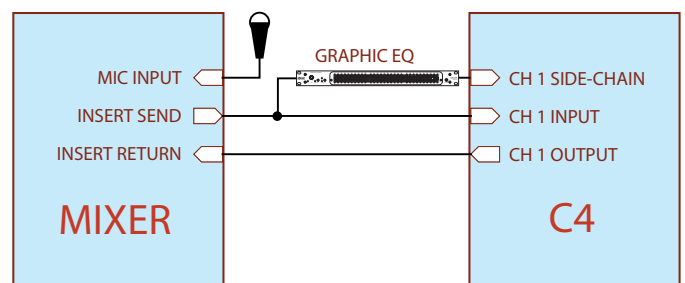
Rear Panel



Applications



Connection to a mixing console.



Using an external equalizer in the side-chain.