

General Description

The Rane Model DC 24 Dynamic Controller is a two channel Compressor, Limiter, Expander Gate system with very unusual attributes. The DC 24 offers unprecedented control of its operating parameters as well as a built-in 24 dB/octave Linkwitz-Riley Crossover which gives it very impressive capabilities.

Total freedom from control interaction highlight the DC 24 as well as the availability of separate Compressor and Limiter controls. The Compressor offers control over both Ratio and Threshold, while the Limiter allows setting a separate Threshold. In doing this, the DC 24 allows the operator to create a smooth transition between subtle compression over a wide dynamic range and peak-stop limiting at the sound system's highest allowable level. If that's not enough, the DC 24 also offers independent Expander/Gate Ratio and Threshold controls. This third level of signal manipulation makes the DC 24 a most useful and revolutionary device.

Attack and release times are automatic and program dependent. This simplifies use of the DC 24, as these subtle controls can confuse most users. History has proven that experienced compressor users rarely miss these controls after using a DC 24.

The internal Crossover allows the DC 24 to operate as a two-way speaker dividing network along with all of the dynamic characteristics of a fully featured Compressor Limiter. In addition to this application, the DC 24 supplies the necessary circuitry to allow the unit to divide a single channel of audio information in two separate frequency ranges and to then recombine the program material into one Channel. Using the DC 24 in this way eliminates the pumping and breathing associated with compression and limiting when only one Channel is used to cover the entire audio spectrum.

Refer to "*The DC 24 User's Guide*," on the Rane website, for an easy-to-understand guide of operation and applications.

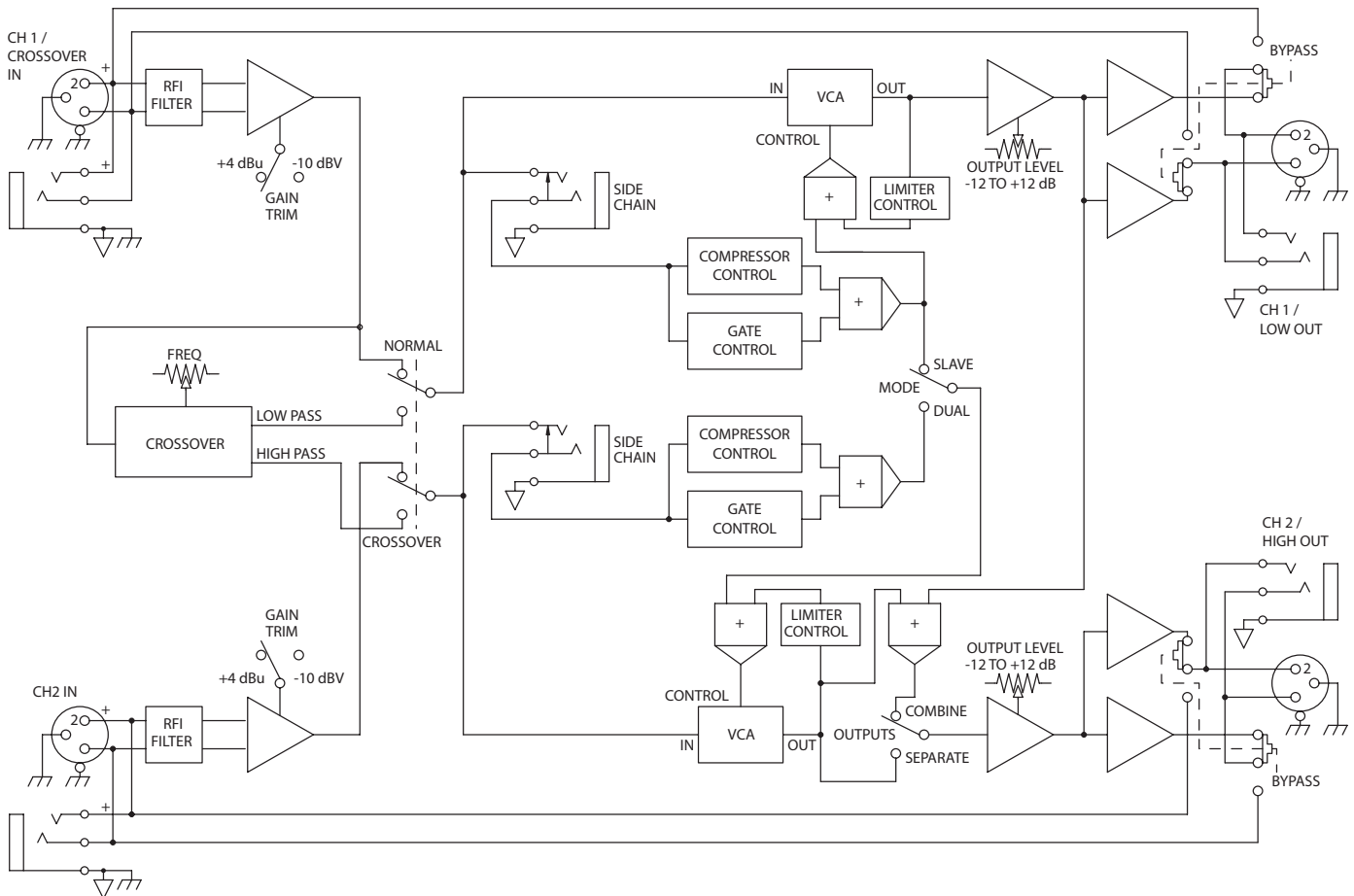
Features

- Ratio & Threshold Controls for Compressor and Gate/Expander
- Limiter Threshold Controls
- Program Dependent Attack & Release
- Linkwitz-Riley Crossover with 24 dB per Octave Slopes
- Low-High Crossover Mode (1 In/2 Out)
- Bandsplit Combine Mode (1 In/1 Out)
- Stereo/Dual Modes (2 In/2 Out)
- Side Chain Insert Jacks
- Balanced XLR & 1/4" TRS Connectors
- -10 dBV / +4 dBu Gain Switch
- UL/CSA Remote Power Supply (120 VAC)
- CE (Low Voltage & EMC) Remote Power Supply (230 VAC)

DYNAMIC CONTROLLER

Parameter	Specification	Limit	Units	Conditions/Comments
Compressor				
.....Threshold Range	-50 to +20	5	dB	
.....Ratio Range	1:1 to 10:1	10	%	
Expander / Gate				
.....Threshold Range	-50 to +10	5	dB	
.....Ratio Range	1:1 to 20:1	10	%	
Limiter				
.....Threshold Range	-20 to +20	2	dB	
Crossover				
.....Type	Linkwitz-Riley 4th-order			24 dB per octave slopes
.....Range	70 Hz to 7 kHz	5	%	41-detent continuously variable pot
Inputs: Type	Active Balanced / Unbalanced			
.....Connectors	XLR & + ¼" TRS			
.....Impedance	20k	1%	Ω	
.....Maximum Level	+20	1	dBu	
Outputs: Type	Active Balanced			
.....Connectors	XLR & + ¼" TRS			
.....Impedance	100	1%	Ω	Each output
.....Maximum Level	+26	1	dBu	2 kΩ or greater
	+20	1	dBu	600 Ω or greater
Overall Gain Range	-12 to +12	±1	dB	Center detent unity gain
RFI Filters	Yes			
Passive Bypass Switch	Yes			
LED Thresholds: Overload	+22	1	dBu	Output or any internal level
.....Signal Present	-40	3	dBu	Input Level
Frequency Response	20 Hz to 20 kHz	+0/-5	dB	
THD+Noise	0.05	.01	%	+4 dBu, 1 kHz
IM Distortion (SMPTE)	0.1	.01	%	60 Hz / 7 kHz, 4:1, +4 dBu
Signal-to-Noise Ratio	108	2	dB	Unity Gain re +20 dBu, 20 kHz BW
	92	2	dB	Unity Gain re +4 dBu, 20 kHz BW
Unit: Agency Listing				
.....120 VAC model	Class 2 Equipment UL & CSA			National Electrical Code Exempt Class 2 equipment
.....230 VAC model	CE-EMC CE-Safety			EMC directive 89/336/EEC Exempt per art. 1, LVD 73/23/EEC
Power Supply: Agency Listing	Rane model RS 1			Class 2 Equipment
.....120 VAC model	UL CSA			File no. E88261 File no. LR58948
.....230 VAC model	CE-EMC CE-Safety			EMC directive 89/336/EEC LV directive 73/23/EEC
.....100 VAC model	Built to JIS			Japan only
Power Supply Requirement	18 VAC w/center tap	0.1	Vrms	
Maximum Current	600		mA	RMS current from remote supply
Unit: Construction	All Steel			
.....Size	1.75"H x 19"W x 5.3"D (1U)			(4.4 cm x 48.3 cm x 13.5 cm)
.....Weight	5 lb			(2.3 kg)
Shipping: Size	4.5" x 20.3" x 13.75"			(11.5 cm x 52 cm x 35 cm)
.....Weight	9 lb			(4.1 kg)
<i>Note 1: 0 dBu=0.775 Vrms</i>				
<i>Note 2: Unless otherwise stated, all measurements made with Thresholds set at maximum, Ratios set at minimum.</i>				

Block Diagram



Architectural Specifications

The dynamic processor shall be a two (2) channel unit, each channel of which provides independent control over its gating, compression and limiting functions. The gating function shall provide a means for setting the gate threshold as well as the ratio of the function thus providing a means for gentler slopes to occur such as one would expect to find in an expander.

The compressor shall also provide a means for setting threshold and ratio independently. The limiter shall also provide a means for setting its operational threshold, but shall differ from the other two functions in that limit ratio shall be a function of limit level.

All attack and release characteristics provided by the dynamic controller shall be a function of the current program material, thus providing a high level of transparency to the listener.

The dynamic processor shall provide an active crossover circuit for the purpose of using the unit to drive amplifiers connected to two-way loudspeaker systems as well as for dividing a single channel audio source into two frequency bands for ul-

mate recombination at the outputs of the device. The crossover shall be a fourth-order Linkwitz-Riley type configuration.

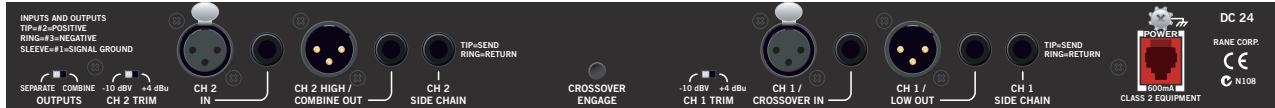
Passive bypass switches shall be provided to ensure total bypass of the unit's active circuitry in the event of power failure. The inputs and outputs shall be active balanced/unbalanced designs terminated with XLR & 1/4" TRS connectors. The side-chain send and receive connectors shall be 1/4" unbalanced types, wired tip=send, ring=return.

RFI filters shall be provided at the processor's inputs. LEDs shall be provided to indicate the presence of an input signal as well as high level overload conditions.

The unit shall be exempt from agency safety requirements and powered from a UL listed / CSA certified remote power supply (120 VAC), or CE approved (230 VAC) via a rear panel input modular plug. The unit shall be entirely constructed from cold-rolled steel, and mount into a standard EIA relay rack occupying 1 rack space.

The unit shall be a Rane Corporation Model DC 24.

Rear Panel



Application Information

Traditionally, a product such as the DC 24 has been referred to as a “Compressor / Limiter” because the range of the Ratio control on the Compressor has been wide enough to accommodate both gentle compression and harder limiting effects. Not, however, simultaneously. One had to make a choice between the two modes of operation. On some models a Gate has been provided which may or may not be part of the Compressor function.

In the DC 24, all three functions of each channel are independent. Gating may occur when low-level signals are present, compression may occur when the level increases, and “peak-stop” limiting is available for high-level signals. This provides a three slope capability which is rather unique in the audio industry.

Additionally, the DC 24 can help out a great deal on the low end of the amplitude spectrum by serving as a noise gate simultaneously. The Compressor may be used to “tighten” vocals and instrumentals while leaving the Limiter function available for use as a safety valve.

To accomplish this feat, the DC 24 provides three separate “Side Chains” in each Channel, each having its own set of front panel controls. For the Gate / Expander function, input signal is converted from an audio format to a control signal and applied to the threshold circuit. If the output of the controller is below the specified threshold, it is passed along to the Gate / Expander Ratio control. The Ratio control allows attenuation of the controller to inhibit the slope of the Expander. After this attenuation, the control signal is delivered to the Channel’s control summing amplifier where it will meet similar signals generated by the Compressor control system.

The Compressor controller works remarkably similarly to the Gate, the exception being the polarity. While the Gate circuit reduces gain when input level decreases below Threshold, the Compressor decreases gain when input increases above Threshold. The Compressor also receives the output of the controller, applies it to its threshold determinator, and passes the signal

to the ratio attenuator if threshold conditions are satisfied. The output of the Ratio control is applied to the summing amplifier referenced in the gate section.

Side Chain inserts have been provided on the rear of the unit to allow the insertion of an equalizer into the control circuits of the Gate and the Compressor. This will allow the user to create a frequency-dependent threshold for the Gate and/or the Compressor. This feature is useful when attempting to control sibilance in vocals.

The Limiter operates in an entirely different manner than the preceding sections. The control circuit for the Limiter monitors the output of the VCA, not the input of the unit. Anytime the output of the VCA exceeds the Threshold set on the front panel, Limiting begins to take place. The ratio of the Limiter is set automatically and is a function of the excess level the system is attempting to deliver above the preset Threshold. The attack and release time of the Limiter is a function of the speed at which the input signal is attempting to drive the output of the unit above the Threshold level.

The Crossover function of the DC 24 is based on Rane’s time-proven 4th-order state-variable Linkwitz-Riley design. This yields a 24 dB per octave slope and an in-phase characteristic. Since the outputs are in phase with each other, they recombine properly when the channel summing mode is selected via the rear panel Separate/Combine switch.

In its band-split mode, the DC 24 allows separate processing of low frequencies and high frequencies; a mode which makes its operation all the more transparent. When the Crossover is used in conjunction with a two-way loudspeaker system, adequate driver protection may be ensured while providing a very flexible means of program manipulation.

For a better view of the various operational modes, refer to “*The DC 24 Users Guide*” RaneNote, from the Rane website.

Available Accessories

- SC 1.7 Security Cover