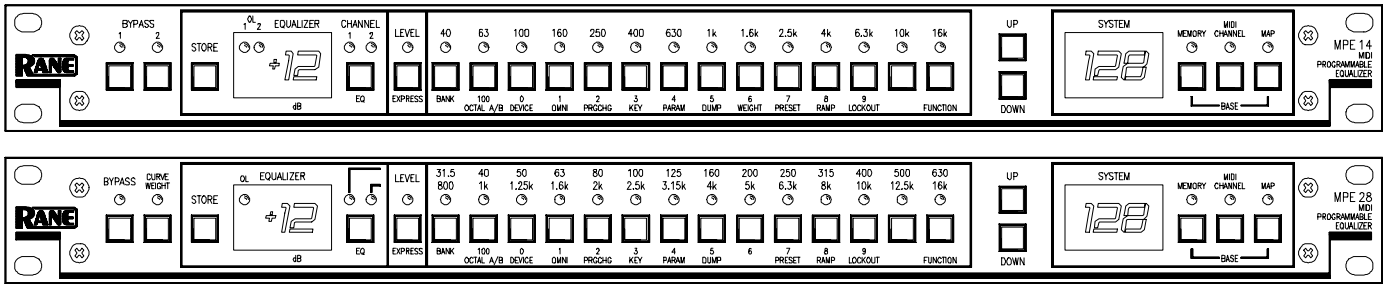


MPE 14 & MPE 28 MIDI Programmable Equalizers

General Description

The MPE 14, two-channel, 14-band, 2/3-octave, and the MPE 28, one-channel, 28-band, 1/3-octave MIDI programmable equalizers begin a generation of automated signal processing from Rane Corporation.

Sound Contracting Presets can be stored for varying room configurations, and recalled via front panel, or external contact closures with the Rane RPS 4 Remote Program Selector (converting switch closures to MIDI program change commands). Access security can be maintained in two levels of front panel lockout.

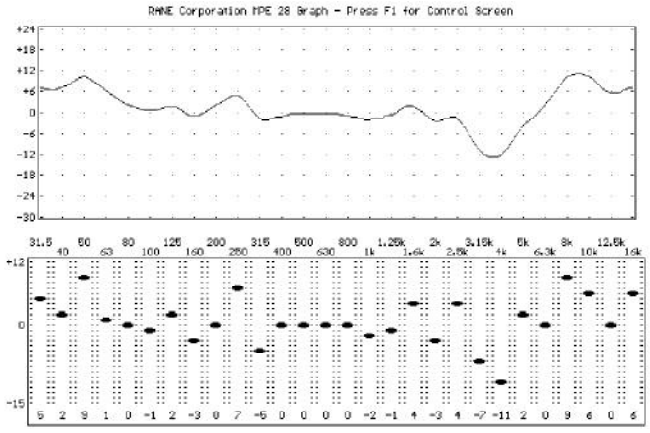
Live Performance: The MPE series interface to any MIDI controller or sequencer, allowing not only program changes, but also curve modification in real time through the use of MIDI System Exclusive (SYSEX) messages.

MIDI Studios: Not only can the MPEs overcome deficiencies in synthesizer and drum machine voices, they also add a new musical dimension: *Expression*. The MPEs respond to expression controllers such as MIDI continuous controllers or channel pressure aftertouch. This feature allows dynamic control and continuous modification of the EQ curve. Bend your bass or tweak your treble; it's now at your fingertips, in real time.

The MPEs are digitally controlled analog equalizers. Start with Rane's proven equalizer performance. Put it under the powerful control of a 16-bit, 16MHz microcontroller. Program the microcontroller to provide full MIDI implementation, including SYSEX. Add it all together and you get an unbeatable programmable equalizer. The MPEs utilize Rane's exclusive Interpolating Constant-Q filter technology. The same design used in the commercial grade model GE 30 for smooth, consistently accurate performance, and minimum interaction. The MPEs are fitted with fully balanced Inputs and Outputs using both 3-pin and ¼" TRS connectors.

The MPEs allow the user to store 128 equalization curves recalled by either the front panel controls, MIDI commands, another MPE, a Rane RPS 4, or from a computer. DOS software is available from the factory (at no charge) that allows graphic editing of the MPE. Other software companies produce MPE Editor/Librarians, such as Opcode Systems (Galaxy) and Mark of the Unicorn (Unisyn and X-oR).

The MPEs also feature decimal and octal program display, program mapping, curve weighting, ramping, copying, and a wealth of usable factory EQ presets. Please consult the **MPE Users Guide** (available upon request) for further information on these and other advanced features.



Rane MPE 28 Editor DOS Program Screen

Features

- **128 MEMORIES WITH DIRECT RECALL**
- **REALTIME DYNAMIC CONTROL VIA MIDI**
- **CURVE COMPARE, WEIGHTING & COPYING**
- **"SNAPLESS" EQ CURVE RAMPING**
- **MIDI SYSEX CURVE EDITING**
- **SEPARATE EQ AND SYSTEM DISPLAYS**
- **INTERPOLATING CONSTANT-Q FILTERS**
- **+12/-15dB RANGE IN 1dB STEPS**
- **INDIVIDUAL BYPASS SWITCHES**
- **BALANCED 3-PIN & ¼" IN/OUT**
- **NON-VOLATILE MEMORY**
- **TWO-LEVEL ACCESS SECURITY SYSTEM**
- **UL/CSA REMOTE POWER SUPPLY**
- **DOS EDITOR PROGRAM AVAILABLE**

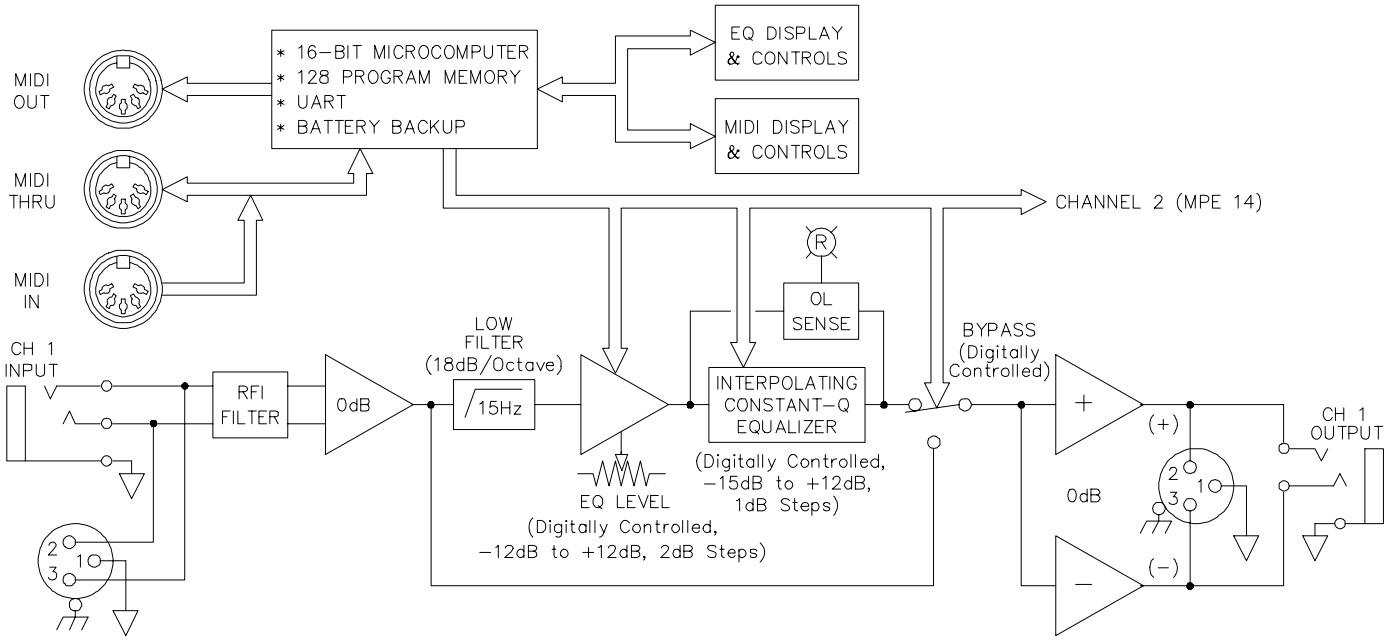
MPE 14 & MPE 28

Professional Audio Products Data Sheet

PROGRAMMABLE EQUALIZERS

Parameter	Specification	Limit	Units	Conditions/Comments
Equalizer: Channels	(2) MPE 14; (1) MPE 28			
.....Bands: MPE 14	(14) 2/3 Octave ISO Spacing			40Hz to 16kHz
..... MPE 28	(28) 1/3 Octave ISO Spacing			31.5Hz to 16kHz
.....Type	Interpolating Constant-Q			
.....Accuracy	3		%	Center Frequency
.....Range	+12/-15	1	dB	1 dB Step Size
.....Program Memories	128			
Inputs: Type	Active Balanced/Unbalanced			
.....Connectors	3-Pin & ¼" TRS			
.....Impedance	15k	1%	•	
.....Maximum Level	+20	1	dBu	
Outputs: Type	Active Balanced/Unbalanced			
.....Connectors	3-Pin & ¼" TRS			
.....Impedance	200	1%	•	Balanced:100• Each Output
.....Maximum Level	+20	1	dBu	
Overall Level Range	±12	2	dB	2 dB Step Size
RFI Filters	Yes			
Memory Battery Life	3	50%	Yrs	Ray-O-Vac BR2325, or equal
MIDI Xmit/Rcv Buffer Size	5,000		Bytes	
Bypass Switches	Yes			Each Channel Separate
Overload LED Thresholds	+16	1	dBu	Output or any Internal Level
Low Filter	15Hz, 18dB/Oct, Butterworth	3%	Hz	
Frequency Response	15-45kHz	+0/-3	dB	
THD+Noise	0.008	.001	%	+4dBu, 20-20kHz
IM Distortion (SMPTE)	0.009	.002	%	60Hz/7kHz, 4:1, +4dBu
Signal-to-Noise Ratio	MPE 14/MPE 28 re +20dBu			20kHz Noise BW, Balanced
	108/104	2	dB	All Bands Centered, Unity Gain
	103/98	2	dB	All Bands Centered, Max Gain
	100/95	2	dB	All Bands Full Cut, Unity Gain
Channel Separation (MPE 14)	75	3	dB	40-20kHz
Power Supply Input	18-24VAC w/center-tap	10%	Vrms	Proposed AES RAP Standard
Power Supply Connector	6-pin mod plug			Wired per above
Safety Agency—Unit				
.....Classification	Class 2 Equipment			National Electrical Safety Code
.....Design	Safety Extra-Low Voltage			VDE SELV
.....U.L. Listing	U.L. 813 Exempt			Class 2
.....C.S.A. Certification	C22.2 No. 1 Exempt			Class 2
.....CENELEC	IEC 65 Exempt			Harmonization Doc. HD 195.S4
—Remote Power Supply				Class 2 Equipment
.....U.L. Listed	E90493			UL 1012
.....230VAC Export Model	Meets requirements of IEC 950			TUV Approved
EMI/RFI Emission Levels	FCC Part 15 Compliance			Class A Digital Device
	Satisfies VDE 0871			Class A Digital Device
Maximum Current	500		mA	RMS Current From Remote Supply
Unit: Construction	All Steel			
.....Size	1.75"H x 19"W x 8.5"D (1U)			(4.4cm x 48.3cm x 21.6cm)
.....Weight	6 lb			(2.7 kg)
Shipping: Size	7" x 22" x 13"			(18cm x 56cm x 33cm)
.....Weight	11 lb			(5.0 kg)
Note: 0dBu=0.775Vrms				

Block Diagram



Application Information

Using a Rane MPE programmable equalizer is really no different than using any conventional equalizer. It hooks-up the same, and you use it the same. The main difference is you use pushbuttons instead of sliders. Another difference, of course, is that up to 128 different curves may be set and stored for recall at a later time. Recalled either directly using the front panel, or remotely, using another MPE, contact closures with a Rane RPS 4, or MIDI commands. And the MIDI program number is displayed in either decimal or octal format. Your choice.

Different also is the ability to program the step size required to go from one curve to another. By ramping between curves you avoid the "snap" often associated with abrupt EQ changes. This curve ramping feature operates similarly to "dissolve" in slide and video productions.

And, of course, another difference is the curve-weighting feature. With this you can modify any new curve by a preset curve—either factory set, or your own. So, for instance, if you want the high-end rolled off, all you do is flatten the system then apply the curve-weighting function to automatically adjust the roll off.

Then there is the two-level security system built into all MPEs. The first level allows users to select Stored Memories, but not to edit them; the second level prevents all changes. This feature alleviates many of the late-night and early Sunday morning service calls.

And lastly, there's SYSEX. The MIDI system exclusive remote curve editing capability allows one MPE to program another MPE, or as many MPEs as you want. Used this way, any MPE may be designated as a master unit and all others as slaves. This opens up a whole new world of remote control capabilities. The other possibility, using the powerful MPE SYSEX code, is to allow anyone with the proper equipment and programming ability to manipulate all curve parameters in real time. Rane provides an MPE Editor for DOS (at no charge) that allows graphic editing on a PC with a MIDI interface card (laptops can be fitted with a MIDIator serial-to-MIDI converter). Third party companies also provide MPE support for Macintosh and Windows™ users.

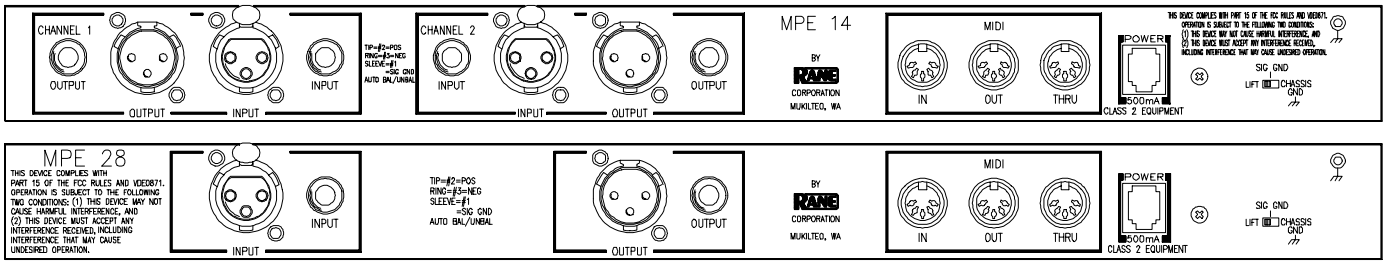
Please see the **MPE Users Guide** for advanced application information.

MPE 14 & MPE 28

PROGRAMMABLE EQUALIZERS

Professional Audio Products Data Sheet

Rear Panels



Architectural Specifications

The programmable equalizer shall consist of one or two channels; each channel shall have 14 or 28 bands, spaced on ISO centers from 31.5Hz to 16kHz and be 1/3 or 2/3-octaves wide—all as specified elsewhere. The amplitude control range of each band shall be +12dB and –15dB, adjustable in 1dB steps. The overall level range shall be ±12dB, adjustable in 2dB steps. Individual bypass switches shall be provided for each channel.

The inputs and outputs shall be active balanced/unbalanced designs terminated in 3-pin and parallel ¼" tip-ring-sleeve (TRS) connectors. The input impedance shall be 15k ohms, while the output impedance shall be 200 ohms, balanced. Both shall be capable of processing audio signal levels of a maximum of +20dBu. RFI input filters shall be provided. A low filter shall exist with 18dB/octave slopes and a corner frequency of 15Hz. The frequency response of the unit shall be 3dB down at 15Hz and 45kHz respectively.

MIDI In, Out and Thru jacks shall be provided. All controls shall be rubber-based pushbutton switches. Two digital displays shall exist, one using green LED digits for displaying amplitude information, and a separate red LED display for system information.

The unit shall be exempt from agency safety requirements and powered from a UL listed remote power supply (120VAC), or meet IEC 950 requirements (230VAC) and conform to the proposed AES RAP-6 design via a rear panel input red modular plug. The unit shall be constructed entirely from cold-rolled steel, and mount into a standard EIA relay rack occupying 1U space.

The unit shall be a Rane Corporation Model MPE Programmable Equalizer.

Available Accessories

- **RPS 4 Remote Program Switcher**
- **RWS 4 Remote Wall Switch (requires RPS 4)**
- **DOS MPE Editor Programs (versions available for MPE 28 and MPE 14).**

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