

## Description

The ECM 64e Conference System is part of Rane's Engineered Conference System (ECS) line of professional audio products. When all you have is a small conference room requiring four mics, two line-level devices and a telephone, and you want the best in full duplex conferencing, the ECM 64e is the product of choice. Like Rane's larger conference system, the ECB 62 and ECM 82, the ECM 64e is flexible in many different applications. The ECM 64e can work on its own for presentation and conference rooms, or as an add-on for the larger ECS.

## Features

- 4 Programmable Mic or Line-level Inputs
- 2 Programmable Balanced Line-level Inputs
- 3 Programmable Balanced Line-level Outputs
- 6 Channels of Matrix Mixing
- Separate Routing Functions for Each Output
- Pink Noise Source Selection for Each Output
- Level Meter for all Inputs and Outputs
- Optional Acoustic Echo Canceller Module (ECA 2)
  - Noise Gate with adjustable Gate Depth
  - Adjustable Echo Suppression
- Optional Digital Hybrid Module (DH 1e)
- RS-232 Control System Connection using Rane's RW 232
- RaneWare control (under Windows 95 and 98SE®)
- Front Panel Control of Output One's Level and Off-Hook
- Front Panel Lock Selection
- 1 Working and 16 Non-Volatile Memories
- 4 External Control Inputs for MRP (Memory Recall Port)
- Firmware Updates via RW 232
- External Control Inputs for Off-Hook, Privacy, Volume Up, Volume Down, and Mute
- External Open Collector Status Outputs for Off-Hook, Privacy, Mute, and Ring

The ECM 64e has six inputs and four outputs, and is basically four independent six channel matrix mixers. All audio inputs and outputs use Euroblock type connections. All audio connections use Euroblocks. All Inputs are balanced except for the external AEC Reference which is unbalanced.

### Inputs include:

- Four programmable mic or line-level Inputs with rear panel selectable phantom power that are mixed to one audio mix, called Mic Mix
- Two programmable line-level Inputs called Line In and Aux In
- A selectable external AEC Reference.

### Outputs include:

- Three programmable balanced Outputs.
- Two unbalanced outputs (AEC Reference Out and AEC Out).
- When installed, the optional Digital Hybrid (DH 1e) becomes the fourth programmable Output.

There are two optional modules for the ECM 64e, the DH 1e and the ECA 2. The DH 1e is a Digital Hybrid and allows for connecting to a Plain Old Telephone Service (POTS), also called a two-wire phone line. The ECA 2 is an Acoustic Echo Canceller module, required when using the ECM 64e for conferencing applications. Using optional modules gives the system designer more applications flexibility. By ordering the ECM 64eAD, both of these modules are factory installed.

The ECM 64eAD supports both two-wire and four-wire audio connections. Two-wire connections use standard telephone lines. A two-wire line consists of one balanced audio line used for both the transmit and receive audio paths. A four-wire connection uses separate audio pairs for the transmit and receive audio paths. Devices such as a video codec, audio over ISDN (like the Telos Zephyr™) and personal computers that support Voice Over IP use four-wire audio connections.

The ECM 64eAD can operate as a standalone conference system by itself, with switch closures using the MRP/EXT Port, or with a personal computer running RaneWare® or with a RS-232 based control system like Panja or Crestron.

To operate the ECM 64eAD by itself, just connect microphones, a speaker, a telephone line, and a telephone set for dialing. From the front panel, use the OFF HOOK button to connect and disconnect the ECM 64eAD to and from the phone line, and use the VOLUME buttons for Program level.

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**ECM 64e Applications**

For simple external control, using switch closures, use the MRP/EXT (DB-15 female) connector on the rear panel. From this connector memories can be recalled and some control functions can be performed. Control functions on this connector include Off Hook, Privacy, Volume Up and Down and Mute. Status signals are also available from this connector which include Off Hook, Privacy, Mute and Ring.

Full control of the ECM 64e, including programming, DTMF dialing and receiving status signals are available via the rear panel RW 232 port. This port can interface directly to any RS-232 port on a personal computer or control system.

Status LEDs on the front of the ECM 64e indicate Input and Output Signal present and Overload conditions, Off Hook (OH), Ring (RNG), Privacy (PRV), Mute (MUT), Auto-Answer (AA), a monitored input or output Level Meter, RW 232 communication (COM) and Power.

Front panel controls include Mic Gain switches for Line or Mic inputs, OFF HOOK to connect to and disconnect from a telephone call, VOLUME DOWN and UP to control Program (OUT 1) level, and PORT STEP to select which Input or Output to monitor on the LEVEL Meter.

- ECM 64e by itself - Small presentation room requiring a programmable audio system with up to four microphones, two line inputs and three outputs. *Combined with a Rane SRM 66, the ECM 64e makes a great audio system for hotel room combining.*
- By installing the DH 1e, the ECM 64e becomes a digital hybrid to interface with a standard POTS type telephone line. *This is also a useful add-on to the larger ECS (ECB 62 with an ECM 82a).*
- By installing the ECA 2, the ECM 64e becomes an audio system for a small video conference room connected by a four-wire device, such as a video codec or a personal computer that supports Voice Over IP.

**ECM 64eAD Applications**

- Small conference room requiring full duplex conferencing over a standard POTS type telephone line.
- Small conference room requiring full duplex conferencing with a four-wire device, such as a Video Codec or a personal computer that supports Voice Over IP.
- Small conference room requiring full duplex conferencing with both a standard POTS type telephone line and a four-wire device.

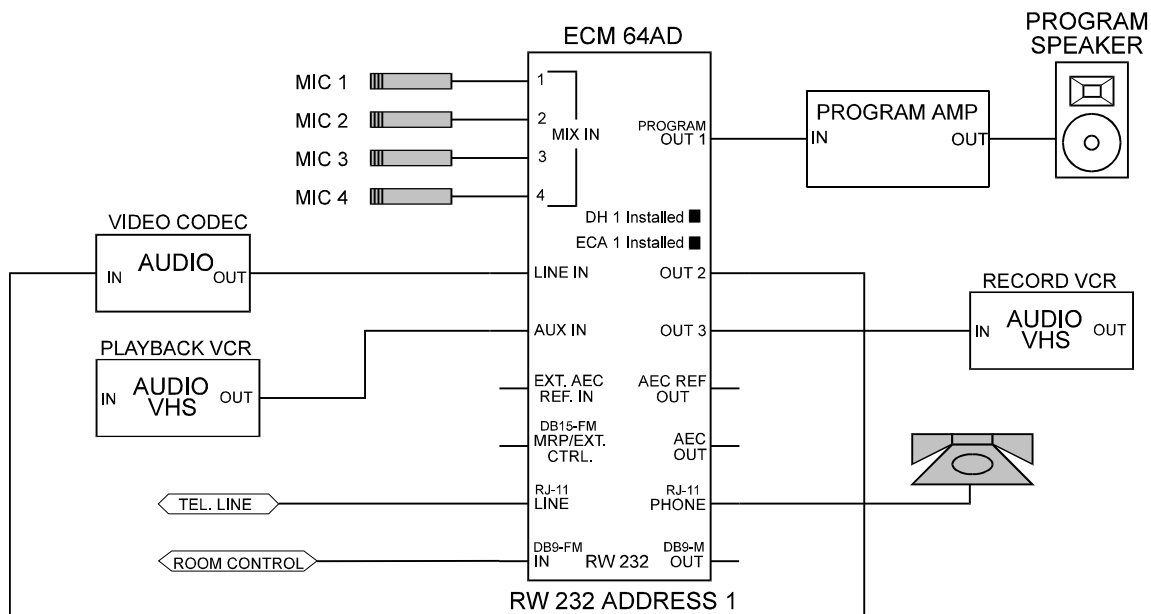
**Non-Volatile Memories**

Batteries not included. All memories are stored in an Electrically Erasable Prom (EEPROM) with a data retention of 200 years. Stored Memories may be recalled by remote switch contact closures using the Memory Recall Port (MRP) or RS-232. The translation between switch closure and the 16 Memories is programmable. Current settings, called working memory, are also non-volatile. Selecting a memory transfers its contents to working memory.

**Typical ECM 64eAD installation**

The ECM 64eAD is preprogrammed to operate out of the box using the following system configuration:

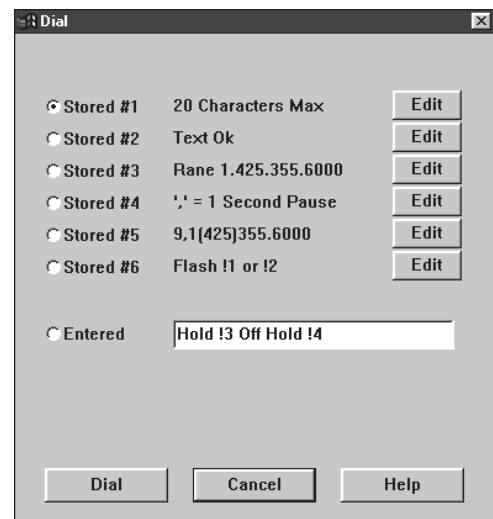
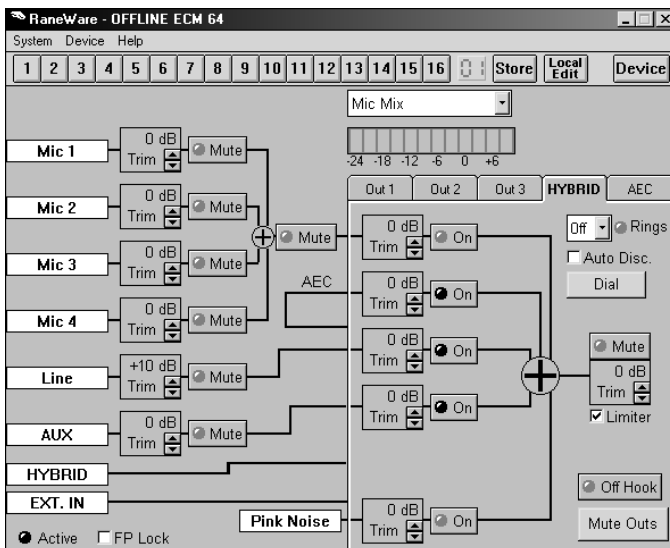
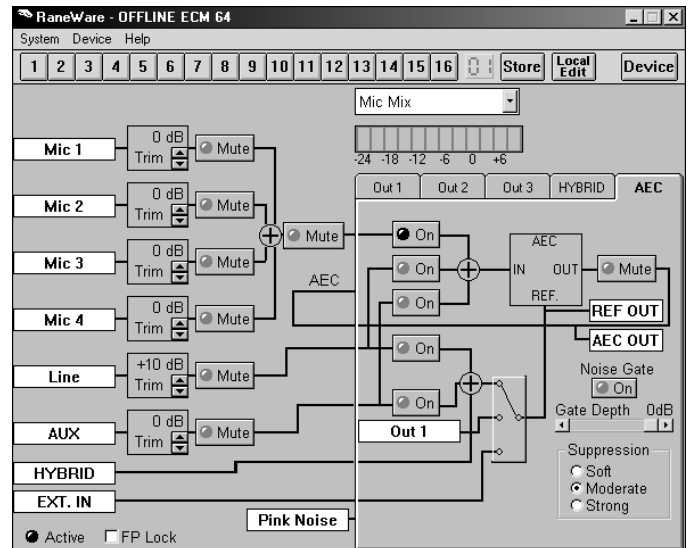
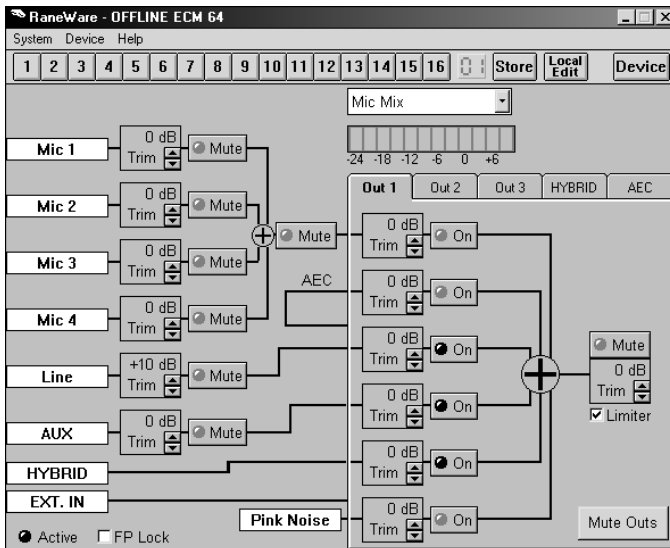
- Mix In routed to the AEC In
- Out 1 is used for the room speakers and the AEC Ref.
- Line In, Aux In and Hybrid routed to Out 1 (Program)
- AEC Out, Aux In and Hybrid routed to Out 2 (video codec)
- Mix In, Line In, Aux In and Hybrid routed to Out 3 (VCR)
- AEC Out, Line In and Aux In are routed to the Hybrid



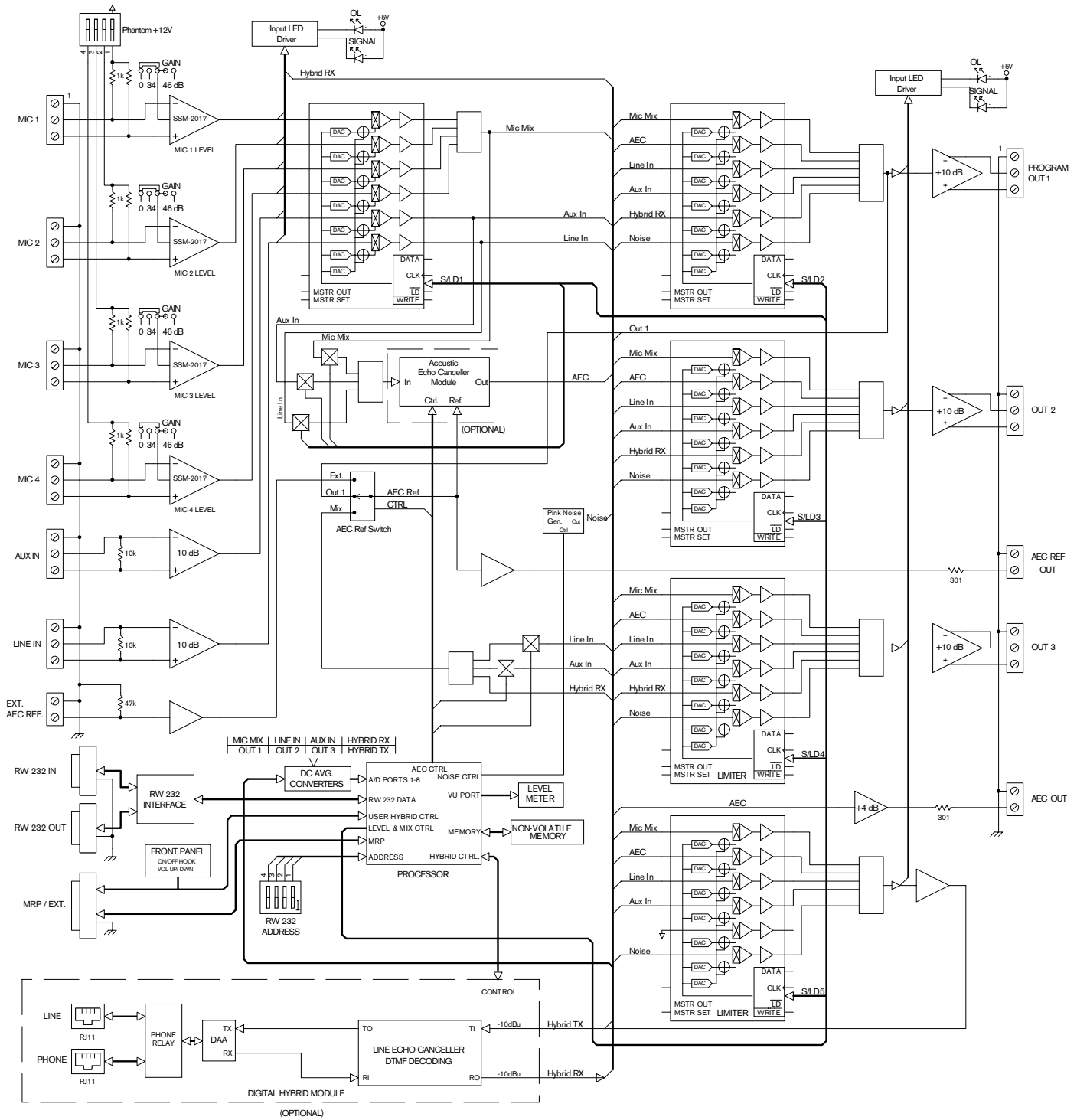


### RaneWare®

Rane's software called **RaneWare (under Windows 95 and 98SE)**, is included at no extra cost, allowing the units to be controlled in real time. RaneWare is available free from Rane's website, [www.rane.com](http://www.rane.com). The software's easy-to-use graphical interface features control of all parameters, and extensive on-line help. Memories may be recalled, copied, and stored. A Site Control window is provided with password protection so that all units can recall stored memories without further access. *Local Edit* mode allows parameters to be viewed and edited without affecting a unit. These parameters can then be sent to a unit or saved in a file. The software is operational even without an ECM 64e connected, using an offline device. The Rane RPD 1 may be used to control the ECM 64e from a remote location using a modem. Also the Rane Via 10 Ethernet Bridge allows remote control of the ECM 64e over a 10Base-T Ethernet.



# ECM 64e Block Diagram



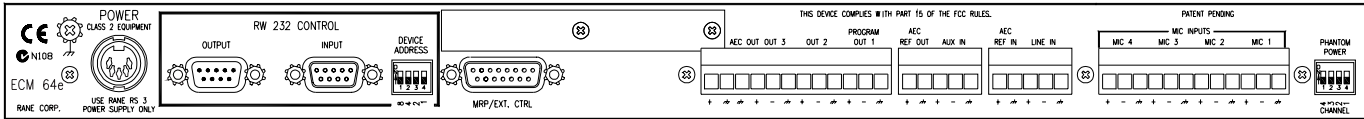
## ECA 2 Specifications

Parameter	Specification	Limit	Units	Conditions/Comments
DSP Adaptive Acoustic Echo Canceller				
Frequency Response	40 up to 20,000		Hz	
Audio Processing Delay	<3		ms	Local to Remote Output
Tail Length	> 150		ms	
Total Echo Cancellation	Up to 60		dB	Receive State only
Adaptive Echo Cancellation	45		dB	
Shipping: Size	6.5" x 5.0" x 2.5"			16.5 cm x 12.5 cm x 6.5 cm
.....Weight	2 lb			0.9 kg

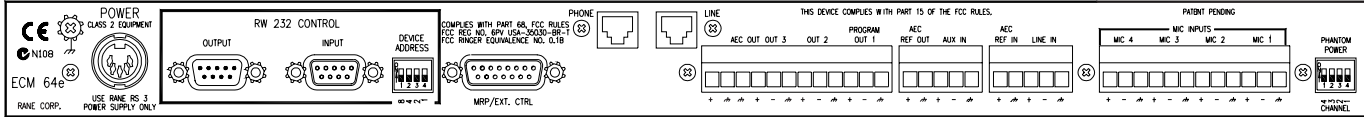
## ECM 64e Features and Specifications

Parameter	Specification	Limit	Units	Conditions/Comments
<b>Mic Inputs:</b> Type	Active Balanced			
.....Connectors	Euroblock			
.....Impedance	1.67k	1%	ohms	
.....Phantom Power	12	V		10 mA / Selectable
.....Signal LED Threshold	-25	2	dBu	Mic Levels @ 0 dB
.....Overload LED Threshold	11	2	dBu	Mic Levels @ 0 dB
.....Maximum Level				Input Levels set to -15 dB
.....@ 0 dB	12		dBu	
.....@ 34 dB	-22		dBu	
.....@ 46 dB	-34		dBu	
<b>Line Inputs:</b> Type	Active Balanced			
.....Connectors	Euroblock			
.....Impedance	10k	1%	ohms	
.....Signal LED Threshold	-19	2	dBu	
.....Overload LED Threshold	17	2	dBu	
.....Minimum Level	-19		dBu	Input Levels @ +16 dB
.....Maximum Level	18		dBu	Input Levels @ -15 dB
<b>Line Outputs:</b> Type	Active Balanced			Cross-coupled
.....Connectors	Euroblock			
.....Impedance	50	1%	ohms	
.....Signal LED Threshold	-19	2	dBu	Output Levels @ 0 dB
.....Overload LED Threshold	18	2	dBu	Output Levels @ 0 dB
.....Maximum Level	21		dBu	Output Levels @ +4 dB
.....Limiter: Threshold	5 dB above set Output Level	1	dB	
.....Attack Time	10		ms	1 dB step
.....Release Time	50		ms	1 dB step
<b>System</b>				
THD & Noise	<0.05	.05	%	+4 dBu, 20-20k Hz (80 kHz BW)
Signal-to-Noise Ratio	>80	2	dB	Inputs @ 0 dB, Outputs @ +4 dB
Crosstalk	>70	3	dB	@ 1 kHz
<b>Unit:</b> Agency Listing				
.....120 VAC Model	Class 2 Equipment UL / CSA			National Electrical Code Exempt Class 2 equipment
.....230 VAC Model	Certified FCC part 15J CE-EMC CE-Safety			Class B Device EMC Directive 89/336/EEC Exempt Art. 1 of LVD 73/23/EEC
<b>Power Supply:</b> Agency Listing				
.....120 VAC Model	UL CSA			File no. E137895 File no. LR53696-75
.....230 VAC Model	CE-EMC CE-Safety			EMC Directive 89/336/EEC LV Directive 73/23/EEC
<b>Power Supply:</b> Input	95-250 VAC			IEC line cord jack
.....Output	+5 VDC, 5.0 A -12 VDC, 1.5 A +12 VDC, 0.8 A Return			Pin 3 Pin 4 Pin 5 Pins 1 & 2
<b>Unit:</b> Construction	All Steel			
.....Size	1.75" H x 19" W x 8.5" D (1U)			(4.4 cm x 48.3 cm x 21.6 cm)
.....Weight	6 lb (w/o power supply)			(2.7 kg)
<b>Shipping:</b> Size	4.5" x 20.3" x 13.75"			(11.5 cm x 52 cm x 35 cm)
.....Weight	11 lb			(5.0 kg)
<i>Note: 0 dBu=0.775 Vrms</i>				<i>*Level Controls Set at "0"</i>

**ECM 64e Rear Panel**



**ECM 64eAD Rear Panel**



**Architectural Specifications**

- The programmable audio system shall provide:
- Programmable level controls for all inputs and outputs
  - A mix of four microphone (or line) inputs
  - Two line-level inputs
  - Three line-level outputs
  - Six channels of matrix mixing with crosspoint level control on each output
  - A selectable pink noise source for each output
  - Acoustic Echo Canceller, as required.
  - Digital Hybrid, as required.
  - RS-232 or contact closure control

The inputs and outputs shall use Euroblock connections with active balanced designs using cross-coupled outputs. All inputs shall have programmable level controls with an operating range from -15 to +16 dB, in 1 dB steps. All outputs shall have programmable level controls with an operating range less than -80 and greater than +3 dB, in 1 dB steps. Each output shall have a six channel matrix mixer with crosspoint levels and routing controls. All crosspoints shall have programmable level controls with an operating range from -15 to +16 dB, in 1 dB steps. Each output shall have a selectable limiter.

If required, the audio system shall provide for a connection to a Plain Old Telephone Service (POTS) two-wire line using a digital hybrid. The digital hybrid must provide for more than 32 milliseconds of line echo cancelling and a return loss of more than 40 dB. Programmable DTMF dialing, auto-answer and auto-disconnect shall also be provided.

If required, the audio system shall provide for an Acoustic Echo Canceller (AEC). The input to the AEC shall provide a means to select and mix different audio sources. These audio sources shall include a microphone mix, a Line input and an Aux input. The AEC reference shall provide a means to select different audio sources. These audio sources shall include the selection of the Program output of the audio system, a mix of the Line, Aux and Hybrid inputs, and an external audio source. The AEC shall be continually adaptive and not require training.

*The programmable audio system shall be a Rane Corporation ECM 64e, an ECA 2 Acoustic Echo Canceller module (as required), and a DH 1e Digital Hybrid module (as required).*

**Available Accessories**

- Optional Acoustic Echo Canceller module (ECA 2)
- Optional Digital ECM 64e Hybrid Module (DH 1e)

**DH 1e Specifications**

Parameter	Specification	Limit	Units	Conditions/Comments
DSP Adaptive Line Echo Canceller				
Frequency Response	250 to 3500		Hz	
Tail Length	32		ms	
Total Echo Cancellation	Up to 60		dB	Receive State only
Adaptive Echo Cancellation	45		dB	
THD & Noise	<0.1%			0 dBu, 20-20k Hz (80 kHz BW)
Signal-to-Noise Ratio	>60		dB	Inputs @ 0 dB, Outputs @ +4 dB
Maximum Output Level	-10		dBm	
DTMF Tone Burst	100		ms	
Connector Type	RJ11C			
Unit: Agency Listing	FCC Part 68 REN IC Compliance			0.1B
Shipping: Size	4.5" x 12" x 14"			11.5 cm x 30.5 cm x 35.5 cm
.....Weight	4 lb			1.8 kg