



HAL1 Multiprocessor

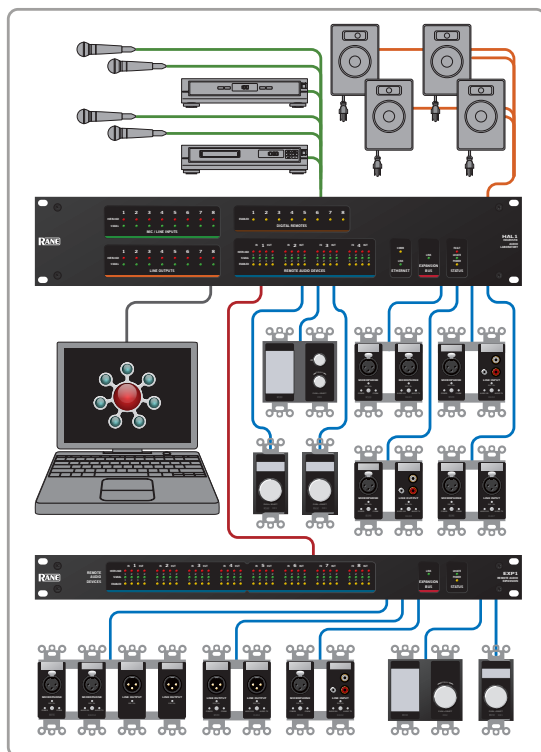


EXP1 Expansion Unit

General Description

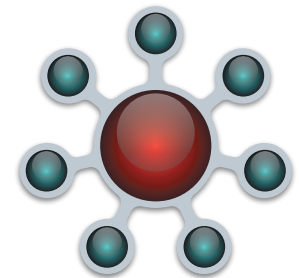
Meet HAL, an expert in room combining, paging and distributed audio systems. This groundbreaking architecture is dimensions beyond any other solution. HAL easily guides even novice users through what used to be complex tasks in just minutes. No intricate matrix mixing or presets are required for room combining and paging. No virtual wiring required to distribute pages and background music to multiple zones.

Seamlessly interface HAL to your application with a broad variety of peripheral devices including smart Digital Remotes, Remote Audio Devices (RADs), portable and in-rack auto mixers, bus Expansion devices, and an advanced Paging Station.

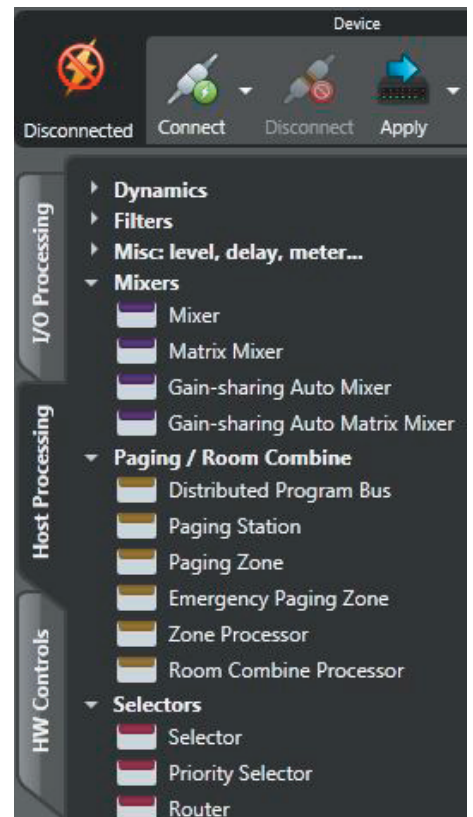


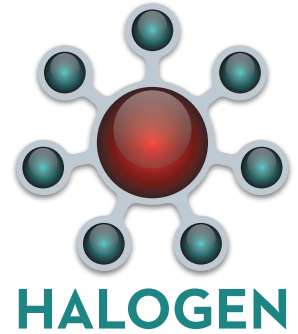
In addition, the HAL1 and Halogen software check the status, location, CAT5 wiring integrity, and that audio is flowing in all peripheral devices, so you know your system is properly connected and ready to go.

HAL is more than just another DSP drag-and-drop system. It will revolutionize the way you design and install systems. HAL is fully compatible and easily integrated with existing Rane products like gain-sharing auto mixers and Rane's almost endless variety of RADs.



HALOGEN





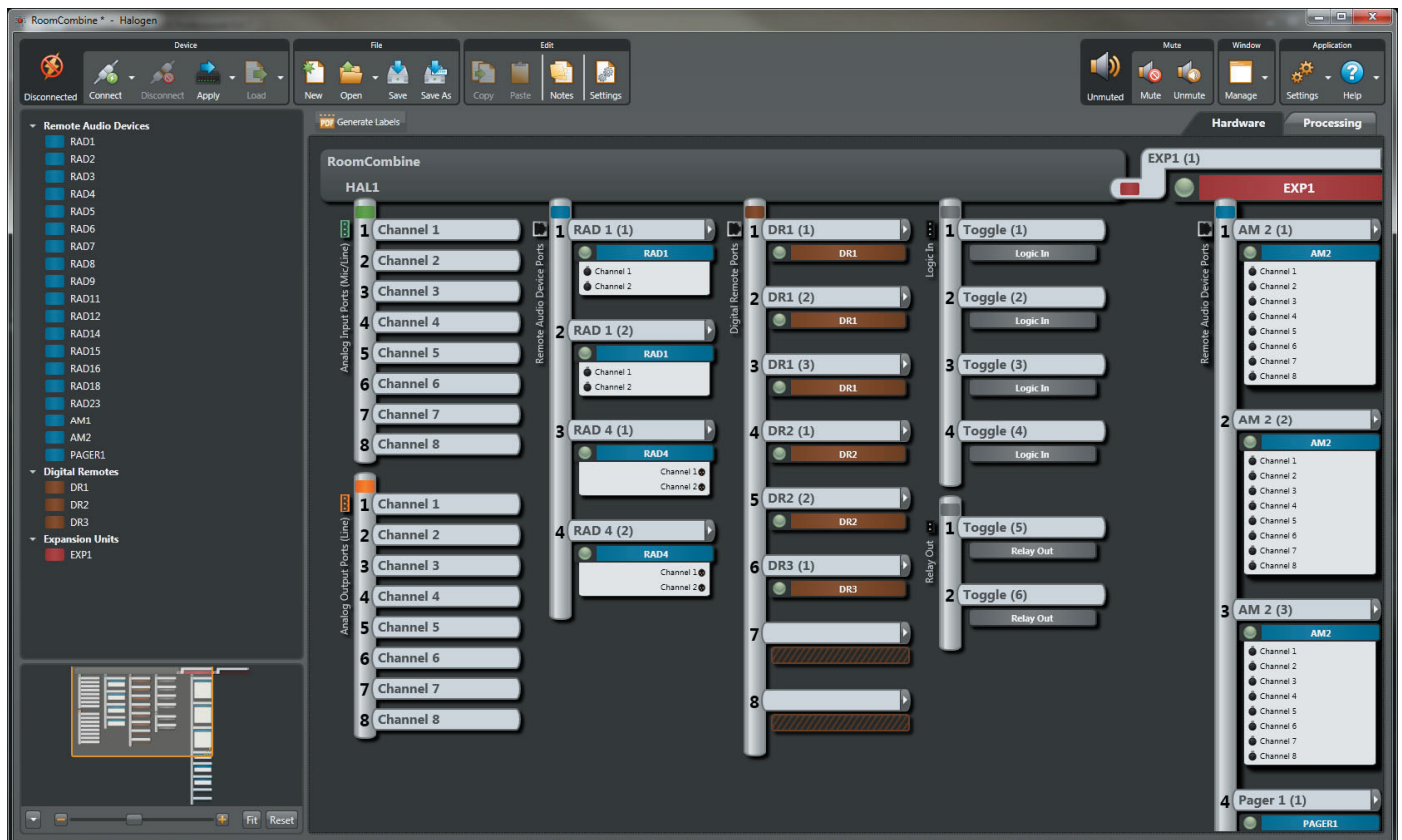
Halogen Software

The Halogen software application is your home for designing, configuring, and controlling your HAL audio system. Halogen's easy-to-use graphical user interface simplifies the design and configuration process so much that your only concern will be deciding how to use the extra time you suddenly have!

The Halogen software manages global tasks such as discovering, connecting to, and applying configurations to HAL devices. The interface is divided into two main sections: the Hardware Workspace and the Processing Workspace.

Hardware Workspace

Specify, configure, and troubleshoot the physical hardware components of your audio system.



Processing Workspace

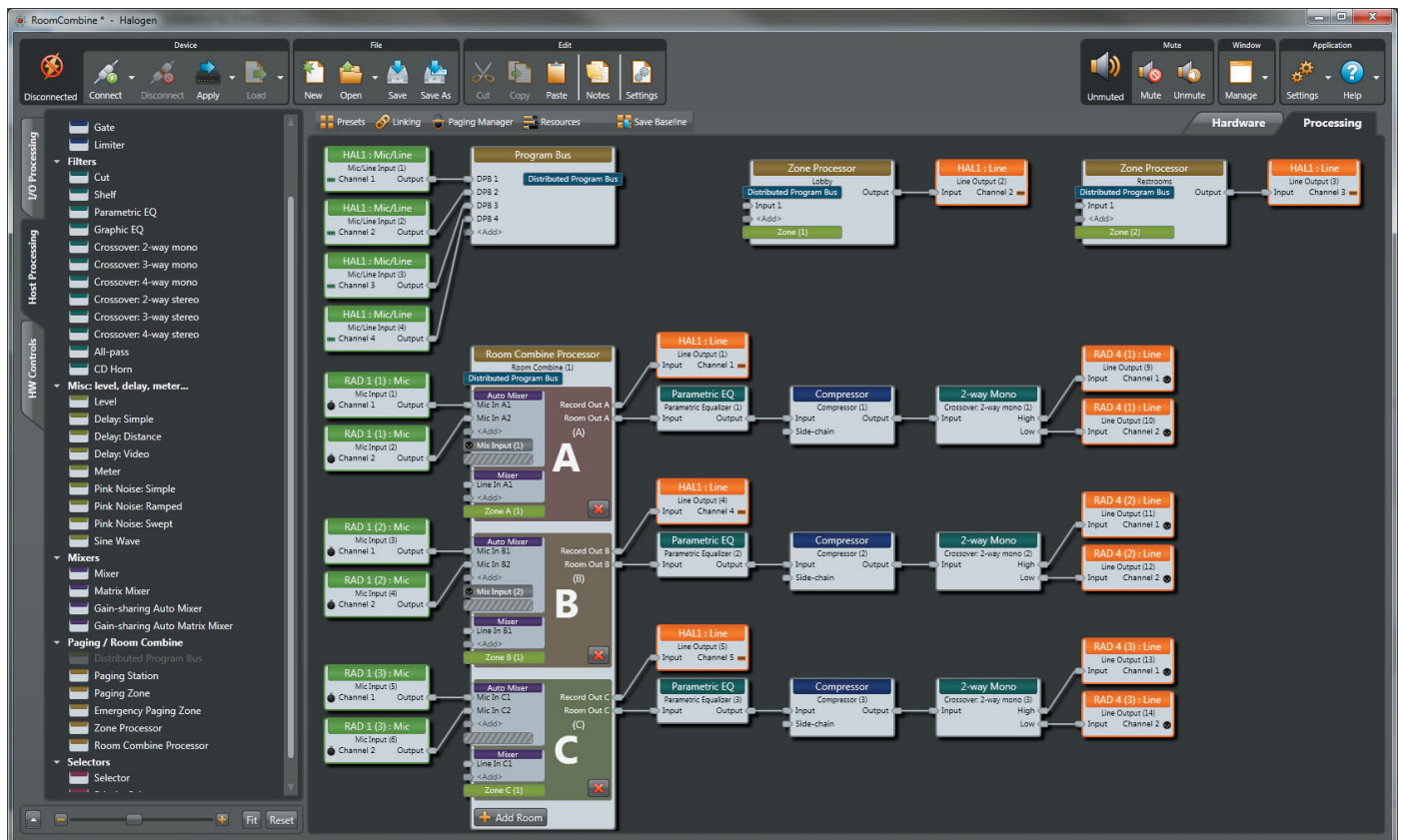
Wire together the audio processing components of your system, adding and configuring standard processing blocks such as equalizers, matrix mixers, compressors, limiters, and so on. Manage and configure control links and presets here. Halogen also provides innovative processing blocks that simplify complex paging and room combine scenarios.

Notice that Halogen separates the hardware view from the processing view of your audio system. A key benefit of this separation is the flexibility it provides when configuring the system's various inputs and outputs. For example, suppose you have a RAD2 in your audio system. You drag the RAD2 device into the Hardware Workspace but then go to the Processing Workspace to configure the RAD2's line input and mic input. This separation of hardware from processing allows you to work with each input and output individually instead of having to work with the hardware device as a single entity. It also allows you to focus on hardware in one place and audio flow and processing in another place—simplifying your job as a result. Brilliant!

Workspace Layout

As you may have noticed, the Hardware Workspace and the Processing Workspace have similar layouts. On the right is the actual workspace itself in which you create your system. Associated with each workspace is a palette of objects on the left, and at the top a toolbar specific to the workspace. To add an entity to your audio system, you drag one or more objects from the palette to the workspace.

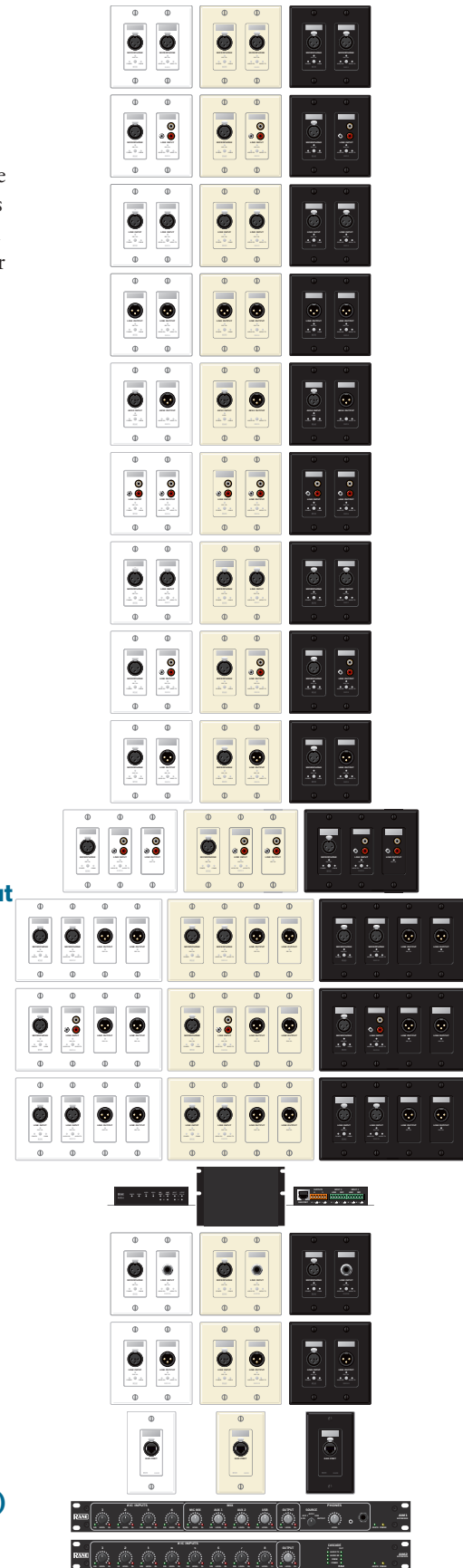
A simple way to think of the Halogen workspaces is that you use the Hardware Workspace to create and connect all of your physical hardware, while you use the Processing Workspace to select, configure, and connect the processing blocks and controls.

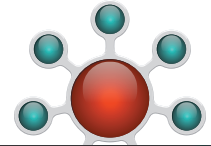


RADs

The entire family of RAD models interface with HAL, for digital conversion at the wall. Each converts analog audio to or from 24-bit, 48 kHz digital audio. Standard CAT 5 cable and termination transport four digital audio channels – two channels each direction – as well as power, ground and a communications channel, with status indicators at each RAD, HAL or EXP unit, and Halogen software. HAL auto-checks the CAT 5 crimp and verifies audio. All are hot-swappable with 500-foot homerun connections (66% farther than Ethernet). Light sensors dim the RAD indicators in dark rooms. Except for the RAD16, AM1, AM2, and PAGER1, all RADs mount in standard US electrical gang boxes. These RADs are available in white, ivory, or black, with a matched Decora™ plate cover included.

- RAD1** **Dual XLR Mic Inputs**
- RAD2** **XLR Mic Input / Mini & RCA Mono'ed Line Input**
- RAD3** **Dual XLR Line Inputs**
- RAD4** **Dual XLR Line Outputs**
- RAD5** **AES3 Input / AES3 Output**
- RAD6** **Mini & RCA Stereo Line Input / Stereo Line Output**
- RAD7** **XLR Mic Input / XLR Line Input**
- RAD8** **XLR Mic Input / Mini & RCA Stereo Line Output**
- RAD9** **XLR Mic Input / XLR Line Output**
- RAD11** **XLR Mic In / Mini & RCA Mono'ed Line In / Mini & RCA Stereo Line Out**
- RAD12** **Dual XLR Mic Inputs / Dual XLR Line Outputs**
- RAD14** **XLR Mic In / Mini & RCA Mono'ed Line In / Dual XLR Line Out**
- RAD15** **Dual XLR Line Inputs / Dual XLR Line Outputs**
- RAD16** **Dual Mic-Line Input / Dual Line Output Euroblocks in a Box**
- RAD18** **XLR Mic Input / 1/4" Balanced Line Input**
- RAD23** **XLR Line Input / XLR Line Output**
- RADX** **RAD Port Extension (CAT 5 wall jack for portable RADs)**
- AM1** **Four-Channel Gain-Sharing Automixer**
- AM2** **Eight-Channel Gain-Sharing Cascadable Automixer**
- PAGER1** **Mic Preamp with Push-to-Talk and Page Zone Selection (see page 4)**





Digital Remotes

Three Digital Remotes simplify end user control and eliminate installer brain fatigue. Use Digital Remotes for volume control, preset recall, source selection, or resetting or toggling system states. All offer customizable backlit LCD screens for intuitive end user labeling. Home run CAT5 connections to HAL1 or EXP1 eliminate addressing, external power, and the need to test the cables.

The DR1 supports Level Control.

The DR2 offers Single Selector and List of Toggles/Commands behavior.

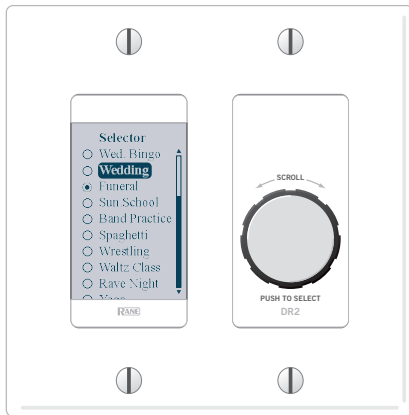
The three DR3 behaviors are Single Level & List of Toggles/Commands, List of Levels for either multizone volume control or input source mixing, and Single Level plus Selector.

DR1 Digital Volume Remote

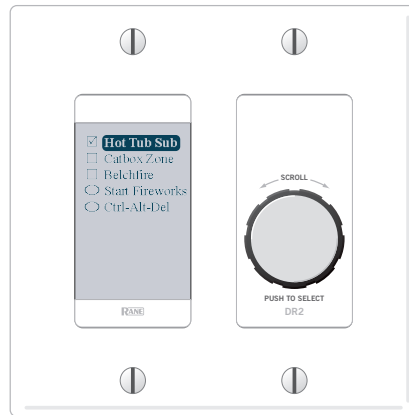


Level Control

DR2 Digital Selection Remote

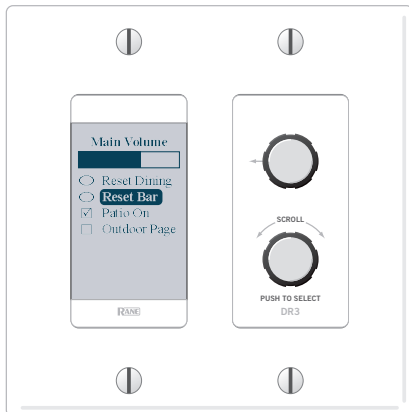


Single Selector

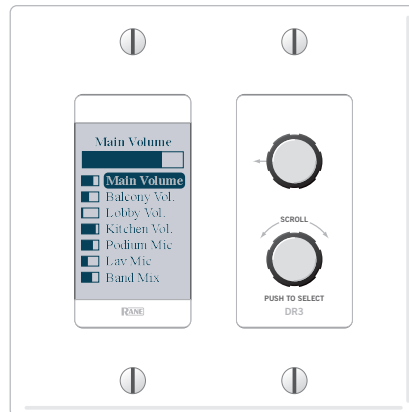


List of Toggles / Commands

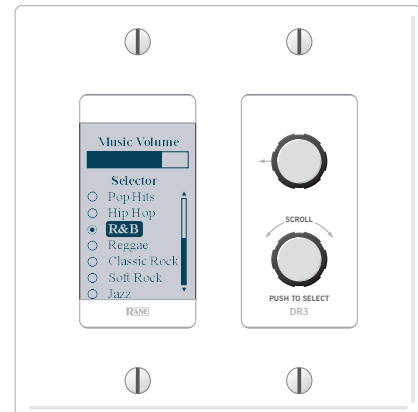
DR3 Digital Volume and Selection Remote



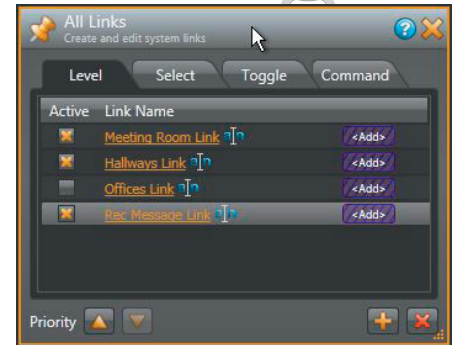
Single Level & List of Toggles / Commands



List of Levels



Single Level & Selector



Control Linking

Drag the purple control chain icons atop one another to create links. This screen shot shows linking a DR1 volume onto the Meeting Room Output Level control. Four Control Link types and behaviors are supported: Level, Select, Toggle or Command. Activation and Priorities work together for incredible flexibility.

Multizone Paging Systems

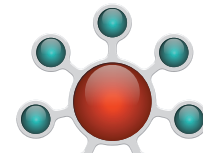
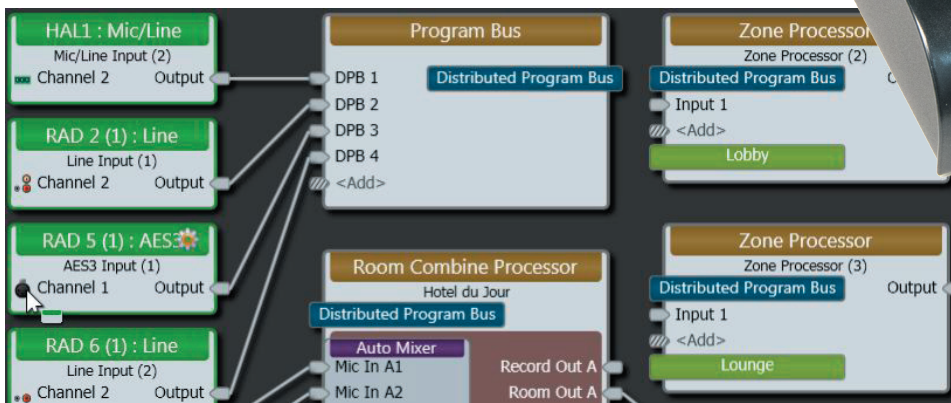
PAGER1

This RAD is a mic preamp with a paging zone(s) [Scenario] selector with integrated push-to-talk switch. Busy, Caution and Ready indicators inform end users when priorities clash.



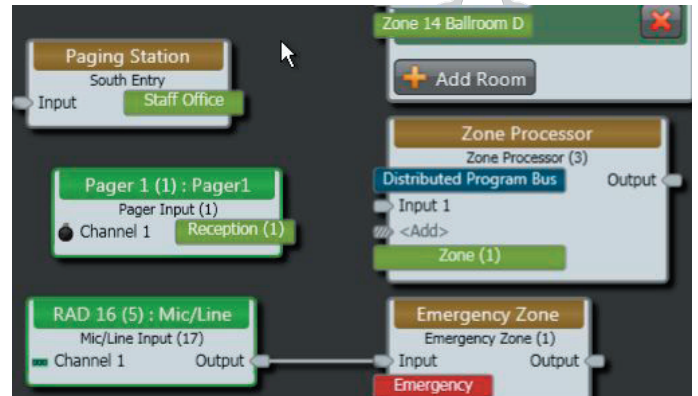
DISTRIBUTED PROGRAM BUS

Wiring system-wide background music sources into the single Distributed Program Bus automatically wires all music sources to every output zone. The blue Distributed Program Bus label represents bus output and input to blocks.



PAGING STATION AND ZONES

Paging Station and PAGER1 input DSP blocks automatically connect input page sources (lime green labels) to zones requiring paging. Thus, wiring from all page sources through the Paging Manager to all page zones – including rooms that combine – is automatic. The Paging Manager easily maps all page sources to any combination of zones when using the Paging Zone, Emergency Page, Zone Processor and Room Combine Processor blocks.

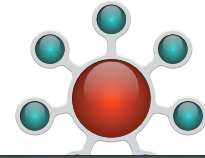


Paging Manager
Create and edit paging scenarios

Stations	
Name	Status
Mic Page	Off
Hostess	Paging

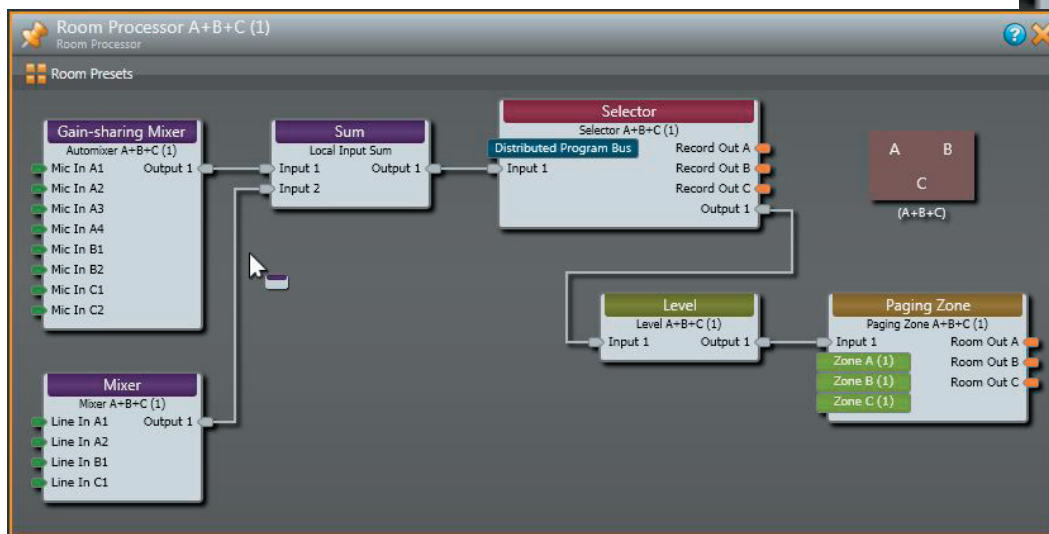
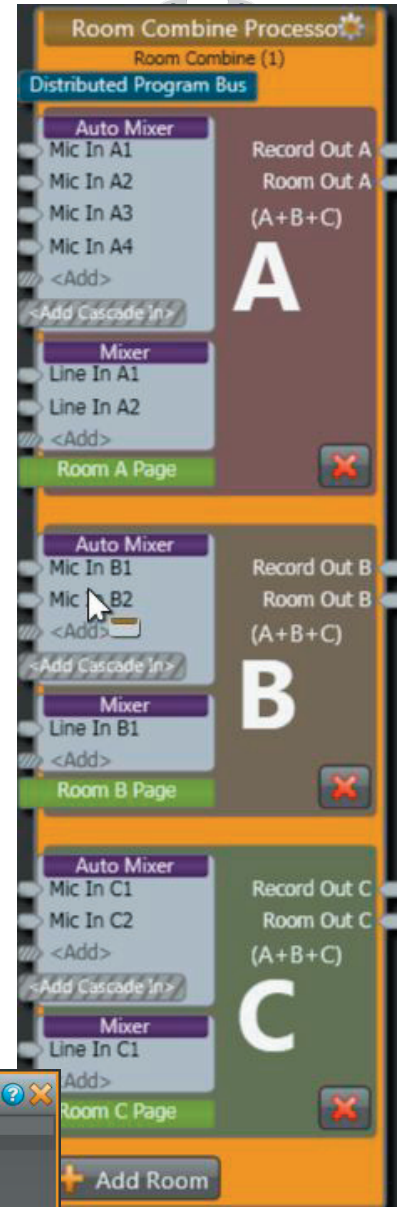
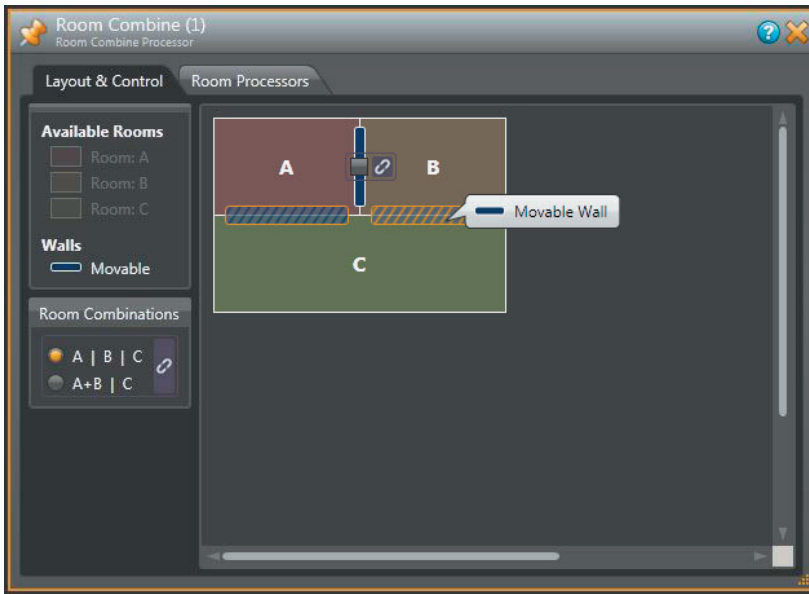
Scenarios				
Name	Priority	Number	Status	
Table Ready	50	1	Busy	
Dining Room	50	2	Ready	
Lounge	50	3	Ready	
Page All	50	4	Ready	

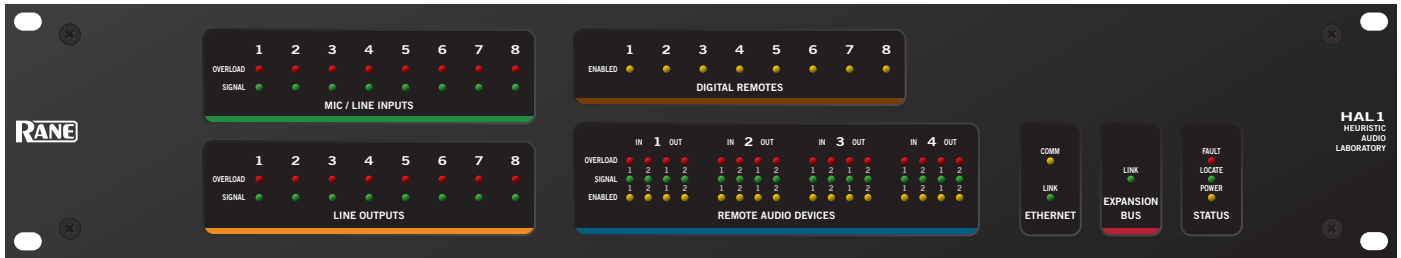
Zones	
Name	Status
Entry	Active
Lounge	Active
Dining East	Off
Dining West	Off
Hallways	Active
Ballroom A	Off
Ballroom B	Off
Ballroom C	Off



Room Combining

The Room Combine Processor supports custom wall layouts and auto-activation of independent room processors for each possible physical room as walls open and close. Control linking between Rane's Digital Remotes to wall open/close toggles and room volumes is exquisitely intuitive. Gain-share auto mix mics in combined rooms and separate the mix automatically as walls close. Use Rane's AM2 Automixer which gain-shares automatically with in-room mics when cascaded into the HAL1's room combine processor. Control links to Digital Remotes also combine and separate automatically as wall states change. No presets required. Easily change signal processing settings as walls open and close.

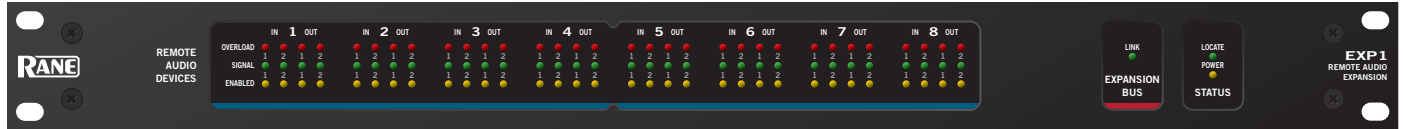




HAL1 Specifications

Parameter	Specification	Limit	Conditions/Comments
Analog I/O	8 x 8		
...Input Connectors	Euroblock		4 x 6-pin, 5 mm pitch, Green
...Output Connectors	Euroblock		4 x 6-pin, 5 mm pitch, Orange
...CODEC	24-bit, 48 kHz		
Mic Inputs	Active Balanced		
...Gain Settings	+10 to +60 dB		1 dB steps
...Input Impedance	2.6 kΩ	1%	1 kHz, each leg to ground
...Phantom Power	+48 VDC		10 mA max per input
...Equivalent Input Noise	-127 dBu	max	20-20k Hz, 150 Ω source, 60 dB gain, A-weighted
...THD+N	< 0.008 %	typ	20-20k Hz, +4 dBu, +10 dB gain, 20 kHz BW
...Maximum Input	3 dBV (1.4 Vrms)	typ	Input gain at +10 dB, 1 kHz, < 1% THD+N
Line Inputs	Active Balanced		
...Gain Settings	Unity & +10 to +20 dB		1 dB steps from +10 to +20
...Input Impedance	5.1 kΩ	1%	1 kHz, each leg to ground
...THD+N	< 0.008 %	typ	20-20k Hz, +4 dBu, unity gain, 20 kHz BW
...Maximum Input	20.8 dBu	typ	Input gain at 0 dB, 1 kHz, <1% THD+N
...Frequency Response	20-20k Hz, +0, -.05 dB		+4 dBu, unity gain
...Dynamic Range	109 dB	max	re +20 dBu, 20 kHz BW, A weighted, Rs = 150 Ω
...Interchannel Isolation	104 dB	max	20-20k Hz, +20 dBu, unity gain, channel-to-channel
Outputs	Active Balanced		
...Impedance	200 Ω	1%	Each leg
...Maximum Output	+20.9 / +16.4 dBu	typ	1 kHz, 100 kΩ / 600 Ω load
...Frequency Response	20-20k Hz		+0.1 / -0.3 dB, +4 dBu, unity gain, 100 kΩ load
...Dynamic Range	109 dB	max	re +20 dBu, 20 kHz BW, A-weighted, 100 kΩ load
...Interchannel Isolation	110 dB	typ	20-20k Hz, +20 dBu, channel-to-channel, 100 kΩ load
Indicators			
...Signal	-50 dBFS	typ	Green LED, peak-reading
...Overload	-0.5 dBFS	typ	Red LED, peak-reading
Propagation Delays			See the Latency graphic on page 11.
...RAD In to RAD Out	1.71 ms	typ	Tested with RAD23
...RAD In to Analog Out	1.85 ms	typ	
...Analog In to RAD Out	2.25 ms	typ	
...Analog In to Analog Out	2.39 ms	typ	
...Expansion Bus Delay	0.83 ms	typ	In or Out of Expansion Unit

Parameter	Specification	Limit	Conditions/Comments
DSP			
...Processing Power	9600 MIPS	max	4 DSPs @ 300 MHz each with up to 8 instructions / cycle
...Word Length	32 / 64-bit Floating Point		
...Delay Memory	80 seconds	max	
Computer Interface			
...Type	Ethernet 1000 base-T		Zeroconf service discovery protocol for easy set up
...Cable	CAT 5e		RJ-45 connector
...Length	328 feet / 100 meters	max	Standard Ethernet cable length limit
Expansion Bus			
...Audio Channels	64 in x 32 out of HAL1	max	Plus control channel
...Maximum EXP1 Units	4	max	Daisy-chain with FireWire cable included in EXP box
...Type/Connector/Cable	IEEE 1394a, 6-pin		Optional screw locks on HAL and EXP units* (see page 10)
...Maximum Cable Length	15 feet / 4.5 meters	max	Standard IEEE 1394a cable length limit
...Included Cable Length	3 feet / 1 meter		Included cable with EXP unit is not a locking type
RAD Ports			
...Audio Channels	4		RJ-45 connectors
...Audio Channels	8 in x 8 out		Each port 2 in x 2 out, plus control channel, 24-bit, 48 kHz
...Power	24 VDC @ 100 mA	max	Each port
...Length	500 feet / 152.4 meters	max	Shielded CAT 5 cable or better
DR Ports			
...Power	8		RJ-45 connectors
...Power	24 VDC @ 50 mA	max	Each port
...Length	1000 feet / 304.8 meters	max	Shielded CAT 5 cable or better
Relay Outputs			
...Connector	2		
...Connector	Mini Euroblock		6-pin, 3.81 mm pitch, Black
...Type	COM, NC & NO		
...Limit	2 A, 48 V	max	60 W max switching power
Logic Inputs			
...Connector	4		
...Connector	Mini Euroblock		6-pin, 3.81 mm pitch, Black
...Type	Internal passive pull-up		Protected to +24 V
...Vin High	> 2.2 V	min	Normal state
...Vin Low	< 1.0 V	max	External circuit sinks > 22 μ A to assert
Wiring			
...Wiring	Class 2		All rear panel terminals
Power Requirement			
...Power Requirement	100 to 240 VAC		50/60 Hz, 55 W max
Ambient Room Temp.			
...Ambient Room Temp.	40 °C	max	Maximum external loading
Conformity: Safety			
...NRTL (USA)	UL 60065		cCSAus (CSA file no. 247105)
...CSA (Canada)	CAN/CSA 60065		cCSAus (CSA file no. 247105)
...EU Directive 2006/95/EC	EN 60065		CB Certificate (Nemko)
Conformity: EMC			
...FCC	Part 15B		Class B Device
...EU Directive 2004/108/EC	EN 55103-1, EN 55103-2		Environment E2
Unit: Size			
...Unit: Size	2U, 3.5"H x 19"W x 8.25"D		(8.9 cm x 48.3 cm x 20.9 cm)
...Weight	7 lb		(3.2 kg)
Shipping: Size			
...Shipping: Size	6.5" x 20.3" x 13.75"		(11.5 cm x 52 cm x 35 cm)
...Weight	10 lb		(4.5 kg)



EXP1 Specifications

Parameter	Specification	Limit	Conditions/Comments
Expansion Bus			IEEE 1394a (FireWire) connectors
...Audio Channels	64 in x 32 out of HAL1	max	Plus control channel
...Maximum EXP1 Units	4	max	Daisy-chain with FireWire cable included in EXP box
...Type/Connector/Cable	IEEE 1394a, 6-pin		Optional screw locks on HAL and EXP units* (see below)
...Maximum Cable Length	15 feet / 4.5 meters	max	Standard IEEE 1394a cable length limit
...Included Cable Length	3 feet / 1 meter		Supplied cable is not a locking type* (see below)
RAD / DR Ports	8		RJ-45 connectors
...RAD Audio Channels	16 in x 16 out		Each port 2 in x 2 out, plus control channel, 24-bit, 48 kHz
...RAD Cable Length	500 feet / 152.4 meters	max	Shielded CAT 5 cable or better
...DR Cable Length	1000 feet / 304.8 meters	max	Shielded CAT 5 cable or better
...Power	24 VDC @ 100 mA	max	Each port
Wiring	Class 2		All rear panel terminals
Power Requirement	100 to 240 VAC		50/60 Hz, 30 W max
Conformity: Safety			
...NRTL (USA)	UL 60065		cCSAus (CSA file #247105)
...CSA (Canada)	CAN/CSA 60065		cCSAus (CSA file #247105)
...EU Directive 2006/95/EC	EN 60065		CB Certificate (Nemko)
Conformity: EMC			
...FCC	Part 15B		Class B Device
...EU Directive 2004/108/EC	EN 55103-1, EN 55103-2		Environment E2
Unit Size	1U, 1.75" x 19" x 8.25"		(4.4 x 48.3 x 20.9 cm)
...Weight	5 lb		(2.3 kg)
Shipping Size	6.5" x 20.3" x 13.75"		(11.5 x 52 x 35 cm)
...Weight	8 lb		(4.5 kg)

***FireWire Cable Sources**

Northwire NAFW1322-XX where XX is the length in meters. Features screw locks and industrial-grade cable. northwire.com

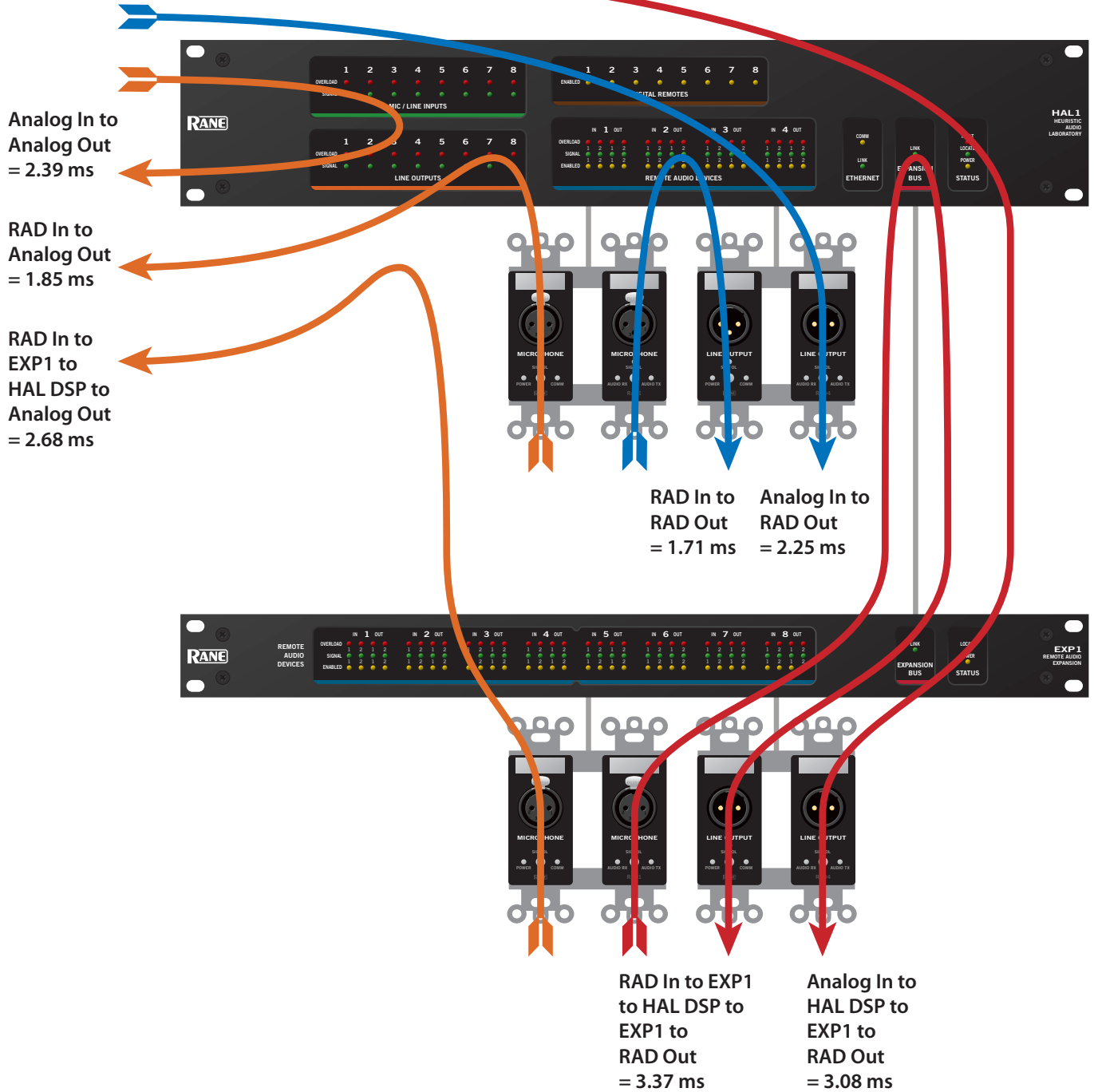
Newnex CFS-66XX-S where XX is the length in meters. Features thumb-screw locks. newnex.com

PAGER1 Specifications

Parameter	Specification	Limit	Conditions/Comments
RAD Port	Rear panel with indicators		RJ-45 connector
Mic Input	Accepts any gooseneck mic		
...Connector	3-pin female XLR		Locking tab may be removed
...Phantom Power	24 VDC @ 100 mA		On/off in Halogen software
...Mic Pad	13 dB	max	Set in Halogen software
...Signal & OL Indicators	See RAD Specifications		
Page Indicators	Busy (red), Caution (yellow), Ready (green)		
Unit	All Steel		Lockdown holes in chassis allow securing to a table
...Size	4.5"H x 6"W x 2"D		(11.5 cm x 15.3 cm x 5.1 cm)
...Weight	20 ounces		(567 grams)
Shipping Size	6.25" x 8.5" x 5.5"		(16 cm x 22 cm x 14 cm)
...Weight	1.64 lb		(745 grams)



Latency



RAD Specifications (all models)

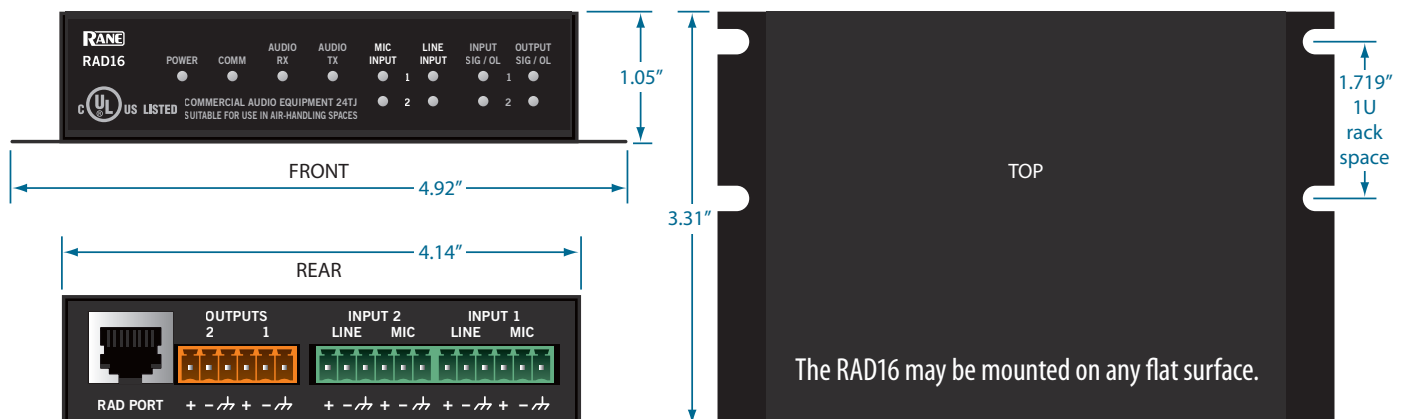
Parameter	Specification	Limit	Units	Conditions/Comments
Signal Indicator	-50	typ.	dBFS	Unbalanced / balanced output, green LED, peak-reading
Overload Indicators	-0.5	typ.	dBFS	Unbalanced / balanced output, red LED, peak-reading
Conformity: EMC				
...FCC	Part 15B			Class B Device
...EU Directive 2004/108/EC	EN 55103-1, EN 55103-2			Environment E2

RAD1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15, 18, 23 Features & Specifications

Parameter	Specification	Limit	Units	Conditions/Comments
Microphone Input Specs (Both XLR & Euro RADs)				
Input Impedance	2.16 k	1%	Ω	Balanced 1.08 k + 1.08 k
Max. Input Level	-17	min.	dBu	Balanced, Gain = 26 dB, <1% THD
Equivalent Input Noise	-121	typ.	dBu	20 kHz BW, Rs = 150 Ω, Gain = 26 dB
Dynamic Range	98	typ.	dB	re: 0 dBFS, 20 kHz BW, A-weighted, Gain = 26 dB
CMRR	-70	typ.	dB	Rs = 150 Ω, 1 kHz, Gain = 26 dB
Frequency Response	30 to 20k	typ.	Hz	+0, -3dB, At All Gain Settings
THD+Noise	0.010	typ.	%	@ 1 kHz, 20 kHz BW, Rs = 150 Ω, Output = -6 dBFS, Gain = 26 dB
Gain Range	26 to 60	typ.	dB	In 1 dB Steps
Phantom Power	+24	4%	V	15 mA Max.
Impedance	1.21 k	1%	Ω	Each Leg
Balanced Line-Level Output Specs (Active Balanced)				
Output Impedance	600	1%	Ω	Each Leg
Max. Output Level	18	min.	dBu	Balanced, <1% THD, Load = 10 kΩ
Dynamic Range	103	typ.	dB	re: 0 dBFS, 20 kHz BW, A-weighted
Frequency Response	10 to 22k	typ.	Hz	+0, -3dB
THD+Noise	0.017	typ.	%	@ 1 kHz, 20 kHz BW, Output = -6 dBFS
Balanced Line-Level Input Specs				
Input Impedance	22.18 k	1%	Ω	Balanced 11.09 kΩ + 11.09 kΩ
Max. Input Level	23	min.	dBu	Balanced, <1% THD
Dynamic Range	102	typ.	dB	re: 0 dBFS, 20 kHz BW, A-weighted
CMRR	-56	typ.	dB	Rs = 150 Ω, 1 kHz
Frequency Response	10 to 22k	typ.	Hz	+0, -3dB
THD+Noise	0.004	typ.	%	@ 1 kHz, 20 kHz BW, Rs = 150 Ω, Output = -6 dBFS
Unbalanced Line-Level Input Specs				
Input Impedance, Mono (RAD2, RAD11 & RAD14)	20 k	1%	Ω	Unbalanced
Max. Input Level, Mono (RAD2, RAD11 & RAD14)	6	min.	Vrms	Unbalanced, <1% THD
Input Impedance, Stereo (RAD6)	20 k	1%	Ω	Unbalanced
Max. Input Level, Stereo (RAD6)	3	min.	Vrms	Unbalanced, <1% THD
Dynamic Range	96	typ.	dB	re: 0 dBFS, 20 kHz BW, A-weighted
Frequency Response	10 to 22k	typ.	Hz	+0, -3dB
THD+Noise	0.005	typ.	%	@ 1 kHz, 20 kHz BW, Rs = 150 Ω, Output = -6 dBFS
Unbalanced Line-Level Output Specs				
Output Impedance, Stereo (RAD6, RAD8, RAD11)	600	1%	Ω	Unbalanced
Max. Output Level, Stereo (RAD6, RAD8, RAD11)	3.3	min.	Vrms	Unbalanced, <1% THD, Load = 10 kΩ
Dynamic Range	98	typ.	dB	Re: 0 dBFS, 20 kHz BW, A-weighted
Frequency Response	10 to 22k	typ.	Hz	+0, -3dB
THD+Noise	0.028	typ.	%	@ 1 kHz, 20 kHz BW, Output = -6 dBFS

RAD16 Features & Specifications

Parameter	Specification	Limit	Units	Conditions/Comments
Input Impedance	2.16 k	1%	Ω	Balanced 1.08 k + 1.08 k
Max. Input Level	-16	min.	dBu	Balanced, Gain = 26 dB, <1% THD
Equivalent Input Noise	-121	typ.	dBu	20 kHz BW, R _s = 150 Ω, Gain = 26 dB
Dynamic Range	96	typ.	dB	re: 0 dBFS, 20 kHz BW, A-weighted, Gain = 26
CMRR	-62	typ.	dB	R _s = 150 Ω, 1 kHz, Gain = 26 dB
Frequency Response	41 to 20k	typ.	Hz	+0, -3dB, At All Gain Settings
THD+Noise	0.008	typ.	%	@ 1 kHz, 20 kHz BW, R _s = 150 Ω, Output = -6 dBFS, Gain = 26 dB
Gain Range	26 to 60	typ.	dB	In 1 dB Steps
Phantom Power	+24	4%	V	15 mA Max.
Impedance	1.21 k	1%	Ω	Each Leg
Balanced Line-Level Input Specs				
Input Impedance	22.60 k	1%	Ω	Balanced 11.3 kΩ + 11.3 kΩ
Max. Input Level	23	min.	dBu	Balanced, <1% THD
Dynamic Range	99	typ.	dB	re: 0 dBFS, 20 kHz BW, A-weighted
CMRR	-52	typ.	dB	R _s = 150 Ω, 1 kHz
Frequency Response	22 to 22k	typ.	Hz	+0, -3 dB
THD+Noise	0.008	typ.	%	@ 1 kHz, 20 kHz BW, R _s = 150 Ω, Output = -6 dBFS
Balanced Line-Level Output Specs (Active Balanced)				
Output Impedance	600	1%	Ω	Each Leg
Max. Output Level	18	min.	dBu	Balanced, <1% THD, Load = 10 kΩ
Dynamic Range	103	typ.	dB	20 kHz BW, A-weighted
Frequency Response	10 to 22k	typ.	Hz	+0, -3 dB
THD+Noise	0.07	typ.	%	@ 1 kHz, 20 kHz BW, Output = -6 dBFS
Conformity: Safety				
...NRTL (USA)	UL 60065			C/UL/US (UL file no. E193164)
...CSA (Canada)	CAN/CSA 60065			C/UL/US (UL file no. E193164)
...Plenum Rating	UL 2043			C/UL/US (UL file no. E193164)
Conformity: EMC				
...FCC	Part 15B			Class B Device
...EU Directive 2004/108/EC	EN 55103-1, EN 55103-2			Environment E2
Unit Size				
...Weight	4.92" x 3.31" x 1.05"			(12.5 x 8.4 x 2.7 cm)
Shipping Size				
...Weight	12 oz			(340 g)
...Weight	7.25" x 5.25" x 3.375"			(18.5 x 13.4 x 8.6 cm)
...Weight	1 lb			(436 g)



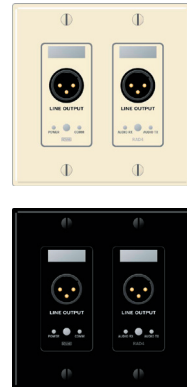
RAD16 Dual Euroblock Mic or Line Input / Dual Euroblock Line Output Available only in black.

All wallplate RADs are available in white, ivory or black



RAD1 Dual XLR Mic Inputs

RAD1W = white RAD1I = ivory RAD1B = black



RAD4 Dual XLR Line Outputs

RAD4W = white RAD4I = ivory RAD4B = black



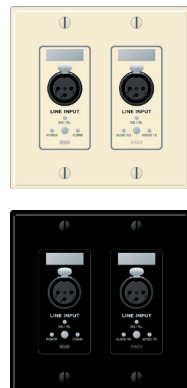
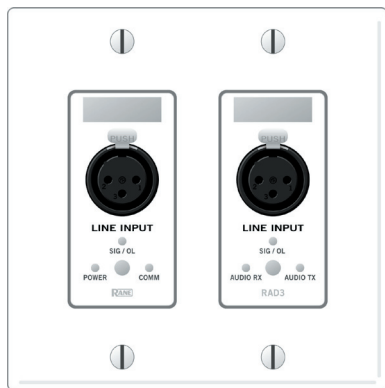
**RAD2 XLR Mic Input /
Mini & RCA Mono'd Line Input**

RAD2W = white RAD2I = ivory RAD2B = black



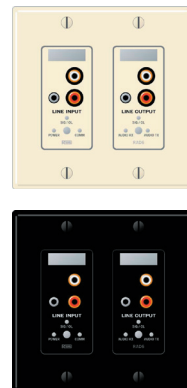
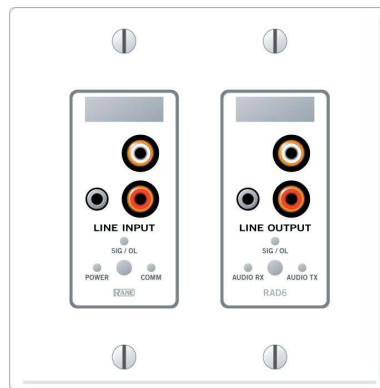
RAD5 AES3 Input / AES3 Output

RAD5W = white RAD5I = ivory RAD5B = black



RAD3 Dual XLR Line Inputs

RAD3W = white RAD3I = ivory RAD3B = black



**RAD6 Mini & RCA Stereo Line Input /
Mini & RCA Stereo Line Output**

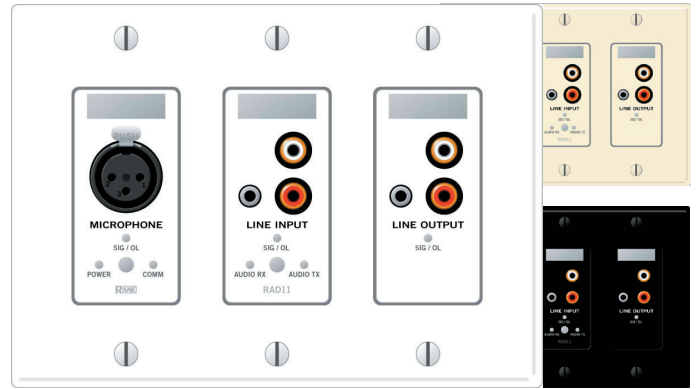
RAD6W = white RAD6I = ivory RAD6B = black

All wallplate RADs are available in white, ivory or black



RAD7 XLR Mic Input / XLR Line Input

RAD7W = white RAD7I = ivory RAD7B = black



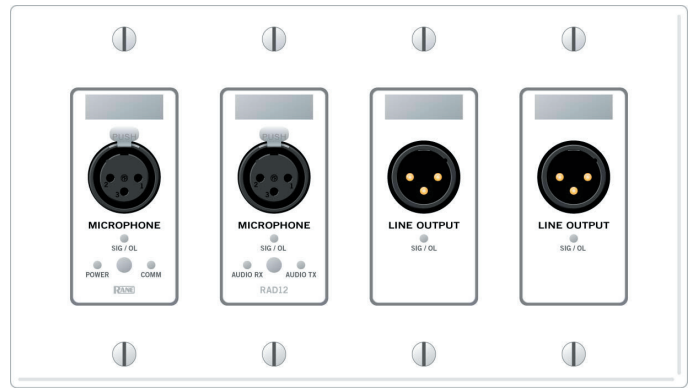
RAD11 XLR Mic Input / Mini & RCA Mono'ed Line Input / Mini & RCA Stereo Line Output

RAD11W = white RAD11I = ivory RAD11B = black



RAD8 XLR Mic Input / Mini & RCA Stereo Line Output

RAD8W = white RAD8I = ivory RAD8B = black



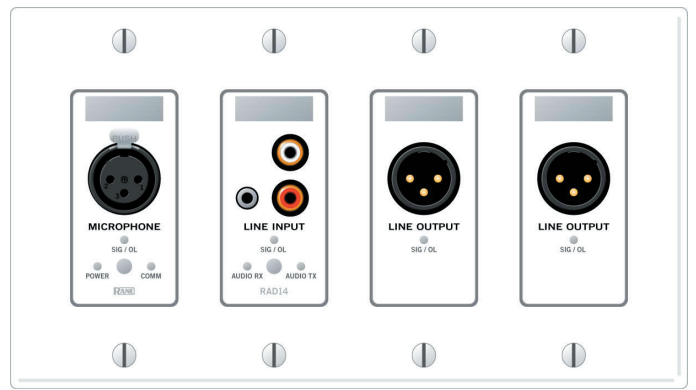
RAD12 Dual XLR Mic Inputs / Dual XLR Line Outputs

RAD12W = white RAD12I = ivory RAD12B = black



RAD9 XLR Mic Input / XLR Line Output

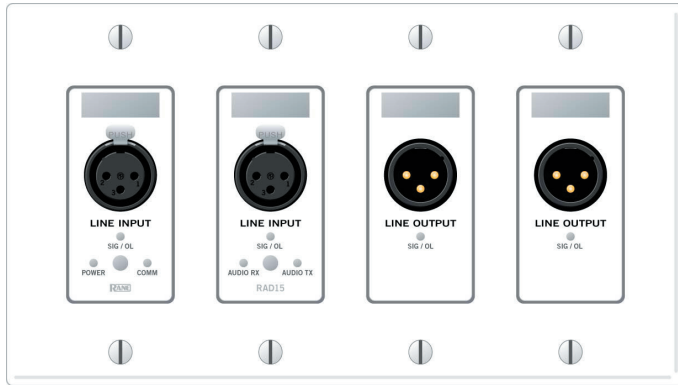
RAD9W = white RAD9I = ivory RAD9B = black



RAD14 XLR Mic Input / Mini & RCA Mono'ed Line Input / Dual XLR Line Outputs

RAD14W = white RAD14I = ivory RAD14B = black

All wallplate RADs are available in white, ivory or black



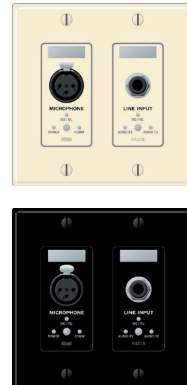
RAD15 Dual XLR Line Inputs / Dual XLR Line Outputs

RAD15W = white RAD15I = ivory RAD15B = black



RAD18 XLR Mic Input / 1/4" Balanced Line Input

RAD18W = white RAD18I = ivory RAD18B = black



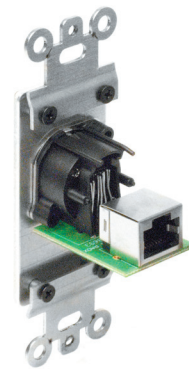
RAD23 XLR Line Input / XLR Line Output

RAD23W = white RAD23I = ivory RAD23B = black



RADX RAD Port Extension

RADXW = white RADXI = ivory RADXB = black
Distinguish Ethernet RJ-45 from Audio RJ-45 jacks.



AM1 Automixer with 4 XLR Mic/Line Inputs, 2 Line Inputs, USB Audio I/O, XLR Mix Output, RCA Record Output, Headphone Amp, and RAD Port. See the AM1 Data Sheet for details

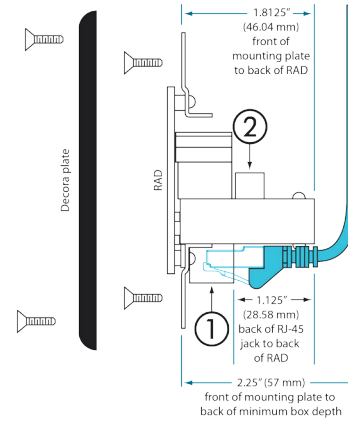
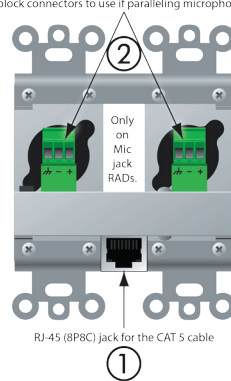


AM2 Automixer with 8 XLR Mic/Line Inputs, XLR Mix Output, and Cascadable RAD Port.

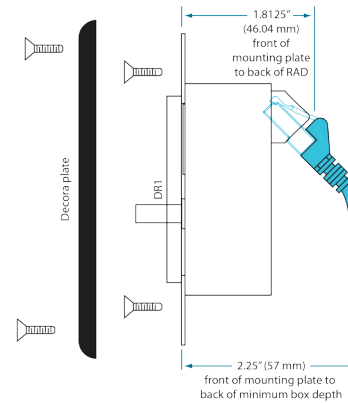
See the AM2 Data Sheet for details

RAD Side View

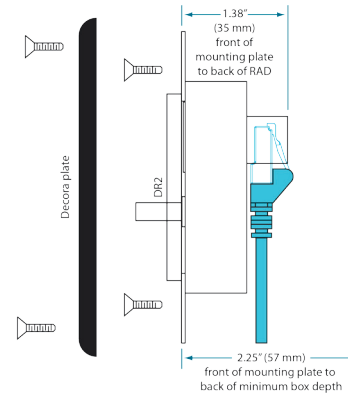
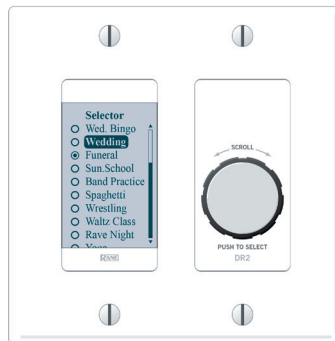
Euroblock connectors to use if paralleling microphone jacks



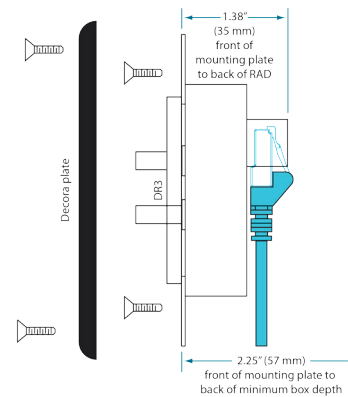
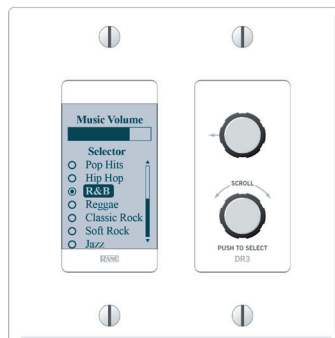
DR1 Digital Volume Remote Side View

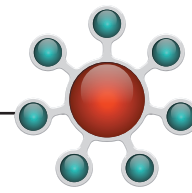


DR2 Digital Selection Remote Side View

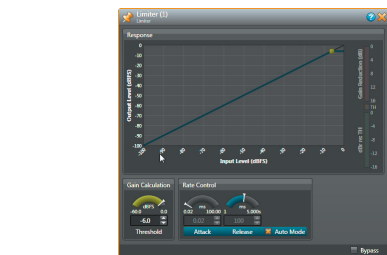
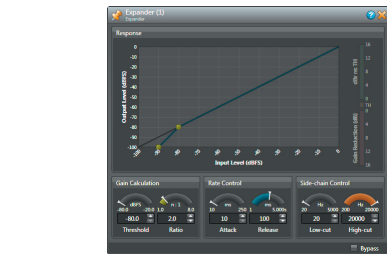


DR3 Digital Volume and Selection Remote Side View

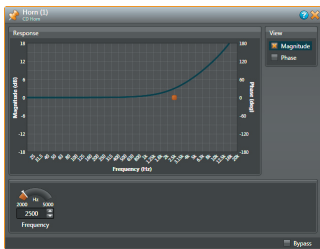
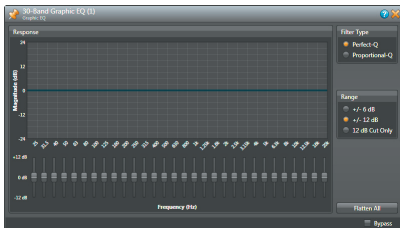
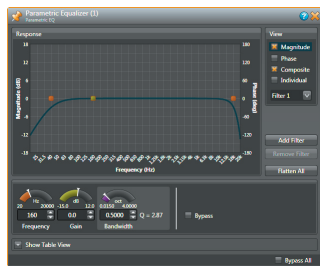
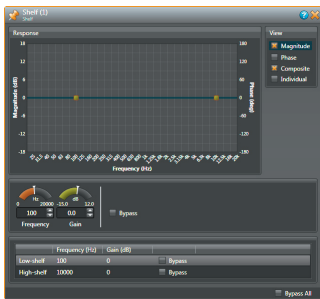
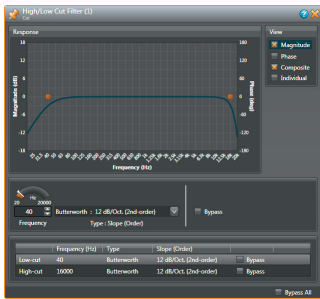




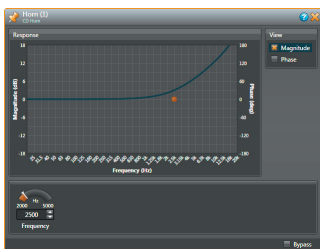
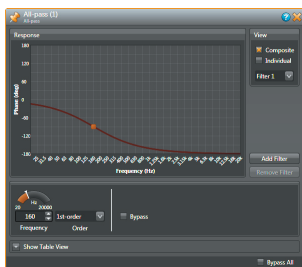
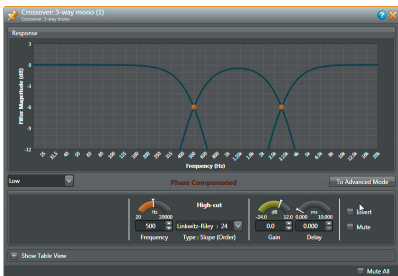
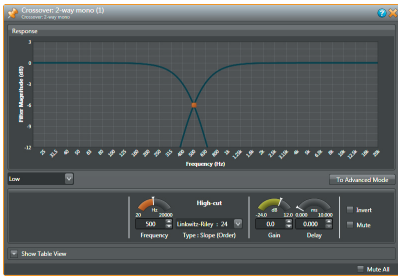
Halogen DSP Parameters



Block	Parameter	Unit	Min	Max	Default	
Dynamics						
AGC	Target	dBFS	-50	-10	-20	
	Ratio	n:1	1	10	2	
	Max Gain	dB	0	30	15	
	Increase Rate	dB/s	1	200	10	
	Decrease Rate	dB/s	1	200	100	
	Hold Time	s	0	31	3	
	Gain	dB	-12	12	0	
Compressor	Threshold	dBFS	-60	0	-40	
	Ratio	n:1	1	10	2	
	Knee	dB	0	20	0	
	Attack	ms	10	250	10	
	Release	ms	1	5000	100	
	Auto Mode					On
	Gain	dB	-12	12	0	
Ducker	Threshold	dBFS	-80	0	-68	
	Depth	dB	0	80	10	
	Attack	ms	0.02	100	0.02	
	Release	ms	1	5000	100	
	Hold Time	s	0	3	3	
	Low-cut	Hz	20	5000	20	
	High-cut	Hz	200	20000	20000	
Expander	Force duck				Off	
	Side-chain Talkover				Off	
	Threshold	dBFS	-80	-20	-80	
	Ratio	n:1	1	8	2	
	Attack	ms	10	250	10	
	Release	ms	1	5000	100	
	Low-cut	Hz	20	5000	20	
Gate	High-cut	Hz	200	20000	20000	
	Threshold	dBFS	-80	0	-80	
	Depth	dB	0	80	10	
	Attack	ms	0.02	100	0.02	
	Release	ms	1	5000	100	
	Hold Time	s	0	3	3	
	Low-cut	Hz	20	5000	20	
Limiter	High-cut	Hz	200	20000	20000	
	Threshold	dBFS	-60	0	-6	
	Attack	ms	0.02	100	0.02	
	Release	ms	1	5000	100	
	Auto Mode					On



Block	Parameter	Unit	Min	Max	Default	
Filters						
Cut	Low-cut Frequency	Hz	20	20000	40	
	High-cut Frequency	Hz	20	20000	16000	
	Magnitude				On	
	Phase				Off	
	Composite				On	
	Individual				Off	
	...Type and Slope				Bw 12 dB/octave	
		1st-order: 6 dB/oct. (1st-order)				
		Linkwitz-Riley: 12 dB/octave (2nd-order)				
		Linkwitz-Riley: 24 dB/octave (4th-order)				
Shelf	Low Shelf Frequency	Hz	0	20000	100	
	Low Shelf Gain	dB	-15	12	0	
	High Shelf Frequency	Hz	0	20000	10000	
	High Shelf Gain	dB	-15	12	0	
	Magnitude				On	
	Phase				Off	
	Composite				On	
	Individual				Off	
	PEQ	Low-cut Frequency	Hz	20	20000	40
		High-cut Frequency	Hz	20	20000	16000
Parametric Frequency		Hz	20	20000	ISO centers >160	
Parametric Gain		dB	-15	12	0	
Parametric Bandwidth		Oct	0.015	4	0.5	
Graphic EQ	Magnitude				On	
	Phase				Off	
	Composite				On	
	Individual				Off	
	Filter Type		Perfect-Q or Proportional-Q		Perfect-Q	
Range		±6, ±12, 12 dB cut-only		±12		
Gain	dB	12	-12	0		

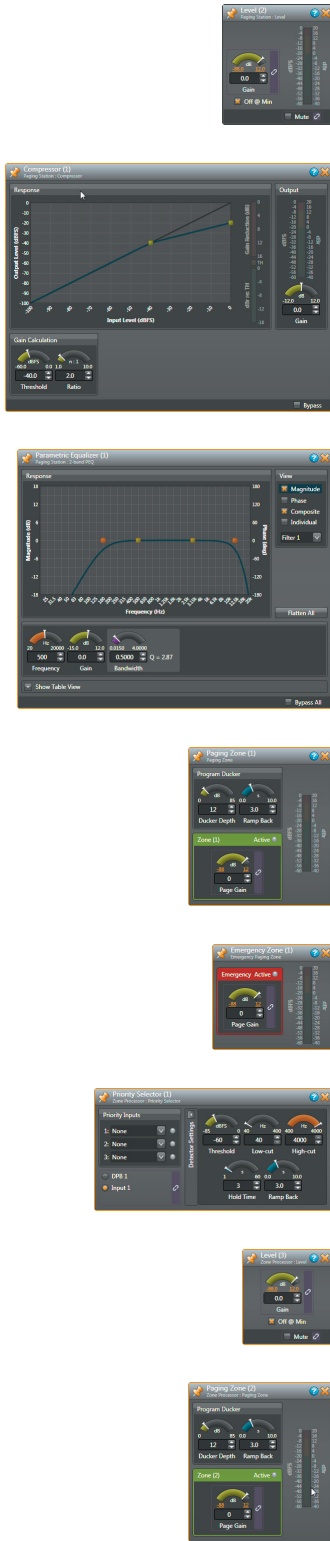


Block	Parameter	Unit	Min	Max	Default
Crossovers	Low : High-cut	Hz	20	20000	500
	High : Low-cut	Hz	20	20000	500
	Gain	dB	-24	12	0
	Delay	ms	0	10	0
	Invert				Off
	Mute				Off
	...Type and Slope	1st-order: 6 dB/oct. (1st-order) Linkwitz-Riley: 12 dB/octave (2nd-order) Linkwitz-Riley: 24 dB/octave (4th-order) Linkwitz-Riley: 48 dB/octave (8th-order) Butterworth: 12 dB/octave (2nd-order) Butterworth: 18 dB/octave (3rd-order) Butterworth: 24 dB/octave (4th-order) Bessel: 12 dB/oct. (2nd-order) Bessel: 18 dB/oct. (3rd-order) Bessel: 24 dB/oct. (4th-order)			
...2-Way Crossovers	Low : High-cut	Hz	20	20000	500
	High : Low-cut	Hz	20	20000	500
...3-Way Crossovers	Low : High-cut	Hz	20	20000	500
	Mid : Low-cut	Hz	20	20000	500
	Mid : High-cut	Hz	20	20000	2900
	High : Low-cut	Hz	20	20000	2900
...4-Way Crossovers	Low : High-cut	Hz	20	20000	100
	Mid : Low-cut	Hz	20	20000	100
	Mid : High-cut	Hz	20	20000	500
	High-Mid : Low-cut	Hz	20	20000	500
	High-Mid : High-cut	Hz	20	20000	4000
	High : Low-cut	Hz	20	20000	4000
All-pass	Frequency	Hz	20	20000	160
	Order		1st-order or 2nd-order		1st-order
	Add Filters		1	6	1
	Composite				On
	Individual				Off
CD Horn	Frequency	Hz	2000	5000	5000
	Magnitude				On
	Phase				Off

Block	Parameter	Unit	Min	Max	Default
Misc: Level, Delay, Meter, Signal Generator					
Level	User Min	dB	-88	User max	-88
	User Max	dB	User min	12	12
	Gain	dB	-88	12	0
Delay: Simple	Off @ Min				On
	Mute				Off
	Delay	ms	0	Max	0
Delay: Distance	Max Delay	s	0.250005	20	0.250005
	Standard: Distance	ft	0	1000	0
	Standard: Temp.	F	-22	140	72
Delay: Video	Metric: Distance	m	0	300	0
	Metric: Temp.	C	-30	60	22
	Max Delay	ms	250.005	999.999	999.999
Pink Noise: Simple	Metric Units				Off
	Frame Rate				23.976 fps
	...23.976 fps NTSC	fps	0	12	
	...24 fps NTSC	fps	0	12	
	...25 fps PAL	fps	0	12.5	
	...29.97 fps NTSC	fps	0	15	
	...50 fps PAL	fps	0	25	
	...59.94 fps NTSC	fps	0	25	
	...60 fps NTSC	fps	0	25	
	Max Delay	ms	250.005	500.01	500.01
Pink Noise: Ramped	Amplitude (rms)	dBr	-100	0	-20
	Mute				On
	Min Amplitude	dBr	-100	Max -1	-100
Pink Noise: Swept	Max Amplitude	dBr	Min +1	0	0
	Ramp Time	min	0.1	180	
	Mute				On
Sine Wave	Manual Frequency	Hz	20	20000	1000
	Start Frequency	Hz	20	Stop -1	20
	Stop Frequency	Hz	Start +1	20000	20000
	Steps		1	255	100
	Dwell Time	ms	10	2000	20
	Repeat				Off
	Amplitude (rms)	dBr	-100	0	-20
Meter	Mute				On
	Frequency	Hz	20	2000	1000
	Amplitude (rms)	dBr	-100	0	-30
	Mute				On
	no controls	dBFS	-60	0	
		dBr	-40	20	

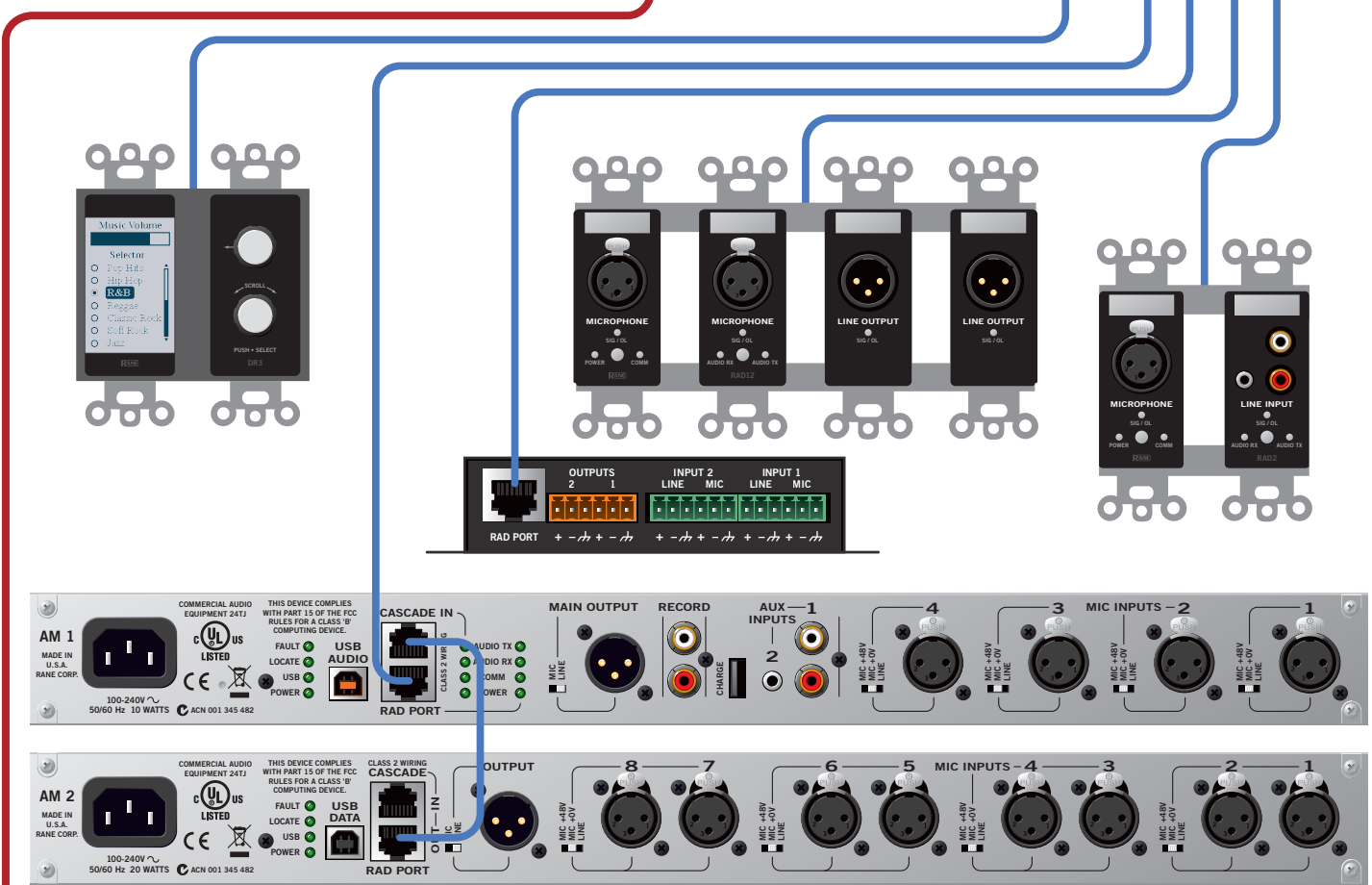
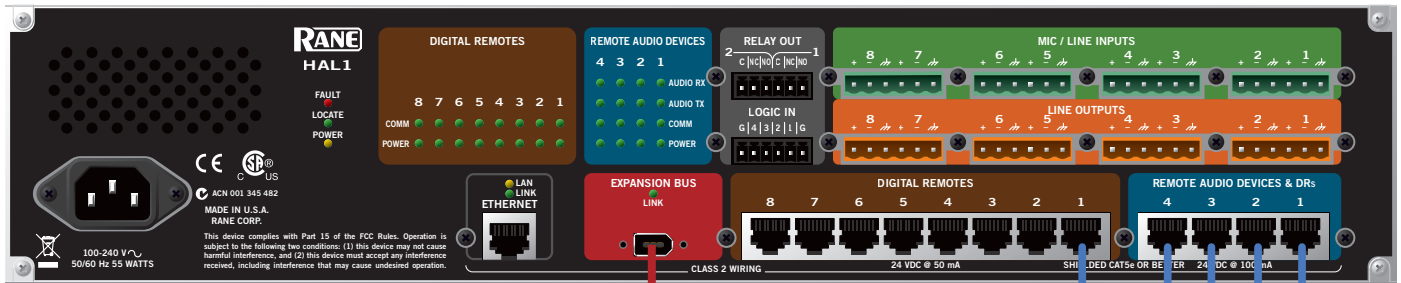


Block	Parameter	Unit	Min	Max	Default
Mixers					
Mixer	Crosspoint Level	dB	-120	0	0
	Output Level	dB	-120	0	0
	Output User Max	dB	User min	0	0
	Output User Min	dB	-120	User max	-120
	Output Off @ Min				On
	Inputs		2	80	2
	Mute				Off
Matrix Mixer	Crosspoint Level	dB	-120	0	0
	Crosspoint Enable				Off
	Output Level	dB	-120	0	0
	Output User Max	dB	User min	0	0
	Output User Min	dB	-120	User max	-120
	Output Off @ Min				On
	Crosspoints		2	1024	2 in x 2 out
Automixer (Gainsharing)	Mute				Off
	Crosspoint Priority				Off
	Output Level	dB	-120	0	0
	Output User Max	dB	User min	0	0
	Output User Min	dB	-120	User max	-120
	Output Off @ Min				On
	Mute				Off
Matrix Automixer (Gainsharing)	Priority Level	dB	0	60	6
	Crosspoint Priority				Off
	Crosspoint Enable				Off
	Output Level	dB	-120	0	0
	Output User Max	dB	User Min	0	0
	Output User Min	dB	-120	User max	-120
	Output Off @ Min				On
Selector	Mute				Off
	Priority Level	dB	0	60	6
	Crosspoint Priority				Off
	Crosspoint Enable				Off
	Output Level	dB	-120	0	0
	Output User Max	dB	User Min	0	0
	Output User Min	dB	-120	User max	-120
Priority Selector	Output Off @ Min				On
	Mute				Off
	Input #		2	80	Input 1
	Priority Input #		0	80	None
	Input #		2	80	Input 1
	Detector Threshold	dBFS	-85	0	-60
	Detector Low-cut	Hz	40	400	40
Detector High-cut	Hz	400	4000	4000	
Detector Hold Time	s	1	60	3	
Detector Ramp Rack	s	0.0	30.0	3.0	
Router	Output #		2	80	Output 1



Block	Parameter	Unit	Min	Max	Default
Paging Station (PS)	Scenarios / Talk				Talk Off
PS: Level	User Min	dB	-88	User max	-88
	User Max	dB	User min	12	12
	Gain	dB	-88	12	0
	Off @ Min				On
	Mute				Off
PS: Compressor	Threshold	dBFS	-60	0	-40
	Ratio	n:1	1	10	2
	Gain	dB	-12	12	0
PS: PEQ	Low-cut Frequency	Hz	20	20000	160
	High-cut Frequency	Hz	20	20000	12000
	Filter 1 Frequency	Hz	20	20000	500
	Filter 2 Frequency	Hz	20	20000	3000
	Filter Gain	dB	-15	12	0
	Filter Bandwidth	Oct	0.015	4	0.5
	Magnitude				On
Paging Zone	Phase				Off
	Composite				On
	Individual				Off
	Ducker Depth	dB	0	85	12
	Ramp Back	s	0	10	3
	Page Gain User Min	dB	-88	User max	-88
	Page Gain User Max	dB	User min	12	12
	Page Gain	dB	-88	12	0
	Page Gain User Min	dB	-88	User max	-88
	Page Gain User Max	dB	User min	12	12
Emergency Page Zone	Page Gain	dB	-88	12	0
	Zone Processor (ZP)				
	ZP: Priority Selector				
ZP: Level	Priority Input				None
	Input				Input 1
	Threshold	dBFS	-85	0	-60
	Low-cut	Hz	40	400	40
	High-cut	Hz	400	4000	4000
	Hold Time	s	1	60	3
	Ramp Back	s	0	10	3
	User Min	dB	-88	User max	-88
	User Max	dB	User min	12	12
	Gain	dB	-88	12	0
ZP: Paging Zone	Off @ Min				On
	Mute				Off
	Ducker Depth	dB	0	85	12
	Ramp Back	s	0	10	3
	Page Gain User Min	dB	-88	User max	-88
Page Gain User Max	dB	User min	12	12	
Page Gain	dB	-88	12	0	

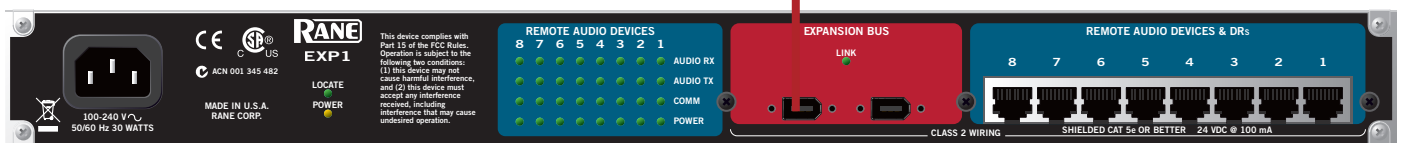
HAL1 Multiprocessor



The Rane HAL1 has four RAD ports: from 2x2 I/O to 64 inputs each. Eight Digital Remote Ports allow simple user control wherever it is needed.

Add up to four EXP1 Expansion Units with Firewire daisy-chain connection, providing 8 more RAD ports each. Connect lots more RADs, DRs, and AMs wherever they are needed.

EXP1 Expansion Unit



Visit rane.com/hal for more applications, product details, and Halogen software.