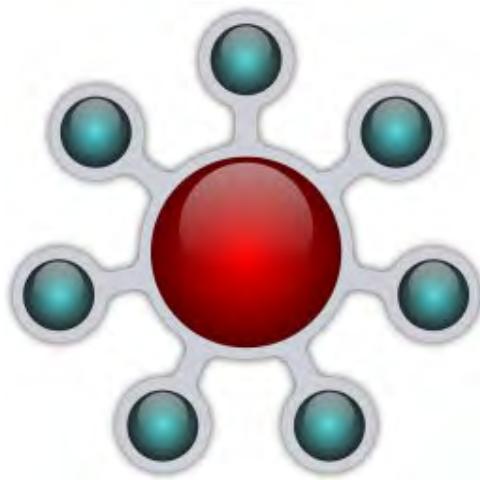


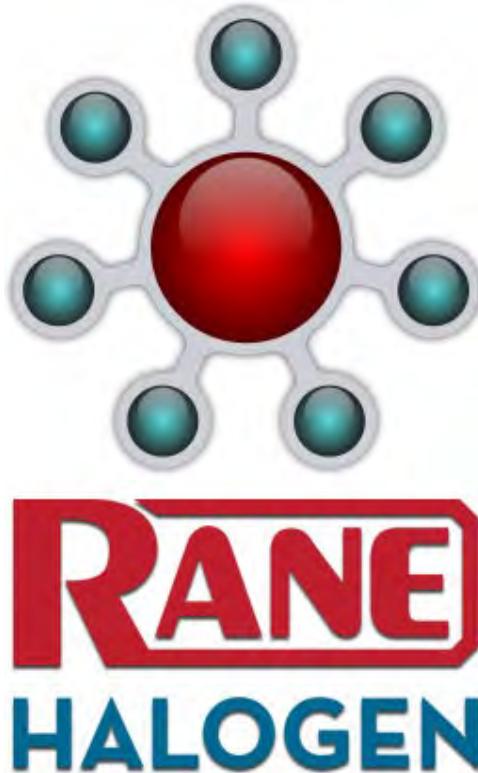
Meet HAL

Rane's New Expandable

DSP Platform



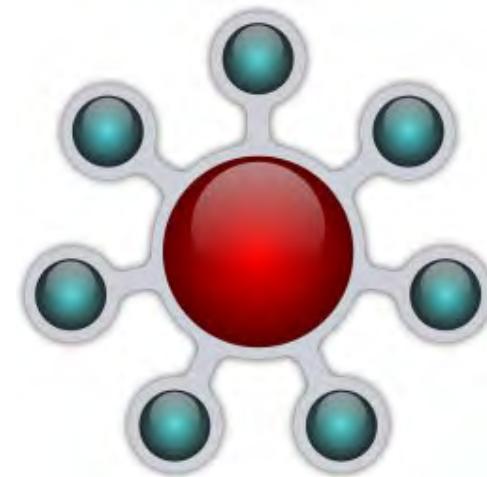
Introducing HAL® DSP Products



The HAL Family

- Five New Hardware products:
 - HAL1 - DSP brain
 - EXP1 - RAD & DR Expander
 - PAGER1 RAD Paging Station
 - Three Digital Remotes: DR1, DR2, DR3
 - All 20 Existing RADs also supported
- New Software: Halogen
- All engineered, designed, built, tested & supported in Mukilteo, WA USA

NEW HAL® EXPANDABLE DSP



- HAL: Heuristic Audio Laboratory
 - Heuristic - *serving to find out or discover*. Also a problem-solving technique using iterative solutions
- New HAL permits:
 - Expandability of HW, SW, FW, Apps, Profits
- HAL's origins
 - Target new customer application problems
 - Talk to customers, understand current solutions, careful study & research

HAL target applications

- Music & paging systems - retail/restaurant
- Auditorium/church/theater
- Room combining, overflow (cry room)
- Also studied conferencing systems
 - But different DSP architecture & power required by acoustic echo canceling moved this to “down the road”

HAL Goals

- Greater flexibility & power, yet simpler to manage and configure
 - Insanely powerful, insanely easier
- You don't have to be smart to use it, using it makes you smart - i.e., educate
- Opens new apps & customers

What HAL brings to the party

1 of 6

- **Expand audio *and control***
 - Audio begins and ends far beyond rack room
 - Old school analog (conduit) is supported, but this century's approach is supported too: RADs, DRs, EXPs...
- *Plug it in, it works*
 - Auto addressing, auto firmware & auto configuration settings
 - Device behaviors follow physical location
 - Plug in RADs, PAGER1 and/or DRs in other locations, their settings change! (portable cart friendly)
 - All peripheral devices' firmware is stored in the HAL1 brain and automatically sent to devices when plugged in

What HAL brings to the party

2 of 6

- Device Connection
 - HAL1 auto-checks all CAT5 crimps; both ends
 - HAL1 auto-verifies audio to/from RADs works
 - HAL1 auto-verifies devices are plugged in to the correct place
 - Mismatches between HW & SW are easily corrected during setup - *without rewiring the rack!*

What HAL brings to the party

3 of 6

- RAD Story - for audio I/O outside the rack
 - A/D & D/A Converters at the wall
 - 500 ft. homeruns - 66% farther than Ethernet
 - CAT5 digital audio cables in data cable tray
 - BIG conduit savings, IT folk friendly
 - Endless variety of audio I/O available
 - Expanded control: AM1, AM2, PAGER1

What HAL brings to the party

4 of 6

- Digital Remote (DR) Story - control is key 99% of the time
 - Simple end user remote interfaces sell the rack box(es)
 - DR thou\$and\$ less than 3rd-party control (AMX, Crestron...)
 - Easy setup & integration w/ auto config, auto verify (no power budget, no termination)
 - Dynamic remote labeling - all w/ LCD display

What HAL brings to the party

5 of 6

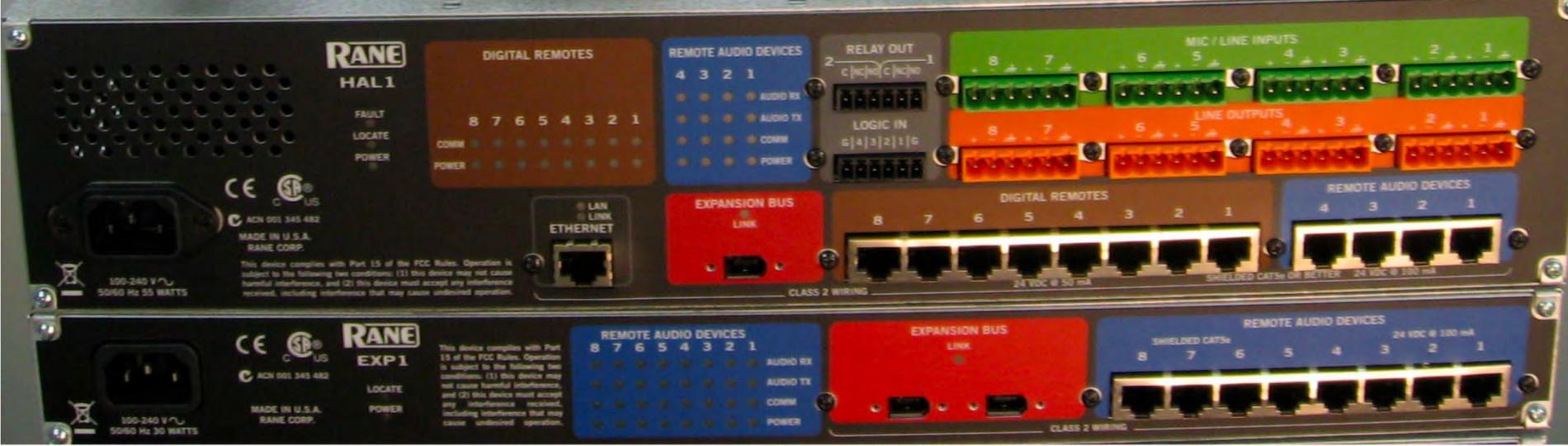
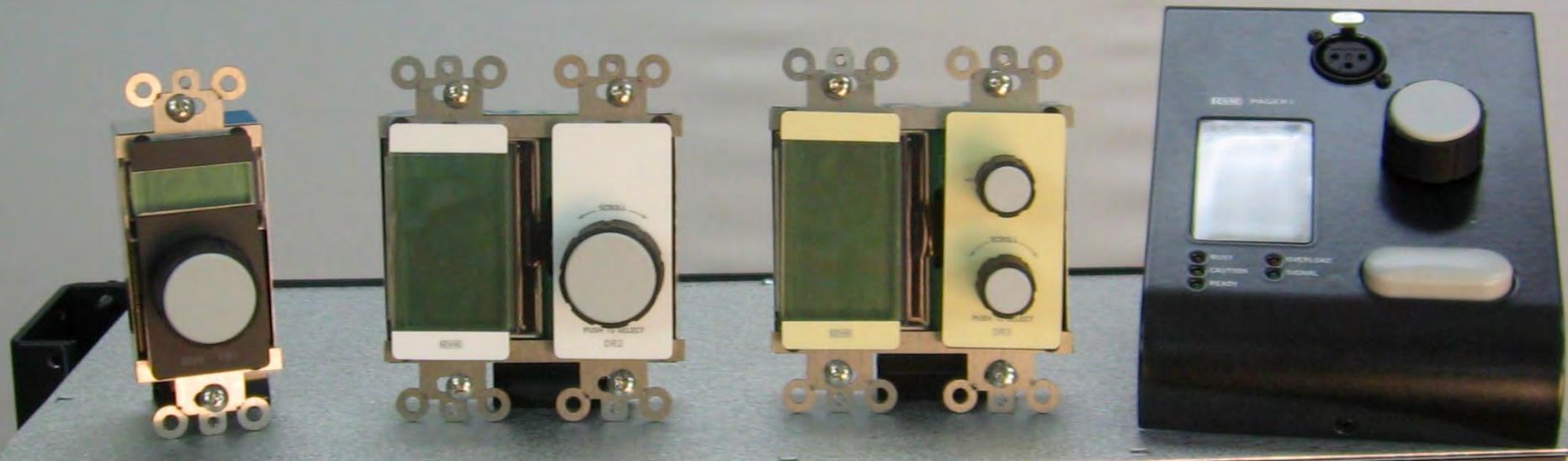
- EXPansion Story - audio & control
 - 64 x 32 audio channels & control expansion
 - Up to four, 16 channel EXPs into HAL1
 - Up to twenty-four, 32 channel EXPs out of HAL1
 - Endless variety of audio I/O - plug in RADs, PAGER1, DRs
 - Endless application-specific solutions
 - More EXP devices on the way

What HAL brings to the party

6 of 6

- The most advanced DSP blocks anywhere
 - Paging System™ auto links dozens of BGM/Paging sources to dozens of zones without wires
 - Paging Manager easy pager-to-zone mapping
 - Room Combining approach will change all future industry expectations
 - The Rane AM2 portable automixer for “talking head” meetings automatically cascade with the rack room HAL DSP room combine processor block.
 - This permits gain-sharing between the audience mic plugged in to the back wall’s XLR jack and the portable mixer’s mics.

Hardware Family



HAL System Audio Channels

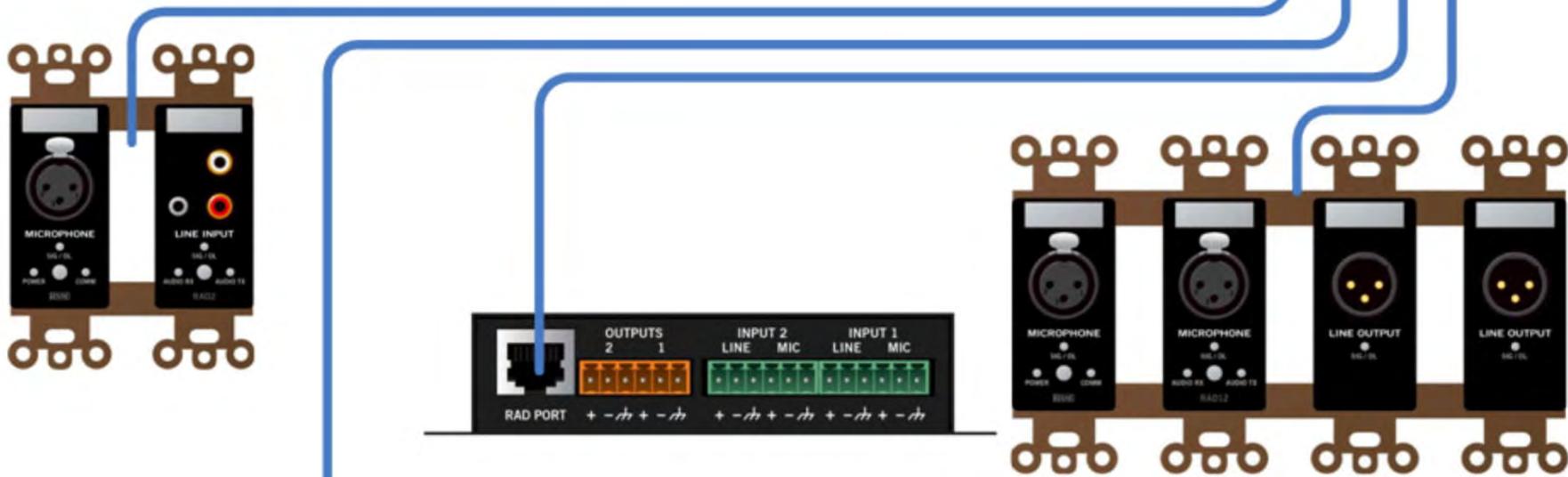
INPUTS

OUTPUTS

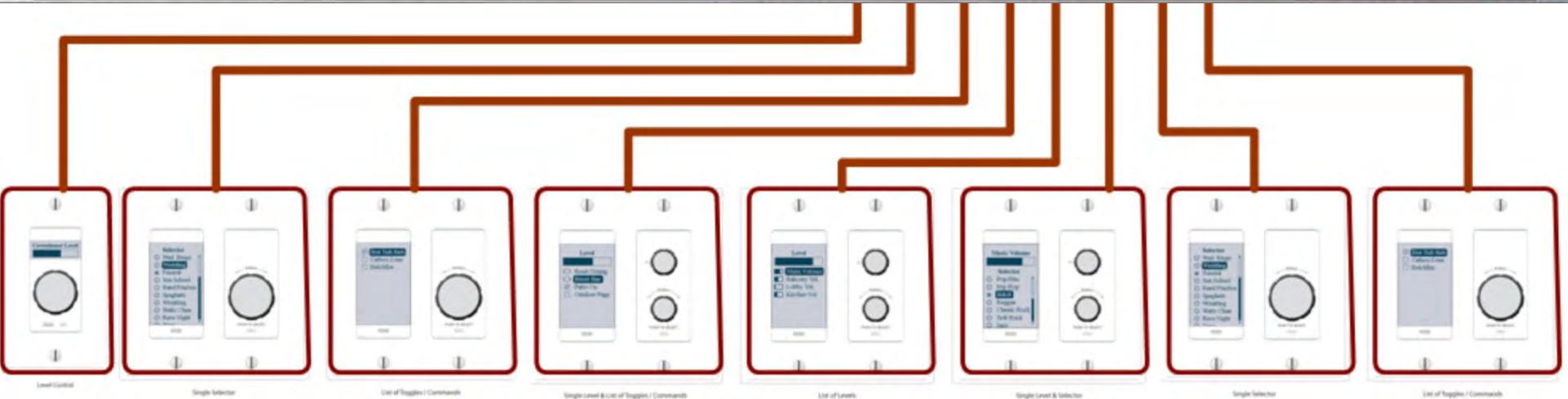
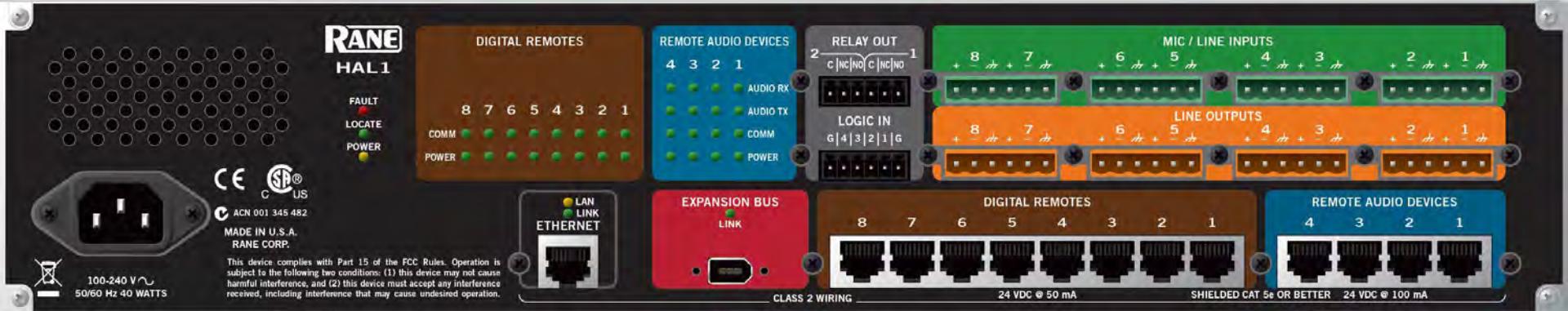
Analog mic/line	8	8 Analog line
Digital RAD ports	8	8 Digital RAD ports
Digital Expansion into HAL1	64	32 Digital Expansion out of HAL1
Total in HAL1 DSP Brain	80	48



HAL1 - DSP Brain



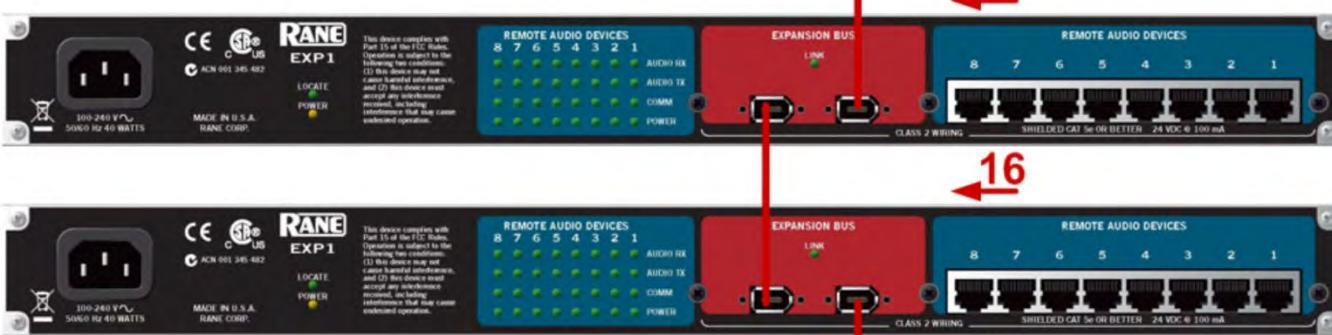
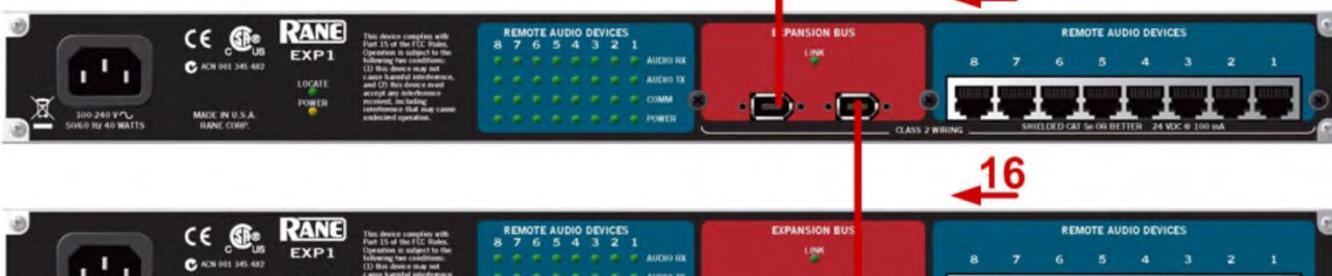
4 RAD Ports: from 2x2 I/O to 64 inputs. Audio where it's needed.
Homerun connection: auto-checks CAT5 crimp & verifies audio.
20 models: RADs, PAGER1, AM1 & AM2 Automixers & 3 DRs.



8 Digital Remote Ports: DR1, DR2, DR3
Homerun Connection: auto-checks CAT5 crimp.
Hot-swapping encouraged. Each with customizable backlit LCDs

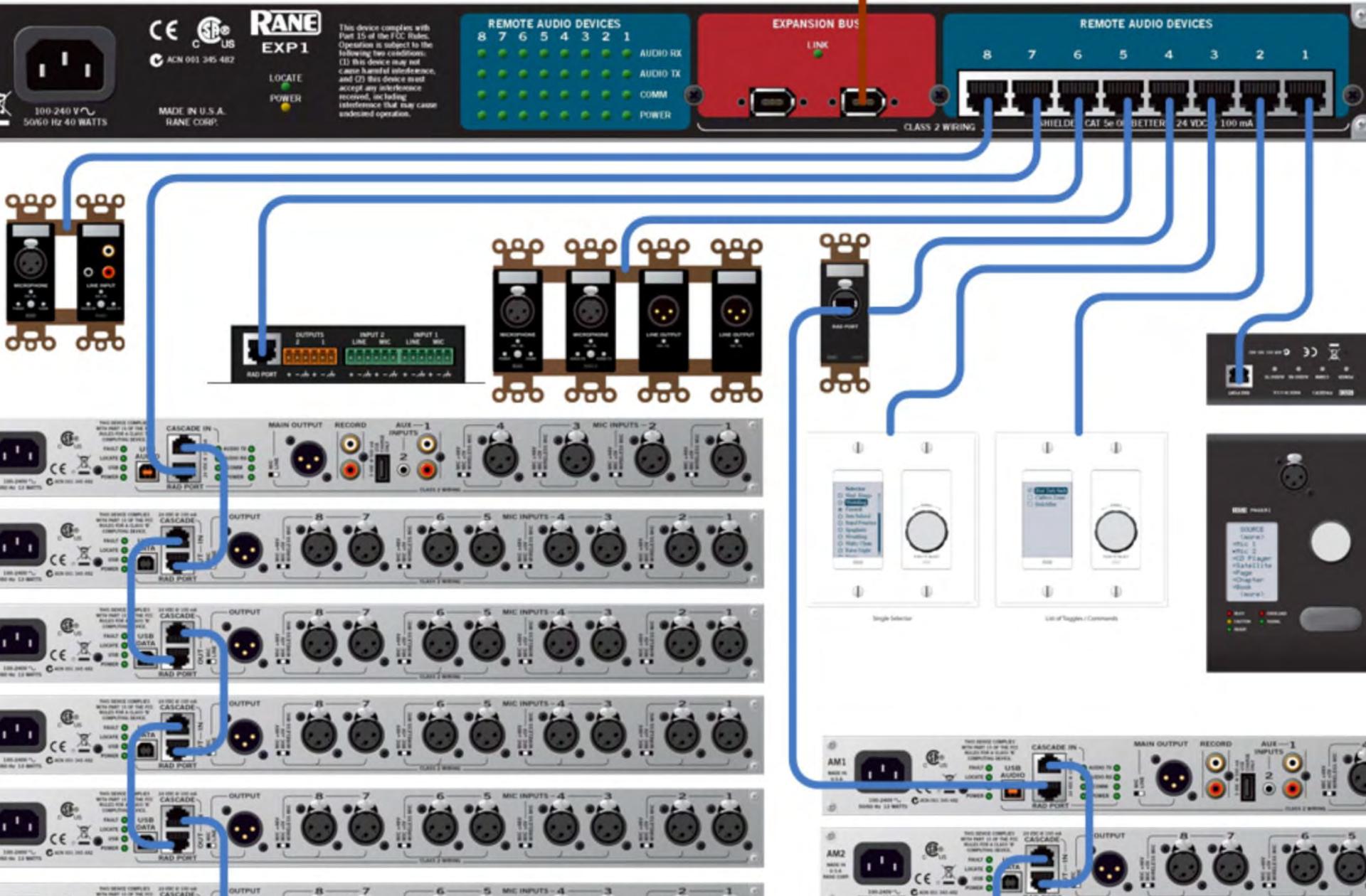
HAL1 - EXP1 Expansion Unit

- RAD & DR Expander



- Max of four EXP1 devices
- Supports RADs and DRs

More Expansion

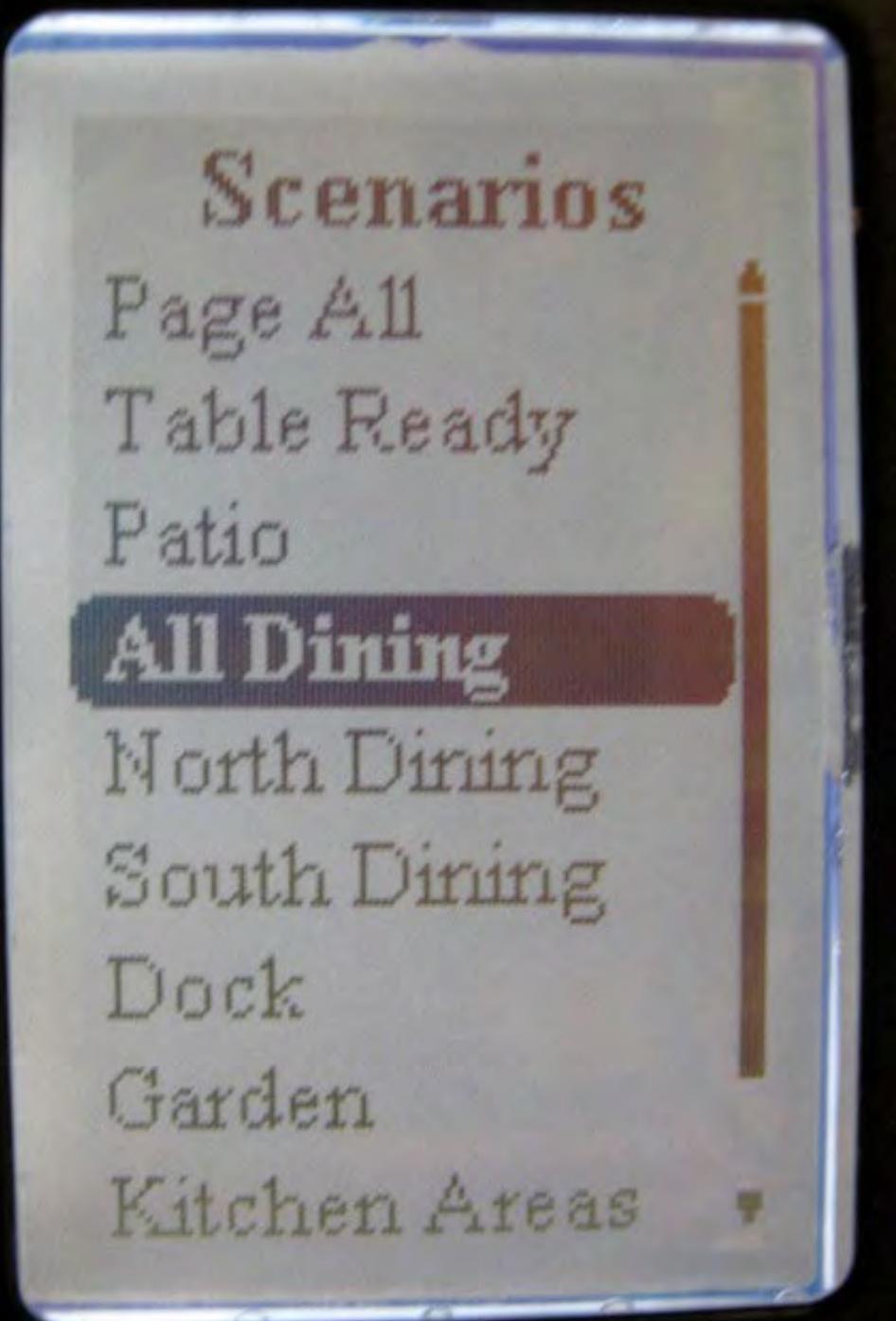


PAGER1 RAD



- Mic stage RAD
 - SW adjust
- *Scenario* (group of zones) LCD list
- Select knob, push-to-talk
- Status indicators

PAGER1 Scenarios screen



Three Digital Remotes

- DR1
 - Volume control



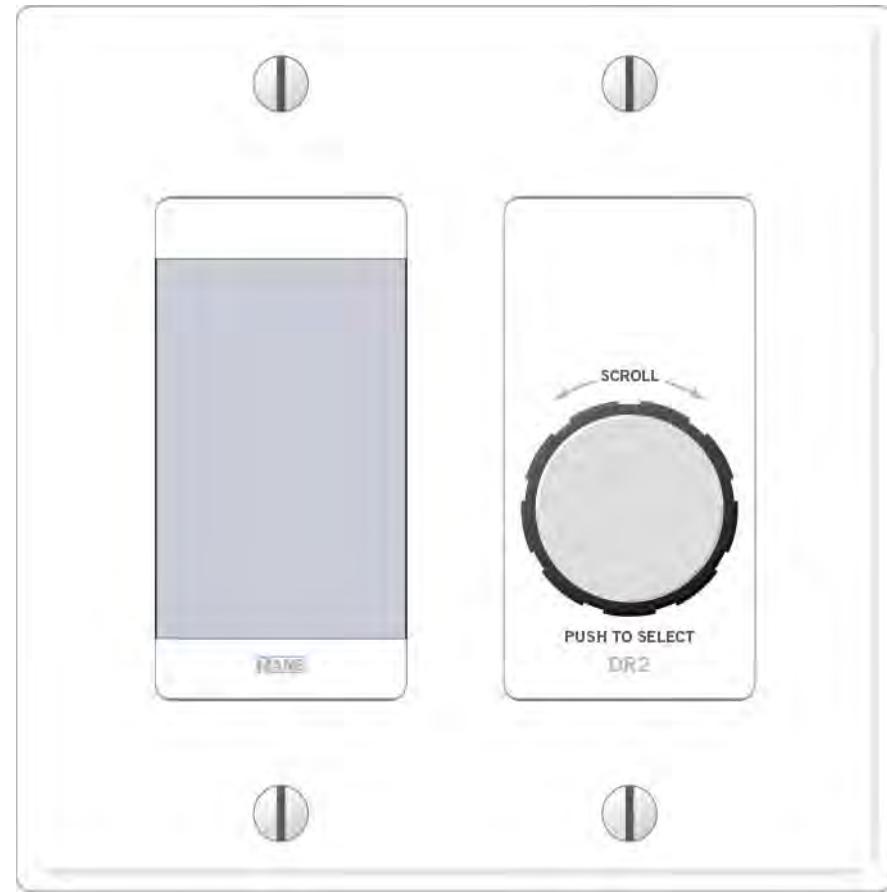
DR2

- Preset Recall:
 - Single Selector
 - “Radio buttons”



DR2

- Preset Recall:
 - List of Toggles or Commands





DR3

- Single Level & Select
 - “Source select & volume”



DR3

- Single Level & List of Toggles /Commands
 - Preset Recall + Level

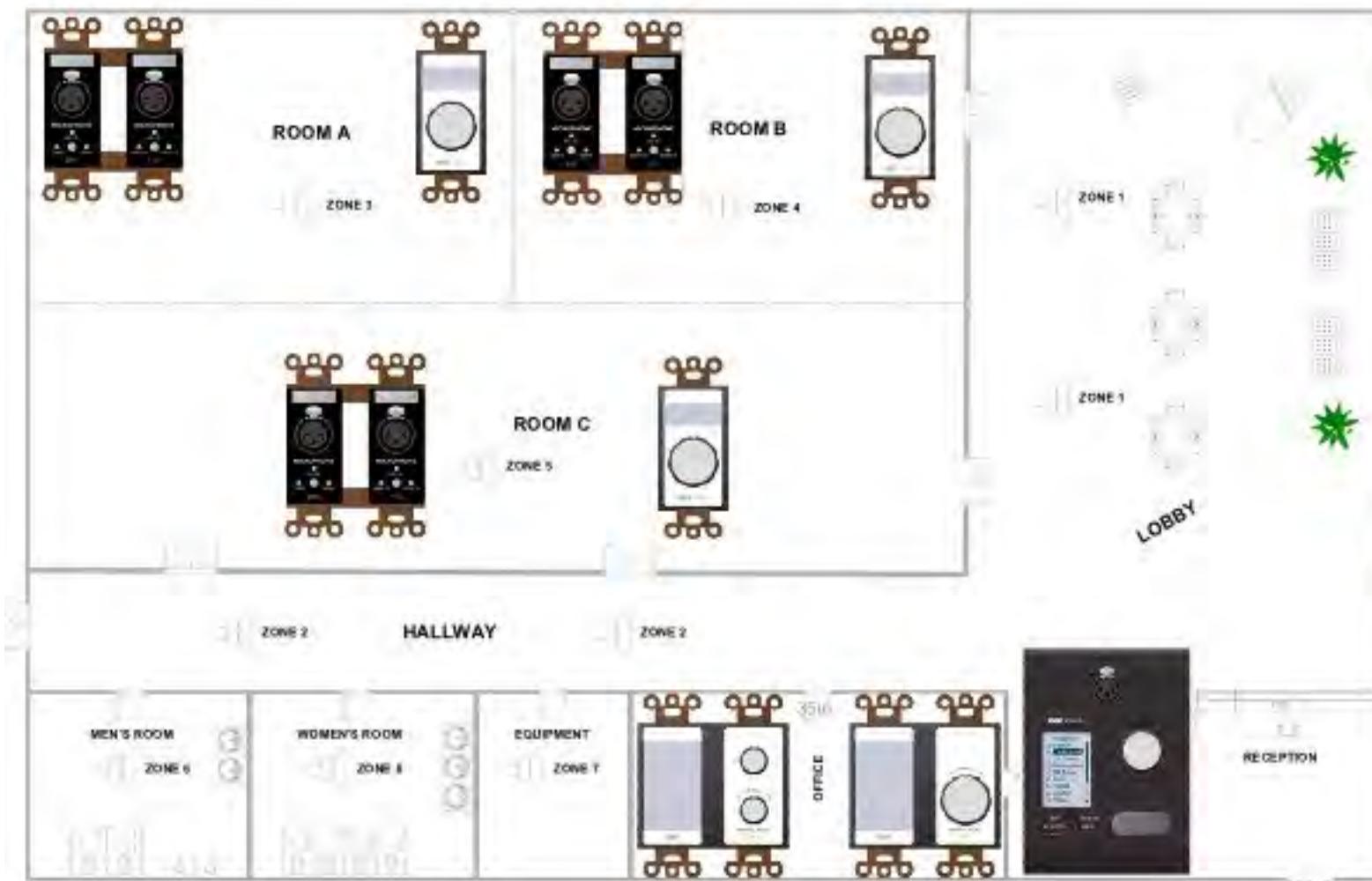


DR3

- List of Levels
 - “Multi-zone Volume control”
 - Simple remote Input mixing -or-
 - Multi-room volume control

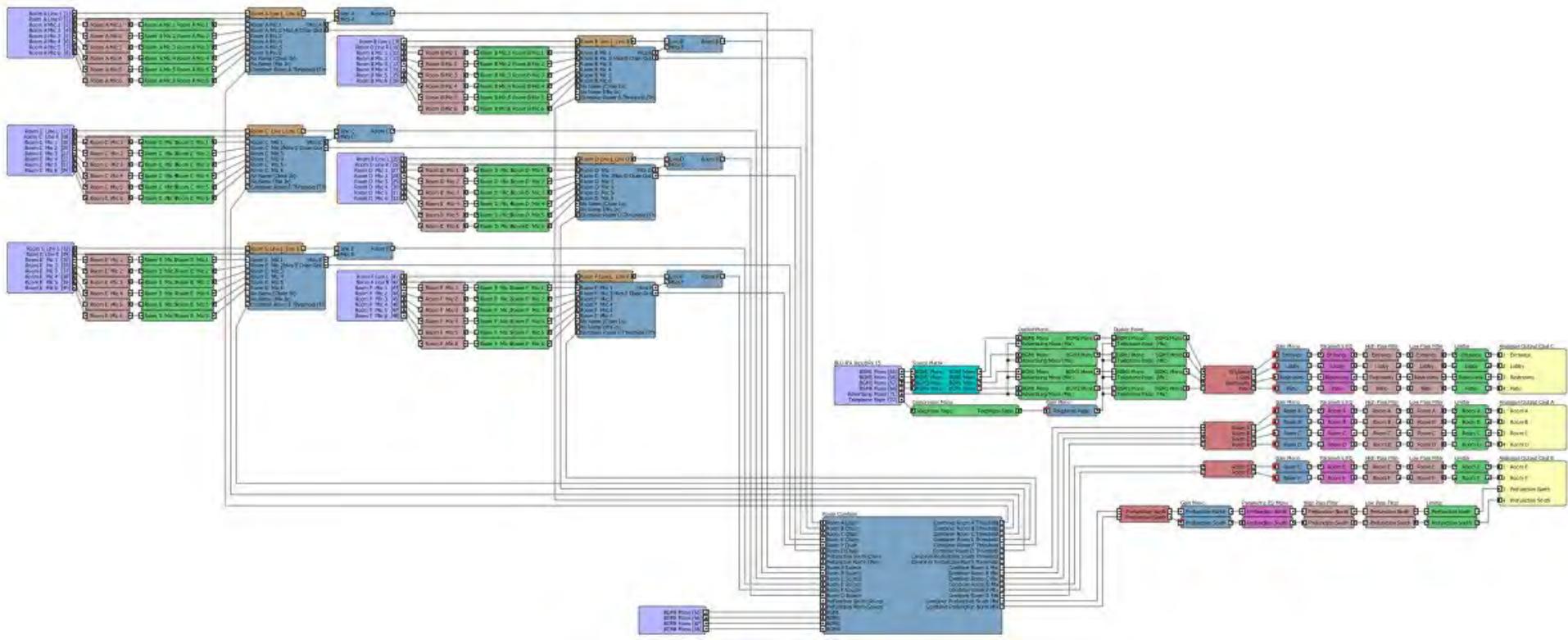


Halogen Software: Hotel du Jour



6 Room Combine Compare

- BSS: 183 blocks, 271 wires. No paging into room combine



6 Room Combine Compare



- Rane Halogen: 171 blocks, 162 wires
- And the Rane solution permits paging into the room combine rooms

Conclusions

- Do larger, formerly complex jobs fast with WAY fewer wires, no presets and intuitive control linking
- Paging system eases pager-to-zone map
- Verify control linking behaviors offline
- Verifies connections (CAT5), audio...
- Behavior changes: plug it in, it works
- Gain-share mix between wall mic jacks, portable mics and rack-connected mics

Thank You!

