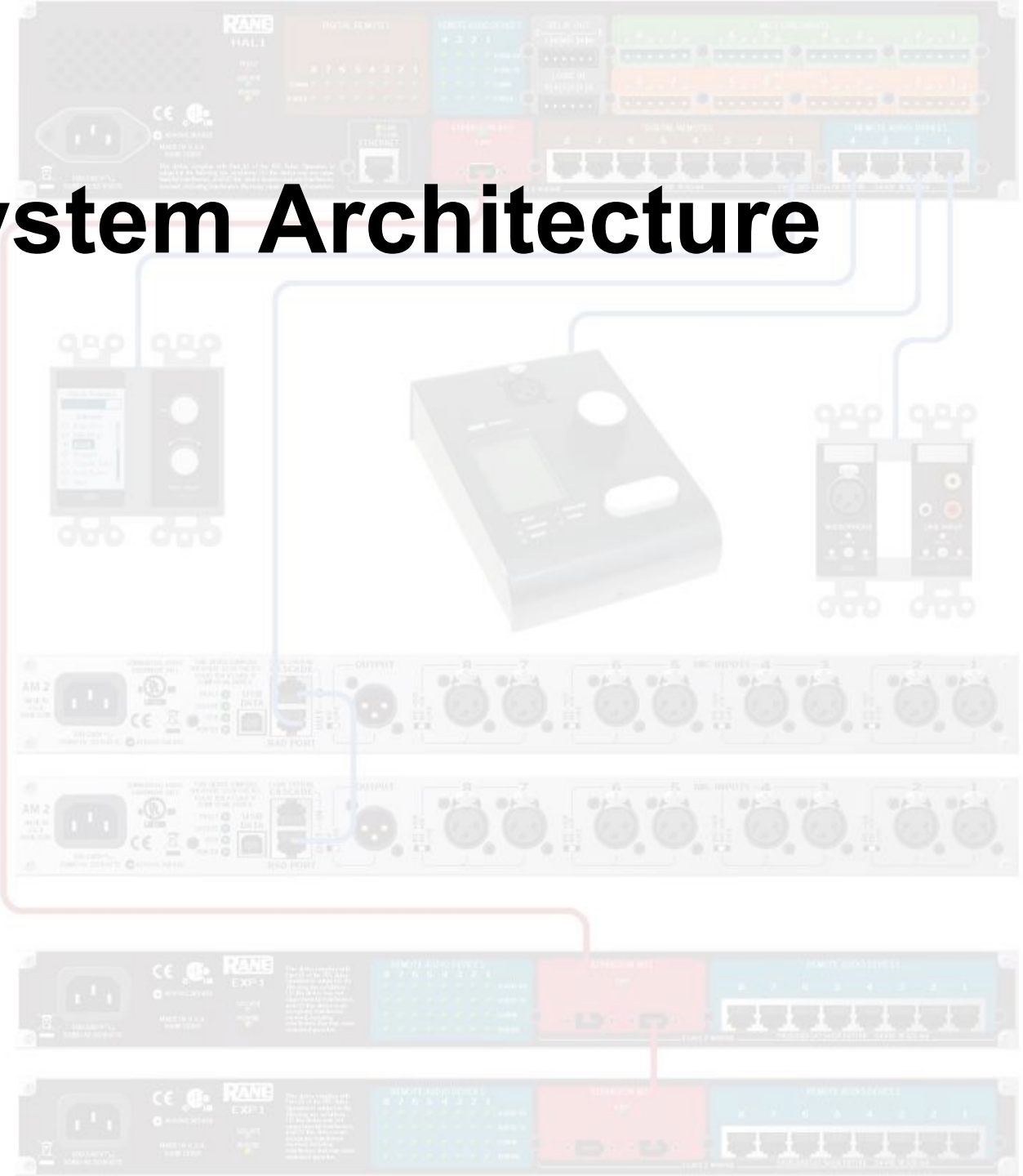
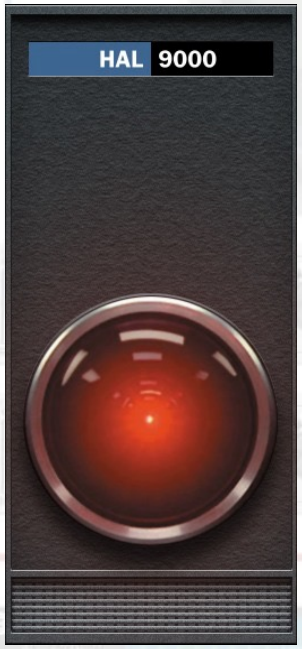
HAL System Architecture



RANE

HALOGEN

HAL System Architecture



RANE

HALOGEN

Outline

Outline

- **Drag-and-Drop Audio Systems**

Outline

- Drag-and-Drop Audio Systems
- **HAL DSP Target Applications**

Outline

- Drag-and-Drop Audio Systems
- HAL DSP Target Applications
- **HAL Architecture**

Outline

- Drag-and-Drop Audio Systems
- HAL DSP Target Applications
- HAL Architecture
  - **How the pieces fit & work together**

Outline

- Drag-and-Drop Audio Systems
- HAL DSP Target Applications
- HAL Architecture
  - How the pieces fit & work together
  - **Products:**

Outline

- Drag-and-Drop Audio Systems
- HAL DSP Target Applications
- HAL Architecture
  - How the pieces fit & work together
  - Products:
    - **4 Main *HAL* Brain models**

Outline

- Drag-and-Drop Audio Systems
- HAL DSP Target Applications
- HAL Architecture
  - How the pieces fit & work together
  - Products:
    - 4 Main *HAL* Brain models
    - **6 *DRs* Digital Remotes for Control**

Outline

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  - How the pieces fit & work together
  - Products:
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    - 6 *DRs* Digital Remotes for Control
    - **22 *RADs* Remote Audio Devices: Convert @ walls**

Outline

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    - **5 *EXPs* Expand audio & control @ racks**

Outline

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    - 22 *RADs* Remote Audio Devices: Convert @ walls
    - 5 *EXPs* Expand audio & control @ racks
      - **Includes a Dante Expander, the EXP2x**

Outline

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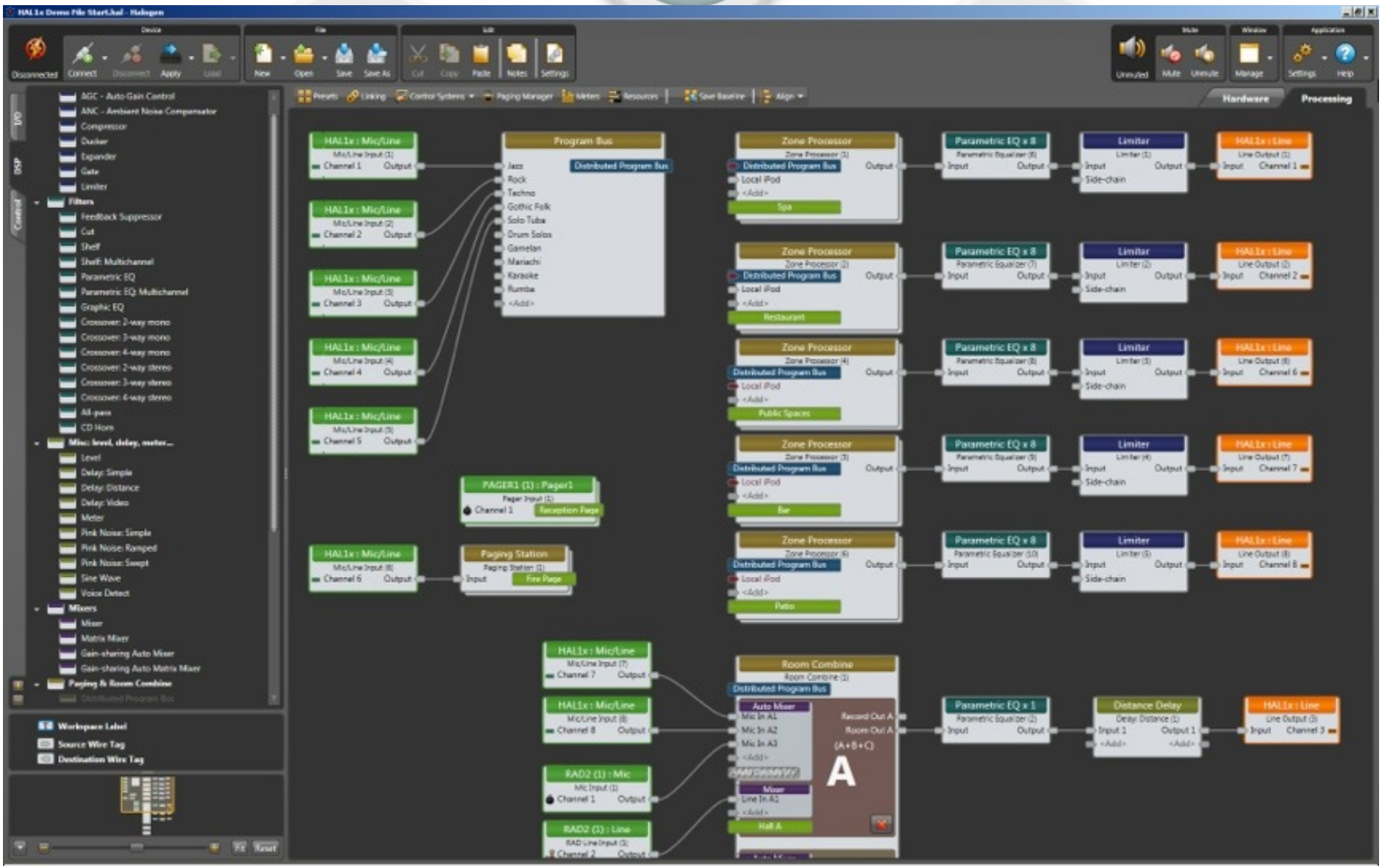
    - 5 *EXPs* Expand audio & control @ racks
      - Includes a Dante Expander, the EXP2x
  - ***"Get on the Plane"*** **Indicator vs job site "Punch Lists"**

Drag-and-Drop Audio

Drag & Drop Halogen Software

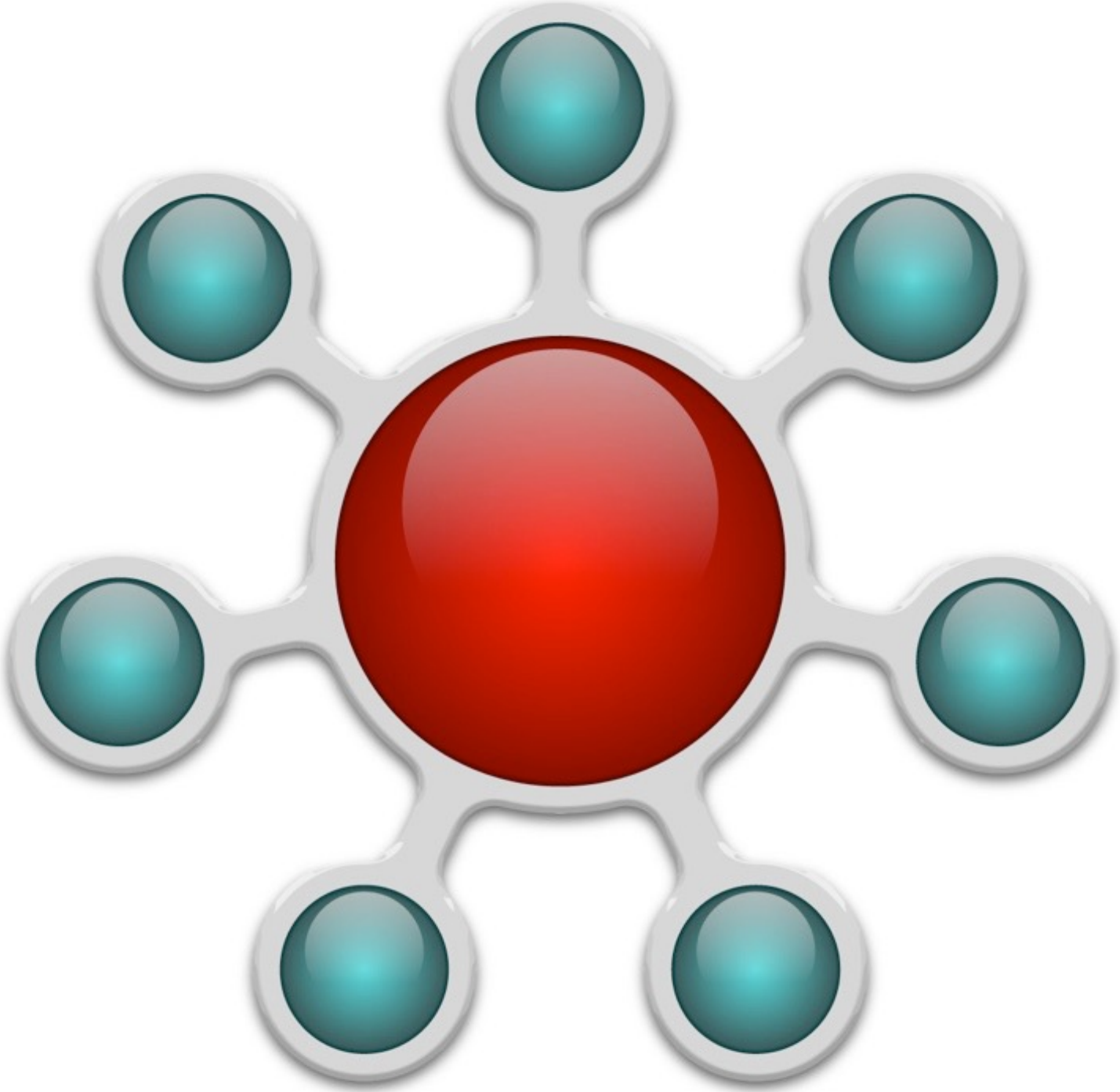


HAL Target Applications

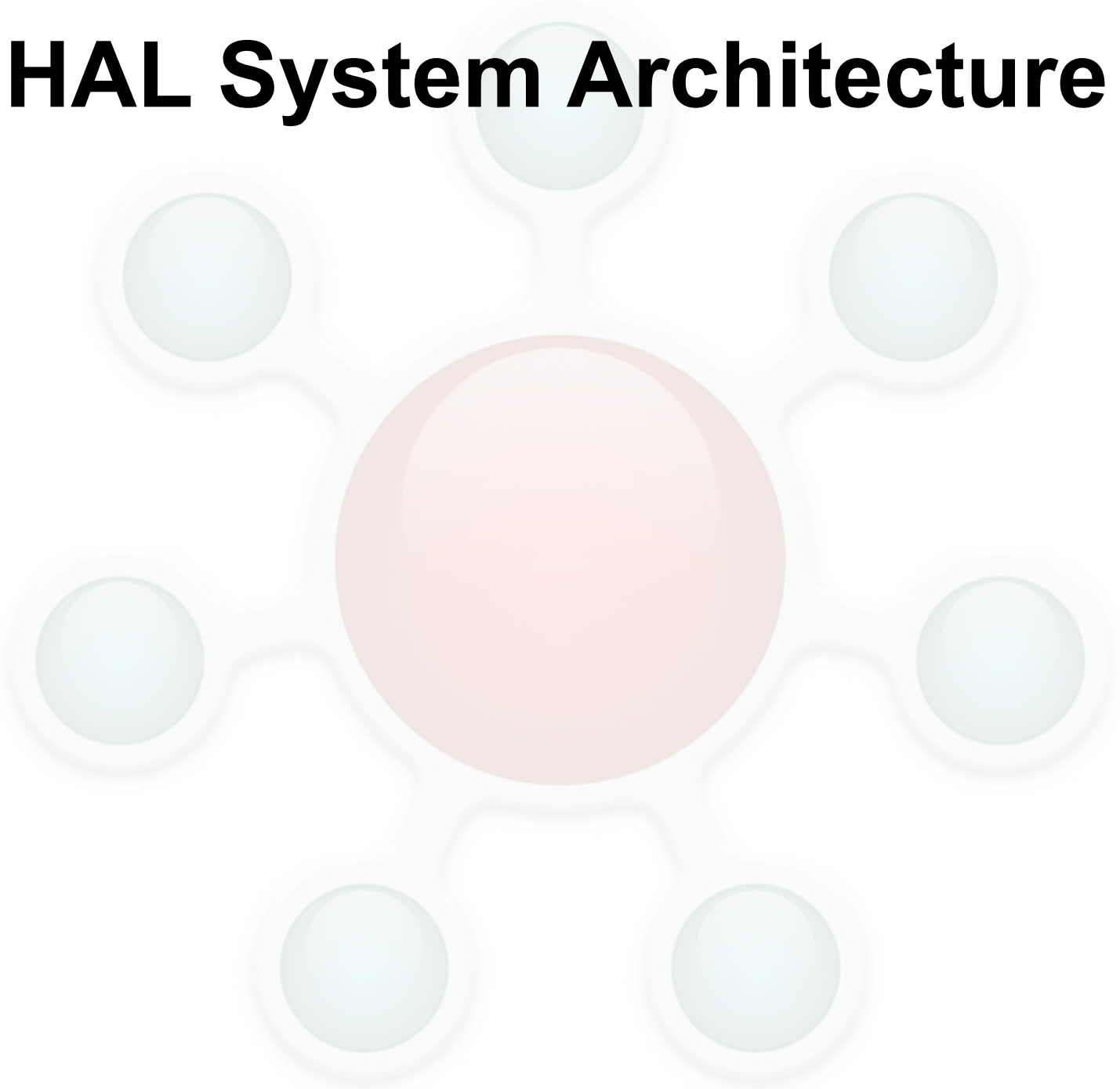
- Music & paging systems - retail/restaurant
- Auditorium, church, theater
- Meeting rooms, convention spaces, conference rooms
- Room combining, overflow or prefunction room

Some HAL Installs

- AC Davis High School Gym, Yakima, WA
- Air Guard Facility, Fargo, ND
- Aritzia (retail), NY NY
- Arsenal Technical High School - Career Tech Center, Indianapolis, IN
- Atlantis water park, Herzogenaurach, Germany
- Avera St. Luke's Hospital multifunction space with room combine, Aberdeen, SD
- Barbagallo Raceway, Neerabup, WA, Australia
- Baths Hall (performance theatre), Scunthorpe, UK
- BJ's Brewhouse, somewhere? USA
- Brown Deer Fieldhouse, Brown Deer, WI
- Cafeteria, Southeastern Regional Vocational Technical High School, South Easton, MA
- Canada Bay Club, Five Dock, NSW, Australia
- Carrabbas on Kirby, Houston, TX
- Caterpillar (office), Australia
- CCH multi-room meeting & banquet facility, Kuala Lumpur, Malaysia
- Clwyd Theatr Cymru, Flintshire, UK
- Collège Boréal, Ontario, Canada
- Conference Center Room Combine, Boeing Company, Chantilly, VA
- Craigleith Ski Club (lodge), Collingwood, Ontario, Canada
- Crystal Pool and Fitness Centre, Victoria. BC
- Dali Art Museum, St. Petersburg, FL thedali.org
- Duquesne University, Chapel of the Holy Spirit, Pittsburgh, PA
- El Molino High School, Forestville, CA
- Express (retail), Mishawaka, WI
- Five Sullivan Bros Convention Cntr, Waterloo, IA
- Flint Islamic Center, Flint, MI
- Gatineau Golf Club, Aylmer, Quebec, Canada
- Gaylord Texas Resort, Grapevine, TX
- Hartville Hardware (330,000 sq feet), Hartville, OH
- Hilton Garden Inn, Las Vegas, NV
- HMS Santa Regina cruise ship, New Zealand
- Holiday Inn, North Vancouver, BC, Canada
- Homewood Flossmoor HS, Flossmoor, IL
- Hope Inn Hotel, Hindmarsh, Adelaide, Australia
- Hyatt Regency Grand Cypress, Orlando,FL& Louisville, KY
- Kissimmee Utility Authority boardroom, FL
- Kuakini Hospital, Honolulu, HI
- Main Event Entertainment, Katy, San Antonio & Shenandoah, TX
- Malibu Presbyterian Church, Malibu, CA
- Marriott Courtyards, Indianapolis,IN&Mankato MN
- Medical Office with room combine, Duncan, OK
- Miramar Cultural Center, Miramar FL
- Morinville Cultural Centre, Morinville, Alberta
- Nobu Sushi House, Malibu, CA
- Oak Bay Beach Hotel, Victoria BC, Canada
- Operatorium (remote operating room for education), undisclosed location (military)
- Orchestra Hall, Minneapolis, MN
- PNW Univ 300 student combinable classroom, Yakima, WA
- Perkins Park Club, Stuttgart, Germany
- Port Colborne Centre, Port Colborne, Ontario, Canada
- Public Safety Academy, Enfield, CT
- Radisson Blu Hotel, Bloomington, MN
- Ramada, Leipzig, Germany
- Red Lion Hotel, Seattle, WA
- Regent Hotel, undisclosed location

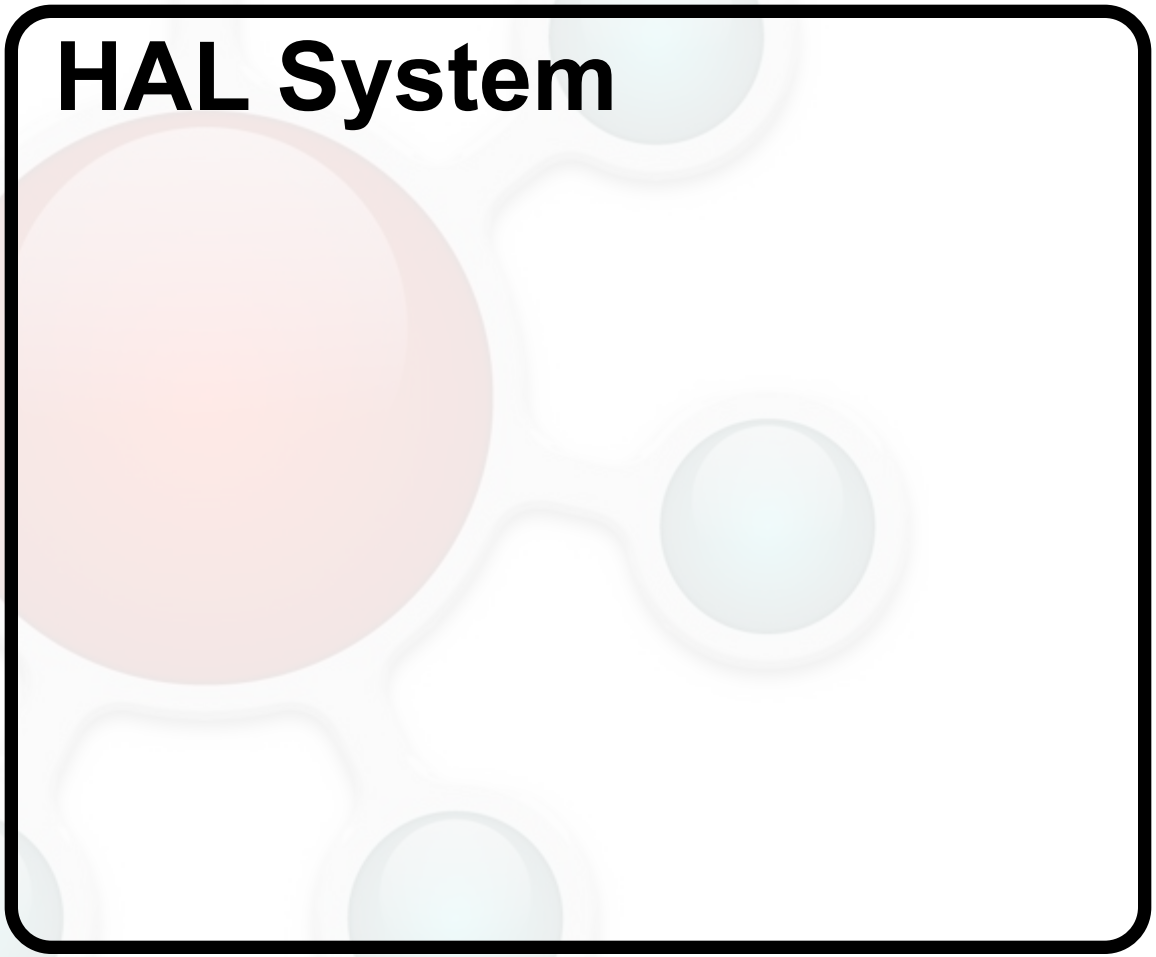


HAL System Architecture



HAL System Architecture

Audio Solution:

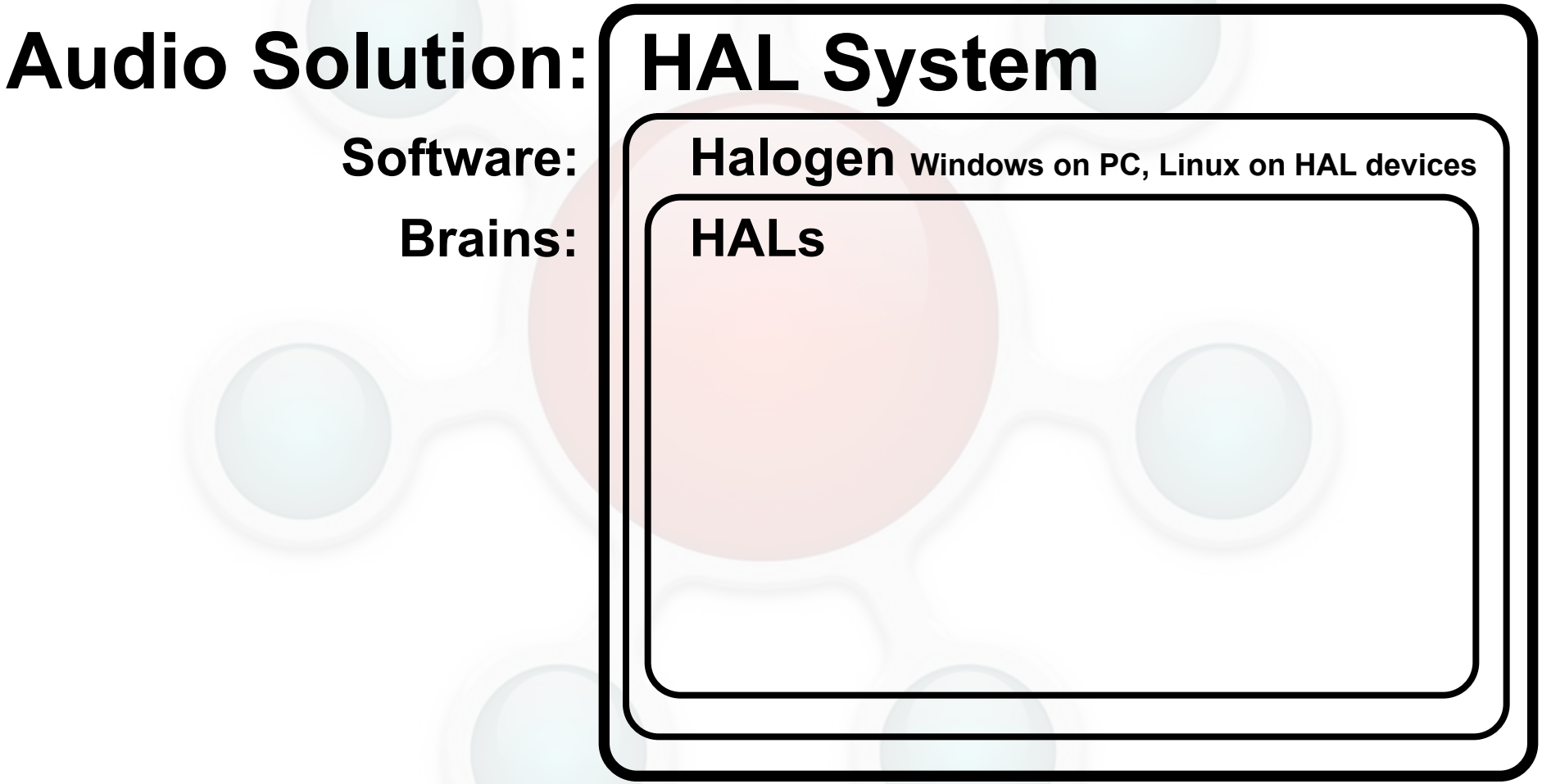


HAL System Architecture

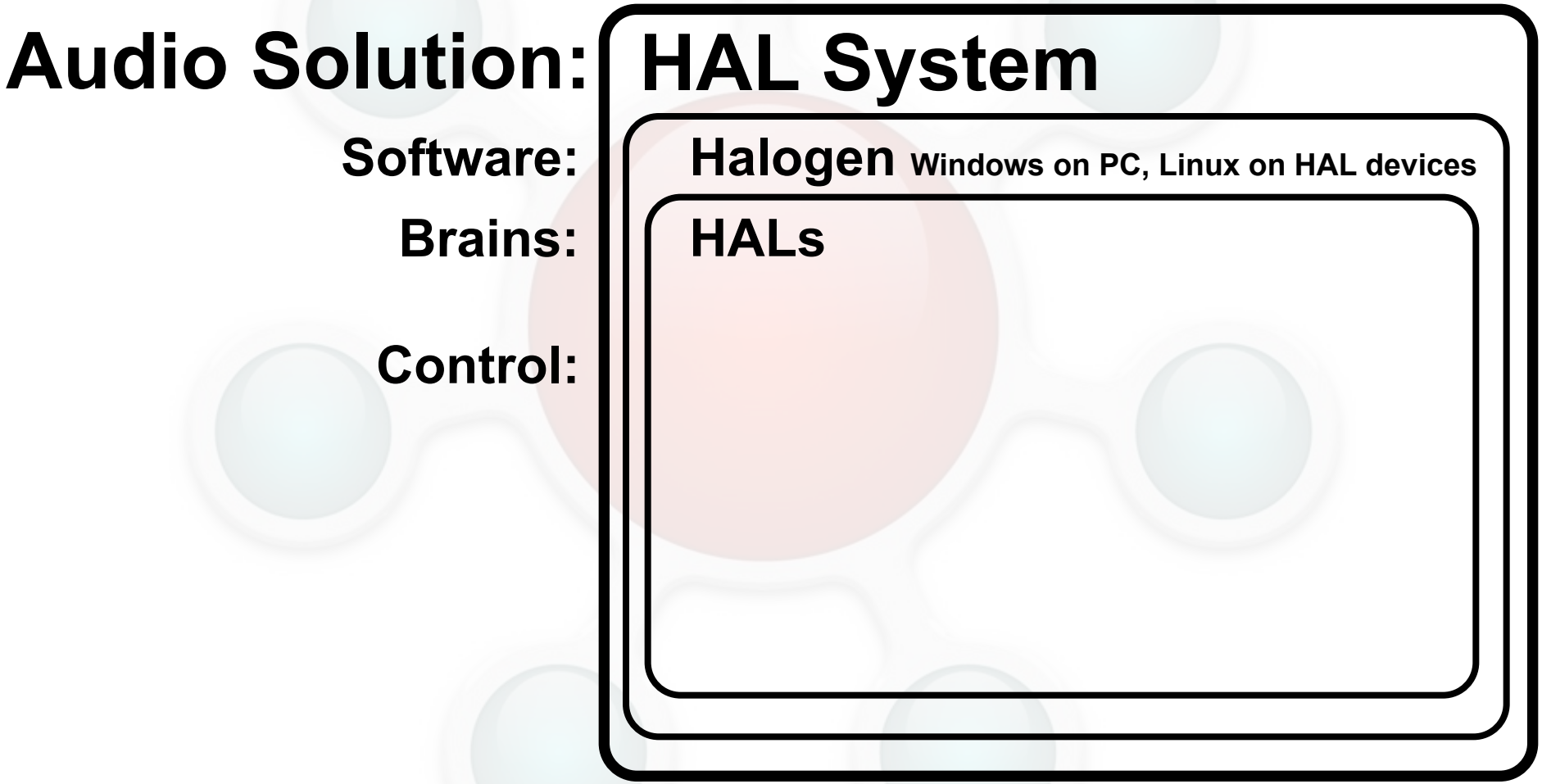
Audio Solution: **HAL System**

Software: **Halogen** Windows on PC, Linux on HAL devices

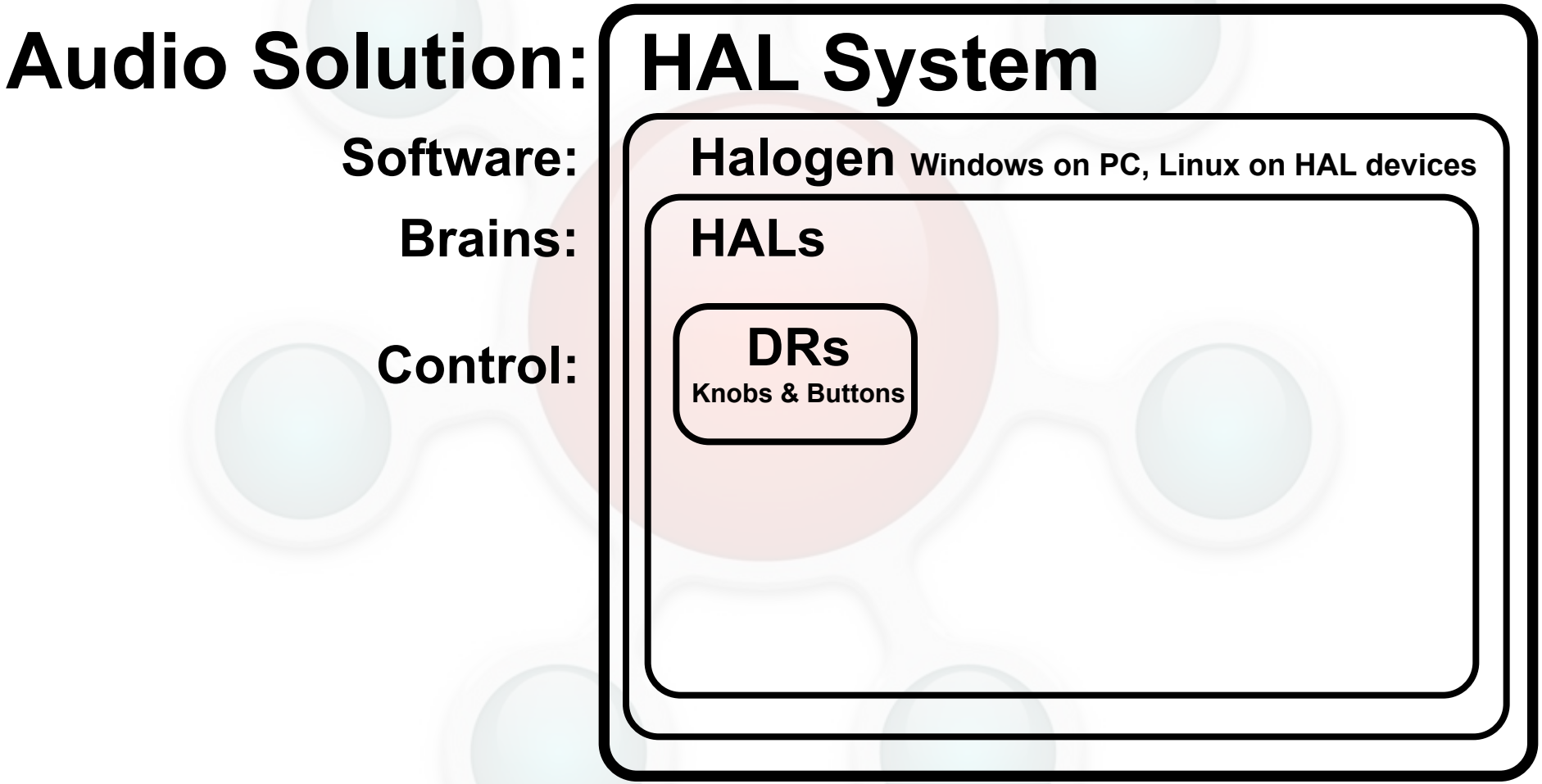
HAL System Architecture



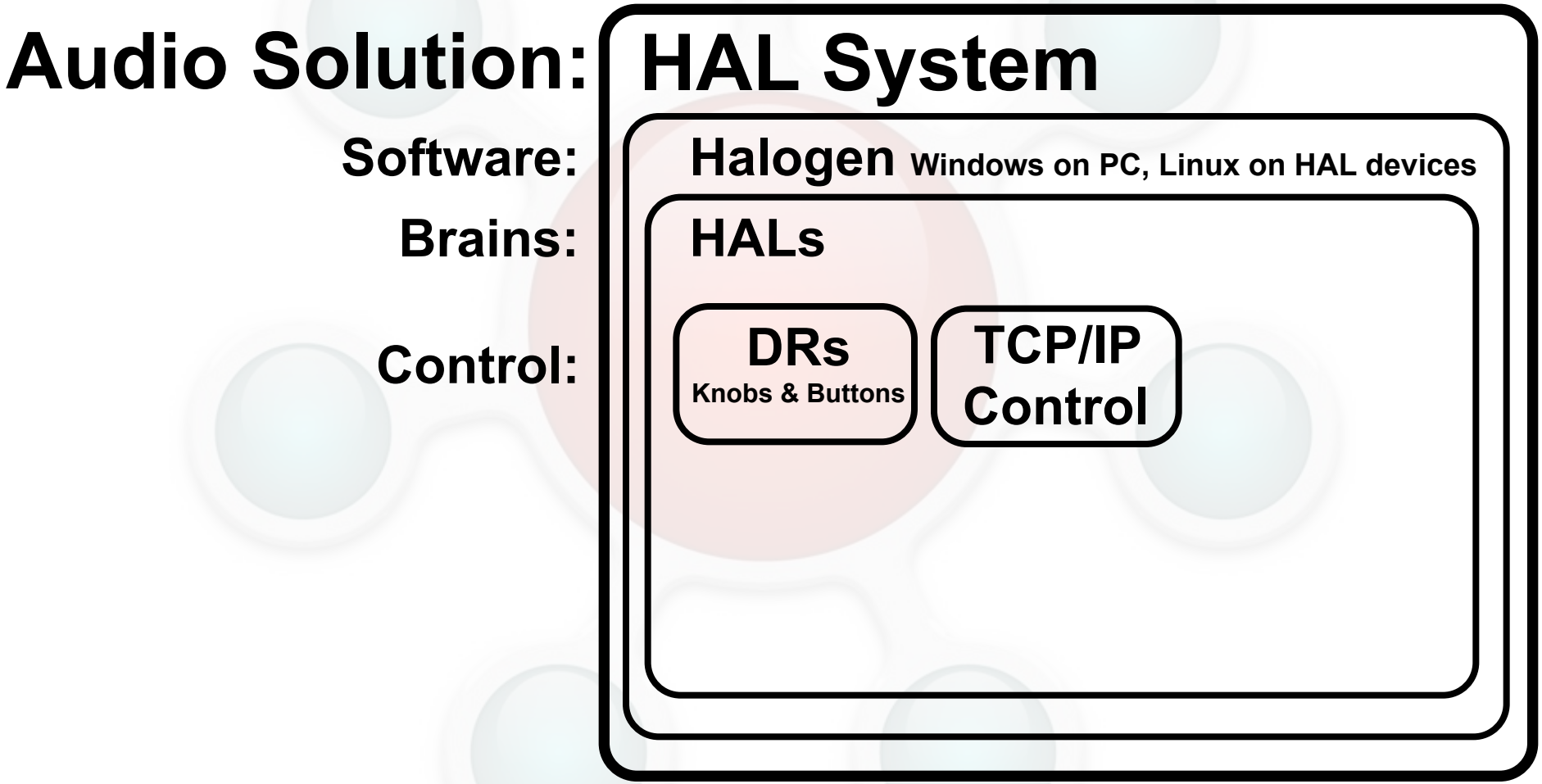
HAL System Architecture



HAL System Architecture



HAL System Architecture



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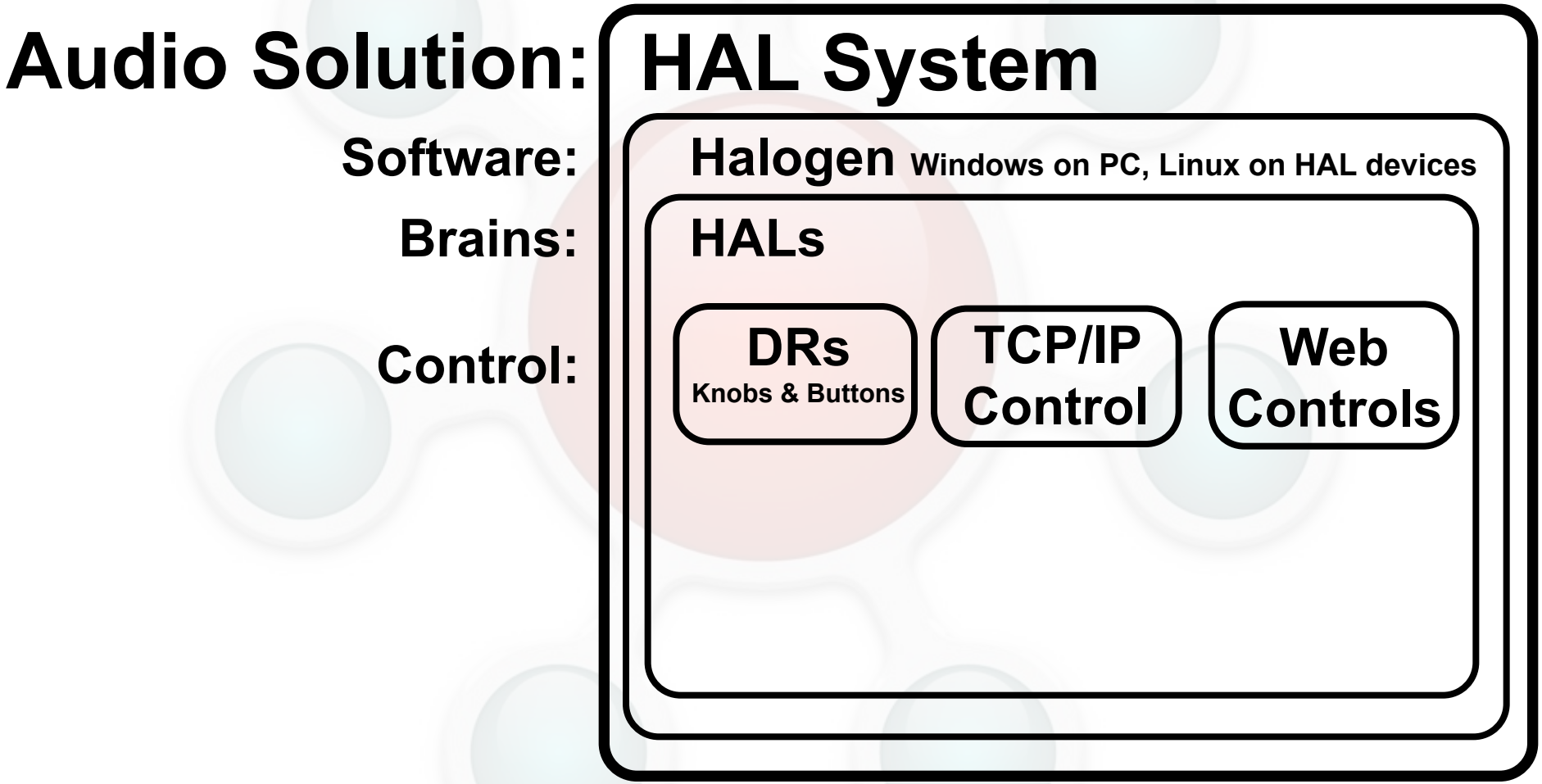

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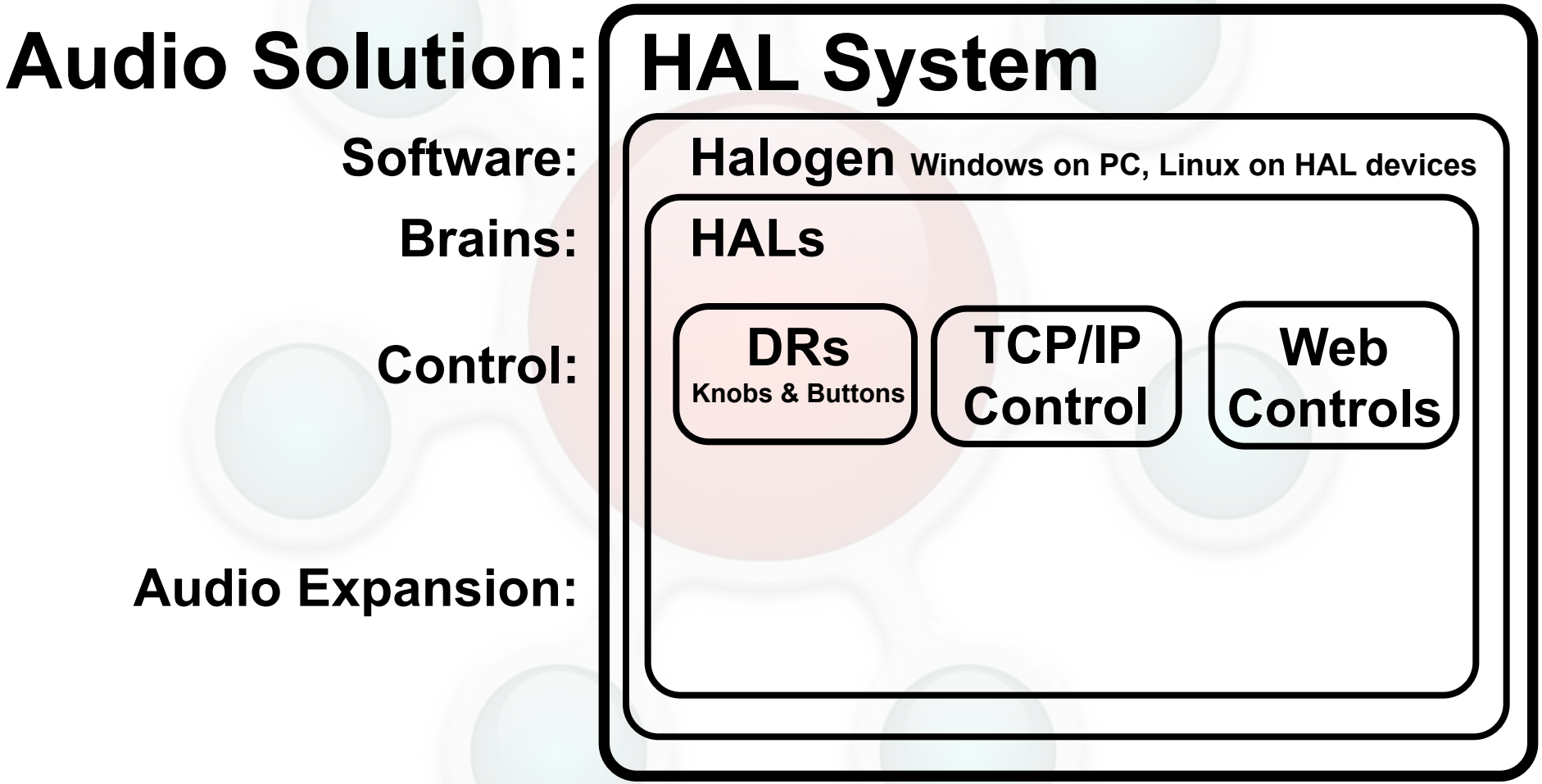

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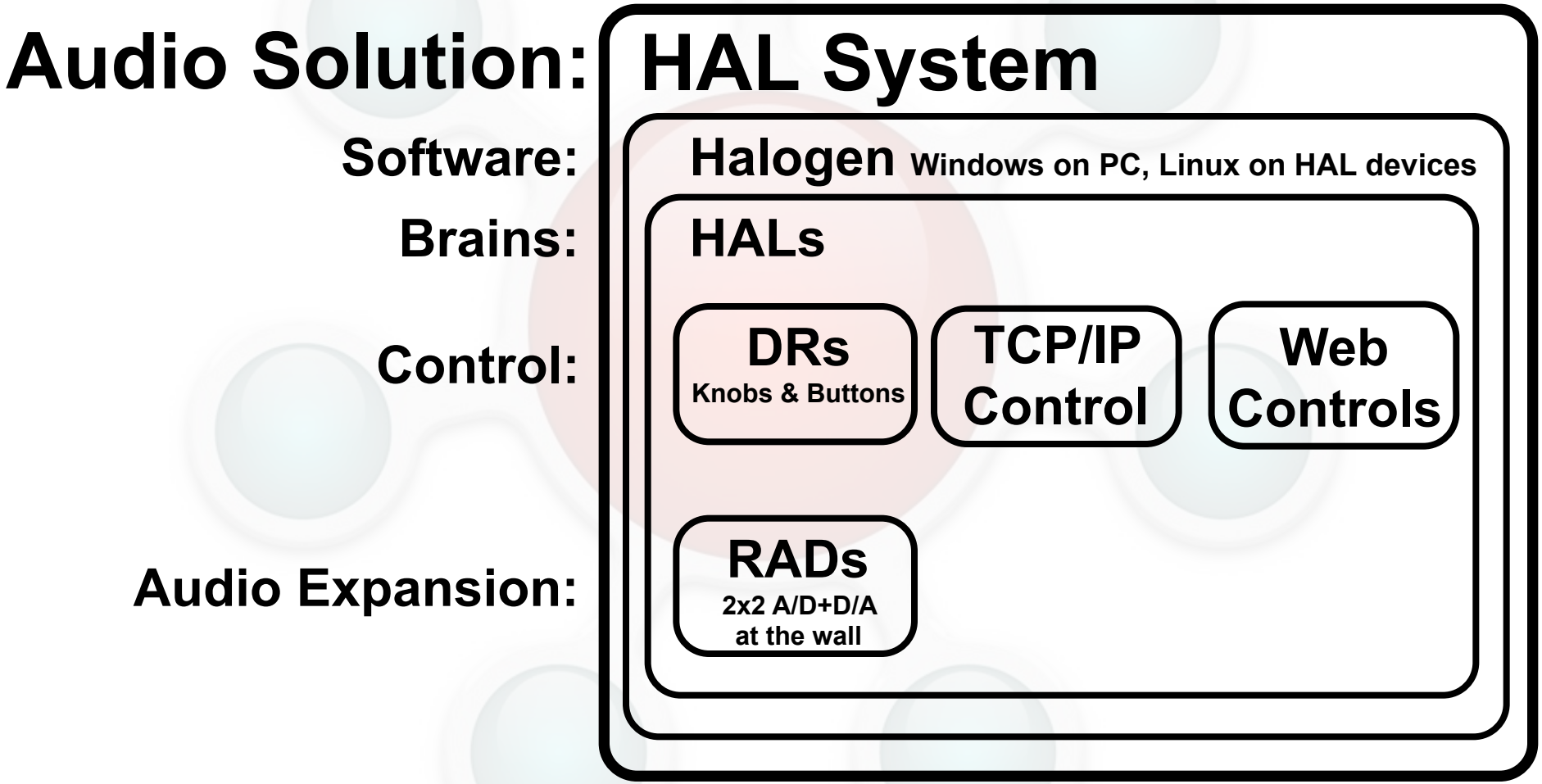

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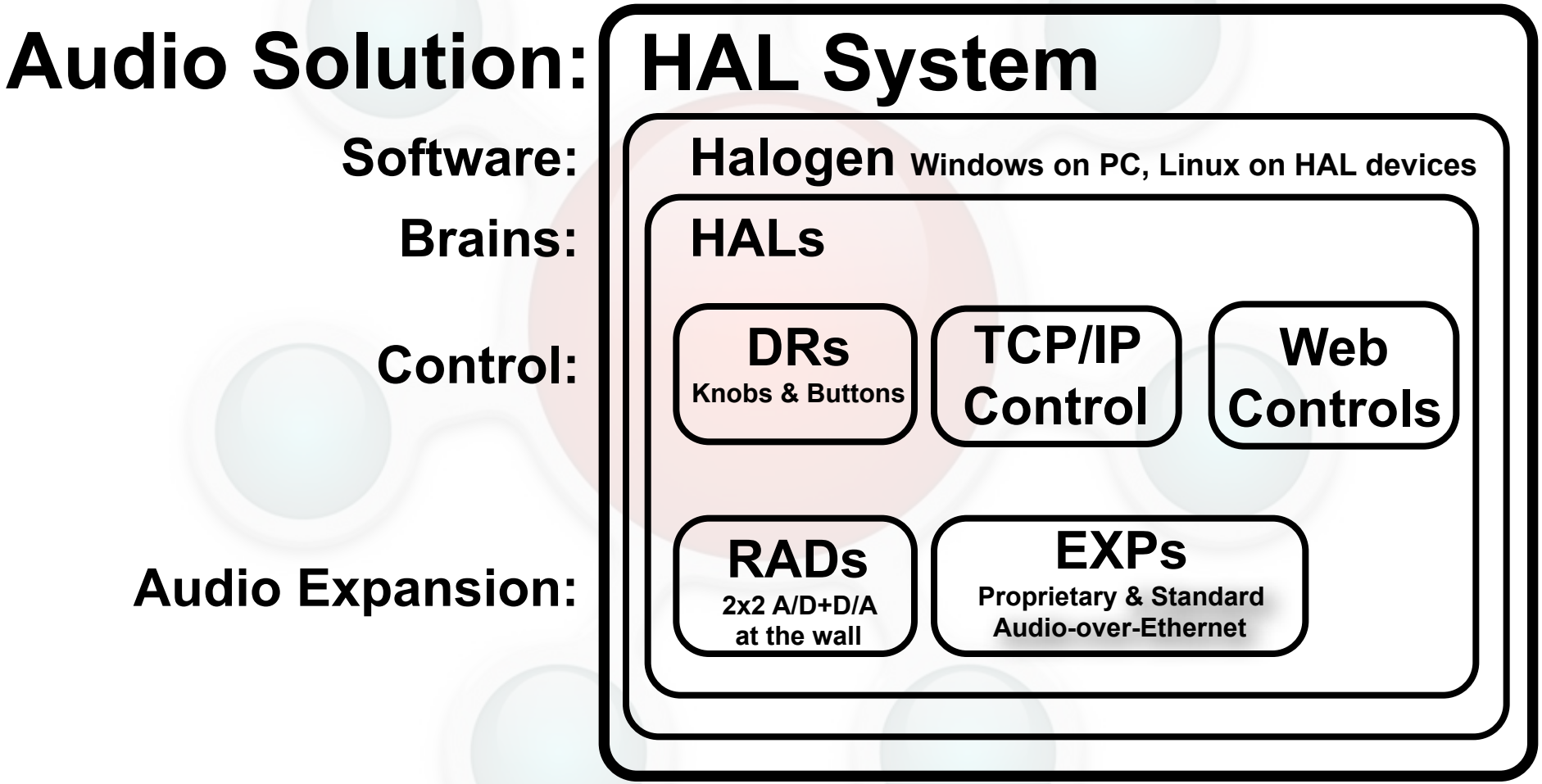
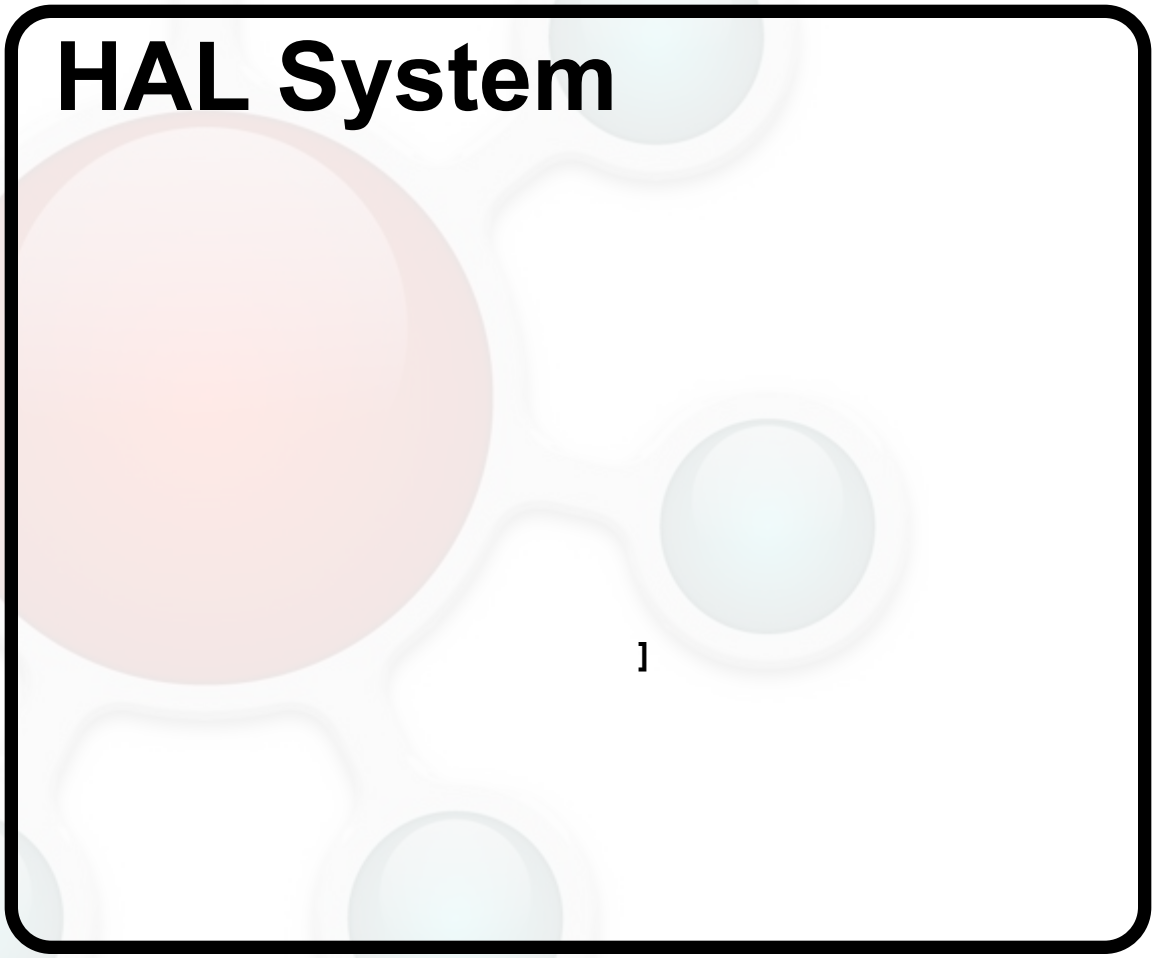


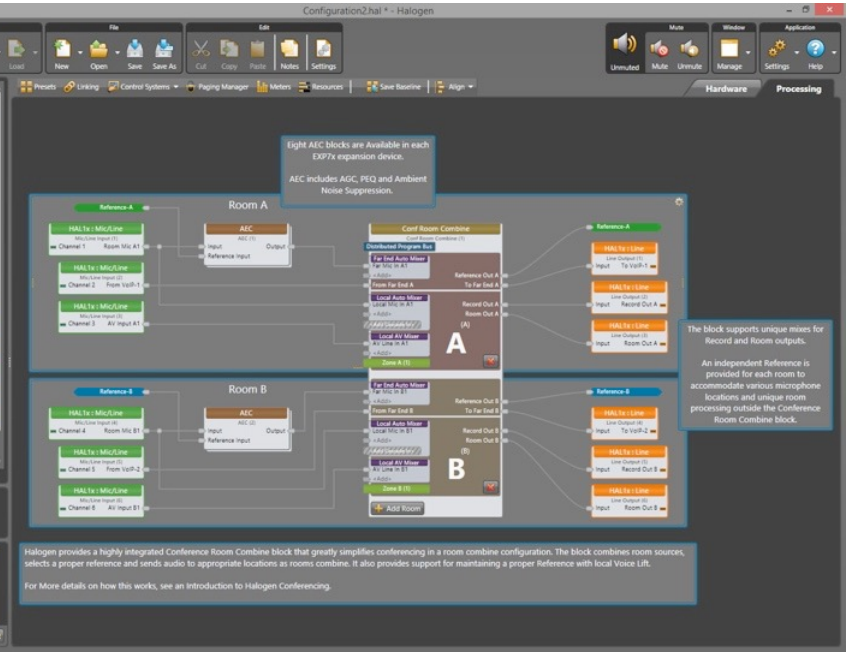
HAL System Architecture

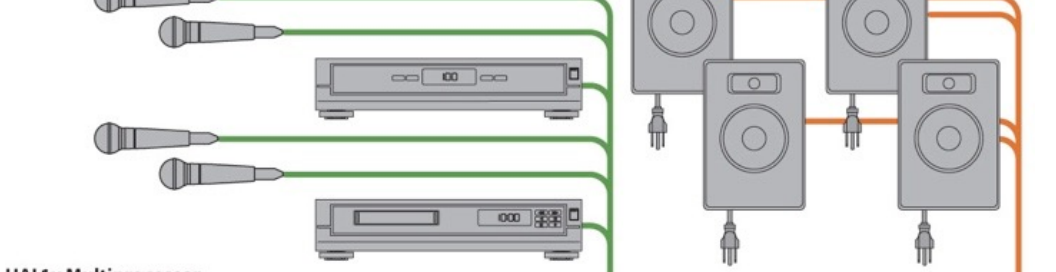
HAL System Architecture

Audio Solution: **HAL System**

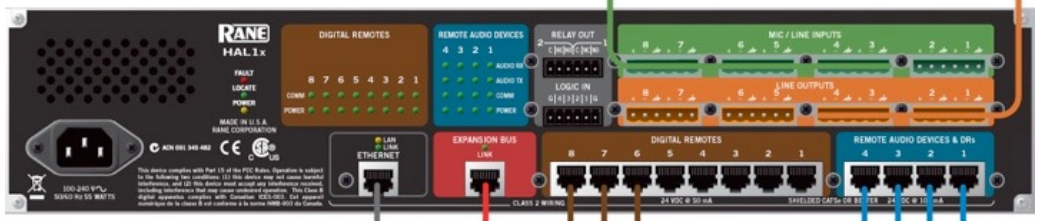


HAL System

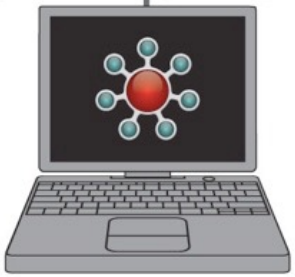


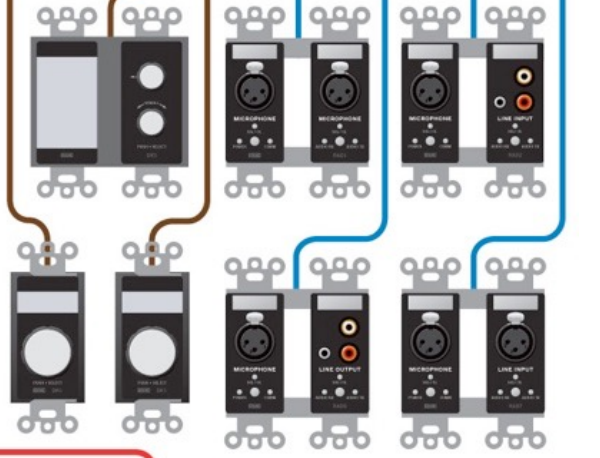


HAL1x Multiprocessor

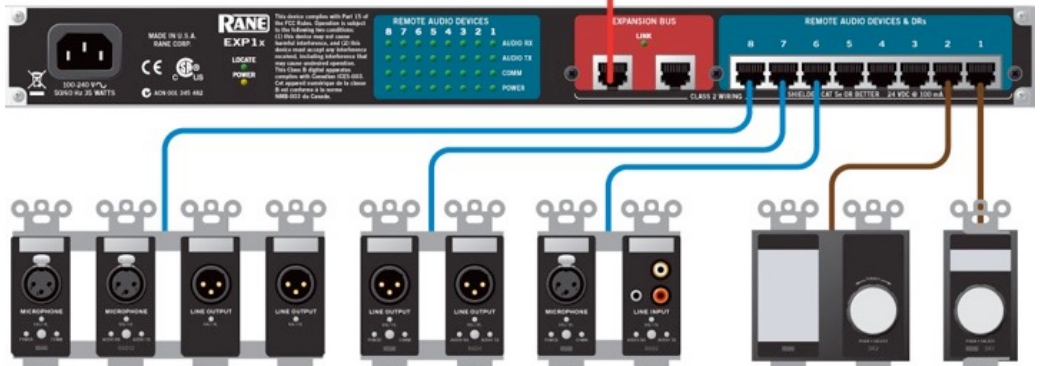


Halogen Software for System Setup



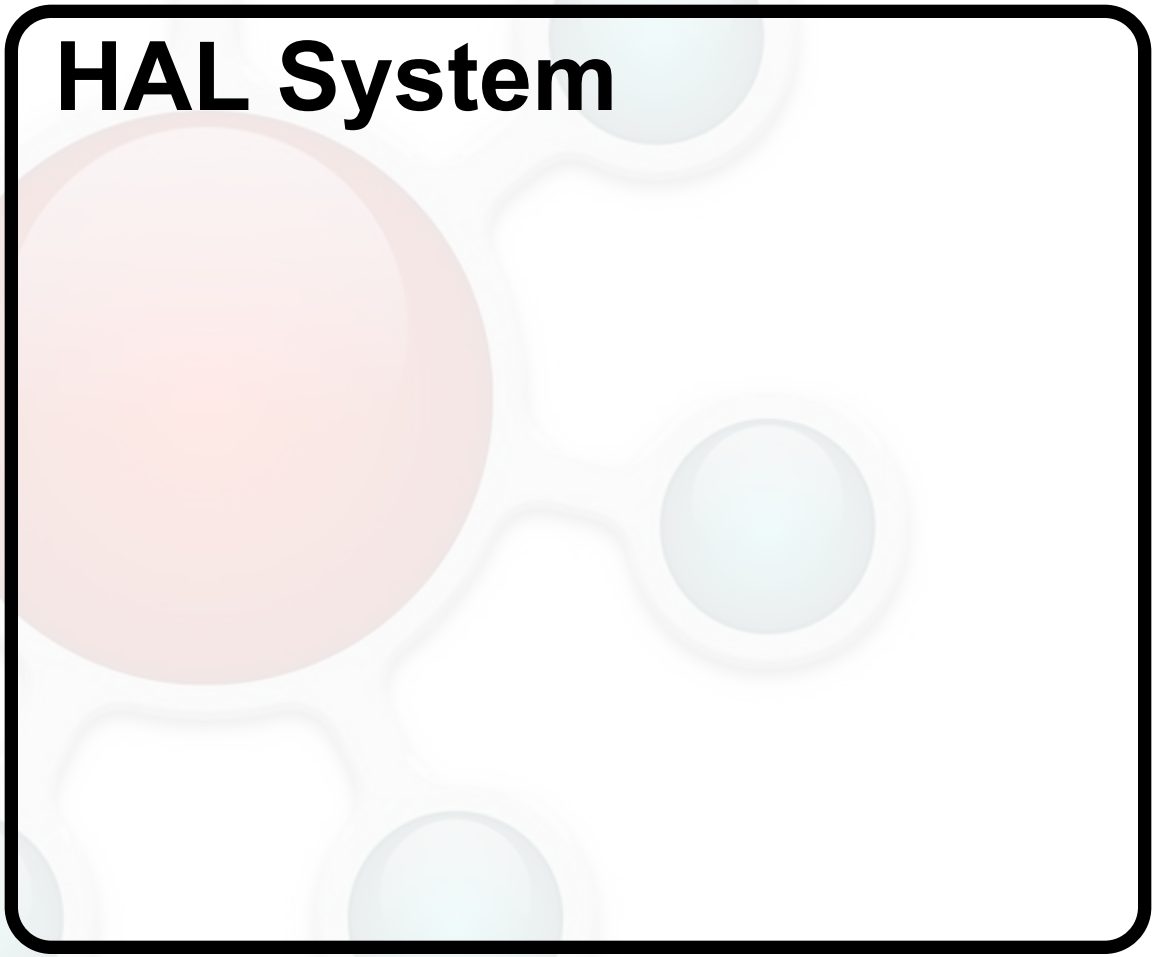


EXP1x Remote Audio Expansion (up to 32 to a HAL1x)



HAL System Architecture

Audio Solution:



HAL System Architecture

Audio Solution: **HAL System**

Software: **Halogen** Windows on PC, Linux on HAL devices

Halogen Software

Halogen Software

DESIGNING

In Windows

Solution for:

Halogen Software

DESIGNING

In Windows

Solution for:

INSTALLING

Setup / Control a Live HAL System

Solution for:

Halogen Software

DESIGNING

In Windows

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Setup / Control a Live HAL System

Solution for:

OPERATION 24/7

Linux in Live HAL

Solution for:

Halogen Software

DESIGNING
In Windows
Solution for:

- **Preliminary & final design**
  - **Generate system requirements & labels**
- **Fast & accurate equipment selection & bid assistance**
- **Configure final system**
  - **I/O, processing & control**
- **COMPLETELY configure, tweak & test behavior & control**
- **KNOW IT WORKS AS DESIGNED BEFORE SELECTING, BIDDING OR ORDERING**

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Solution for:

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Linux in Live HAL
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Solution for:

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- Troubleshooting indication in hardware & software
- Finalize I/O, processing & control
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- Same Software on PC & HAL: HARDWARE BEHAVIORS ALWAYS MATCH SOFTWARE BEHAVIORS

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OPERATION 24/7
Linux in Live HAL
Solution for:

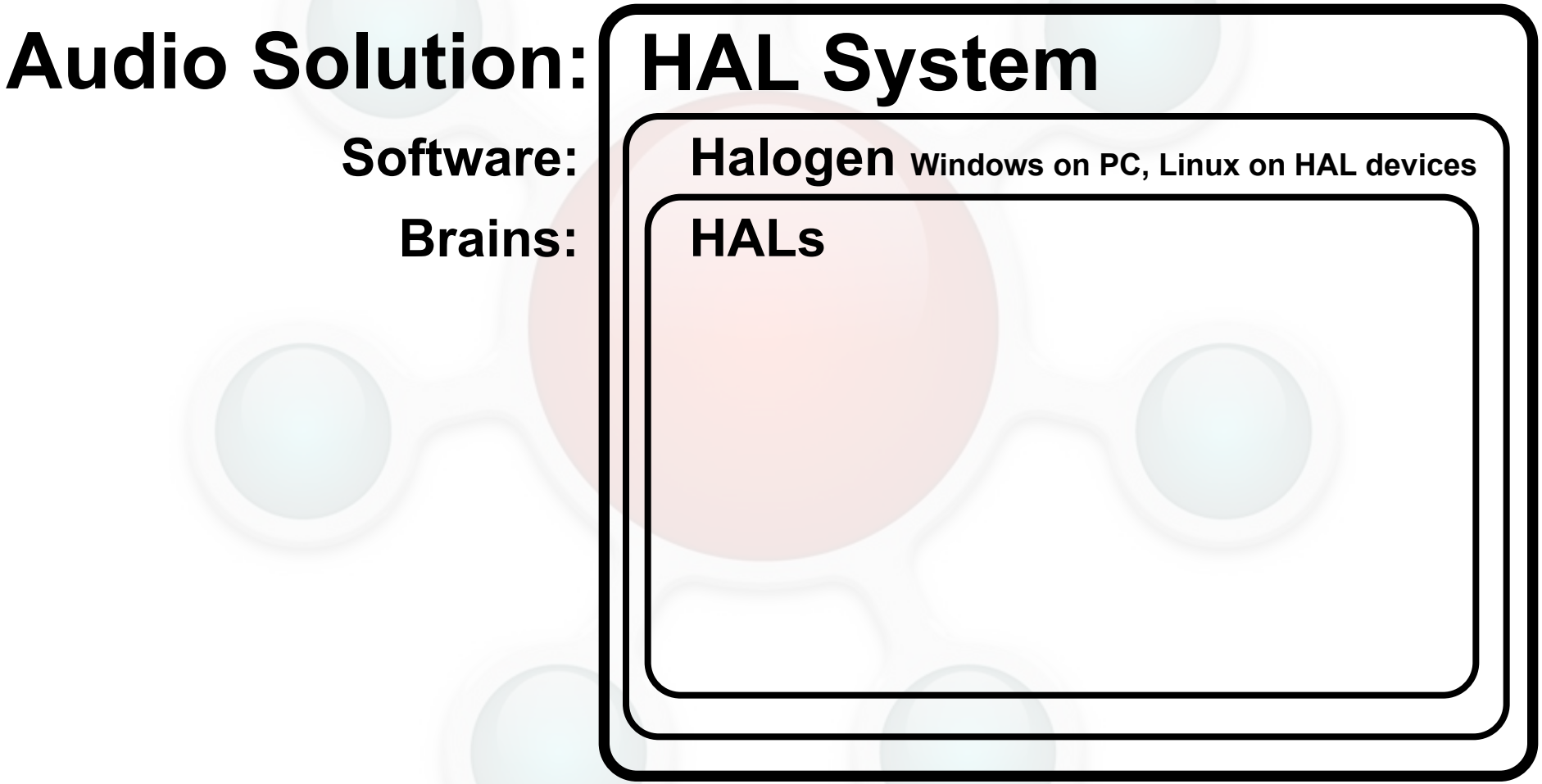
- 24/7 control & monitoring
  - HAL Web Server
  - TCP/IP 3rd-Party
  - Internet monitor
- Indicators on ALL HAL System devices for confidence & troubleshooting
- Use DRs, RADs in portable carts & padded racks
  - Swap any DR, RAD or EXP anywhere, any vintage

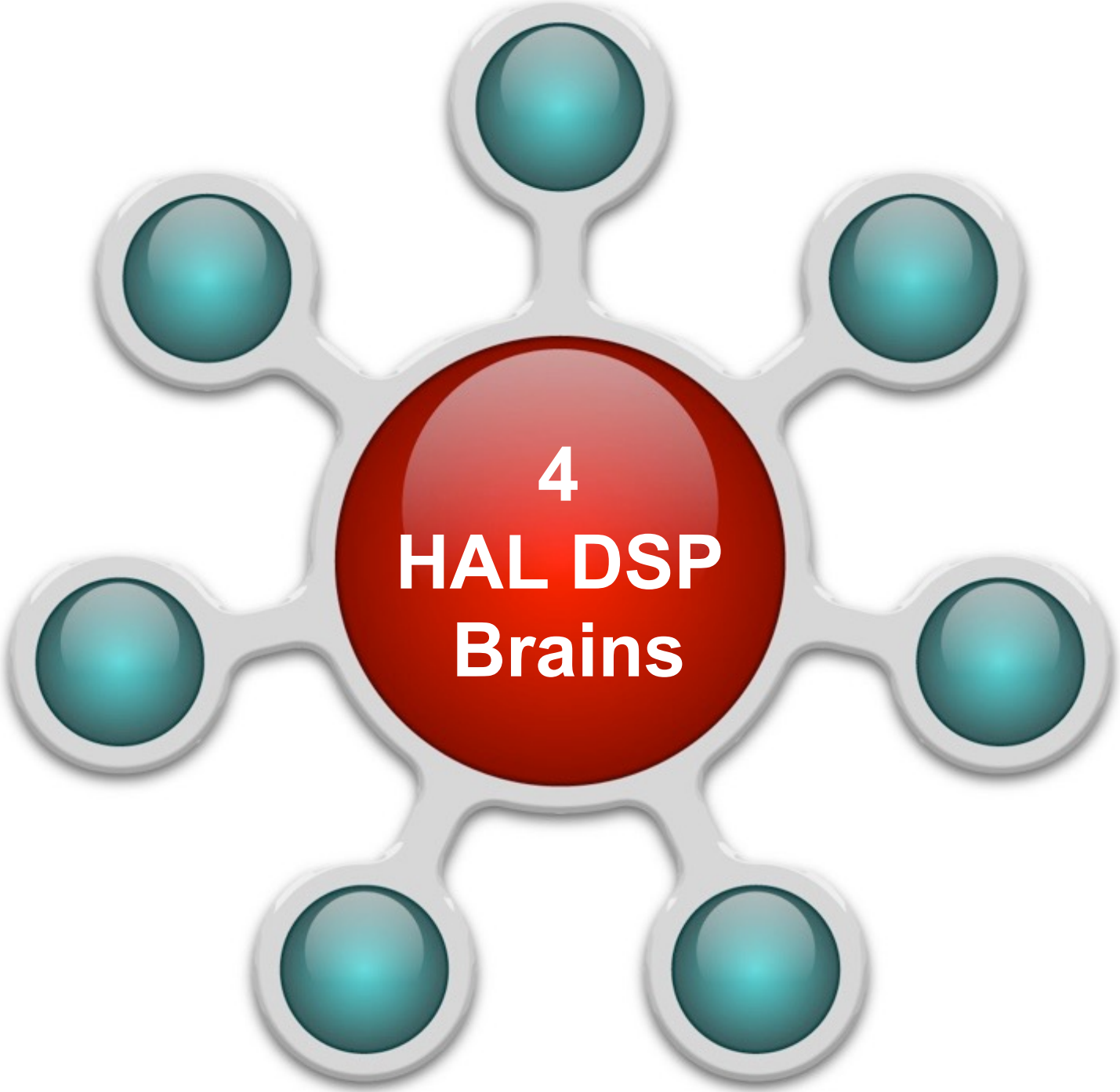
HAL System Architecture

Audio Solution: **HAL System**

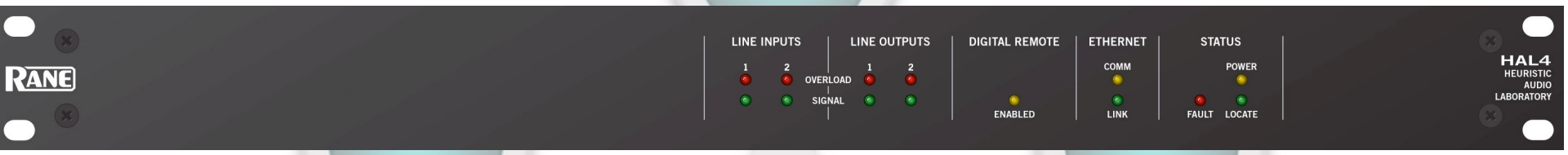
Software: **Halogen** Windows on PC, Linux on HAL devices

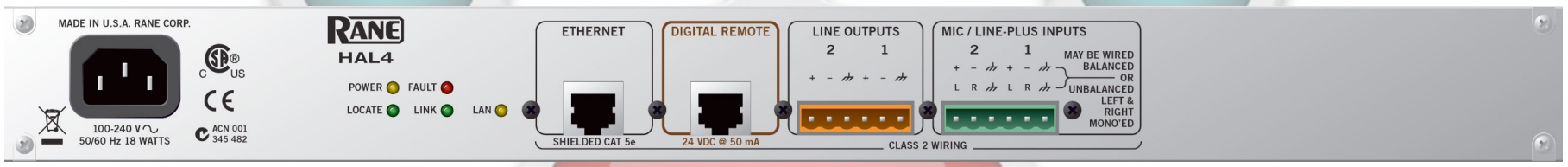
HAL System Architecture




4
HAL DSP
Brains

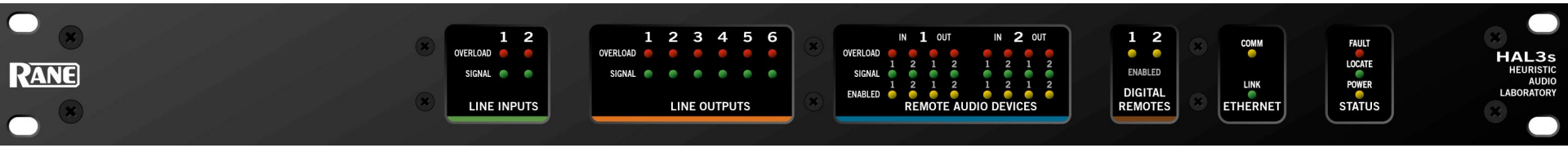
HAL4

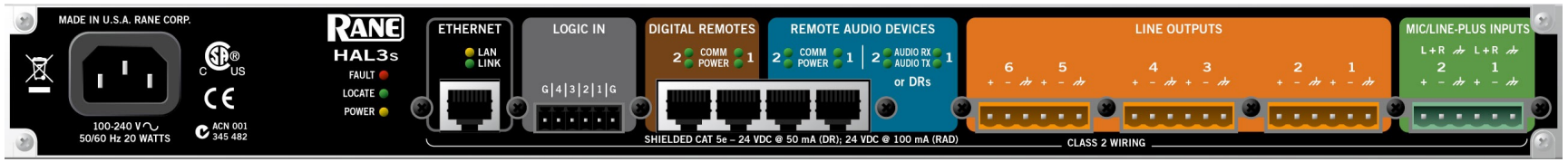

LINE INPUTS
1
2
OVERLOAD
SIGNAL
LINE OUTPUTS
1
2
DIGITAL REMOTE
ENABLED
ETHERNET
COMM
LINK
STATUS
POWER
FAULT
LOCATE
HAL4
HEURISTIC
AUDIO
LABORATORY


MADE IN U.S.A. RANE CORP.
100-240 V~
50/60 Hz 18 WATTS
ACN 001
345 482
HAL4
POWER
FAULT
LOCATE
LINK
LAN
ETHERNET
SHIELDED CAT 5e
DIGITAL REMOTE
24 VDC @ 50 mA
LINE OUTPUTS
2
1
MIC / LINE-PLUS INPUTS
2
1
L R L R
MAY BE WIRED
BALANCED
OR
UNBALANCED
LEFT &
RIGHT
MONO'ED
CLASS 2 WIRING

2x2

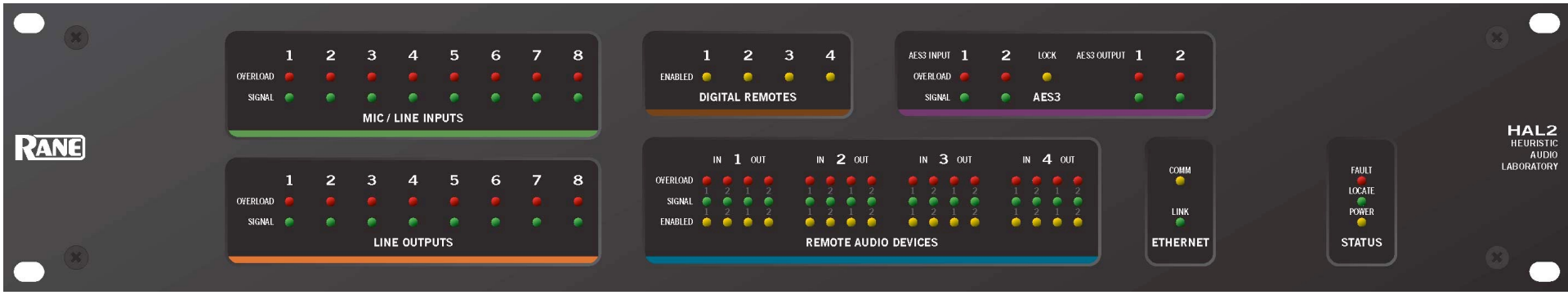
HAL3s

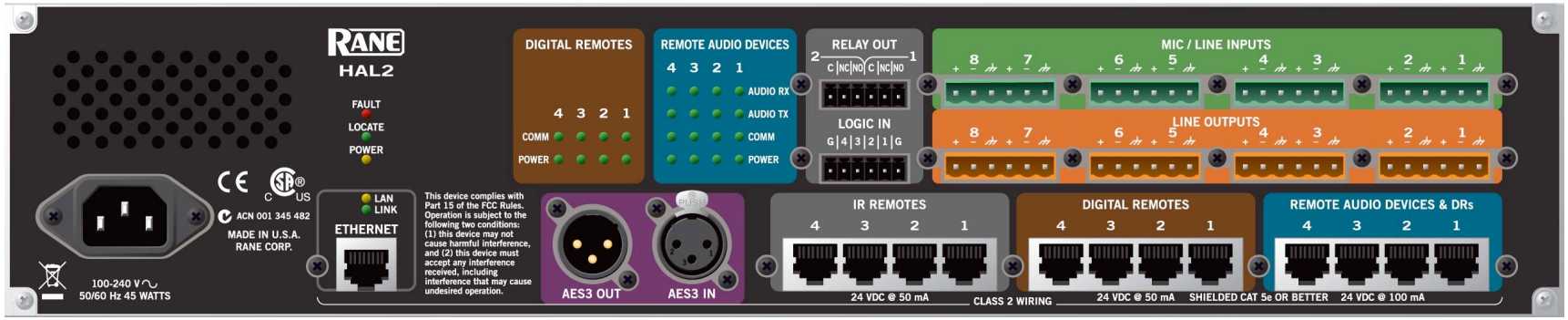

RANE
1 2
OVERLOAD
SIGNAL
LINE INPUTS
1 2 3 4 5 6
OVERLOAD
SIGNAL
LINE OUTPUTS
IN 1 OUT
IN 2 OUT
OVERLOAD
SIGNAL
ENABLED
REMOTE AUDIO DEVICES
1 2
ENABLED
DIGITAL REMOTES
COMM
LINK
ETHERNET
FAULT
LOCATE
POWER
STATUS
HAL3s
HEURISTIC AUDIO LABORATORY


MADE IN U.S.A. RANE CORP.
100-240 V~
50/60 Hz 20 WATTS
ACN 001 345 482
RANE
HAL3s
FAULT
LOCATE
POWER
ETHERNET
LAN
LINK
LOGIC IN
G|4|3|2|1|G
DIGITAL REMOTES
COMM
POWER
REMOTE AUDIO DEVICES
AUDIO RX
AUDIO TX
or DRs
LINE OUTPUTS
MIC/LINE-PLUS INPUTS
L+R
SHIELDED CAT 5e – 24 VDC @ 50 mA (DR); 24 VDC @ 100 mA (RAD)
CLASS 2 WIRING

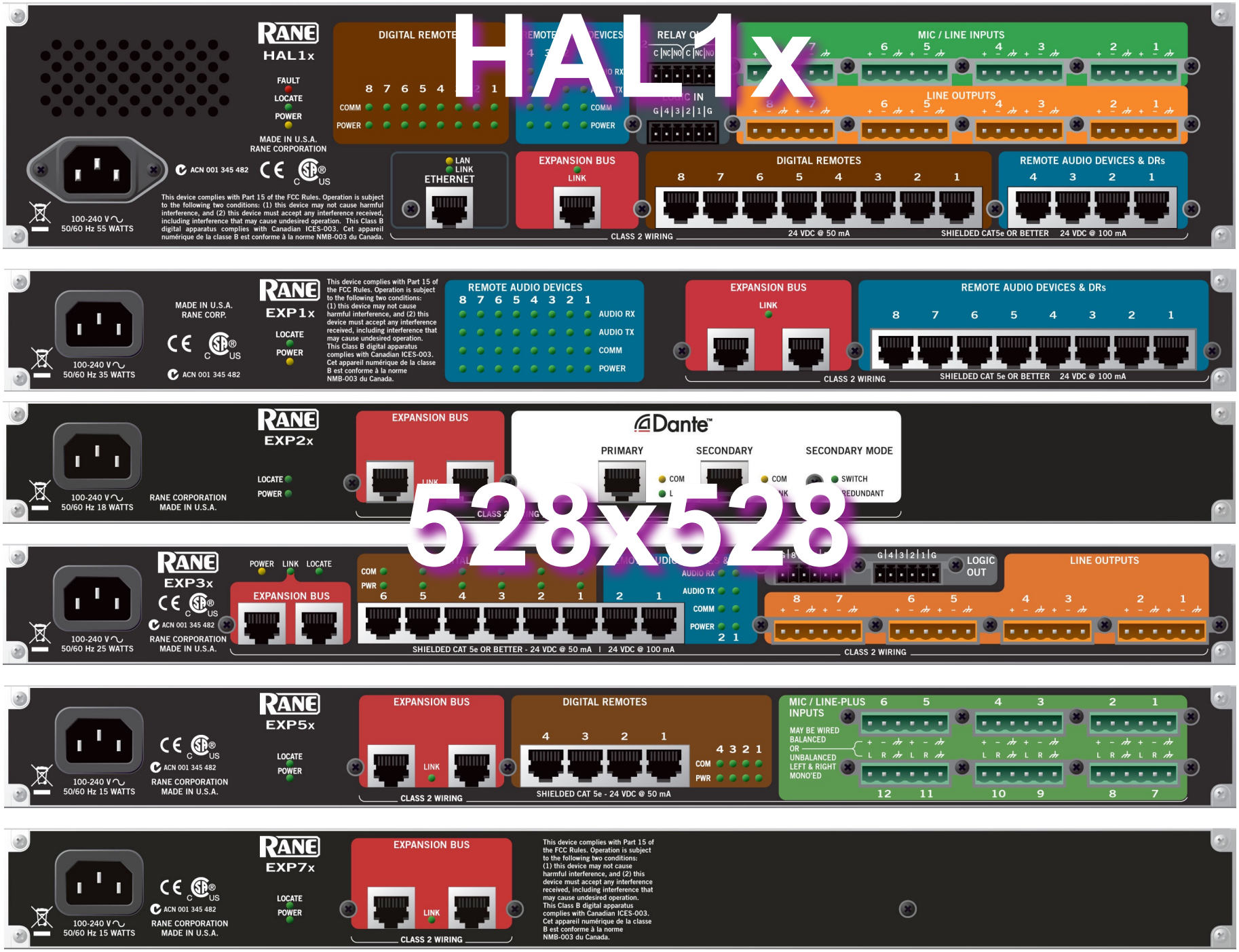
6x10

HAL2

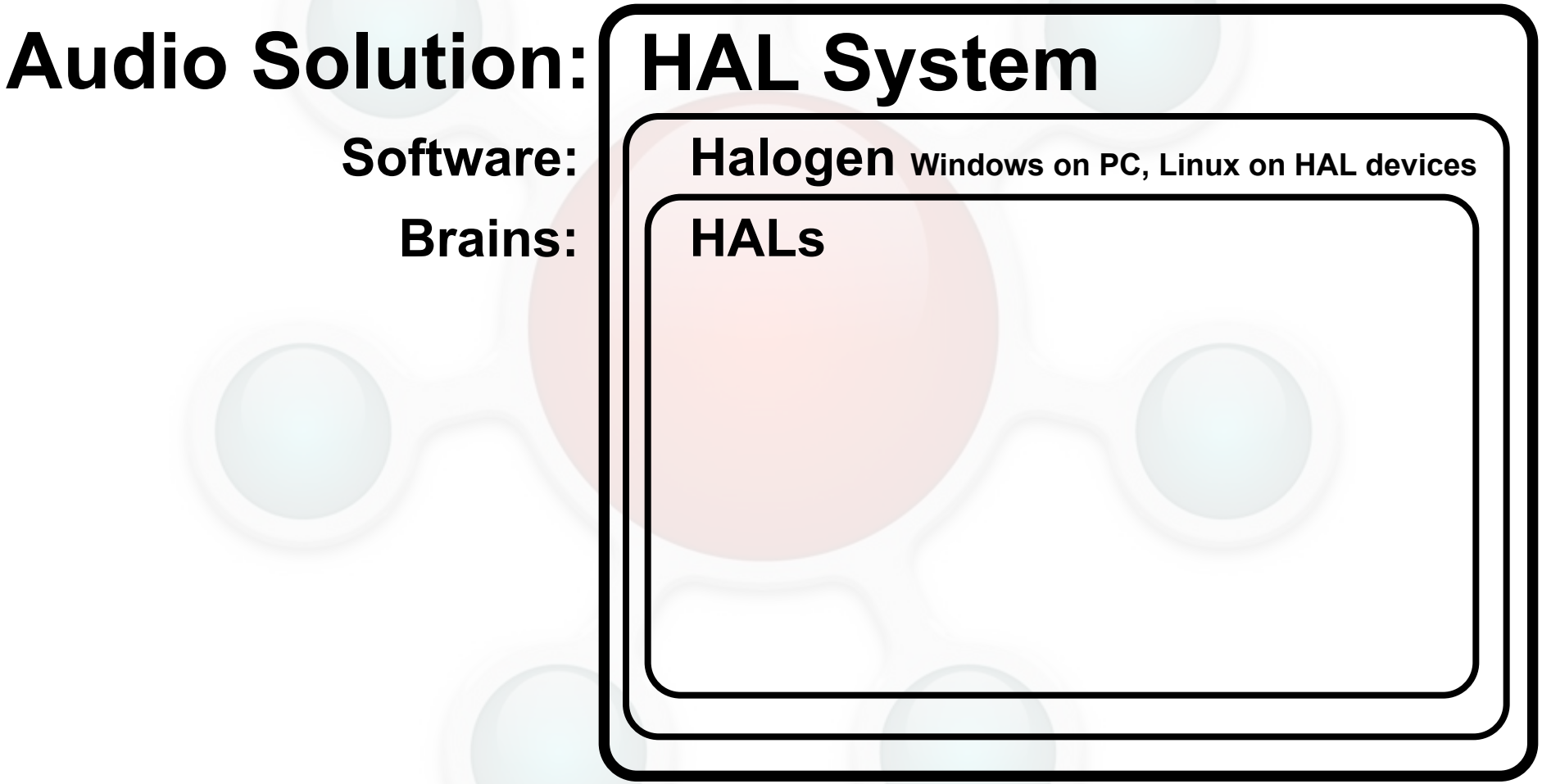

RANE
MIC / LINE INPUTS
OVERLOAD
SIGNAL
1 2 3 4 5 6 7 8
LINE OUTPUTS
DIGITAL REMOTES
ENABLED
1 2 3 4
AES3
AES3 INPUT 1 2 LOCK AES3 OUTPUT 1 2
REMOTE AUDIO DEVICES
IN 1 OUT
IN 2 OUT
IN 3 OUT
IN 4 OUT
ETHERNET
COMM
LINK
STATUS
FAULT
LOCATE
POWER
HAL2
HEURISTIC AUDIO LABORATORY


RANE
HAL2
FAULT
LOCATE
POWER
DIGITAL REMOTES
4 3 2 1
COMM
POWER
REMOTE AUDIO DEVICES
4 3 2 1
AUDIO RX
AUDIO TX
COMM
POWER
RELAY OUT
2 C NC NO C NC NO 1
LOGIC IN
G 4 3 2 1 G
MIC / LINE INPUTS
8 7 6 5 4 3 2 1
LINE OUTPUTS
8 7 6 5 4 3 2 1
ACN 001 345 482
MADE IN U.S.A.
RANE CORP.
100-240 V~
50/60 Hz 45 WATTS
LAN
LINK
ETHERNET
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
AES3 OUT
AES3 IN
IR REMOTES
4 3 2 1
DIGITAL REMOTES
4 3 2 1
REMOTE AUDIO DEVICES & DRs
4 3 2 1
24 VDC @ 50 mA
CLASS 2 WIRING
24 VDC @ 50 mA
SHIELDED CAT 5e OR BETTER
24 VDC @ 100 mA

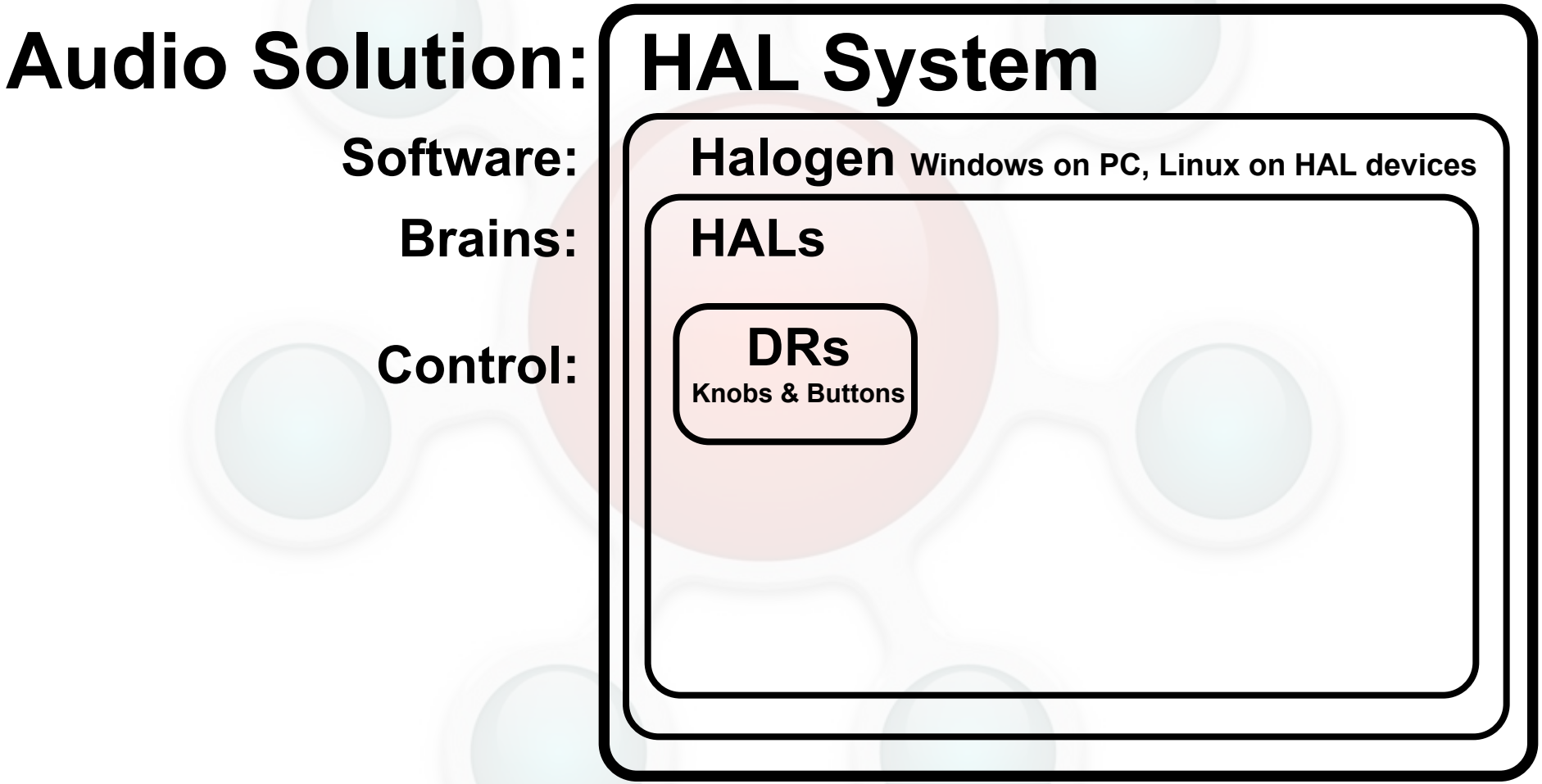
18x18

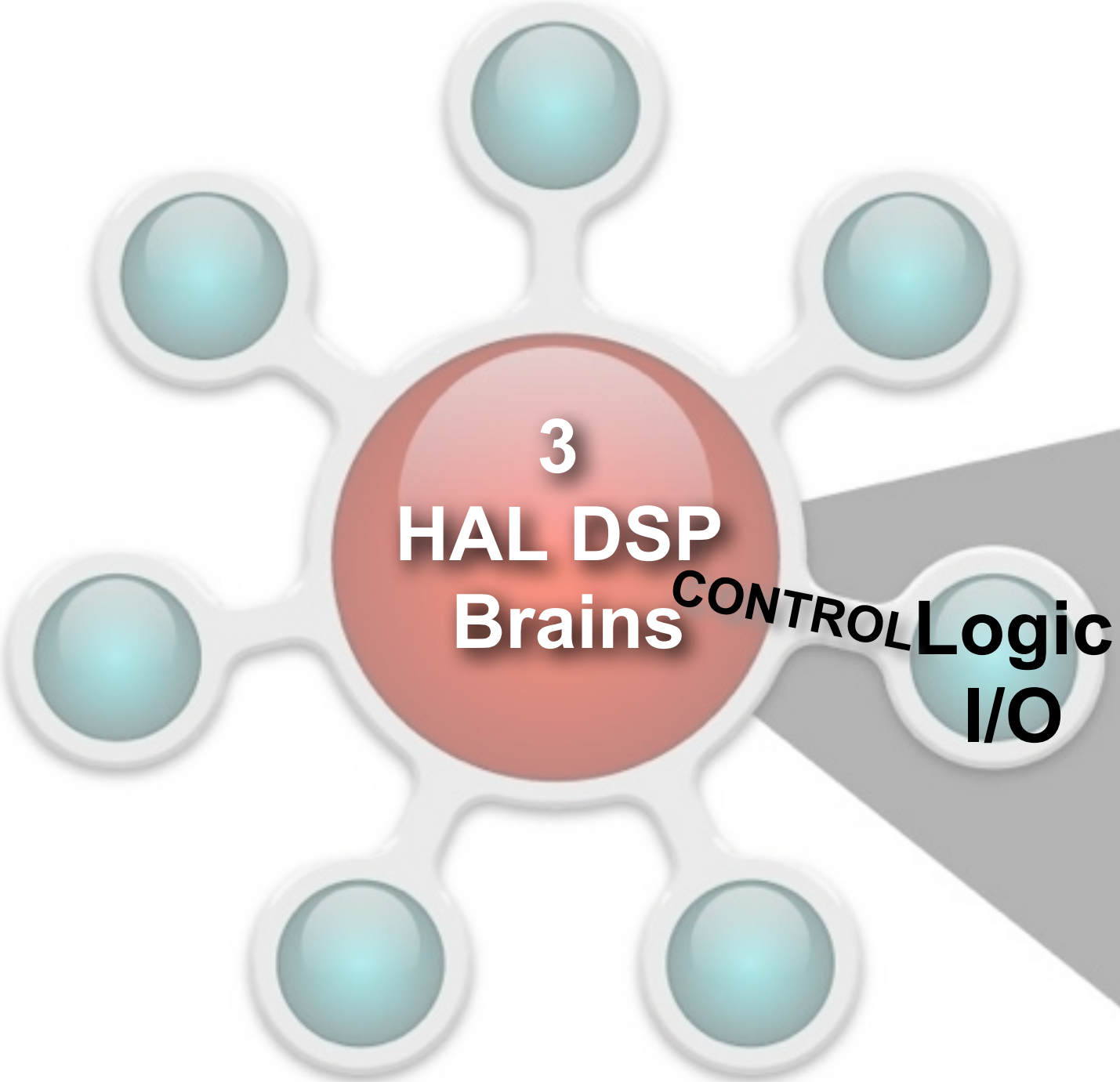

HAL1x
RANE
HAL1x
FAULT
LOCATE
POWER
MADE IN U.S.A.
RANE CORPORATION
ACN 001 345 482
100-240 V~
50/60 Hz 55 WATTS
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
DIGITAL REMOTE
8 7 6 5 4
COMM
POWER
RELAY O
C NC NO C NC NO
C IN
G 4 3 2 1 G
MIC / LINE INPUTS
LINE OUTPUTS
LAN
LINK
ETHERNET
EXPANSION BUS
LINK
DIGITAL REMOTES
8 7 6 5 4 3 2 1
REMOTE AUDIO DEVICES & DRs
4 3 2 1
CLASS 2 WIRING
24 VDC @ 50 mA
SHIELDED CAT5e OR BETTER
24 VDC @ 100 mA
RANE
EXP1x
MADE IN U.S.A.
RANE CORP.
LOCATE
POWER
ACN 001 345 482
100-240 V~
50/60 Hz 35 WATTS
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
REMOTE AUDIO DEVICES
8 7 6 5 4 3 2 1
AUDIO RX
AUDIO TX
COMM
POWER
EXPANSION BUS
LINK
REMOTE AUDIO DEVICES & DRs
8 7 6 5 4 3 2 1
CLASS 2 WIRING
SHIELDED CAT 5e OR BETTER
24 VDC @ 100 mA
RANE
EXP2x
LOCATE
POWER
RANE CORPORATION
MADE IN U.S.A.
100-240 V~
50/60 Hz 18 WATTS
EXPANSION BUS
LINK
Dante
PRIMARY
SECONDARY
SECONDARY MODE
COM
SWITCH
REDUNDANT
528x528
RANE
EXP3x
POWER
LINK
LOCATE
ACN 001 345 482
RANE CORPORATION
MADE IN U.S.A.
100-240 V~
50/60 Hz 25 WATTS
EXPANSION BUS
COM
PWR
6 5 4 3 2 1
AUDIO RX
AUDIO TX
COMM
POWER
2 1
G 4 3 2 1 G
LOGIC OUT
LINE OUTPUTS
8 7 6 5 4 3 2 1
SHIELDED CAT 5e OR BETTER - 24 VDC @ 50 mA | 24 VDC @ 100 mA
CLASS 2 WIRING
RANE
EXP5x
LOCATE
POWER
ACN 001 345 482
RANE CORPORATION
MADE IN U.S.A.
100-240 V~
50/60 Hz 15 WATTS
EXPANSION BUS
LINK
CLASS 2 WIRING
DIGITAL REMOTES
4 3 2 1
4 3 2 1
COM
PWR
SHIELDED CAT 5e - 24 VDC @ 50 mA
MIC / LINE-PLUS INPUTS
MAY BE WIRED BALANCED OR UNBALANCED LEFT & RIGHT MONO'ED
6 5 4 3 2 1
L R L R L R
12 11 10 9 8 7
RANE
EXP7x
LOCATE
POWER
ACN 001 345 482
RANE CORPORATION
MADE IN U.S.A.
100-240 V~
50/60 Hz 15 WATTS
EXPANSION BUS
LINK
CLASS 2 WIRING
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

HAL System Architecture



HAL System Architecture




3
HAL DSP
Brains
CONTROL
Logic
I/O

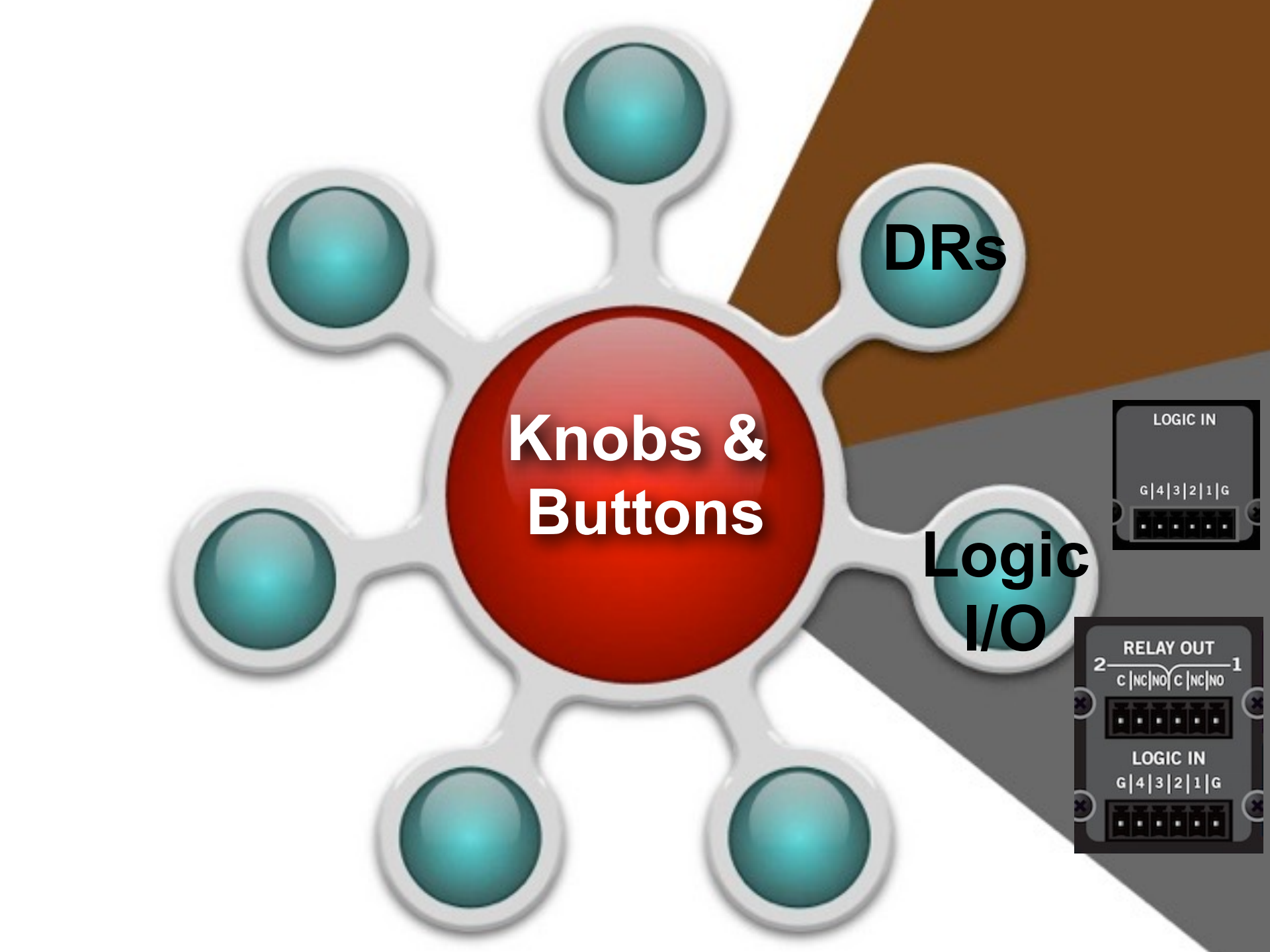
3
HAL DSP
Brains

CONTROL

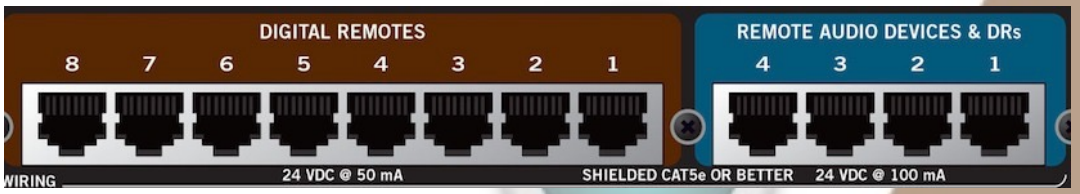
Logic
I/O

HAL3s

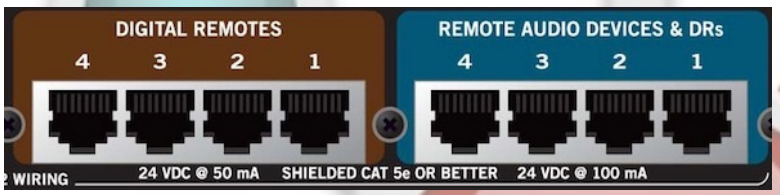
HAL1x
& HAL2


DRs
Knobs &
Buttons
Logic
I/O
LOGIC IN
G|4|3|2|1|G
RELAY OUT
2
1
C|NC|NO|C|NC|NO
LOGIC IN
G|4|3|2|1|G

HAL1x



HAL2



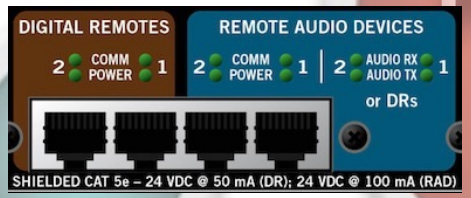
DRs

4

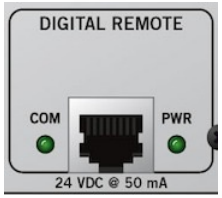
HAL DSP

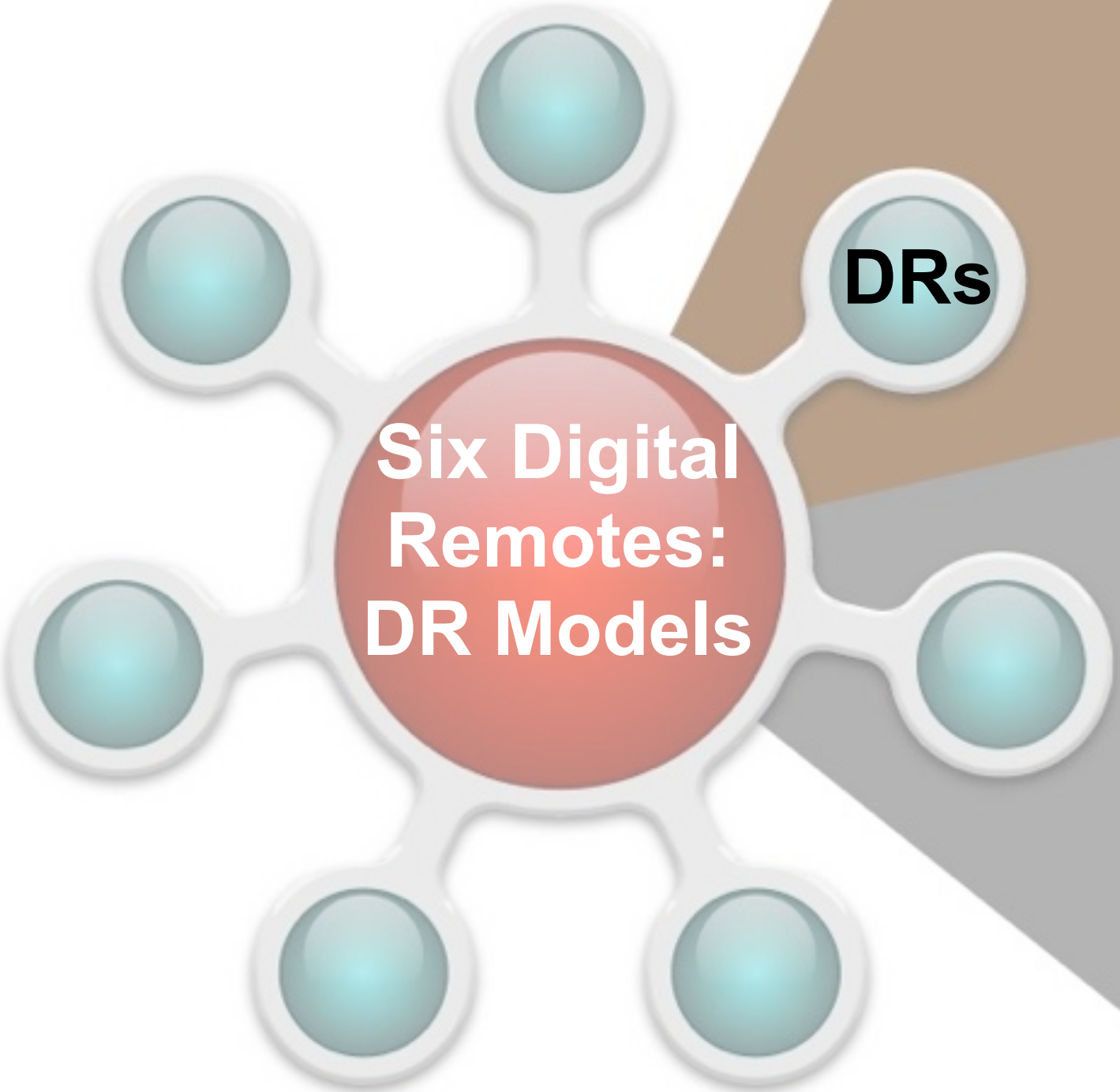
Brains

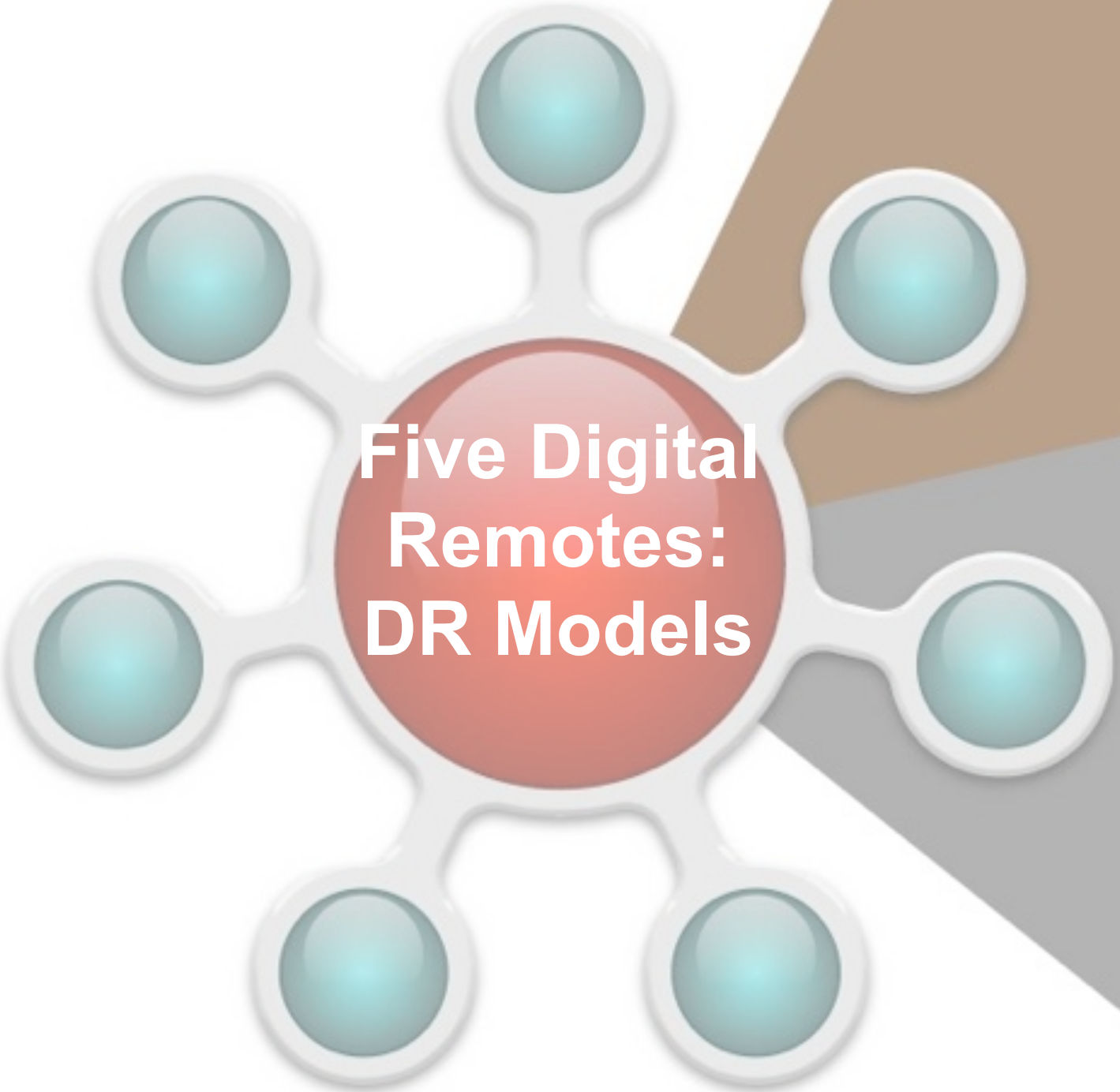
HAL3s



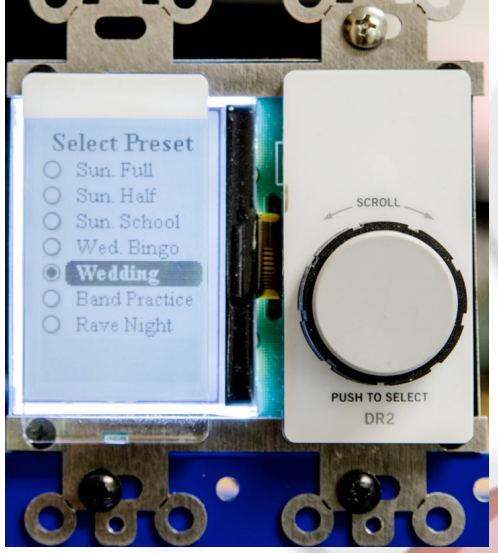
HAL4




DRs
Six Digital Remotes: DR Models


Five Digital
Remotes:
DR Models

DR1

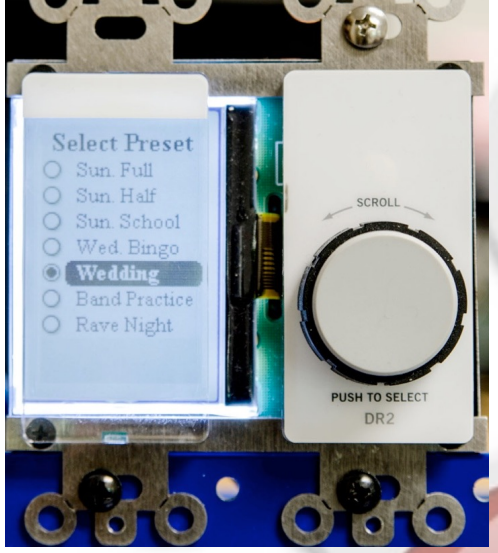


DR2

Five Digital Remotes: DR Models

DR3

DR1

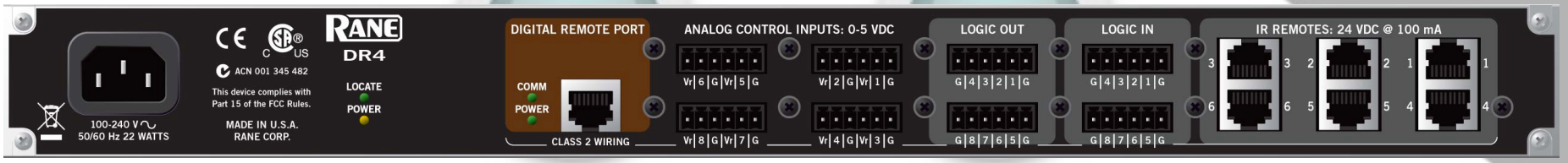


DR2

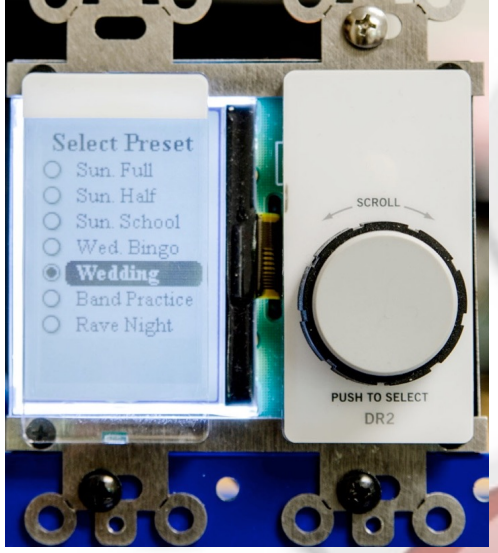
Five Digital Remotes: DR Models

DR3

DR4



DR1

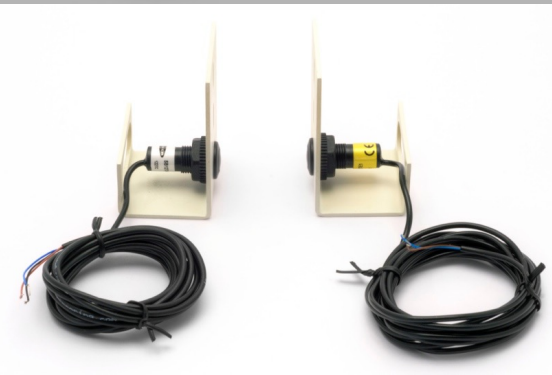


DR2

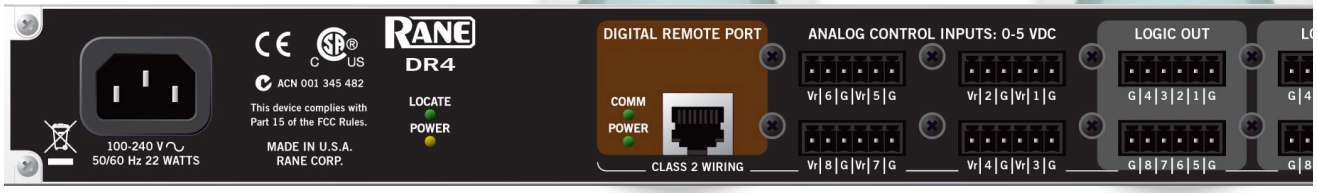
Five Digital Remotes: DR Models

DR3

IR2

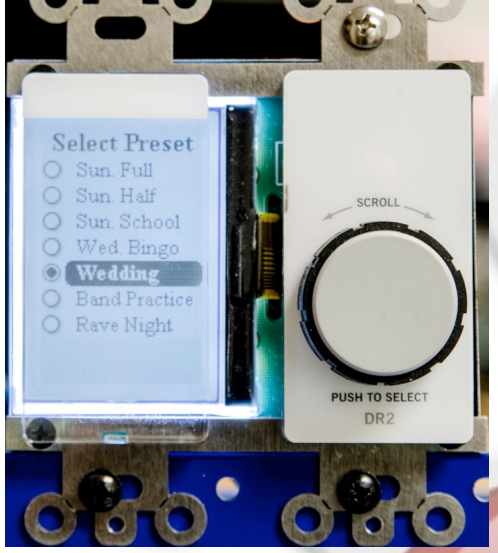


DR4



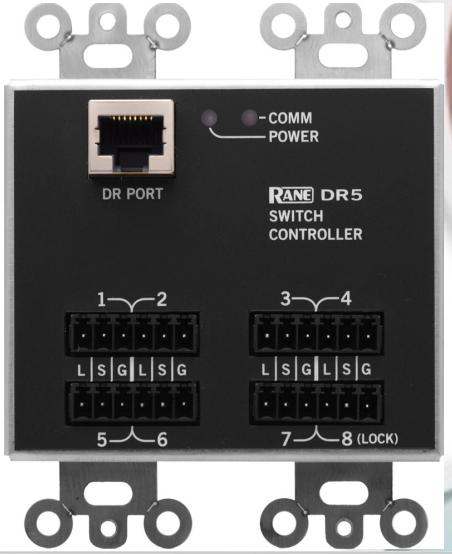
Five Digital Remotes: DR Models

DR1

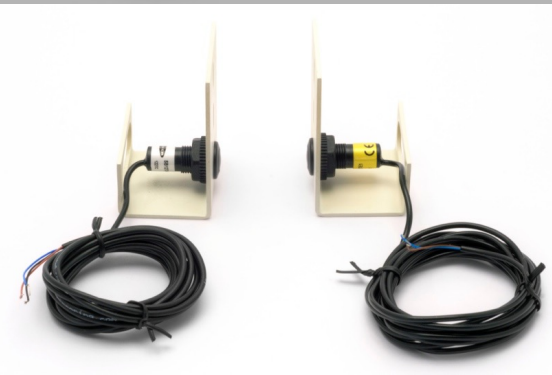


DR2

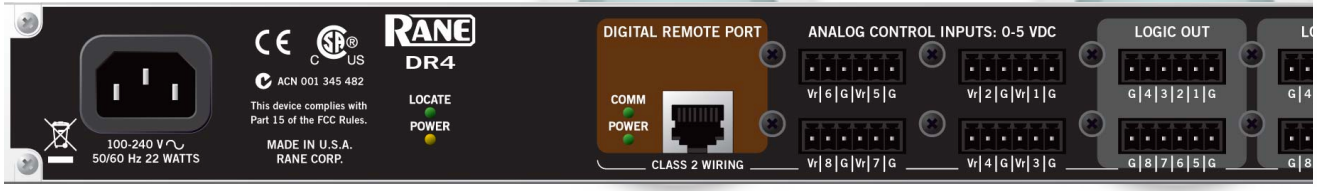
DR3



DR5

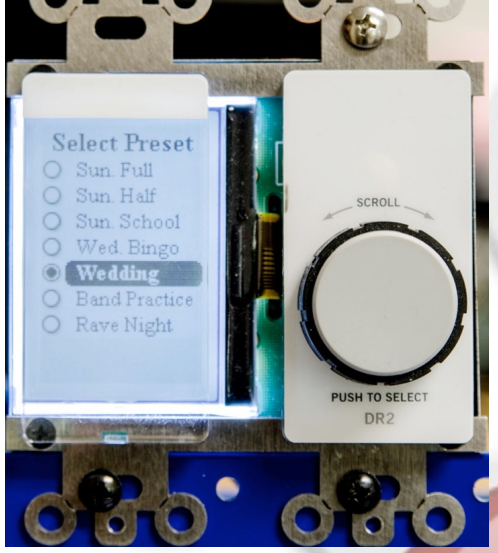


IR2



DR4

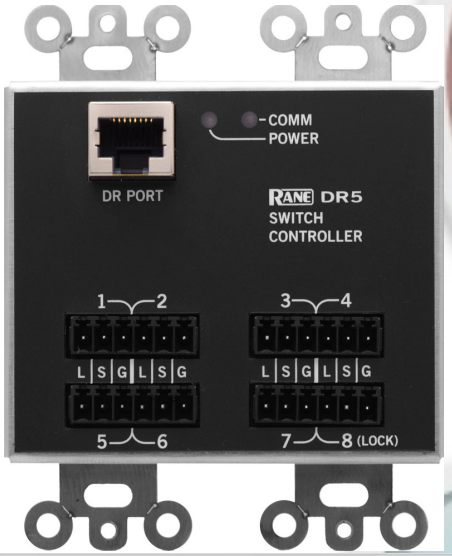
DR1



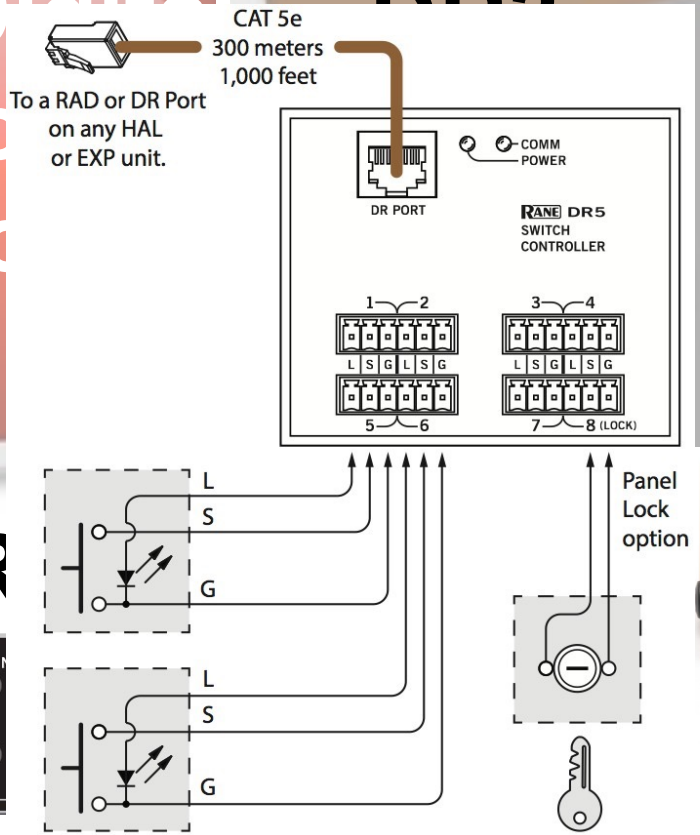
DR2

Five Digital Remo

DR Mo



DR5

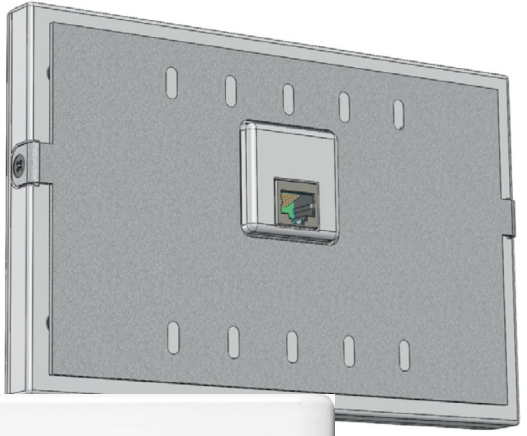


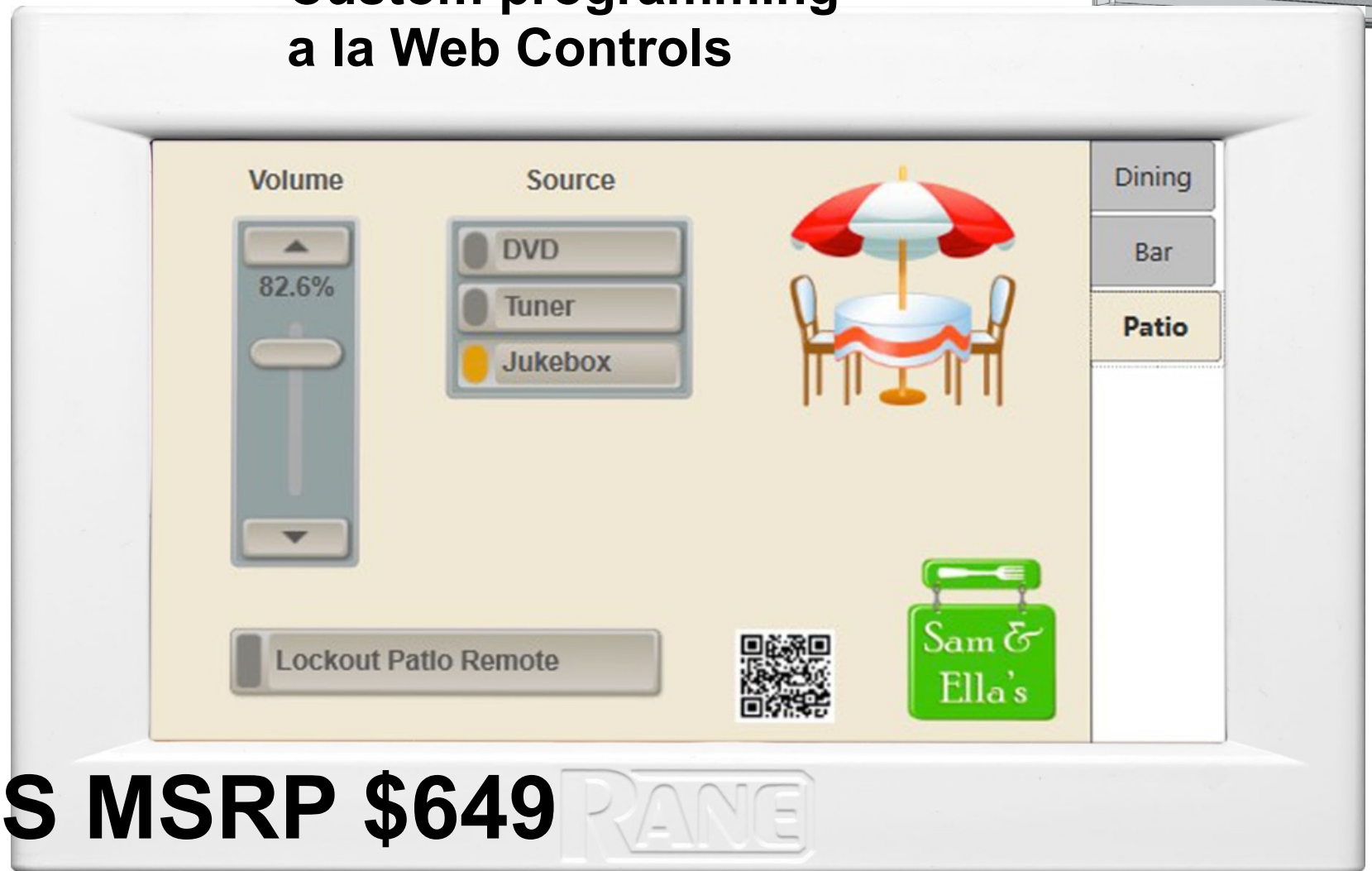
IR2

DR

Rane DR6 Remote

- 7” color LCD touch screen
  - Custom programming a la Web Controls

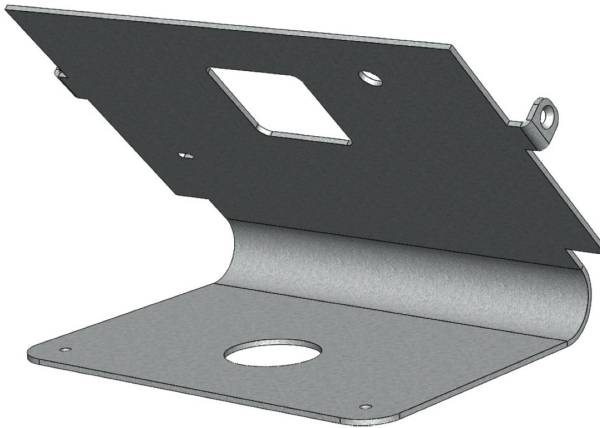




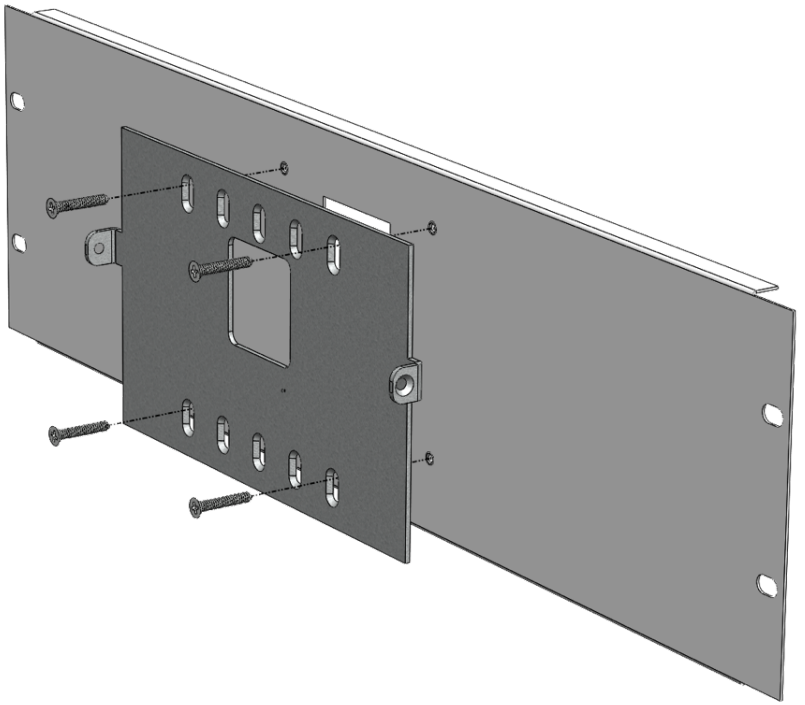
US MSRP $649

Rane DS1 Desk Stand

- **Sold separately**



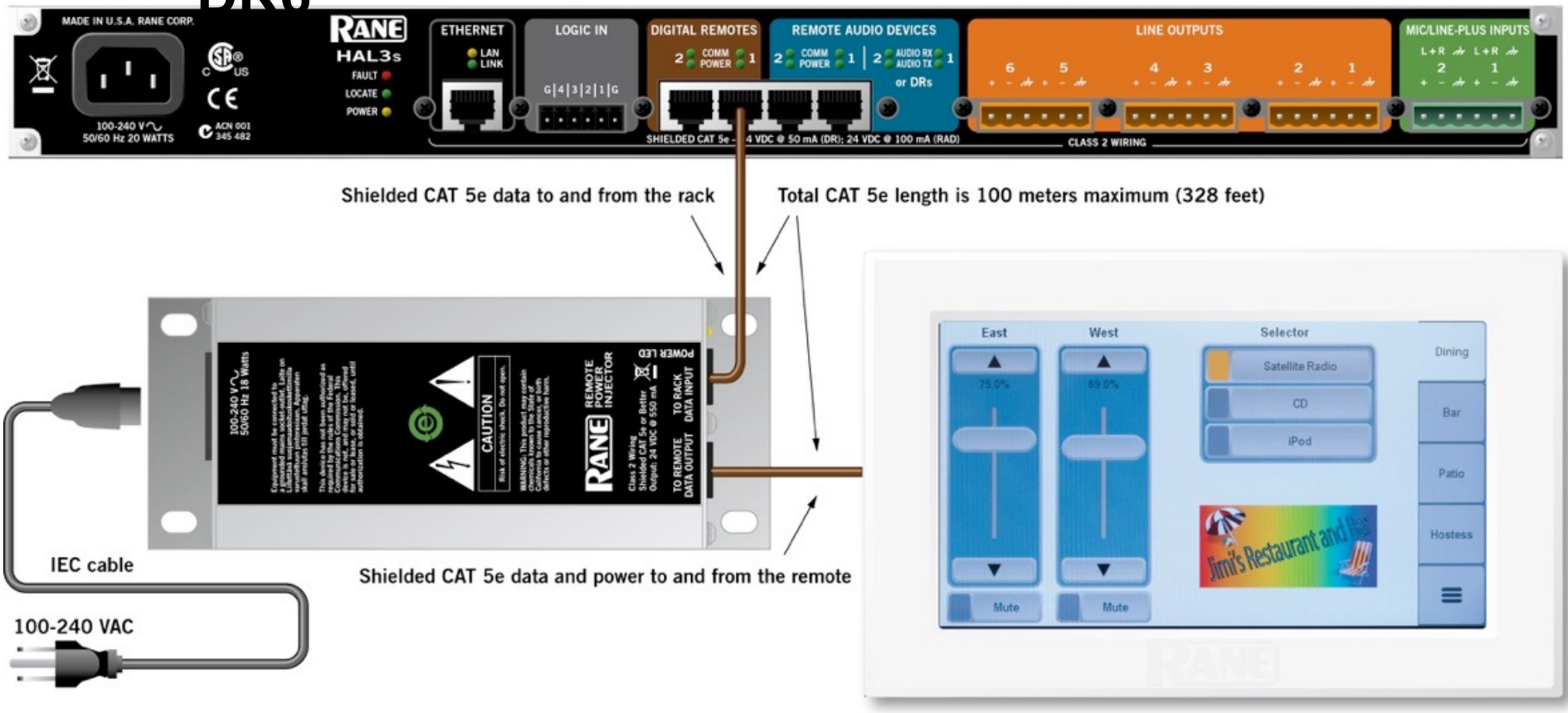
Rane RB1 Rack Bracket (3U)



- **Sold separately**

Rane DR6 Remote

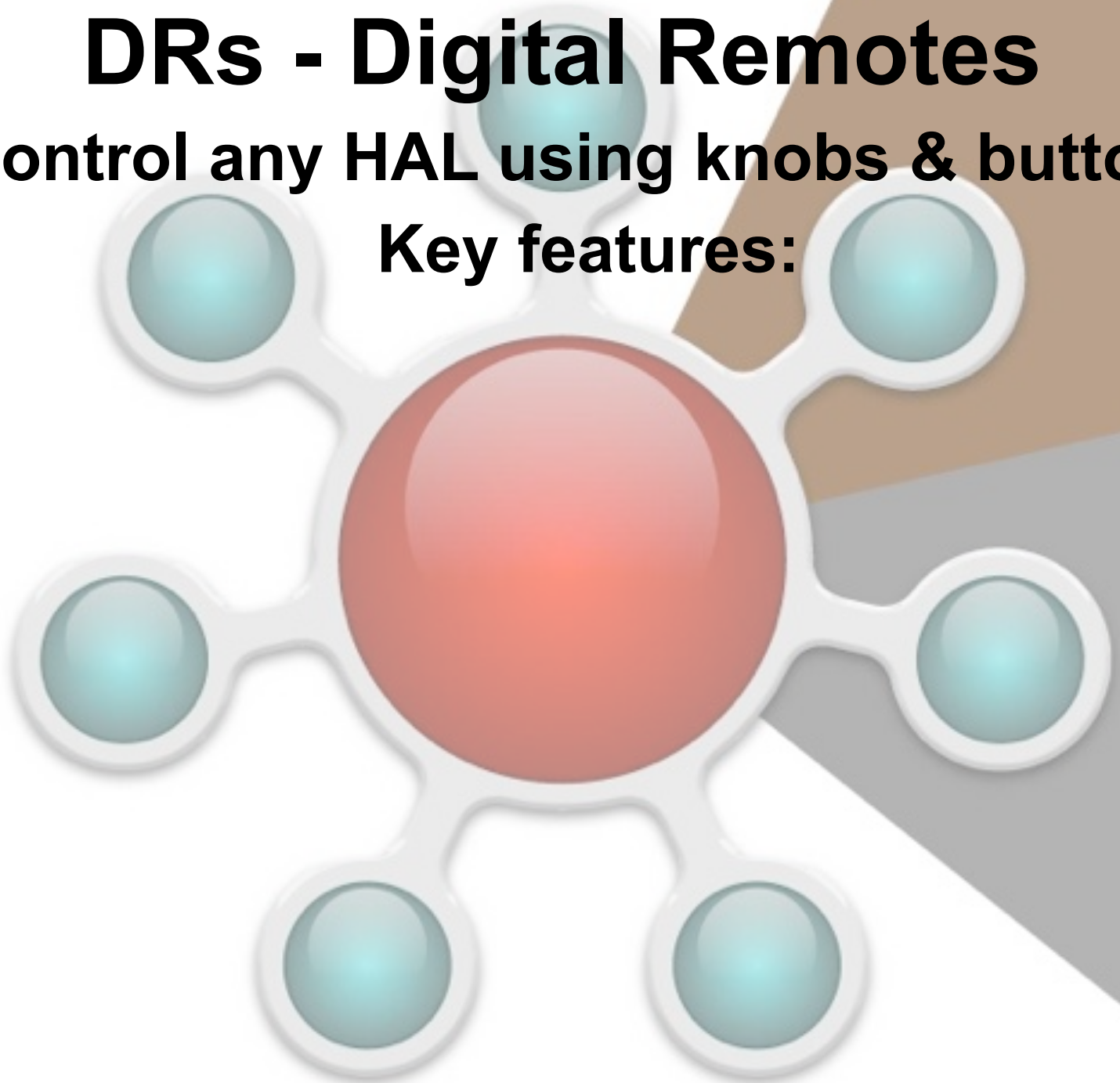
- **Includes RPI: Remote Power Injector**
  - **Place RPI between any HAL RAD/DR Port & the DR6**



DRs - Digital Remotes

Control any HAL using knobs & buttons

Key features:

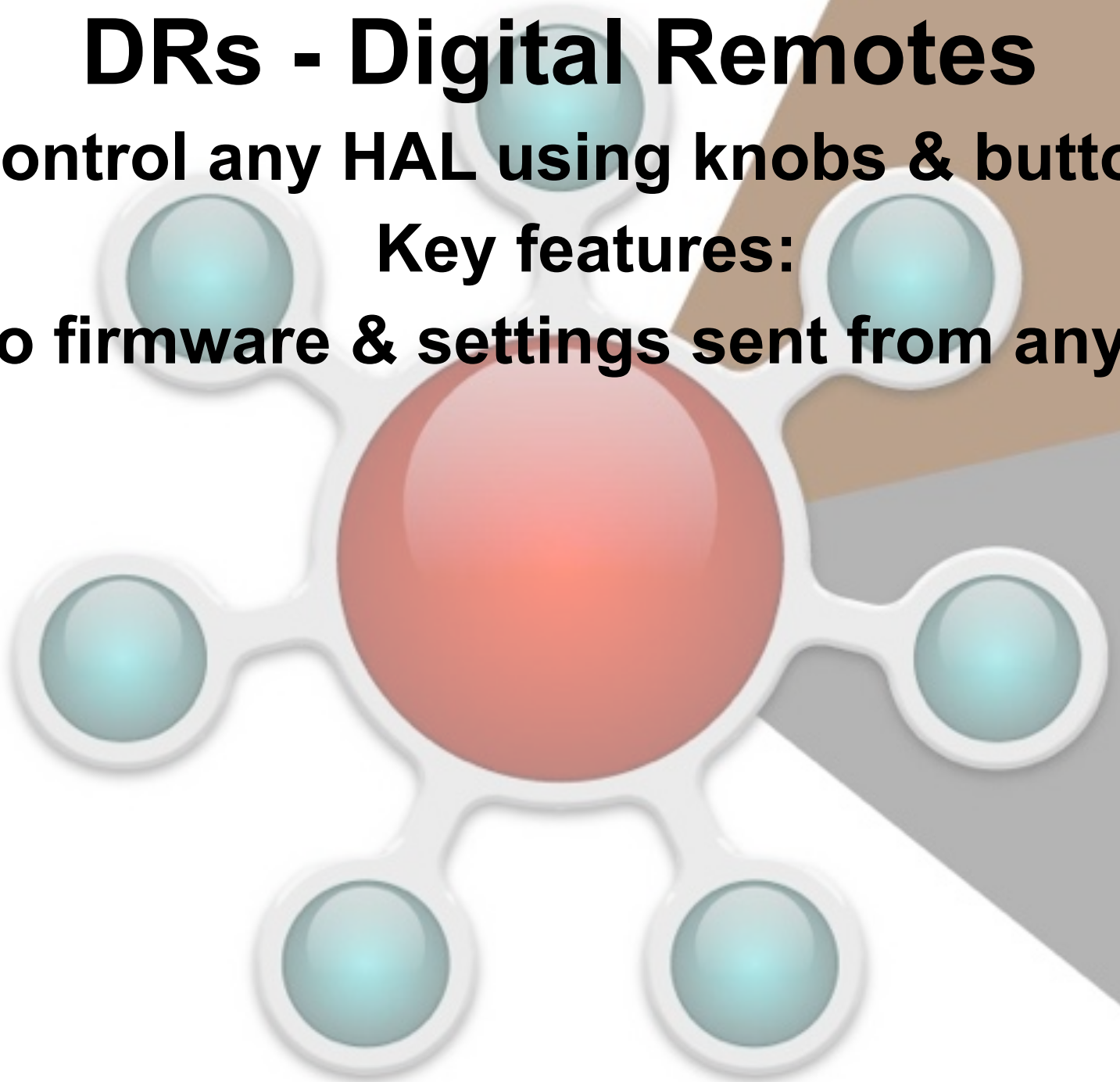


DRs - Digital Remotes

Control any HAL using knobs & buttons

Key features:

- Auto firmware & settings sent from any HAL

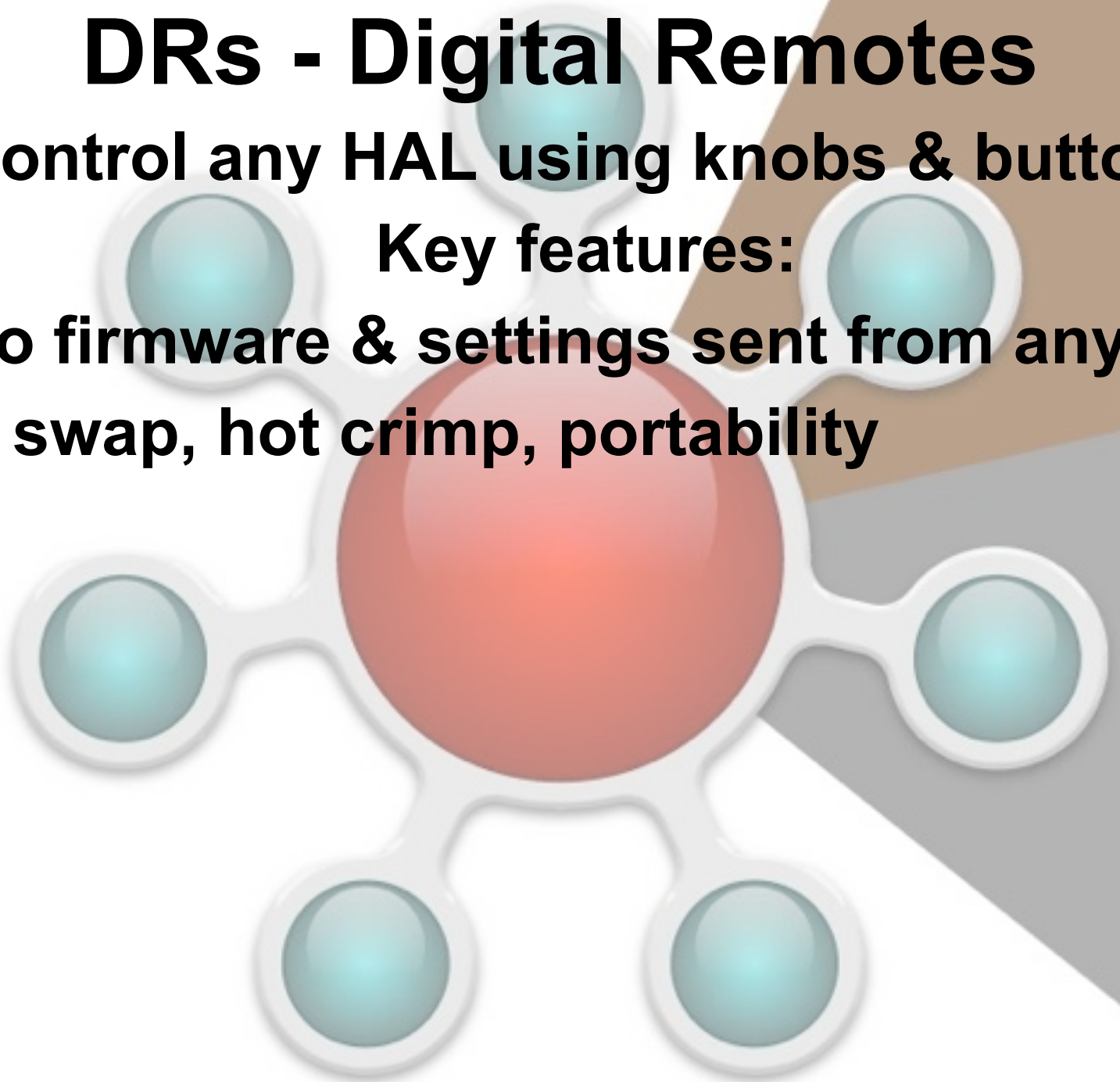


DRs - Digital Remotes

Control any HAL using knobs & buttons

Key features:

- Auto firmware & settings sent from any HAL
- Hot swap, hot crimp, portability

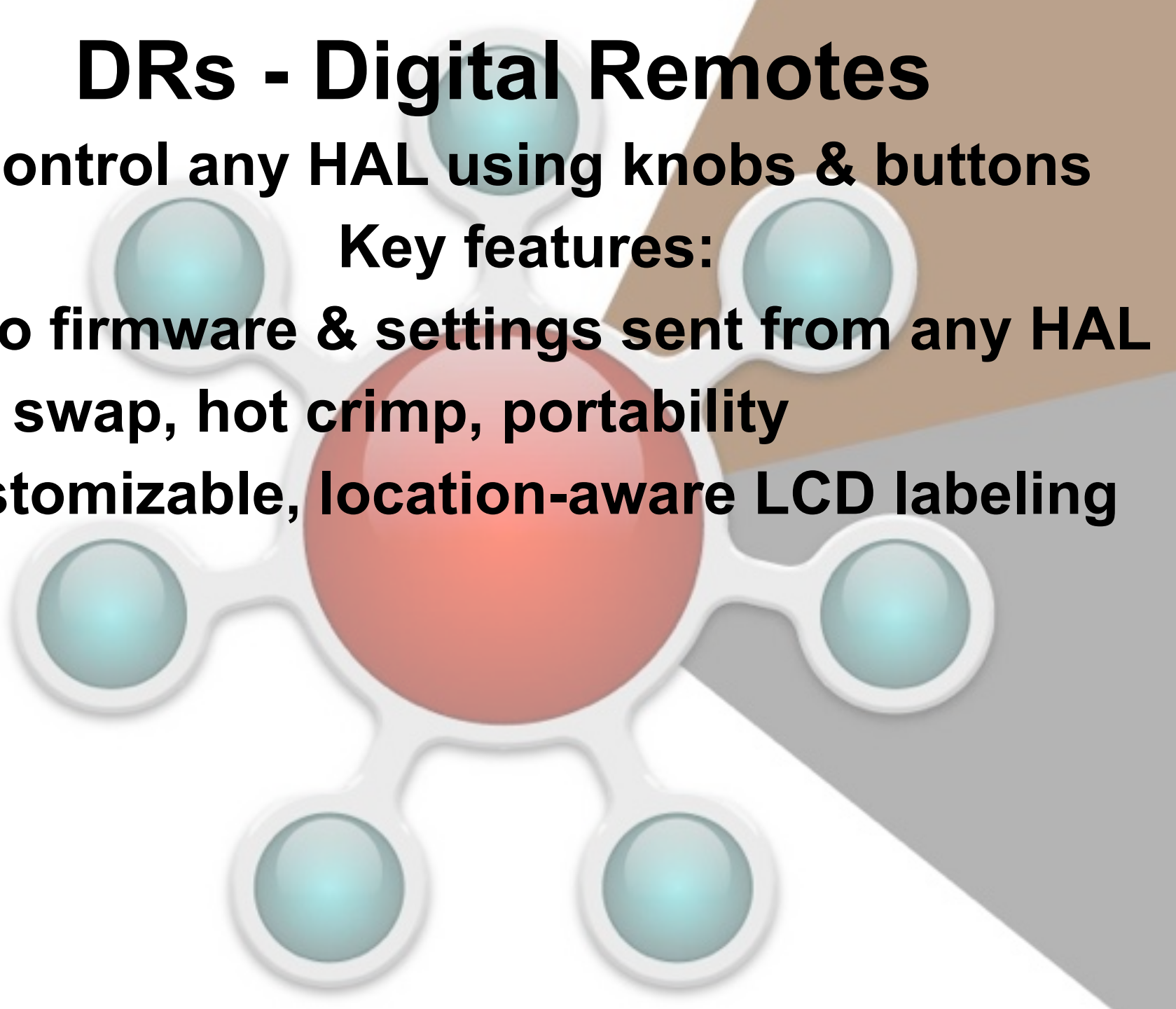


DRs - Digital Remotes

Control any HAL using knobs & buttons

Key features:

- Auto firmware & settings sent from any HAL
- Hot swap, hot crimp, portability
- Customizable, location-aware LCD labeling



DRs - Digital Remotes

Control any HAL using knobs & buttons

Key features:

- Auto firmware & settings sent from any HAL
- Hot swap, hot crimp, portability
- Customizable, location-aware LCD labeling
- Shielded CAT 5e or better homeruns
  - Automatic physical addressing

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  - Automatic physical addressing
- 300 m (1,000 feet) maximum from HAL

DRs - Digital Remotes

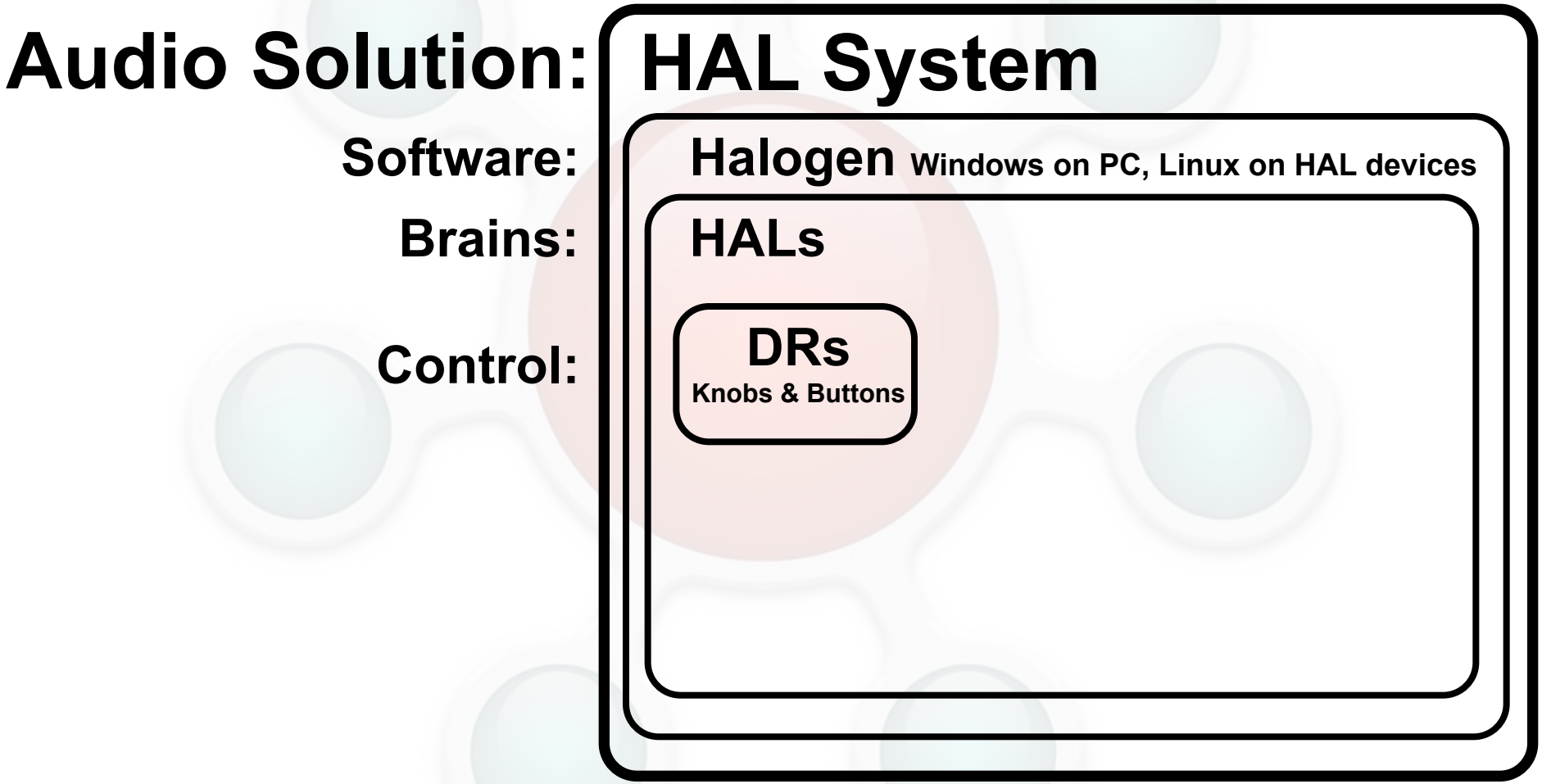
Control any HAL using knobs & buttons

Key features:

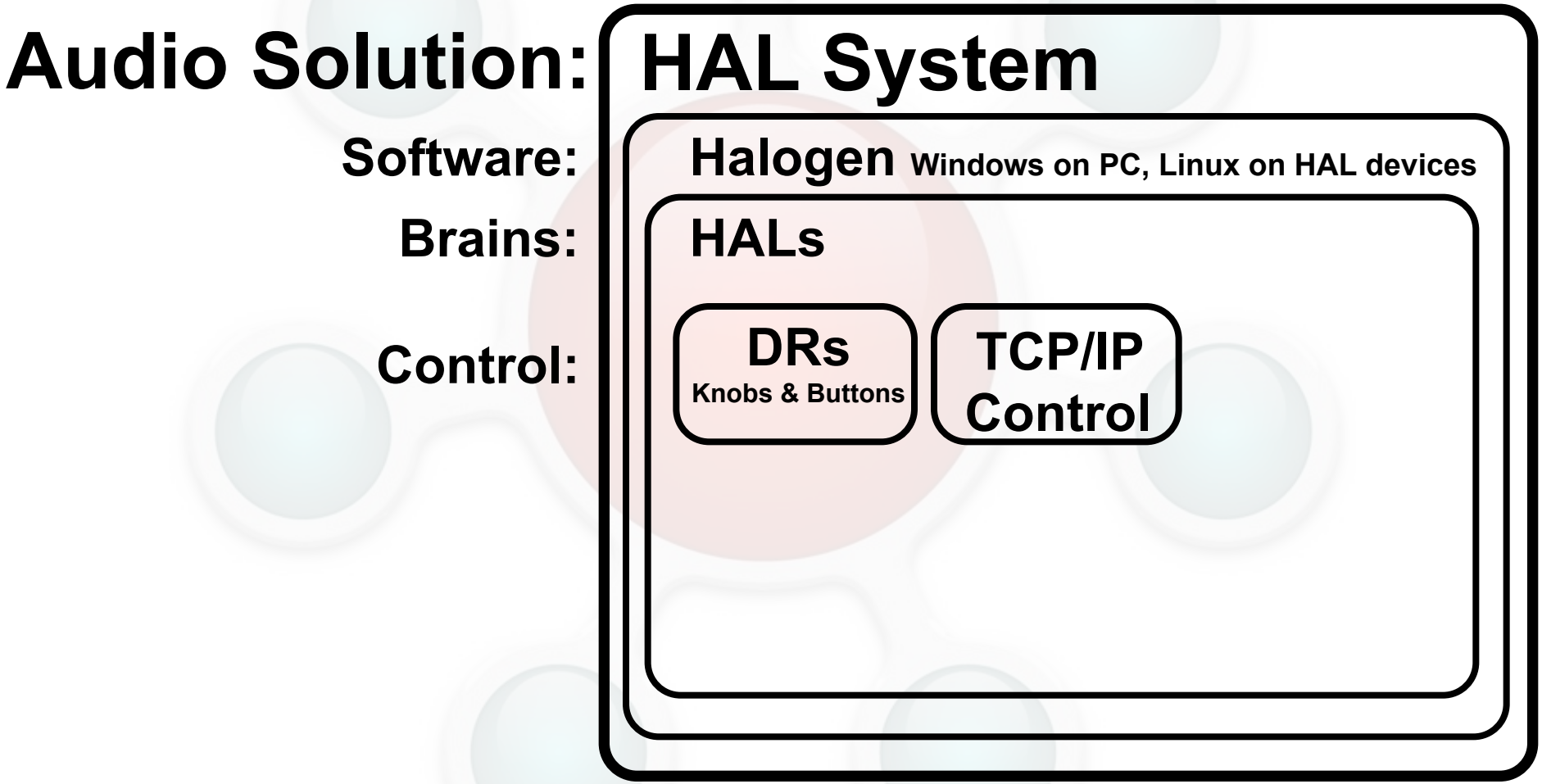
- Auto firmware & settings sent from any HAL
- Hot swap, hot crimp, portability
- Customizable, location-aware LCD labeling
- Shielded CAT 5e or better homeruns
  - Automatic physical addressing
- 300 m (1,000 feet) maximum from HAL
- Device location & RJ-45 crimps are tested:

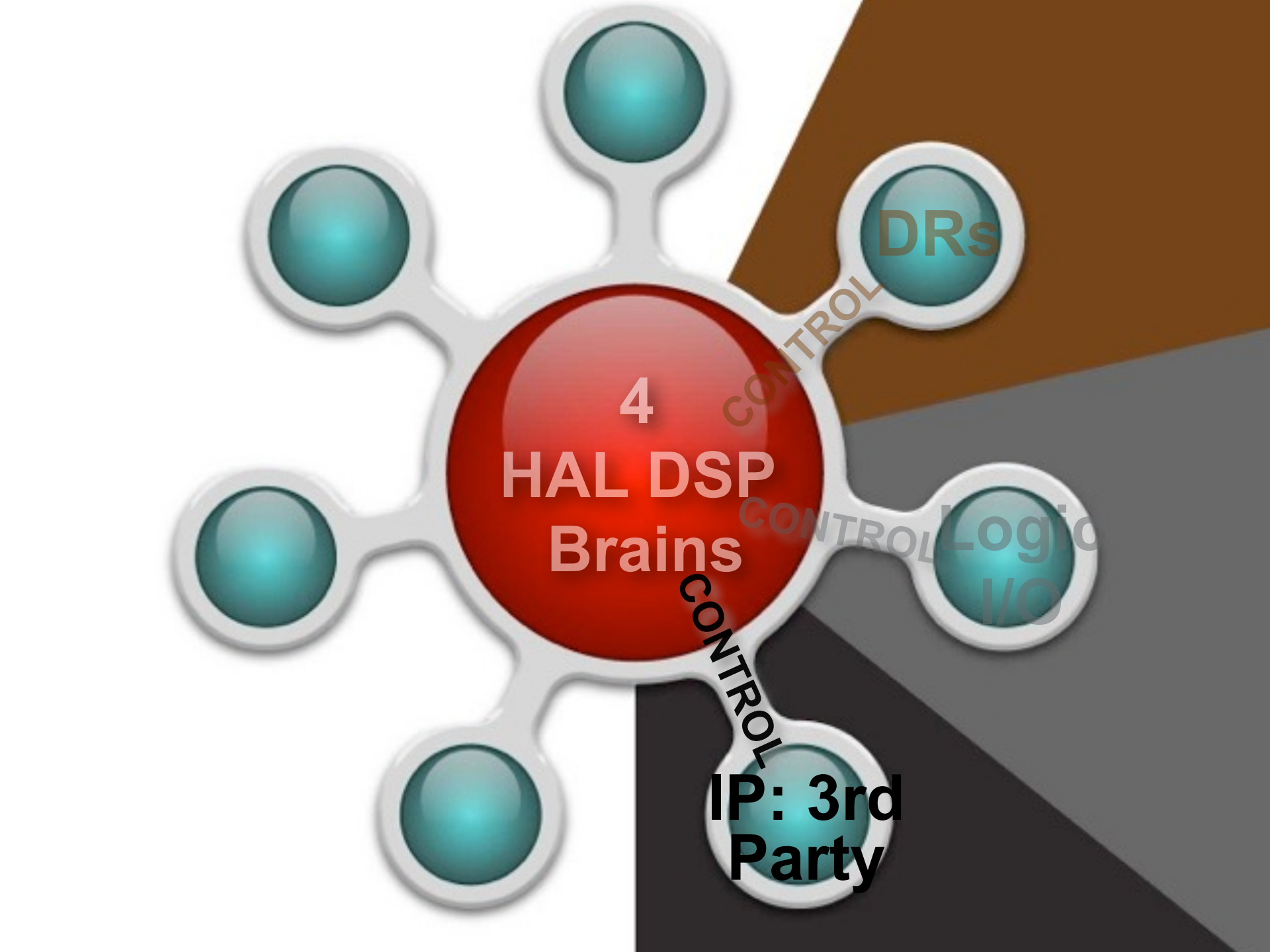
  Troubleshooting indication in SW & HW (both ends of cable)

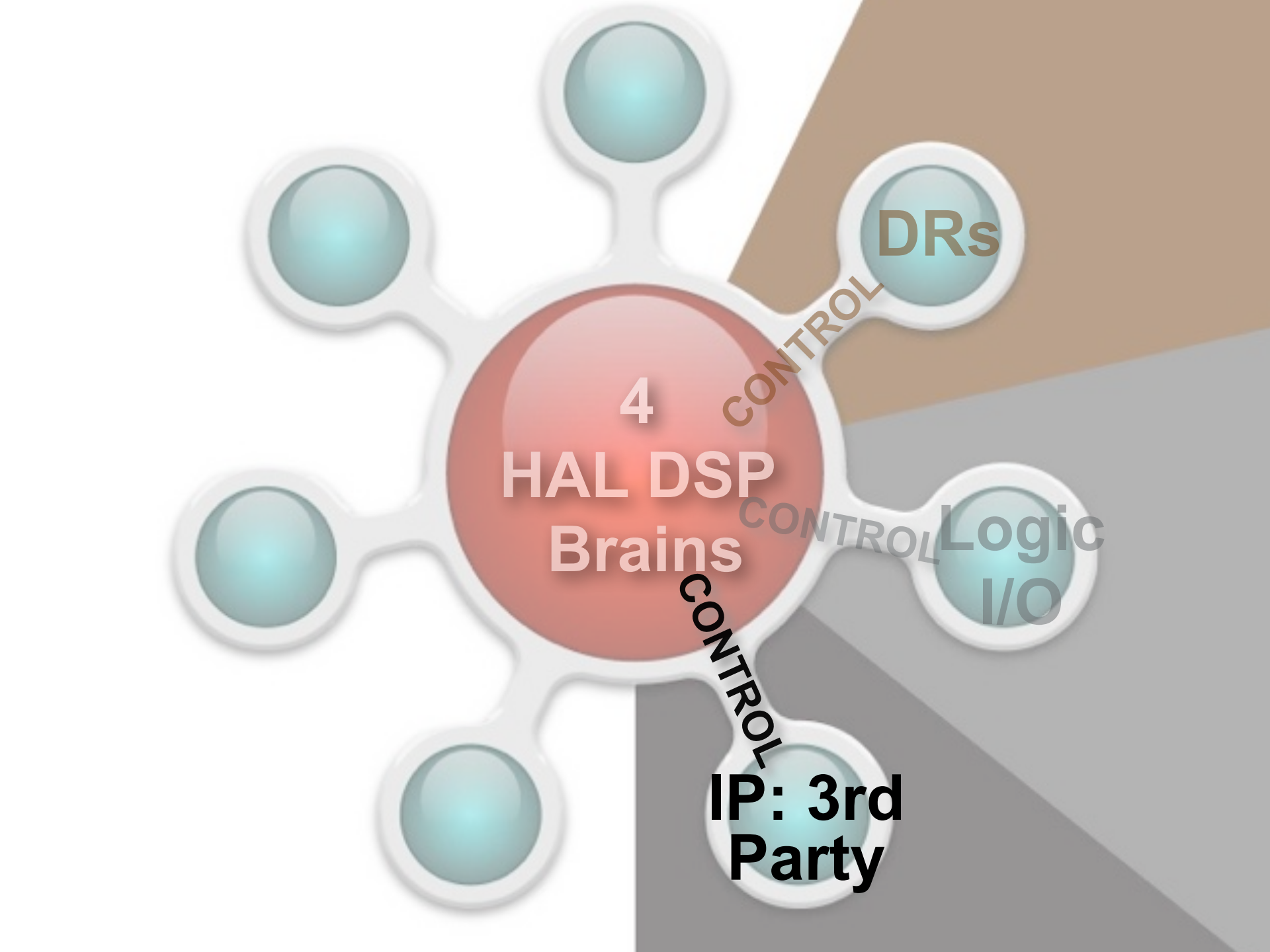
HAL System Architecture



HAL System Architecture




4
HAL DSP
Brains
CONTROL
DRs
CONTROL
Logic
I/O
CONTROL
IP: 3rd
Party


4
HAL DSP
Brains
CONTROL
DRs
CONTROL
Logic
I/O
CONTROL
IP: 3rd
Party

ASCII Text over TCP/IP

4
HAL DSP
Brains

CONTROL
DRs

CONTROL
Logic
I/O

CONTROL
IP: 3rd
Party

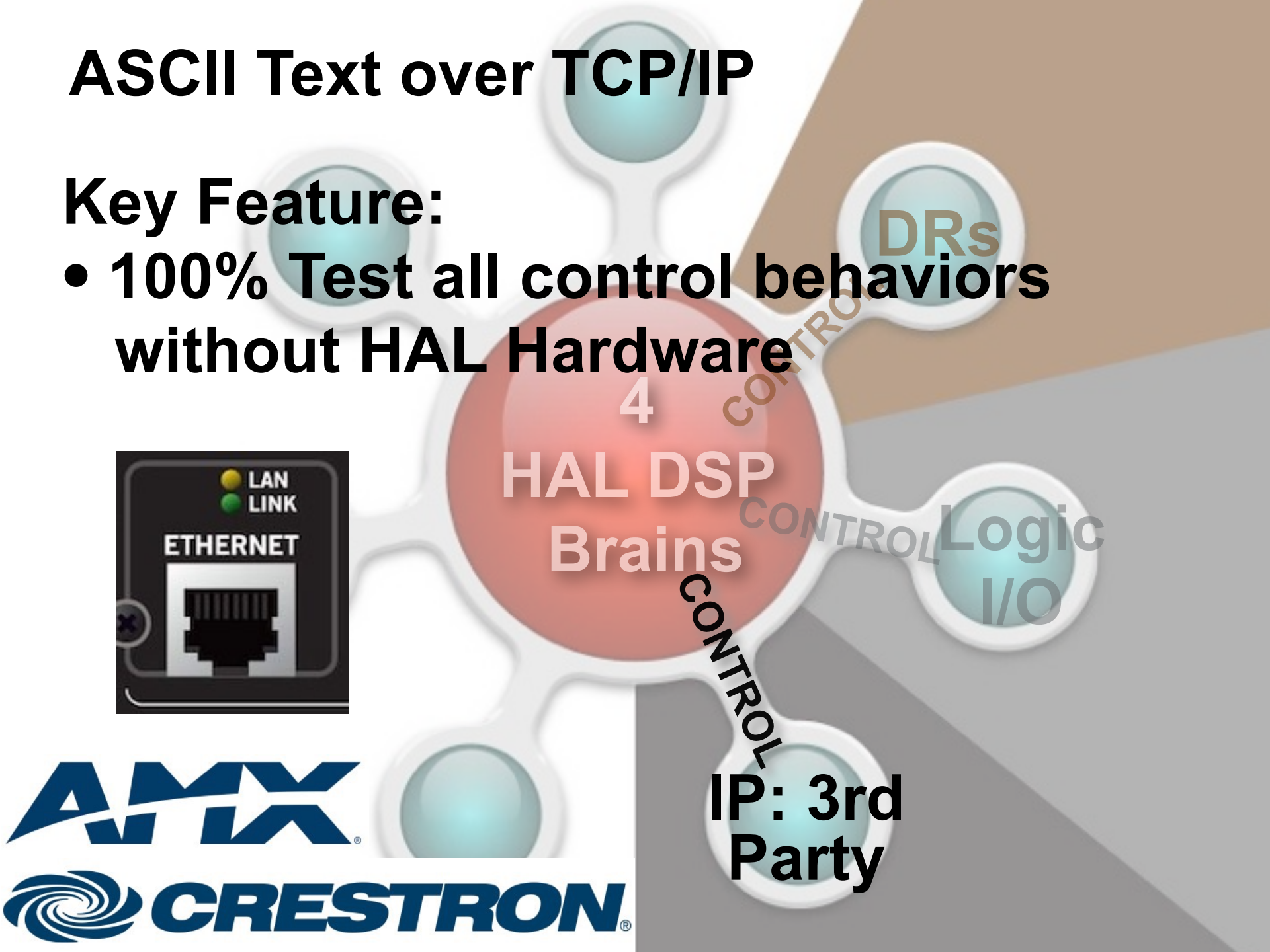
AMX

CRESTRON

ASCII Text over TCP/IP

Key Feature:

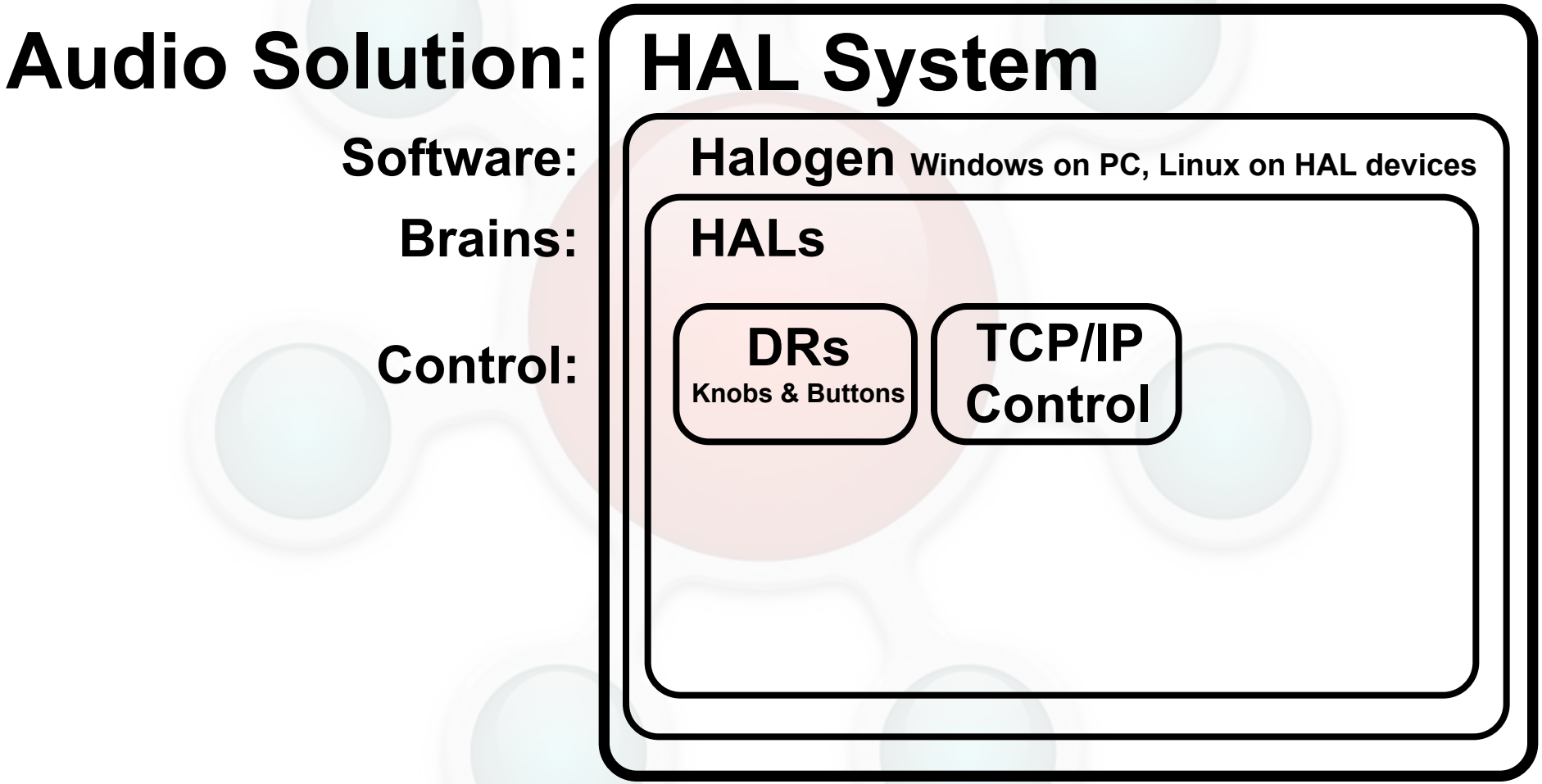
- 100% Test all control behaviors without HAL Hardware



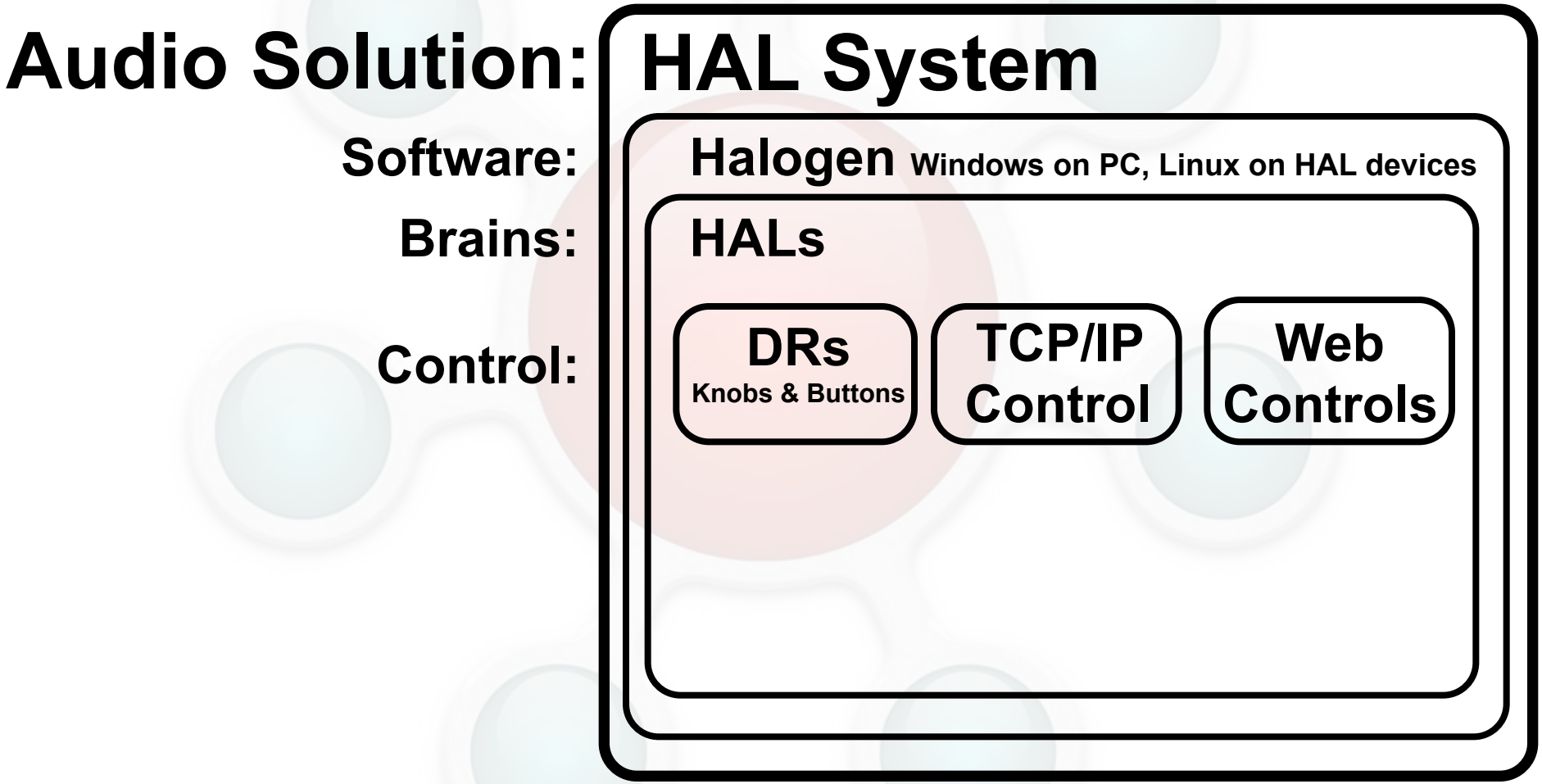
AMX

CRESTRON

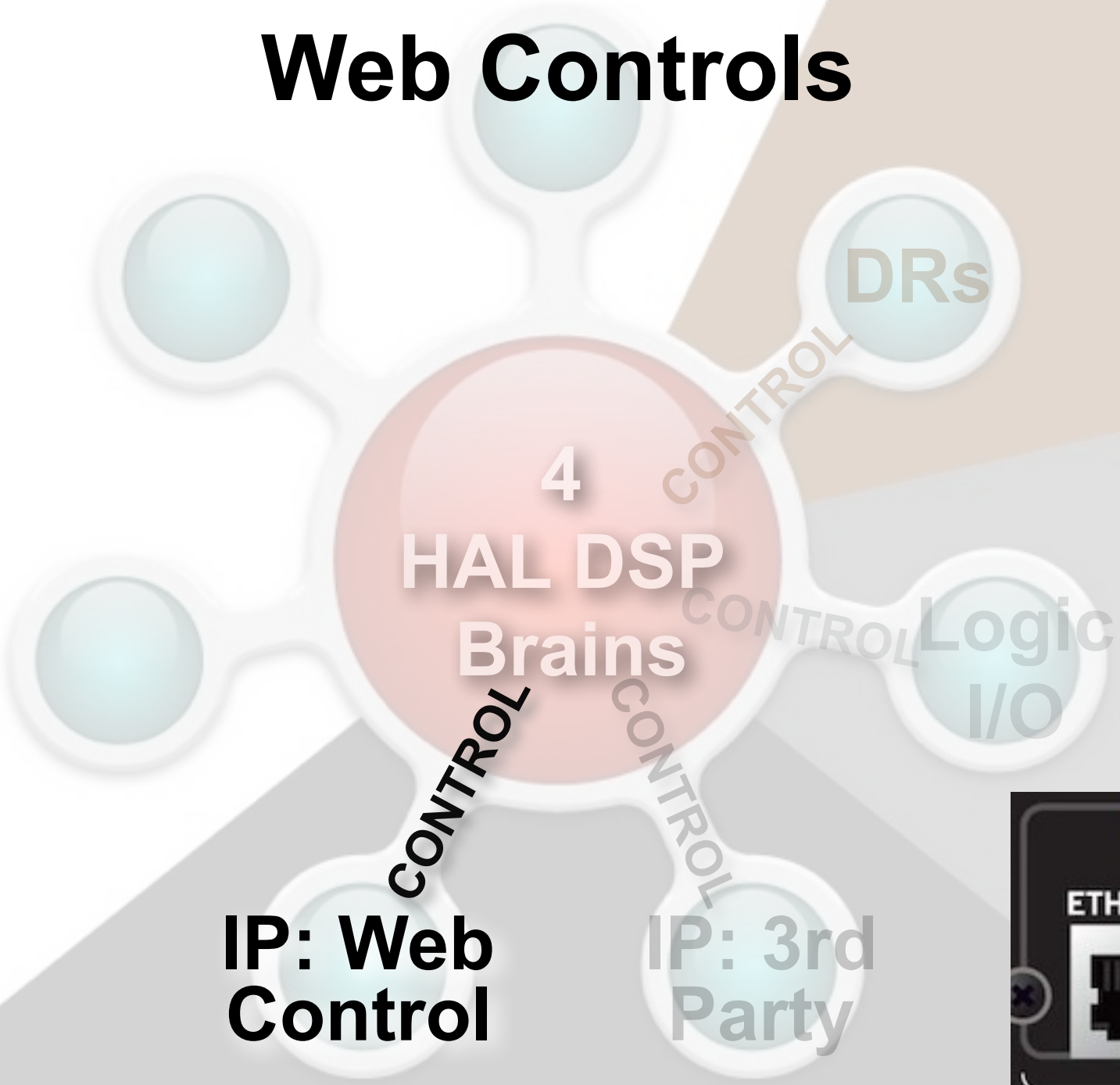
HAL System Architecture



HAL System Architecture



Web Controls



Web Controls

Key Features:

4
HAL DSP
Brains

DRs

Logic
I/O

IP: 3rd
Party

IP: Web
Control

CONTROL

CONTROL

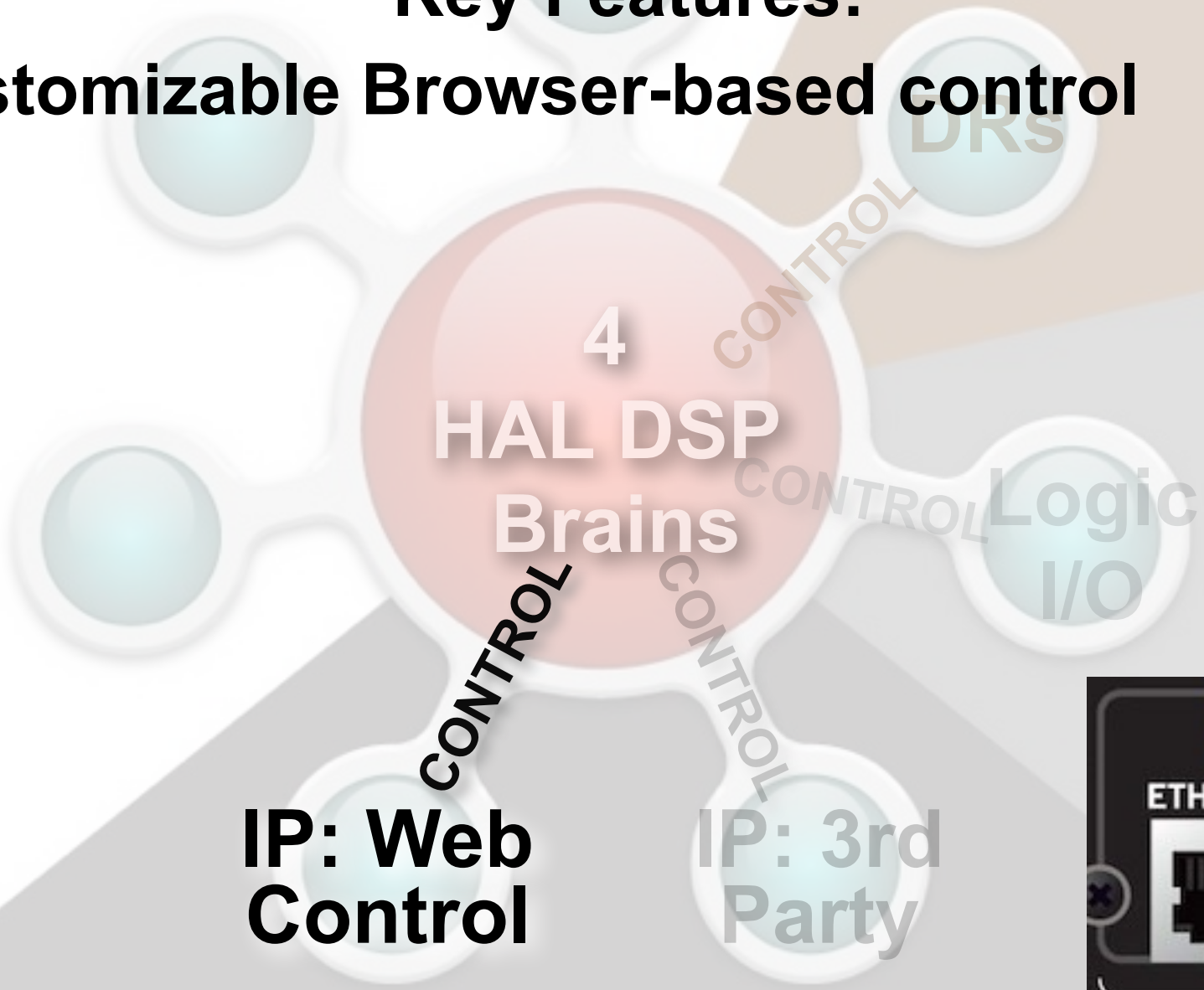
CONTROL

CONTROL

Web Controls

Key Features:

- **Customizable Browser-based control**



Web Controls

Key Features:

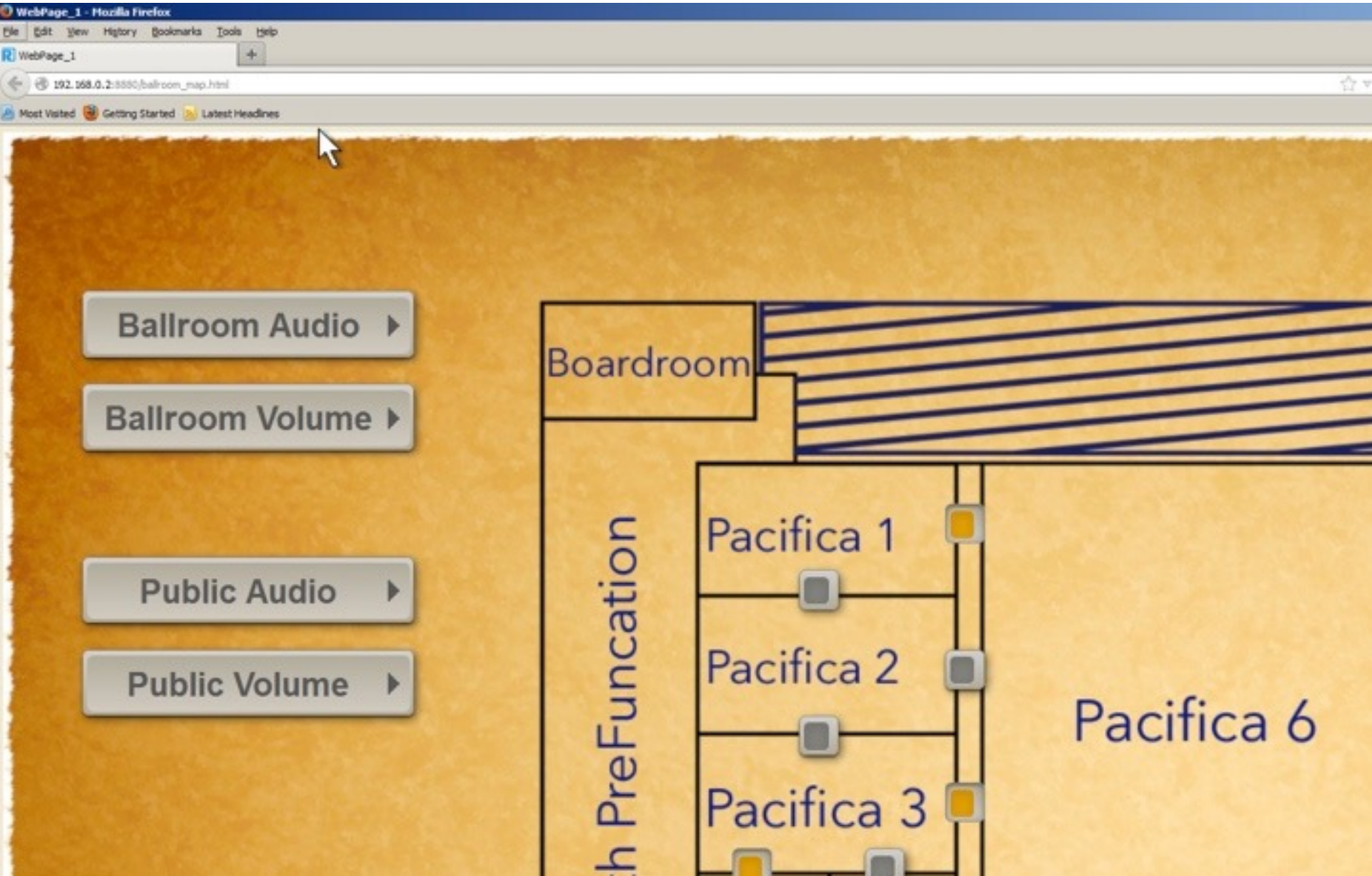
- Customizable Browser-based control
- Web pages run on any device browser
  - Any PC: Windows or Apple
  - Any Tablet: iPad, Surface, Samsung...
  - Any Smart Phone: iPhone, Android, Windows

Web Controls

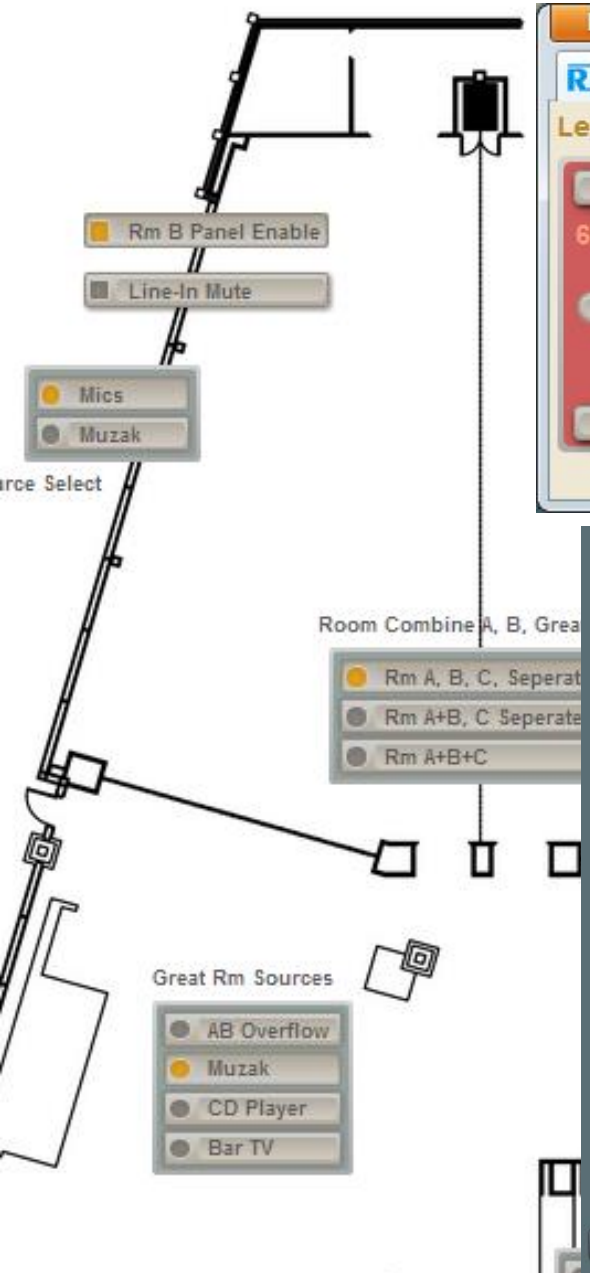
Key Features:

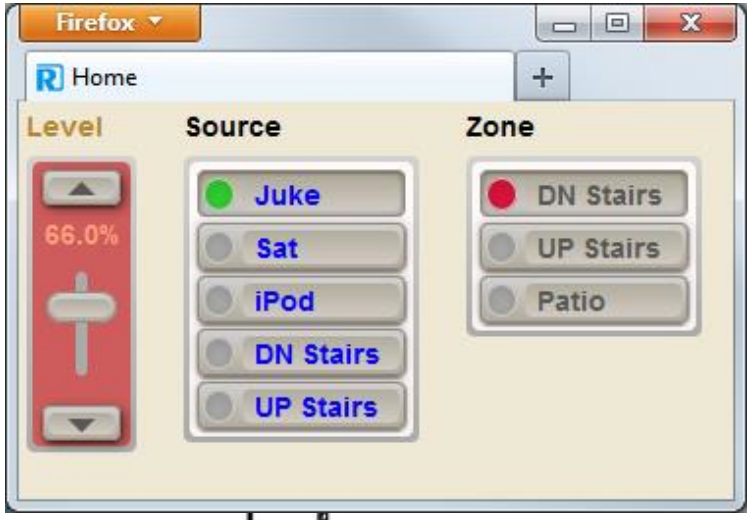
- Customizable Browser-based control
- Web pages run on any device browser
  - Any PC: Windows or Apple
  - Any Tablet: iPad, Surface, Samsung...
  - Any Smart Phone: iPhone, Android, Windows
- 100% Test all control behaviors without HAL Hardware

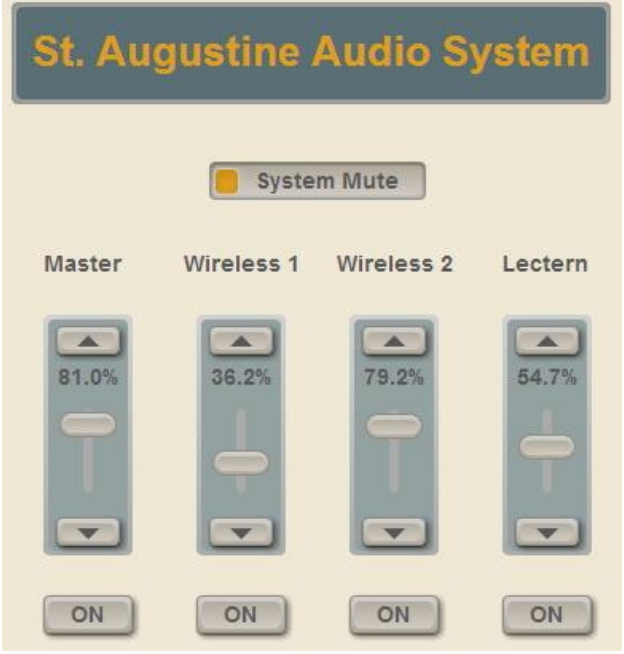
Example Hotel Room Combine

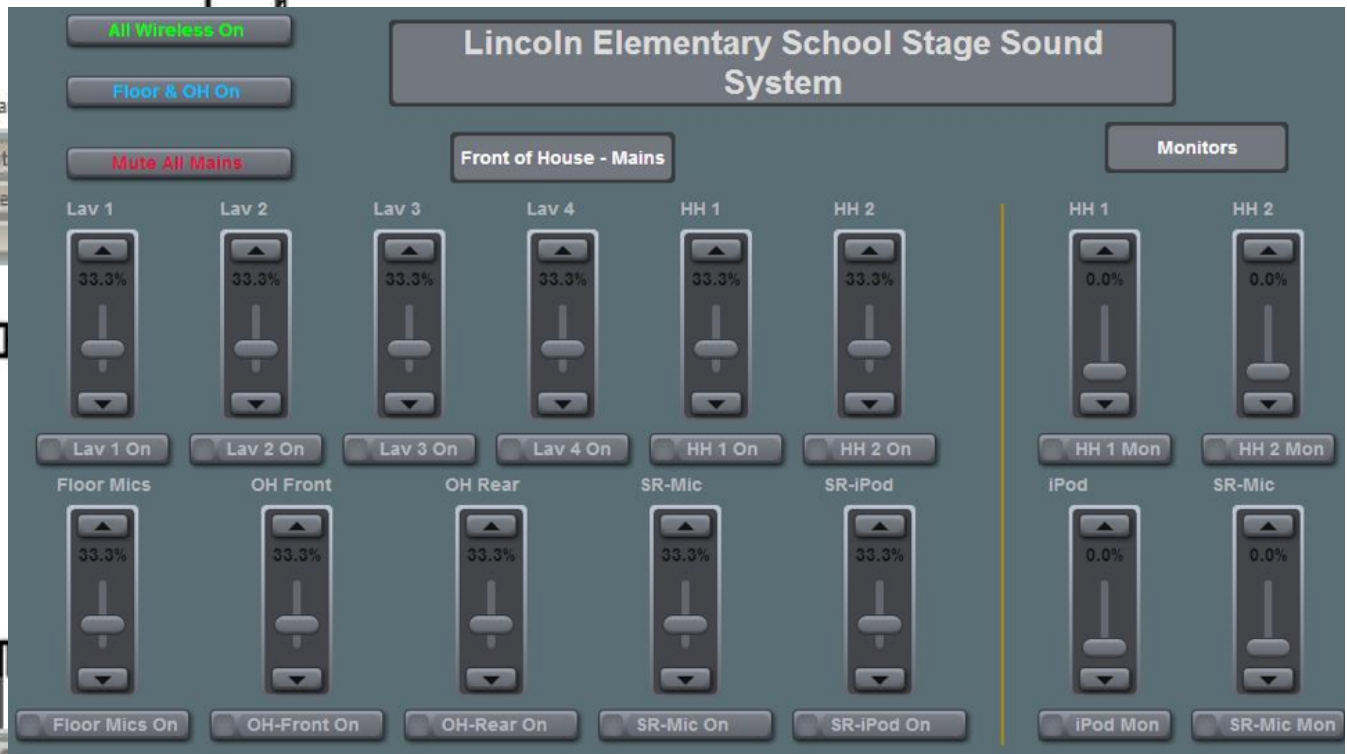


Example webpages

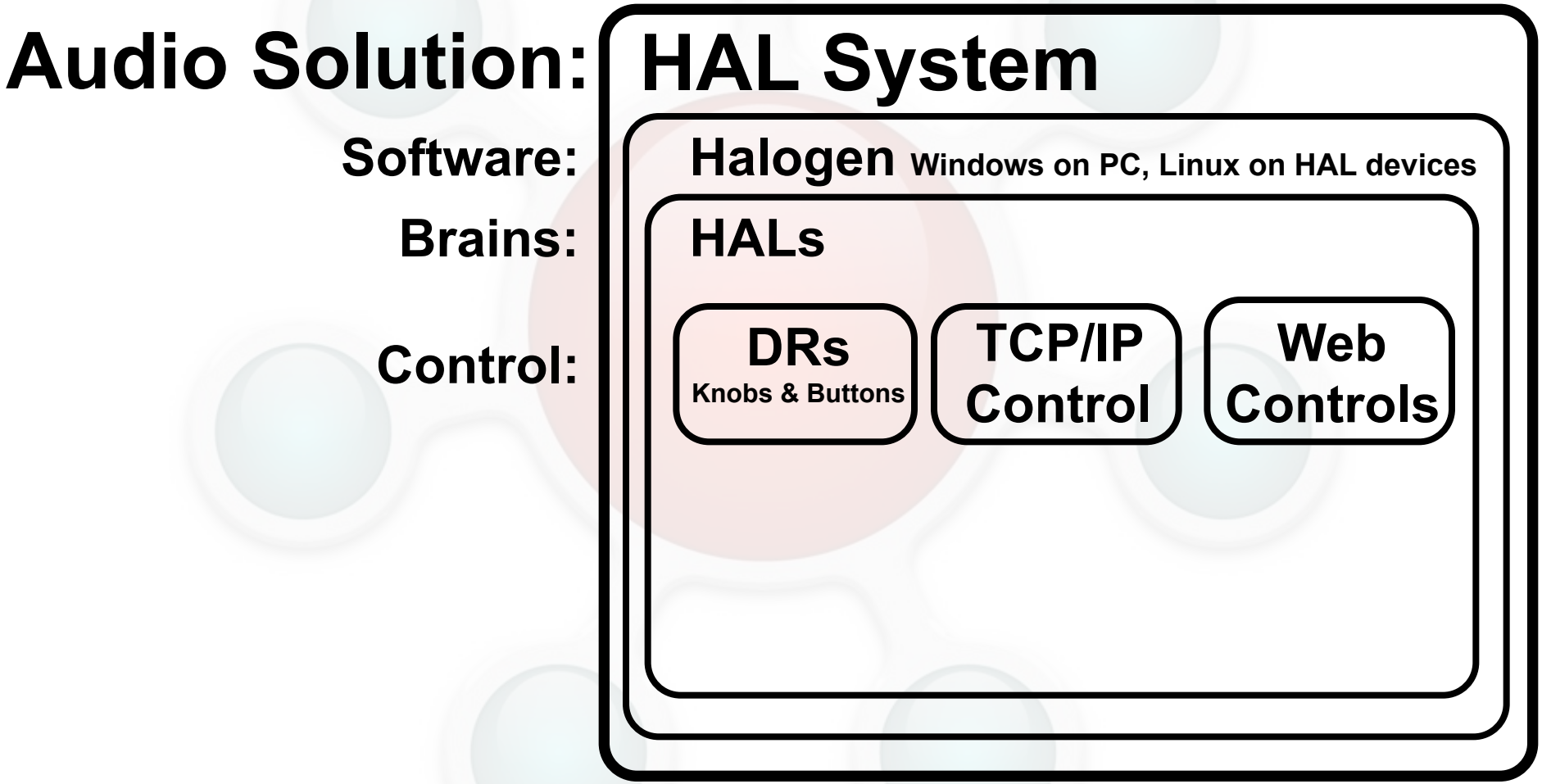




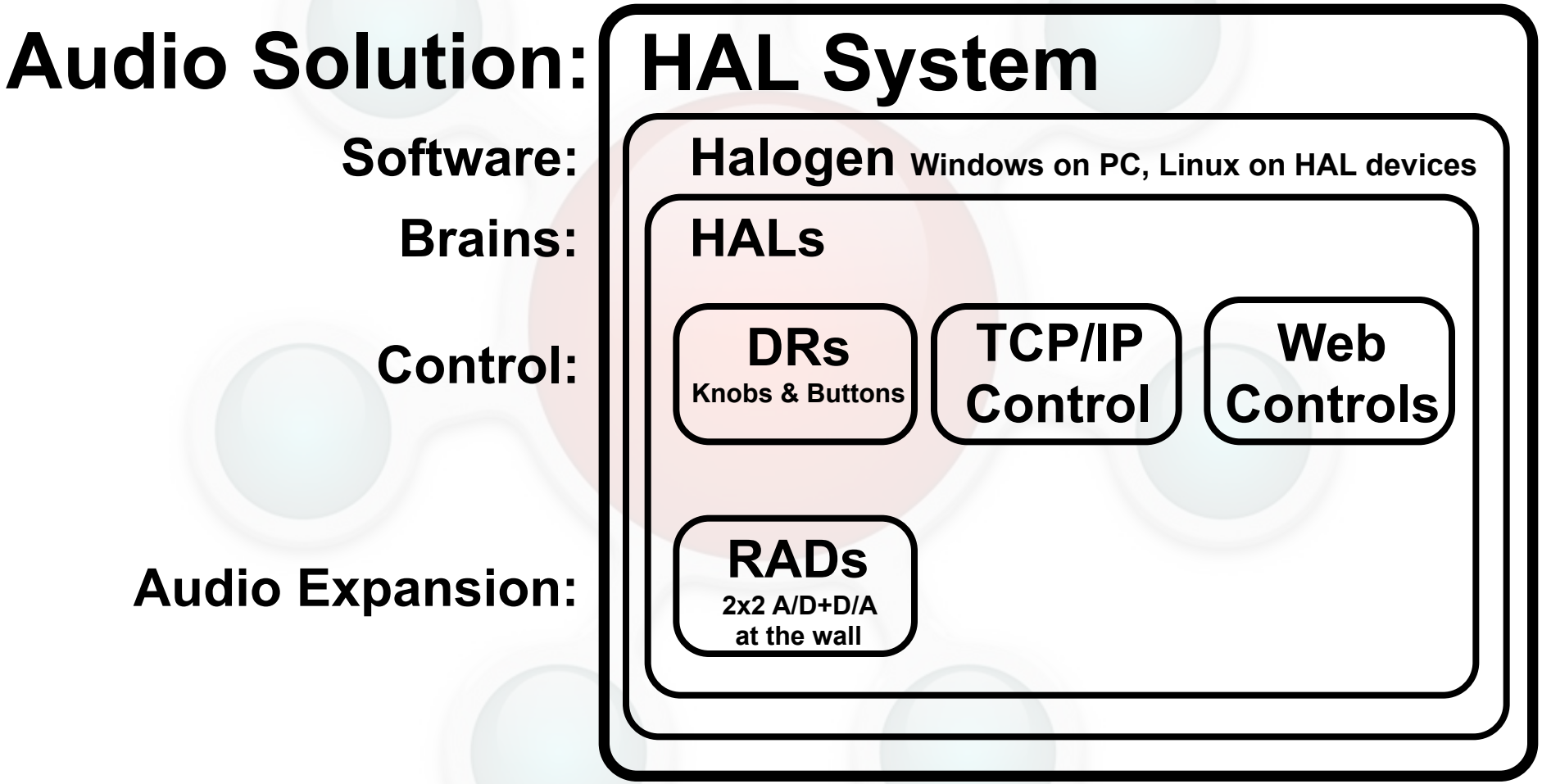


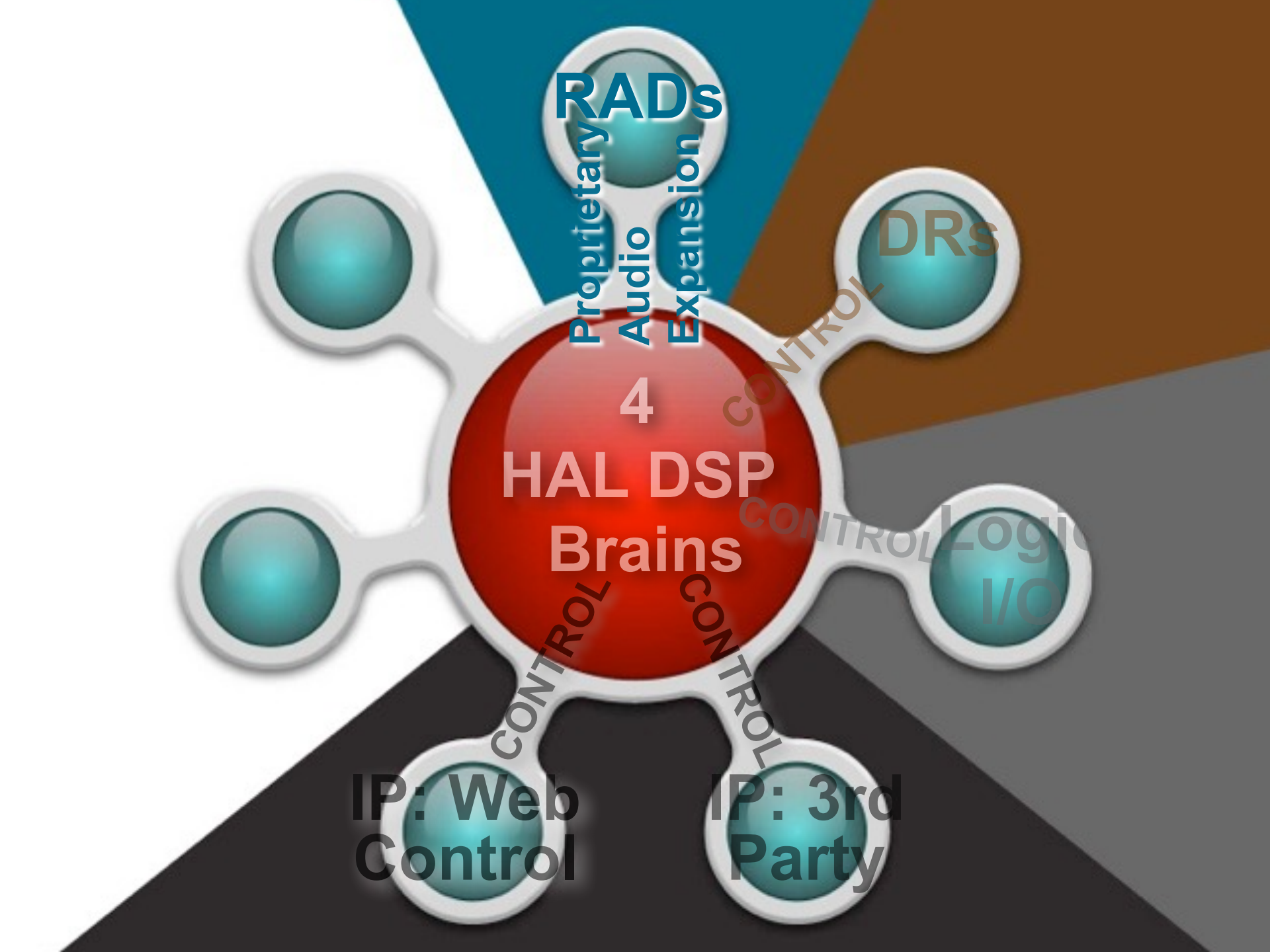


HAL System Architecture



HAL System Architecture




RADs
Proprietary Audio Expansion
DRs
CONTROL
4
HAL DSP
Brains
CONTROL
Logi
I/O
CONTROL
CONTROL
IP: Web
Control
IP: 3rd
Party

RADs

RAD1

RAD2

RAD3

RAD4

RAD5

RAD6

RAD7

RAD8

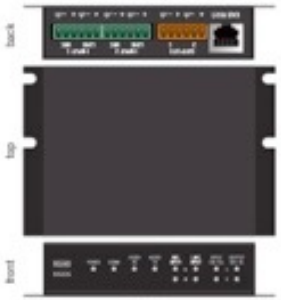
RAD9

RAD11

RAD12

RAD14

RAD15



RAD16

RAD17

RAD18

RAD23

RAD24

RAD27

RAD8

AM1 and AM2 AUTOMIXERS

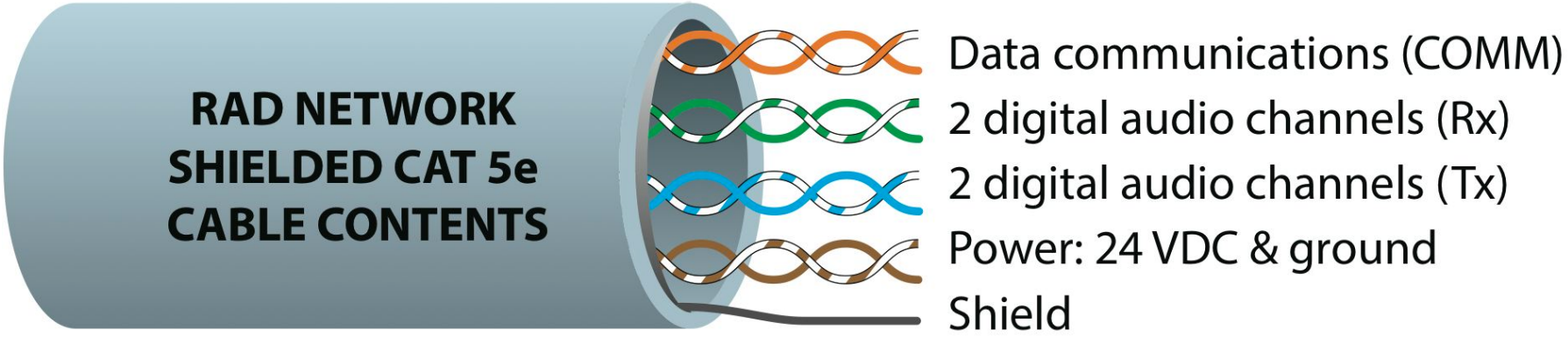
PAGER1

RADs - Remote Audio Devices

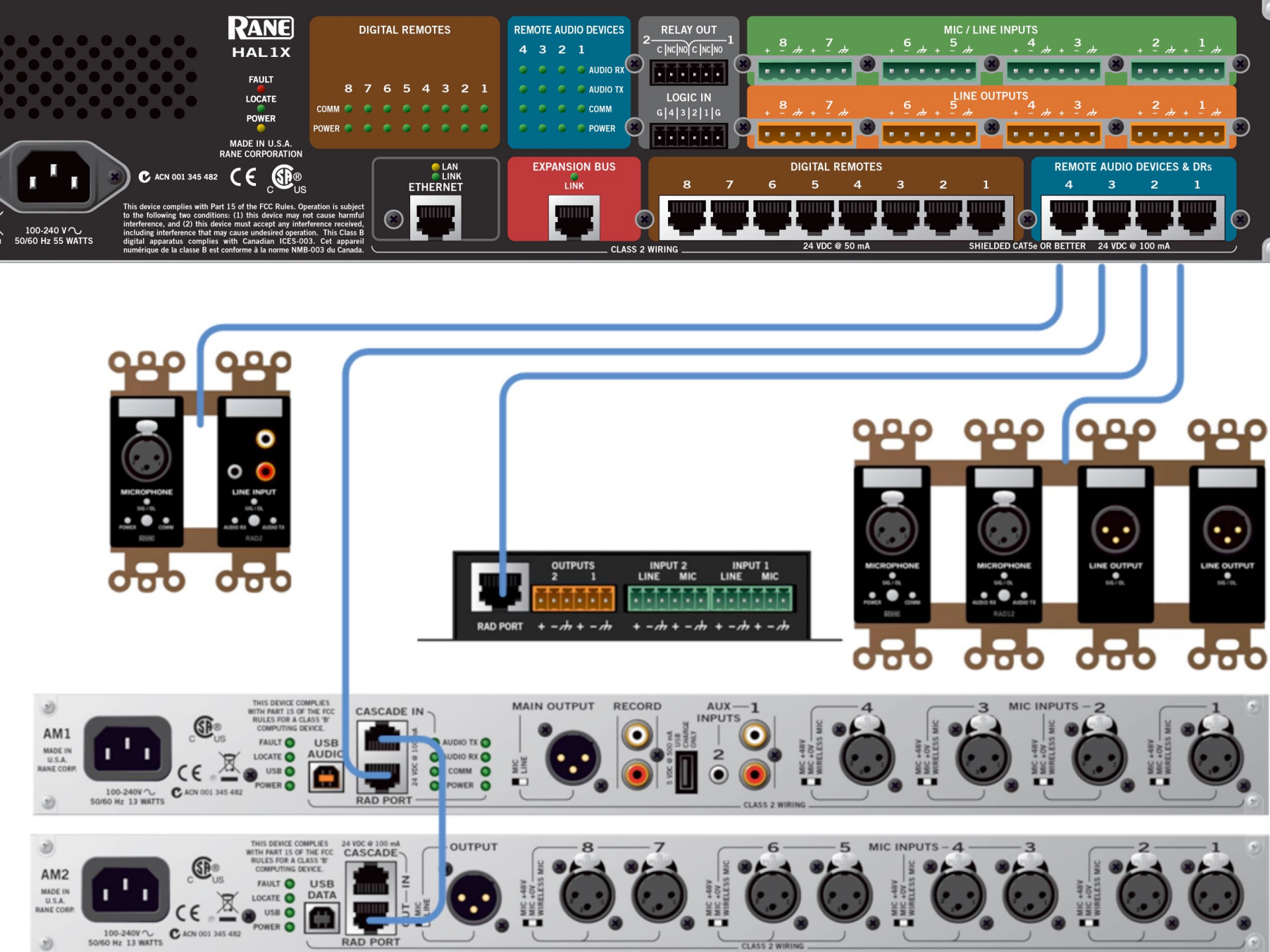
Incremental (2x2) expand audio for any HAL
A/D & D/A at the wall, podium, desk...

- **Auto firmware & settings sent from any HAL**
- **Hot swap, hot crimp, portability**
- **Location-aware**
  - **Shielded CAT 5e or better homeruns**
    - **Automatic physical addressing**
  - **150 m (500 feet) maximum from HAL**
- ***Audio*, device location & crimps testing**
  - **Troubleshooting indication in SW & HW (both ends of cable)**

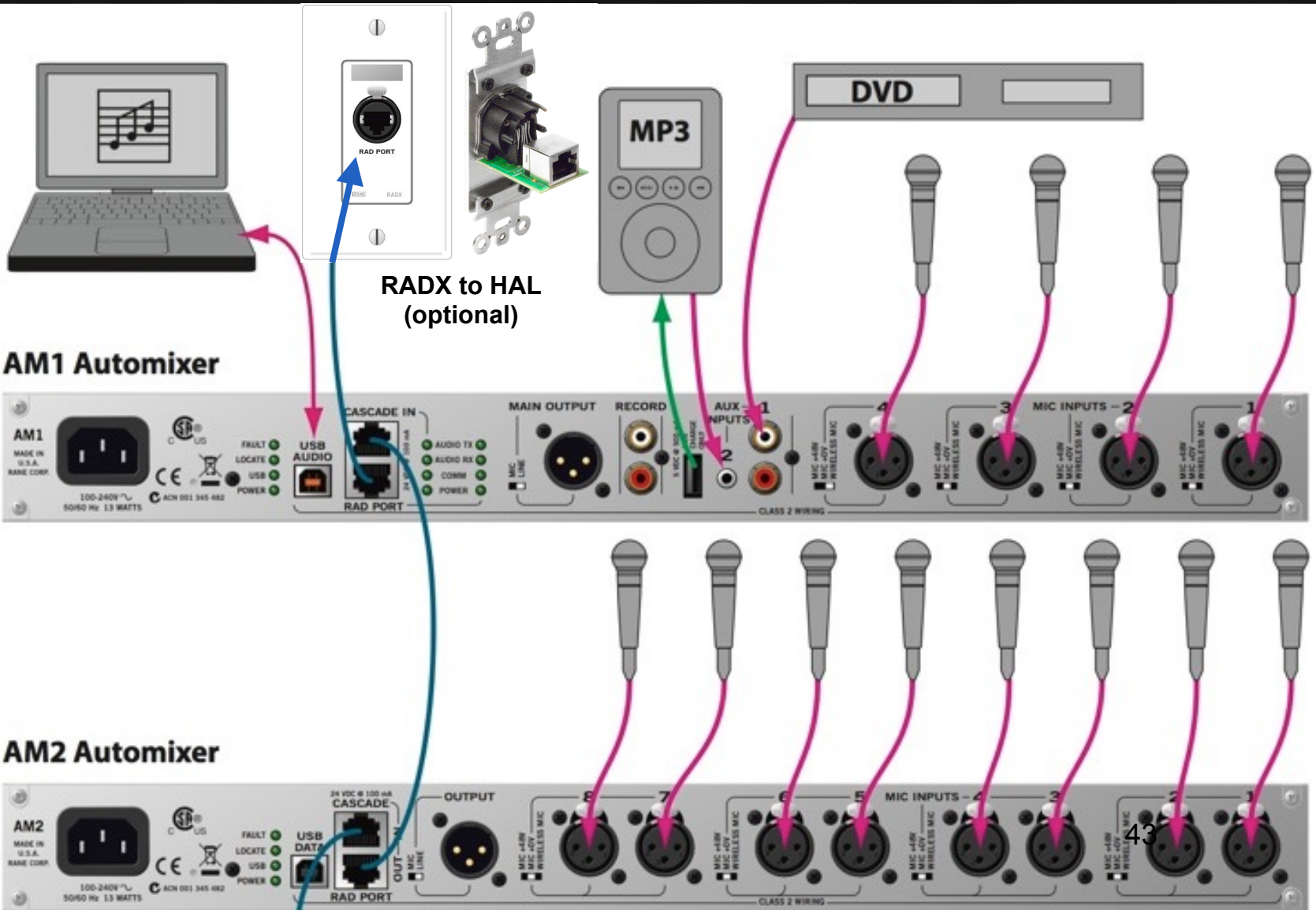
What's in the RAD cable?



- **Communications RS-485**
- **AES3 Receive, 24-bit, 48 kHz; 2 audio Channels**
- **AES3 Transmit 24-bit, 48 kHz; 2 audio Channels**
- **Power & ground**
- **Shielded CAT 5e (or better) cable required**
  - **Shield required due to AES3's constant 6 Mb/s (e.g., FCC/CE EMI)**
  - **Low data rate = RJ-45 patch bays &/or punch downs are OK**


RANE
HAL1X
FAULT
LOCATE
POWER
MADE IN U.S.A.
RANE CORPORATION
ACN 001 345 482
100-240 V~
50/60 Hz 55 WATTS
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
DIGITAL REMOTES
8 7 6 5 4 3 2 1
COMM
POWER
REMOTE AUDIO DEVICES
4 3 2 1
AUDIO RX
AUDIO TX
COMM
POWER
RELAY OUT
2 C NC NO C NC NO 1
LOGIC IN
G 4 3 2 1 G
MIC / LINE INPUTS
8 7 6 5 4 3 2 1
LINE OUTPUTS
8 7 6 5 4 3 2 1
LAN
LINK
ETHERNET
EXPANSION BUS
LINK
DIGITAL REMOTES
8 7 6 5 4 3 2 1
REMOTE AUDIO DEVICES & DRs
4 3 2 1
CLASS 2 WIRING
24 VDC @ 50 mA
SHIELDED CAT5e OR BETTER
24 VDC @ 100 mA
MICROPHONE
LINE INPUT
RAD PORT
OUTPUTS
2 1
INPUT 2
LINE MIC
INPUT 1
LINE MIC
MICROPHONE
MICROPHONE
LINE OUTPUT
LINE OUTPUT
AM1
MADE IN U.S.A.
RANE CORP.
100-240V~
50/60 Hz 13 WATTS
ACN 001 345 482
THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES FOR A CLASS 'B' COMPUTING DEVICE.
FAULT
LOCATE
USB
POWER
USB AUDIO
CASCADE IN
AUDIO TX
AUDIO RX
COMM
POWER
RAD PORT
MAIN OUTPUT
MIC
LINE
RECORD
AUX INPUTS
2
1
MIC INPUTS
4
3
2
1
CLASS 2 WIRING
AM2
MADE IN U.S.A.
RANE CORP.
100-240V~
50/60 Hz 13 WATTS
ACN 001 345 482
THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES FOR A CLASS 'B' COMPUTING DEVICE.
FAULT
LOCATE
USB
POWER
USB DATA
24 VDC @ 100 mA
CASCADE
RAD PORT
OUTPUT
MIC
LINE
IN
MIC INPUTS
8
7
6
5
4
3
2
1
CLASS 2 WIRING

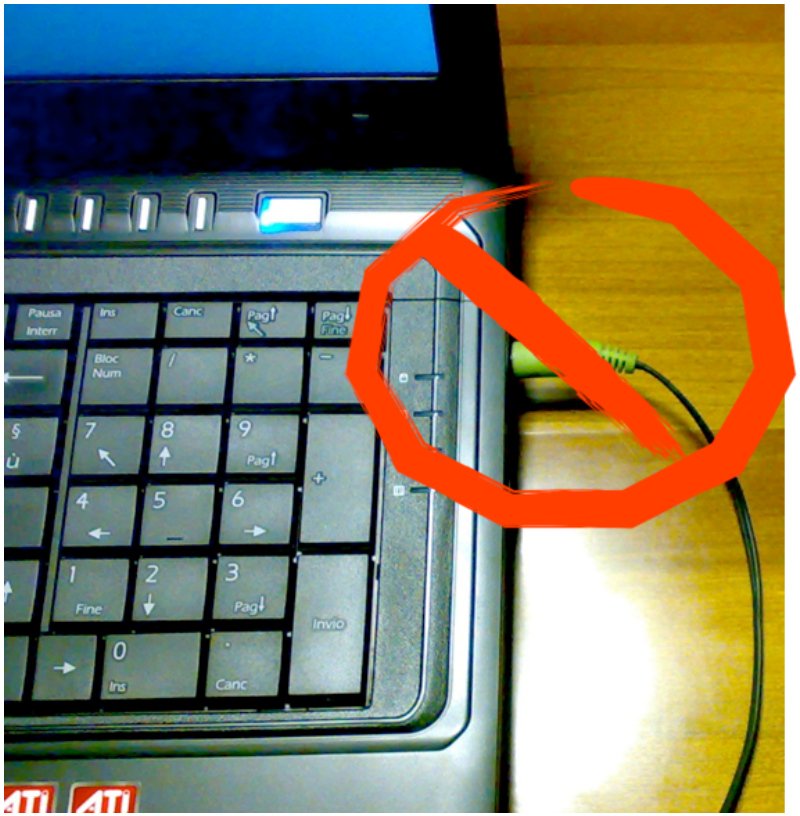
AM1 & AM2 Gain-Sharing Automixer (also RADs)



RAD27 USB Audio Sound Card

- USB Audio I/O
- 16-bit, 48 kHz
- Simultaneously Playback & Record from one PC
- Any vintage Mac or PC
  - No driver to install
- Auto-senses OS authorization:
  - Projector on,screen/lights down, switch vid

RAD27 USB Audio Sound Card



- Presentation Podiums
- Meeting Rooms, Education
- City Council, PTA meetings, School Dances, Nightclubs, Concerts, Sports events...
- PCs with prerecorded announcements, messages, K-Mart blue light specials...

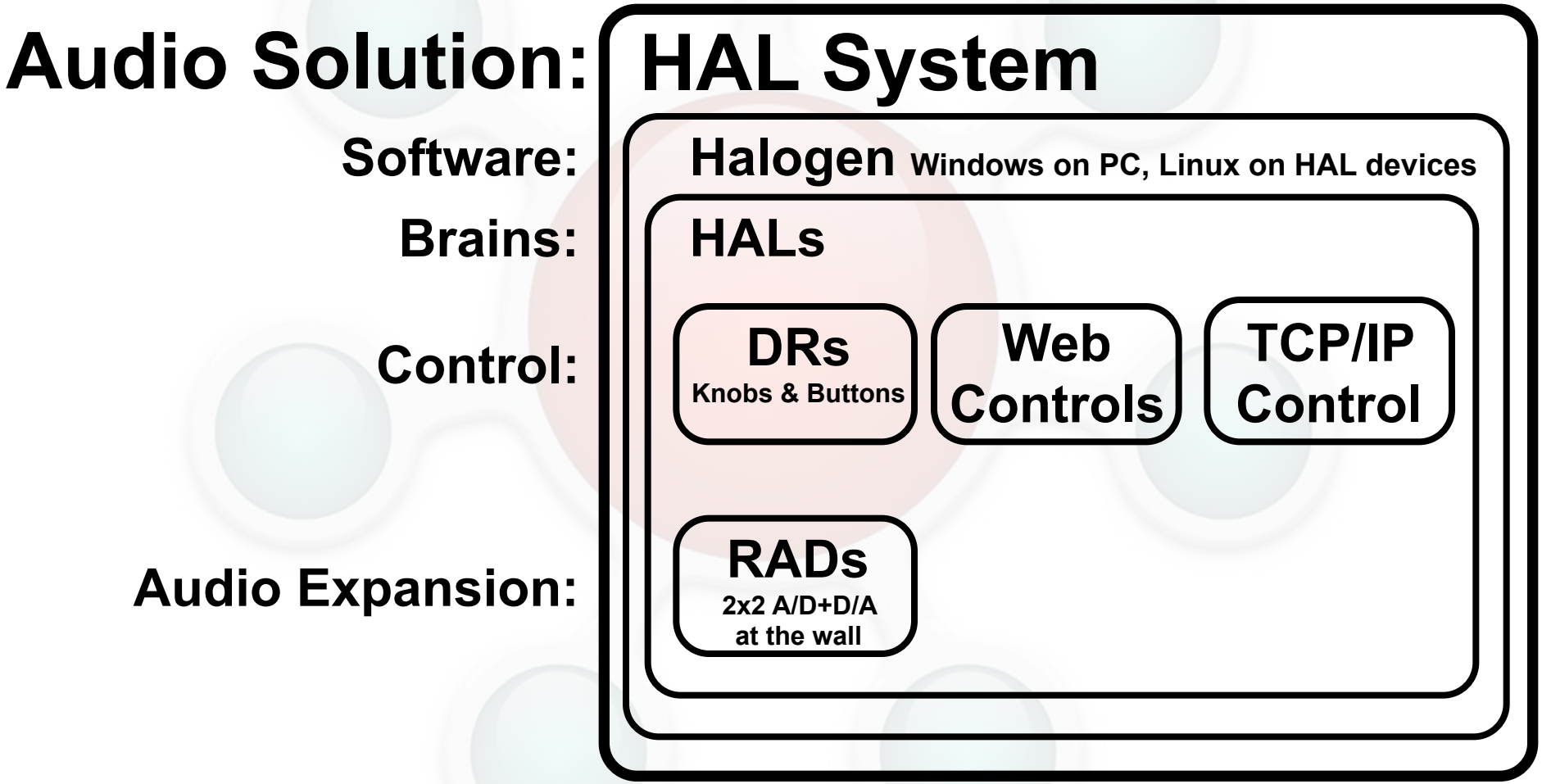
PAGER1 Desktop Paging Station

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

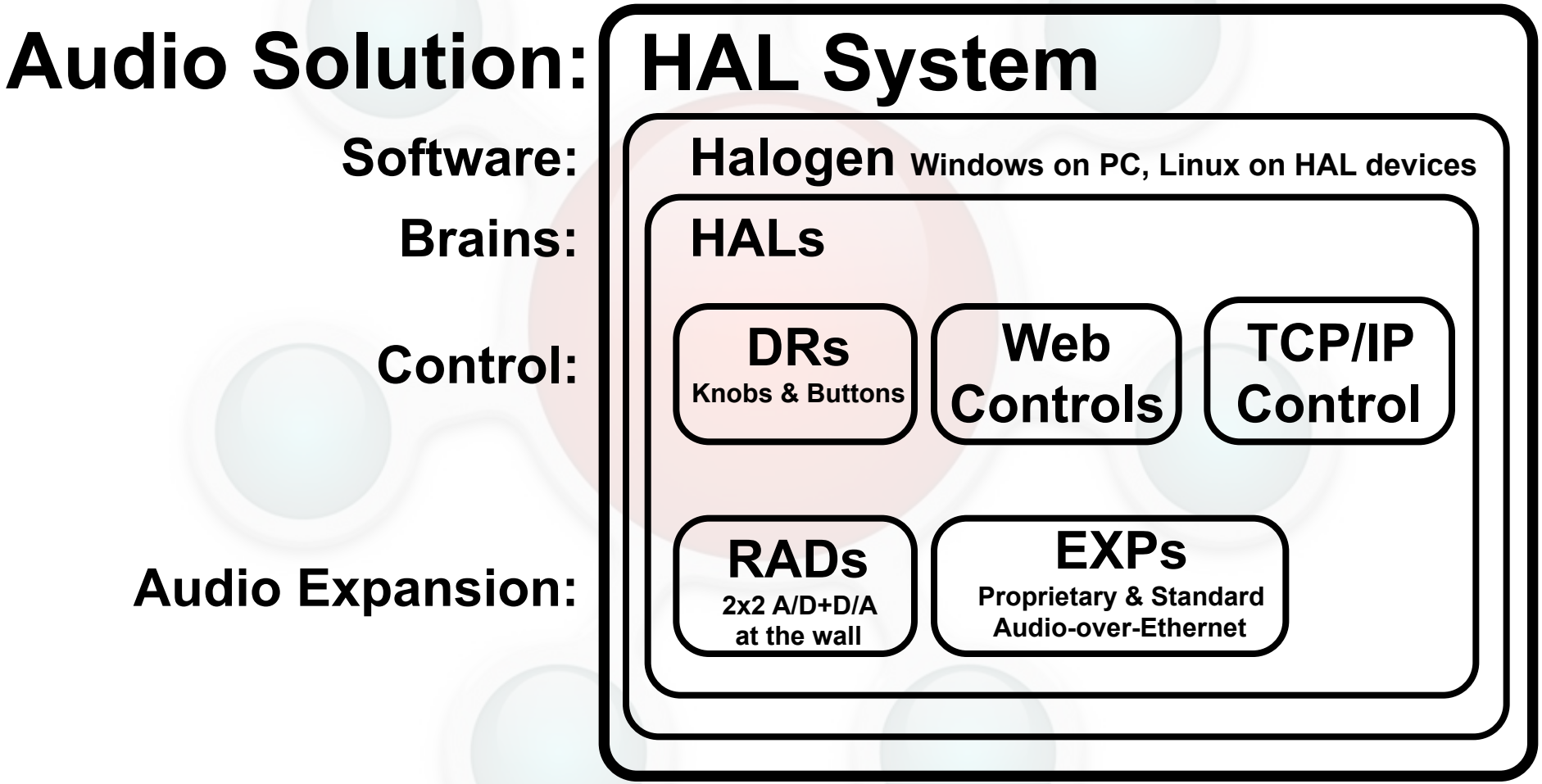
RAD17

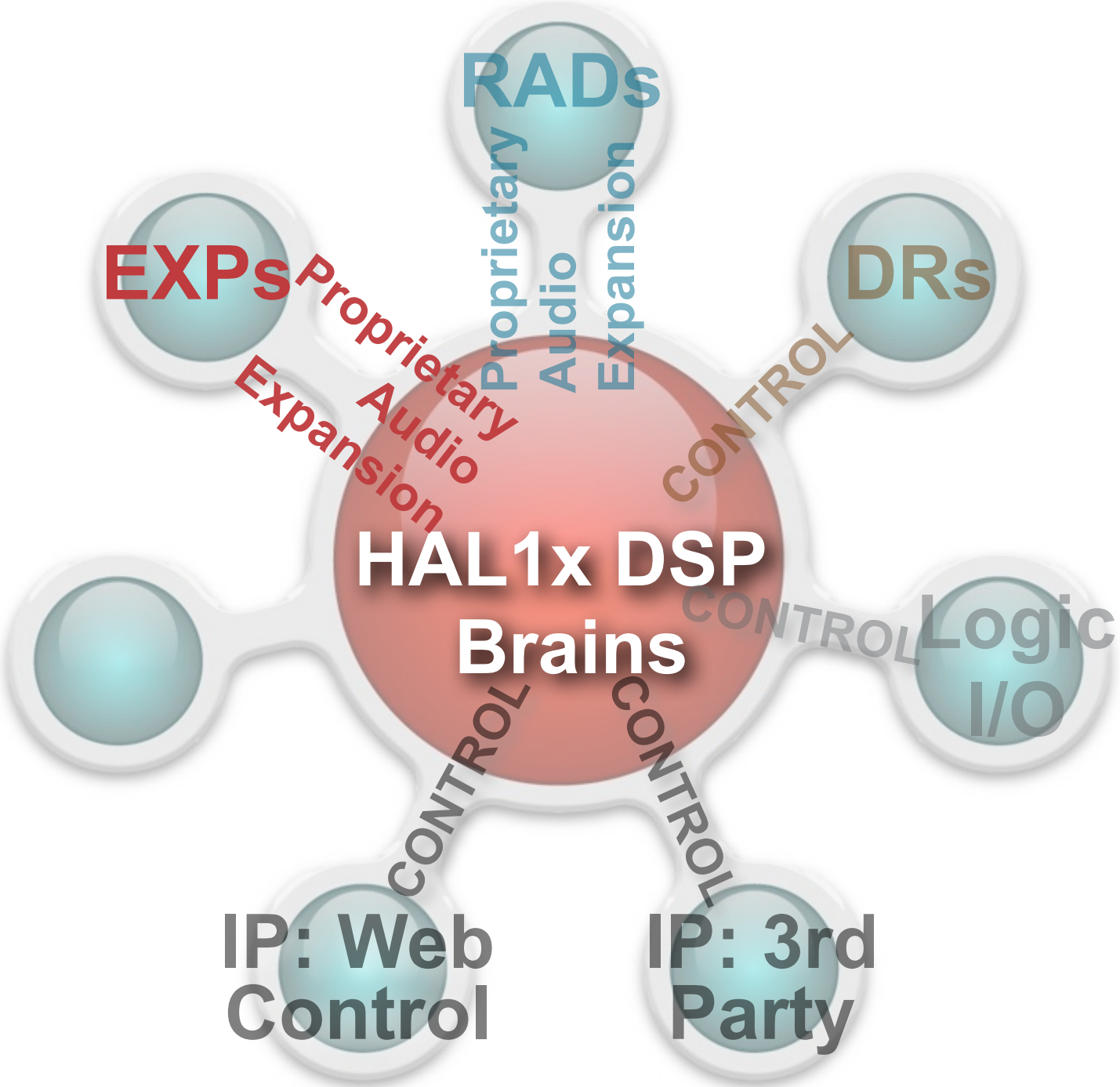
- Boundary Layer Mic RAD
  - aka PZM Pressure Zone Mic
- Weather resistant ...mylar
  - Omni electret element
- Ambient noise sensing, surveillance, interrogation, detention center, security, industrial, train stations...
- Use with *Ambient Noise Compensation* DSP block
- Spray paint any color to please Interior decorators

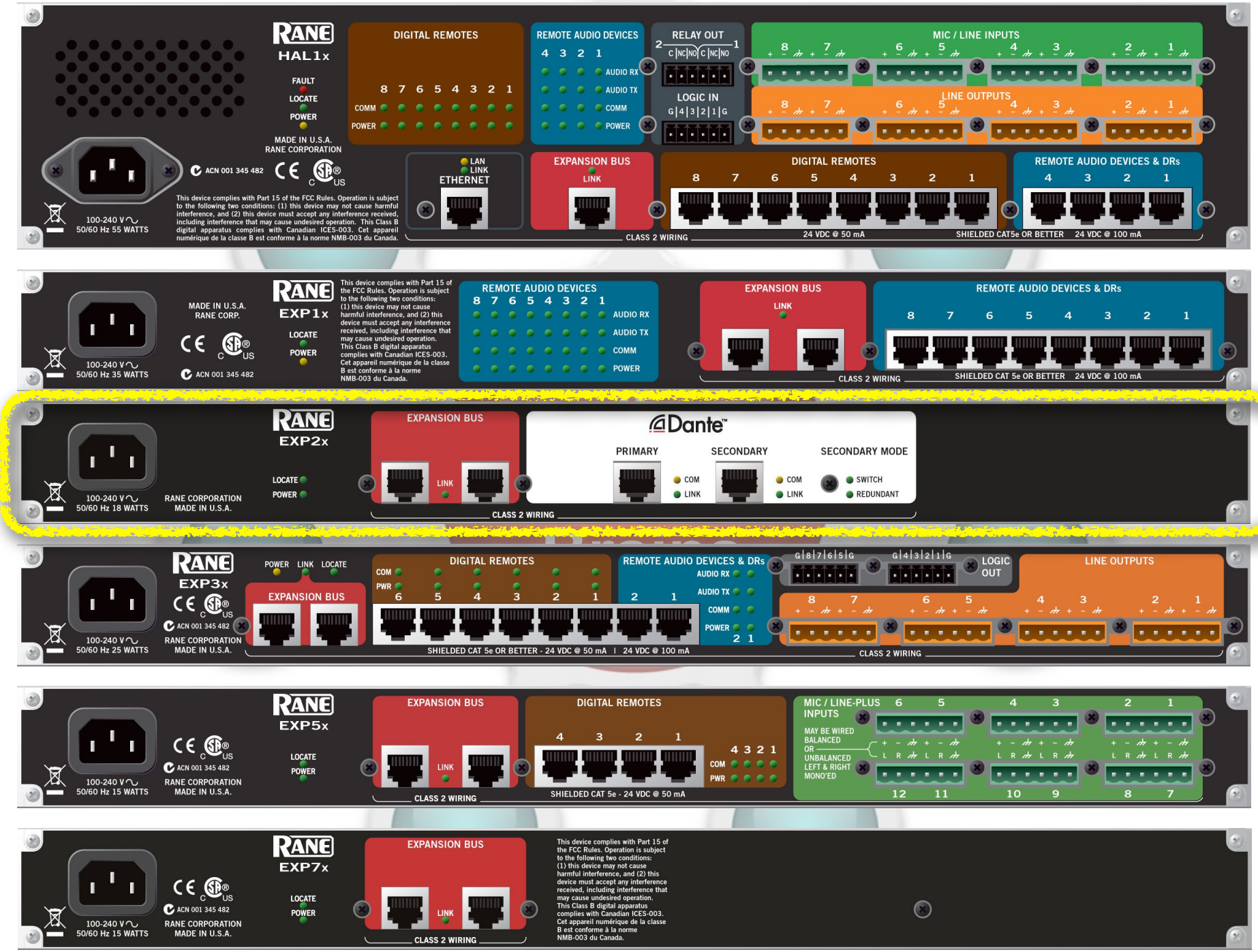
HAL System Architecture



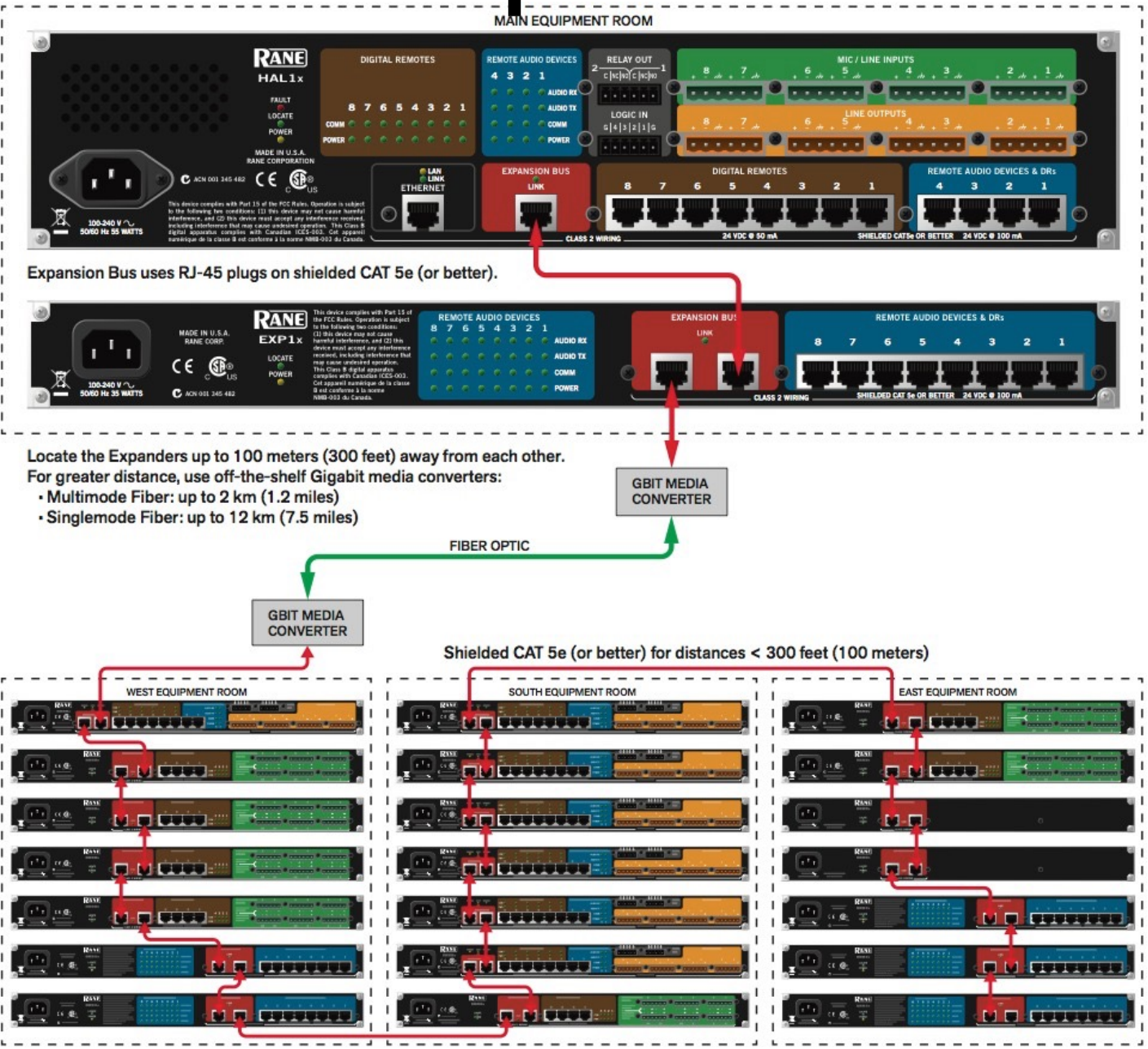
HAL System Architecture




RADs
Proprietary
Audio
Expansion
EXPs
Proprietary
Audio
Expansion
DRs
CONTROL
HAL1x DSP
Brains
CONTROL
Logic
I/O
CONTROL
CONTROL
IP: Web
Control
IP: 3rd
Party


RANE
HAL1x
FAULT
LOCATE
POWER
MADE IN U.S.A.
RANE CORPORATION
ACN 001 345 482
100-240 V
50/60 Hz 55 WATTS
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
DIGITAL REMOTES
8 7 6 5 4 3 2 1
COMM
POWER
REMOTE AUDIO DEVICES
4 3 2 1
AUDIO RX
AUDIO TX
COMM
POWER
RELAY OUT
2 C NC NO C NC NO 1
LOGIC IN
G 4 3 2 1 G
MIC / LINE INPUTS
8 7 6 5 4 3 2 1
LINE OUTPUTS
8 7 6 5 4 3 2 1
LAN
LINK
ETHERNET
EXPANSION BUS
LINK
DIGITAL REMOTES
8 7 6 5 4 3 2 1
REMOTE AUDIO DEVICES & DRs
4 3 2 1
CLASS 2 WIRING
24 VDC @ 50 mA
SHIELDED CAT5e OR BETTER
24 VDC @ 100 mA
RANE
EXP1x
MADE IN U.S.A.
RANE CORP.
LOCATE
POWER
ACN 001 345 482
100-240 V
50/60 Hz 35 WATTS
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
REMOTE AUDIO DEVICES
8 7 6 5 4 3 2 1
AUDIO RX
AUDIO TX
COMM
POWER
EXPANSION BUS
LINK
REMOTE AUDIO DEVICES & DRs
8 7 6 5 4 3 2 1
CLASS 2 WIRING
SHIELDED CAT 5e OR BETTER
24 VDC @ 100 mA
RANE
EXP2x
LOCATE
POWER
100-240 V
50/60 Hz 18 WATTS
RANE CORPORATION
MADE IN U.S.A.
EXPANSION BUS
LINK
Dante™
PRIMARY
SECONDARY
SECONDARY MODE
COM
LINK
SWITCH
REDUNDANT
CLASS 2 WIRING
RANE
EXP3x
POWER
LINK
LOCATE
EXPANSION BUS
ACN 001 345 482
100-240 V
50/60 Hz 25 WATTS
RANE CORPORATION
MADE IN U.S.A.
DIGITAL REMOTES
COM
PWR
6 5 4 3 2 1
REMOTE AUDIO DEVICES & DRs
2 1
AUDIO RX
AUDIO TX
COMM
POWER
2 1
G 8 7 6 5 G
G 4 3 2 1 G
LOGIC OUT
LINE OUTPUTS
8 7 6 5 4 3 2 1
SHIELDED CAT 5e OR BETTER - 24 VDC @ 50 mA | 24 VDC @ 100 mA
CLASS 2 WIRING
RANE
EXP5x
LOCATE
POWER
ACN 001 345 482
100-240 V
50/60 Hz 15 WATTS
RANE CORPORATION
MADE IN U.S.A.
EXPANSION BUS
LINK
DIGITAL REMOTES
4 3 2 1
4 3 2 1
COM
PWR
MIC / LINE-PLUS INPUTS
6 5 4 3 2 1
MAY BE WIRED BALANCED OR UNBALANCED LEFT & RIGHT MONO'ED
L R L R L R
12 11 10 9 8 7
CLASS 2 WIRING
SHIELDED CAT 5e - 24 VDC @ 50 mA
RANE
EXP7x
LOCATE
POWER
ACN 001 345 482
100-240 V
50/60 Hz 15 WATTS
RANE CORPORATION
MADE IN U.S.A.
EXPANSION BUS
LINK
CLASS 2 WIRING
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

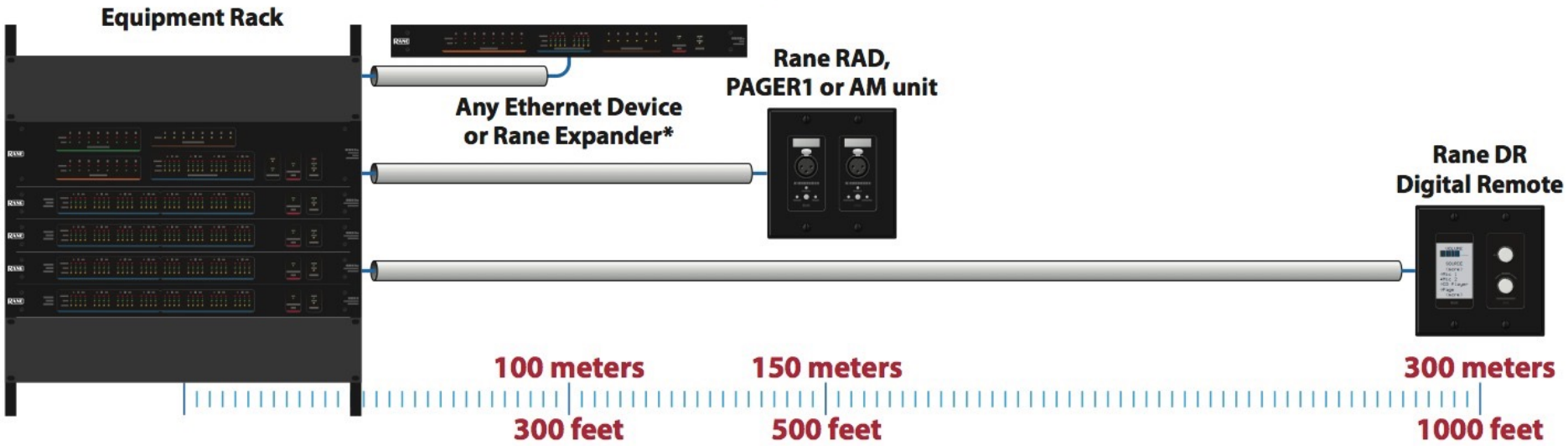
“EXP” Expansion Bus



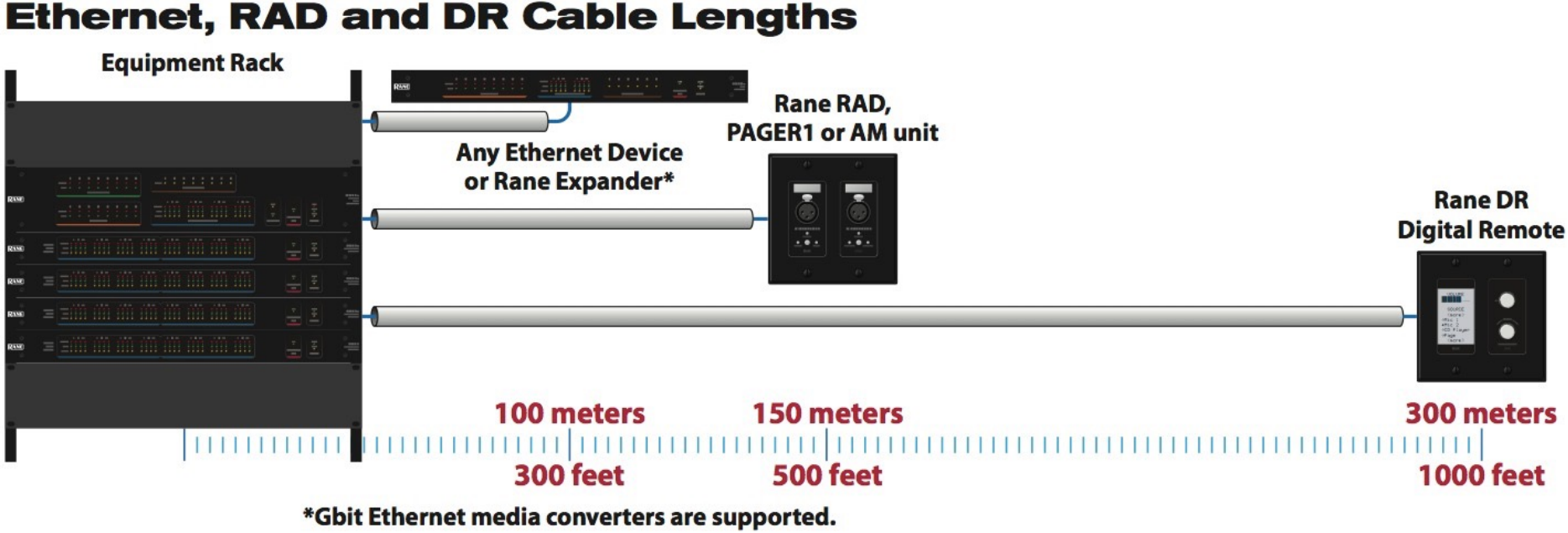
- **EXP1x, EXP2x, EXP3x, EXP5x & EXP7x**

- Conference Centers
- Classrooms
- Campus
- Hotels
- Malls
- Arenas, Sports & Water Parks
- Multiple Equipment Rooms

Ethernet, RAD and DR Cable Lengths

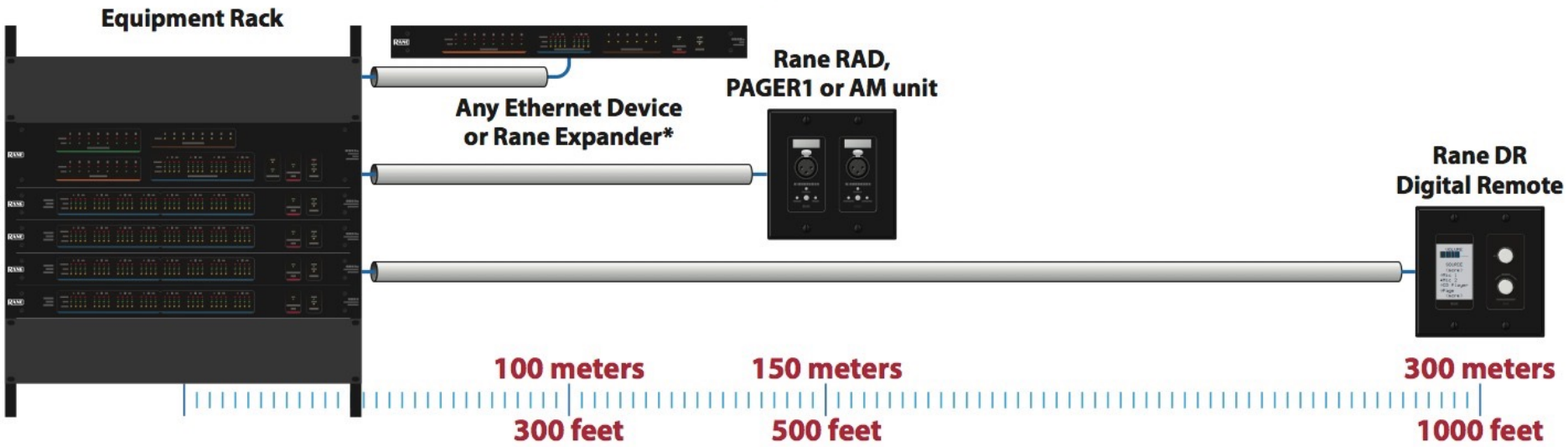


*Gbit Ethernet media converters are supported.



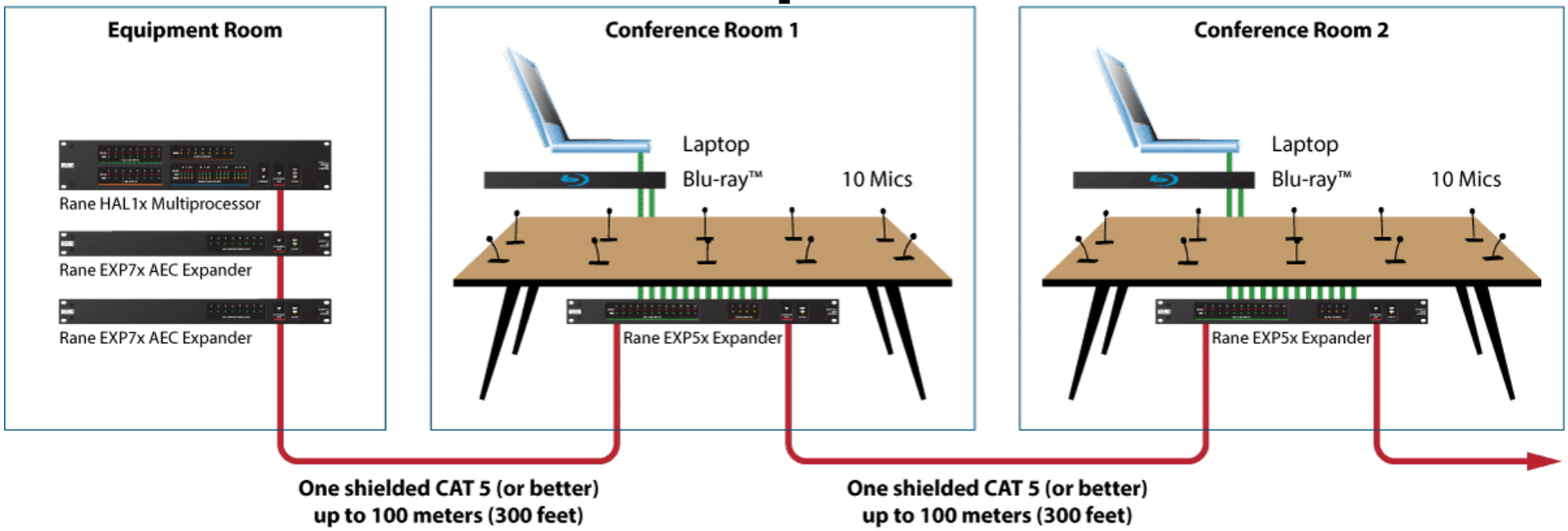
Useful HAL1x Expansion Bus Idea

Ethernet, RAD and DR Cable Lengths



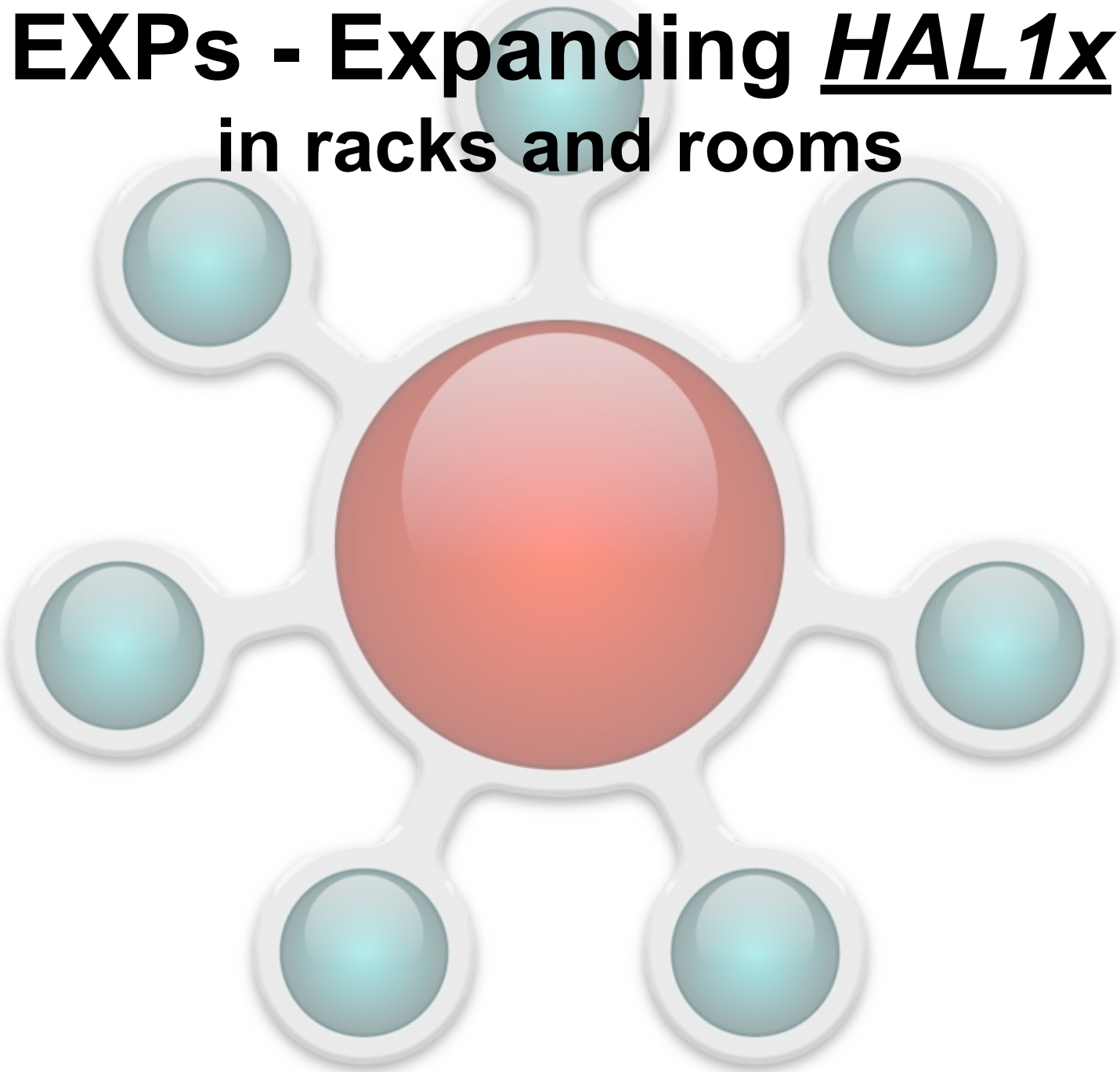
*Gbit Ethernet media converters are supported.

Useful HAL1x Expansion Bus Idea



EXPs - Expanding *HAL1x*

in racks and rooms

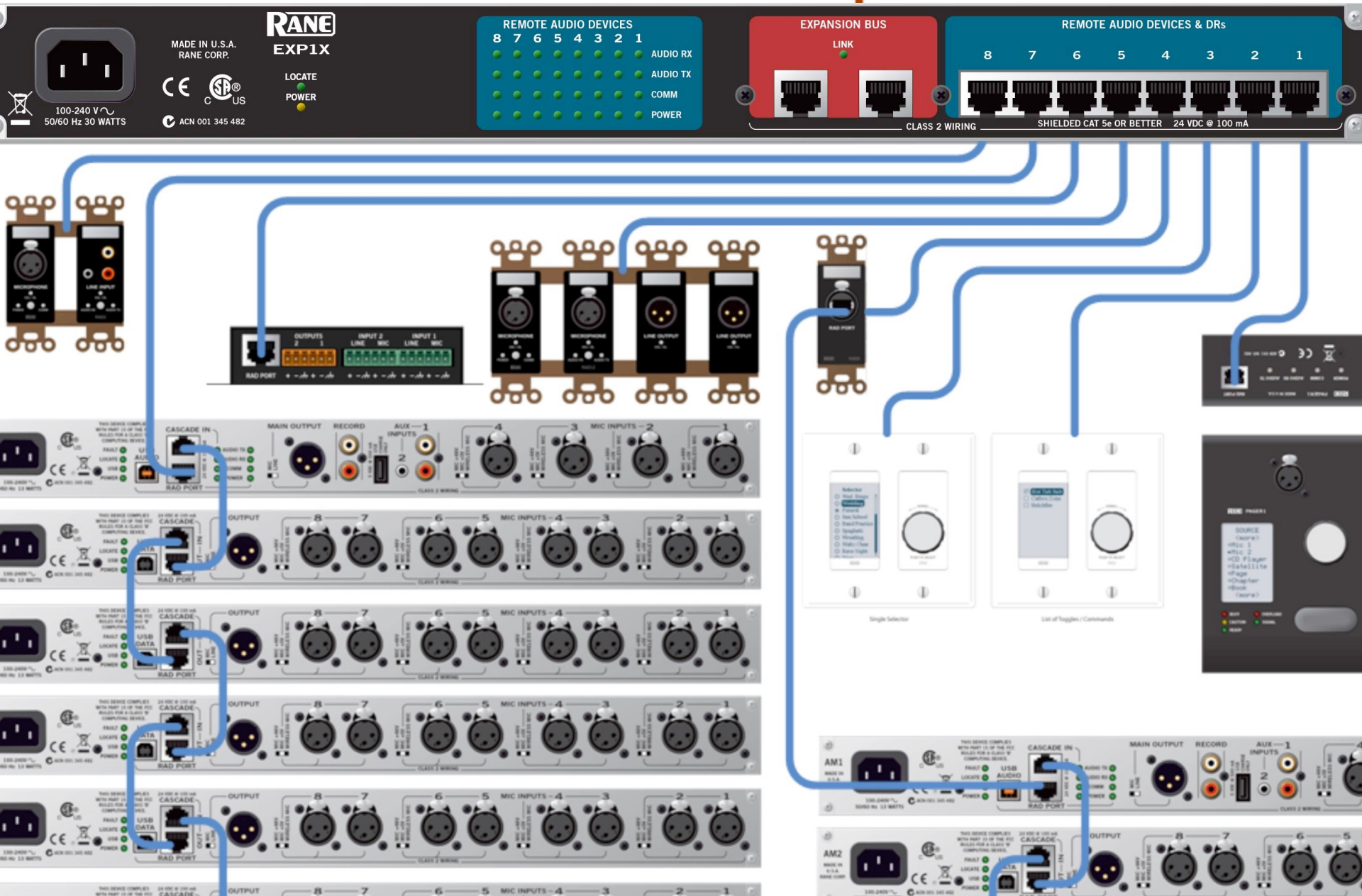


EXPs - Expanding *HAL1x*
in racks and rooms

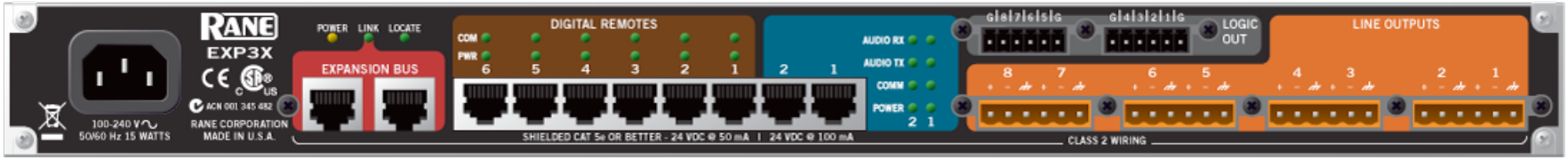
512x512 audio Expansion Bus for HAL1x

- **Auto firmware & settings sent from HAL1x**
- **Hot swap, hot crimp, auto SW wiring**
- **Daisychain any combo up to 32 EXPs**
  - **Shielded CAT 5e or better or unmanaged fiber optic gigabit media converters**
- **Ethernet layer 1 (*not* layer 2)**
  - **100 m (325 feet) between devices**
- **Link indication in SW & HW: both cable ends**

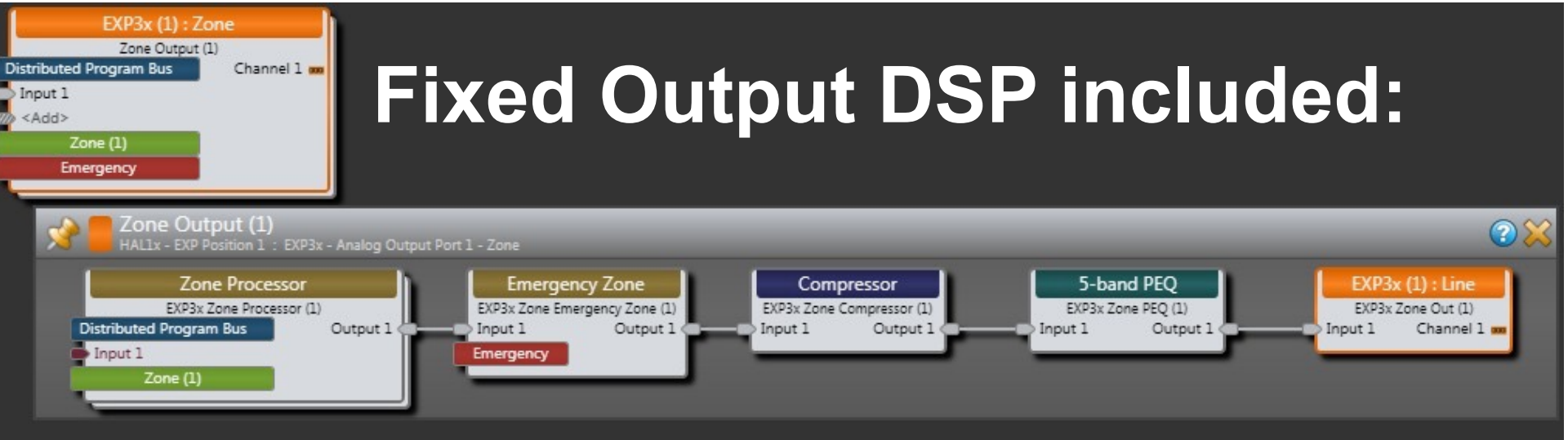
EXP1x - Expand more RAD/DRs



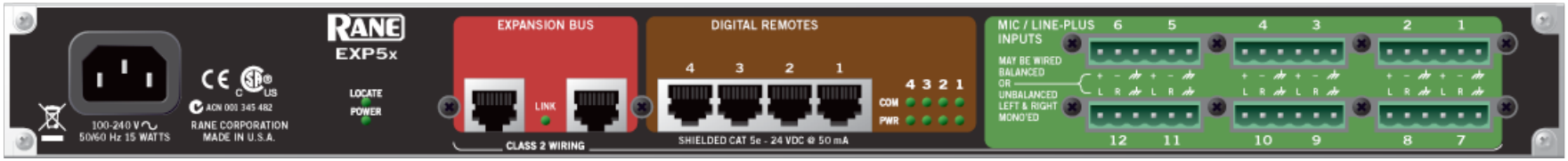
EXP3x Output & DSP Expander



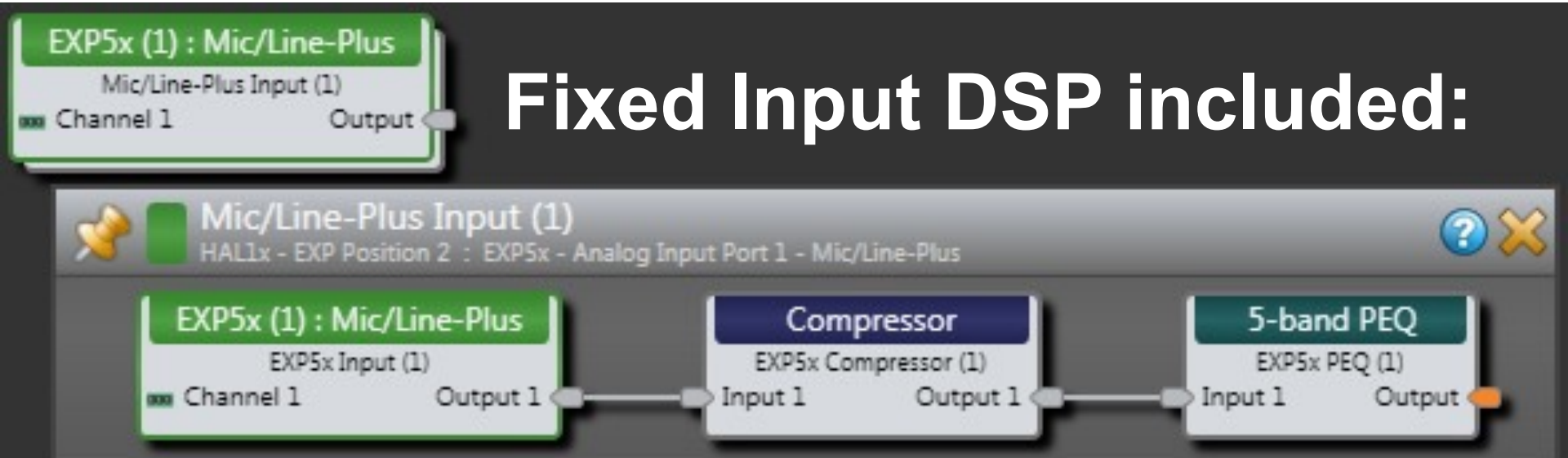
- ***4 inputs 12 outputs***
- **8 Logic Outputs - for 70 V relay paging apps**
- **Daisychain 32 = 256 out; +64 RADs = 384 outputs**



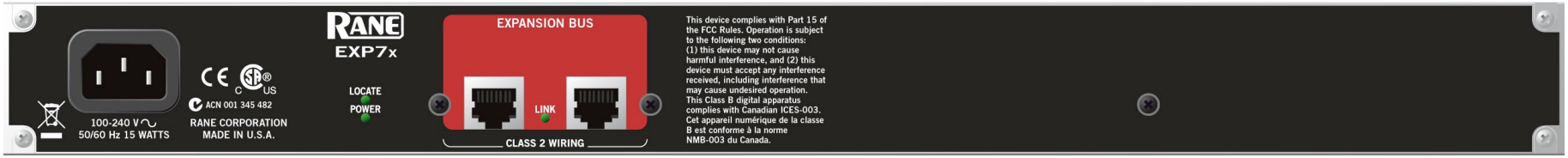
EXP5x Input & DSP Expander



- **12 Mic/Line/Line-Plus - handles any audio input**
  - **Line-Plus: Monos unbalanced RCA L&R inputs**

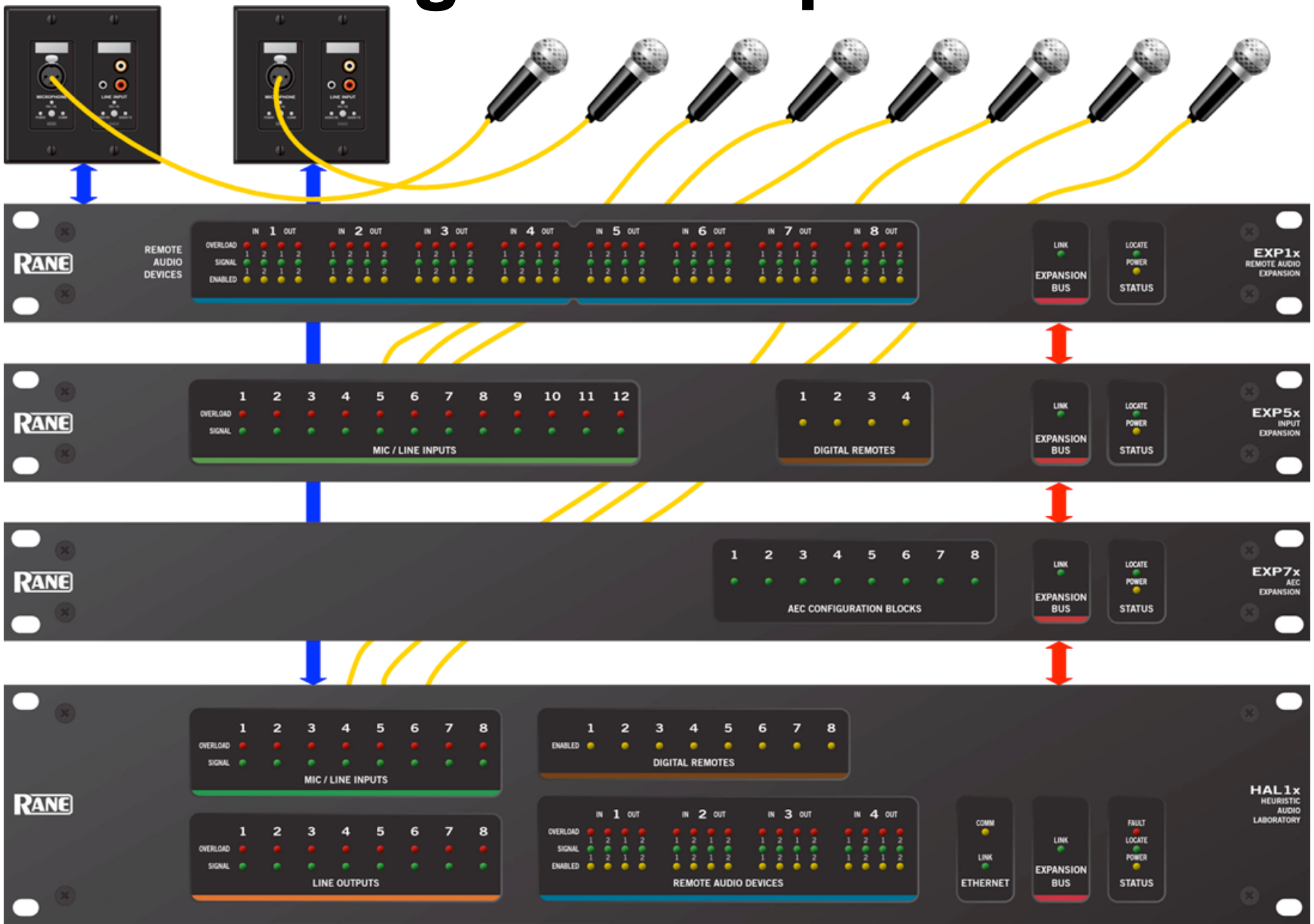


EXP7x: Acoustic Echo Cancelling

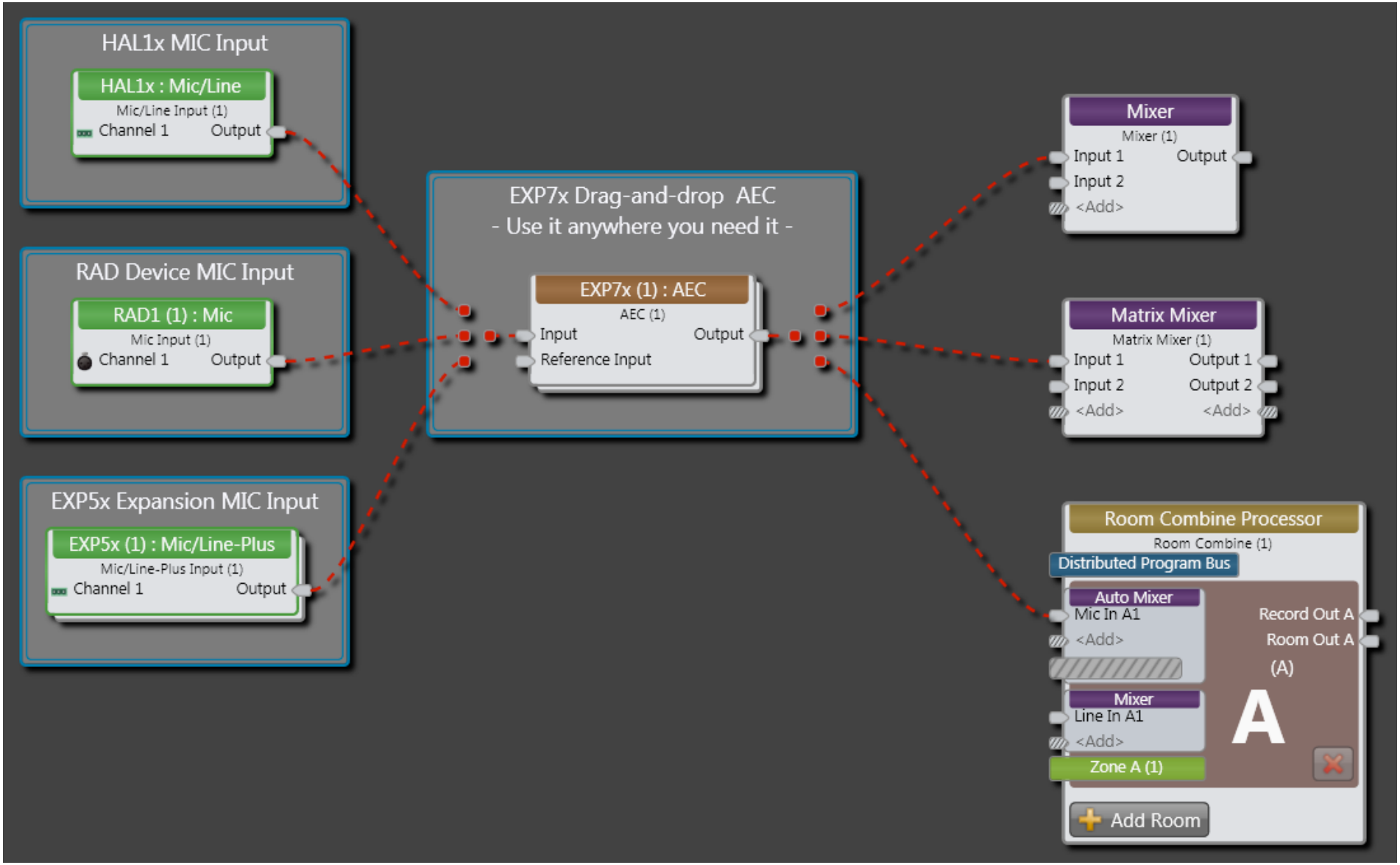


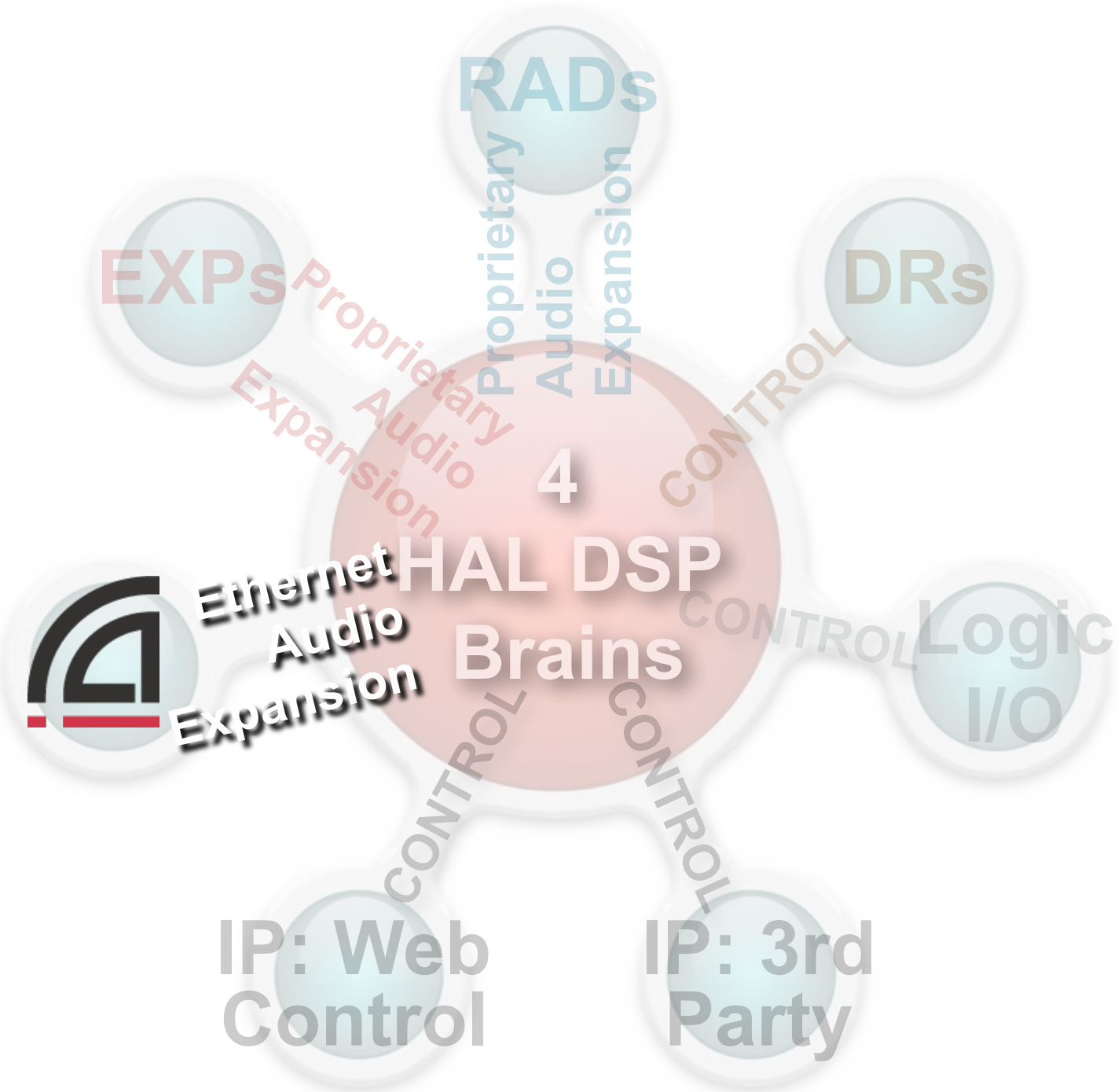
- 8 channels of drag and drop AEC
  - Use the AEC block with any HAL1x input anywhere in the system
    - e.g., Analog, RAD, EXP, AES3, USB Audio, Dante

Drag and Drop AEC

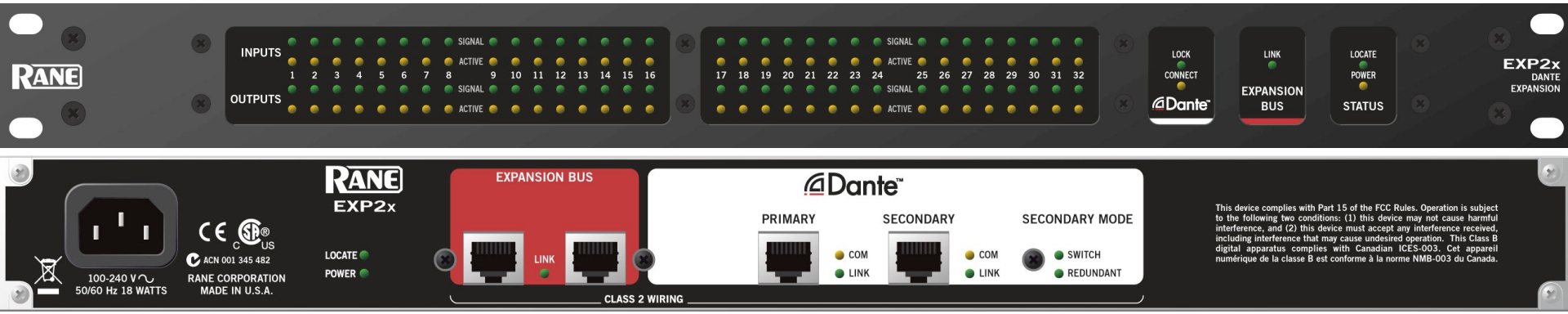


Drag and Drop AEC




RADs
Proprietary
Audio
Expansion
EXPs
Proprietary
Audio
Expansion
DRs
CONTROL
4
HAL DSP
Brains
Ethernet
Audio
Expansion
CONTROL
Logic
I/O
CONTROL
CONTROL
IP: Web
Control
IP: 3rd
Party

New EXP2x Dante Expander



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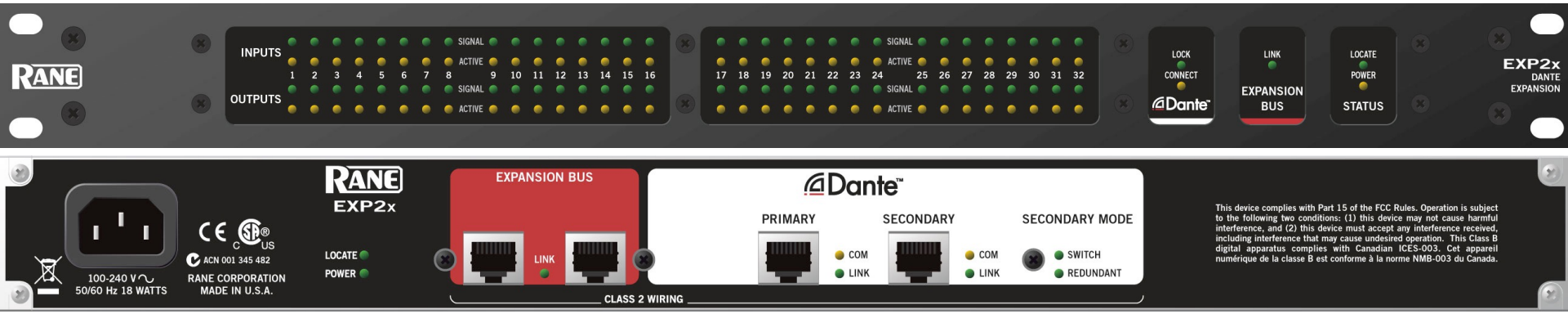

- **Network facilities or multiple independent HAL1x Systems together**

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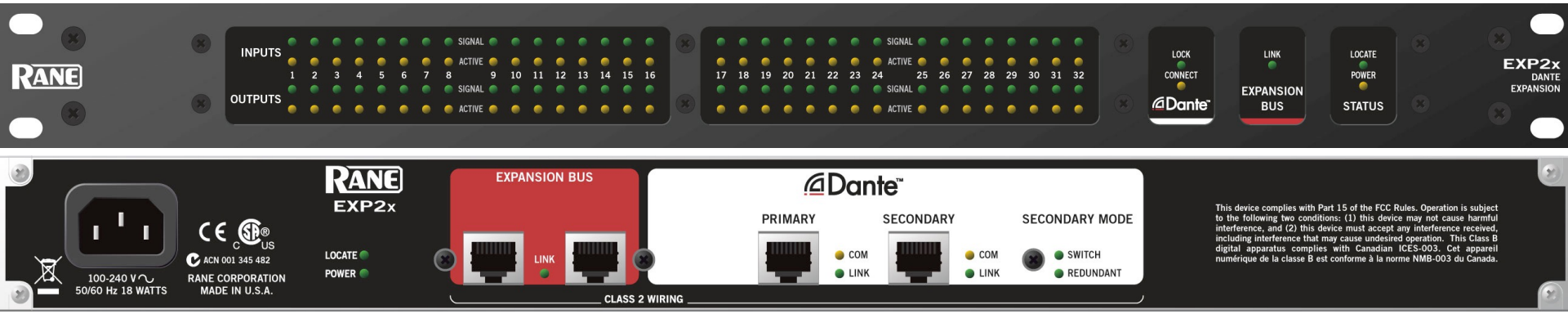

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- **32 x 32 Dante channels @ 48 kHz or 96 kHz**

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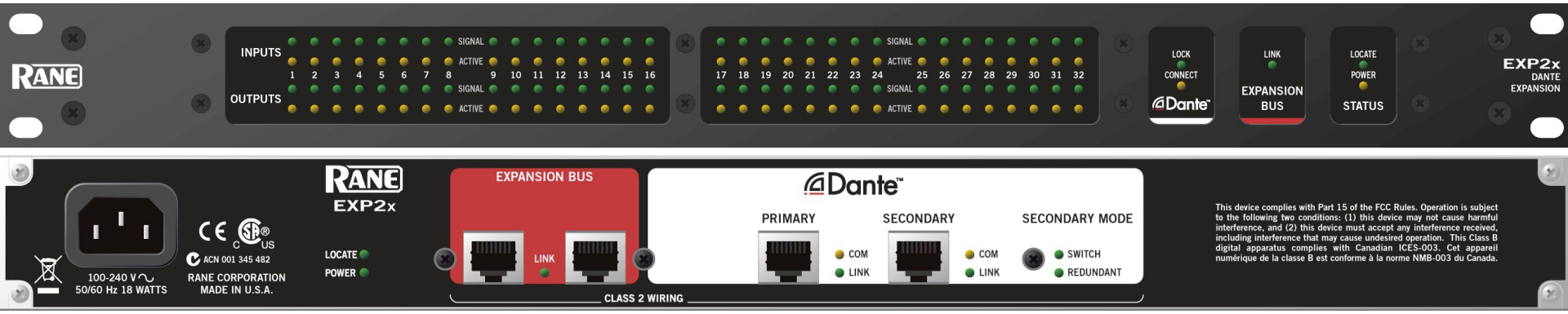

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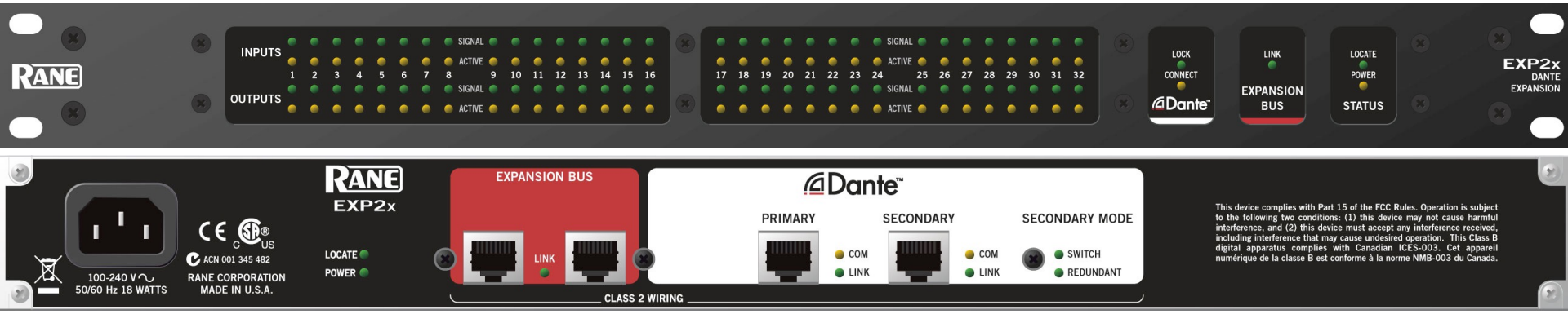
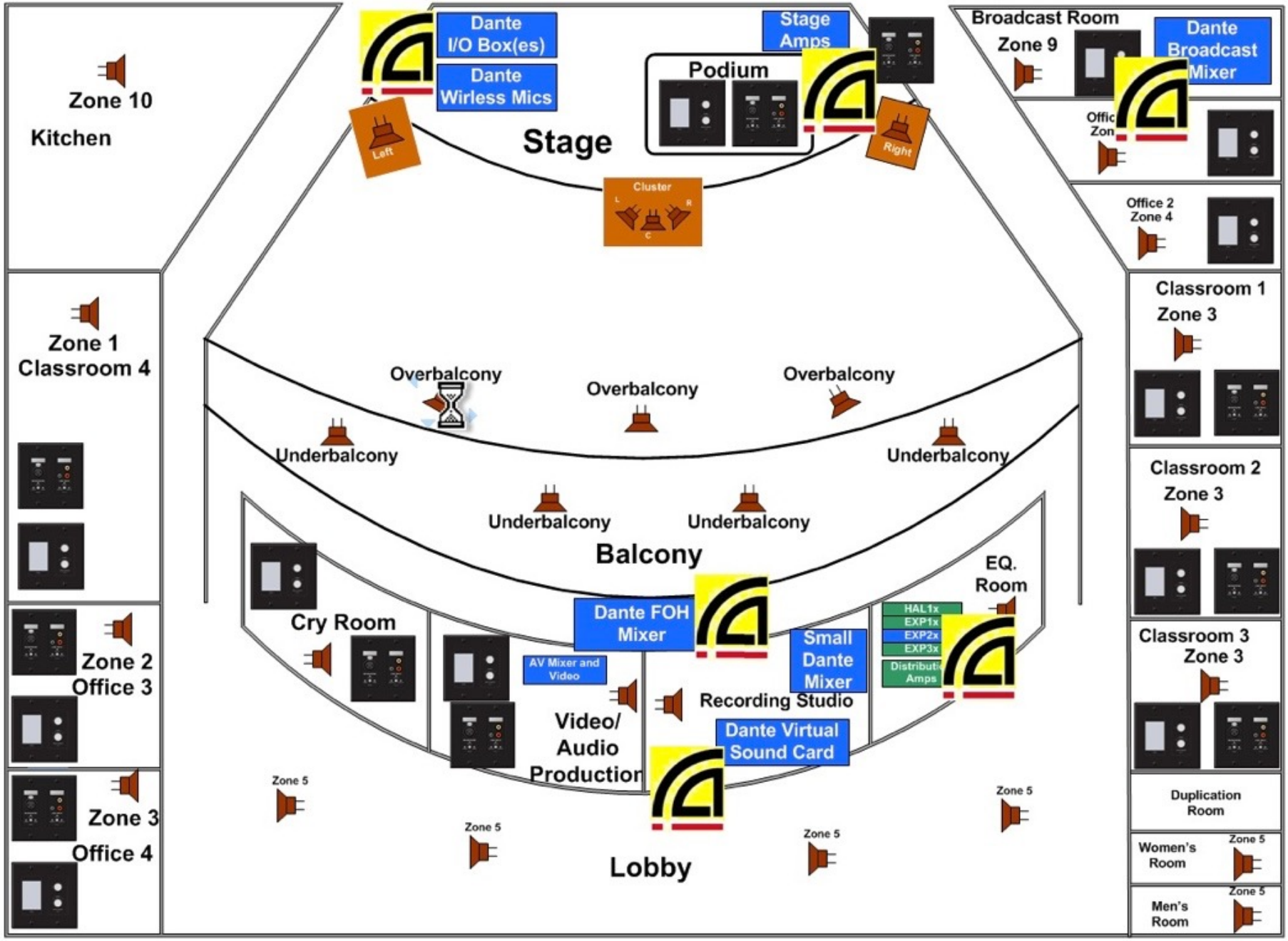
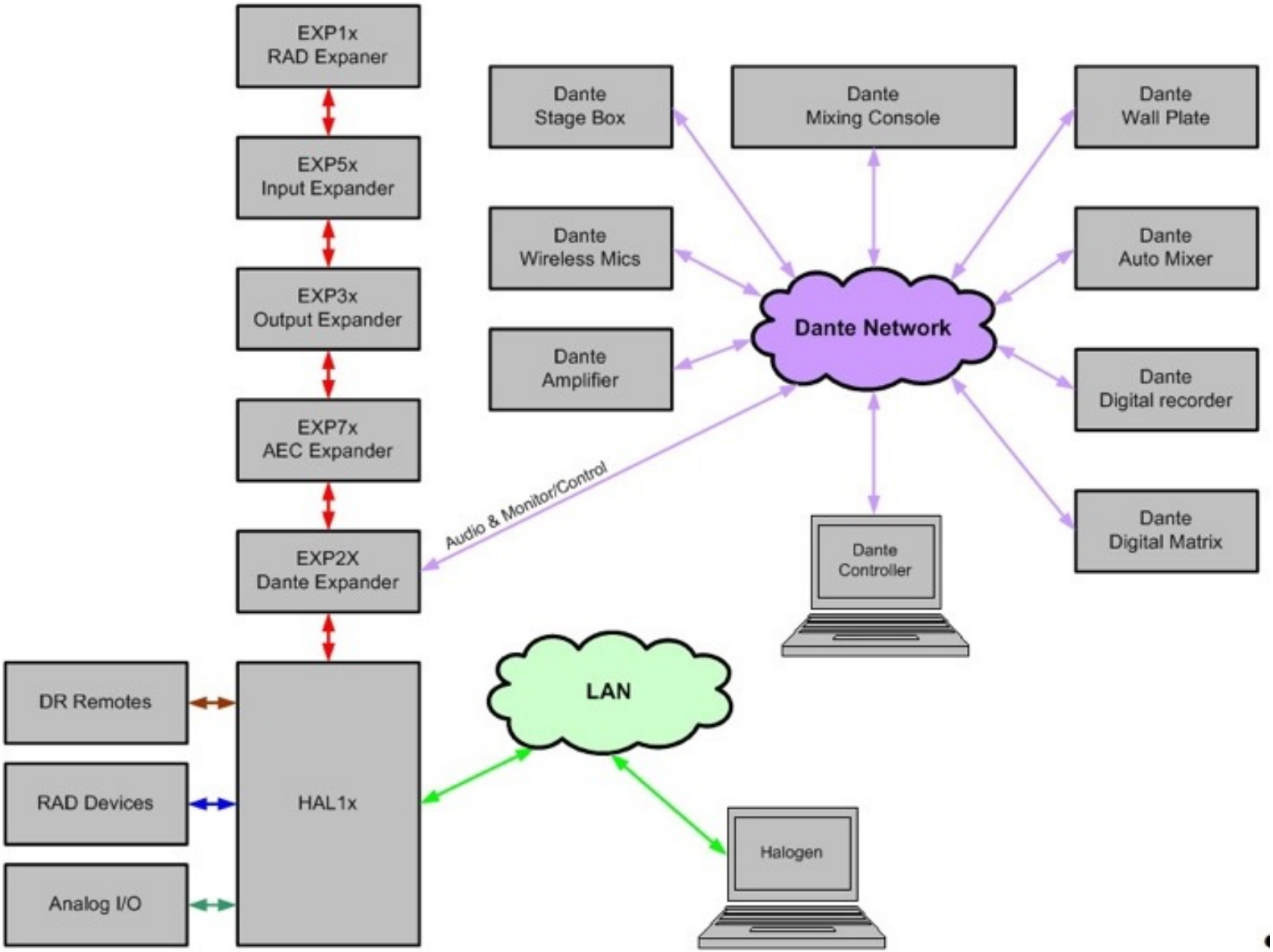


- **Network facilities or multiple independent HAL1x Systems together**
- **32 x 32 Dante channels @ 48 kHz or 96 kHz**
- **Daisychain up to 16 EXP2x to a single HAL1x: 512 x 512 channels, maximum**
- **Secondary Dante port supports Redundant or Switch modes**

EXP2x Performance Theatre



New EXP2x Dante Expander



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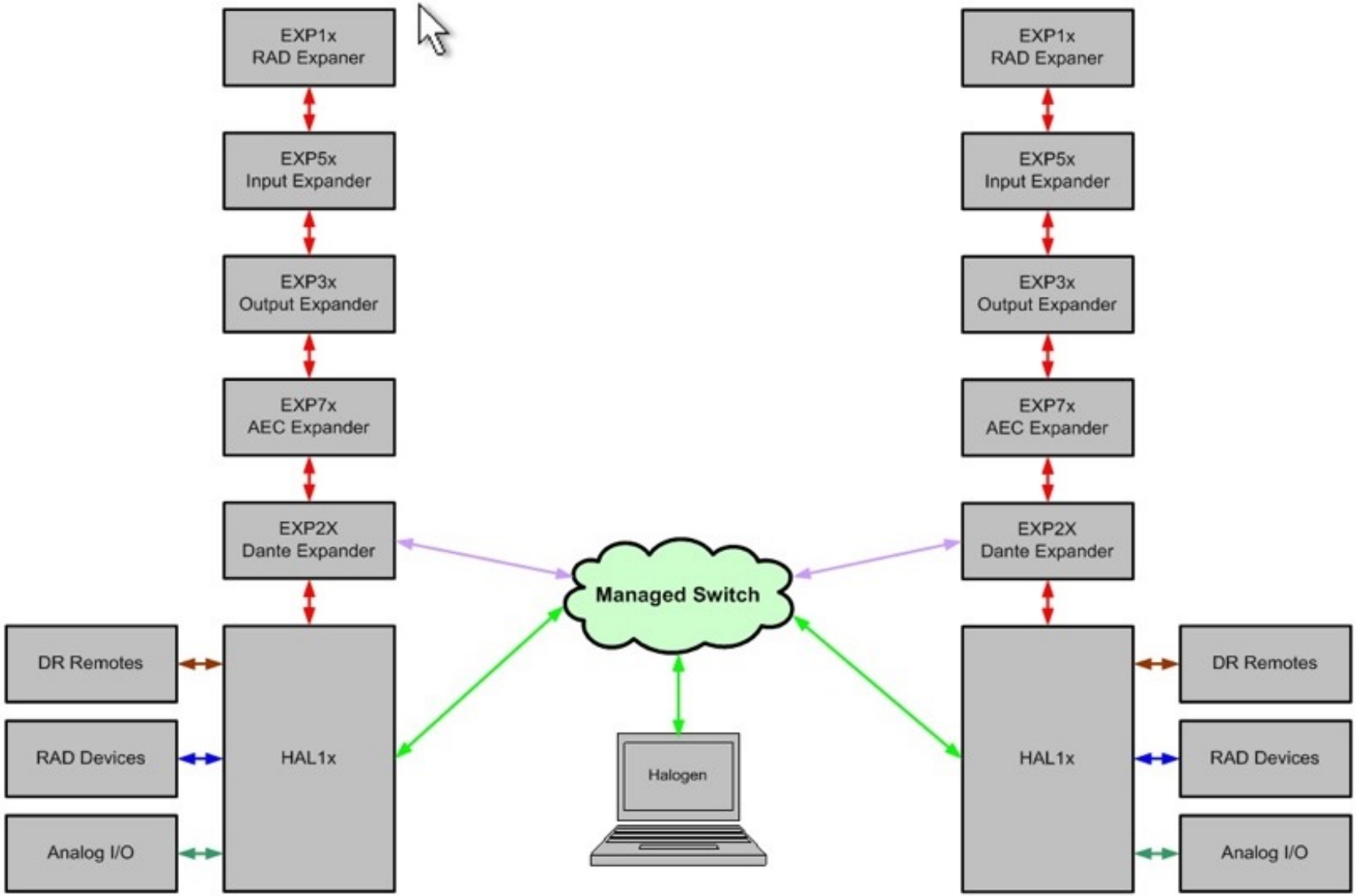
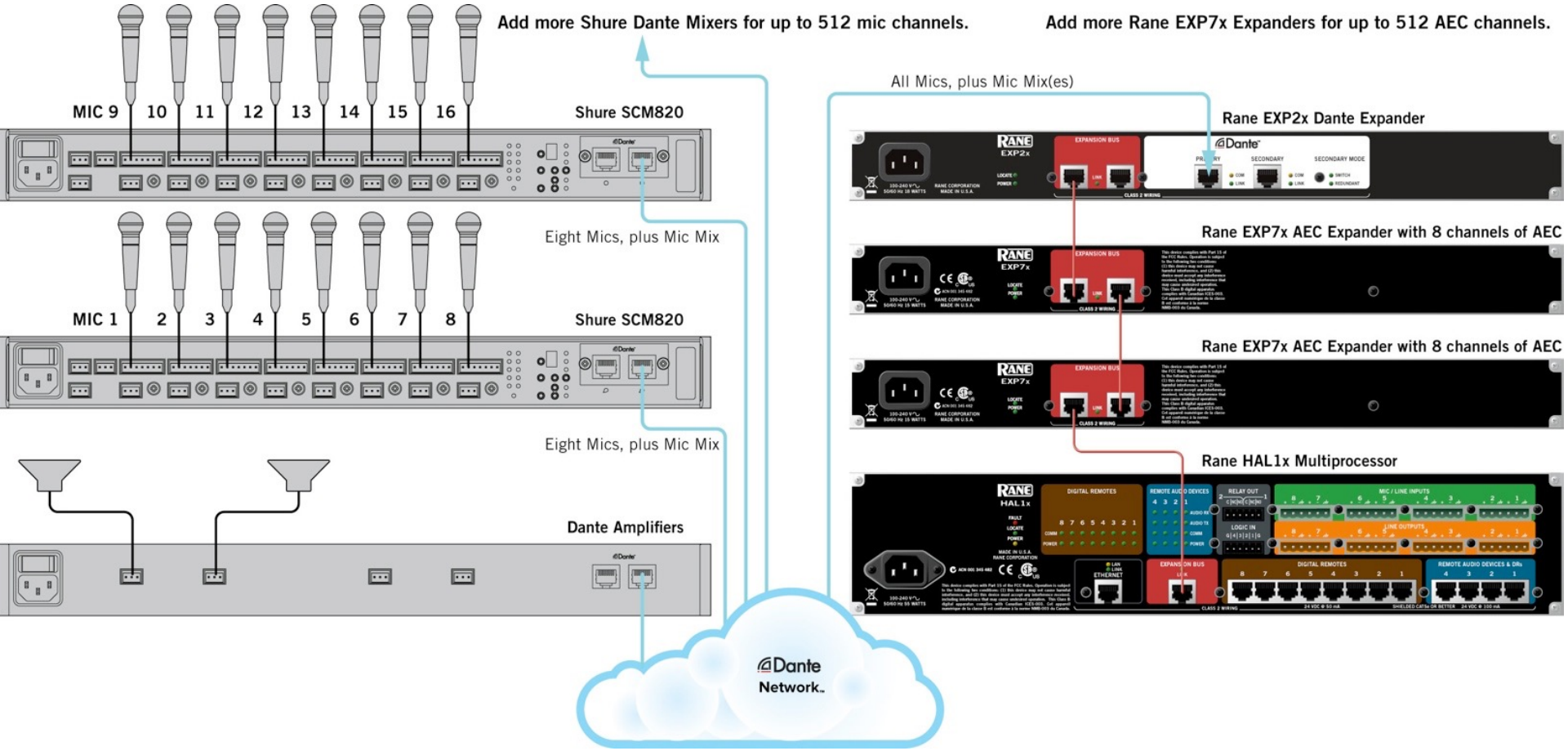
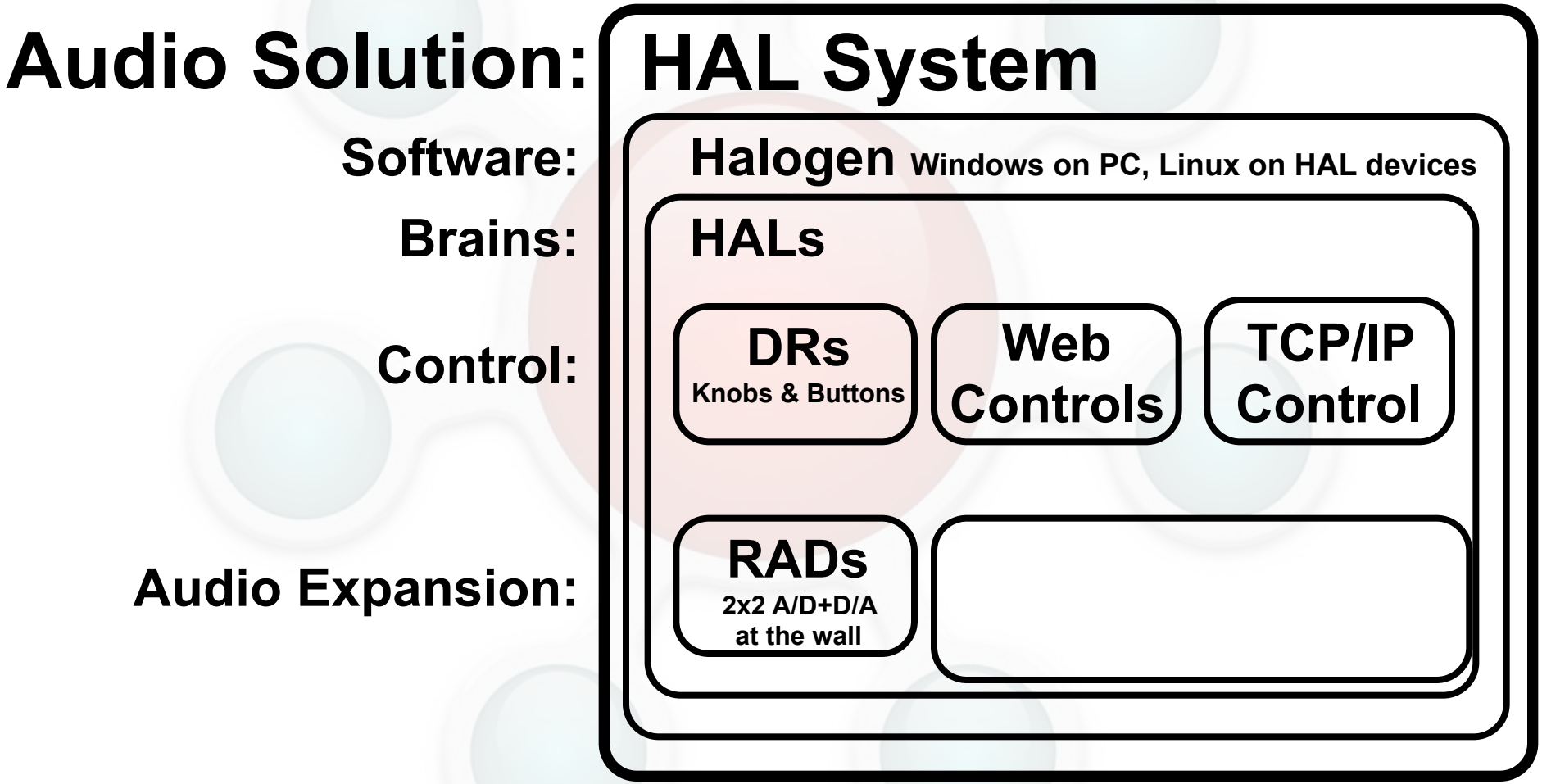


Add AEC to Shure's SCM820 Dante mixer(s)



HAL System Architecture



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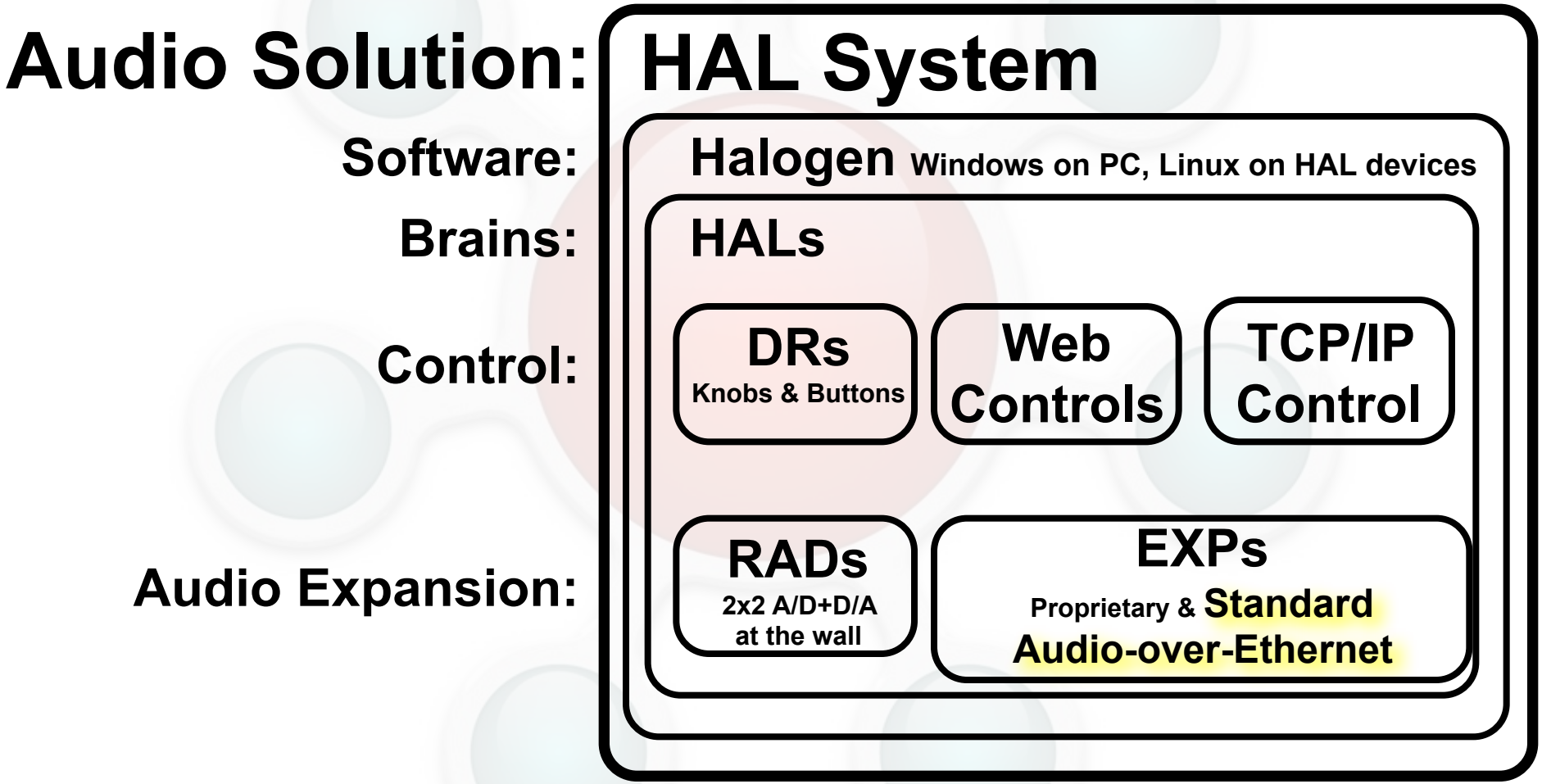
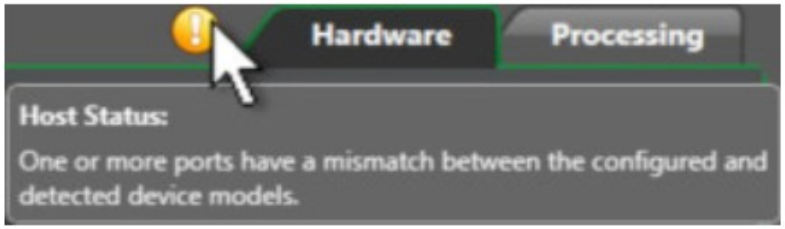


Designer/ Consultant Benefits

- **Get on the Plane Indicator**

Green means "Get on the Plane"



Yellow means "Don't Get On the Plane, Yet."

Know HAL #1: HAL's "Get on the Plane" Indicator

Does your formerly favorite audio DSP tell you all 7 of the following things with a single, live device software indicator?

All hardware devices in your original Halogen design file are:

(1) physically present in the building and connected,

(2) in the proper location in the building,

(3) all cables were pulled through the building without mistakes or mislabeled cables,

(4) all cable crimps on all RJ-45 cables are correct,

(5) control communications and all audio I/O are already working,

(6) the settings for all DR and RADs are intact and working,

(7) the proper version of firmware is already loaded and working in every attached HAL System device.

Thank you

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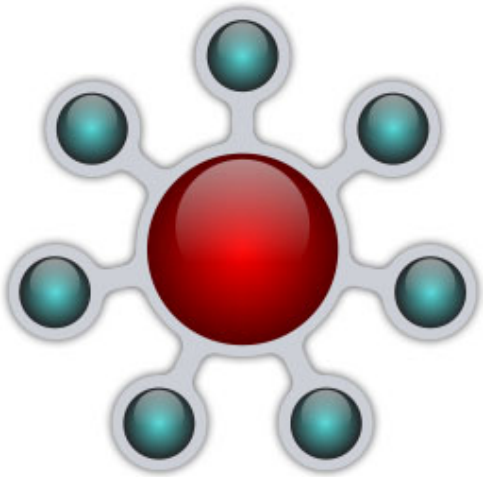
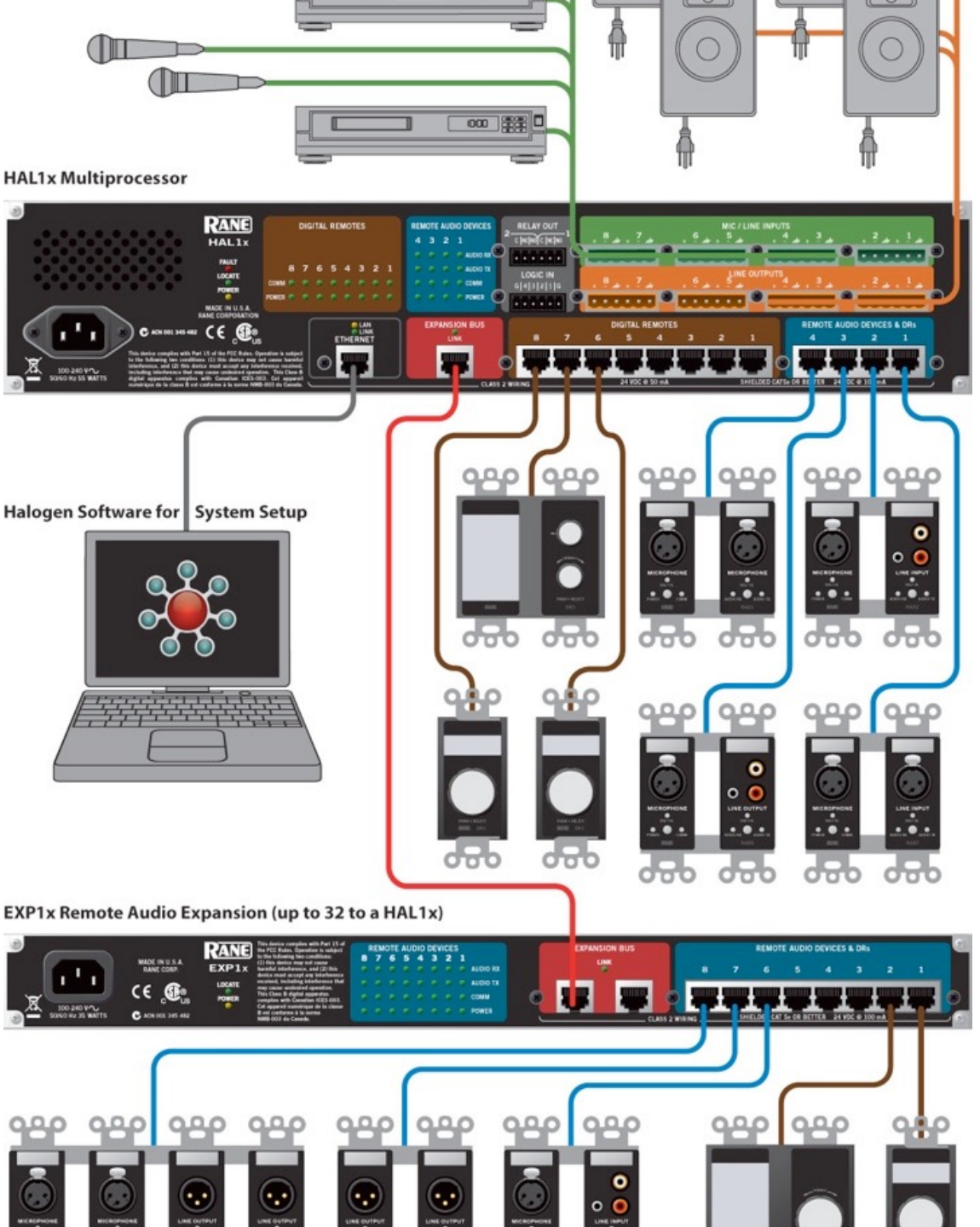
Still privately owned by the gal who started Rane in her garage

Thank You!




HAL1x Multiprocessor
RANE
HAL1x
DIGITAL REMOTES
REMOTE AUDIO DEVICES
RELAY OUT
MIC / LINE INPUTS
LINE OUTPUTS
LOGIC IN
ETHERNET
EXPANSION BUS
DIGITAL REMOTES
REMOTE AUDIO DEVICES & DRs
Halogen Software for System Setup
EXP1x Remote Audio Expansion (up to 32 to a HAL1x)
RANE
EXP1x
REMOTE AUDIO DEVICES
EXPANSION BUS
REMOTE AUDIO DEVICES & DRs