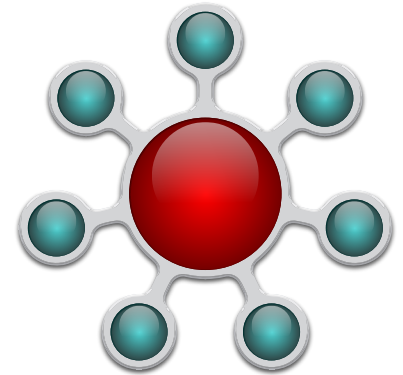


### In this tutorial, you'll learn how to:

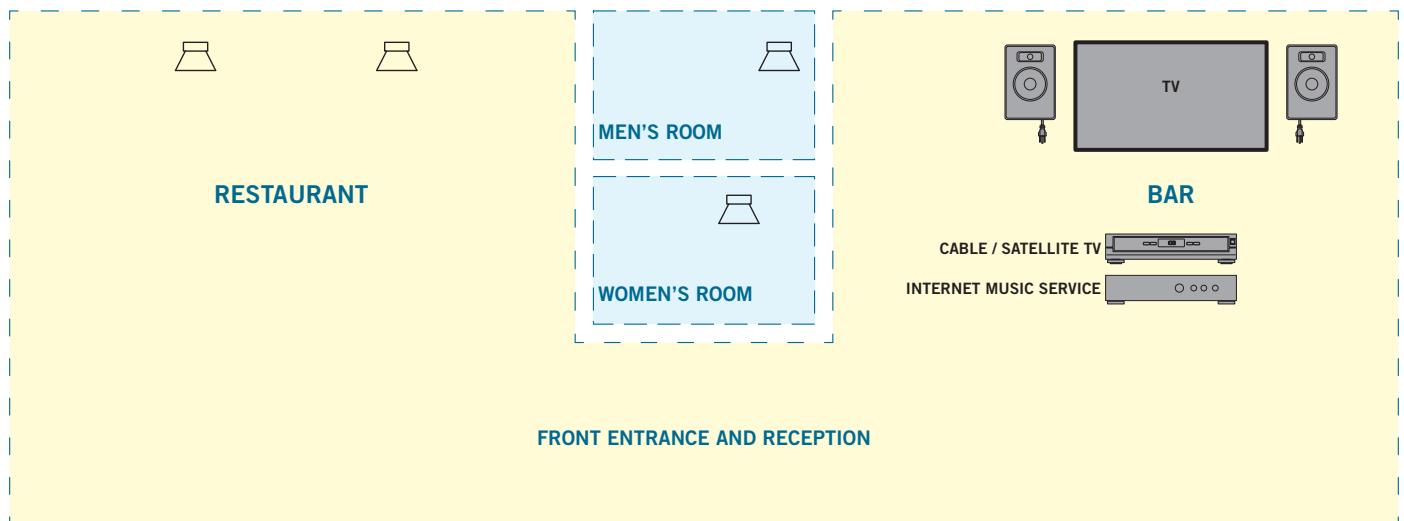
- Map the Processing Workspace
- Link Remotes to Blocks
- Create Web Controls
- Configure System Settings



**Let's build a two-zone, restaurant and bar audio system.**  
**We'll use a couple of RADs and a couple of DR remotes.**  
**We'll also make some web controls for the boss's phone.**

This system provides background music and paging for 2 primary zones in a restaurant and bar, using these requirements:

- The Lounge has stereo speakers on each side of a single large screen TV above the bar. A cable TV receiver and an internet music service are the only two program sources. The manager wants stereo audio at the bar for music and games. Audio selection and TV controls are made at the bar.
- The Restaurant has two speakers with a mono mix of the same program for background music. A dedicated remote sets the volume in the restaurant so a waiter can easily turn audio up or down.
- The men's and women's restrooms each have a mono speaker using the same mono feed from the restaurant.
- A host/receptionist needs to be able to page using these three scenarios: Page All, Restaurant Only, Lounge Only.
- Source and volume in the Restaurant and Bar need quick access, but the boss may want to adjust other zone levels.



### Start Halogen

The best way to learn anything new is by doing it with your own hands, eyes and mind. You will learn the quickest with Halogen running on your computer, and this PDF on another monitor or printed. If you don't already have Halogen installed, download it from [rane.com/hal](http://rane.com/hal).

The first thing is deciding the kind and size of system you want to build. Any system design starts by choosing the best equipment fit. Think of the answers to these questions as you select one of the four HAL Multiprocessors:


1. How many audio inputs are needed at the rack (short audio lines to HAL), and how many longer distance audio inputs are needed (from RADs) away from the rack?
2. How many audio outputs are needed at the rack? How many different audio zones are there? Are RAD outputs on distant walls or rooms needed for devices around the building?
3. What kind of controls does the end user need?
4. Does HAL need to integrate with existing wiring or equipment?

HAL options can easily be compared next to each other. Launch Halogen. In the top **File** toolbar, choose **New**, and then **Choose HAL Model Configuration**. Hover your mouse over the four models to see the ins and outs of each. The HAL1x and HAL2 may look similar, but if you need more inputs, outputs, RAD ports, Dante or AEC, choose the HAL1x which lets you add Expanders.

**Choose HAL Model for new configuration**

HAL Model	Inputs	Outputs	Ports
HAL1x	8 Mic/Line	8 Line	4 RAD, 8 DR, 4 Logic In, 2 Relay Out, 1 EXP (RJ-45)
HAL2	8 Mic/Line, 2 AES3	8 Line, 2 AES3	4 RAD, 4 DR, 4 IR, 4 Logic In, 2 Relay Out
HAL3	2 Line-Plus	6 Line	1 RAD, 3 DR, 4 Logic In
HAL3s	2 Mic/Line-Plus	6 Line	2 RAD, 2 DR, 4 Logic In
HAL4	2 Mic/Line-Plus	2 Line	1 DR

**HAL3s**



Input(s): Two - Mic/Line-Plus, selectable from software between:  
 Dynamic mic (Euro)  
 Condenser mic with 48 V phantom power (Euro)  
 Two consumer unbalanced L & R monoed (Euro)  
 One balanced line-level (Euro)

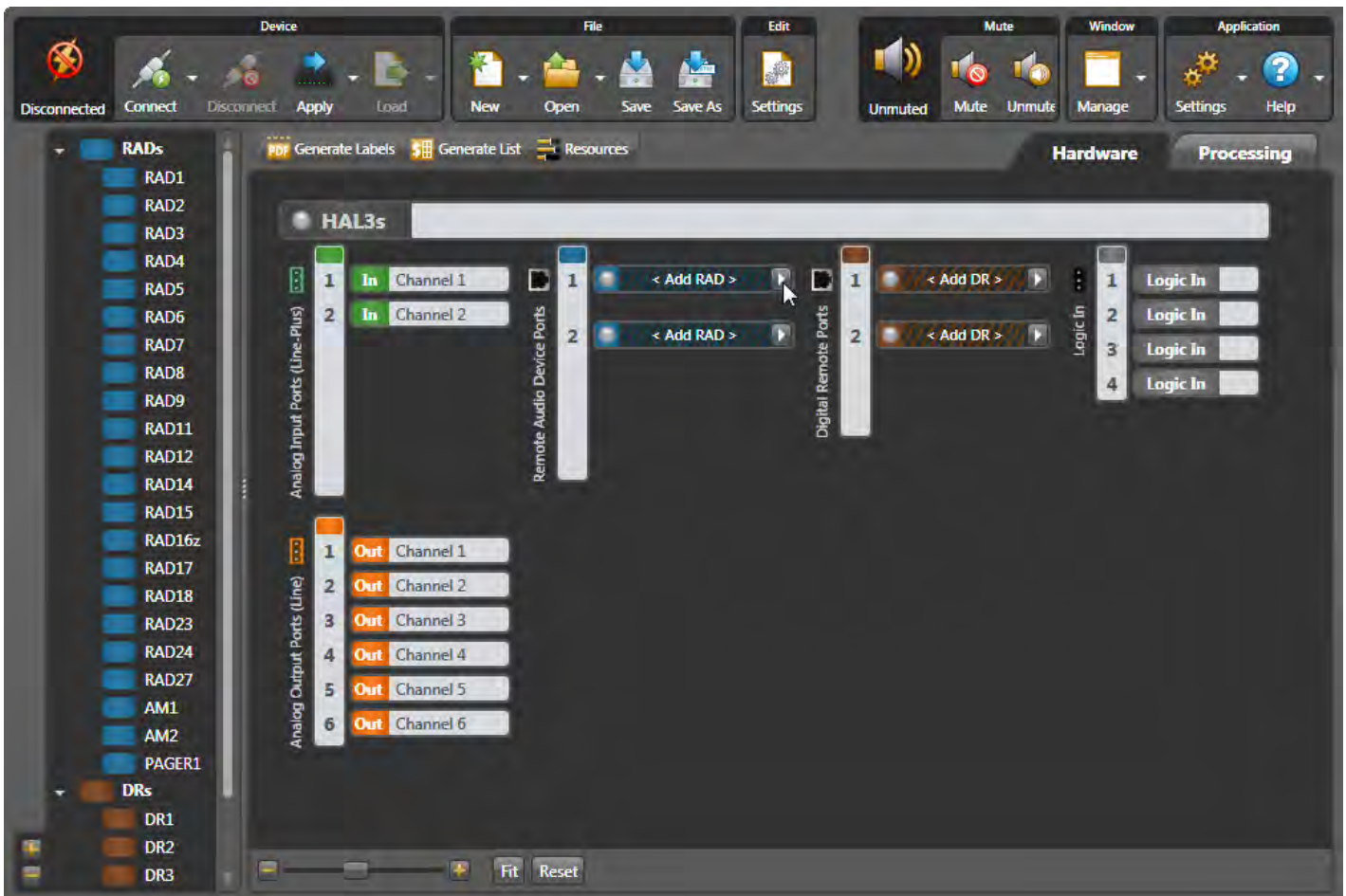
Output(s): Six - balanced line-level (Euro)

Ports: Two - Remote Audio Device (RJ-45)  
 Two - Digital Remote (RJ-45)  
 Four - Logic In (Euro)

Form Factor: 1U rack mount

Show discontinued devices when creating configurations

I'm choosing the HAL3s because I have two stereo sources and a paging mic (five mono inputs). Two are analog inputs (green area) and three are remote audio device inputs (blue area). I want stereo audio around the big screen TV in the bar and mono background audio in the main restaurant and restrooms. After choosing the HAL3s, the Hardware workspace appears.



The screenshot shows the Halogen software interface. The top toolbar includes menus for Device, File, Edit, Mute, Window, and Application. The left sidebar lists various hardware components: RADs (RAD1-RAD15, RAD16z, RAD17-RAD24, RAD27, AM1, AM2, PAGER1), DRs (DR1-DR3), and Logic In ports. The main workspace displays the HAL3s configuration with the following ports:


- Analog Input Ports (Line-Plus):** 1 In Channel 1, 2 In Channel 2
- Remote Audio Device Ports:** 1 < Add RAD >, 2 < Add RAD >
- Digital Remote Ports:** 1 < Add DR >, 2 < Add DR >
- Analog Output Ports (Line):** 1 Out Channel 1, 2 Out Channel 2, 3 Out Channel 3, 4 Out Channel 4, 5 Out Channel 5, 6 Out Channel 6
- Logic In:** 1 Logic In, 2 Logic In, 3 Logic In, 4 Logic In

At the bottom of the workspace, there are 'Fit' and 'Reset' buttons.

Let's add the RADs for the additional "distant" audio inputs we need. You can hover your mouse over the blue RAD models on the left to get a brief description, and then drag the model over. But there's a better way. In the workspace, click the white triangle at the right end of the blue < **Add RAD** > bar. This brings up a detail list with the input and output type of each RAD along with a picture. The [RAD6](#) gives me the stereo line inputs I want for the cable receiver at the bar, along with the outputs for the stereo bar speakers. Click on the RAD6 line to virtually install this RAD. Once selected, this informs the HAL3s to expect the RAD6 model to physically be plugged into this indicated port once connected to the live audio system.

**Choose device model for HAL3s - RAD Port 1**
**RAD6**
✕

RAD Model	Input(s)	Output(s)
RAD1	2 Mics	
RAD2	1 Mic, 1 Line (Mono)	
RAD3	2 Lines	
RAD4		2 Lines
RAD5	2 AES3	2 AES3
RAD6	2 Lines (Stereo)	2 Lines (Stereo)
RAD7	1 Mic, 1 Line	
RAD8	1 Mic	2 Lines (Stereo)
RAD9	1 Mic	1 Line
RAD11	1 Mic, 1 Line (Mono)	2 Lines (Stereo)
RAD12	2 Mics	2 Lines
RAD14	1 Mic, 1 Line (Mono)	2 Lines
RAD15	2 Lines	2 Lines
RAD16z	2 Mic/Line-Plus	2 Lines



Input(s): Stereo consumer line-level (3.5 mm TRS and RCA x 2)

Output(s): Stereo consumer line-level (3.5 mm TRS and RCA x 2)


Form Factor: Two-gang switchbox with Decora

After building a system in Halogen, if you want to try a different RAD, come back to this right-arrow and replace the RAD. For instance, if I figure out later that an [RAD16z](#) would be better than the [RAD6](#), I can quickly change it here. Isn't it nice to quickly swap this out before buying any hardware?

We need a paging mic at the host desk, and Rane has a great paging station that plugs into an RAD port. Click on the next < **Add RAD** > white triangle, and choose the [PAGER1](#) at the bottom of the list.

**Choose device model for HAL3s - RAD Port 2**
**PAGER1**
✕

RAD Model	Input(s)	Output(s)
RAD1	2 Mics	
RAD2	1 Mic, 1 Line (Mono)	
RAD3	2 Lines	
RAD4		2 Lines
RAD5	2 AES3	2 AES3
RAD6	2 Lines (Stereo)	2 Lines (Stereo)
RAD7	1 Mic, 1 Line	
RAD8	1 Mic	2 Lines (Stereo)
RAD9	1 Mic	1 Line
RAD11	1 Mic, 1 Line (Mono)	2 Lines (Stereo)
RAD12	2 Mics	2 Lines
RAD14	1 Mic, 1 Line (Mono)	2 Lines
RAD15	2 Lines	2 Lines
RAD16z	2 Mic/Line-Plus	2 Lines
RAD17	1 Microphone	
RAD18	1 Mic, 1 Line	
RAD23	1 Line	1 Line
RAD24		1 Speaker Out
RAD27	2 USB	2 USB
AM1	Automixer	
AM2	Automixer	
PAGER1	1 Mic	



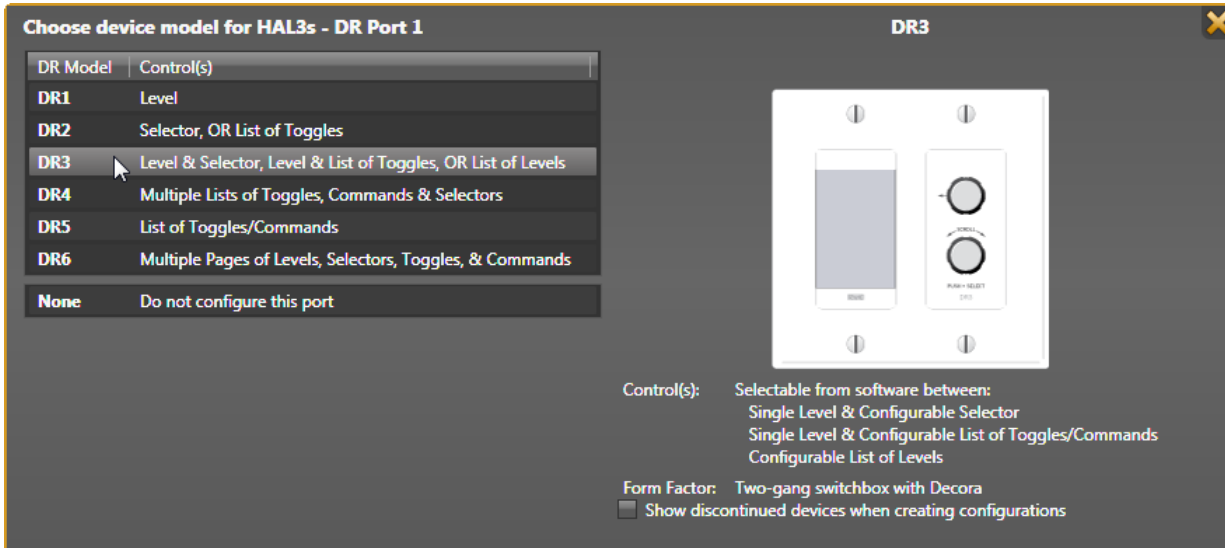
Input(s): One pro quality microphone (XLR) with 24 V phantom power

Output(s): None

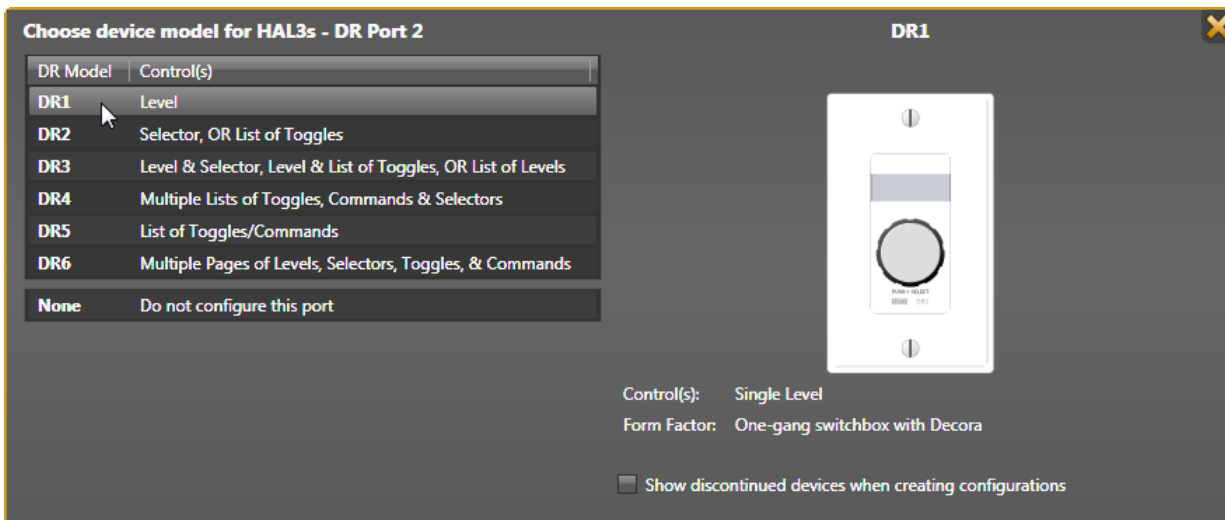
Control(s): Single Toggle

Form Factor: Tabletop box

Let's add some control remotes so the system can be operated within each of the bar and restaurant areas. These are added just like the RADs. Click the white arrow at the right end of the brown < Add DR > bar. For Port 1, choose the **DR3**, as it is the main remote in the system to select the program source, and adjusts the volume in the bar.



For Port 2, choose the **DR1**, as we just need a simple volume control in the restaurant.



Now let's name all the hardware connections. This helps you verify all ins, outs, and controls are accounted. Hover your mouse over the name in a white block of an In, Out, RAD or DR. Click, and you'll get a text edit box with an I-beam edit symbol on your mouse cursor once it is in an editable region. The keyboard's Enter (Return) commits the name.



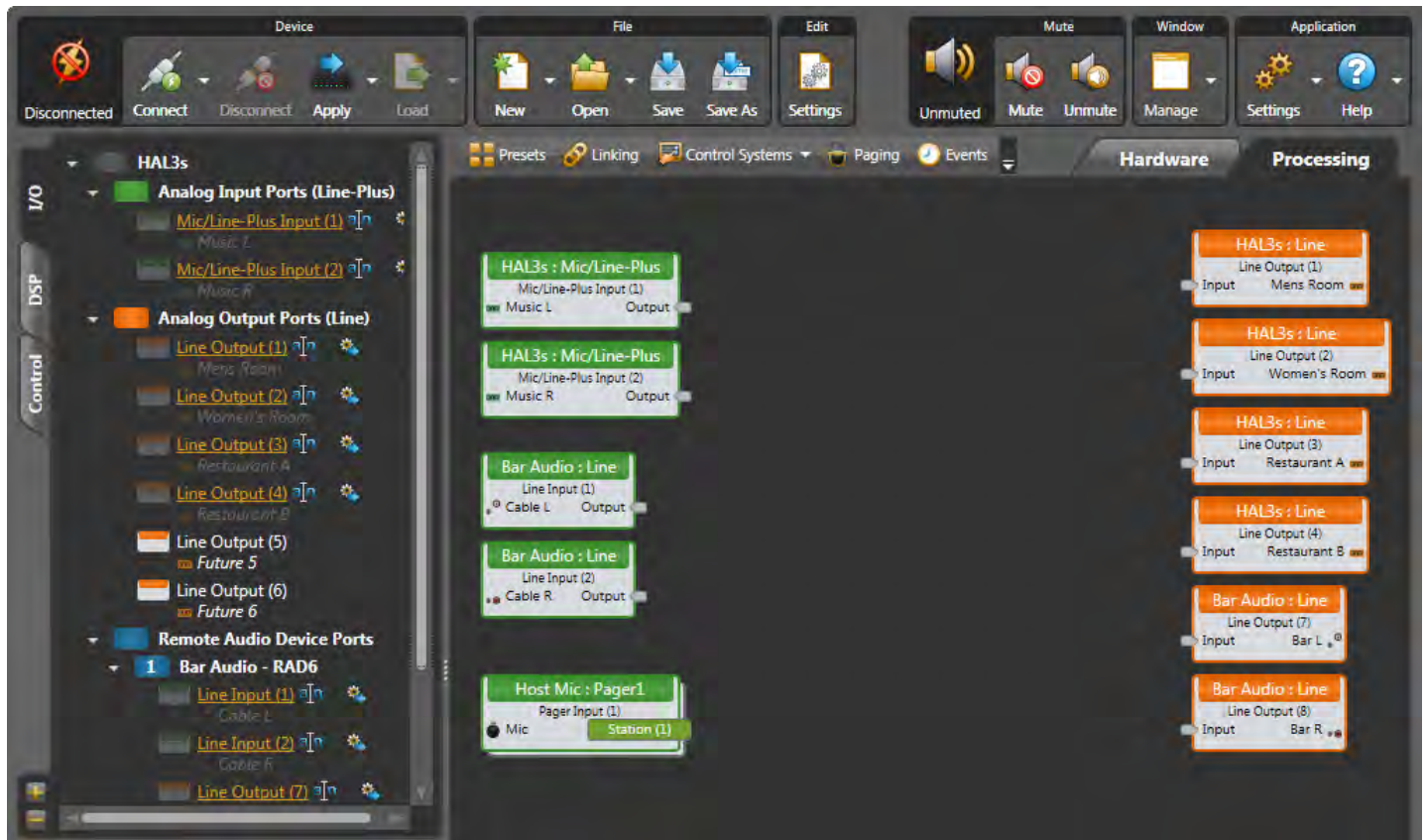
When hovering over a RAD or DR name, a white daisy appears right of the name. Clicking the daisy opens additional unique settings along with the name. For instance, the RAD6 lets you name the individual inputs (green) and outputs (orange). The RAD LED or DR backlight settings can be changed here. When you eventually connect to a live HAL device, the properties also include a status bar below the RAD name as well as a Locate button and a device serial number. This information quickly helps you locate and fix any port or cable errors.



As with any software, it's always smart to save your work as you go. In the top menu, **File > Save As** works like any other program. Save regularly as you finish sections.

## Map The Processing Workspace

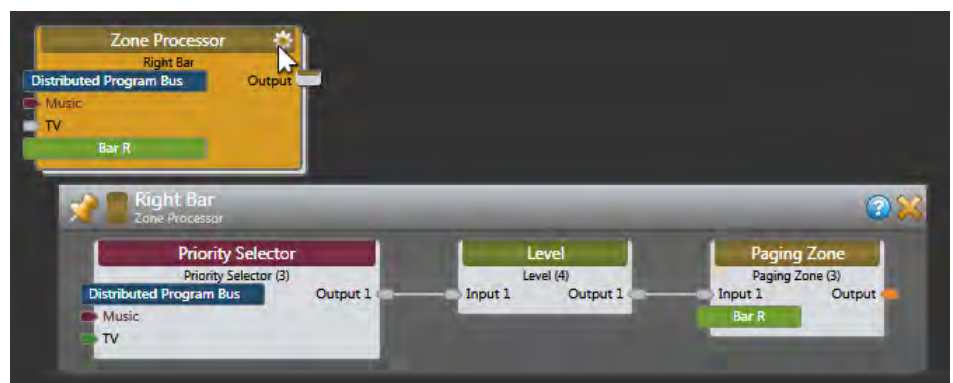
The first time you click the Processing tab (*upper right*) a page of instructions appears. We'll follow these with more explanation, in the same order, for those reading while Halogen is open. This text disappears as soon as you add a block to the workspace. Let's set up the basic audio routing and processing for the restaurant. Open the I/O Processing tab in the palette to the left. Drag and drop the appropriate Input and Output blocks anywhere in the workspace. Place inputs (green) at the left, outputs (orange) toward the right, and leave room for DSP in the middle. After an I/O block is dragged to the map, it goes gray in the I/O palette, easily showing what's used and what's not. There are a couple of leftover outputs that could feed future speakers in the kitchen and patio, but I'll add those someday; not now.



Open the DSP tab on the left. We'll drag and drop the appropriate processing blocks to the workspace.

A big plus of working with Halogen is in helping you build real-world audio systems. It provides applications-level DSP blocks, not just disparate parts and pieces that must be manually wired together then finagled repeatedly to create predictable system behaviors. This makes dense systems easier to understand because every possible switchable I/O configuration isn't cluttering up your design: less dragging and dropping, less manual virtual wiring, and less design time.

The Zone Processor block is made for background music and paging systems like this restaurant. The Zone Processor block provides source selection, level control and page ducking for an audio output zone. Included in every Zone Processor is an automatic connection to the Distributed Program Bus, which simplifies the wiring to multiple zones of background music and other common audio sources. "Local" inputs to the Zone Processor allow the addition of local inputs (for example, jukeboxes, TVs, laptops, or local microphones) reinforced only in this zone. Every Zone Processor includes a **Priority Selector** block for controlling source selection (via automatic and/or end user control), a **Level** block for controlling the zone volume, and a **Paging Zone** block connecting to the HAL paging system that ducks background music when the host pages into the zone.

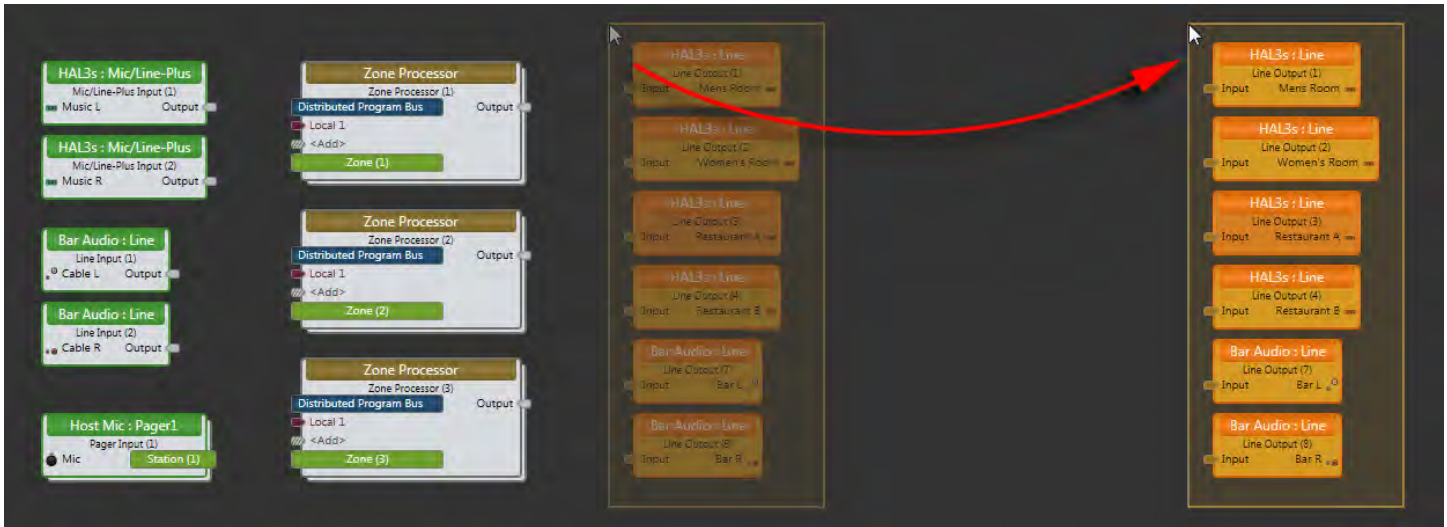


We don't need six Zone Processors for six outputs. We would only need one if this system is mono and we always hear the same source at the same volume with the same page. As soon as an area's audio or paging needs differ from another area, that's your clue that another Zone Processor is needed. A single Zone Processor can cover any area that:

- Requires the same audio input
- Requires the same relative volume
- Is a single paging zone

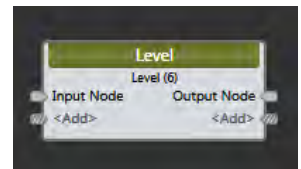
This system needs a Zone Processor for the mono Restaurant, another for the restrooms, another for the Bar left channel, and one more for the Bar right channel. So let's drag four Zone Processors into our map.

I know I want some more processing before my outputs, and I need more space for DSP blocks. No problem, the workspace is easy to expand and rearrange. Expand the overall Halogen window on your screen, click-drag around the orange output blocks until they are highlighted, and then move them all as a group to the right (clicking on any one moves the group). Notice at the bottom left is a zoom slider control, and a **Fit** button that gets you back to full and center.



For audio tone control, a 3-band parametric EQ is easier than a graphic and lets me have different settings for each zone. I'll use a Multichannel Parametric for the stereo speaker pair in the Bar, a single Parametric for the two Restaurant zones, and another for the two restroom zones. I could have a mono Parametric for every output, but using three is fewer duplicate controls and just as effective. To protect the all the speakers, use a Limiter between the EQ and each output.

Line up the blocks left to right in the order you think they will be. Input nodes are on the left and Output nodes are on the right of each block. Leave a little space between the blocks for the wires we'll connect.

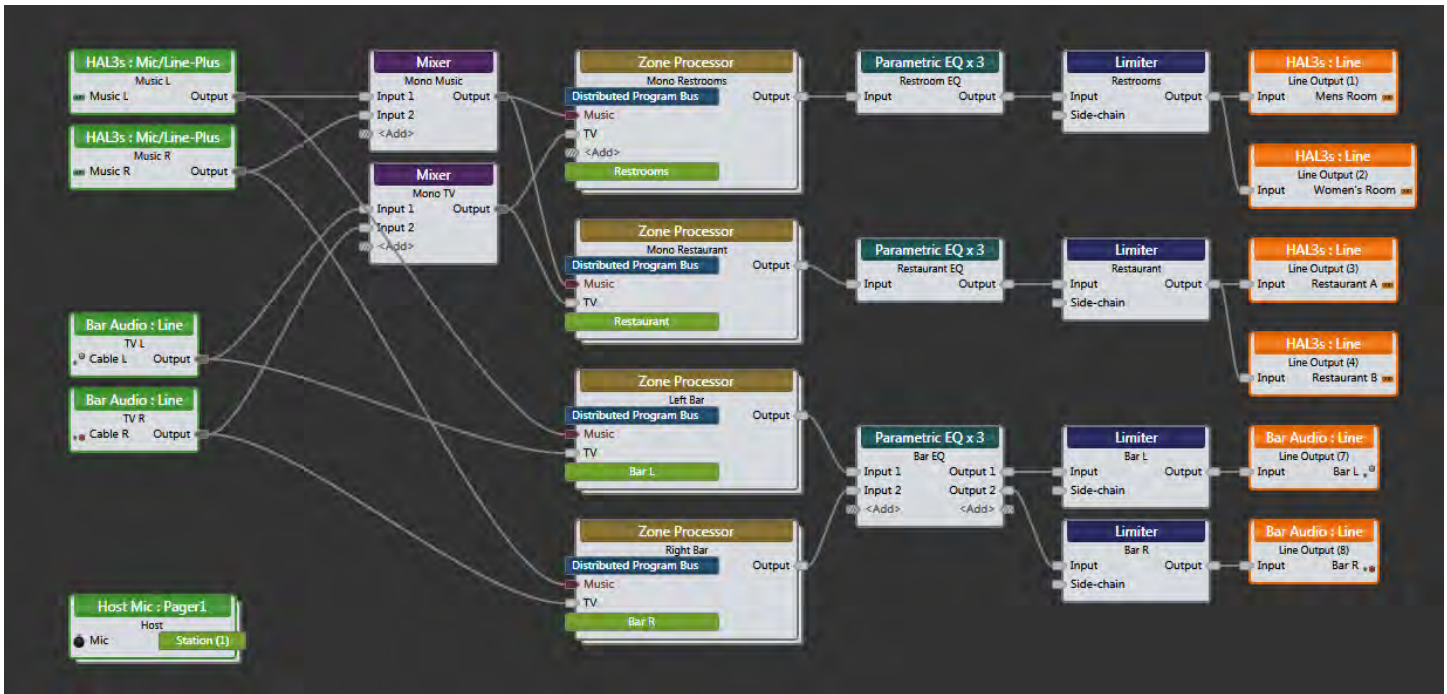


Name the blocks before wiring them. Naming is easy: just hover, click and type. Names help keep your signals straight when wiring. Name the Zone Processor inputs as well, *TV* and *Music* will go on all three, and these labels will show up later in the Remote Controls. Notice that naming or wiring to an input on the Zone Processor (or other Mixer / Selector blocks) invites you to **<add>** more if they are needed.

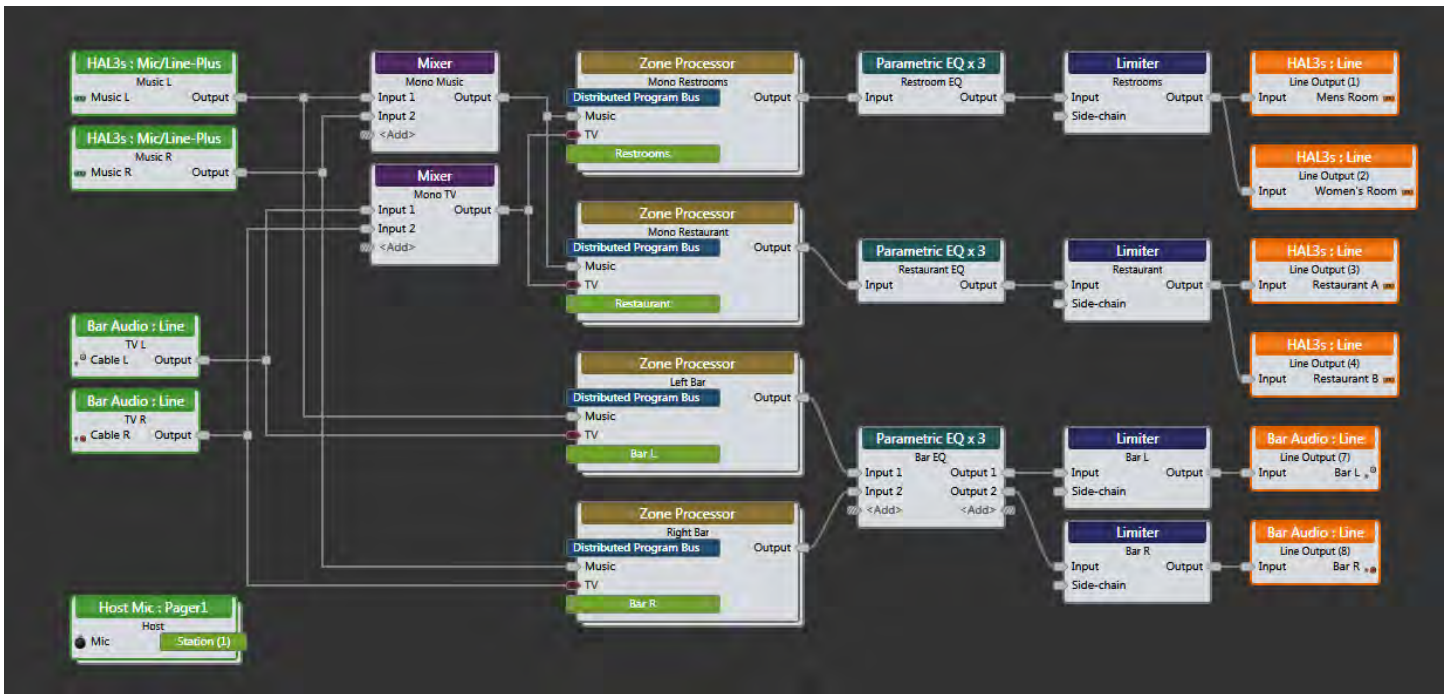
Let's wire the blocks together. Click and release on a block output node and then connect it to the input node of another block with a second click. One output can feed multiple inputs, but combining inputs requires a mixer block. You can move blocks around to get wires to look better or straighter. Right-click wires to get cut, copy or delete commands.

There are wire-dressing techniques for deleting and replacing wires. If you want to delete a wire, click the middle of it to highlight in yellow, and hit your delete key. If you start creating an unwanted wire, hit the Esc key so it turns yellow, then hit delete. If you want to delete several wires at once, click and drag to include input and/or output nodes, or hold down the Ctrl key while you select each wire, then hit delete.

Uh-oh, now I need to put in a couple of summing mixers for the mono zone so that my bar will stay in stereo. Not a problem. Click-drag to highlight the group of input blocks, and pull them left to make room; the wires and screen will expand. From the DSP palette, drag two new Mixers ahead of the Mono Zone Processor. Name one mixer *Mono Music* and the other mixer *Mono TV*. Wire them as in the map below.



Though the wiring around the mixers is correct, it can get messy with overlapping wires over blocks. Turn Smooth Wires off (in the Settings drop-down at the upper right) and keep Orthogonal on to make the lines snap to a grid. With Orthogonal on, wires are only drawn as horizontal and vertical. To make corners, click on an empty place in the background to place a vertex, which is like a staple holding the wire so you can route the wire around blocks. To create a visible connection node in the middle of a wire (e.g., split an output), instead of starting the wire from an output node, start at an input node and connect mid-wire, creating a vertex. Here's the same map with straight lines.



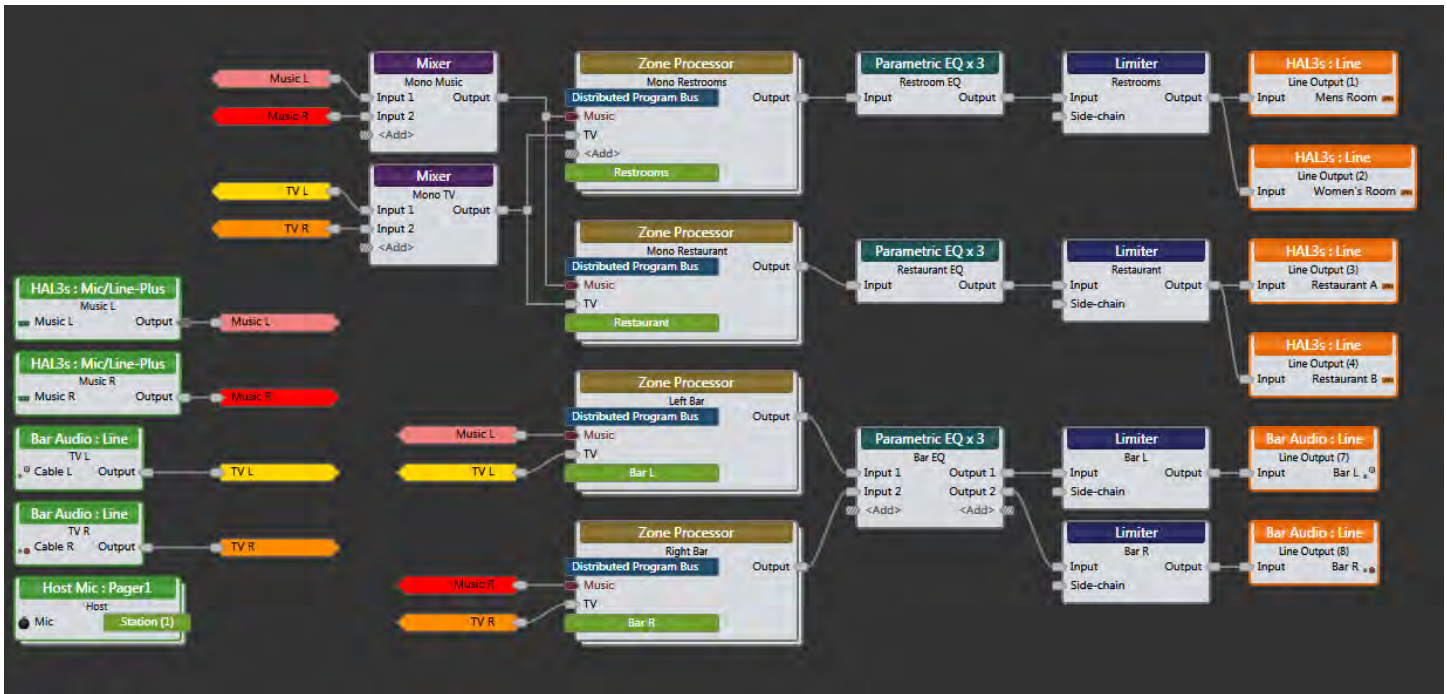
Seeing what wires to where increases in difficulty as you add more mixers, zones and larger maps than this. To make wire tracing easier, Halogen has color-coded wire tags. Below the palette on the left, you'll see a **Source Wire Tag** and a **Destination Wire Tag**.





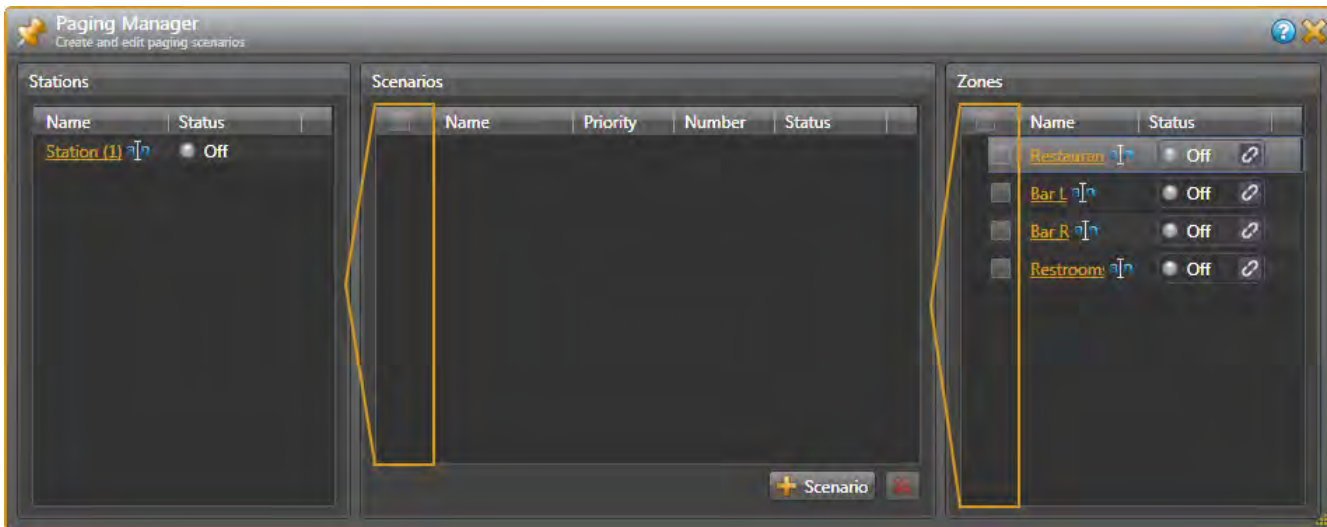
Drag a **Source Wire Tag** from the left column over to the processing map near an Output node of one of the green inputs, and connect it with a wire. Hover over the Tag, click the daisy, enter a name, and choose a Background color that is easy to see. You can also change the Font color when the background color chosen makes reading the name difficult. Make Source Tags for the other Input source Output nodes in contrasting colors. In this system, I made four Sources: pink, red, yellow and orange.

Add a **Destination Wire Tag** near an Input node, and connect it with a wire. Hover over it, and at the right end you'll see a down-arrow. Click on that, and see a list of the sources you made. Select a source here, and the tag adopts the name and color of its Source. Continue to add Destination Tags for the inputs that need Source Tags. Now it's easy to understand all the same color tags are connected.

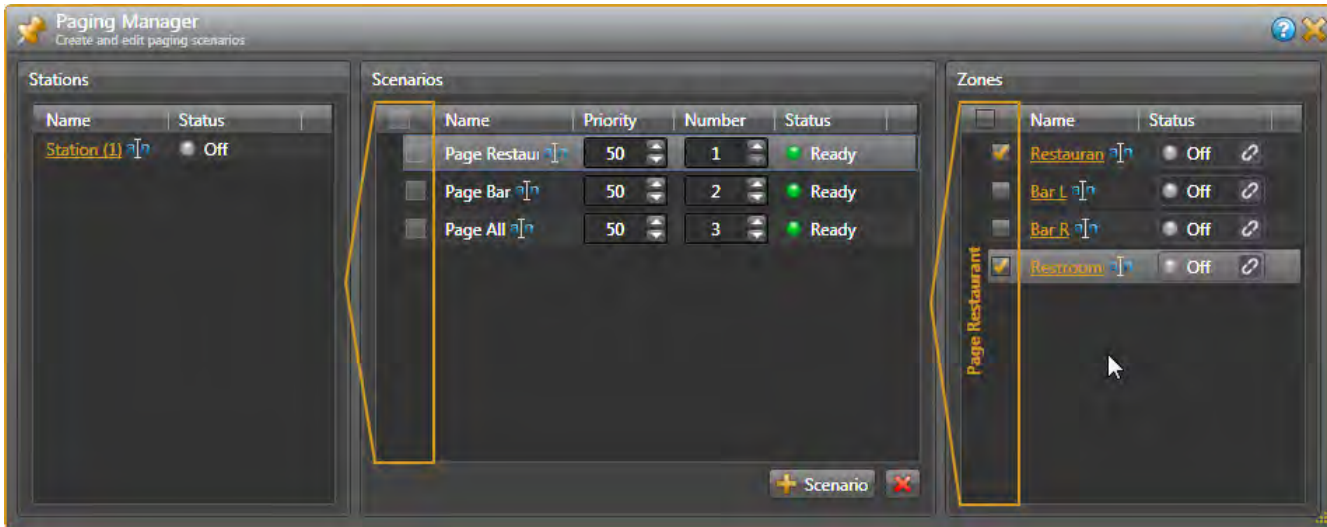


Notice there isn't a node on the Pager1 for the host station. The lime green bar on the Pager1 connects through the Paging Manager to the lime green bars on the Zone Processors. These are built-in lime green Wire Tags for paging sources (sticking out to the right side of the block) and destinations or zones (sticking out to the left of the blocks).

Click the **Paging** icon above the Processing Workspace (top of the page) to open the **Paging Manager**. It already knows you have one station and four paging zones. Edit the zone names by clicking once on each Zone Processor's lime green bar (clicking twice opens the block), or edit the name in the **Zones** column.



We'll make the Scenarios in the Paging Manager that the restaurant host will see on the PAGER1 display, and associate each page Scenario with one or more zones. Click on + **Scenario** at the bottom. Edit the name of this first one to be *Page Restaurant*. Under Zones, tick the checkbox by the *Restaurant* and *Restroom* zones, where this page will be heard. Click on + **Scenario** again, name this *Page Bar*, and only tick the *Bar L*, *Bar R*, and *Restroom* Zone checkboxes. Click on + **Scenario** again, name this *Page All*, and tick all four Zones. Test this by clicking on each of the Scenarios and watch how the Zone checkboxes change with each Scenario. Very quick and easy.

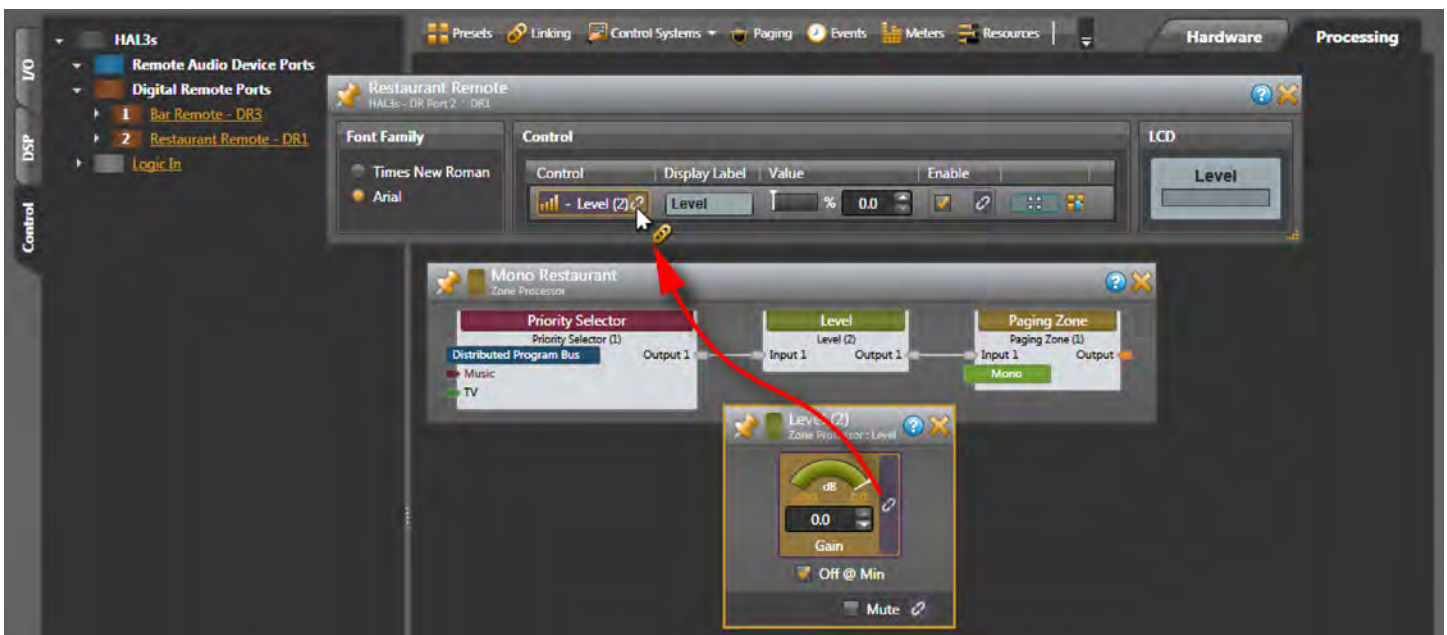



## Link Remotes to Blocks

Let's start with the DR1 Volume Remote located in the Restaurant. Click the Control tab at the left, and click on the orange underlined name of the **Restaurant Remote – DR1**. This opens the DR1 dialog.

Double-click the title bar of the Zone Processor block for the *Mono Restaurant* to see the three pre-wired blocks inside. Double-click the Level block's title bar to open its dialog.

To the right of the Level's Gain control, hover over the unlinked icon  until you see a floating gold link icon  added to your mouse cursor. As you click this link and drag, the DR1 Level Control link highlights in gold, leading your way to a potential link.



Release the mouse when you drag onto the DR1 Level Control link, and a Create New Link confirmation allows you to name the link. Call this *Restaurant Level Link*. Click OK, and both link icons activate by turning purple . Now the DR1 on the wall in the restaurant will control its room volume. Test this by grabbing the white line of the green arc in the Level dialog, and moving your mouse up and down.

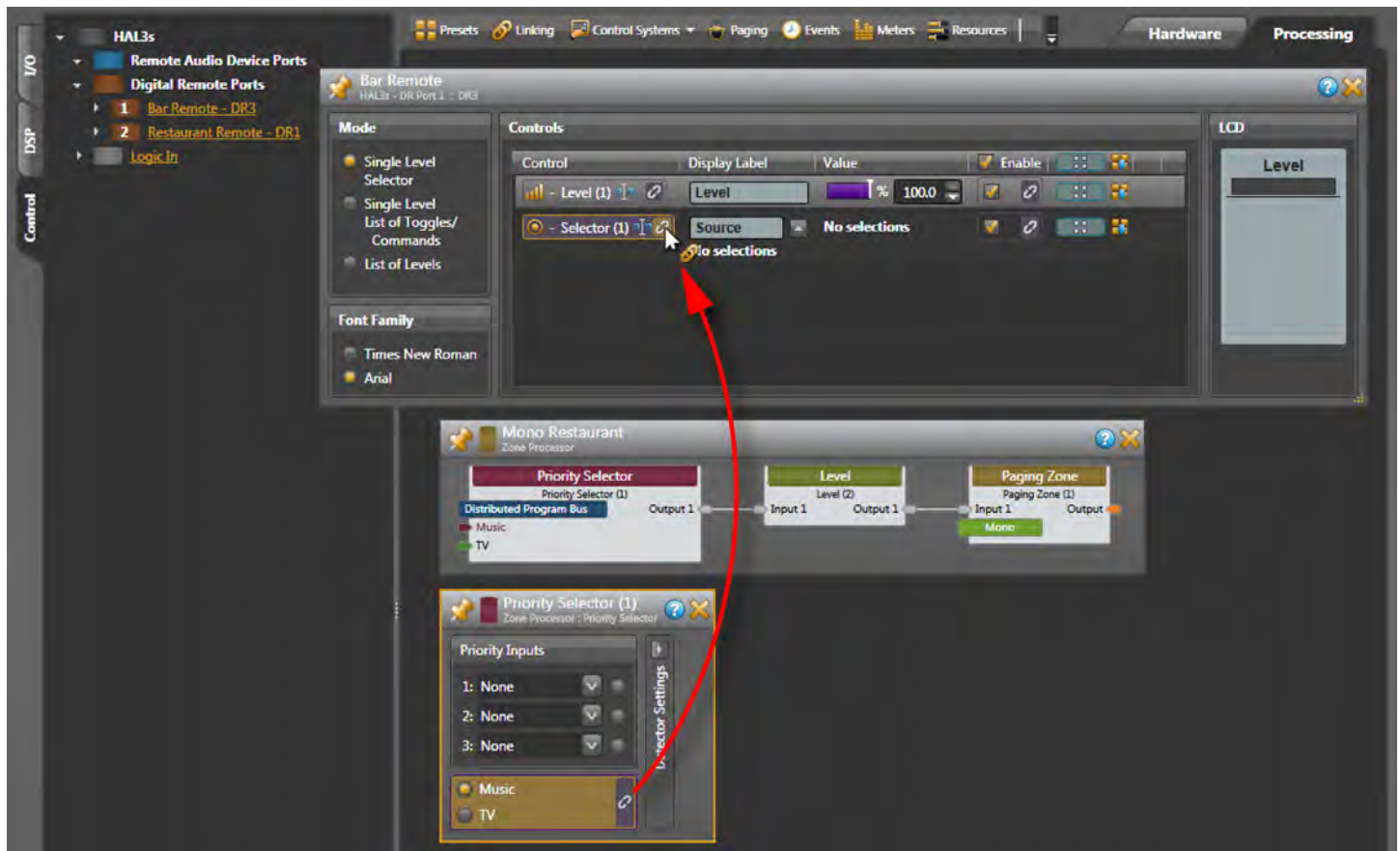
You'll see the Control Value move, and you'll see the DR1's Value and LCD display bar move. This confirms it's all working. The DR1 always displays in percent, not dB – 0% for off, and 100% for full on. Checking the **Off @ Min** box allows the DR1 to mute the audio completely when turned fully counter-clockwise. If you don't want it off at minimum, you can set the max and min volume of the DR1 by clicking the yellow underlined numbers at the ends of the green arc in the Level block.




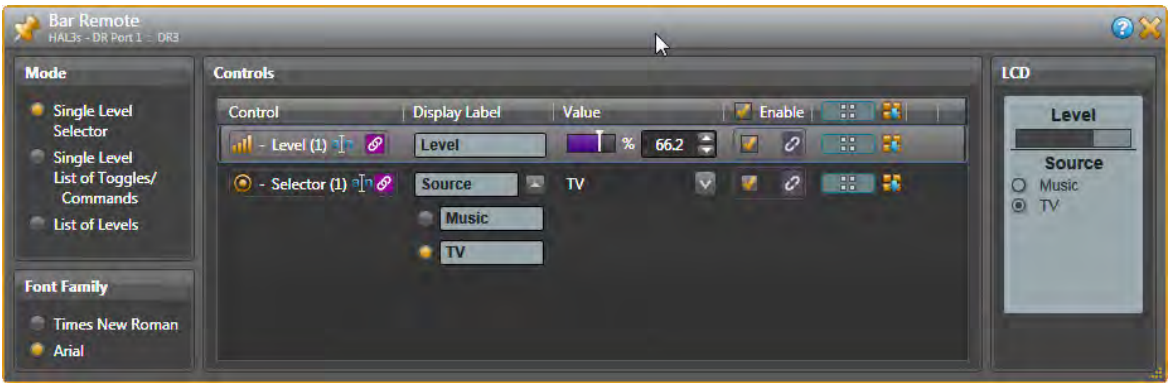
Close the Level block and the DR1 Remote dialog. Leave the Mono Restaurant Zone Processor open, so we can map the DR3 Remote located in the Bar to the source selector. In this installation, we want one background music source consistent across the entire establishment because of the open floor layout.

Let's link the Restaurant Zone source to the DR3 Source and Volume Remote in the Bar. In the Control tab in the left column, click on the yellow underlined name of the **Bar Remote – DR3**.

Double-click the Priority Selector block title bar so its dialog appears. Notice the *Music* and *TV* sources are already named. Right of these, hover over the unlinked icon  until the floating gold link icon  appears. Click and drag from the Zone Processor Priority Selector link to the DR3 Control Selector link.

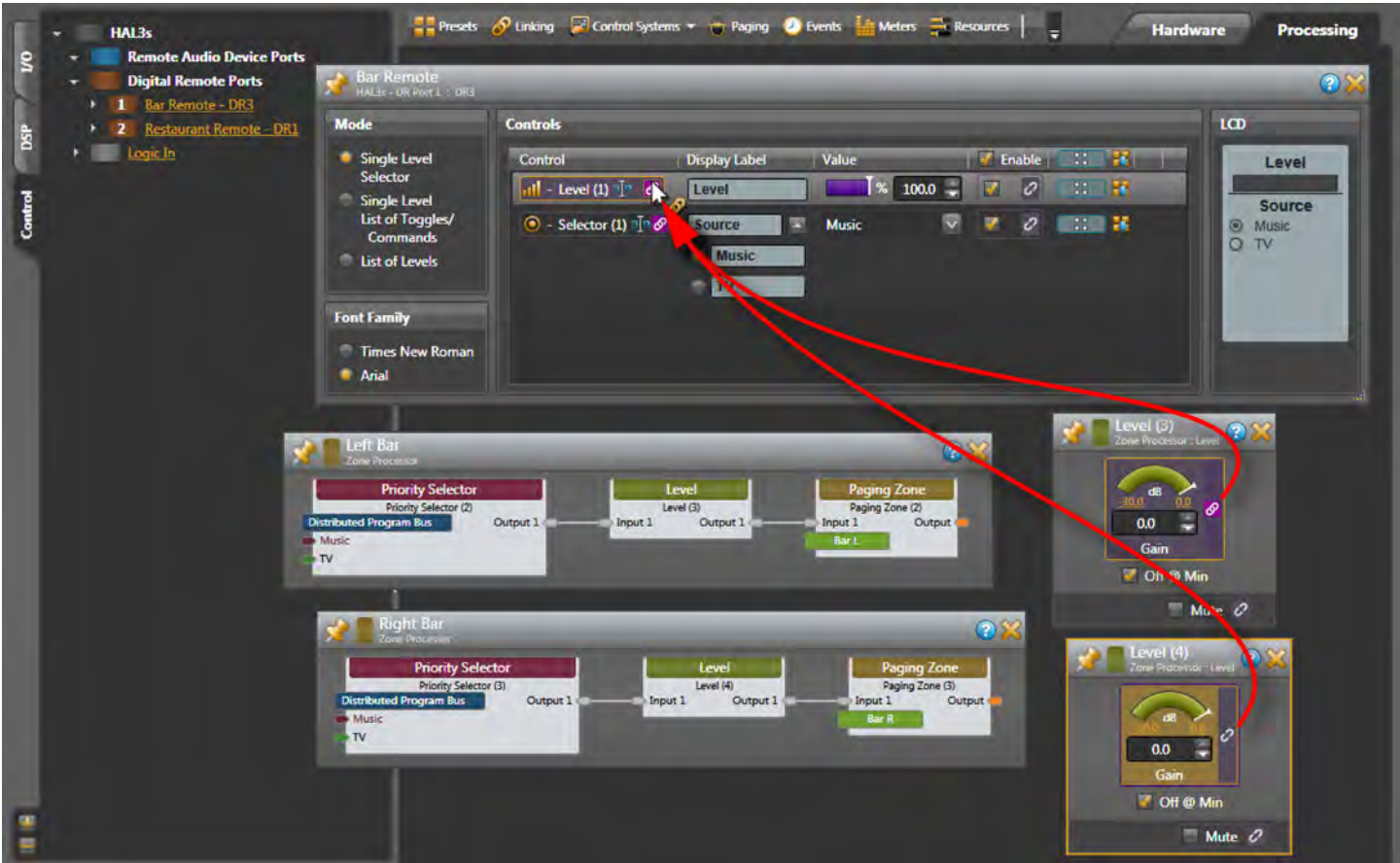


Release the mouse when you drop on to the DR3 Selector Control link, and a **Create New Link** confirmation appears. Name this *Source Selector Link*. Click OK, and both link icons activate by turning purple . Now the DR1 Level control and the DR3 Selector control are linked to the Mono Restaurant Zone Processor. In other words, the Volume is controlled by the Restaurant DR1 and the Source is controlled in the Bar's DR3. At the right side of the Remote dialog, see the preview of the DR3 display, so you know your names fit when you get real hardware. You can change the Display Labels to *Volume* or *Level*, and *Source* or *Selection*. Any label on the display is editable here.



We've linked both the Level and Selector in the Restaurant, so close the Restaurant Zone Processor and Selector dialogs. Let's link the Stereo Zone to the DR3 remote. Double-click the Zone Processors for the Left Bar and the Right Bar.

Create the links to the Bar Level Controls. Open the dialogs for both Level blocks; it's OK to move things around to get them to fit on your screen. Click and drag the Left Bar Gain link to the DR3 Level Control link. Click OK. Then, click and drag the Right Bar Gain link to the same DR3 Level Control link.



After making the second link to the same control, you get a new dialog. Do you want to **Add to Link**, or **Create New Link**? Leave **Add to Link** checked and click **OK**. Test the control by dragging up and down either of the white lines inside the green Gain arcs, and you'll verify everything tracks together. Close the Level blocks.

Open the Priority Selector blocks for both Left Bar and Right Bar. Click-drag from the Left Priority Selector link to the DR3 Selector control link, and be sure the Add Link box is checked. When you make the third link for the Right Priority Selector, keep **Add to Link** checked and click **OK**.

Open the Priority Selector block for the Mono Restrooms. Click-drag from the Restrooms Priority Selector link to the DR3 Selector control link, with the **Add to Link** box checked. We'll make a web control for the level in the Restrooms later.

Verify all the Zones are switching sources together by clicking on any of the Music or TV buttons in the Selectors or DR3 Control dialogs. All wall remotes are linked to all zones, and we know how they look. Close all the block details.

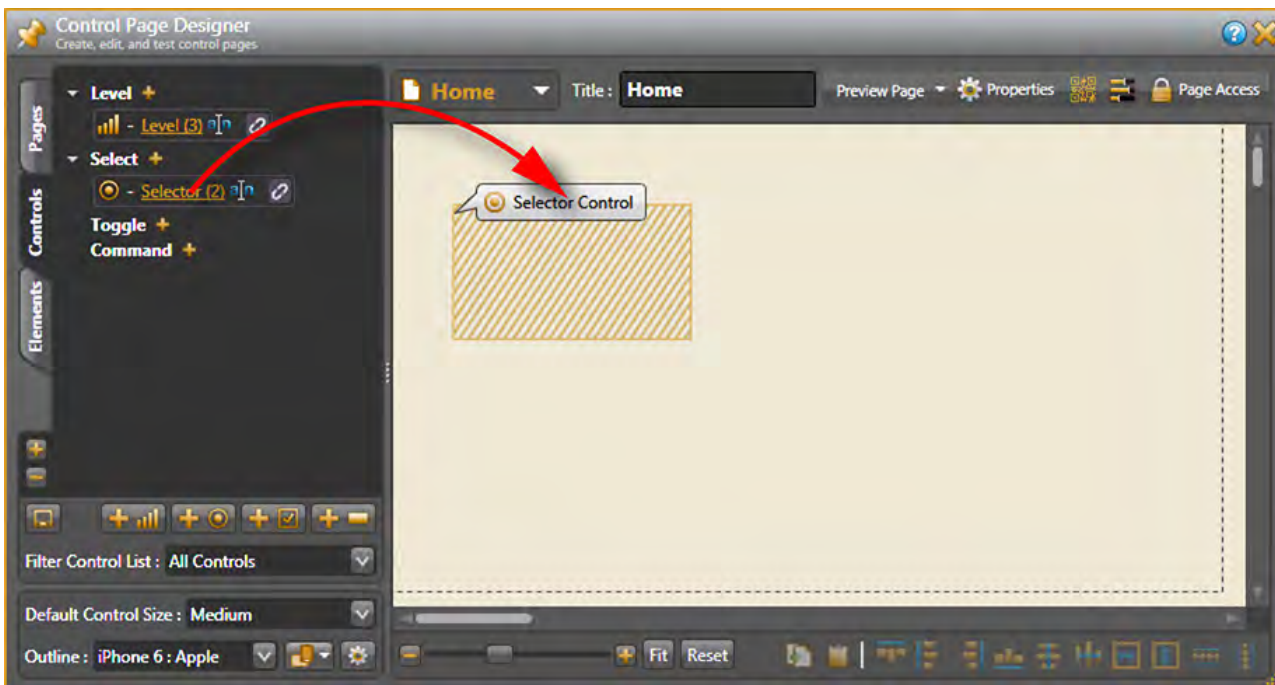
## Create Web Controls



Any computer, tablet, or smartphone on the premises will have a web browser. Any web browser that has access to the local network on Wi-Fi can talk to HAL, if the HAL is on the same Wi-Fi network. Web Controls are another way of remote-controlling the system, and can have more functions than the DR1 and DR3, and there is no remote to buy, so no added expense. Using drag-and-drop layout and links makes creating web controls for a HAL system is easier than you imagine. Giving web controls to the manager(s) of the bar gives them the power they want, with more controls and without buying more remotes.

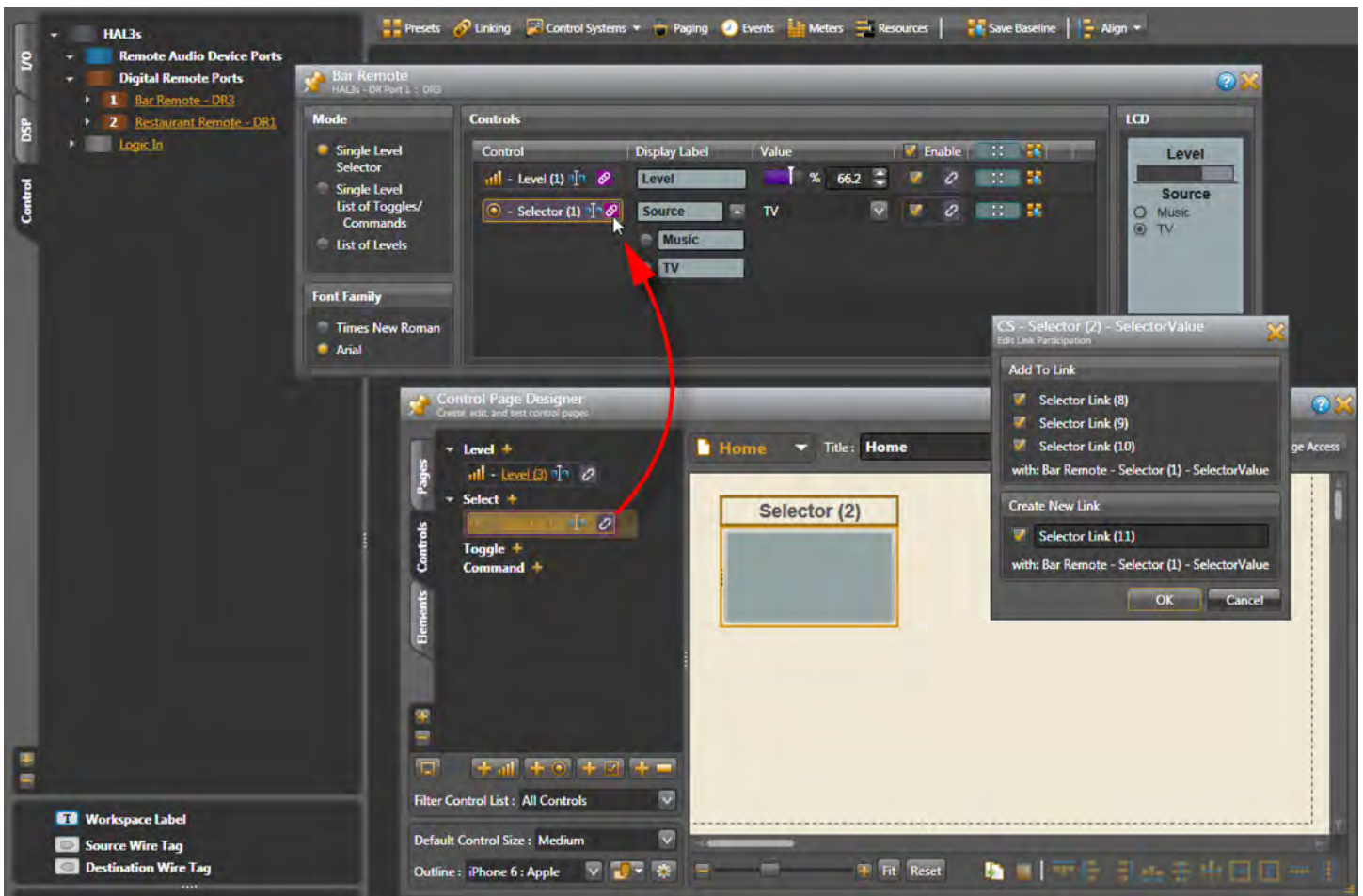
In the Processing screen, click the **Control Systems** drop-down, and choose **Control Page Designer**. Web browsers come in all sizes and resolutions, so the first question to ask is: on what device will these controls be used? In the lower left, click the **Outline** menu to see popular phones and tablets. Don't see your device? Click the daisy to the right of the menu, and you have an expandable window that lets you check the devices to display in the Outline menu. The icon before the daisy lets you choose portrait or landscape. If you have more than a few controls, choose **Landscape**. If you're designing for a computer monitor, choose **None** as the outline.

Let's set up a web page for the boss that includes the source selector, bar volume, restaurant volume, but also individual volumes for the restrooms. I heard the boss has an Apple iPhone 6, so I'll select that, in Landscape. You'll see a dashed line as your boundary to work within.

Open the Controls tab at the left. Add a new Selector by clicking the "+" sign to the right of Select. Drag the Selector onto the left side of the screen. Let go, and notice you can reposition it and its title around. But it doesn't look like much because it's not linked to anything yet.



Since the DR3 already links to all our zones, and we want the same function here, just link this web selector to the DR3 selector. Open the **Control** tab at the left of the main screen, and under Digital Remote Ports, click the name of the Bar Remote DR3. Drag the unlinked  Selector icon in the Control Page Designer to the DR3 Selector link. Since this is the fifth thing linking to the DR3, and we want them all to follow each other, only check **Add to Link**. Click **OK**, and the web Selector link icon activates by turning purple .



Now the Selector buttons and names appear on the web control page with our source names.

To get the Bar Level control on our page, in the Control Page Designer's Control tab, click the "+" after **Level**. Drag the Level icon from the left Control Page Designer column to your page. Drag the unlinked  Level icon in the Control Page Designer up to the DR3 Level link and release the mouse. Check only the **Add to Link** box in the confirmation dialog. Click OK, and the Level link icon activates by turning purple .

Double-click the Level slider's graphic. You'll find lots of settings here to adjust as you wish. Change the **Name** to *Bar Level* and change the **Label Text** to *Bar Volume* so we know what this control does. Close the box.

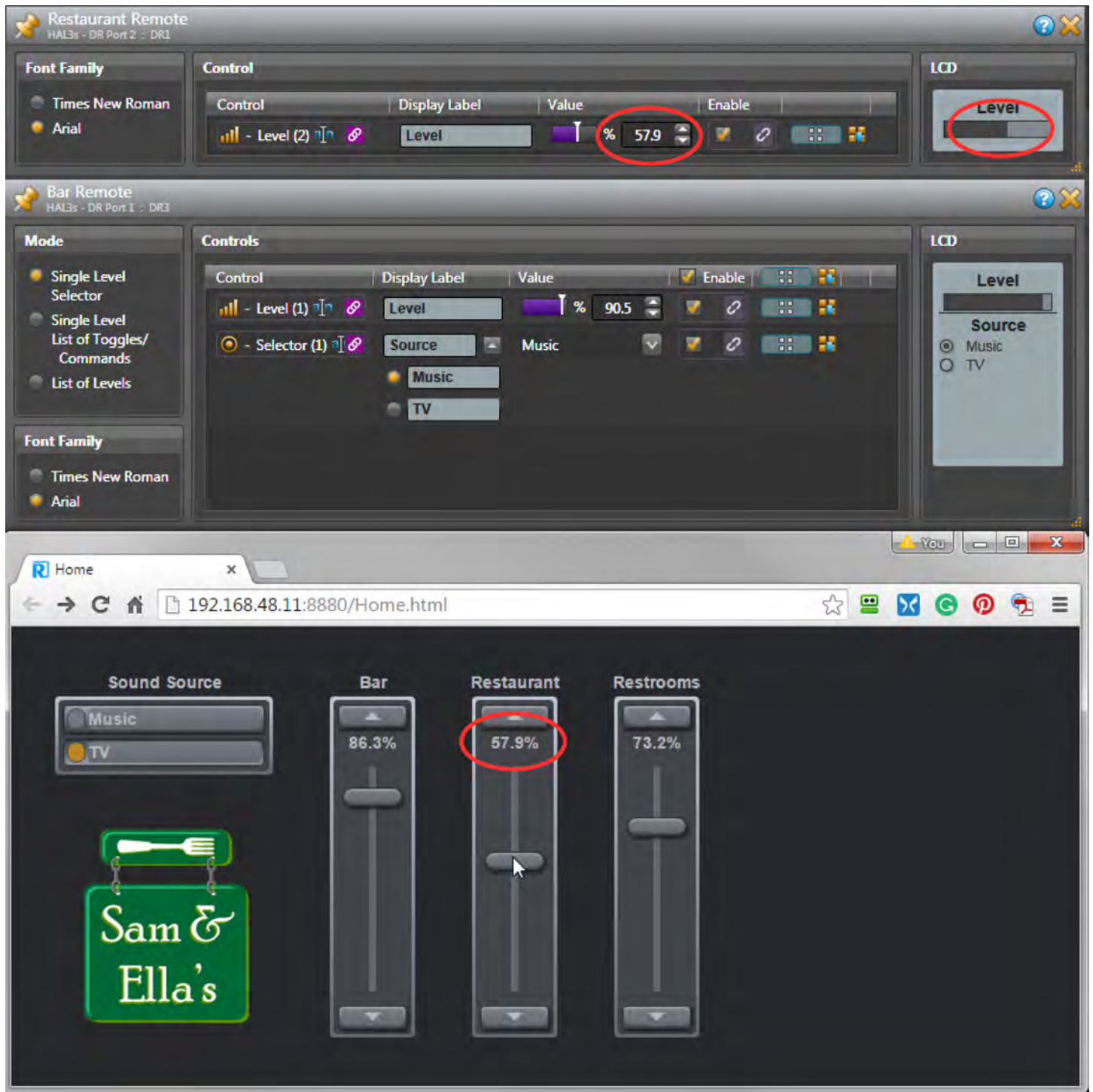
Now link the Restaurant Level to a web control. Close the DR3 Remote dialog, and open the DR1 Remote dialog by clicking its name in the HAL3s Control tab. Click the "+" after **Level** in the left column of the Control Page Designer to add another Level control. Drag it over to your page. Drag its link to the DR1 Level Control link and click OK. Name this *Restaurant Level* and make the Label Text *Restaurant*. Uh, this big word doesn't fit on the control page. No problem — grab the edge of the gold border around the Restaurant label to resize and reposition it. Close the DR1 dialog.

Add one more Level control for the restrooms. Name this *Restrooms* and make the Label Text *Restrooms*. Double-click the Mono Restrooms Zone Processor, then double-click its Level block. Link a new web Level control to the Gain, and name it *Restrooms*. The boss can adjust the volume if it's ever needed. Close the dialog boxes.

It's easy to size controls to fit the device screen. Click on any web control to highlight it, and stretch, move, resize and rearrange to make a nice layout. Get pixel-precise with the control settings by double-clicking a control. Sliders are easier to adjust with fingers when they are larger. On small phone screens, removing the slider completely, displaying only up and down buttons, is easier for some users. Right-click on an empty area, select **Properties**, and try different Themes. Choose a custom color background to match your décor. Click the Elements tab on the left to add more labels, lines or import your logo. Here is a simple iPhone 6 design for this restaurant.



Now let's test. In Control Page Designer, Click the **Preview Page** button, and the page launches in your computer's default browser. Open the DR1 and DR3 dialogs from their names in the HAL3s Control column on the left. Resize your browser window so you can see it next to all the open dialogs. Operate any control on your browser screen. See how the matching Source and Levels change, and how the wall remote displays track? Pretty cool.



These are just a couple of web controls you can make. For example, link sliders to individual Parametric band Gains for bass, mid and treble controls. For subwoofers in the bar, insert 2-way Crossovers after the Zone Processors, run their low ends to the unused line outputs, and link volume sliders to those output gains. Create another zone for the kitchen, and another for the patio using leftover HAL3s outputs. Web controls are a powerful feature that the boss will love, created without programming knowledge or extra hardware expense.

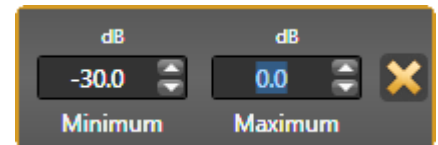
## Configure System Settings

Let's inspect each block and its available controls. Properties are opened by double-clicking any block's title bar. Let's go left to right, from the input to output.

**Input Blocks:** When using unbalanced (RCA) sources, set the analog Mic/Line-Plus inputs to **Unbalanced L&R monoed**, (even if connecting one channel). Keep unbalanced lines short, less than 10 feet (3 meters). Use balanced line-level inputs if your source has them, and select **Balanced line-level**. Adjust the Level Gain during installation; with both sources playing at full volume, adjust the Left and Right Gains, so they are similar when switching to either Music or TV.

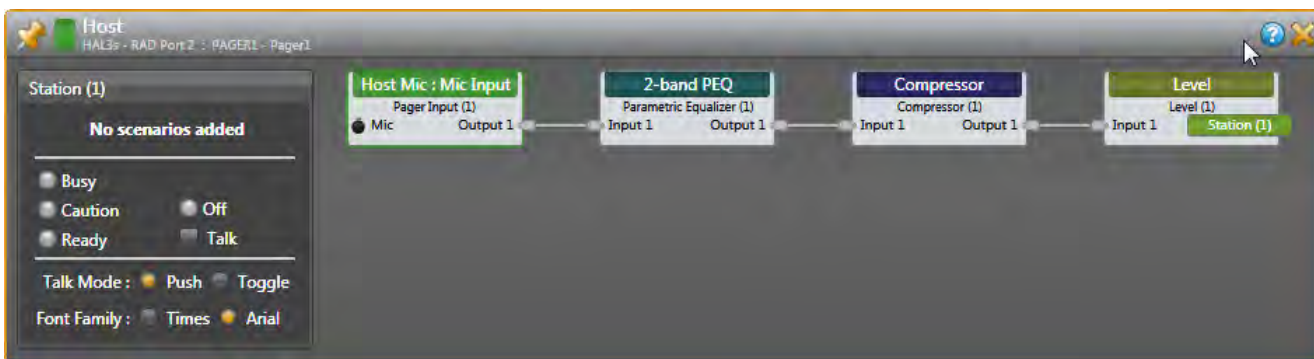


All the **Gain Levels** in Halogen are unique because the range of the Gain is adjustable. Click on the gold numbers at either end of the green arc. This lets you set a max and min range if the end users are better off with less control. The defaults of -30 dB minimum and 0 dB maximum, along with the Off @ Min checkbox, behave like a regular off-to-on volume control.



**Pager1 Block:** The controls and LCD screen on the [PAGER1](#) appear on the left of this parent block. There is a list of the Paging Scenarios into which the PAGER1 can page; these are set up in the Paging Manager that we covered earlier. The Busy, Caution, and Ready indicators display the state of the Scenario:

- If no Zones in the selected Scenario are being paged, the **Ready** light illuminates.
- If one or more Zones in the selected Scenario are currently receiving a page, the **Busy** light illuminates.
- The **Caution** indicator illuminates if there is another Page source active in the system.



Checking the **Talk** checkbox initiates a page into the selected Scenario for configuration test purposes, and is read-only when connected to an HAL.

**Talk Mode** specifies the behavior of the Talk button. **Push** mode is momentary or push-to-talk; it initiates a page with a push of the Talk button and terminates the page when released. **Toggle** mode leaves the PAGER1 in page mode until pushing the talk button again. For a restaurant, Push mode is more intuitive since most pages will be short.



The Pager1 block contains four child blocks:

- **Mic Input:** These settings are dependent on the chosen gooseneck microphone. Turn on Phantom if your mic needs it. During installation, set the Pad and Sensitivity, so the meter reaches the yellow without going into the red when talking normally into the mic.
- **2-Band Parametric EQ:** Use Filters to adjust the tone of a mic so it's clear and understandable. The Low-Cut Filter set to, say, 250 Hz, can block HVAC or train rumble. The High-Cut Filter can reduce sibilance or interference from a fountain. This block is optional, and can Bypass the EQ with the lower right checkbox.
- **Compressor:** This block helps maintain an even volume without being too loud or quiet. Start with a Threshold of -20 dB, and adjust it so normal speaking volume sits halfway on the meter between the Threshold and full scale. A good Ratio is 2. This block is optional, and the lower right checkbox can Bypass it. See the Dynamics Processors RaneNote for a better explanation on Compressor operation <link>.
- **Level:** This sets the nominal volume of the page. In most cases, you will leave this at 0 dB.

**Mixer Blocks:** These stereo-to-mono blocks need no adjustment; leave all input and output levels at 0.0 dB (unity gain).



**Zone Processors:** This parent block has three child blocks inside.



We don't need any adjustments to the Priority Selector or Levels; we already linked these to our digital remotes and web controls. The DR3 remote and web controls select the source, so leave Priority Inputs set to None.

Here's a variation that takes advantage of the Priority Selector. If the TV in the Bar is normally turned off, and you want the source in the Bar to automatically switch to TV when it's turned on, set the TV as a priority input. To do this, open the Priority Selectors in the Left and Right Zone Processors. Under Priority Inputs, select the TV as the source in the #1 pulldown in both channels.

Open the Paging Zone detail. Ducker Depth lowers the music temporarily during a page. The default is 12 dB and a good starting place. The Ramp Back time is the seconds it takes, after paging, for music to return to its regular volume. The 3-second default is fine. If the Page volume is too high in a zone, lower the Paging Zone Page Gain. The Bar zone is in stereo, so set left and right channels to the same values. Or once you have one channels' blocks settings correct, copy and paste settings from one channel to the next. Or, best of all, link the Left and Right Zone selectors and Levels together, and link the Page Gains together to create stereo zones that always track each other.



**Parametric EQ Blocks:** Treat these like 3-band tone controls (Low, Mid, & High). It's easiest to see all settings at once by clicking the **Show Table View** option. To change a value, move the arc indicator, click the up/down value arrows, or highlight the numbers and type directly. Here are some suggested starting settings.

- Set Filter 1 (Low) to 200 Hz, Gain to 0 dB, Bandwidth at 2.5 octaves.
- (Click on Add Filter) Set Filter 2 (Mid) to 800 Hz, Gain to 0 dB, Bandwidth at 2.5 octaves.
- (Click on Add Filter) Set Filter 3 (High) to 3150 Hz, Gain to 0 dB, Bandwidth at 2.5 octaves.
- The Low-Cut Filter default is 40 Hz. Set this to match your loudspeaker roll off.
- The High-Cut Filter default 16,000 Hz. Set this to match your loudspeaker roll off.



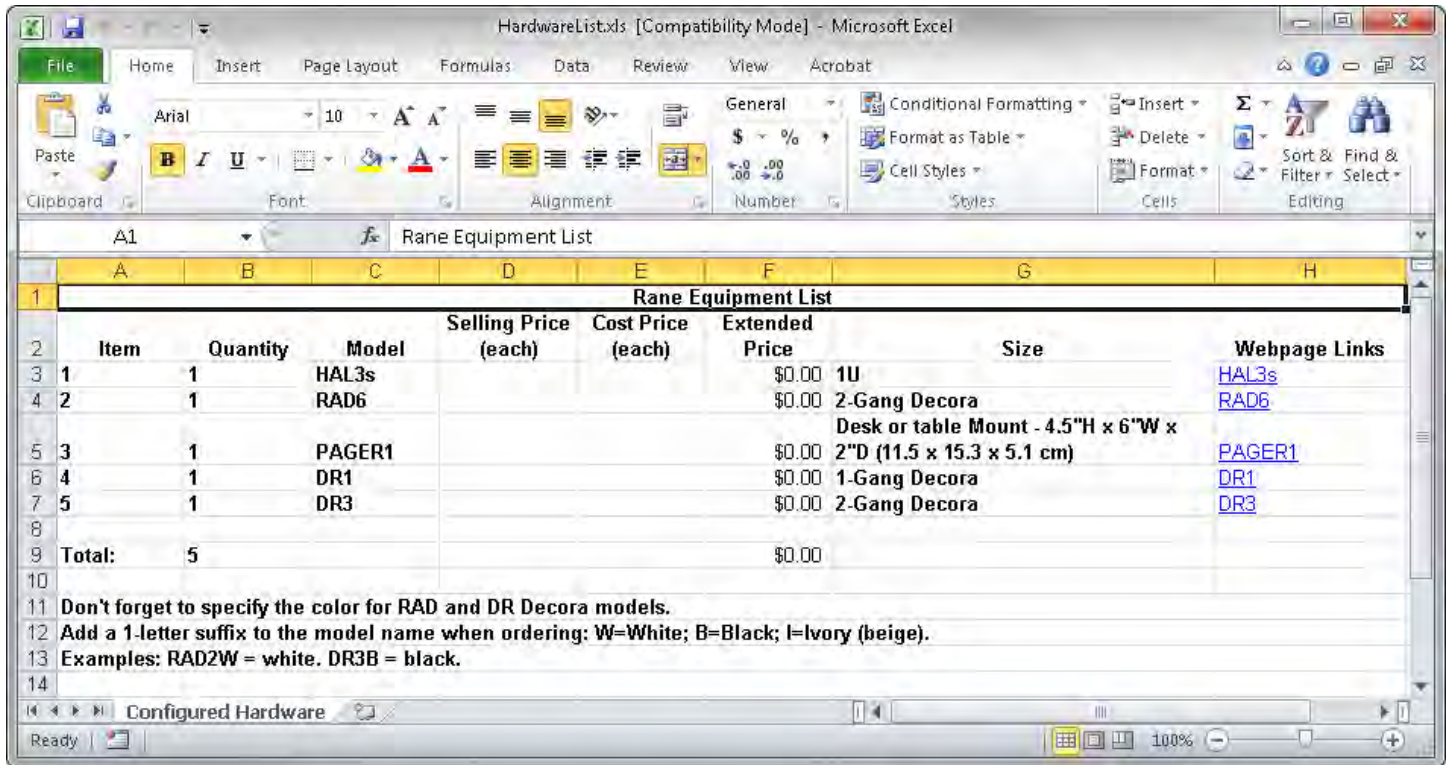
**Limiter Blocks:** These help prevent amplifier clipping and protect loudspeaker drivers. The Threshold defaults at -6 dB with a checked Auto Mode to take care of Attack and Release times. Set this block with live audio during installation. Don't limit audio constantly or it will sound bad and could overload and overheat the speakers. Read the [Dynamics Processors RaneNote](#) to understand how Limiters work.

**Output Blocks:** These are the final stage that set the volume at the orange blocks that connect to your amplifier inputs. An Output block looks like and has the same functions as a Level block. Rane always recommends balanced inputs if they are available (positive, negative and ground wires). If the amplifier only has unbalanced connectors (like RCA inputs), then use the + and ground terminals on the HAL3s outputs. Locate the amplifier nearby and keep cables short (under 10 feet [3 meters]). The [Sound System Interconnection RaneNote](#) can help you properly wire the HAL3s to other audio connectors at installation time.



## Finish Up

If you've finished the design stage, Halogen can generate your Rane shopping list. Click the Hardware tab, and **Generate List** in the toolbar at the top. It will generate a spreadsheet showing quantities, models, price columns, and links to online product details. Copy and paste this into another spreadsheet, or use this as the starting point for the other equipment in your proposal.



Halogen can help make your RAD installations look professional by making labels for you. You already entered the names of the inputs early in your design. In the Hardware Workspace, click the Generate Labels button at the top. Choose the same color that you chose your RADs. Click **Create**, and then **View**, and your PDF viewer opens for you to print. Cut out the labels and insert them behind the little windows at the top of each RAD. After the label is in, trim the top edge with an Exacto blade for the cleanest look. Printing and installing labels before going to your job site really helps when you have lots of RADs.

	Input Channels		Output Channels	
RAD: Bar Audio Model: RAD6 Path: HAL3s - RAD Port 1	Trim to finish	Trim to finish	Trim to finish	Trim to finish
	Cable L	Cable R	Bar L	Bar R

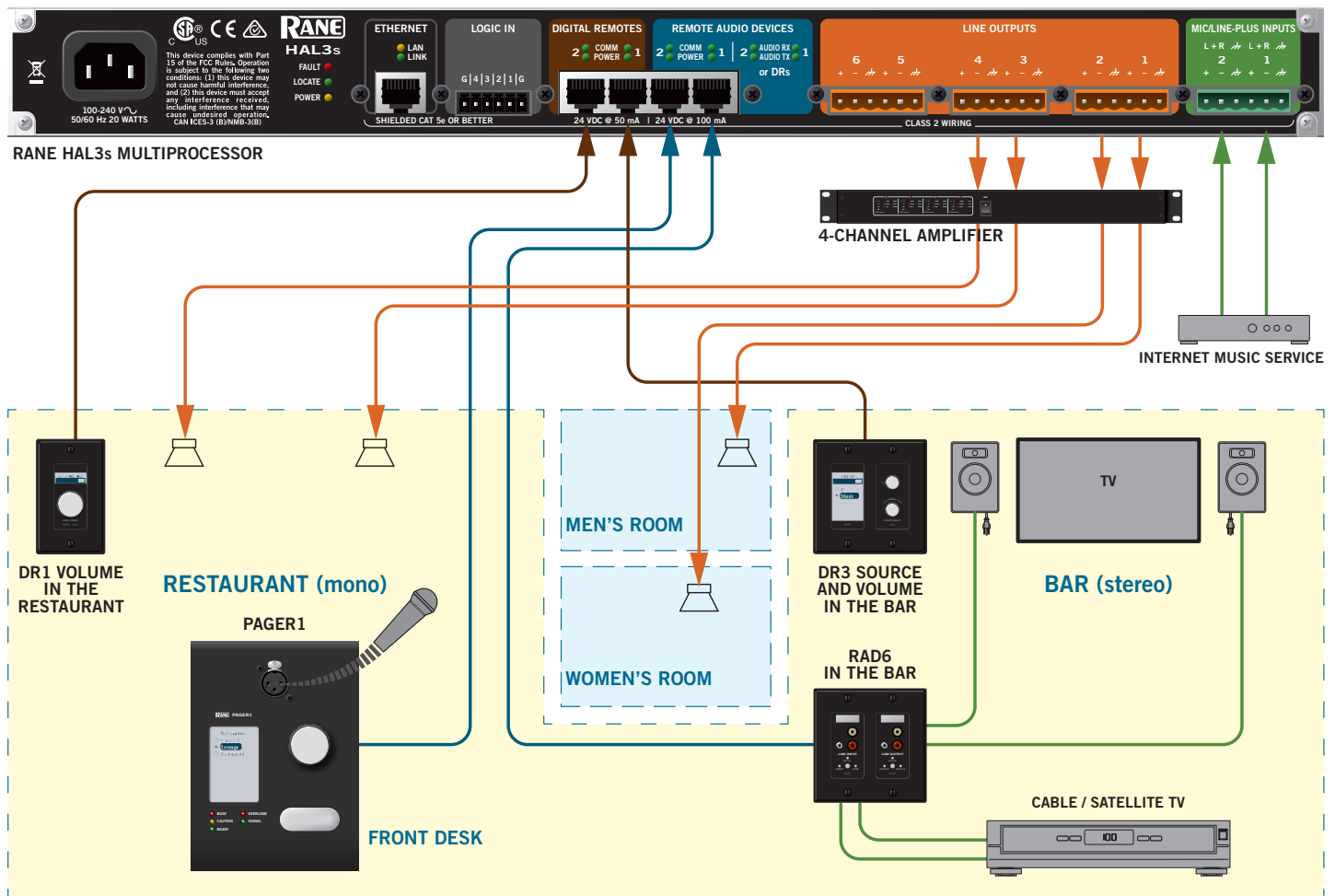
### Cutting Instructions:


1. Cut along lines as needed. [safety goggles not included]
2. Slip paper behind the Lexan window on a RAD of your choosing.
3. Align until it looks swell.
4. Trim the exposed edge with an Exacto blade or box knife. [Avoid placing such blades in your airplane carry-on baggage.]

### Additional info:

- Paper size once cut to fit (but trim in place, otherwise it's hard to align):  
 0.96 inches by 0.96 inches [in USA, Liberia and Myanmar]  
 24.5 mm by 24.5 mm [everywhere else]
- Recommended paper weight: no more than 24 lb (90 g/m<sup>2</sup>) or caliper thickness no more than 5 mils (0.127 mm)
- Ivory RAD color: Pantone 7500
- Black is 100% black or none more black
- White is 0% black
- To adjust fonts and colors: download and edit the Microsoft Word Template found at [rane.com/hal](http://rane.com/hal)

Here's the floor plan and wiring diagram.



Rane hopes this tutorial makes Halogen easier than you thought it would be. If you get stuck, or don't understand a control, use Halogen's built-in Help system by clicking on the blue-circled question mark  at the top of any block.

If you have a system you need help with, our HAL specialists at the Rane Factory in Mukilteo, Washington are ready to help by email or phone. Call 425-355-6000, Monday through Friday, 8:30 am to 5 pm Pacific Time.

[rane.com/hal](http://rane.com/hal)