

RPM 44, Your Table is Ready: Multi-Zone Restaurant with Paging

Before You Begin

The Storage (offline) configurations for all of the examples discussed in this article are available from Rane's website (<http://www.rane.com>). Download or copy these files to your computer, and add them to a new or existing Project.

NOTE: Drag Net 3.0 or higher is required to view these device configurations. The latest version of Drag Net can be downloaded from <http://www.rane.com/dragnet.html>

To add Storage configurations to a Project:

- 1) Right-click anywhere within the Project window and choose **Add File(s)**.

- or -

Click on the **File** menu, choose **Project**, then select **Add File(s)**.
- 2) Browse to the location of the Application Example files (.rx file extension, where xx is the device type - .r88 for RPM 88, as an example) on your hard drive.
- 3) Select one or more of the files from the list, then choose **Open**. The configurations then appear as entries under the Storage folder of the Project window.

Drag Net Files Required

- Restaurant_1.r44
- Restaurant_1.r44.mem
- Restaurant_1.r44.lnk.xml

Concepts Presented in this Example

- Introduction to the AGC block's Music and Speech settings.
- Using the Priority Auto Mixer/Ducker to manage multiple sources in a multi-zone installation.
- Assigning Priority Auto Mixer/Ducker inputs to VIP logic inputs for push-to-talk functionality.
- Using Rane VR 2 "pot-on-a-wall" remotes to control Levels.



Problem

A restaurant is divided into four zones: Lobby, Dining Room, Lounge and Kitchen. A Host paging microphone is used in the Lobby, and a DJ/announce microphone is used in the Lounge. Both microphones are activated using momentary push-to-talk switches. The Lounge has a mono TV feed for News and Sporting events. The fourth input to the system is a mono feed from a Satellite music service.

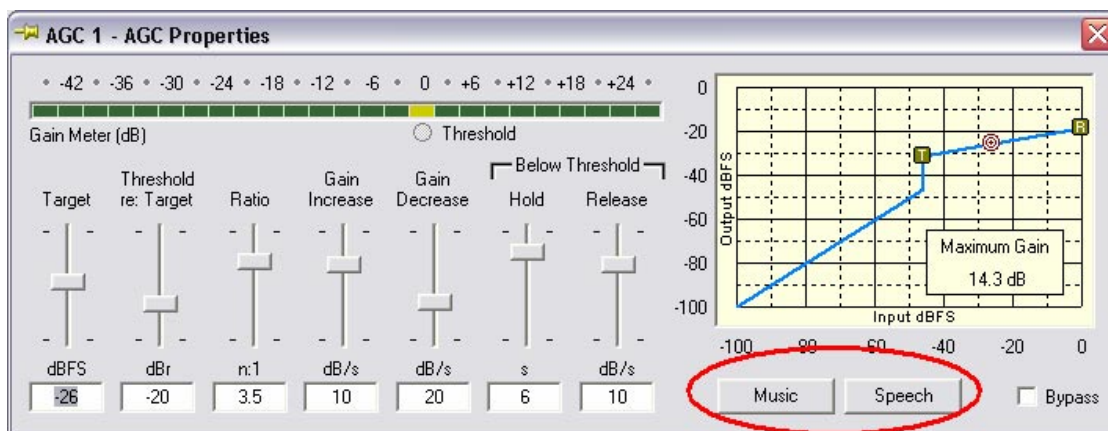
Signal processing (EQ, Limiting, etc.) for each zone is required. Each zone uses a simple “pot-on-a-wall” arrangement for remote volume control. The user also wants all source selection to happen automatically. For example, when the TV is turned on in the Lounge it must automatically duck (turn down) the Satellite music feed. This sounds like a job for the Priority Auto Mixer/Ducker...

Solution

A single RPM 44 handles all inputs and outputs. The Priority Auto Mixer/Ducker block handles all signal routing.

Can You Hear Me Now? Good.

Each input passes through an AGC (Automatic Gain Control) block to automatically compensate for any level variations between talkers or music selections. The AGC block can seem a bit daunting at first, hence the inclusion of **Music** and **Speech** default settings (Figure 1). Clicking one of these buttons sets all parameters to a good starting point, from which you can flavor to taste - often just a quick tweak of the **Target** and **Threshold** parameters does the trick.



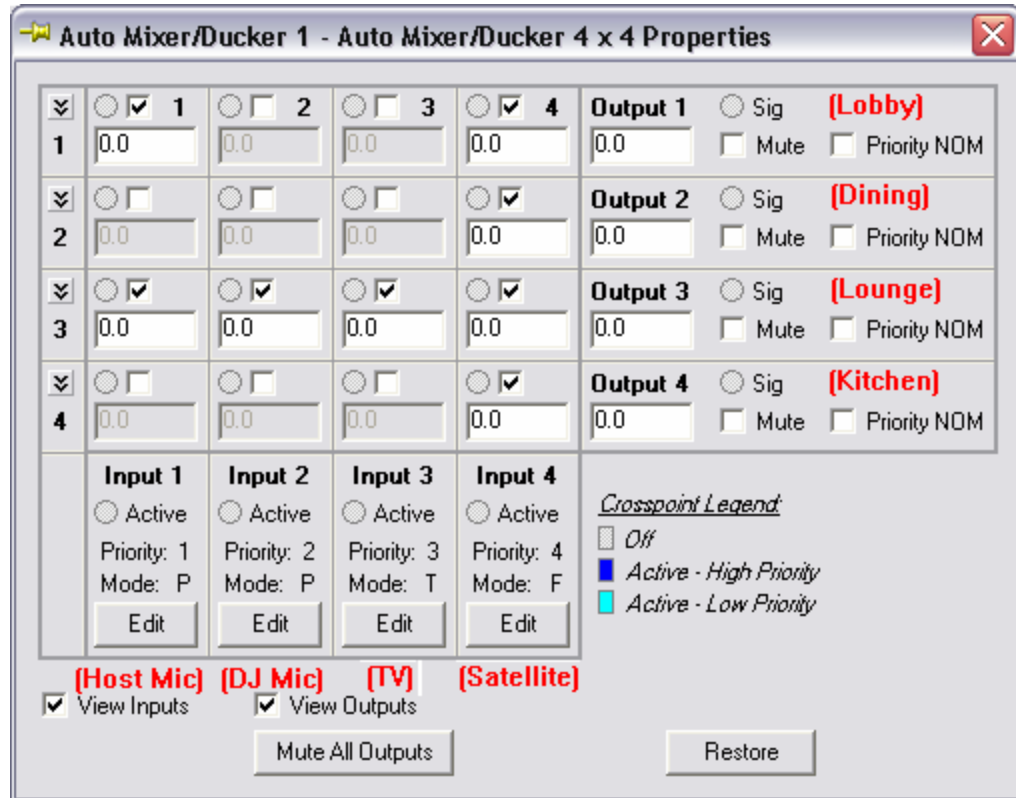
■ Figure 1 AGC Properties dialog. The Music and Speech default settings are a good starting point when commissioning a system.

Full Service Routing

The Priority Auto Mixer/Ducker shown in Figure 2 handles signal routing for all zones.



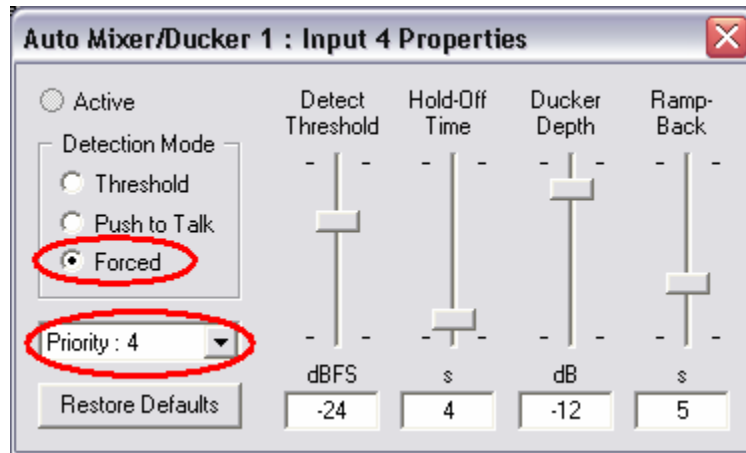
Input 1 of the Auto Mixer/Ducker is the Host paging microphone (“Smith, party of five...”) and is routed to the Lobby (Output 1), and Lounge (Output 3). Inputs 2 and 3 - the Lounge microphone and TV feed, respectively - are routed to the Lounge only. Input 4 is the Satellite music feed, which is distributed to all zones. The Host and Lounge microphones are not routed to the Dining Room or Kitchen, so as not to disturb patrons or staff.



■ Figure 2 Priority Auto Mixer/Ducker assignments.

Let's work backwards through our audio sources. Clicking on the **Edit** button for Input 4 shows the Satellite music feed is given a relatively low priority - Priority 4 (Figure 3). The Detection Mode is set to **Forced** so the input is always active. This doesn't necessarily mean that music will always be heard; since the Satellite music is a low priority input it will be ducked by any input with a higher priority assigned to the same zone (output). The **Threshold**, **Hold-Off**, **Ducker Depth** and **Ramp-Back** parameters are not used when Forced detection mode is selected.

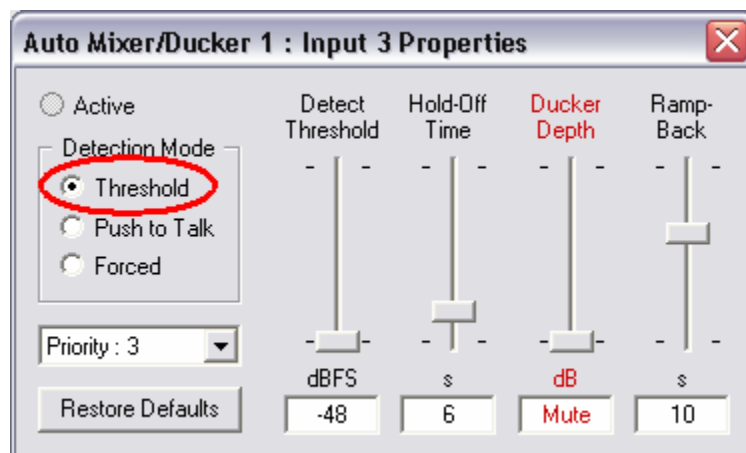




■ Figure 3 Auto Mixer/Ducker Satellite music input settings.

The TV source (Input 3) is set to Priority 3. The Detection Mode is set for automatic **Threshold** detection. The **Detect Threshold** is set to -48 dBFS, which is easily exceeded when the TV is turned on and audio is present. A **Hold-Off Time** of 6 seconds is adequate for the relatively short pauses encountered in television broadcasts. The **Ducker Depth** is set to Mute, causing any lower priority inputs (Satellite) to be automatically replaced when the TV becomes active. The **Ramp-Back** time of 10 seconds yields a smooth transition from TV back to Satellite music. The input parameters for the TV feed are shown in Figure 4.

Important Note: **Ducker Depth** determines the amount of attenuation applied to the crosspoint levels of active, lower priority inputs, when the selected input becomes active. Similarly, **Ramp-Back** determines how fast a ducked signal returns to its previous setting once a higher priority input becomes inactive. These parameters are NOT the amount the selected input is ducked by, nor the time it takes for the selected input to ramp back after being ducked. Confused? Keep reading, it should become clear.

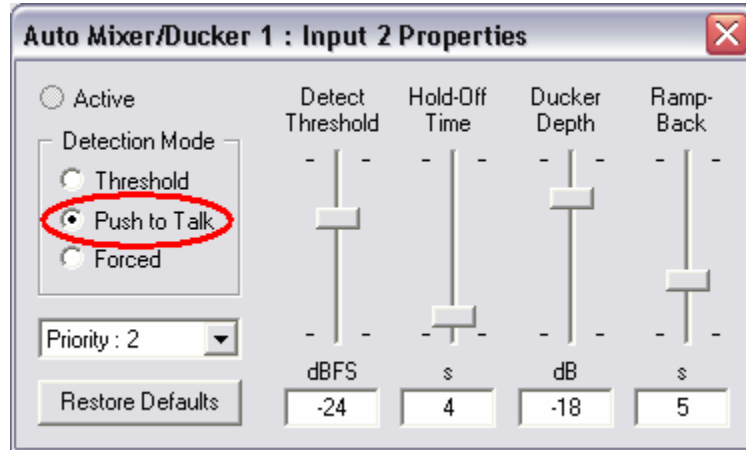


■ Figure 4 Auto Mixer/Ducker TV audio input settings.

The Lounge microphone (Input 2) is set to Priority 2 and **Push to Talk** Detection Mode is selected. An upcoming section discusses how to associate Auto Mixer/Ducker inputs with VIP logic inputs. The **Detect Threshold** and **Hold-Off Time** parameters are not used with Push to Talk mode.

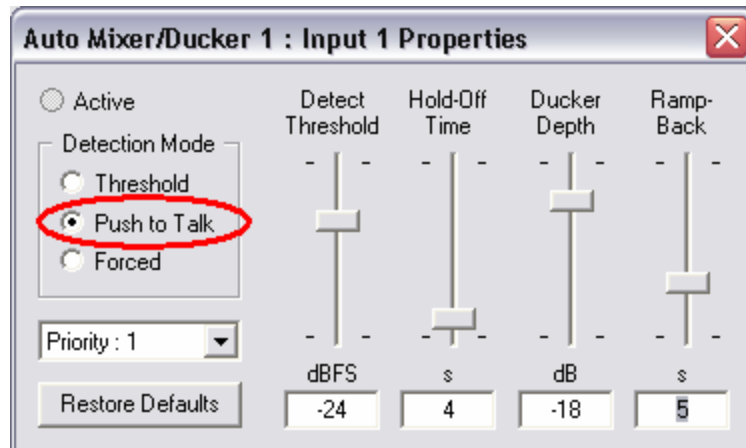


All lower priority inputs assigned to the same zone (e.g., TV or Satellite in the Lounge) are ducked by -18 dB when the Lounge microphone is active. A **Ramp-Back** time of 5 seconds allows the relatively mild ducker depth of 18 dB to transition smoothly back to the TV or Satellite music source once the Hold-Off time has elapsed. The input parameters for the Lounge mic are shown in Figure 5.



■ Figure 5 Auto Mixer/Ducker Lounge mic input settings.

The Host paging microphone is set to Priority 1, so customers in the Lobby and Lounge can hear announcements regardless of the racket the DJ using the Lounge mic is making. All other input parameters for the Host mic are identical to those of the Lounge mic.



■ Figure 6 Auto Mixer/Ducker Host mic input settings.

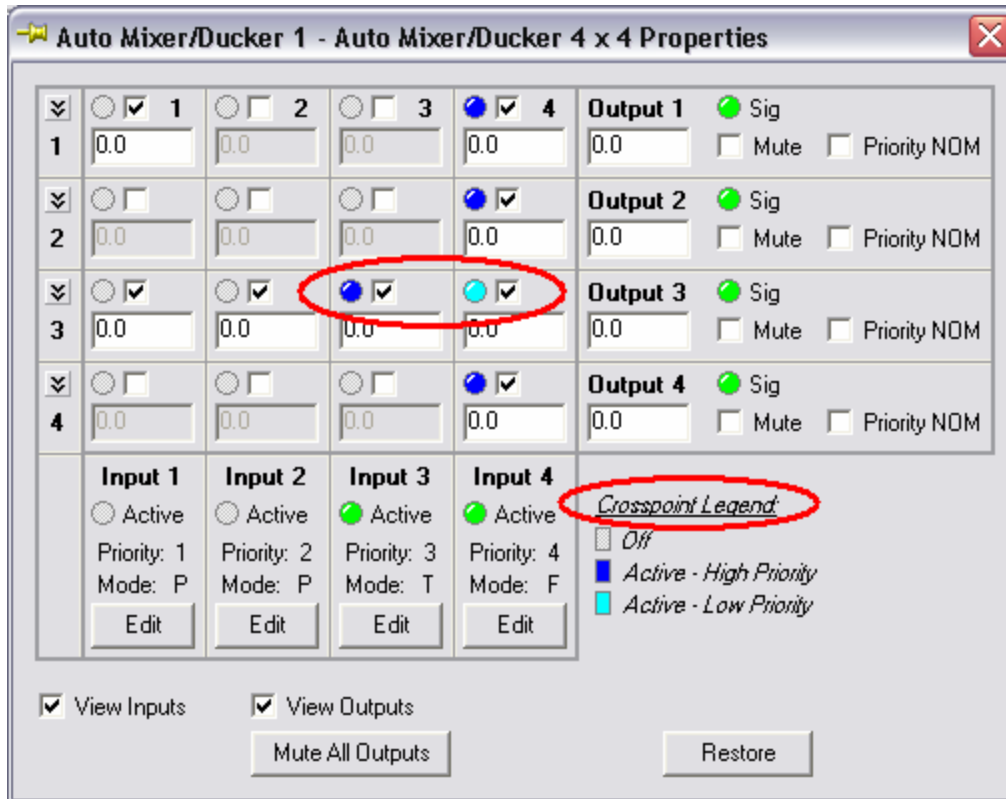
Stand at the Crossroads, but Duck at the Crosspoints

Okay, so now that we've set up our Auto Mixer/Ducker inputs what are the real interactions and implications when audio is flowing through the system? Let's consider a few cases, keeping the previously described Input Priority assignments in mind.

Case 1: Satellite Music playing in all zones, then the TV is turned on.



The TV exceeds the detection threshold and becomes the active input with the current highest priority assigned to the Lounge, thereby muting the Satellite music in the Lounge; the music feed to the Lobby, Dining Room and Kitchen are unaffected because the signal is ducked at the Auto Mixer/Ducker's matrix *crosspoint*, not at its input. If the signal ducked at the Auto Mixer/Ducker input it would affect all zones equally, leaving the customer in the Dining Room wondering why the music suddenly became REALLY quiet...



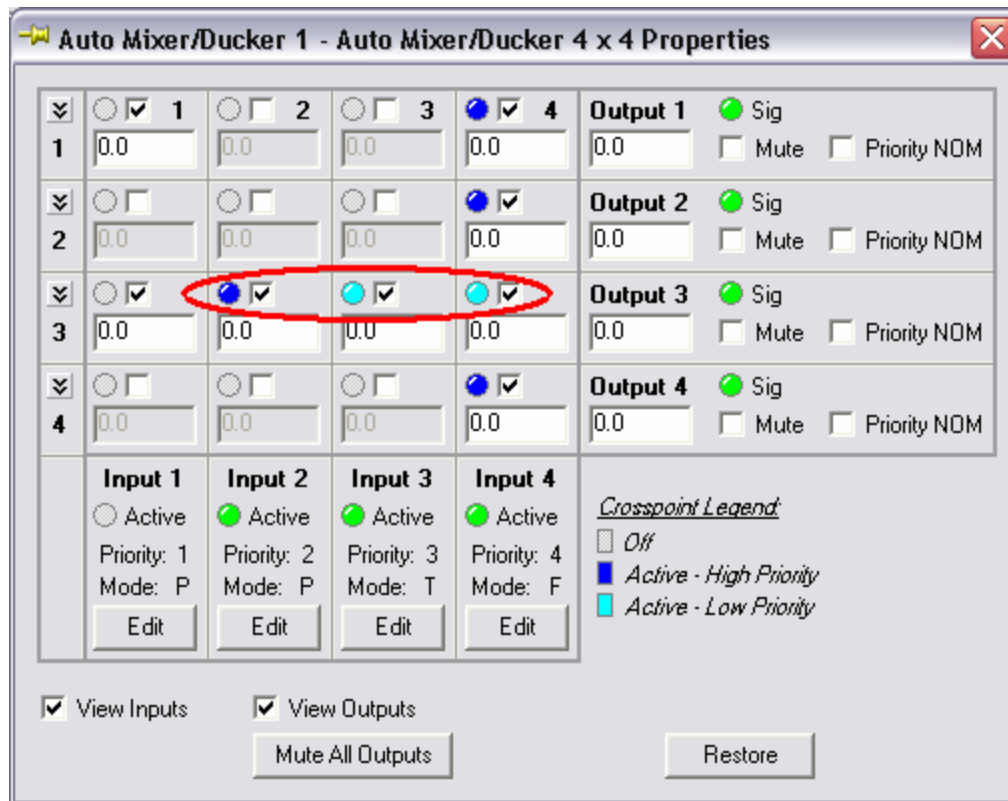
■ Figure 7 TV is Active - High Priority in the Lounge

On a Live device, each crosspoint is displayed using one of three colors depending on an assigned input's state. Unassigned or inactive crosspoints are grey. Currently active crosspoints with the highest relative priority in each zone are dark blue. Currently active crosspoints with a lower relative priority – i.e., they're being ducked by one or more higher priority inputs – are light blue.

Case 2: The Lounge mic is activated.

The Lounge mic ducks the TV (if it's active), or the Satellite music feed by -18 dB. The Lobby and Dining Room are unaffected.



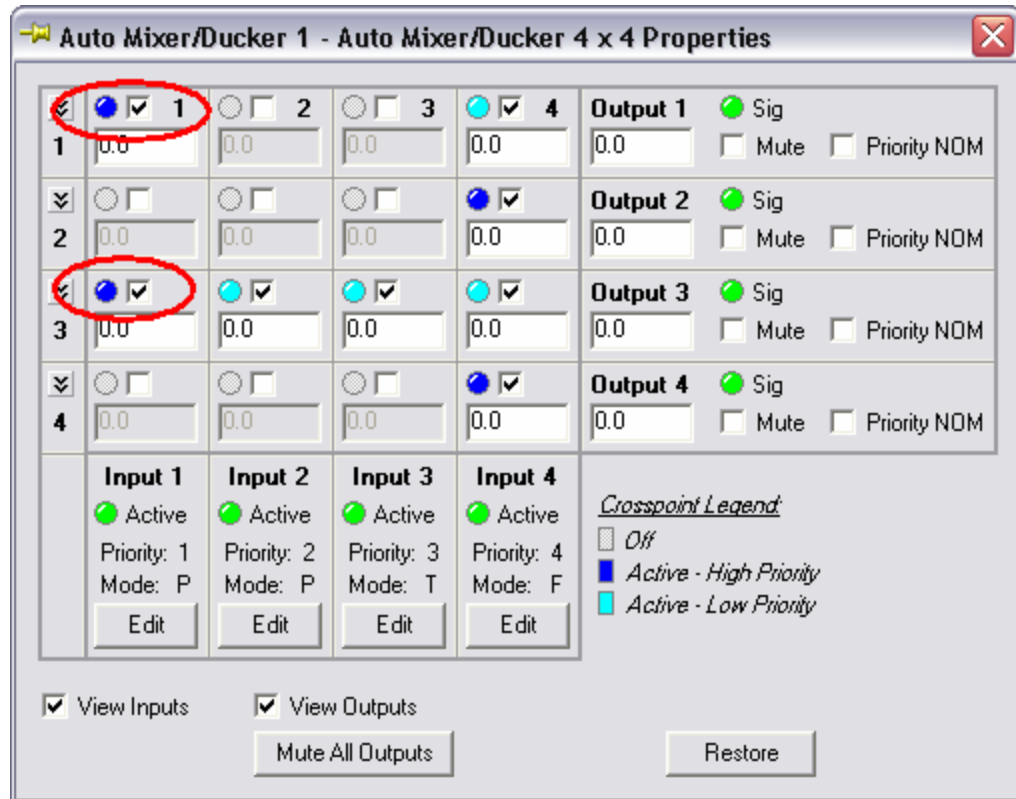


■ Figure 8 Lounge mic is Active - High Priority in the Lounge

Case 3: The Host mic is activated.

The Satellite feed in the Lobby is ducked by -18 dB so the page can be heard. One of two things happens in the Lounge: if the Lounge mic is off, the TV or Satellite (whichever is currently active, high-priority) is ducked by -18 dB (Figure 9). If the Lounge mic is active (and therefore ducking the TV or Satellite), it is ducked by -18 dB and, since ducker depths are cumulative, the TV or Satellite is ducked an additional -18 dB (-36 dB total: -18 dB due to the Lounge mic, -18 dB due to the Host mic).



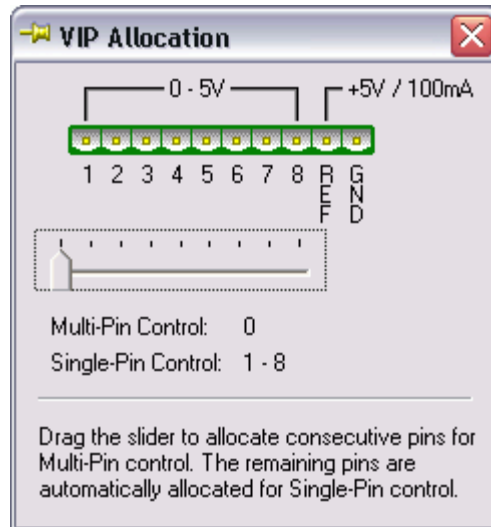


■ Figure 9 Host mic is Active - High Priority in Lobby and Lounge.

Is this thing on? Using VIPs for push-to-talk

The RPM 44's Versatile Input Port (VIP) features eight logic inputs, each capable of performing contact-closure Preset Recall (Multi-pin control) or 0-5V continuous, single-pin control. Switch to the Remote Map and double-click the **Edit VIP Properties** entry within the VIP section of the Parameter Window to display the VIP Allocation dialog (Figure 10). Since we have no need to use multi-pin control mode to recall Presets, the eight logic inputs have been allocated for single-pin control by moving the slider all the way to the left.





■ Figure 10 VIP Allocation Properties dialog.

To assign an Auto Mixer/Ducker input to one of the VIP pins, simply create a group (by dragging and dropping elements from the Parameter Window into an empty Group) containing both the input and the desired VIP pin. Figure 11 shows the Host mic (Input 1) assigned to VIP pin 7; VIP pin 8 is assigned to the Lounge mic (Input 2). These inputs become active whenever the associated VIP pin is in its grounded state.



■ Figure 11 Auto Mixer/Ducker Input push-to-talk control assignments.

Pot-on-a-Wall Panacea

Fancy remotes are not needed for this installation, so we chose to use simple “pot-on-a-wall” devices, namely Rane VR 2s. Each remote is wired to its own VIP pin and assigned to a specific Level control, as shown in Figure 12



The figure displays four distinct control panels, each representing a different level of a building. Each panel is structured as follows:

- Panel 1:** Labeled '1' for the 'Lobby - Level'. It includes a 'VIP Single-Pin [1] - Level' control. Below the level names are the labels 'Group', 'Parameter Linking', and a 'Master >>' button.
- Panel 2:** Labeled '2' for the 'Dining - Level'. It includes a 'VIP Single-Pin [2] - Level' control. Below the level names are the labels 'Group', 'Parameter Linking', and a 'Master >>' button.
- Panel 3:** Labeled '3' for the 'Lounge - Level'. It includes a 'VIP Single-Pin [3] - Level' control. Below the level names are the labels 'Group', 'Parameter Linking', and a 'Master >>' button.
- Panel 4:** Labeled '4' for the 'Kitchen - Level'. It includes a 'VIP Single-Pin [4] - Level' control. Below the level names are the labels 'Group', 'Parameter Linking', and a 'Master >>' button.

■ Figure 12 Pot-on-a-wall Level control assignments (Remote Map).

