

# Vortex<sup>®</sup> / VSX<sup>™</sup> 8000 Integration

Application Note

Polycom Installed Voice  
Business Group

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# INTRODUCTION

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This application note is designed to give instruction as to the setup and integration of the VSX™ 8000 to a Vortex® Device.

## CONNECTING THE VSX 8000 INPUTS AND OUTPUTS

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In order to send and receive audio to the Polycom VSX 8000 codec, you need to connect the system as shown in Figure 1 and described below.

1. Connect one of the Outputs of the Vortex device to the mixer Input of the codec. By default, Outputs A, B, or C of the Vortex device are mix-minus versions of the Inputs A, B, or C signals, respectively. Any of these signals can be used with the default factory preset on the Vortex. If you are using Polycom InstantDesigner™, choose the input and output that InstantDesigner recommends.
2. Connect the auxiliary line level output of the codec to one of the line level inputs of the Vortex device (Inputs A-D). If you have more line inputs, you may use one of the Mic/Line level inputs instead of a line level input, but you need to disable all processing on that Mic/Line input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.
3. Optionally connect the RS-232 interface between the VSX 8000 and the Vortex device.

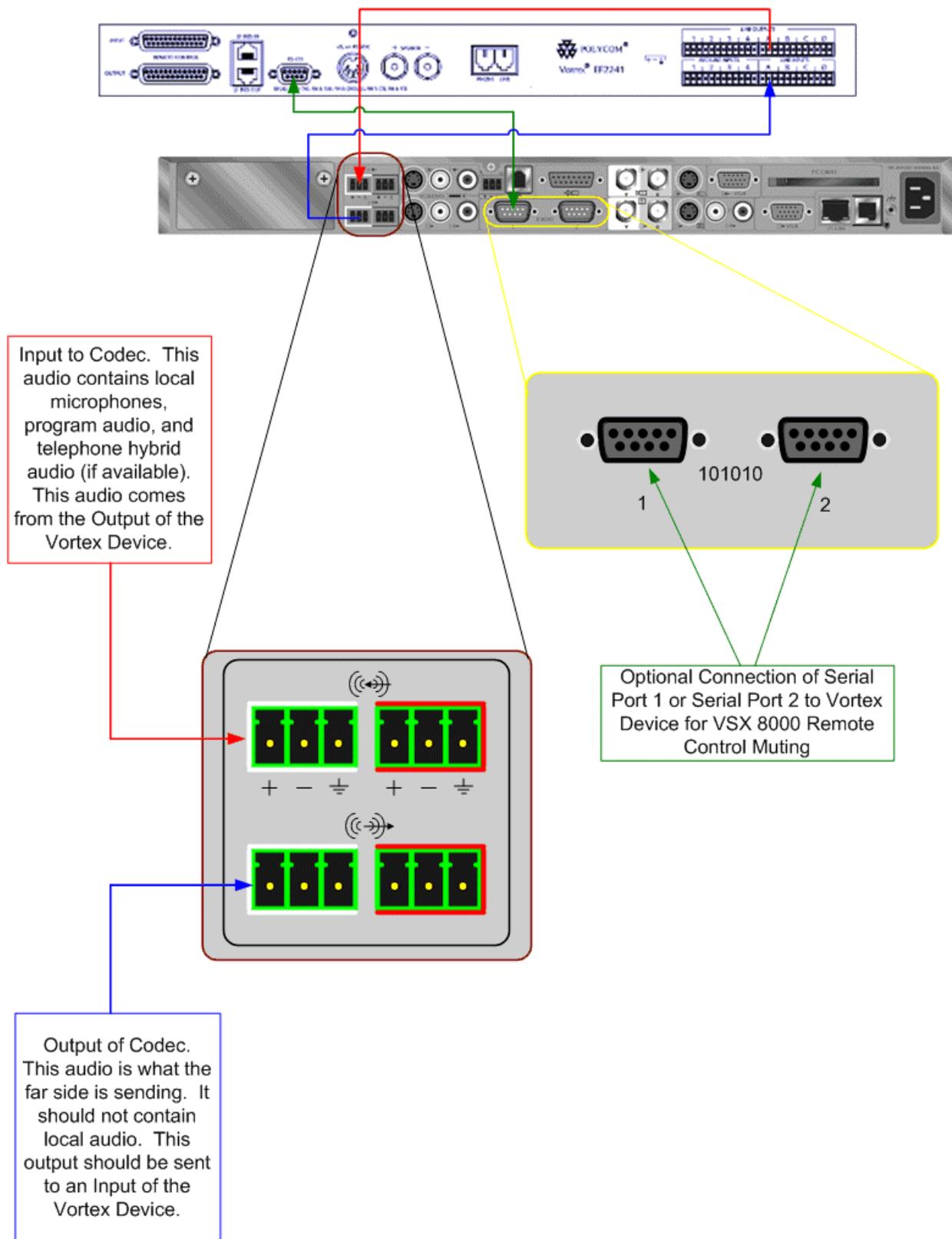


Figure 1. Connecting the VSX 8000 to a Vortex EF2241.



You may use either the left or right channels for sending and receiving monaural audio to the VSX 8000. For stereo operation, both the left and right channels must be used.



Please follow our instructions for wiring the Vortex device to the codec (See the section **WIRING FROM VSX 8000 TO VORTEX DEVICE**). Failure to do so may induce hum and ground noise into the signals sent and received from the codec.

## ENABLING THE VSX 8000 TO WORK WITH A VORTEX DEVICE

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1. Connect a video monitor to Video Output 1 of the codec.
2. On the VSX 8000 User Interface, go to SYSTEM, ADMIN SETTINGS, AUDIO SETTINGS, and select NEXT for Page 2. Select the LINE INPUT option for the Input Type. Set the Level setting to 5.
3. (Optional) Enable the VSX 8000 to control the Vortex Device by setting Serial Port 1 or Serial Port 2 to Vortex Mixer. In the VSX 8000 User Interface, go to SYSTEM, ADMIN SETTINGS, GENERAL SETTINGS, SERIAL PORTS. For the appropriate port, select VORTEX MIXER for RS-232 Mode. Verify that the baud rate of the VSX 8000 matches the baud rate of the Vortex Device. See the page CONTROLLING A VORTEX DEVICE VIA THE VSX8000 for more information.
4. Once that is completed, make sure that the Codec Input to the Vortex Device is assigned to the appropriate AEC Reference signal if the VSX 8000 will be used in Mono mode (Standard AEC Operation). If using InstantDesigner to create the configuration settings for the Vortex, the reference will be set automatically. For Stereo Mode, please refer to the STEREO AEC OPERATION section.

# GAIN STRUCTURE

## MICROPHONE LEVELS

For wired microphones, the input gain on the Vortex is dependent on the sensitivity of the microphone as well as the typical distance from the talker to the microphone.

Table 1. Recommended microphone settings.

Type of Microphone	Average Level
Tabletop	Mic Mode, 15 dB
Ceiling	Mic Mode, 25 dB
Podium	Mic Mode, 10 dB
Gooseneck	Mic Mode, 5 dB
Wireless	Depends on the receiver*

\*Some wireless receivers transmit audio at line level (approximately 0 to -10 dB) and others transmit at mic level (approximately -30 dB). Based on the transmit level, you may need to apply gain in the Vortex Device. For example, if a wireless receiver's nominal transmit level is -10 dB, you will need to apply +10 dB on the input of the Vortex Device to achieve unity (0 dB) gain.

In order to set the gain appropriately, we recommend leaving all processing enabled and having someone talk into the microphone. Have another person watch the levels in Conference Composer or via the front panel of the Vortex device. You want the speech to light up the first yellow LED (0 dBu) and flicker the second yellow LED (+3 dB) during normal conversation. This level indicates that the Vortex device has a good level for processing while having about 20 dB of headroom.

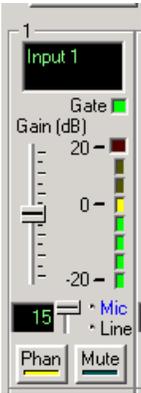


Figure 2. The microphone level adjustment control within Conference Composer.

## GAIN STRUCTURE FOR LINE INPUT SOURCES

Once the external devices have been wired to the Vortex Device, the Input and/or Output gain of the Vortex Device needs to be set to match the nominal level of the external devices. Here is a table that references the types of connectors to the proper input / output level of a Vortex Device:

Table 2. Recommended input and output gain settings based on connection type

Connector Type	Input Gain	Output Gain
RCA	+10 dB	-10 dB
1/8 inch	+10 dB	-10 dB
XLR	0 dB	0 dB
Phoenix / Terminal Block	0 dB	0 dB

The issue of nominal levels will affect the gain structure of the Vortex Device. Devices that have RCA and 1/8 inch style connectors are normally designed to operate with a nominal level of .3 Vrms. The Vortex Device is designed to operate with a nominal input and output level of .775 Vrms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB. Therefore, the inputs of the Vortex that receive consumer level outputs need to be set to +10 dB in order to achieve a unity gain. The outputs of the Vortex will be about 10 dB too high for the consumer level equipment and, in turn, need to be set to -10 dB to avoid clipping and to maintain enough headroom in the consumer level devices.

The Input gain of a Vortex device that is connected to a SoundStation VTX 1000 should be set to +10 dB. The Output gain of a Vortex device that is connected to a SoundStation VTX 1000 should be set to -10 dB. The Input and Output gains of a Vortex Device that is connected to a VSX 8000 and any other balanced devices should be set to 0 dB.

## TESTING THE AUDIO INPUTS AND OUTPUTS

1. Go to SYSTEM, DIAGNOSTICS, AUDIO, AUDIO METER and then speak into one of the microphones. Your level should be around 0 dB on the BALANCED IN meter. You may also use the loop-back feature to listen to your own audio in the local room. That feature is under SYSTEM, DIAGNOSTICS, NETWORK, NEAR END LOOP.
2. Go to SYSTEM, DIAGNOSTICS, AUDIO, SPEAKER TEST to listen to a codec-generated 400 Hz tone.

## CONTROLLING A VORTEX DEVICE VIA THE VSX 8000

When connected via an RS-232 cable to the VSX 8000, a Vortex Device can be controlled via the Mute button of the Remote Control of the VSX 8000. When the Mute button is pushed to mute the

VSX8000, the VSX 8000 will send \*\*\*MACROX180 to Serial Port 1 or Serial Port 2. When the Mute button is pushed again to unmute the VSX 8000, the VSX 8000 will send a \*\*\*MACROX181 to Serial Port 1 or Serial Port 2.

Also, the Volume Up / Down buttons on the remote control also can control a Vortex Device. The Volume Up button will send a \*\*\*MACROX183 command to Serial Port 1 or 2 and the Volume Down button will send a \*\*\*MACROX184 command to Serial Port 1 or 2.

Here are three steps to follow in order to set up this functionality:

## 1.) ENABLE VORTEX MIXER AS AN RS-232 OPTION IN THE VSX 8000

In the VSX 8000 User Interface, go to SYSTEM, ADMIN SETTINGS, GENERAL SETTINGS, SERIAL PORTS. For the appropriate port, select Vortex Mixer for RS-232 Mode.

Each Serial Port of the VSX8000 is wired as DTE. This means that the VSX 8000 transmits on Pin 2 and receives on Pin 3. In order to connect the VSX 8000's serial port to the Vortex Device's serial port, a "straight through" serial cable should be used.

Below is a diagram that shows how to make this connection:

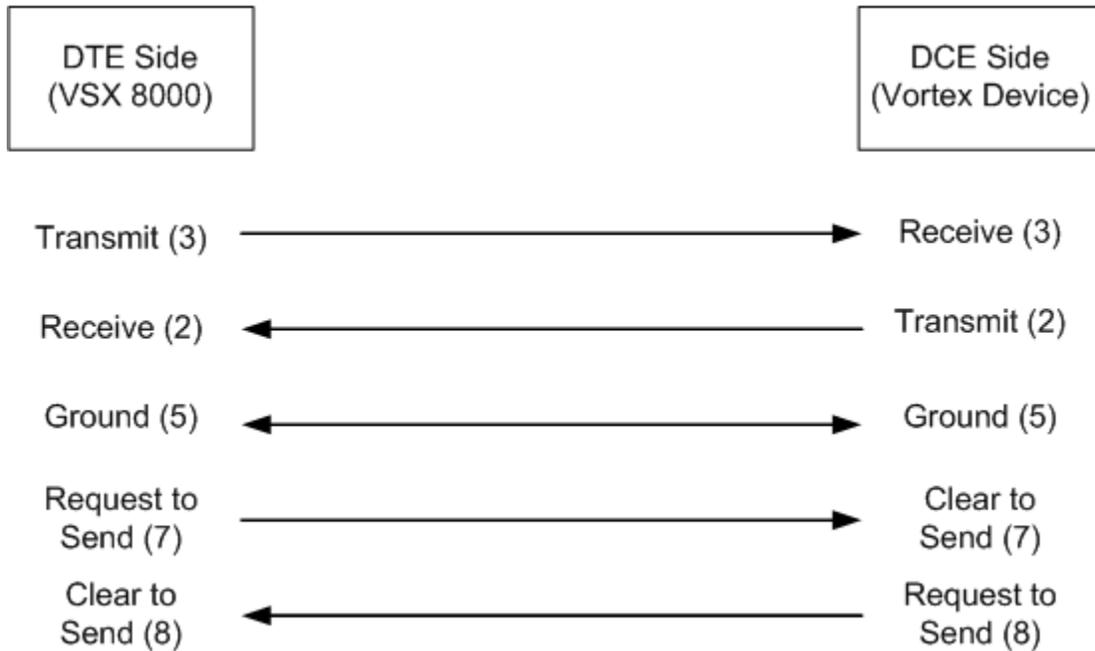


Figure 3. The RS-232 serial port wiring diagram.

Match the baud rate and flow control requirements of the VSX 8000 device to the baud rate and flow control settings of the Vortex Device. (When communicating with a Vortex device at baud rates higher than 9600, we recommend the use of flow control between the RS-232 device and the Vortex Device). Go to Vortex System Settings on the LCD display, select the Enter key, and use the Up or Down buttons to scroll until you see Baud Rate. Once that parameter is set, use the Up or Down buttons to scroll until you see Flow Control.

## 2.) CREATE THE APPROPRIATE MACROS IN THE VORTEX DEVICE(S)

### MUTING

As previously mentioned, the Mute button on the Remote Control sends a command to execute Macro 180 and Macro 181. Here is an example of how to write Muting Macros for a system with 4 microphones and an EF2241:

First, label Macro 180 as "Mute" and Macro 181 as "Unmute":

180*	Mute		
181*	Unmute		

Figure 4. Macro labeling.

Next, insert the muting command for Input 1. Click Insert Command, Input, 1, Mute, On:

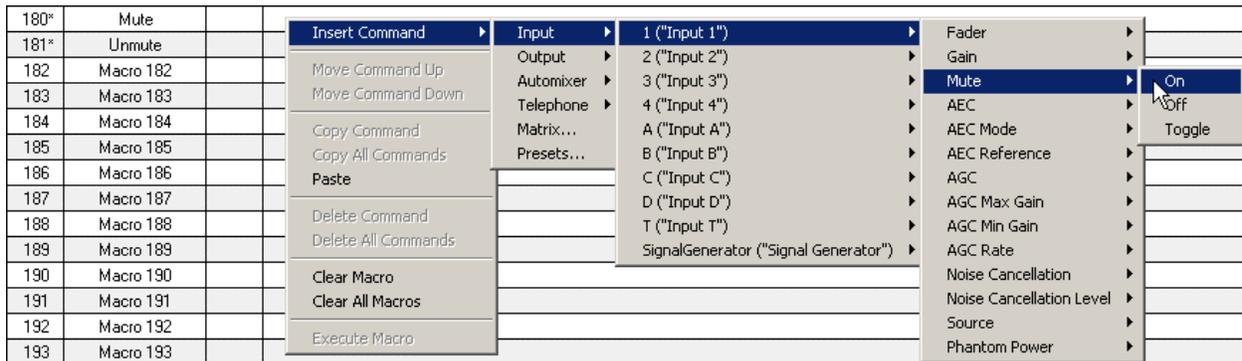


Figure 5. Inserting the muting command.

If you are successful, you should see this in the window:

180*	Mute	1	Input 1 ("Input 1") Mute = On
181*	Unmute		

Figure 6. Result of inserting the macro definition.

Repeat this process for Inputs 2-4. When you are done, you should see this:

180*	Mute	1	Input 1 ("Input 1") Mute = On
		2	Input 2 ("Input 2") Mute = On
		3	Input 3 ("Input 3") Mute = On
		4	Input 4 ("Input 4") Mute = On
181*	Unmute		

Figure 7. Mute macro definition.

For Macro 181, repeat the same steps as for Macro 180 except that the Mute for Inputs 1-4 should be off. When you are finished, you should see this:

180*	Mute	1	Input 1 ("Input 1") Mute = On
		2	Input 2 ("Input 2") Mute = On
		3	Input 3 ("Input 3") Mute = On
		4	Input 4 ("Input 4") Mute = On
181*	Unmute	1	Input 1 ("Input 1") Mute = Off
		2	Input 2 ("Input 2") Mute = Off
		3	Input 3 ("Input 3") Mute = Off
		4	Input 4 ("Input 4") Mute = Off

Figure 8. Unmute macro definition.

If there are more inputs on other Vortex Devices in your system that need to be muted and

unmuted, repeat these steps for the appropriate inputs.

## VOLUME CONTROL (CODEC ONLY)

To use the Vortex Device to perform volume control, first set the VSX 8000's Balanced Outputs to FIXED. On the VSX 8000 User Interface, go to SYSTEM, ADMIN SETTINGS, AUDIO SETTINGS, and select NEXT twice for Page 3. Select the FIXED option for Output Mode. Set the Level setting to 5.

As previously mentioned, the Volume Up / Down buttons on the Remote Control send a command to execute Macro 183 and Macro 184. Here is an example of how to write a Volume Control Macro for a system that has the VSX 8000 connected to Input A of a Vortex Device. Inside the Vortex Device, Input A is routed to Output B and to R1. The Macros should control the cross-point gains to Output B and to the R1 reference bus so that the room gain stays consistent for increasing volume.

First, label Macro 183 as "Volume Up" and Macro 184 as "Volume Down":

183*	Volume Up		
184*	Volume Down		

**Figure 9. Volume macro labels.**

Next, insert the cross-point muting command for Input 1. Click Insert Command, Matrix, A ("From VSX 8000"), B ("To Amplifier"), Gain, +, 1 dB:

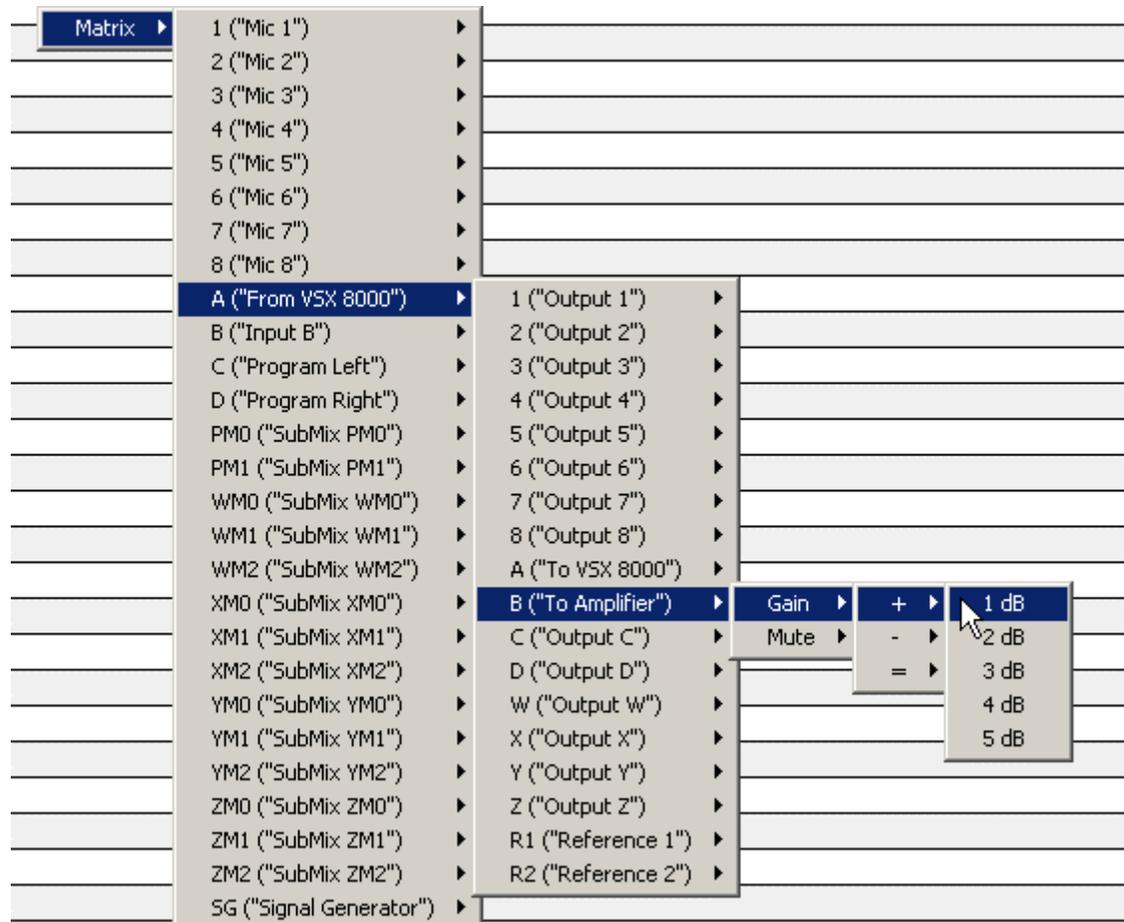


Figure 10. Volume increment macro creation.

If you are successful, you should see this in the window:

183*	Volume Up	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = + 1 dB
184*	Volume Down		

Figure 11. Result of selecting the volume increment option.

Next, add the cross-point control for R1. Click Insert Command, Matrix, A ("From VSX 8000"), R1 ("Reference 1"), Gain, +, 1 dB:

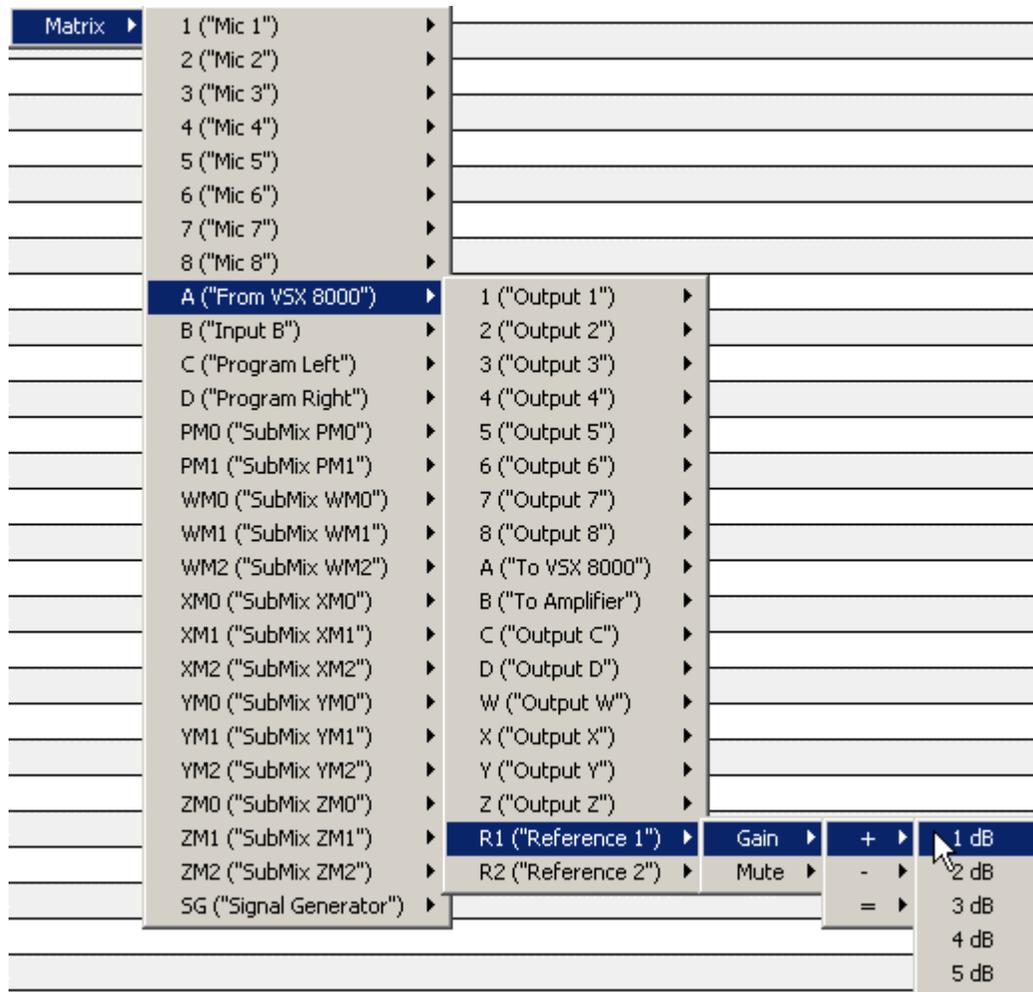


Figure 12. Incrementing the gain in the reference.

If you are successful, you should see this in the window:

183*	Volume Up	1	Matrix[Input A ("From VSX 8000"),Output B ("To Amplifier")] Gain = + 1 dB
		2	Matrix[Input A ("From VSX 8000"),Output R1 ("Reference 1")] Gain = + 1 dB
184*	Volume Down		

Figure 13. Volume up macro definition.

For Macro 184, repeat the same steps as for Macro 183 except that the increments for each cross-point should be -1 dB. When you are finished, you should see this:

183*	Volume Up	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = + 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = + 1 dB
184*	Volume Down	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = - 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = - 1 dB

Figure 14. Volume up and down macros.

## VOLUME CONTROL (CODEC AND TELEPHONE)

If the Vortex Device to be controlled has a built in telephone hybrid (such as the Vortex EF2241) or if the Vortex Device is linked via the EFBus to another Vortex Device that does have a built in telephone hybrid, the Volume Up / Down buttons of the VSX 8000 remote control can also control that volume.

Here is an example of how to write a Volume Control Macro for a system that has the VSX 8000 connected to Input A of a Vortex Device and a built-in telephone hybrid on Input T. Inside the Vortex Device, Input A and Input T are routed to Output B and to the reference R1. The Macros should control the cross-point gains for Inputs A and T to Output B and to the R1 reference bus so that the room gain stays as the volume is increased.

First, follow the directions given in the VOLUME CONTROL (CODEC ONLY) section to setup Macros 183 and 184. Next, assign the Input T to Output B cross-point at +1 dB and the Input T to Output R1 cross-point at +1 dB to Macro 183. If you are successful, you should see the following:

183*	Volume Up	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = + 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = + 1 dB
		3	Matrix(Input T ("From Phone"),Output B ("To Amplifier")) Gain = + 1 dB
		4	Matrix(Input T ("From Phone"),Output R1 ("Reference 1")) Gain = + 1 dB

Figure 15. Adding the phone volume to the Volume up macro definition.

Finally, assign the Input T to Output B cross-point at -1 dB and the Input T to Output R1 cross-point at -1 dB to Macro 183. If you are successful, you should see the following:

183*	Volume Up	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = + 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = + 1 dB
		3	Matrix(Input T ("From Phone"),Output B ("To Amplifier")) Gain = + 1 dB
		4	Matrix(Input T ("From Phone"),Output R1 ("Reference 1")) Gain = + 1 dB
184*	Macro 184	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = - 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = - 1 dB
		3	Matrix(Input T ("From Phone"),Output B ("To Amplifier")) Gain = - 1 dB
		4	Matrix(Input T ("From Phone"),Output R1 ("Reference 1")) Gain = - 1 dB

Figure 16. Adding the phone volume to the Volume up and down macro definitions.

### 3.) VERIFY THAT THE VSX 8000 REMOTE CONTROL PROPERLY CONTROLS THE VORTEX DEVICE

If there is only one Vortex Device, go to System, Diagnostics, Audio, Audio Meter in the VSX 8000 User Interface and first verify that there is activity on the Balanced In meter by talking into one of the microphones. Next, press the Mute button on the Remote Control. Now, there should be no activity on the Balanced In meter. Press the Mute button again and you should see meter activity on the Balanced In meter.

To test the Volume Up / Down buttons, turn on the signal generator in the VSX 8000 User Interface. Go to System Info, Diagnostics, Audio, Speaker Test.

If there are multiple linked Vortex Devices in the system you can perform the same series of steps, or you can connect your computer to the RS-232 port of the second Vortex device, run Conference Composer, autoscan, and open a Console Window in Conference Composer by right clicking on the Comm port in the left side of the window and select Console as shown in Figure 17.

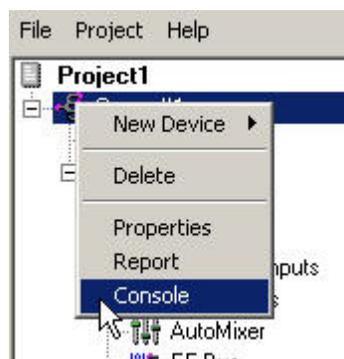


Figure 17. Open the console window by right clicking on the device chain and selecting Console.

Now, push the Mute button on the VSX 8000's Remote Control. If the Macro programming was successful, you should see activity in the Console Window:

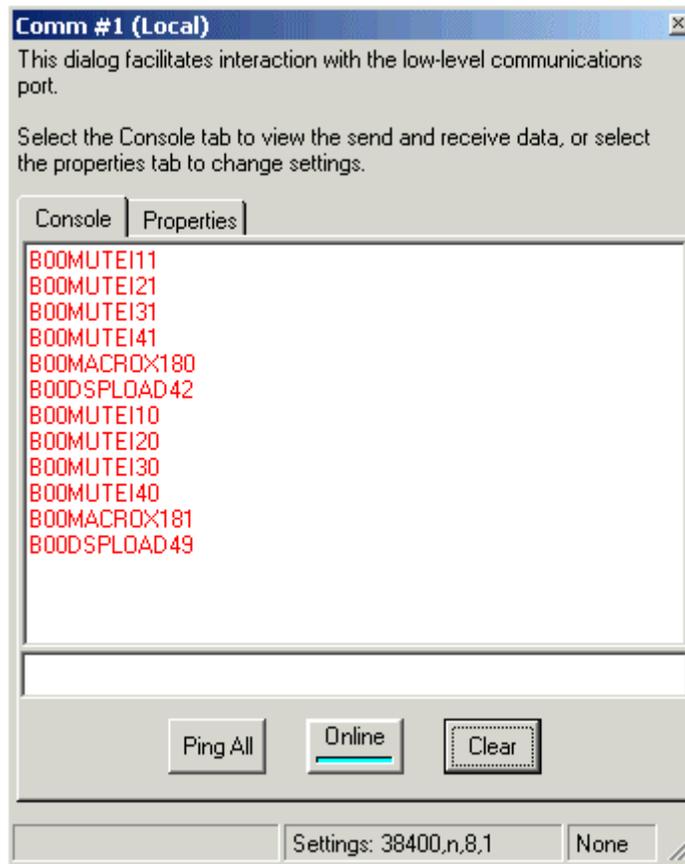


Figure 18. The console window.

Repeat the process for the Volume Up and Volume Down buttons if you have assigned commands to Macro's 183 and 184.

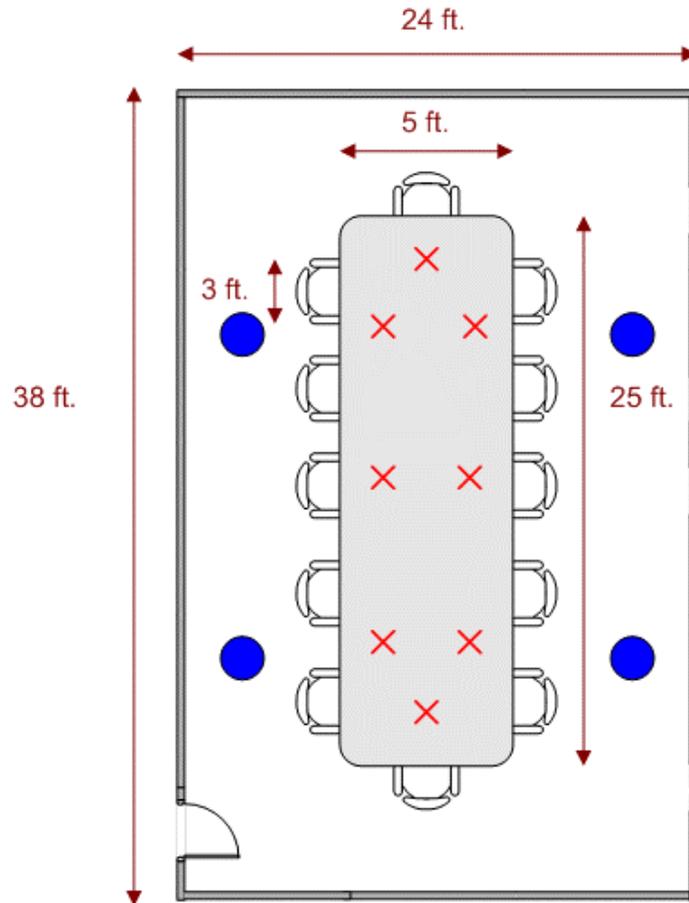
## STANDARD AEC OPERATION

The default operation for the VSX 8000 and Vortex System is as a mono video codec connected via a single line level input and output to the Vortex Device.

## EXAMPLE

### INTRODUCTION / ROOM LAYOUT

This example illustrates a medium sized conference room with dimensions of 38 ft. X 24 ft. The ceiling height is 10 ft. The conference room that has 8 tabletop microphones and 4 ceiling loudspeakers. The system includes an EF2280 matrix mixer, a VSX 8000 video codec, and a stereo program audio source. There is no sound reinforcement in this room.



Key:

Table Microphone:	X
Ceiling Loudspeaker:	●

General Notes:

Ceiling height is 10 feet. Ceiling loudspeaker sensitivity is assumed to be at least 85 dB 1W/1M and the coverage angle is assumed to be at least 120 degrees. Microphones are assumed to have a cardioid pickup pattern

Figure 19. Typical conference room layout.

## SYSTEM LAYOUT

The audio components for the room are 8 tabletop microphones, 1 EF2280, 1 VSX 8000 video codec, 1 program audio source, and 4 ceiling loudspeakers. The video codec will use Input A / Output A. The program audio will use Inputs C and D. The amplifier will use Output B.

On the VSX 8000, either the left or right input / outputs can be used for mono operation.

We will assume that the microphones, amplifier, program audio, and VSX 8000 have balanced connections.

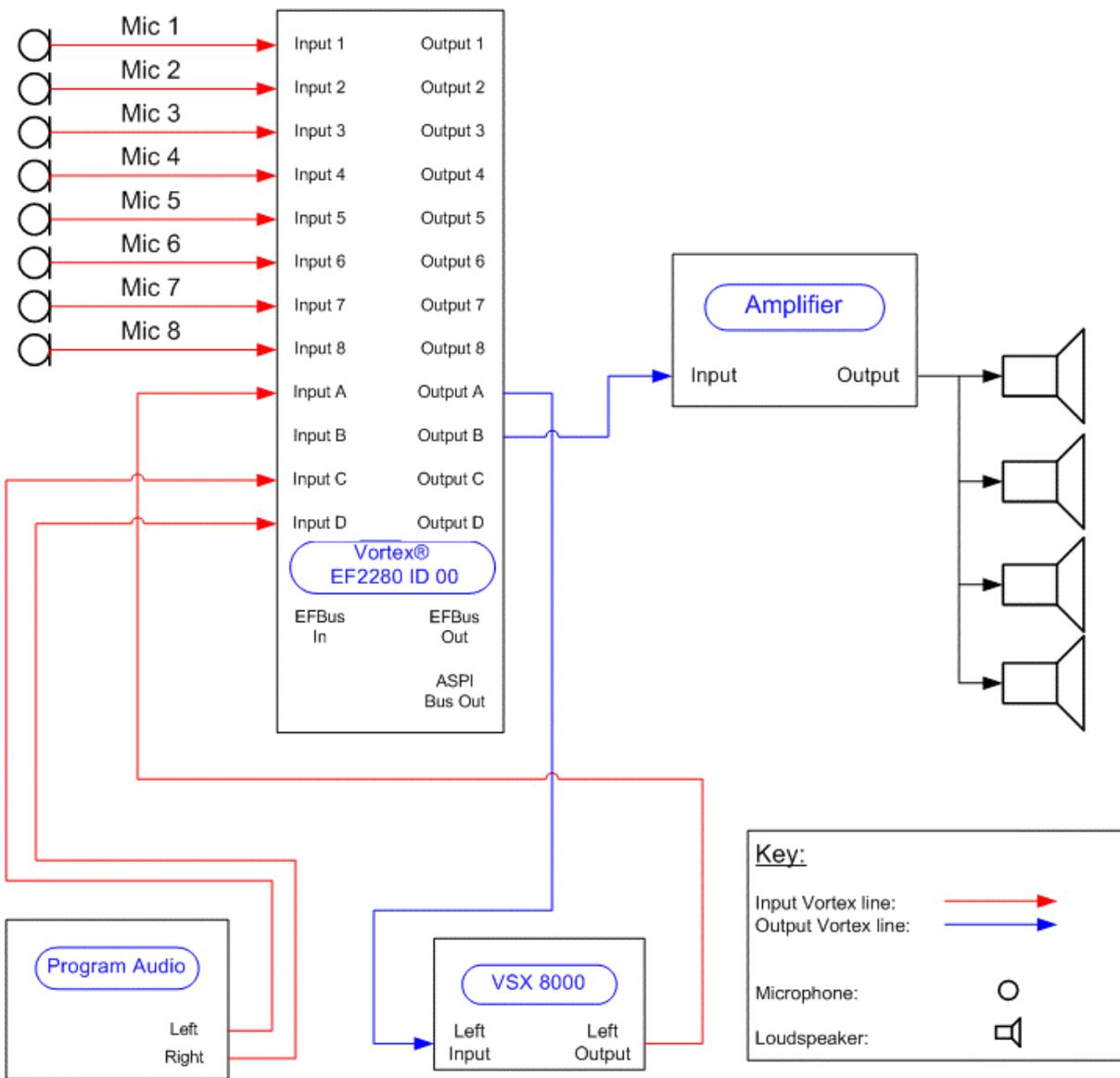


Figure 20. Vortex design with VSX 8000.

## CONFERENCE COMPOSER LAYOUT

Most of the default parameters of the EF2280 will satisfy our design. However, we will need to change the Matrix Mixer and Presets to satisfy our design goals.

### Matrix Mixer

The matrix mixer will need to be changed from the default settings in order use Output A for the VSX 8000 and Output B for the Amplifier. Inputs 1-8 need to be assigned to Output A so that the people on the far end of a VSX 8000 call can hear the local microphones. The cross-points are colored blue to indicate that they are automixed to Output A.

Inputs C and D are attenuated by 3 dB to Outputs A, B, and R1 to account for a stereo signal being routed to a mono output. Since the two signals may not be correlated (i.e. have no time relationship between each other), then when they are added together, the summed signal will be +3 dB higher.

In this example, we will assume that the VSX 8000, program audio, and amplifier are designed to send and/or receive a professional level signal. Therefore, Inputs A, C, and D and Outputs A and B will be set to 0 dB. For more information as to the reasoning behind the gain levels, please see the Gain Structure for Amplifiers and Other Sources page.



**Local Microphones should NEVER be included the reference signal!**

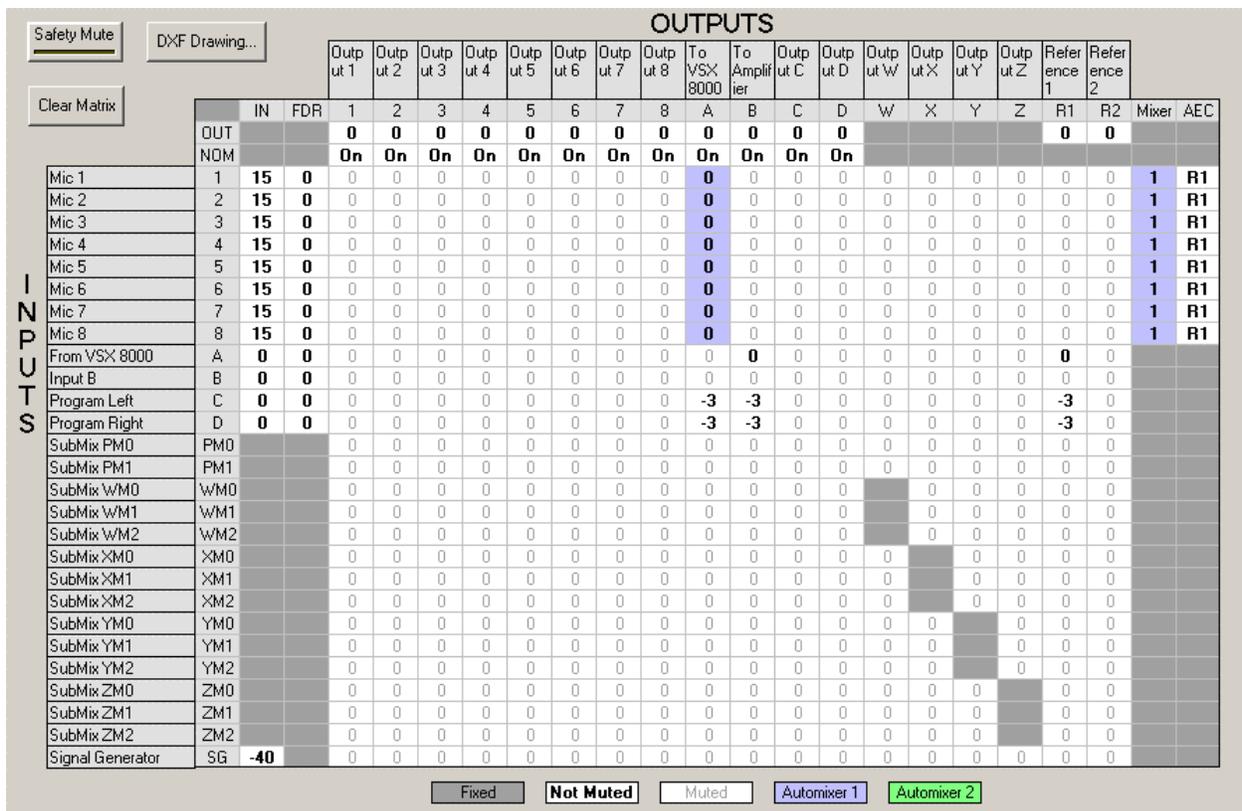


Figure 21. Matrix for the VSX 8000 and Vortex integration.

## Presets

In order to permanently save the settings to the EF2280, you must use a User Preset. Here, we've used PRESET 16, although you may use any of the User Presets 16-47 to accomplish this task. We've also renamed USER PRESET 16 to CONFERENCE ROOM. Once the User Preset has been saved, you must also change the POWER ON PRESET to reflect the proper Preset that you want the unit to power up to if the unit loses AC power.

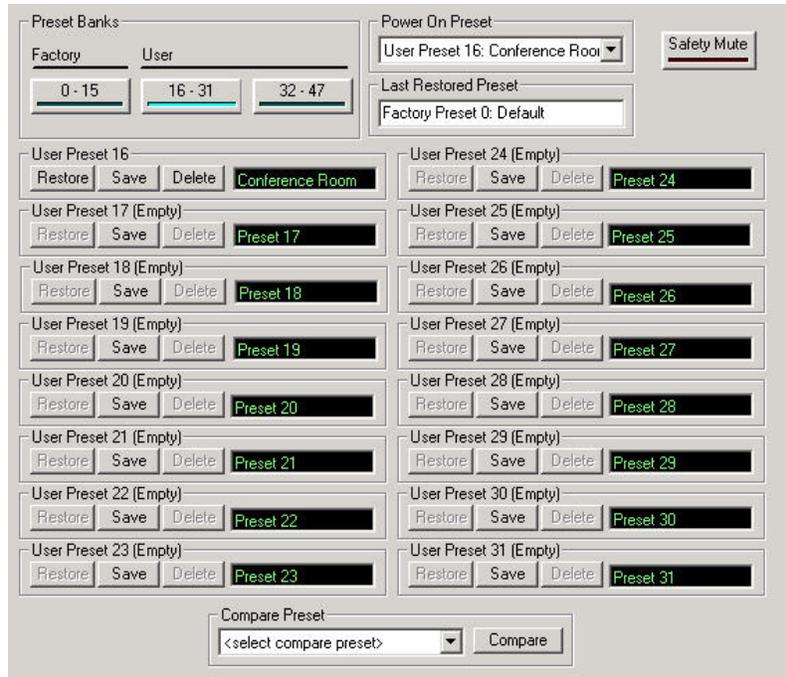


Figure 22. Preset page within Conference Composer.

# STEREO AEC OPERATION

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This section explains what steps need to be taken in order to send a stereo microphone signal from a Vortex Device to the VSX 8000. In stereo operation, the Vortex Device is responsible for the acoustic echo cancellation, automixing, and matrix mixing for the microphones and the loudspeakers.

## VORTEX INTEGRATION WITH THE VSX 8000 STEREO AEC

A Vortex can be used as a stereo echo canceller provided that the outputs that will feed the loudspeaker and the internal AEC references are setup properly.

When the stereo far-end speech is reproduced in the local room, the matrix mixer will be used to create a local mix such that the stereo channel separation (difference) is about 10 dB. This difference is also applied to the R1 and R2 outputs so that the AEC can use both sources as a reference.

Here are the Vortex tips when using the Stereo AEC of the VSX 8000 (see Figure 26 for the resulting matrix configuration):

- Assign the left channel codec input to the R1 output in the Vortex Device. Assign the right channel codec input to the R2 output in the Vortex Device.
- Assign the left channel codec input to the left channel output of the Vortex Device that will feed the left channel of the stereo amplifier. Assign the right channel codec input to the right channel output of the Vortex Device that will feed the left channel of the stereo amplifier.
- Assign the left channel codec input to the right channel output that will feed the right channel of the amplifier. Use the matrix mixer to create a crosspoint at -10 dB that is unmuted. Assign the left channel codec input to the R1 output also with a crosspoint attenuation of -10 dB that is unmuted.
- Assign the right channel codec input to the left channel output that will feed the left channel of the amplifier. Use the matrix mixer to create a crosspoint at -10 dB that is unmuted. Assign the right channel codec input to the R2 output also with a crosspoint attenuation of -10 dB that is unmuted.
- The microphones that are located on the left side of the room should only feed the left output of the Vortex Device that will be connected to the left channel input of the codec. Likewise, the microphones that are located on the right side of the room should only feed

the right output of the Vortex Device that will be connected to the right channel input of the codec. Any microphones that are considered in the center should feed both left and right outputs with a crosspoint attenuation of -3 dB.

- Each microphone on the left side of the room should have its AEC set to R1. Each microphone on the right side of the room should have its AEC set to R2.
- In the VSX 8000 User Interface, go to SYSTEM, ADMIN SETTINGS, AUDIO and select ENABLE POLYCOM STEREO SURROUND.
- Any stereo audio that is sent into the VSX 8000 will be reproduced on opposite channels at the far end when sent to a Polycom stereo-compatible codec, i.e. left channel input will be reproduced via the right loudspeaker and right channel input audio will be reproduced via the left channel loudspeaker. This is done so that audio will track the video image on the far side.

Here are some room design tips when using the Stereo AEC of the VSX 8000:

- We do not recommend using a channel separation any lower than -10 dB (e.g., -15 dB would not be recommended).
- Most small to medium rooms with table microphones should work well with a channel separation of 10 dB. These types of rooms would probably have a STI or RaSTI of .75 or higher.
- For larger rooms or rooms with ceiling microphones, the channel separation may have to be lowered (for instance to -5 dB) in order to prevent residual echo (echo that is never fully removed by the AEC). If residual echo remains an issue, the VSX and Vortex may have to be configured in mono mode (see the section entitled *Standard AEC Operation*).
- The use of front-of-room mounted stereo loudspeakers will enhance the stereo image.
- Distributed ceiling loudspeakers can also be used in addition to the front-of-room loudspeakers to provide broader coverage. Note that the ceiling loudspeakers should be assigned to a "left" or "right" zone and should be powered by a multi-channel amplifier. The use of output delay with the ceiling loudspeakers can also enhance the stereo realism. An approximation is 1 millisecond per foot delay to the signals that will be sent to the distributed loudspeakers. The delay can be added from the Vortex outputs page within Conference Composer.

An advantage to using the Vortex Device's internal AEC is that you can continue to use a Vortex telephony interface, such as the Vortex EF2201, when operating in stereo with the VSX 8000 because a separate mono mix can be created in the Vortex matrix mixer to feed the telephony interface separately.

# EXAMPLE

## INTRODUCTION / ROOM LAYOUT

This example illustrates a 38 ft. X 24 ft. X 10 ft. conference room that has 7 tabletop microphones and 2 stereo loudspeakers. The system includes an EF2280 matrix mixer, a VSX 8000 video codec, and a stereo program audio source. There is no sound reinforcement in this room.

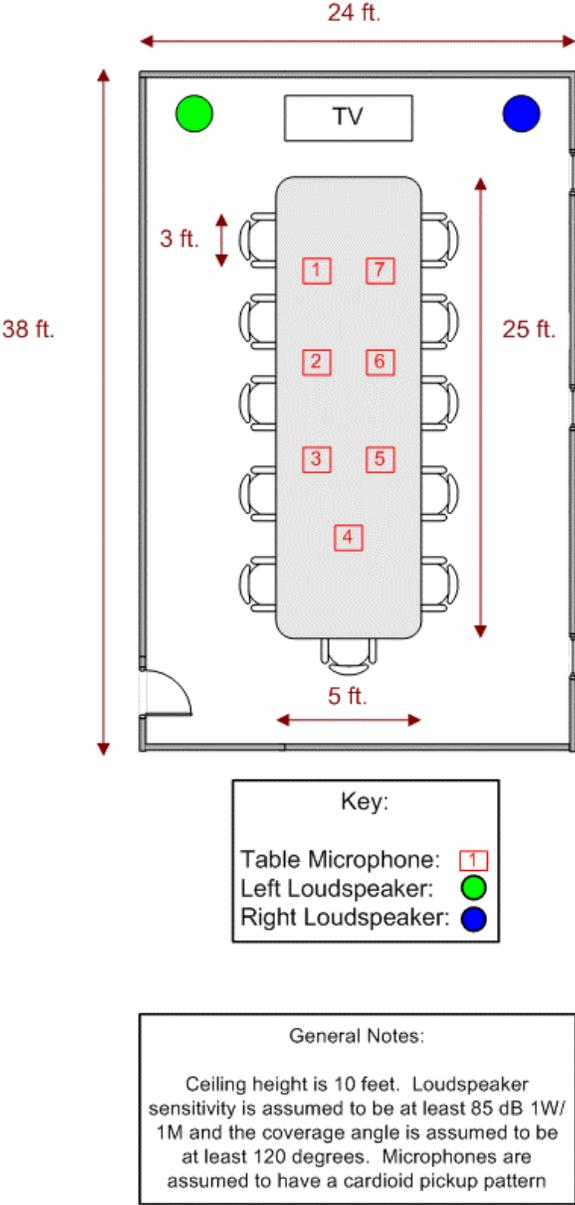


Figure 23. Stereo room layout with the VSX 8000 and Vortex.

## SYSTEM LAYOUT

The audio components for the room are 7 tabletop microphones, 1 EF2280, 1 VSX 8000 video codec, 1 program audio source, and 2 program loudspeakers. The video codec will use Inputs C and D / Outputs C and D. The program audio will use Inputs A and B. The amplifier will use Outputs A and B.

We will assume that the microphones, amplifier, program audio, and VSX 8000 have balanced connections (.775 Vrms professional nominal levels).

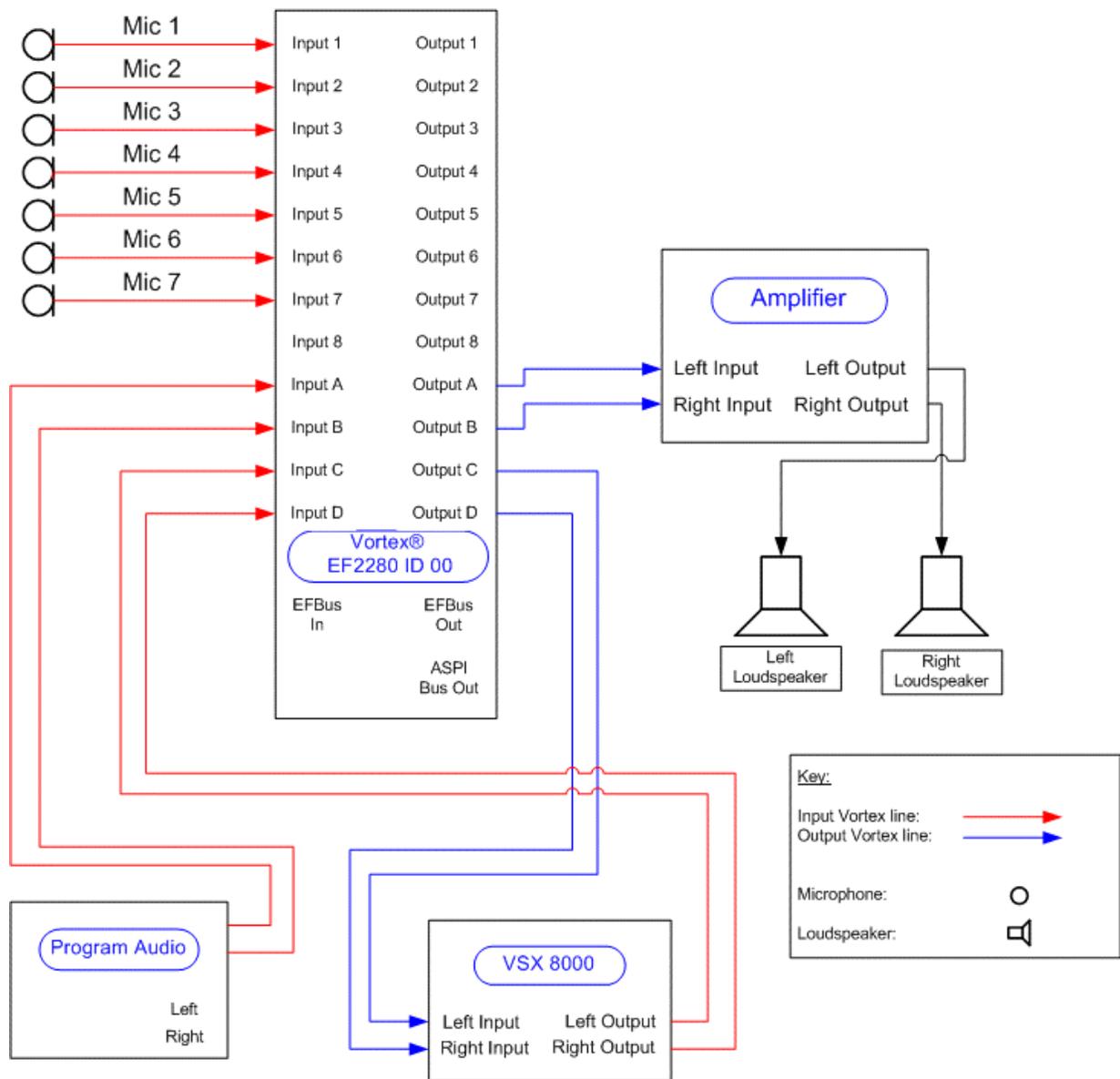


Figure 24. Vortex and VSX 8000 wiring diagram for stereo operation.

## CONFERENCE COMPOSER LAYOUT

Most of the default parameters of the EF2280 will satisfy our design. However, we will need to change the Mic/Line Inputs, Automixer, Matrix Mixer, and Presets to satisfy our design goals.

### Mic/Line Inputs

On Inputs 5-7, the AEC needs to be set to R2 as shown in Figure 25.

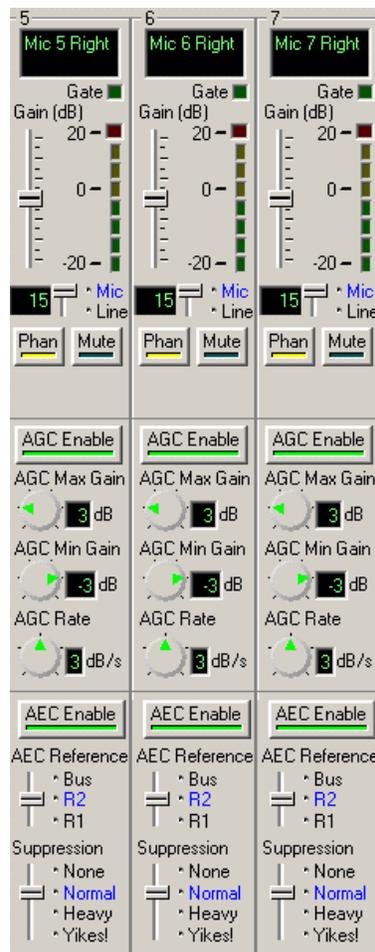


Figure 25. Setting the microphone inputs 5 – 7 to reference R2.

### Matrix Mixer

The matrix mixer will need to be changed from the default settings in order use Outputs A and B for the amplifier, and Outputs C and D for the VSX 8000.

Inputs 1-3 need to be assigned to Output A to feed the left channel of the VSX 8000. Input 4 will be assigned to Outputs A and B at -3 dB since it is considered a center mic. By assigning a crosspoint attenuation of -3 dB, the level from the microphone when reproduced on the far end will be about the same as the left or right side microphones.

The channel separation is shown via the Input A to Output D and Input B to Output C crosspoints as well as the Input A to R2 and Input B to R1 crosspoints. These crosspoints must have the same value in order for the Vortex AEC to be able to track both left and right channels of audio. If the channel separation needs to be raised from -10, then all four crosspoints will need to be changed to the new value.

Inputs C and D are attenuated by 3 dB to Outputs R1 and R2 to account for a stereo signal being routed to a mono output. Since the two signals may not be correlated (i.e. have no time relationship between each other), then when they are added together, the summed signal will be +3 dB higher.

In this example, we will assume that the VSX 8000, program audio, and amplifier are designed to send and/or receive a professional level signal. Therefore, Inputs A, B, C, and D and Outputs A, B, C, and D will be set to 0 dB. For more information as to the reasoning behind the gain levels, please see the Gain Structure for Amplifiers and Other Sources page.



**Local Microphones should NEVER be included the reference signal!**

**OUTPUTS**

Safety Mute      DXF Drawing...      Clear Matrix

		IN	FDR	1	2	3	4	5	6	7	8	A	B	C	D	W	X	Y	Z	R1	R2	Mixer	AEC			
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
		On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On			
<b>INPUTS</b>	Mic 1 Left	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1	
	Mic 2 Left	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1	
	Mic 3 Left	3	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1	
	Mic 4 Center	4	15	0	0	0	0	0	0	0	0	0	-3	-3	0	0	0	0	0	0	0	0	0	1	R1	
	Mic 5 Right	5	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R2	
	Mic 6 Right	6	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R2	
	Mic 7 Right	7	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R2	
	Input 8	8	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	R1	
	From VSX Left	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	
	From VSX Right	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	0	
	Program Left	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-3	
	Program Right	D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-3	
	SubMix PM0	PM0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix PM1	PM1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix WM0	WM0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix WM1	WM1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix WM2	WM2			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix XM0	XM0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix XM1	XM1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix XM2	XM2			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix YM0	YM0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix YM1	YM1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix YM2	YM2			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix ZM0	ZM0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix ZM1	ZM1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SubMix ZM2	ZM2			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Signal Generator	SG		-30		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Fixed   
 Not Muted   
 Muted   
 Automixer 1   
 Automixer 2

Figure 26. A sample matrix for using the Vortex with the VSX 8000.

## Presets

In order to permanently save the settings to the EF2280, you must use a User Preset. Here, we've used PRESET 16, although you may use any of the User Presets 16-47 to accomplish this task. We've also renamed USER PRESET 16 to CONFERENCE ROOM. Once the User Preset has been saved, you must also change the POWER ON PRESET to reflect the proper Preset that you want the unit to power up to if the unit loses AC power.

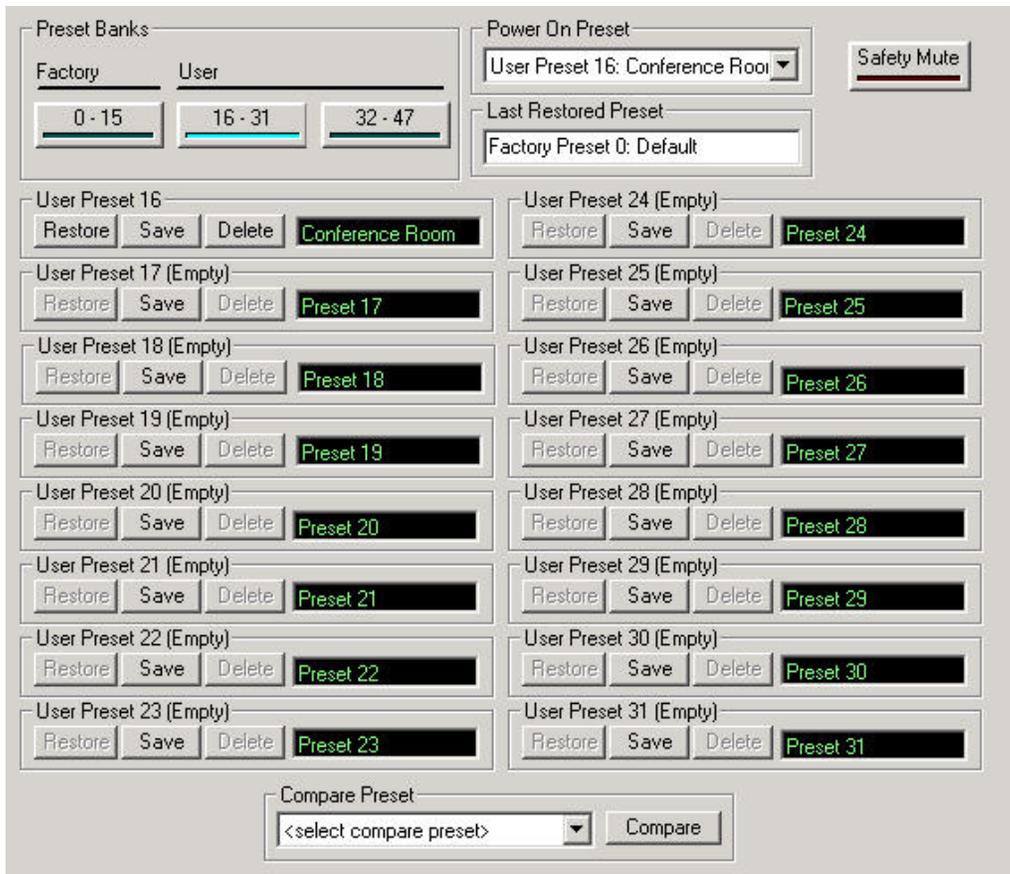


Figure 27. The preset page within Conference Composer.

# INTEGRATING A VSX 8000 / SOUNDSTATION VTX 1000 / AND A VORTEX DEVICE

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**This section only applies if the SoundStation VTX 1000 has software release 1.5 or later and VSX software release 7.5 or later.**

**In lieu of a newly purchased VSX 7400 or VSX 8400 bundle, if you have an existing SoundStation VTX 1000 and VSX 7000 or VSX 8000, you will have to upgrade your software per the above, as well as purchase the SoundStation VTX 1000/VSX Upgrade Kit to integrate the two products.**

1. Follow the instructions for integrating the SoundStation VTX 1000 and the Vortex Device in the Application Note entitled “Interfacing to the SoundStation VTX 1000” - [http://www.polycom.com/common/pw\\_item\\_show\\_doc/1,1276,2321,00.pdf](http://www.polycom.com/common/pw_item_show_doc/1,1276,2321,00.pdf)
2. Connect the Conference Link port of the SoundStation VTX 1000 to the VSX 7400 or VSX 8400.
3. In the VSX 7400 or VSX 8400 User Interface, go to SYSTEM, ADMIN SETTINGS, AUDIO and ensure ENABLE POLYCOM MICROPHONES IS NOT SELECTED.

## SYSTEM LAYOUT

As an example, here is a system that contains 6 tabletop microphones, 1 EF2280, 1 VSX 7000 video codec, 1 program audio source, 1 SoundStation VTX 1000 (the loudspeakers are not shown), and the SoundStation VTX 1000/VSX ConferenceLink cable. The video codec will use Inputs 7 and 8 / Outputs 7 and 8. The program audio will use Inputs A and B. The SoundStation VTX 1000 will use Input A / Output A.

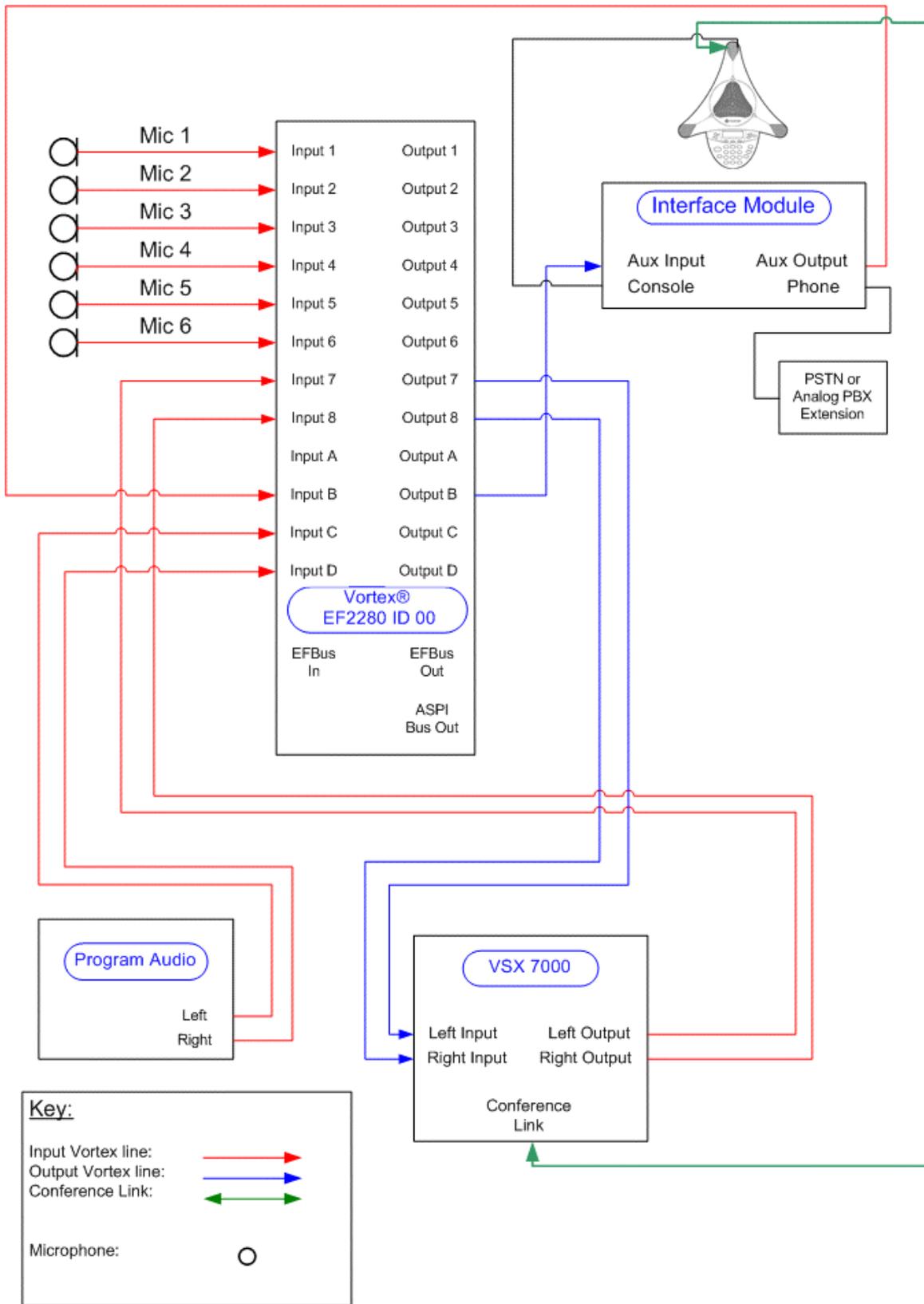


Figure 28. The system schematic for using the VSX 7000 with a Vortex EF2280 and a SoundStation VTX 1000.

# WIRING FROM VSX 8000 TO VORTEX DEVICE

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## INPUT TO VSX 8000 FROM OUTPUT OF VORTEX DEVICE



Figure 29. Building a cable for the balanced to balanced connections on the Vortex and VSX 8000.

Both the Vortex device and the VSX 8000 have the ground pin tied to the chassis ground of the unit. Thus, you may connect the shields between both units and that will not degrade the audio quality. Any ground loops that are formed between the two units will flow exclusively on the shields.

Connect the Positive, Negative, and Shield of the VSX 8000 to the Positive, Negative, and Shield of the Vortex Device.

## OUTPUT OF VSX 8000 TO INPUT OF VORTEX DEVICE



Figure 30. Building a cable for the balanced to balanced connections on the Vortex and VSX 8000.

Both the Vortex device and the VSX 8000 have the ground pin tied to the chassis ground of the unit. Thus, you may connect the shields between both units and that will not degrade the audio quality. Any ground loops that are formed between the two units will flow exclusively on the shields.

Connect the Positive, Negative, and Shield of the VSX 8000 to the Positive, Negative, and Shield of the Vortex Device.

## TIPS FOR VSX 8000

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The internal volume control for the VSX 8000 controls the incoming remote audio and the local tone generator. It does not, however, control the sound effects inside the units such as incoming call ring and the female speech that occurs when you dial a number. This is important to note because if the volume control is very low, it may appear that the codec audio is operating correctly because the sound effects are still generated and will be heard in the local room. However, when a call is connected, the local side may not hear the far side because the local volume control is too low. Since the local participants heard the sound effects audio at a normal level, it may not be obvious that the volume control is set too low. If the volume control is performed in the Vortex Device, this will not be an issue.

The sound effects volume control can be adjusted in the System, Admin Settings, Audio Settings page.

Also, if you are using the Vortex Device to perform volume control, you should set the Balanced Line Output of the VSX 8000 to Fixed. Note that if the volume control is raised or lowered via the VSX 8000 remote control, you will still see the volume bar displayed on the video monitor; however, the VSX is not raising or lowering the volume to the balanced output. This setting can be adjusted in the VSX 8000 User Interface. Go to SYSTEM, ADMIN SETTINGS, AUDIO SETTINGS, and select NEXT twice for Page 3. Select the FIXED option for Output Mode. Set the Level setting to 5.

# TECHNICAL SUPPORT

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