

# **TECH NOTE**

## **PRODUCTS SUPPORTED:**

All CONVERGE Pro 2 Products excluding 128SR and 128SRD models

CLEARONE DOCUMENT NTS-0049-001 (REVISION 1.0) JUNE 2017 CONVERGE® Pro 2 AEC Configuration Guide

## **Overview**

This document provides guidelines for configuring a simple Acoustic Echo Cancellation (AEC) reference for CONVERGE Pro 2.

# **Create a Reference**

On a CONVERGE Pro 2 unit, you must first create either a standard reference or a custom reference as a resource.

- 1. Load or create a site file offline. If you are currently connected to the stack you must first disconnect, and then load the site file into the CONVERGE CONSOLE software.
- 2. Go to Resource & Partition Mgt.
- 3. Make certain you have added a Line Output or a Speaker Output as a resource.
- 4. Click the arrow beside your main amplifier/speaker output to open it.
- 5. Click either the Add Standard button or the Add Custom button. Please see Figure 1.

Project (Classic)	Room: MyRoom	
Select	In Room/Partition Assets	
Project Info		Sort by Device & Connector  Sort
Project Properties	Part_A 🧪 + Add	
Reports	📀 Gating Groups (1)	
Stack	✓ Mic/Line Inputs AEC (4)	
Devices	VoIP (1)	
Settings	Mic/Line Outputs (1)	
Room (Space)	Out_Name_1_01 Release ►	
Resource & Partition Mgt.	Cut_vanie_r_or	
Naming	Add Standard References	
Channel Groups		
Macro Recorder	Add Custom	
Macros		

# **Configure a Standard Reference**

A microphone can use a **Standard Reference** when its audio is not routed to this output, i.e. when the mic is not being reinforced into the same room for voice lift.

- 1. Go to the MatrixView<sup>™</sup>. Select the tab Reference Matrix.
- 2. Add an arrow E for each microphone that will need to use this AEC reference. Please see Figure 2.

Select		
Project Info	MatrixView <sup>™</sup> Reference Matrix	
Project Properties		
Reports		
Stack		
Devices		
Settings		
Room (Space)		
Resource & Partition Mgt.		ef.1
Naming		eOut_StdRef_1
Channel Groups		Öut
Macro Recorder	$\frown$	à
Macros	TableMic01	
Timers	TableMic02	
Room Partitions	TableMic03	
FlowView™		
MatrixView™	TableMic04	$\leftarrow$
Channel Properties	VoIP_Rx	
Gating Groups		



# **Configure a Custom Reference**

A microphone must use a **Custom Reference** when its audio is routed to this output, i.e. when the mic is being reinforced into the same room for voice lift.

- 1. Go to the MatrixView. Select the tab Reference Matrix.
- 2. Add an arrow  $\blacksquare$  for each microphone that will need to use this AEC reference.
- 3. Add an X 🖾 on each mic input whose audio must be excluded from the reference. For any mic whose audio is routed to this output that mic's audio must be excluded from the reference. Otherwise there will be self-referencing, where the AEC will try to suppress all of the mic's audio.

Any mic that is not reinforced can use a separate Standard Reference. Or that mic can use this same Custom Reference.

### EXAMPLE 1

In this example all mic inputs are routed directly to the line output. For this reason, the audio from all mic inputs must be excluded from this reference. Please see Figure 3 below.

Project (Classic)	Room: MyRoom	Partition: Part_A	•	2	Preset: [Part_A_Preset_1]
Select					
Project Info	MatrixView™	Reference Matrix			
Project Properties					
Cl Reports					
Stack					
Devices					
Settings				Exclusion	
Room (Space)					
Resource & Partition Mgt.			eOut_CustRef_1	CustRef_1	
Naming			Cust		
Channel Groups			Ğ	Out	
Macro Recorder			Line	Line	
Macros	TableMic01		Ð	X	
Timers	TableMic02			Ŷ	
Room Partitions				$\mathbf{C}$	
FlowView™	TableMic03		-	X	
MatrixView™	TableMic04		Ł	X	
Channel Properties	VoIP_Rx				
Gating Groups					

### Figure 3

### EXAMPLE 2

Please see Figures 4 and 5 below. In Figure 4 all mics are routing to the VoIP TX so that their audio will be heard on the far end of a VoIP call.

# » Note: VoIP needs to be routed to AmpOut1 and AmpOut2, otherwise they do not contain the far end audio.

The table mics are also routed to the process bus labeled TableMicsReinforced and this bus is routed to the amp outputs. The handheld and lapel mics are also routed to the process bus labeled WirelessMicsReinforced and this bus is routed to the amp outputs.

Since these two process busses are routed to the amp output that contains the custom reference, their audio must be excluded from this reference. Please see Figure 5 below.

As a general rule, all audio routed directly to the output that has the custom reference is automatically included in that reference. Therefore any mic audio that is routed to this output must be excluded from that reference.

- » Note: Each Output can support a Standard Reference. Each Standard Reference uses one C-Link channel.
- » Note: Custom References. Each Custom Reference uses two C-Link channels.



Figure 4

-		
File Help		
Project (Classic) 🗷	Room: MyRoom Partition: Part_A	▼ <b>⊻</b> Prese
Select		
Project Info	MatrixView <sup>™</sup> Reference Matrix	
Project Properties		
Reports		
/ Stack		
Devices		S
Settings		clusic
Room (Space)		pOut1_CustRef_1 pOut1_CustRef_1 Exclusion
Resource & Partition Mgt.		pOut1_CustRef_1 pOut1_CustRef_1
Naming		
Channel Groups		Out
Macro Recorder		Amp
Macros	HandheldMic	2
Timers	LapelMic	$\overline{\mathbf{z}}$
Room Partitions		
FlowView™	TableMic1	$\leftarrow$
MatrixView™	TableMic2	$\leftarrow$
Channel Properties	Beamformer1	$\overline{\leftarrow}$
Gating Groups	Beamformer2	2
GPIO Logic Input Triggers	VoIP_Rx	
GPIO Output Pin Actions	-	
	TableMicsReinforced	
	WirelessMicsReinforced	

Figure 5

# **Gating Groups**

A gating group is necessary for correct mic gating. Otherwise mics will gate independently and multiple mics can gate onto one person talking. The same audio from these different mics sources can interfere with itself. The mics will then have a hollow, distant, cave-like sound. There may also be phase cancellation which can cause the mic audio to drop out, or sound like it is in a tunnel.

A gating group is necessary to enable mics to operate together according to the enabled features such as: 1st Mic Priority, Last Mic Priority; Max # Mics; Chairman Overrride; and NOM.

- » NOTE: In CONVERGE Pro 2 you must create a gating group resource and add all mics to that gating group in order for the mics to gate properly. Improperly gating mics may affect echo cancellation and cause other audio problems. Please see below.
- 1. Load your site file into CONVERGE CONSOLE while offline.
- 2. Go to Resource & Partition Mgt.
- 3. Add a Gating Group resource.
- 4. Under Room Partitions, go to Gating Groups from the "Type" tab.

CONVERGE® Pro 2 CONSOLE® -- TechSupport\_1st\_stack.PCCP2



Figure 6

- 5. Select the gating group you created and click the button Add/Remove Mic.
- 6. Add all mic inputs and/or Beamforming Mics to this gating group.

Where there are mics in separate rooms or room divisions, there should be a separate gating group for each room or room division.

» **NOTE:** In configurations with multiple room partitions, be sure to configure a separate gating group for each partition and include all mics in the partition in the same gating group.

	CONVERGE® Pro 2 CONSOLE® TechSupport_1st_stack.PCCP2					
	File Help					
	Project (Classic)	Room: MyRoom Pa	rtition: Part_A	• <b>•</b>	Preset: [MyRoom_Part_A_Preset_1]	<b>▼ ▼</b>
	Select	Gating Groups		Gating Group	Properties : GatingGroup01	Mics in Gating Group
	Project Info					Beamformer1
	Project Properties	Gating_Group01				beamormen
	Reports			First Mic Priority :	On ○ Off	
	Stack					
	Devices			Max Number Mics On	4 ▼	
	Settings			Last Mic Priority :	Off 🝷	
Figure 7	Room (Space)			cust mic monty .		
Figure /	Resource & Partition Mgt.			NOM:		
	Naming					
	Channel Groups					
	Macro Recorder					
	Macros					
	Timers					
	Room Partitions					
	FlowView™					
	MatrixView™					Add/Remove Mics
	Channel Properties		k			
	Gating Groups					
	GPIO Logic Input Triggers					
	GPIO Output Pin Actions					

# Line Inputs

In CONVERGE Pro 2, all inputs start out as Mic Inputs and will have mic processing enabled. When using a Line Input, i.e an input that will have line type audio rather than mic audio, you must configure it as a line input. For example, an input receiving program audio or audio from a stand-alone video conferencing system must be configured as a line input.

- » NOTE: Be sure to configure a Line Input correctly. Please see below.
- 1. To configure an input as a line input, go to the MatrixView or Channel Properties.
- 2. Double-click on this line input to bring up its channel properties window.
- 3. Right-click in the channel view to bring up the pop-up window.
- 4. Select Configure as Line Input.

This disables all mic processing on this input.

» NOTE: In configurations with multiple room partitions, the line inputs for each partition must be separately configured as line inputs. Be sure to check each room divide/combine scenario to ensure each line input is configured as such.



Figure 8

# **Multiple Room Partitions**

When a project file has multiple room partitions, the AEC references for each combination of partitions have to be configured separately. For example, if there are three room partitions, then six different partition combinations will automatically be generated. See Figure 9 below.

In this example, the AEC references will have to be added to each of the three room partitions, and a reference matrix will have to be configured separately for all six partition combinations.



Figure 9

The same is true for multiple room configurations via presets. If you "Add" a new preset, you must also reassign AEC and other properties. If you "Clone" a preset feature, the AEC and other properties are carried over to the new preset. If that is not what is required, then it must be redefined.

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