

TECH NOTE

PRODUCTS SUPPORTED:
All CONVERGE Pro and INTERACT Products

CLEARONE DOCUMENT NTS-0044-001
(REVISION 1.0) AUGUST 2016

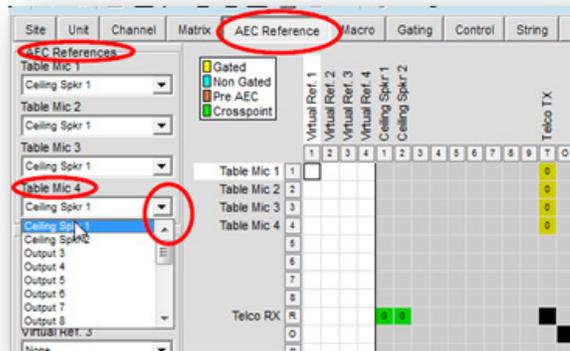
CONVERGE PRO AND INTERACT AEC CONFIGURATION GUIDE

OVERVIEW

This document provides guidelines for configuring a simple Acoustic Echo Cancellation (AEC) reference in both the CONVERGE and INTERACT.

CONVERGE

On a CONVERGE Pro unit, configure a simple echo cancellation reference in CONVERGE Console on the AEC reference tab by setting the dropdown window for each mic input to reference the main output to the amp and speaker system.



Setting AEC References for Mic Inputs

Virtual AEC / Public Address Adapt References

When a CONVERGE Pro site uses local sound reinforcement so that there is mic audio in the speaker output you cannot use the speaker output as the AEC reference. In this case you must use a Virtual Reference. Virtual AEC/Public Address (PA) Adapt references also allow you to combine multiple audio sources for such applications as those with two speakers (left and right) providing audio, and combined audio and video conferencing. In these and other multiple output applications, using virtual AEC/PA Adapt references improves AEC performance.

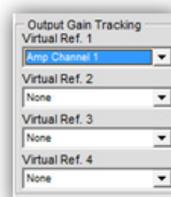
Virtual AEC/PA Adapt reference sources are defined in a special section of the virtual reference matrix:

Configuring Virtual AEC References

Add a crosspoint in the white cross point area to select the audio source for each virtual reference source you want to define. In the example above, **Outputs 8 and 9** are connected to the room amplifier. This audio includes microphones that cannot be included in the AEC reference, so Output 8 should not be used directly as the AEC reference source. Instead, use a Virtual Reference and route any inputs that you want canceled to that reference. This typically would include **Telco/VoIP RX** audio and audio from a video codec (**Input 9** above), which in this example are combined to create **Virtual Reference 1**.

- » **NOTE:** The post gain meter is a peak meter. If it peaks into the red, clipping occurs, resulting in audio distortion. If the meter remains green, the level may be too low. This approach to gain structure, sometimes called unity gain, should be followed on all channels throughout a CONVERGE Pro system. Also note that on mic inputs, it is better to err on the side of audio that is a little low than audio that is too hot.

AEC requires a physical output reference to track output gain changes. Therefore when using virtual AEC/PA Adapt references, you must use output gain tracking to provide level information to the AEC process. Use the **Output Gain Tracking** section of the screen (shown above) to specify the level source for each virtual reference that you define. When using multiple outputs to multiple amplifier channels, only one of those outputs needs to be used for gain tracking.



Expansion Bus References

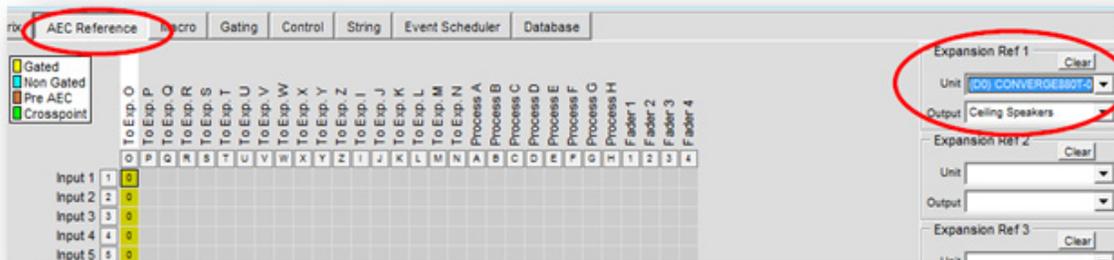
Whenever there are microphones on other CONVERGE units in addition to the unit with the AEC reference, an expansion bus reference is required. For example, if a site has a CONVERGE Pro 880T with outputs to room speakers and a CONVERGE Pro 8i with additional microphones, the mic inputs on the 8i will need to use an expansion bus reference so their AEC can reference the 880T audio.

All Beamforming Microphone Arrays must use an expansion bus reference (see below).

On the AEC Reference tab, use the **Expansion References (1-8)** section of the screen to use audio from an expansion bus channel as the AEC/PA Adapt reference source. For each expansion reference, select the **Unit** and the **Output** you want to use as a reference using the drop-down lists.

The following types of sources are available for use as expansion AEC/PA Adapt reference sources:

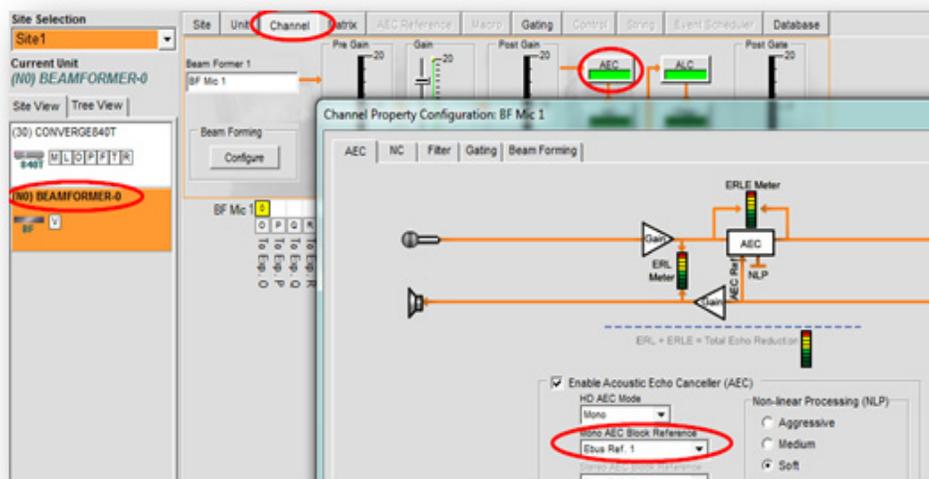
1. Output channels
2. Speakers
3. Virtual references



Setting Expansion Bus (Ebus) References

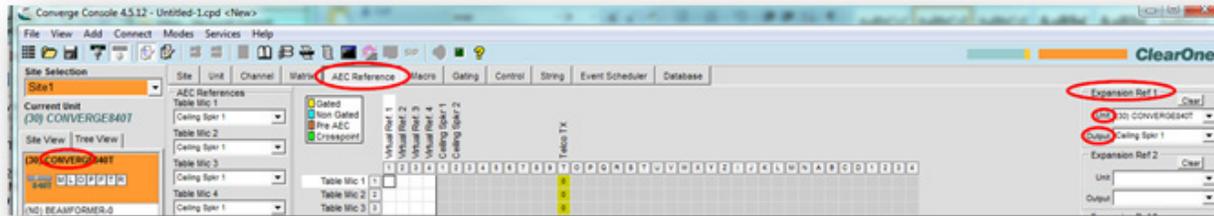
Beamforming Microphone Array Referencing

A Beamforming Mic Array must always use an Expansion Bus Reference. By default the Beamformer will use Expansion Reference 1 (Ebus Ref. 1).



Beamforming Mic Array AEC Reference - factory default

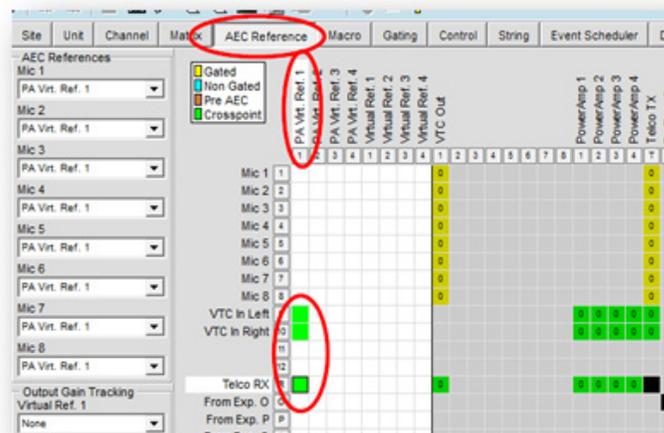
Make sure that the Beamformer's Expansion Reference definition points to the speaker output.



Setting the Expansion Bus Reference definition for a Beamformer

PA Virtual References

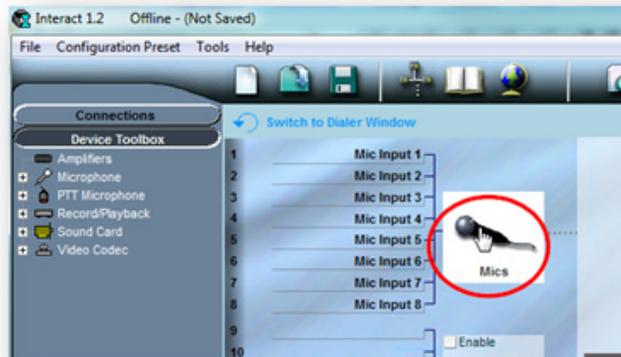
Whenever the PowerAmp channels of an 880TA or an SR1212A are used for room audio, a PA Virtual Reference should be used instead of a regular Virtual Reference. A PA Virtual Reference assigns audio from a given amp output and applies the same processing to a corresponding amp channel. All processing and audio information is applied to the amp channel. (For example, if the feedback eliminator is enabled on PA channel 2 the feedback eliminator adds a new node. That same feedback node will be added to the audio contained on PA Virtual Channel 2.) A PA Virtual Reference does not need Output Gain Tracking, since it tracks all audio changes on the PowerAmp Output Channel.



Setting a PA Virtual Reference

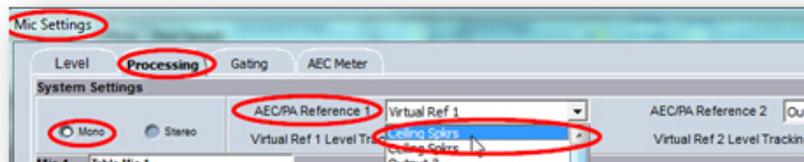
INTERACT PRO AEC REFERENCING

On the INTERACT Pro, all mics use the same AEC reference. To configure the AEC reference, click the Mics icon in the INTERACT software to go to Mic Settings.



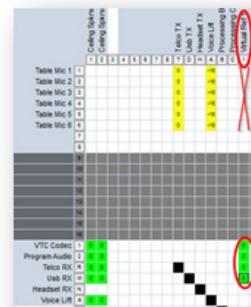
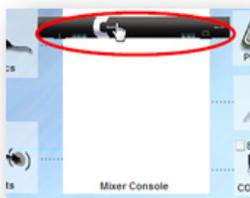
Go to Mic Settings Window

In Mic Settings, go to the Processing Tab. In most instances a Mono AEC reference will be preferable to a Stereo one. Set the "AEC/PA Reference 1" to the main output that goes to the amp and speaker system. All mics on the INTERACT Pro and an INTERACT Pro 8i mic expansion unit, if present, will use this AEC reference.

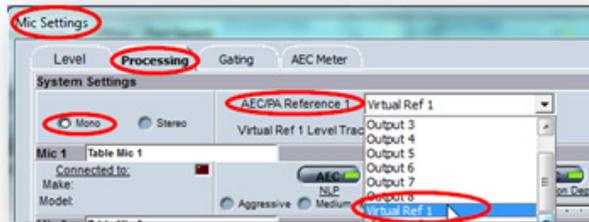


Setting the AEC Reference for INTERACT Pro

Virtual References on the INTERACT Pro are set in the routing matrix under the Mixer Console.



In the Mixer Console, add crosspoints to the column “Virtual Ref 1” for all far end audio sources (Telco Receive, VTC Receive, USB Receive, etc.) and optionally any program audio sources. DO NOT include mic audio in the virtual reference. Then in Mic Settings set “AEC/PA Reference” to Virtual Ref 1.



- » **NOTE:** If the channels selected for a virtual reference use Process Busses, you should select the process channel as the virtual reference source. This provides the AEC process with the most accurate reference for the signal, thereby providing faster convergence and more accurate AEC performance.

INTERACT AT AEC REFERENCING

In the factory default configuration, the room audio is sent to the build-in amplifier which outputs to the speaker terminals on the back of the INTERACT mixer. The AEC (Acoustic Echo Canceller) is set to reference all audio routed to this amp/speaker output.



However, the room audio can also be routed to an external amplifier. Using an RCA cable, connect the **Line Out** or **Record Out** on the INTERACT mixer to the Line In on an amplifier.



Configuring the INTERACT AT to use an External Amplifier

After connecting the audio cables, connect to the INTERACT mixer with the INTERACT software.



Open the Device Toolbox, open Amplifiers, and select the Generic Amplifier. With your mouse, grab the Generic amplifier icon, drag it and drop onto the correct output.



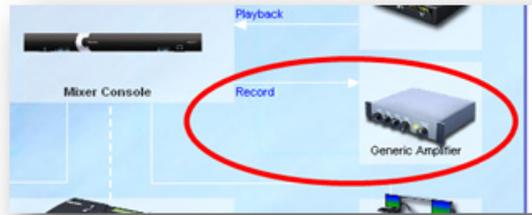
If you are using the Line Output for your external amplifier, drop the Generic Amplifier onto the icon for the Line Output.



This icon then changes to the Generic Amplifier.



If you are using the Record Output for your external amplifier, drop the Generic Amplifier onto the icon for the Record Output and the icon will change appropriately.



Once you have dropped the Generic Amplifier onto the icon for the appropriate output, this action will have three important effects on the INTERACT AT Mixer's configuration:

1. **The AEC will now reference all audio routed to that output.**
2. The routing in the Mixer Console will be automatically changed to insure that audio is correctly routed.
3. The Volume Up and Volume Down keys on the **INTERACT Dialer** will control the correct output.



Setting the AEC Reference for INTERACT Pro

CLEARONE LOCATIONS

HEADQUARTERS:

Salt Lake City, UT USA

5225 Wiley Post Way
Suite 500
Salt Lake City, UT 84116

Tel: 801.975.7200

Toll Free: 800.945.7730

Sales: 800.707.6994

Fax: 801.303.5711

e-mail: sales@clearone.com

Europe

Tel: +44.1454.616.977

UK Tech Support: +44.0800.680.0682

e-mail: global@clearone.com

Asia Pacific

Tel: +86.138.23287825

Tech Support: +86.18420152949

e-mail: global@clearone.com

Middle East

Tel: +91.9930782195

e-mail: global@clearone.com

Other Regions

Tel: +1.801.975.7200

e-mail: global@clearone.com

TechSales

Tel: 800.705.2103

e-mail: techsales@clearone.com

Technical Support

Tel: 800.283.5936

Tel: 801.974.3760

e-mail: tech.support@clearone.com