ClearOne.

APPLICATION TECH NOTE

PRODUCTS SUPPORTED:

All CONVERGE Pro 2 Products

CLEARONE DOCUMENT NTS-0055-001 (REVISION 1.0) SEPTEMBER 2017 CONVERGE Pro 2 System Basic Setup and Configuration

OVERVIEW

This document provides guidelines for basic setup and configuration of a CONVERGE Pro 2 (CP2) system in the following three sections:

- Part I: Creating a Basic Project File
- Part II: Loading Your Project to Your Equipment
- Part III: Beamforming Mic Array 2 (BFM2) Connection Troubleshooting Guide

PART I: CREATING A BASIC PROJECT FILE

On a CP2 unit or stack of units, you must first create a project file in CONVERGE CONSOLE while offline. This section outlines how to create a basic project file.

Make sure you are running the latest version of the CONSOLE software. To verify the version you are currently running, click on the Help menu and select About. If you don't know what version is the latest version, click on the Help menu, and choose Check for Updates to see what version of CONSOLE is listed.

1. Run CP2 CONSOLE. Under Select, click New.

iile Help 📐		
Select	Discovered on current LAN subnet Manually Discover IP Address: Add Image: Contract of the second	Projects New Browse C:\Users\pwebb\Documents\ClearO

- 2. Add a device to the project. For this tutorial, we will add a single 128V.
 - **» NOTE:** You can also add multiple devices to the project at this time.

\subseteq	New Project		×
Pro	ject Name: MyProject		
٢	Equipment		
	Device Type:	Add	
	CONVERGE Pro 2 128SR	0 🜩	
	CONVERGE Pro 2 128SRD	0	
	CONVERGE Pro 2 128T	0	
	CONVERGE Pro 2 128TD	0	
	CONVERGE Pro (128V)		
	CONVERGE Pro 2 128VD	0 👻	
	CONVERGE Pro 2 48T	0	
			<u> </u>
	ОК	Cancel	

3. Under Project Properties, assign a project name. This is the name that identifies this stack of equipment under "Discovered on current LAN subnet" in CONSOLE.

File Help	
Project (Classic) 🗷	
Select	Project Name: Iutorial_Project
Project Info	Project Properties
Project Properties	
Reports	
Stack	
Devices	
Settings	Notes + Total Notes: 0
Room (Space)	
Resource & Partition Mgt.	

4. Under Stack, click Devices, and select Settings. Assign a name to the 128V under Device Name. This is the network name of the device.

File Help		
Project (Classic)		
Select		Add Device
Project Info	Name_1 Settings	
Project Properties	John Market State Stat	Move
Reports	Add P-Link Dev	
Stack		
Devices	General GPIO VoIP Stack VoIP Phones	
Settings		
Room (Space)	Device Type: CONVERGE Pro 2 128V	
Resource & Partition Mgt.	Device Name: 128V_Room1	
Naming	Serial Number	
Channel Groups	Senar Number.	
Macro Recorder	IP Settings	

- » NOTE: Go to Device Settings when you are ready to configure the VoIP interface of the 128V. For an analog telco unit, such as a 128T, this is where telephone settings are configured. Also note that if GPIO Logic Input pins are to be used, they must be specified here.
- 5. We are including a Beamforming Microphone Array in this tutorial setup. Under Stack, click on Devices, and select Add a P-Link Device. Assign a name to this Beamforming Mic Array.
 - » **NOTE:** You must add a Beamforming Mic Array input channel under Resource & Partition Mgt., as outlined in Step 9.

File Help	Ē						
Project (Classic)	ſ						
Select		C-Linked D	Devices			Add Dev	ice
Project Info		128V_Room1			Settings		B
Project Properties					Jettings	Move	
Reports					Add P-Link Device		
Stack		CONVERGE Pr	o 2 128V		Delete		
Devices			C Add Device			×	
Settings			<u> </u>				
Room (Space)			Device Type:	Beamfo	rming Mic Array 2	-	
Resource & Partition Mgt.			Device Name	Beamfo	rmer RM1		
Naming			Device Hume.	Canno	Incl_RWT		
Channel Groups			Serial Number:				
Macro Recorder			Mount Style:	Auto-Se	elect	•	
Macros				_			
Timers				ОК	Cancel		
Room Partitions							

Our tutorial project does not yet contain any audio channels. Although the Beamforming Mic Array has been added, there still is no audio channel for this mic.

- 6. Under Room (Space), select Resource & Partition Mgt. This is where you add all the audio channels this project needs. We recommend adding only the channels you need. This keeps things simpler and helps to avoid unnecessary complexity.
- 7. Add a gating group. Under Available Assets, select Gating Groups, and click Add. For mics to gate properly, it is necessary for multiple mics in the same room to be in the same gating group.

File Help				
Project (Classic)	Room: MyRoom			
Select	In Room/Partition Assets	Sort by Device & Connector 🔻 Sort	Available Assets	
Project Info	Part A		By Type By Device	
Project Properties			by type by better	
Reports	Gating Groups (1)		Gating Groups (7)	🔺 Add) 1 😴
Stack			 Mic/Line Inputs AEC (12) 	Add 1 🜩
Devices			Beamforming Mic Array 2 (1)	◄ Add 1 ÷
Settings			👽 USB (2)	Add 1
Room (Space)				
Resource & Partition Mgt.			VoIP (2)	Add 1 🖶
Naming			😪 GPIO (4)	◄ Add 1 ♣
Channel Groups			Processing Block (8)	▲ Add 1 -
Macro Recorder			😪 Fader (8)	◄ Add 1 -
Macros				

8. For this tutorial, we are adding four Mic/Line Inputs. These will be for a wired mic, a wireless mic, and program audio left and right.

	m		
Project (Classic) 🔹	Room: MyRoom		
Select	In Room/Partition Assets		Available Assets
Project Info		Sort by Device & Connector Sort	
Project Properties	Part_A 🧷 🕴 + Add		By Type By Device
Reports	Sating Groups (1)		✓ Gating Groups (7) ✓ Add 1
Stack	Mic/Line Inputs AEC (4)		Mic/Line Inputs AEC (8)
Devices	MicAEC_Name_1_01	Release 🕨	Seamforming Mic Array 2 (1)
Settings	MicAEC_Name_1_02	Release 🕨	✓ USB (2)
Room (Space)	MicAEC_Name_1_03	Release 🕨	
Resource & Partition Mgt.	MicAEC_Name_1_04	Release 🕨	
Naming			✓ GPIO (4) ▲ Add 1 ♣
Channel Groups			📀 Processing Block (8) 🛛 🖪 Add 1 🚍

9. Add an input channel for the Beamforming Mic Array.

File Help			
🖻 📥 📥 🕻			
Project (Classic)	Room: MyRoom		
Select	In Room/Partition Assets	Sort by Device & Connector - Sort	Available Assets
Project Info		dart by benee a connector	
Project Properties	Part_A 🥢 + Add		By Type By Device
Reports	Sating Groups (1)		Sating Groups (7)
Stack	Sinc/Line Inputs AEC (4)		Section And Mic/Line Inputs AFC (8)
Devices			🕑 Beamforming Mic Array 2 (1) 🛛 🔍 Add 🔤
Settings			
Room (Space)			

10. Add two USB channels for left and right PC audio.

Select	In Room/Partition Assets	Sort by Device & Connector 💌 Sort	Available Assets	
Project Info Project Properties	Part_A 🧨 🕂 Add		By Type By Device	
Reports	Sating Groups (1)		Gating Groups (7)	▲ Add 1 ♣
Stack	Mic/Line Inputs AEC (4)		Mic/Line Inputs AEC (8)	◄ Add 1 ♣
Devices	Seamforming Mic Array 2 (1)		🕑 USB (2)	Add 😫 🖨
Settings			VoIP (2)	✓ Add 1 ÷

11. Add a VOIP channel. As noted earlier, the VoIP interface must be configured under Device Settings.

Select	In Room/Partition Assets	Available Assets
Project Info		
Project Properties	Part_A 🧷 🕴 + Add	By Type By Device
Reports	Sating Groups (1)	✓ Gating Groups (7) ✓ Add 1 ♣
Stack	✓ Mic/Line Inputs AEC (4)	→ Mic/Line Inputs AEC (8) Add 1
Devices	Seamforming Mic Array 2 (1)	- VolP (1)
Settings	✓ USB (2)	
Room (Space)		
Resource & Partition Mgt.	VolP (1)	V Processing Block (8)
		🖸 Ender (0) 🚽 Add 🔳 🗖

If Processing Blocks and Faders are to be used, they must also be added here.

12. Add one line output. This output would be cabled to an external amplifier.

Select	In Room/Partition Assets	ort by Davica & Connector	Available Assets	
Project Info		Solution of the solution of th		
Project Properties	Part_A 🥒 + Add		By Type By Device	
Reports	✓ Gating Groups (1)		😪 Gating Groups (7)	▲ Add 1 🚔
Stack	✓ Mic/Line Inputs AEC (4)		Mic/Line Inputs AEC (8)	▲ Add 1 ♣
Devices	Seamforming Mic Array 2 (1)		VoIP (1)	▲ Add 1 ÷
Settings	✓ USB (2)		🗢 GPIO (4)	Add 1
Room (Space)				
Resource & Partition Mgt.			Processing Block (8)	
Naming	Mic/Line Outputs (1)		🕑 Fader (8)	✓ Add 1 ÷
Channel Groups			Mic/Line Outputs (7)	Add 1

13. Add an AEC reference. Open up this output and click Add Standard to add a standard AEC reference to this output.

Mic/Line Outputs (1)			
Out_Name_1_01		Release 🕨	
Add Standard	Peferences		
Add Custom	Out_Name_1_01_StdRef_1		Release

» NOTE: If a mic needs to have audio routed back into the room for local sound reinforcement, you will also need to add a custom reference for that mic or those mics. For further detail, see the technical App Note document "CONVERGE Pro 2 AEC references":

http://www.clearone.com/uploads/resource/CONVERGE_Pro_2_AEC_Referencing.pdf

- » **NOTE:** You can now add **+ Add** a second room partition, and then add other channels to that partition. In a project with two room partitions, a GPIO pin can be added to the second partition for opening and closing the divider between the two partitions. If a GPIO Logic Input pin is to be used for opening and closing a room divider, this must be configured here.
- 14. Under Naming, assign names to your channels that reflect their respective purposes.
 - » **NOTE:** Names may contain only letters, numbers, underscores "_", or hyphens "-". A name cannot start with a number, and cannot contain spaces.

Select Project Info	Naming Tool	Sort by Device & Connector 🔻	Sort Electro Partition All Partitions 🔻
Project Properties	Gating Groups		☐ Mic/Line Outputs
Reports	Gating_Group01	PC_Audio_Left	Amp_Output
Stack		PC_Audio_Right	
Devices	-Mic/Line Inputs (AEC)		
Settings	Table_Mic		
Room (Space)	Wireless_Mic	VOIP1	
Resource & Partition Mgt.	Program_Left		
Naming	Program_Right		
Channel Groups	Peamforming Mis Arrow 2		
Macro Recorder	Beamforming Mic Array 2		
Macros	Beamormer_Nivi 1		

15. Under Room Partitions, click MatrixView. This is where you determine how input channels are routed to various output channels and busses.

For this tutorial we will simply route the mics to the PC and VoIP Tx, and the PC and VoIP Rx to the amp output.



16. You must now configure the Reference Matrix so that the mic inputs will have Acoustic Echo Cancellation. While still in MatrixView, select the Reference Matrix. Add an arrow to the reference Matrix for each mic input. This tells each mic input to use this AEC reference.

Select		
Project Info	MatrixView Reference Matrix	
Project Properties		
Reports		
Stack		
Devices		
Settings		
Room (Space)		lef.1
Resource & Partition Mgt.		StdR
Naming		itput,
Channel Groups		Du Du
Macro Recorder		Am
Macros	Program_Left	
Timers	Program Right	
Room Partitions		
FlowView™		Ę
MatrixView™	Wireless_Mic	\leftarrow
Channel Properties	Beamformer_RM1	\leftarrow
Gating Groups	PC_AUGIO_LETT_KX	
GPIO Logic Input Triggers	PC Audio Right Rx	
GPIO Output Pin Actions		
	VOIP1_Rx	

For further information see the technical App Note document "CONVERGE Pro 2 AEC references": http://www.clearone.com/uploads/resource/CONVERGE_Pro_2_AEC_Referencing.pdf

17. Under Channel Properties, select Table_Mic. Since this is a wired mic, you must enable Phantom Power (PPWR).



18. Still in Channel Properties, select Program_Left and Program_Right. Since these inputs are for line audio rather than mic audio, you must configure them as line inputs. To do this, right-click in the channel properties window for each of these inputs and select "Configure as Line Input."

ort by: Device & Connector 💌	Selection: O Collapse O E	xpand			
 Mic/Line Input AEC Table_Mic Wireless_Mic 	Program_Left	Pre Gain - 20 - 10	Coarse Gain - 56 - 50 - 41	Gain (dB)	Post Gain 20 - 10
Program_Left Program_Right Beamforming Mic USB Receive	Copy cha Paste cha Configur	annel properties e as Line Input	35 - 28 - 21 - 14 - 7 - 0	65 0.0 🜩	- 0 10 20 30 -99 dB
 VoIP Receive Mic/Line Output USB Transmit 					

19. Go to Gating Groups. To add mics to your gating group click Add/Remove Mics. In the pop-up window, select our three mic inputs. Use Control-Click to select multiple mics.

Select	Gating Groups		Gating Group Propertie	es : Ga	tingGroup01	Mics in Gating Group
Project Info	Gating_Group01					
Project Properties		_				
Reports		C Add Mics		×	Off	
Stack		Select micro	ophones to add:			
Devices		1) Salact/Da	select each individual microphon		·	
Settings		2) Highlighte	ed microphones are included in th	ne	T.	
Room (Space)		aroup when	the OK button is pressed.	_		
Resource & Partition Mgt.		Beamforme	r_RM1			
Naming		Program_Le	ft			
Channel Groups		Program_Rig	ght			
Macro Recorder		Wireless Mi	ic	-1		
Macros						
Timers				-		
Room Partitions						
FlowView™						
MatrixView™						Add/Remove Mics
2 Channel Properties			OK Cancel			
Gating Groups						
GPIO Logic Input Triggers						

- » NOTE: If GPIO Logic Input pins have been added as a resource, and have not already been configured for room partitions/dividers, they can now be configured for other purposes under GPIO Logic Input Triggers. GPIO Output Pin Actions could also be configured now.
- » **NOTE:** Dante Audio Channels require special configuration and routing considerations that are outside the scope of this document.
- 20. Save this project file on your PC using the Save As icon , or by selecting Save As from the File menu.

PART II: LOADING YOUR PROJECT TO YOUR EQUIPMENT

If you have a 128V and a Beamforming Mic Array, you can now load this project file to your equipment.

- » NOTE: If you do not have a 128V but do have a different CP2 unit, you can follow the steps above to create another project file for that unit. Under Step 2 above, select a different CP2 unit or units instead of the 128V.
- 1. Run CONSOLE. Verify that your hardware is on the latest firmware. Click Select and find your hardware under Discovered on Current LAN subnet. Click the small arrow to the left of your device to open up the details.

CONVERGE Pro 2 CONSOLE®	
File Help	
Start	☐ Discovered on current LAN subnet ———
Select	Manually Discover IP Address: Add
	 C TechSupport_2nd_Stack C TechSupport1stStack C TestVoip O Unconfigured Devices (1)

2. Find the current firmware version of your unit.

-Discovered on current LAN	subnet
Manually Discover IP Address:	Add
C TechSupport_2nd_Stack C TechSupport1stStack CP2_128V 0916-1 C TestVoip O Unconfigured Devices (2	: 1706-06 CONVERGE Pro 2 128V 3.4.40.0 10.101.24.157 © Last Discovered: 8/4/20 (2)

- 3. If you hardware does not have the latest firmware be sure to update to latest firmware before proceeding. If you don't know which firmware version is the latest, go to the Help menu and select Check for Updates.
 - » NOTE: If your units have one of the earlier versions firmware, 2.x or below, ClearOne recommends that you Restore Factory Defaults before proceeding with the firmware update, even if you believe this unit is new out of the box.

After the firmware update, your hardware will restart. This restart may take some time.

4. Connect CONSOLE to your hardware. Under Discovered on Current LAN subnet, select your unit and click the Connect button.

Connect

You will be prompted for a user name and password. The default user name and password are clearone and converge.

5. Under Project, select Load. Click Browse, browse to your project file, and load it.

File Help	
Control Panel	Load Project to Stack
Stack	⊂Project Planned Devices
Equipment Admin	File Name Browse
Firmware Project	
Active Load	
Room Partitions	

6. Now you must match up your physical hardware units with the hardware that is specified in the project file.

CONSOLE will find the serial numbers of the hardware units that are currently connected. Click the drop-down menu and select a serial number to match a physical hardware unit, listed under Connected Devices, to the hardware configured in the project file, listed under Project Planned Devices.

» **NOTE:** If you have a Beamforming Mic Array 2 (BFM2) connected, but it is not showing under Connected Devices, please see the Beamformer Connection Troubleshooting Guide below.

- Project Planned	Devices					-Connected Dev	ices		
FIOJECT Flammed	Devices					Connected Dev	ices		
File Name	C:\My Documer	nts\Tutorial_Project.PCCP2			Browse				
Status Device Na	ame	Product	Serial Number	\sim		Device Name	Product	Serial Number	Status
128V_RM1		CONVERGE Pro 2 128V					 CONVERGE Pro 2 1 	0916-1706-06	
Beamfo	rmer_RM1	Beamforming Mic Array 2	0916-1706-06				 Beamforming Mic Ar 	rray 2 2040-1707-06	

7. Once you have matched the serial numbers of the physical hardware to the hardware in the project file, everything will be green. Click Load Project to Stack.

< [P	Load F	Project to Stack Planned Devices —					Connected Devices	5		
File Name C:\My Documents\Tutorial_Project.PCCP2			Browse							
	Status	Device Name	Product	Serial Number			Device Name	Product	Serial Number	Statu
	Good	128V_RM1	CONVERGE Pro 2 128V	0916-1706-06	-		128V_RM1 -	CONVERGE Pro 2 128V	0916-1706-06	Good
		Beamformer_RM1	Beamforming Mic Array 2	2040-1707-06	•		Beamformer_F 🔻	Beamforming Mic Array 2	2040-1707-06	

Once the project has finished loading to the stack, it is ready for testing.

» NOTE: During the testing phase, it is necessary to optimize the gain structure following ClearOne's guidelines. Correct gain structure is essential for achieving effective echo cancellation and other mic processing. Please refer to the Optimizing Gain Structure technical note document:

http://www.clearone.com/resources#professional audio

PART III: BFM2 CONNECTION TROUBLESHOOTING GUIDE

The BFM2 must be powered using a PoE injector. The ClearOne PoE injector for the BFM2, part number 910-3200-202, can power up to three BFM2s or other devices through the P-Link connection.

Connect the hardware as follows:

1. Connect the PoE injector to the P-Link PoE port on the back of the CP2 unit.



2. Connect a standard network cable to the P-Link Out port on the CP2 unit.



3. Connect the other end of this cable to the P-Link In port on the BFM2.



- 4. Ensure that the Power Selection Switch is switched to the P-Link position.
 - » NOTE: It is also possible to connect the PoE injector directly to the PoE In port on the BFM2 as long as the Power Selector Switch is set for PoE. However, this requires two separate cable runs from the rack to the BFM2.
 - » NOTE: Do not connect the PoE injector between the CP2 unit and the BFM2.

Third-party PoE injectors can, in some cases, be used to power the BFM2. However, they must meet the correct IEEE standards and use PoE Mode B. To power one BFM2, a PoE injector must meet the IEEE 802.3AF standard. To power up to three BFM2s, it must meet the IEEE 802.3AT standard for PoE-Plus. Note that the BFM2 only supports PoE Mode B. It does not support Mode A. Network switches cannot be used since they use Mode A. Some third-party PoE injectors also use Mode A, so these also cannot be used. For further information, see the PoE and CP2 P-Link Peripheral Products technical App Note in the Resource Library:

http://www.clearone.com/resources#professional audio

You can also find the CONVERGE Pro 2 CONSOLE User Manual in the Resource Library for further CP2 setup and configuration details.

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