Gentner
Technical Services

Audio Perfect™ Products

Distributed Echo Cancellation

Audio Perfect 800

Audio Perfect 10

Audio Perfect 400

Audio Perfect IR Remote

Audio Perfect Tools

Distributed Echo Cancellation™

- Single Echo Cancellation vs. Distributed Echo Cancellation.
- Advantages of Distributed Echo Cancellation

Single Echo Canceller

SINGLE ECHO CANCELLER

AUDIO FROM DISTANT SITE

SAMPLE (EC REF)

ACOUSTIC ECHO

ECHO CANCELLED AUDIO

DIGITAL ECHO CANCELLER

MIC MIXER

Distributed Echo Cancellation™

Advantages of Distributed Echo Cancellation™

- One echo canceller per microphone
- Faster convergence
- Plug and play operation
- Allows operation in a greater variety of environments
- Better duplex
- More tolerant to changes in the environment

Audio Perfect™ 800

Product Features & Technical Description
Setup and Calibration

AP800 Features

- Distributed Echo Cancellation™ technology; each microphone has its own echo canceller for a total of eight per unit.
- Plug and play echo cancellation.
- Eight mic / line selectable, echo cancelled inputs with built in auto mixing and four line level inputs for a total of 12 inputs.
- 12 line level outputs.
- 12 x 12 matrix mixer.
- All inputs and outputs can be independently adjusted and muted.
- Two internal sub-mixing buses used for mixing and level control in sound reinforcement systems.
- RS232 control and programming
- Programmable contact closure control.
- Expandable using a high speed digital network bus. (G-Link)
- Password protection

AP800 Mic/Line Inputs 1-8

AP800 Line Inputs A-D

Matrix

AGC — On/Off

AGC — On/Off

AGC — On/Off

AGC — On/Off

Mute — On/Off

Mute — On/Off

Mute — On/Off

Mute — On/Off

Input Gain (+/- 20)

Input Gain (+/- 20)

Input Gain (+/- 20)

Input Gain (+/- 20)

A/D

A/D

A/D

A/D

+ −

+ −

+ −

+ −

Input A

Input B

Input C

Input D

AP800 Line Outputs A-D & 1-8

A - D

| Output A | Output D | Output 1 | Output 8 |

1 - 8

Output A   Output D   Output 1   Output 8

+   -   +   -   +   -   +   -

D/A   D/A   D/A   D/A

Output Gain (+/- 20)   Output Gain (+/- 20)   Output Gain (+/- 20)   Output Gain (+/- 20)

Mute — On/Off   Mute — On/Off   Mute — On/Off   Mute — On/Off

NOM — On/Off   NOM — On/Off   NOM — On/Off   NOM — On/Off

Matrix

AP800 Sub-bus

AP800 G-Link

AP800 Routing Matrix

Routing Matrix Setup		Outputs				G-Link			Sub-bus		Outputs							
		A	B	C	D	X	Y	Z	S1	S2	1	2	3	4	5	6	7	8
From Codec Receive	**Input A**		X	X	X		X											
From AP10 Receive	**Input B**	X		X	X		X											
Tape Play	**Input C**	X	X		X		X											
	Input D	X	X	X	X		X											
Mic Inputs From Other AP's	**G-Link X Bus**	X	X	X		▓												
Line Inputs From Other AP's	**G-Link Y Bus**	X	X	X	X		▓											
	G-Link Z Bus							▓										
	Sub-bus S1 In								▓									
	Sub-bus S2 In									▓								
Mic 1	**Mic / Line 1***	G	G	G		G					N							
Mic 2	**Mic / Line 2***	G	G	G		G						N						
Mic 3	**Mic / Line 3***	G	G	G		G							N					
Mic 4	**Mic / Line 4***	G	G	G		G								N				
Mic 5	**Mic / Line 5***	G	G	G		G									N			
Mic 6	**Mic / Line 6***	G	G	G		G										N		
Mic 7	**Mic / Line 7***	G	G	G		G											N	
Mic 8	**Mic / Line 8***	G	G	G		G												N

* G = Gated   N = Non-Gated

Echo Cancellation Setup				Outputs								G-Link
	A	B	C	D	1	2	3	4	5	6	7	8	EC Ref
Define EC Ref 1				X									
Define EC Ref 2													
Define G-Link EC Ref													▓

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System Wide Parameters

- Presets 1-6
- Lock Front Panel
- Set Passcode
- Mixer Mode
  - Master-Single
  - Master-Linked
  - Slave
  - Dual

- RS232
  - Baud Rate
  - Flow Control
  - Enable Modem
- Device ID
  - AP800 0-7
- Unit ID
- Gate Parameters….

Gate Parameters

- Adaptive Ambient
- Gate Ratio
  - 0-50dB (15dB)
- Hold Time
  - .1-8 seconds (.3)
- Decay Rate
  - (slow), Medium, Fast
- Off Attenuation
  - 0-50dB (12)

- First Mic Priority
- PA Adaptive
- Last Mic Mode
  - Last On
  - (Off)
  - Mic 1
- Manual Ambient
  - 0 to -70dB (-30)
  - Inactive when adaptive ambient is on.

Microphone Gating

RS232 Serial Port

**Allows real time control and status of all functions
of the system, including::**

- Input and output gain control and audio levels
- Channel input and output muting control and status
- Mic/line input select
- Phantom power on/off
- Control and status of AGC, EQ and echo cancellation

- Auto mixing/gating parameters
- Microphone gate status
- Routing
- Control/Status port configuration
- Preset control and configuration
- Password protection
- G-Link control

RS232 Command Structure

Signifies the start of a command line

Command

O=Output
I=Input
S=Subbus

Level (dB)

#10 GAIN D O 1 R

Device Type
1=AP800
2=AP10
3=AP400
* All devices

Device ID
0-7 AP800/400
0-F AP10
* All units

Channel
1-8, A-D
* Global 1-8

R=Relative level change
A=Absolute level change

1=On state
0=Off state
2=Toggle state

#31 MUTE 2 I 1

#1* GAIN * I 6 A   #11 MUTE * I 1   #11 MUTE * I 0

Remote Control / Status Port

- Control via momentary or sustained contact closure to ground.
- Status provides open collector outputs capable of sinking 40mA.
- The first 16 pins on each port are programmable.

AP STATUS PIN

AP CONTROL PIN

LED

SWITCH

AP GROUND
(Pin 25 Port A)

AP +5VDC
(AP800 Pin 23 or 24 Port B)
(AP400 Pin 23 or 24 Port A)

AP800 Front Panel

Gentner AP800 Ver. 1.00

System	Inputs	Outputs	Routing	Meter
Select Preset	Inputs 1-8	Output 1-8	Route to: Outputs 1-8	Inputs
Lock Panel	Inputs A,B,C,D	Output A,B,C,D	Route to: Outputs A,B,C,D	Outputs
Set Passcode	Subbus 1,2		Route to: Subbus 1,2	ERL
Device ID			Route to: G-Link X,Y,Z	ERLE
Unit ID's			Route to: EC Ref. 1,2	Default Meter
Mixer Mode			Route to: G-Link EC Ref.	
Gate Parameters				
RS232				

Setup and Calibration

- Set system parameters.
  - Device ID
  - Mixer Mode (Master/Slave configuration)
- Set microphones (inputs 1-8) input gain to a level of approximately 0 dB when someone is speaking at a normal level and distance from the microphone.
- Set line inputs (A-D) for a level of 0 dB.
- Route inputs to desired outputs.
  - Utilize default routing.
- Setup echo canceller reference (EC Ref)
- Set desired output levels.

Audio Perfect™ 10

- Audio Perfect system analog telephone interface.
- G-Link network connection with AP800 and AP400.
- Simultaneous two-wire/four-wire operation within an AP system.
- DTMF Dialing capability.
- Remote ON/OFF control via serial commands or contact closure.
- Full time digital telco echo cancellation.
- Conference up to 16 callers (with 16 AP10s) within an Audio Perfect system.
- Selectable auto answer and auto disconnect.

AP10 Block Diagram

Setup and Calibration

- Connect G-Link to AP800 or AP400 (Control only on AP10)
- Connect Receive Output to a line input on the AP800 or AP400. Default is input B.
- Connect the Transmit Input to a line output on the AP800 or AP400. Default is output B.
- Setup input and output gain on the AP800 or AP400.
- Setup dip switches including device ID.
- To make a call: Dial the phone # via the serial port or a telephone set connected to the set jack, then press the ON button to put caller into conference.

Audio Perfect™ 400

Same as AP800 except:

- Four mic / line selectable, echo cancelled, inputs with built in auto mixing and four line level inputs for a total of 8 inputs
- Eight line outputs
- 8 x 8 routing matrix
- One Subbus
- One Control/Status port
- Built in telephone interface with all the capabilities of the AP10.
- Built in 5 watt power amplifier

Can be G-Linked to both the AP800 and AP10.

Setup and calibration is the same as the AP800 and AP10.

AP400 Inputs

AP400 Outputs

Output A	Output D	Telco Out	Speaker Output	Output 1	Output 4

A - D
1 - 4

5W PA

D/A

Limiter
LowPass

Output Gain (+/- 20)

Mute — On/Off
NOM — On/Off

Matrix

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AP400 Routing Matrix

Routing Matrix Setup		To Codec Transmit (A)	To Tape Record (B)	To PA System (C)	To Telco Transmit (D)	Telco	G-Link X	G-Link Y	G-Link Z	Sub bus	Direct 1	Direct 2	Direct 3	Direct 4
From Codec Receive	Input A		X	X	X	X		X						
	Input B	X		X	X	X		X						
Tape Play	Input C	X	X		X	X		X						
	Input D	X	X	X	X	X		X						
From Telco Receive	Telco Receive	X	X	X	X			X						
Mic Inputs From Other AP's	G-Link X Bus	X	X	X		X								
Line Inputs From Other AP's	G-Link Y Bus	X	X	X	X	X								
	G-Link Z Bus													
	Sub-bus													
Mic 1	Mic / Line 1*	G	G	G		G	G				N			
Mic 2	Mic / Line 2*	G	G	G		G	G					N		
Mic 3	Mic / Line 3*	G	G	G		G	G						N	
Mic 4	Mic / Line 4*	G	G	G		G	G							N

* G = Gated   N = Non-Gated

Echo Cancellation Setup	Outputs A	B	C	D	Outputs 1	2	3	4	G-Link EC Ref
Define EC Ref & PA (Speaker Output)				X					
Define G-Link EC Ref									

AP IR Remote

- Small and easy to use handheld infrared remote for AP800, AP400, AP10.
- Control Features include:
  - Connect and disconnect
  - Dial a telephone number
  - Redial
  - Store & activate speed dial
  - Hook flash
  - Volume control
  - Mute control
- Programmable for custom operation
- IR range: 25-40 feet
- Angle of acceptance: 90^0-120^0 (+/-60^0 max from center)

Troubleshooting

- Acoustic Echo
  - Verify that EC Ref is correct
  - Verify proper input / output levels
  - Check routing
- Poor Duplex
  - NLP settings
  - Verify proper input / output levels
  - Room conditions
- Audio Cuts In and Out
  - Gate Parameters
  - Max. # of mics and Gate Ratio
  - Mics routed to their own EC Ref.

- Noise
  - Transmitted
    - Room noise
    - Mic cables & power module
  - Received
    - Far end or network noise
    - Poor SNR due to improper gain settings
- Telco Echo (Side-Tone)
  - Verify proper telephone line parameters.
  - Verify proper levels to telephone interface

Troubleshooting

- Error Codes
  - Indicated on LCD or on front panel flashing LEDs.
    - D0=Sync error caused by improper master/slave configuration
    - D1=Device ID conflict
    - 21=Baud rate mismatch
    - 22=Improperly set flow control on linked units

- Cannot connect via RS232
  - Verify serial cable is straight through, not null modem
  - Verify baud rate on AP unit matches control device (Error 21)
  - Verify correct com port

AP400

+12
+8
+4
0
-2
-10
-30

1
2
3
4

D
1

ERROR D1

AP800

-12
+8
+4
0
-4
-10
-30

1
2
3
4
5
6
7
8

D
0

ERROR D0

Audio Perfect™ Tools….