

APPLICATION NOTE

KudosPro Application note 8

Audio Processing





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Introduction

The KudosPro audio process has been extensively modified in version V1.3. The audio menus can appear daunting and complex at first glance. However, the interface is designed to be intuitive and can be mastered in a relatively short time.

There are various audio menus appearing at both system level and at channel level.

In the System menu there are two submenus:

- Audio Routing
- Audio Control

Each video channel has its own set of audio menus. These are:

- Audio Routing
- Audio Control
- Audio Shuffle

'System' menus control global settings that affect all video processing channels.

'Channel' menus adjust only parameters associate with a particular video channel.

System Audio Menus

Audio routing

AES 1 AES 2 AES 3 AES 4 Analog Group 1 Analog Group 2		Ch 1 Pair 1 Ch 1 Pair 2 Ch 1 Pair 3 Ch 2 Pair 4 Ch 2 Pair 4 Ch 2 Pair 4 Ch 2 Pair 4 Ch 2 Pair 2 Press and hold for preset	🐼 Done
MC2000 0000:08:00	- KudosPro Frame		
nlock	Unit Statu	5	
dio Routing	MC2000	10 81 82	
dio Control	Ref Los	55	
BS	Ver 16	7.3X.4	
by	×		
ES Output AES 1	AES 2	AES 3	AES 4
Ch 1 Pair 2	Ch 1 Pair 2	Ch 1 Pair 2	Ch 1 Pair 2
Ch 1 Dair 3	Ch 1 Pair 3	Ch 1 Pair 3	Ch 1 Pair 3
Ch 1 Dair 4	Ch 1 Dair 4	Ch 1 Dair 4	Ch 1 Pair 4
Ch 2 Dair 4	Ch 2 Dair 1	Ch 2 Dair 1	Y Ch 2 Dair 1
		C. C	Care Paul
nalog Output		1	
Group 1	Group 2		
Ch 1 Dairs 1 & 2	Ch 1 Pairs 1 & 2		
CIT I FOID FOIL	Ch 1 Pairs 3 & 4		
Ch 1 Pairs 3 & 4			
Ch 1 Pairs 3 & 4 Ch 2 Pairs 1 & 2	Ch 2 Pairs 1 & 2		

Figure 1: System Menu - Audio Routing submenu

There are two submenus in the Audio Routing Menu:

- AES Output
- Analog Output

AES Output

Status System Au	dio Routing Sys	tem	System Aud	lio Routing AES 1			
AES 1 AES 2 AES 3 AES 4 Analog Group 1 Analog Group 2			Constant of the second se	Ch 1 Pair 1 h 1 Pair 2 h 1 Pair 3 h 1 Pair 4 h 2 Pair 1 h 2 Pair 2 h 2 Pair 2 h 3 Pair 2	📀 Done		
S Output							
S Output		AES 2		LAES 3		AES 4	
S Output ES 1 C h 1 Pair 1		AES 2		AES 3		AES 4	^
S Output ES 1 Ch 1 Pair 1 Ch 1 Pair 2		AES 2 Ch 1 Pair 1 Ch 1 Pair 2		AES 3 Ch 1 Pair 1 Ch 1 Pair 2	Â	LES 4	-
S Output ES 1 Ch 1 Pair 1 Ch 1 Pair 2 Ch 1 Pair 3	Ô	AES 2 Ch 1 Pair 1 Ch 1 Pair 2 Ch 1 Pair 3	Ô	AES 3 Ch 1 Pair 1 Ch 1 Pair 2 Ch 1 Pair 3	Ô	SES 4 Ch 1 Pair 1 Ch 1 Pair 2 Ch 1 Pair 3	Ô
S Output ES 1 Ch 1 Pair 1 Ch 1 Pair 2 Ch 1 Pair 3 Ch 1 Pair 4	Î	AES 2 Ch 1 Pair 1 Ch 1 Pair 2 Ch 1 Pair 3 Ch 1 Pair 4	Ô	AES 3 Ch 1 Pair 1 Ch 1 Pair 2 Ch 1 Pair 3 Ch 1 Pair 4	Ô	LES 4 Ch 1 Pair 1 Ch 1 Pair 2 Ch 1 Pair 3 Ch 1 Pair 4	Î

Figure 2: AES Output configuration

The AES outputs are derived from the Embedded Audio Pairs 1 to 4.

This menu allows configuration of which particular embedded audio pair that each AES output (balanced or unbalanced) is derived from.

Note - Only pairs 1-4 from each channel can be routed to the AES output. Pairs 5-8 are not available on the AES Output.

Analog Output

Status System Audio Routing System AES 1 AES 2 AES 4 Analog Group 1 Analog Group 2	System Audio Routing Analog Group 1 Ch 1 Pairs 1 & 2 Ch 1 Pairs 3 & 4 Ch 2 Pairs 3 & 4 Ch 2 Pairs 3 & 4 Ch 3 Pairs 3 & 4 Ch 3 Pairs 3 & 4 Press and hóld fôr prese? Done
nalog Output Group 1	Group 2
Ch 1 Pairs 1 & 2	Ch 1 Pairs 1 & 2
Ch 1 Pairs 3 & 4	Ch 1 Pairs 3 & 4
Ch 2 Pairs 1 & 2	Ch 2 Pairs 1 & 2
Ch 2 Pairs 3 & 4	Ch 2 Pairs 3 & 4

Figure 3: Analog Audio Output configuration submenu

The analog audio outputs can be derived from the embedded audio groups 1 and 2 of any video channel.

Note - Only groups 1–2 from each channel can be routed to the analog output groups. Groups 3- 4 are not available for configuration into the analog output groups.

Audio groups may be comprised of audio pairs from different video channels. The appropriate pairing may be selected in the 'Analog Output Group' selection menu. In the following example Group 1 Analog output has been configured to be derived from Video Channel 3, pair 2 and Video channel 4, pair 2

Analog Output	
-Group 1	
Chs 1 & 2 Pair 4	^
Chs 3 & 4 Pair 1	\cap
Chs 3 & 4 Pair 2	
Chs 3 & 4 Pair 3	
Chs 3 & 4 Pair 4	*

Figure 3a: Analog Audio routing example.

Note: Figure 3a shows an audio menu from a four channel KudosPro unit, such as an LC4000. Analog outputs may be configured any of the four video channels available.

Figure 3 shows the same menu, but for a two channel converter, such as an MC2000. Hence, only video channels 1 and 2 are offered as possible sources of audio for the analog audio output.

Audio Control

E MC2000 0000:08:00 - KudosPro F	rame
Genlock	Unit Status
Audio Routing	MC2000
Audio Control	IP 1/2.19.81.82 Ref Loss
CVBS	Ver 167.3X.4
Dolby	
Input Analog ADC Headroom Pair 1 18 Pair 2 18 Pair 3 18 Pair 4 18 Pair 4 18 Pair 4	AES input Type Peir 1 Balanced Unbalanced Pair 2 Balanced Unbalanced Pair 3 Balanced Unbalanced Pair 4 Balanced Unbalanced
Output Analog DAC Level Pair 1 18 Pair 2 18 Pair 3 18 Pair 4 18 Pair 4 18 Pair 4 18 Pair 4 18	



Figure 4: System Menu - Audio Control Menu

There are two submenus in the Audio Control Menu

- Input

- Output

Input

There are two further sub-menus in the 'Input' menu

- Analog ADC Headroom
- AES Input type

Analog ADC Headroom

Pair 1	Status System Audio Control System AES Input Type Analog In ADC Headroom Analog Out DAC Level	
Pair 2 18 P		
Pair 3 18 P	ntrol Analog In ADC Headroom System Pair 1 Pair 2 Pair 3	System Analog In ADC Headroom Pair 1
Pair 4 18 P	ran 4	Press and hold for preset Sone

Figure 5: Input Analog ADC Headroom adjustment menu

This sub-menu allows for adjustment of the ADC headroom level for each analog input pair. The adjustment range is 12 dB to 24 dB. The preset value is 18 dB.

AES Input type

AES Input Type	Status System Audio Control System	
Pair 1 Salanced Unbalanced	AES Input Type Analog In ADC Headroom Analog Out DAC Level	
Pair 2 Balanced		
O Unbalanced		
 Balanced Unbalanced 	Audio Control AES Input Type System	System AES Input Type Pair 1
Pair 4	Pair 1 Pair 2 Pair 3 Pair 4	Balanced Unbalanced
O Unbalanced		Press and hold for preset Sone

Figure 6: Input AES source type selection menu

This sub-menu is used to select an AES input source from either the balanced or unbalanced input connections (if fitted).

Output

There is only one sub-menu in the 'Output' menu

- Analog DAC level



Figure 7: Output Analog DAC headroom adjustment menu.

This sub-menu allows for adjustment of the DAC headroom level for each analog output pair. The range of adjustment is 12 dB to 24 dB. The preset value is 18 dB.

Channel Audio Menus

Each KudosPro channel has three audio menus associated with it:

- Audio Routing
- Audio Control
- Audio Shuffle

Audio Control Menu

Channel 1 0000:08:01 - KudosPro	MC			
Invert	Uni Status Channel 1 Inp Loss Out 625 50i Emb 2 Loss			Status I Centrel Ch 1 Video Convert ARC Audio
Poir 1 Poir 2	Pair 3 Pair 4	Pair 6	Pair 7 Pair 8	Timecode Metadaa Memory Rolifcall
0.0dB 0.0dB 0.0dB	0.0dB 0.0dB 0.0dB 0.0dB	0.0dB 0.0dB 0.0dB 0.0dB	0.0dB 0.0dB 0.0dB	Status Control Audio Ch 1
999	P P P	P P P	P P P	Routing Control
LU KHZ P				
Part 1 0 ms Total 90 ms	Par 3 O ms Totel 90 ms	Pair 5 0 ms Total 90 ms	O ms Pl Total 90 ms	itatus Control Audio Control Ch 1
Pair 2 0 ms P Total	Pair 4 O ms Total Total	Pair 6 Oms Cons P	Pair 8 Oms Dims Trail	Tone Frequency Delay
Global Delay Audio		Video		
Total 90 ms		Total 90 ms		

Figure 8: The Channel 'Audio Control Menu'.

Within the Channel audio control menu there are several sub-menus

- Gain
- Tone Frequency
- Delay
- Global Delay

Gain

Control Audio Contro Pair 1 L Pair 1 R Pair 2 L Pair 3 L Pair 3 L Pair 3 L Pair 3 L	ol Gain Ch 1	Ch 1 G	o.0 dB	⊟в			
Pair 4 L Pair 4 R		Press and	d hold for preset	S Done			
Gain Pair 1	Pair 2	Pair 3	Pair 4	Pair 5	Pair 6	Pair 7	Pair 8
0.0 dB 0.0 dB	0.0 dB 0.0 dB	0.0 dB 0.0 dB	0.0 dB 0.0 dB	0.0 dB 0.0 dB	0.0 dB 0.0 dB	0.0 dB 0.0 dB	0.0 dB 0.0 dB
P P	P P	P P	P P	P P	P P	P P	P P

Figure 9: The 'Gain' control menu within the Channel audio Control menu.

This menu allows for audio gain adjustments of the individual audio channels. The adjustment range is -18dB to +18dB in 0.3dB steps. The default value is 0 dB.

Tone Frequency				
	Status Control Audio Control	Ch 1	Ch 1 Control Tone Free	quency
Tone Frequency 1.0 kHz	Gain Tone Frequency _{Delay}		1.0 kHz 0.1 kHz	2 10.0 kHz
			Press and hold for preset	📀 Done

Figure 10: Tone Frequency adjustment control

This control allows the User to set the frequency of the internal Tone Generator. The range of adjustment is 100 Hz to 10 KHz.

Note: Audio Tones are Enabled/Disabled in the Audio Shuffle menu.

Delay

There are two sub-menus in the Delay menu:

- Global Delay Pair Offsets
- Global Delay

Global Delay

Control Audio Control Delay Ch 1		Control Delay Global Delay	Ch 1	Ch 1 Global Delay Audio	
Global Delay Pair Offsets Global Delay		Audio Audio Total Video Total		0 ms -40 ms	200 ms
				Press and hold for preset	🥏 Done

Г	Global Delay	
	Audio	Video
	0 ms	
	P	
	Total	Total
	76 ms	76 ms

Figure 12: Global Delay submenu

The Global Delay control adjusts the audio delay relative to the video delay. The adjustment range is -40 ms to 200 ms. The preset value is 0 ms.

This control applies the same delay value to all 8 audio pairs.

The actual video propagation delay is also reported in this window. Any adjustment to the audio Global Delay is relative to the video delay.

Global Delay Pair Offsets

Delay Global Delay Pair Offsets	Ch 1	Ch 1 Global Delay Pair O	ffsets Pair 1
Pair 1			
Pair 1 Total		0	
Pair 2		0 ms	
		<u>⊙</u>	
		-40 ms	200 ms
Pair 3 Total			
		Press and hold for preset	Done
p 1 m		rices and hold for preset	

Global Delay Pair Offsets			
Pair 1	Pair 3	Pair 5	Pair 7
0 ms	0 ms	0 ms	0 ms
		P	P
Total	Total	Total	Total
76 ms	76 ms	76 ms	76 ms
Pair 2	Pair 4	Pair 6	Pair 8
Pair 2 0 ms	Pair 4 0 ms	Pair 6 0 ms	Pair 8 0 ms
Pair 2 0 ms	Pair 4 0 ms	Pair 6 0 ms	Pair 8 0 ms P
Pair 2 0 ms Total	Pair 4 0 ms Total	Pair 6 0 ms Total	Pair 8 0 ms Total
Pair 2 0 ms Total 76 ms	Pair 4 0 ms Total 76 ms	Pair 6 0 ms Total 76 ms	Pair 8 0 ms Total 76 ms

Figure 13: 'Global Delay Pair Offsets' menu

Individual audio pairs may have an audio delay offset applied to them in the 'Global Delay Pair Offset' menu. Any delay set here is added to the Global Delay value. The delay value displayed (Total) for each pair is the 'Global Delay' plus the 'Offset' delay.

Audio Routing and Audio Shuffle

As audio passes through the KudosPro product, it first encounters the 'Audio Routing' process. Here each of the 8 audio processor source pairs are defined. The defined audio pairs are then passed on to the 'Audio Shuffle' process. Here individual channel routing is possible. The 'Audio shuffle' menu also allows individual audio channels to be set to:

- Tone
- Silence (mute)
- Phase inverted



Audio Routing

ndeo	^	Unit Statu	IS			1			
Ionvert		Channe	11						
ARC		Inp 10	80 59i						
Audio Routing		AES 1	5 591 Lose						
Audio Control	~								
Routing									
Input Pairs		Proces	s Pairs						
		Statu	s						
		Р	Р	Р	р	L	L	L	L
Same	Status	Dair1	Dair?	Dair?	Daird	Dair6	Daire	Dair7	DairS
Embedded 1	PCM	• an 1.	0	0	0	O	0	0	0
Embedded 2	PCM	0	۲	0	0	0	0	0	0
Embedded 2	PCM	0	0		0	0	0	0	0
Embedded 4	PCM	0	0	0	۲	0	0	0	0
Embedded 5	Loss	0	0	0	0		0	0	0
Embedded 6	Loss	0	0	0	0	0	۲	0	0
Embedded 7	Loss	0	0	0	0	0	0	۲	0
Embedded 8	Loss	0	0	0	0	0	0	0	۲
AFC 1	1.055	0	0	0	0	0	0	0	0
ALS 1 AFS 2	Loss	0	0	0	0	0	0	0	0
ALS 2 AFS 3	Loss	0	0	0	0	0	0	0	0
AES 3	Loss	0	0	0	0	0	0	0	0
Auglan 4	DCM		0	0	0	0	0	0	0
Analog 1 Analog 2	DCM	0	0	0	0	0	0	0	0
Analog 2	DCM	0	0	0	0	0	0	0	0
Analog 3 Analog 4	PCM DCM	0	0	0	0	0	0	0	0
Analog 4	r CIVI		0		0	0	0		0
Dolby Decoder 1	PCM	0	0	0	0	0	0	0	0
Dolby Decoder 2	Loss		0	0	0	0	0	0	0
Dolby Decoder 3	Loss	0	0	0	0	0	0	0	0
Dolby Decoder 4	Loss	0	0	0	0	0	0	0	0
Dolby Downmix	Loss	0	0	0	0	0	0	0	0
Dolby Encoder	LOSS	0	0	0	0	0	0	0	0



Figure 15: Channel Audio routing menu

The audio routing menu allows the user to define the audio pairs to be passed to the Audio Shuffler. Here audio signals are controlled in 'pairs'.

Source/Status

rce	Status
Embedded 1	PCM
Embedded 2	PCM
Embedded 3	PCM
Embedded 4	PCM
Embedded 5	Loss
Embedded 6	Loss
Embedded 7	Loss
Embedded 8	Loss
AEC 4	Loop
AESI	Loss
ALS 2	Loss
AES J	Loss
AES 4	LUSS
Analog 1	PCM
Analog 2	PCM
Analog 3	PCM
Analog 4	PCM
Dolby Decoder 1	PCM
Jolby Decoder 2	Loss
olby Decoder 3	Loss
Dolby Decoder 4	Loss
Dolby Downmix	Loss
Dolby Encoder	Loss

Figure 16: Available audio sources window

The 'Input Pairs' field shows the possible audio inputs available and the 'status' of these audio inputs.

Note: the analog audio inputs will always report 'PCM' regardless of whether or not audio is present. Any analog input will be converted via an ADC to PCM and then processed as PCM. Hence the 'Status' of the Analog source will indicate 'PCM'.

Note: Dolby Encoder inputs are routed from the Dolby Decoder outputs. If the particular video channel can support the Dolby option, but the option is not installed, the Dolby 'sources' and 'status' will be grayed out. If a particular video channel cannot support Dolby (LC/SV2000 Channel 2, LC/SV4000 Channels 2 & 4) then the Dolby sources will simply not appear.

Routing

put Pairs		Proces	s Pairs — o						
		P	р	Р	Р	L	L	L	L
Source	Status	Pair1	Pair2	Pair3/	Pair4	Pair5	/Pair6	Pair7	Pair8
Embedded 1	PCM		0	0	0	0	\bigcirc	0	0
Embedded 2	PCM	0	۲	0	0	0	\bigcirc	0	0
Embedded 3	PCM	0	0		0	0	\circ	0	0
Embedded 4	PCM	0	0	0	۲	0	\circ	0	0
Embedded 5	Loss	0	0	0	0	۲	0	0	\circ
Embedded 6	Loss	0	0	0	0	0	۲	0	\bigcirc
Embedded 7	Loss	0	0	0	0	0	\circ	۲	0
Embedded 8	Loss	0	0	0	\bigcirc	0	0	0	۲
AES 1	Loss	0	0	0	0	0	0	0	0
AES 2	Loss	0	0	0	0	0	\bigcirc	0	0
AES 3	Loss	0	0	0	0	0	0	0	$^{\circ}$
AES 4	Loss	0	\bigcirc	0	\bigcirc	0	0	0	0
Analog 1	PCM	0	0	0	0	0	0	0	0
Analog 2	PCM	0	0	0	0	0	0	0	0
Analog 3	PCM	0	0	0	\bigcirc	0	\circ	0	\bigcirc
Analog 4	PCM	0	0	0	0	0	0	0	0
Dolby Decoder 1	PCM	0	0	0	0	0	0	0	0
Dolby Decoder 2	Loss	0	0	0	0	0	0	0	0
Dolby Decoder 3	Loss	0	0	0	0	0	0	0	0
Dolby Decoder 4	Loss	0	0	0	0	0	0	0	0
Dolby Downmix	Loss	0	0	0	0	0	0	0	0
Dolby Encoder	Loss	0	0	0	0	0	0	0	0





The 'Process Pairs' menu allows the input pair to each audio processor to be defined. Figure 17 shows the default settings.

The Processed Pairs 'status' displays the type of audio presented to the audio processor. The possible tags are:

P PCM L Loss N Non-PCM

Audio Shuffle

The outputs from the audio routing section are then passed on to the 'Audio Shuffle' process.





Figure 18 : The 'Audio Shuffle' menu.

Audio Shuffle Configuration



Audio Shuffle Output Pair 1 L	Ch 1 Output Pair 1 L Process Pairs Source
Process Pairs Source Invert Phase Control	Pair 1 L Pair 1 R Pair 2 L Pair 2 R Pair 3 L Pair 3 R Press and hölig för preset © Done

Figure 19: Default Shuffle setting

The eight audio processor pairs (as defined by the audio routing menu) are presented to the inputs to the Audio Shuffle process. The Audio Shuffle menu allows audio channel routing to be defined. The output pairs may be mapped from any audio channel coming from the audio routing process:

			N	1	,		F		Þ		r	5	;		р	ſ	•
			1	;			3				5	6			,		3
cess Pairs		L.	R	1 L	R	L	R	L	R	[L	R	L.	R	L	R	[L	R
1	L		0	0	0		0	0	0	0	0	0	0	0	0	0	0
	R	0	0		0	0		0	0	0	0	0	0	0	0	0	0
2	L D	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0
	n i	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	L	0	0	0	0	0	0	۲	0	0	0	0	0	0	0	0	0
4	R	0	0	0	0	0	0	0	۲	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
5	R	0	0	0	0	0	0	0	0	0	۲	0	0	0	0	0	0
6	L	0	0	0	0	0	0	0	0	0	0	۲	0	0	0	0	0
	R	0	0	0	0	0	0	0	0	0	0	0	۲	0	0	0	0
7	L	0	0	0	0	0	۲	0	0	0	0	0	0	۲	0	0	0
	R	0	0	0	0	0	0	0	0	0	0	0	0	0	۲	0	0
8	L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	۲	0
	R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	۲
Invert I	Phase																1
trol																	
1.0 kHz	Tone	0	0	0	0	0	0	0	0	۲	۲	0	0	0	0	0	0
S	ilence	0	0	0	0	0	0	0	0	0	0	۲	۲	0	0	0	0
Use R	outing	۲	۲	۲	۲	۲	۲	۲	۲	0	\odot	0	0	۲	۲	۲	۲

Figure 20: Channel shuffle example

The Audio Shuffle menu allows any configuration of audio channels to be routed to the output. However, a set of rules define what combinations are legal. Illegal combinations will result in the output being forced to silence. An example of this is shown in Figure 20 above.

Output pair 3 has been configured with the left channel derived from a non-PCM pair, and the right channel from a PCM pair. This is deemed illegal and this particular pair has been forced to 'silence'.

The rules that govern the output pair combinations are shown in the following table:

		non-PCM	PCM	Tone	Silence	Loss
	non-PCM	N or F	F	F	F	F
Ch 1	PCM	F	Р	Р	Р	F
CITI	Tone	/ F	Р	Т	Р	F
	Silence	/ F	Р	Р	S	F
	Loss	F	F	F	F	F

h	2	
	2	

See Note below

Pair status is described by one of the following characters

- P-Denotes 'PCM'
- N Denotes 'Non-PCM'
- S Denotes 'Silence'
- T Denotes 'Tone'
- F Denotes 'Forced mute' (silence)

Note: if both audio channels of an audio pair have been derived from non-PCM audio channels, there are two possible states: 'N' or 'F'.

To be recognized as valid non-PCM ('N') both channels must satisfy 3 conditions:

- 1) come from the same input pair
- 2) have the left and right channels the correct way round
- 3) not have the phase inverted

A failure of any of these conditions causes the pair to be muted and the status to be reported as "F".

Output Pairs 'status'



This field describes each audio output (pairs 1 to 8).

Invert Phase

Audio Shuffle Output Pair 1 L	Ch 1	Ch 1 Output Pair 1 L Inve	ert Phase		
Process Pairs Source Invert Phase _{Control}		Invert Phase			
		Press and hold for preset	🕲 Done		
Invert Phase					

Figure 22: Invert Phase menu

In this field, the phase of any of the 16 audio channels maybe inverted. This is usually used as a correction tool for discrepancies associated with input audio.

Note that Non-PCM audio channels cannot be inverted.

Control

				Ch 1		air 1 L Cor	ntrol									
Process Pairs Source Invert Phase Control					USI USI Tone Silen	e Rout	ing									
				Press				Done								
tral																
trol																
trol 1.0 kHz Tone	0	0	0	0	0	0	0	0	•	۲	0	0	0	0	0	0
trol 1.0 kHz Tone Silence	0	0	0	0	0	0	0	0	•	• •	0	0 0	00	0	00	0

Figure 23: Audio shuffle Control menu

In this menu, each audio channel can be set to:

- Use Routing
- Silence
- Tone

When set, the 'Routing' the audio channel output is derived as per the configuration of the Audio Routing and the Audio Shuffle menus.

When set to 'Silence' a PCM carrier is output with no audio data.

When set to 'Tone', a test tone is output as defined in the channel Audio Control menu (see page 8).