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1 Introduction

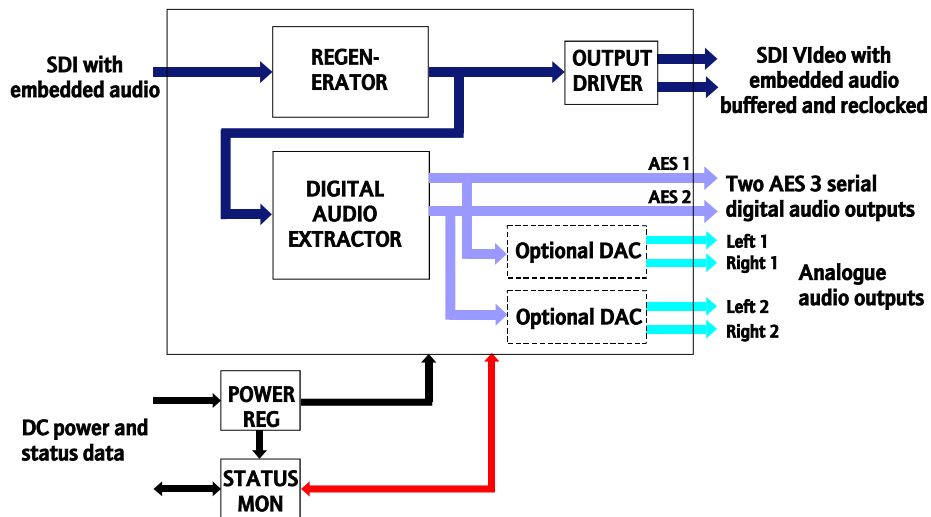
The 4429 extracts up to two dual channel digital audio signals embedded in a serial digital component video signal. The basic card provides AES3 digital audio outputs in both balanced and unbalanced formats. Up to two optional DAC sub-boards are available, each providing electronically balanced programme quality analogue outputs.

The 4429 automatically adjusts to handle audio embedded either continuously or to SMPTE 272M. Equalised and regenerated copies of the digital video input are also provided.

The module is designed to fit in the 1050 3U and 1051 1U Pro-Bel ICON modular product rackframes.

Characteristics of the 4429 module are:

- extracts two dual channel audio signals from an SDI input
- balanced and unbalanced AES3 outputs
- high quality analogue outputs with one or two stereo DACs per module
- handles synchronous or asynchronous embedded audio
- compatible with COSMOS, Pro-Bel status monitoring

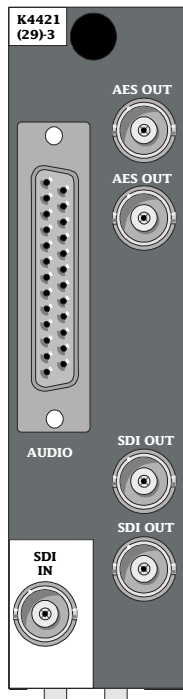
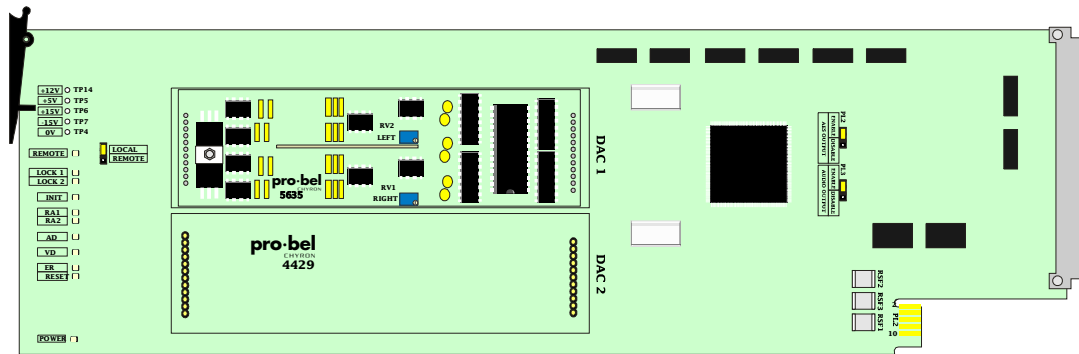


The 4429 SDI Audio Extractor

The 4429 module extracts digital audio signals embedded in a video signal fully meeting the SMPTE 272M standard or the slightly different continuous format used by Sony Betacam equipment. The module can extract any one of the four groups, that is channels 1-4, 5-8, 9-12 or 13-16, but not combinations.

2 Installation

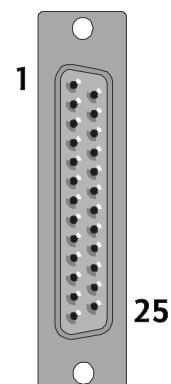
The audio extractor consists of a 4429 ICON module which uses the 30mm K4421.3 rear connector. There are five BNC connections for signal I/O and one 25 way 'D' type female socket for the AES/EBU and analogue audio output. The 30mm rear connector requires three slots in a 3U 1050 ICON frame and one module position in the 1U 1051 ICON frame.



Note: Please refer to the frame manual section for module and rear connector installation assistance.

2.1 Audio connector pin-out

Audio output connector	
25 way 'D' female socket	
Pin	Function
1	Analogue 1 - (AES 1A)
2	Analogue 1+ (AES 1A)
3	GROUND
4	Analogue 3 - (AES 2A)
5	Analogue 3+ (AES 2A)
6	GROUND
7	N/C
8	GROUND
9	N/C
10	N/C
11	GROUND
12	N/C
13	N/C
14	Analogue 2- (AES 1B)
15	Analogue 2+ (AES 1B)
16	GROUND
17	Analogue 4- (AES 2B)
18	Analogue 4+ (AES 2B)
19	N/C
20	GROUND
21	AES1-
22	AES1+
23	GROUND
24	AES2-
25	AES2+



2.2 Installing DAC sub-boards

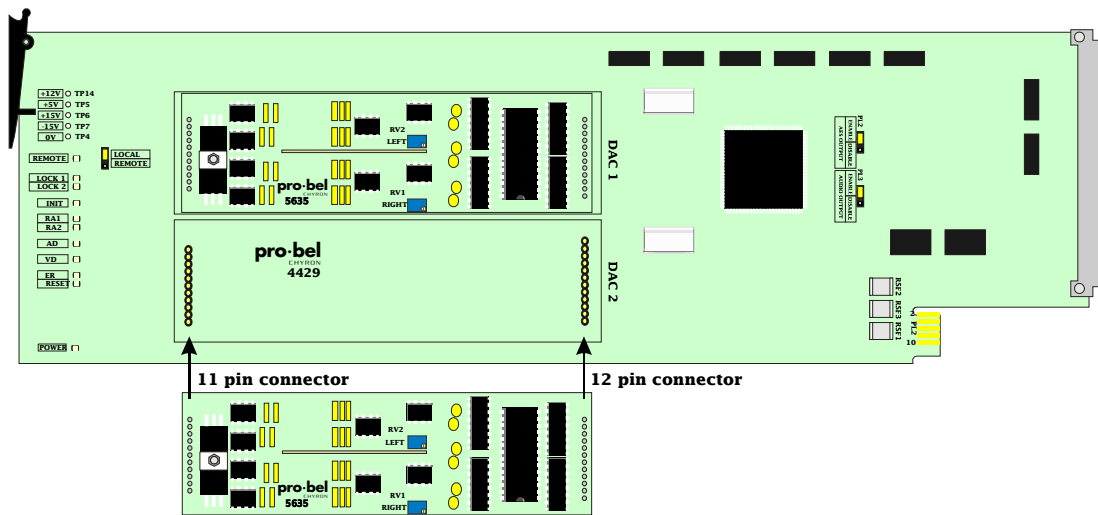
One or two 5635 DAC sub-boards can be fitted to the standard 4429 extractor at any time to provide analogue audio outputs. DAC 1 provides analogue versions of the first stereo pair, whilst DAC2 provides analogue versions of the second audio pair from the selected group.

The converter should only fit one way round into the 4429 base module, since the two header plugs are of slightly different sizes.

Proceed as follows:

- remove the 4429 base module from the frame
- fit the converter(s) as shown in the diagram, taking care to line up the pins with the base board headers
- push the converter gently into its sockets, taking care not to bend any pins
- re-insert the module into the frame

Note: Removal and insertion of the 4429 module may be done with the frame powered



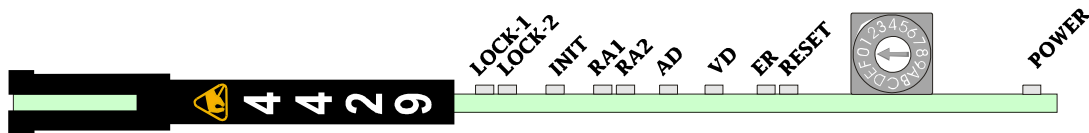
Fitting a 5635 DAC sub-board

Note: In this drawing the silkscreen writing on the 5635 ADC sub-board is shown the right way up for clarity. The actual board may have inverted text.

3 Configuration

3.1 Setting the operating mode

The rotary HEX switch, SW1, mounted on the front edge of the module sets the audio group to be extracted as detailed in the table below. The asynchronous mode should be used in situations where the embedded AES3 audio maybe unlocked.



Hex switch settings		
Mode	Group	Sync/Async
0	1	Sync
1	2	Sync
2	3	Sync
3	4	Sync
4	1	Async
5	2	Async
6	3	Async
7	4	Async

Note: Each audio group selected can provide 2 stereo pairs or 4 mono signals. It is not possible to select a stereo pair from one group and another stereo pair from a different group. At any one time all audio outputs will originate from the same group as selected by SW1.

3.2 Enabling the audio outputs

AES output

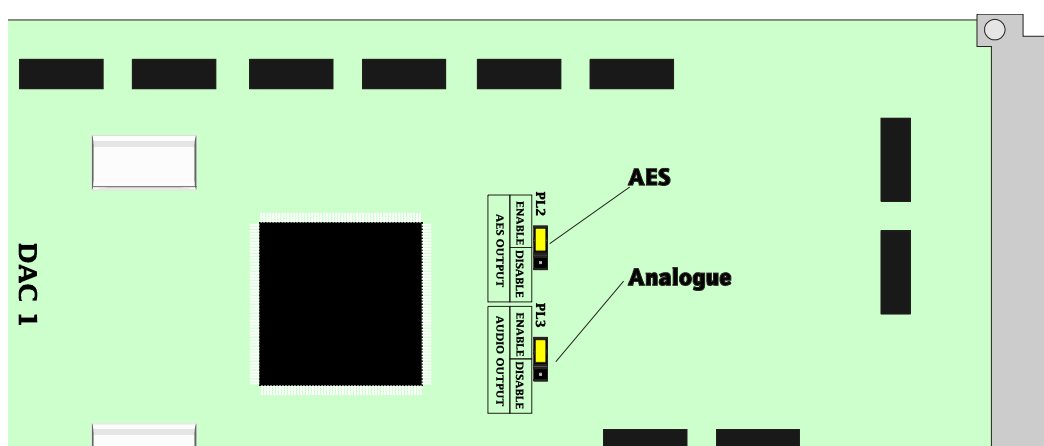
The AES output of the extractor maybe enabled/disabled by jumper PL2 and is described in the following table.

Enabling the AES output	
Position	Function
Enable	Enables the AES output
Disable	Disables the AES output

Analogue Audio output

The audio output of the extractor may be enabled/disabled by jumper PL3 and is described in the following table.

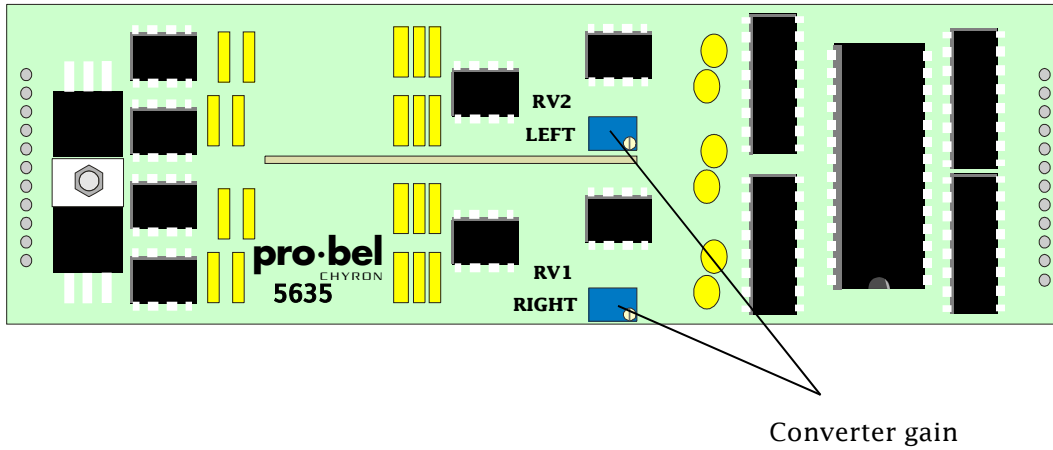
Enabling the analogue audio output	
Position	Function
Enable	Enables the analogue output
Disable	Disables the analogue output



Audio enable Jumper positions

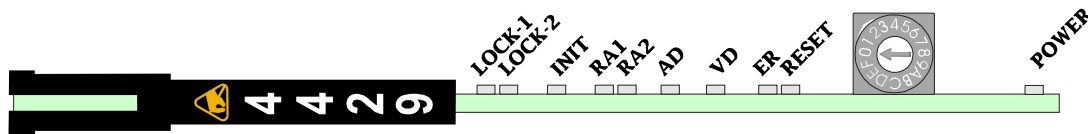
3.3 Setting analogue output levels

The analogue output levels of each 5635 DAC sub-module can be adjusted with RV1 for the right channel and RV2 for the left channel. The adjustment range is +15dBu to +24dBu for Full Scale Digital (maximum digital word or clipping). Standard factory setup is +18dBu=0dB, FSD for Europe and +24dBu=0dB, FSD for the US.



4 Trouble shooting

Once configured, the module should not need further operational adjustments unless signal or system requirements change. However, status LEDs are provided to assist in the unlikely event that problems with configuration or module performance arise.



In normal operation the following green LEDs should be illuminated, VD, AD, RA1, RA2, Lock1, Lock2 and Power. No red or yellow LED should be permanently lit, but may flash briefly during power-up.

4.1 Sample problems and their solutions

The green video present LED, VD is not illuminated

- check that the input cable is connected securely to the BNC socket on the rear panel
- check that there is a digital video signal of the correct format connected

The red error LED, ER is illuminated

- if this red LED is on, then there is no video signal present
- perform checks as for VD LED not illuminated

The green audio present LED, AD is not illuminated

- check that the input cable is connected securely to the BNC socket on the rear panel
- check that there is a digital video signal of the correct format connected
- check Hex switch is set for correct mode of operation

The green read FIFO LEDs, RA1 and RA2 are not illuminated

- RA1 and RA2 indicate the presence of either of the dual audio channels to be extracted from the chosen group
- if audio present LED, AD is lit, a module fault is indicated

The green lock LEDs, LOCK 1 and LOCK 2 are not illuminated

- these LEDs monitor the output phase lock loops
- if only one audio channel is locked then only one LED will be illuminated
- LEDs will not be illuminated when module is in asynchronous mode

The red reset LED, RESET stays illuminated

- there is a fault with the module, this LED should flash briefly on power-up

The yellow initialise LED, INIT stays illuminated

- there is a problem initialising the card, this LED should flash briefly on power-up

The green LED, POWER is not illuminated

- check mains power to the frame is turned on
- if necessary check the PSU as explained in the power supply section
- check the card is plugged in securely
- check to see if one of the resettable fuses has operated, perhaps after recent servicing work on the board. To do this turn the power off, wait for thirty seconds and then restore the power

5 Status monitoring

The module will provide the following information to the status monitoring controller, if fitted:

- module present
- video present
- embedded audio present
- audio 1 PLL locked
- audio 2 PLL locked
- DAC 1 fitted
- DAC 2 fitted
- AES output enable
- analogue output enable
- local/remote mode
- power OK

In addition, the module is programmed with the following information, which can be read by the status monitoring controller:

- Module type
- Module bar code
- Module issue no

In remote mode the following parameters can be controlled by COSMOS.

- group extracted
- synchronous/asynchronous mode

For further details of the Pro-Bel status monitoring system please refer to the COSMOS status monitoring manual.

6 Specification

Inputs

Video:	One SDI to SMPTE 259M-C (270Mb/s)with embedded audio to SMPTE 272M level A (locked 48kHz) or level D (unlocked 48kHz). Fully compliant or embedded on all lines.
Impedance:	75Ω
Return Loss:	>15dB, 10MHz to 300MHz
Equalisation:	Up to 200m Belden 8281, PSF1/2 or equivalent

Outputs

Video:	Two, SDI as input, equalised and reclocked
Impedance:	75Ω
Return Loss:	>15dB, 10MHz to 300MHz
Digital Audio:	Two, balanced, 110Ω, to AES3-1992 and unbalanced, 75Ω to AES3-id
Sample Rate:	48kHz
Analogue Audio:	One or two stereo pairs, balanced
Full Scale Level:	+15dBu, +18dBu or +24dBu
Noise (typ, +18dBu peak):	-86 dBu quasi peak, CCIR 468-2 weighted -96 dBu rms, DIN audio band

On card controls/Indicators

- Group extracted
- Synchronous/asynchronous mode
- AES output enable
- Analogue output enable
- Set analogue output levels (up to four)

Temperature range

Operating:	0° to +40°C
Storage:	-10° to +70°C

7 **Ordering information**

Part number

ICO-4429-3xyz

Description

SDI Audio Extractor, 30mm

Where x = number of stereo D to A converters fitted
0 (none) , S (single), D (dual)
yz = analogue output level in dBu for full scale
digital 15, 18, or 24 (00 if no DACs fitted)