

TECHNICAL INFORMATION

Vi Series Standard & Optional I/O Cards

Issue 0512

Standard Cards

Line Input Card
Line Output Card
Mic/Line Input Card
AES/EBU I/O Card
MADI I/O Cards
MADI HD Cards
GPIO Card with relay outputs
Ext Sync Card

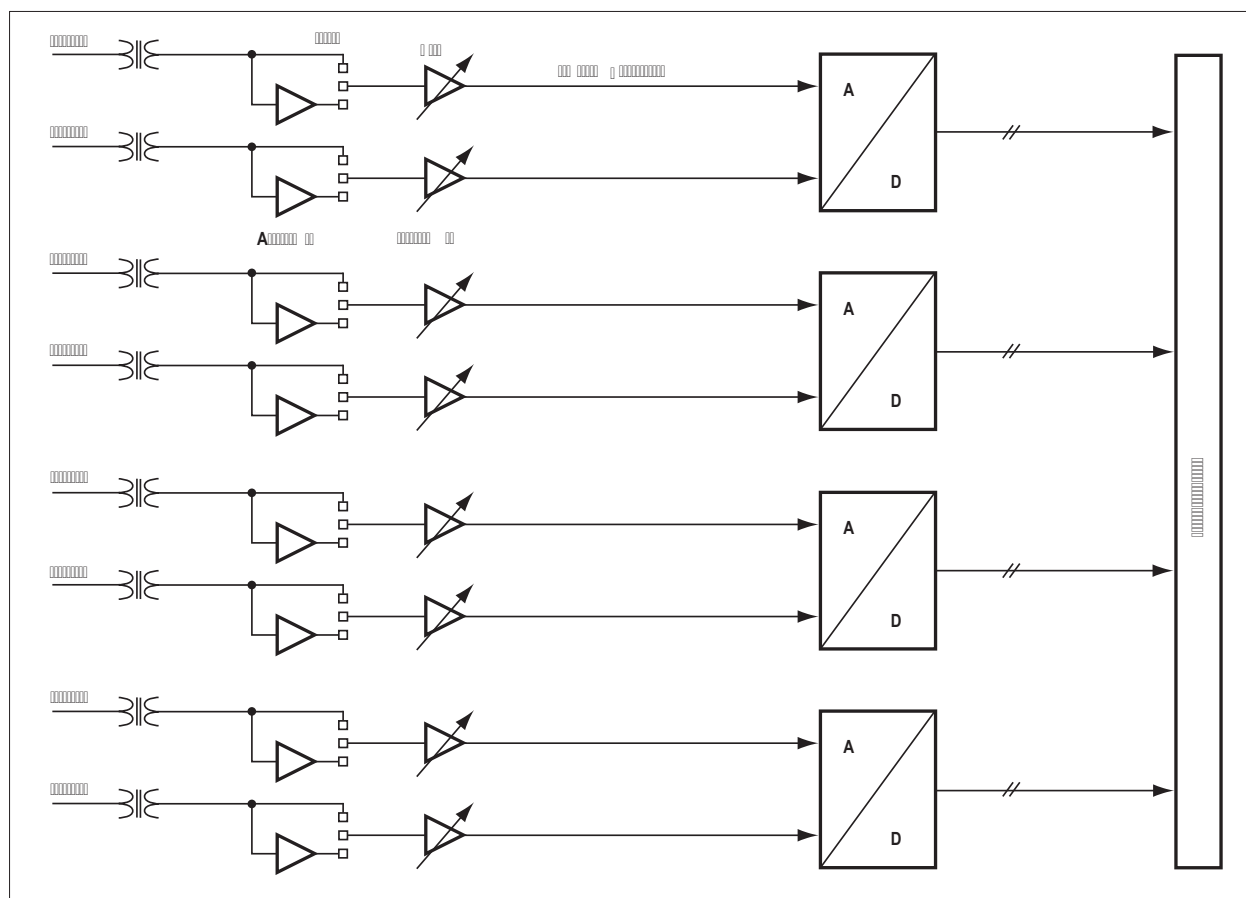
Optional Cards

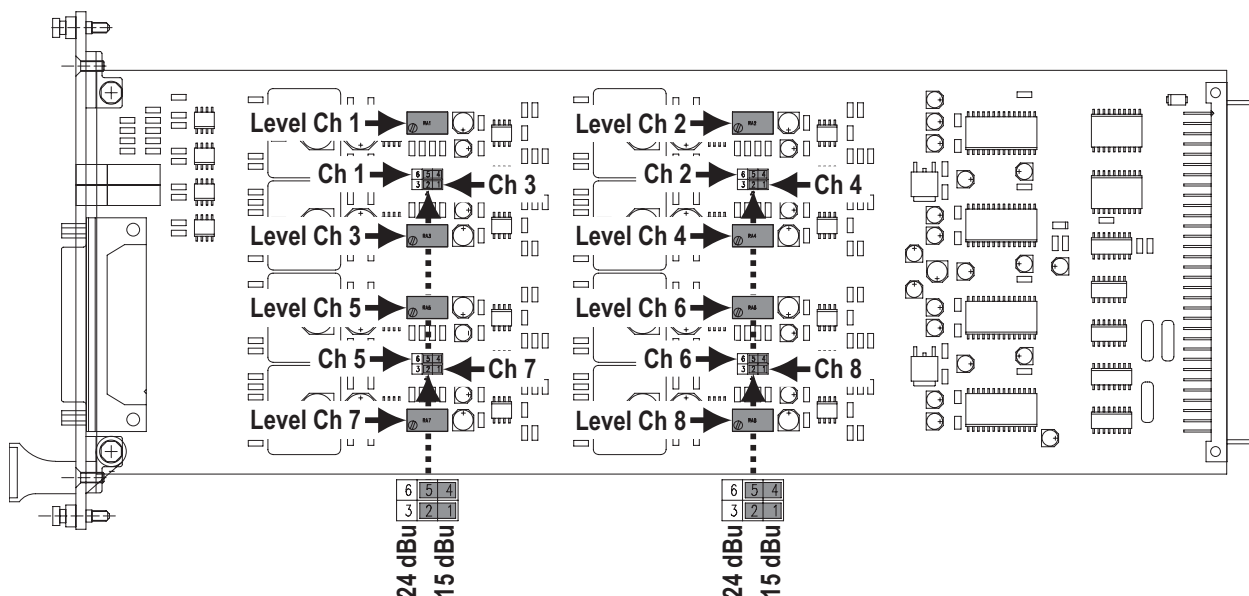
CobraNet™ Interface Card
Aviom A-NET® Interface Card
EtherSound® Interface Card
ADAT I/O Card
SDI In Card
SDI I/O Card
Dolby® D/E Decoder Card



Eight-channel line input card with 24 bit, 44.1/48/88.2/96 kHz A/D Converter, delta-sigma conversion. Transformer-balanced inputs. 96 kHz, 88.2 kHz, 48 kHz, or 44.1 kHz operation. 7...26 dBu input sensitivity. "Signal present" LED indicator. Inputs on standard 25-pin D-type connector (female).

Input level (for 0 dB _{FS})	15/24 dBu (fixed, jumper-selectable) or 7...26 dBu (adjustable)
Input impedance	> 10 kΩ
Frequency response (20 Hz...20 kHz)	-0.2dB
THD&N (35 Hz...20 kHz, -1 dB _{FS} , 15 dBu setting)	< -97 dB _{FS}
(1 kHz, -30 dB _{FS} , 15 dBu setting)	< -111 dB _{FS}
Crosstalk (1 kHz)	< -110 dB
Input delay (local)	38 samples (0.79 ms @ 48 kHz)
(remote)	45 samples (0.94 ms @ 48 kHz)
Current consumption	(7 V) 0.42 A
(±15 V)	0.1 A
Operating temperature	0...45° C





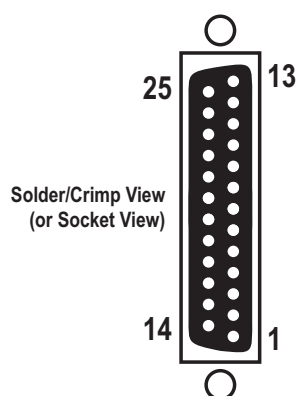
Jumpers: Level (Ch1...8) Two positions each: 15 dBu (factory default) or 24 dBu.

LEDs: SIGNAL 1...8 For each of the eight channels a green LED indicates if input signal is present; its brightness is a rough indication of the signal level.

Alignment: RA1...8 The multi-turn trimmer gives fine adjustment of the input level set with the jumpers. The factory default is +22dBu in = 0dBFS.

If a different input sensitivity has to be adjusted, select the desired range with the jumper and use the LEVEL trimmer potentiometer to adjust to the desired level. Repeat this alignment for all inputs.

Connector Pin Assignment: 8x BALANCED LINE IN (25pin D-type, female, UNC 4-40 thread)

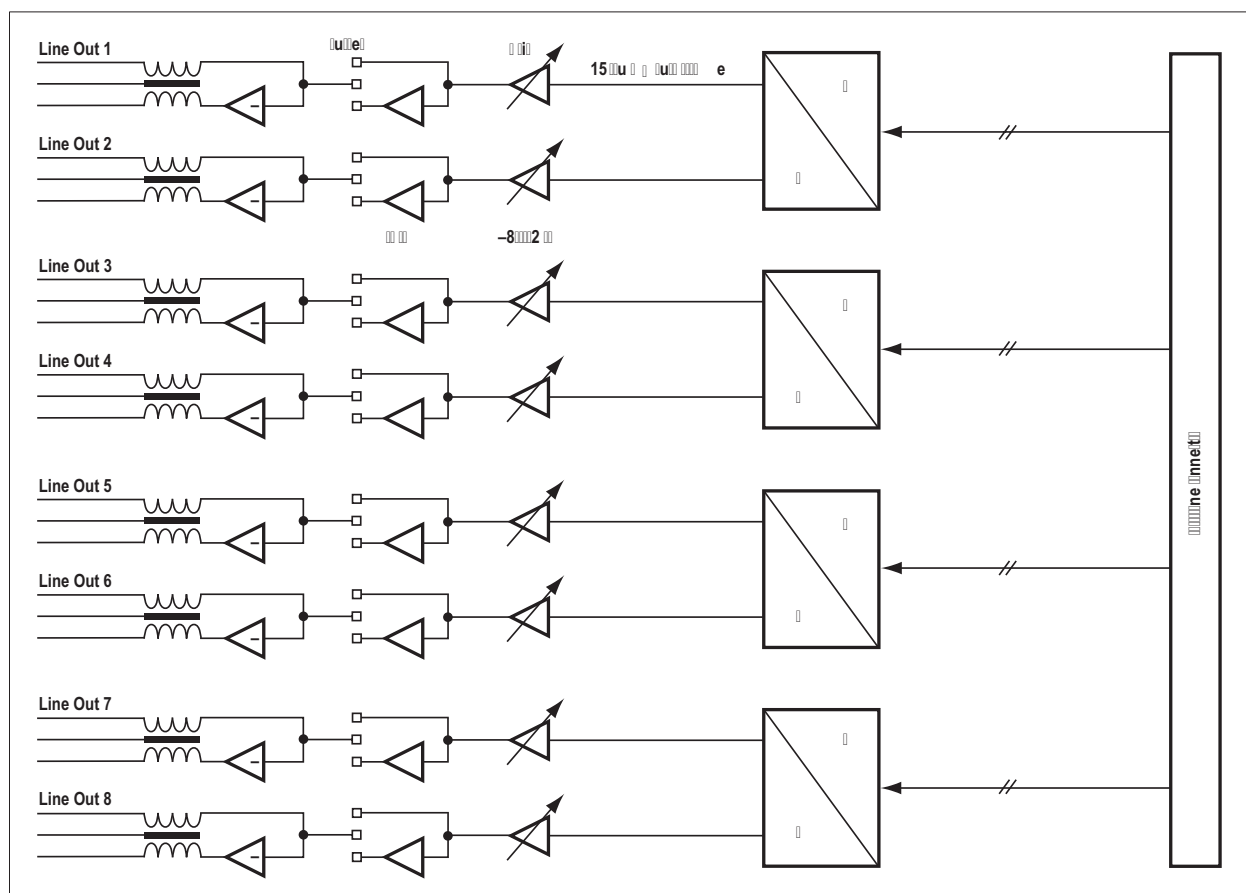


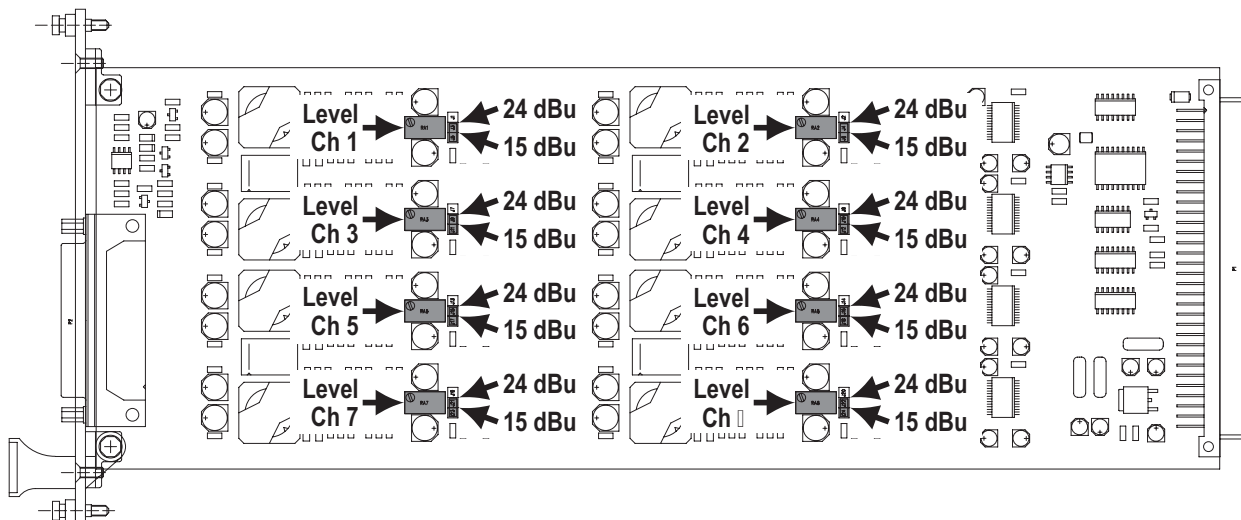
Pin	Signal	Pin	Signal
1	CH 8 in +	14	CH 8 in -
2	CH 8 in GND	15	CH 7 in +
3	CH 7 in -	16	CH 7 in GND
4	CH 6 in +	17	CH 6 in -
5	CH 6 in GND	18	CH 5 in +
6	CH 5 in -	19	CH 5 in GND
7	CH 4 in +	20	CH 4 in -
8	CH 4 in GND	21	CH 3 in +
9	CH 3 in -	22	CH 3 in GND
10	CH 2 in +	23	CH 2 in -
11	CH 2 in GND	24	CH 1 in +
12	CH 1 in -	25	CH 1 in GND
13	n.c.		



Eight-channel, 24 bit line output card with 24 bit D/A converters with 96 kHz, 88.2 kHz, 48 kHz, or 44.1 kHz operation. Electronically balanced outputs. 7...26 dBu max. output level. Outputs on standard 25-pin D-type connector (female).

Output level (for 0 dB _{FS})	15/24 dBu (fixed, jumper-selectable) or 7...26 dBu (adjustable)
Output impedance	40 Ω
Min. load (at +24 dBu)	600 Ω
Frequency response (20 Hz...20 kHz)	-0.2 dB
THD&N (20 Hz...20 kHz, -1 dB _{FS} , jumper at 15 dBu fixed)	< -90 dB _{FS}
(1 kHz, -30 dB _{FS} , jumper at 15 dBu fixed)	< -110 dB _{FS}
Crosstalk (1 kHz)	< -110 dB
Output delay (local)	28 samples (0.58 ms @ 48 kHz)
(remote)	32 samples (0.67 ms @ 48 kHz)
Current consumption (7 V)	0.23 A
(±15 V)	0.25 A
Operating temperature	0...45° C



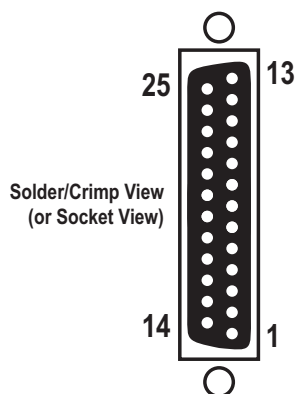


Jumpers: Level (Ch1...8) Two positions each: 15 dBu (factory default) or 24 dBu.

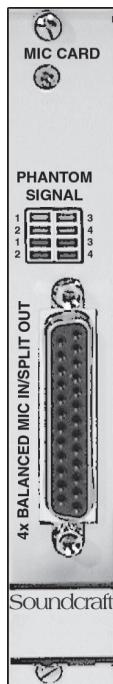
Alignment: RA1...8 The multi-turn trimmer gives fine adjustment of the input level set with the jumpers. The factory default is +22dBu out = 0dBFS.

If a different output level is required, select the desired range with the jumper and use the LEVEL trimmer potentiometer to adjust to the desired level. Repeat this alignment for all outputs.

Connector Pin Assignment: 8x BALANCED LINE OUT (25pin D-type, female, UNC 4-40 thread)

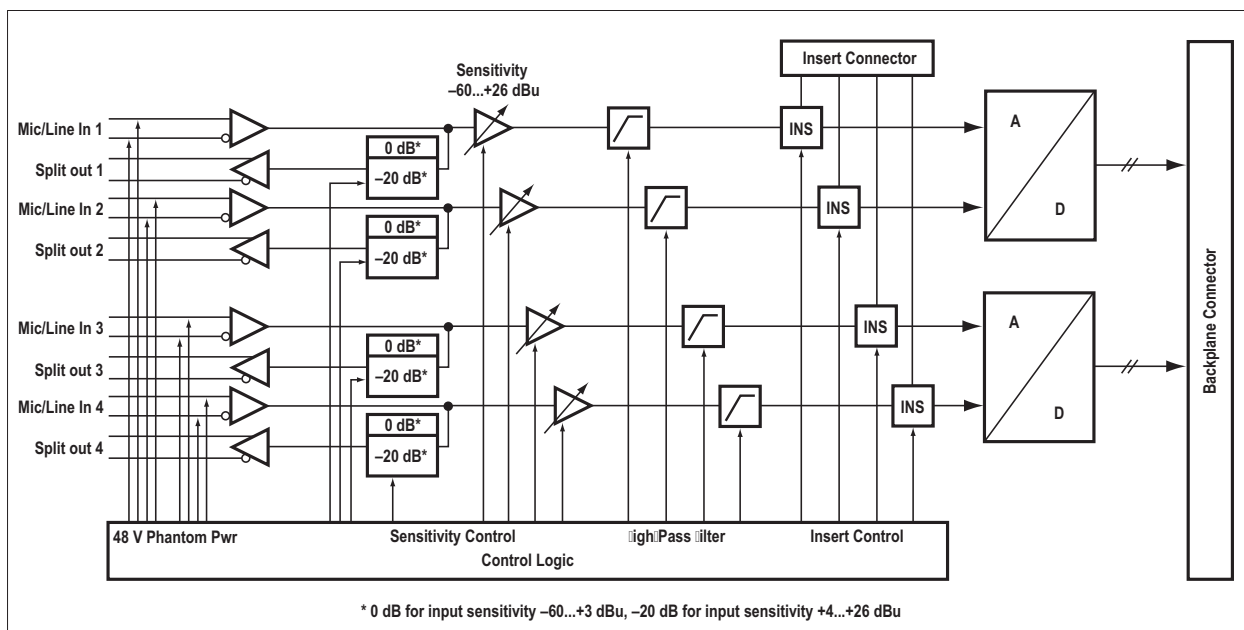


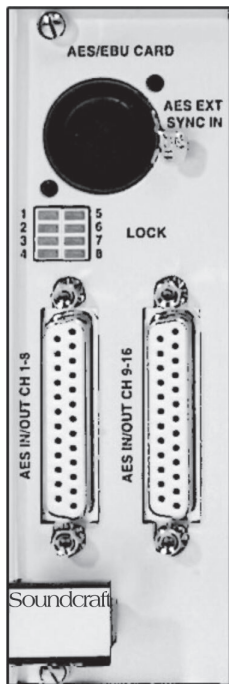
Pin	Signal	Pin	Signal
1	CH 8 out +	14	CH 8 out -
2	CH 8 out GND	15	CH 7 out +
3	CH 7 out -	16	CH 7 out GND
4	CH 6 out +	17	CH 6 out -
5	CH 6 out GND	18	CH 5 out +
6	CH 5 out -	19	CH 5 out GND
7	CH 4 out +	20	CH 4 out -
8	CH 4 out GND	21	CH 3 out +
9	CH 3 out -	22	CH 3 out GND
10	CH 2 out +	23	CH 2 out -
11	CH 2 out GND	24	CH 1 out +
12	CH 1 out -	25	CH 1 out GND
13	n.c.		



Four analog microphone/line inputs, electronically balanced, with 24 bit, 44.1/48/88.2/96 kHz delta-sigma A/D converters (mic/line sensitivity, gain setting in 1 dB steps, low-cut filter, soft clipping and 48 V phantom power on/off controlled by console software); four analog split outputs (not used), electronically balanced. Green “signal present” and yellow “phantom power” indicators per channel. Inputs and split outputs on standard 25-pin D-type connector (female).

Input sensitivity (for 0 dB _{FS})	-60...+26 dBu
Input impedance	1.8 kΩ
Equivalent input noise (R _i 200 Ω, max. gain)	-124 dBu
Crosstalk (1 kHz)	< -110 dB
Frequency response (30 Hz...20 kHz)	-0.2 dB
THD&N (35 Hz...20 kHz, -1 dB _{FS} , min. gain)	< -97 dB _{FS}
(1 kHz, -30 dB _{FS} , min. gain)	< -111 dB _{FS}
(input level 6 dBu, min. gain)	< -107 dB _{FS}
CMRR (30 Hz...20 kHz, all gain settings)	> 55 dB
(1 kHz, input sensitivity -10...+26 dBu for 0 dB _{FS})	typ. 100 dB
Low-cut filter	75 Hz / 12 dB/oct.
Input delay (local)	38 samples (0.79 ms @ 48 kHz)
(remote)	45 samples (0.94 ms @ 48 kHz)
Current consumption (7 V)	0.2 A
(±15 V)	0.25 A
Operating temperature	0...45° C





AES/EBU input/output card with 16 Ch I/O.

With input SFCs only .

Selectable output sampling frequencies:

96 kHz, 48 kHz, 44.1 kHz, or external reference (22...108 kHz). Input SFCs can be bypassed individually.

Output dither is selectable for every AES/EBU output from 24 bit, 20 bit, 18 bit or 16 bit. Settings are made with jumpers. Inputs and outputs on standard 25-pin D-type connectors (female).

Note: Output SFCs are not fitted on the Vi4/6.

Input/output impedance

110 Ω

Input sensitivity

min. 0.2 V

Output level (into 110 Ω)

3.3 V

SFC range

22...108 kHz

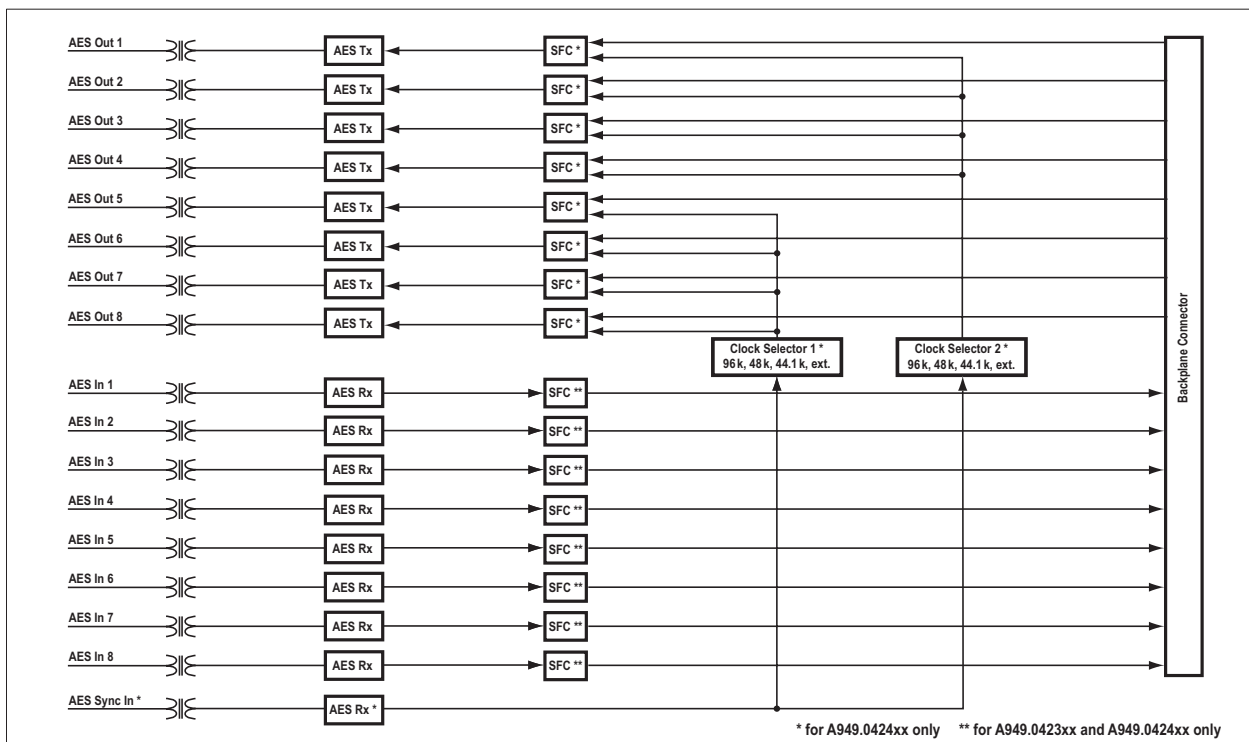
Current consumption (3.3 V)
(5 V)

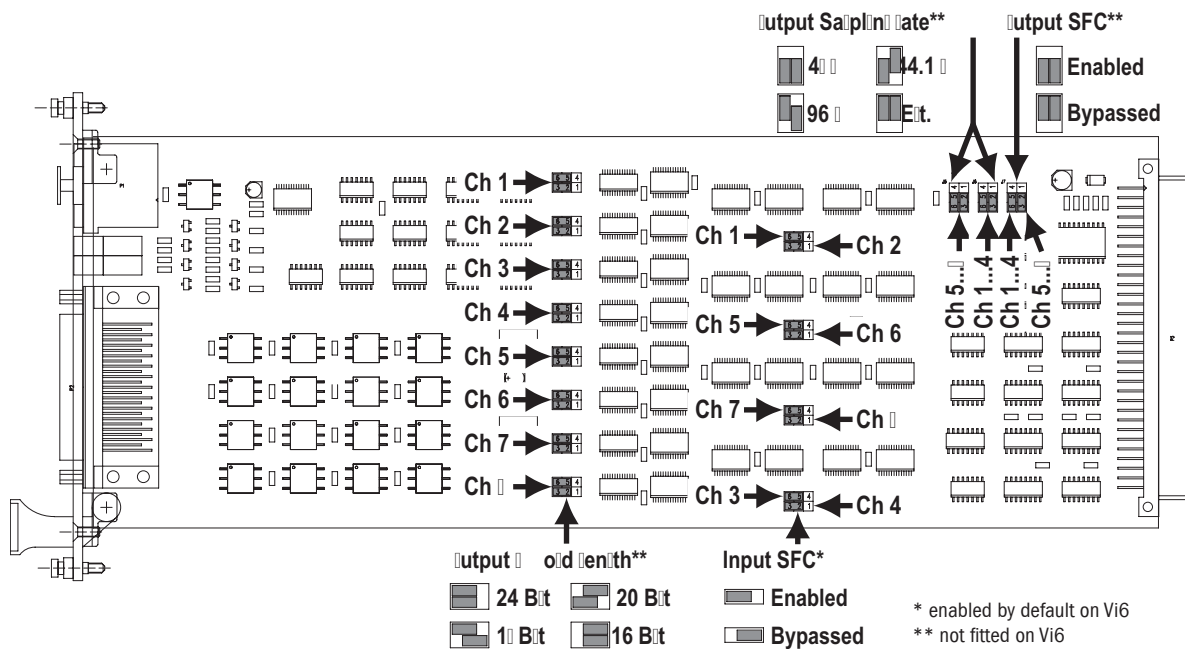
0.2 A / .0423: 0.4 A / .0424: 0.6 A

0.65 A

Operating temperature

0...45° C

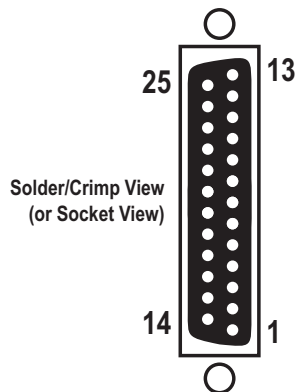




LEDs: LOCK 1...8 These green LEDs are on if a valid AES/EBU signal is available at the inputs.

Jumpers: Input SFC Enabling or bypassing of the SFCs for individual AES/EBU input channels.

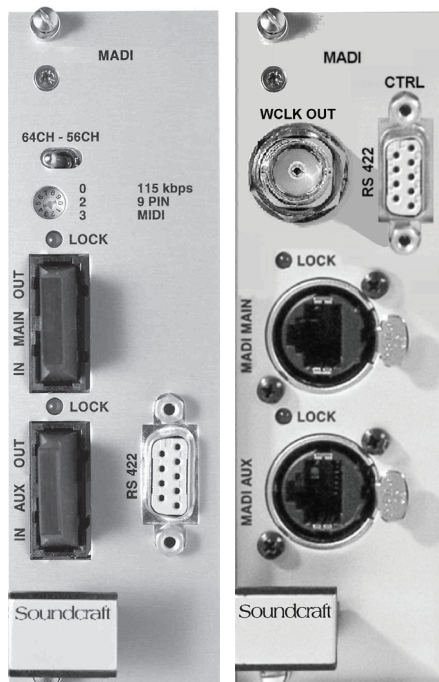
Connector Pin Assignment: AES IN/OUT (2 × 25pin D-type, female, UNC 4-40 thread)



Pin	Signal "CH 1...8"	Signal "CH 9...16"	Pin	Signal "CH 1...8"	Signal "CH 9...16"
1	CH 7/8 out +	CH 15/16 out +	14	CH 7/8 out –	CH 15/16 out –
2	CH 7/8 out screen	CH 15/16 out screen	15	CH 5/6 out +	CH 13/14 out +
3	CH 5/6 out –	CH 13/14 out –	16	CH 5/6 out screen	CH 13/14 out screen
4	CH 3/4 out +	CH 11/12 out +	17	CH 3/4 out –	CH 11/12 out –
5	CH 3/4 out screen	CH 11/12 out screen	18	CH 1/2 out +	CH 9/10 out +
6	CH 1/2 out –	CH 9/10 out –	19	CH 1/2 out screen	CH 9/10 out screen
7	CH 7/8 in +	CH 15/16 in +	20	CH 7/8 in –	CH 15/16 in –
8	CH 7/8 in screen	CH 15/16 in screen	21	CH 5/6 in +	CH 13/14 in +
9	CH 5/6 in –	CH 13/14 in –	22	CH 5/6 in screen	CH 13/14 in screen
10	CH 3/4 in +	CH 11/12 in +	23	CH 3/4 in –	CH 11/12 in –
11	CH 3/4 in screen	CH 11/12 in screen	24	CH 1/2 in +	CH 9/10 in +
12	CH 1/2 in –	CH 9/10 in –	25	CH 1/2 in screen	CH 9/10 in screen
13	n.c.	n.c.			

MADI I/O CARDS

RS2426 (optical multimode) RS2409 (Cat5) RS2563 (Optical single mode)



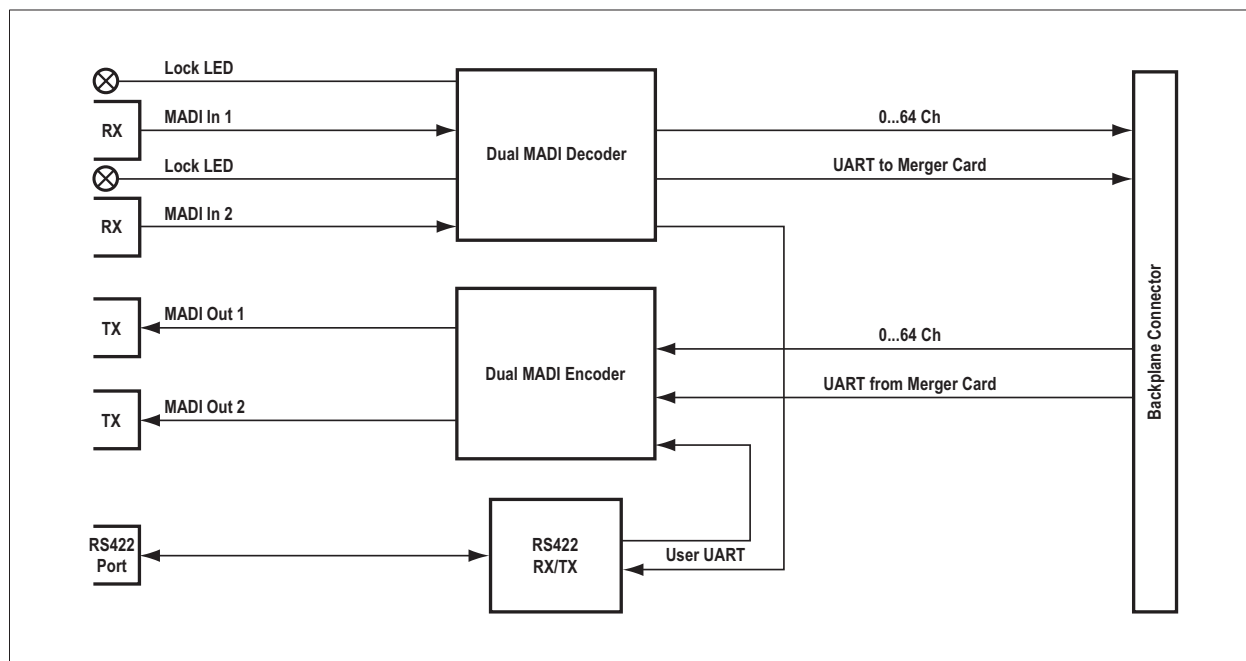
The MADI I/O card can establish a 64-channel MADI input and output to the stagebox or other equipped device. Optical inputs and outputs are provided on SC connectors available in multi-mode and single-mode versions, as well as a version with RJ45 connectors for twisted-pair cable and an additional word clock output on a BNC socket.

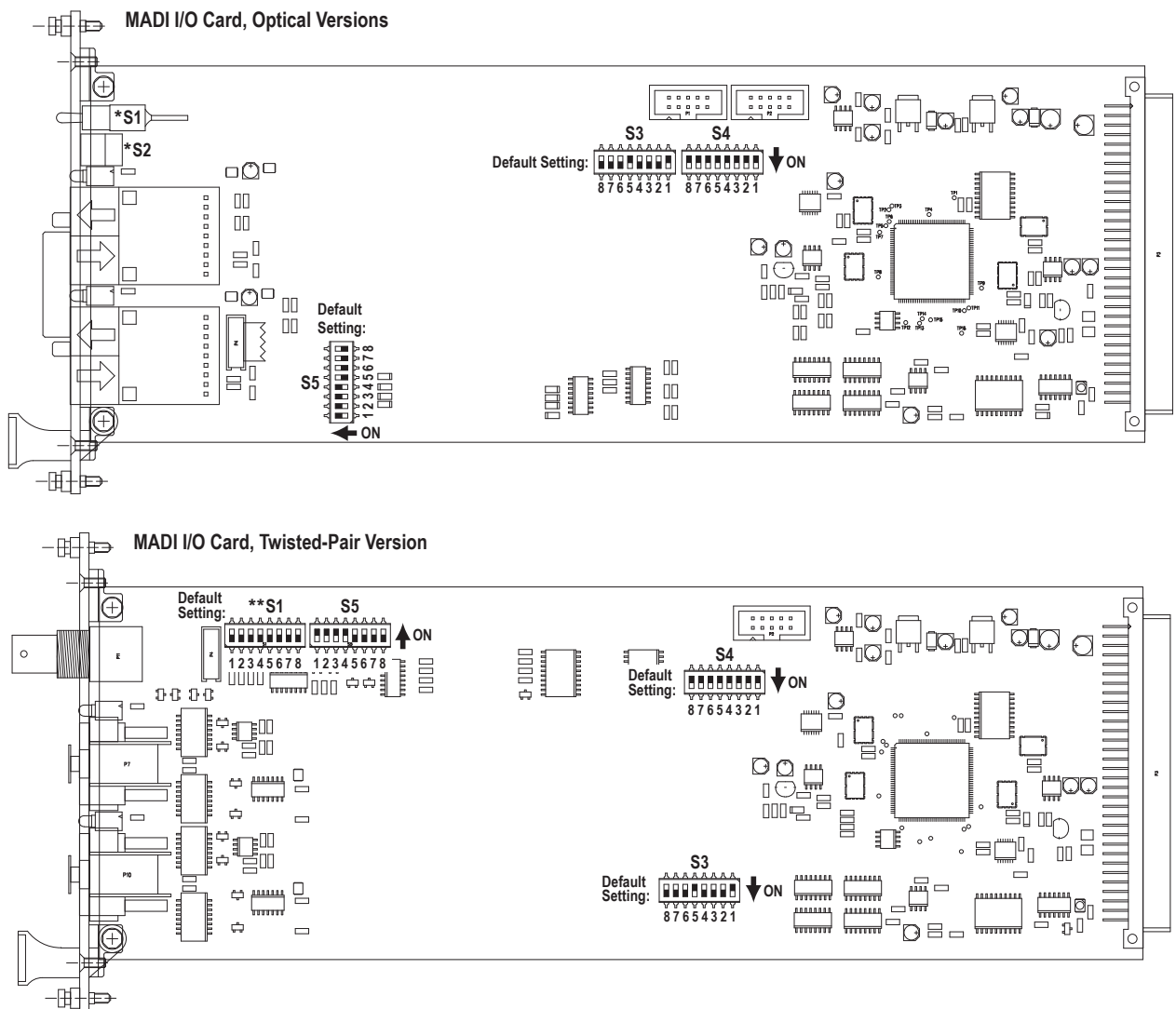
The auxiliary interface can be used as a redundant link.

It is possible to transmit any serial control signals, such as MIDI or Sony 9-pin (machine control) through a MADI connection without losing any audio bandwidth or microphone control of the remote I/O box. For this purpose, an RS422 connector is located on this card (hub frame side). The desired baud rate can be set with a rotary switch. The pinout of the RS422 connector can be set to “device” or “controller” with a DIP switch, depending on the 3rd party serial device connected.

Max. cable length multi-mode fibre 1300 nm 2 km
 single-mode fibre, 1300 nm 15 km
 CAT5e or better, flexible braid <75 m
 Can be <100m if recommended cable used - contact Soundcraft
 CAT7, solid core) <120 m

Input frequencies 48 kHz ± 100 ppm
Current consumption (3.3 V) 0.4A
 (5 V) 0.4A
Operating temperature 0...45° C



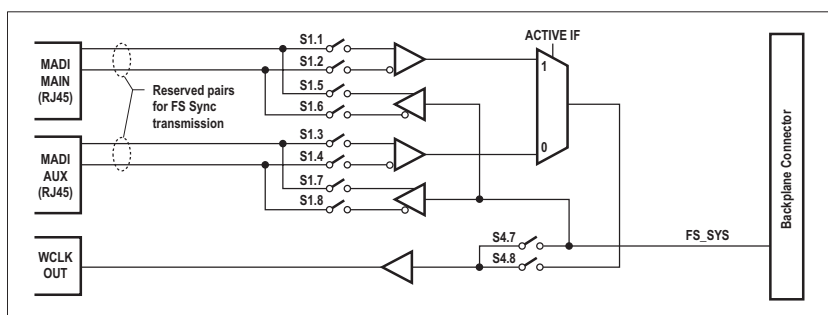


Switches

- *S1 (On optical versions only)
Toggle switch for 64 (factory default) or 56 channel selection.
- **S1 (On Cat5 version only)

In case of connecting two Local Racks, they must be synchronized. The twisted-pair cable version of the MADI card provides a reserved wire pair for both the main and aux RJ45 sockets on which the sync signal can be transferred. The sync transfer direction (from master to slave) is set using the DIP switches S1 and S4.7/.8. *Please note that in such a case the twisted-pair wiring has to be done with a crossover cable. On the slave core, the WCLK output must be patched to the WCLK input of the audio clock card. (refer to the block diagram on the opposite page)*

1	2	3	4	5	6	7	8	Setting
OFF	OFF	OFF	OFF	ON	ON	ON	ON	Card is Master (factory default)
ON	ON	ON	ON	OFF	OFF	OFF	OFF	Card is Slave
NO OTHER SETTINGS ALLOWED !								



*S2 (On optical versions only)

Rotary switch for baud rate selection of the RS422 user interface:

Position	Setting
0	115'200 bps (factory default)
1	57'600 bps
2	38'400 bps (9-pin)
3	31'250 bps (MIDI)
4	19'200 bps
5	9'600 bps
6...9	Reserved for future use

S3 DIP switch for D21m channel count setting:

1	2	3	4	5	6	7	8	Number of Channels
ON	ON	ON	ON	-	-	-	-	0 inputs
ON	ON	ON	OFF	-	-	-	-	8 inputs
ON	ON	OFF	ON	-	-	-	-	16 inputs
ON	ON	OFF	OFF	-	-	-	-	24 inputs
ON	OFF	ON	ON	-	-	-	-	32 inputs
ON	OFF	ON	OFF	-	-	-	-	40 inputs
ON	OFF	OFF	ON	-	-	-	-	48 inputs
ON	OFF	OFF	OFF	-	-	-	-	56 inputs
OFF	ON	ON	ON	-	-	-	-	64 inputs (factory default)
OFF	ON	ON	OFF	-	-	-	-	NOT ALLOWED
:	:	:	:	-	-	-	-	
OFF	OFF	OFF	OFF	-	-	-	-	
-	-	-	-	-	-	-	-	
-	-	-	-	ON	ON	ON	ON	0 outputs
-	-	-	-	ON	ON	ON	OFF	8 outputs
-	-	-	-	ON	ON	OFF	ON	16 outputs
-	-	-	-	ON	ON	OFF	OFF	24 outputs
-	-	-	-	ON	OFF	ON	ON	32 outputs
-	-	-	-	ON	OFF	ON	OFF	40 outputs
-	-	-	-	ON	OFF	OFF	ON	48 outputs
-	-	-	-	ON	OFF	OFF	OFF	56 outputs
-	-	-	-	OFF	ON	ON	ON	64 outputs (factory default)
-	-	-	-	OFF	ON	ON	OFF	NOT ALLOWED
-	-	-	-	:	:	:	:	
-	-	-	-	OFF	OFF	OFF	OFF	
-	-	-	-	OFF	OFF	OFF	OFF	

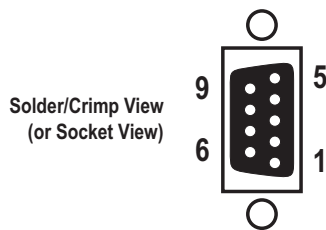
S4 DIP switch for MADI setting (*on the Cat5 version, the switches 4...8 are used differently, as indicated below*):

Card Versions	Switch	Setting			
ALL MADI Cards	1	OFF: AUX IF is used for channel extension at 96 kHz (factory default) ON: AUX IF is used for redundancy at 96 kHz (in 48 kHz mode, AUX IF is used for redundancy regardless of the switch setting)			
	2, 3	Both OFF: Standard operation (factory default) Both ON: No communication on system UART (used for Hub-Hub interconnection) One ON and one OFF: NOT ALLOWED.			
Optical Versions only	4...7	Must be set to OFF (factory default)			
	8	Not used (factory default: OFF)			
Twisted-Pair Cable Version only	4	5	6	Baud Rate	
	OFF	OFF	OFF	115'200 bps (factory default)	
	OFF	OFF	ON	57'600 bps	
	OFF	ON	OFF	38'400 bps (9-pin)	
	OFF	ON	ON	31'250 bps (MIDI)	
	ON	OFF	OFF	19'200 bps	
	ON	OFF	ON	9'600 bps	
	ON	ON	OFF	Reserved for future use	
		
	7	8	Setting (refer to **S1 above)		
	ON	OFF	BNC output carries D21m system word clock (factory default)		
OFF	ON	BNC output carries received word clock			

S5 DIP switch for RS422 pinout selection:

1	2	3	4	5	6	7	8	Setting
OFF	OFF	OFF	OFF	ON	ON	ON	ON	RS422 Controller pinout
ON	ON	ON	ON	OFF	OFF	OFF	OFF	RS422 Device pinout (factory default)
NO OTHER SETTINGS ALLOWED!								

Connector Pin Assignments:



CTRL (9pin D-type, female, UNC 4-40 thread)

Pin	RS422 Controller	RS422 Device
1	Chassis	Chassis
2	RxD –	TxD –
3	TxD +	RxD +
4	GND	GND
5	n.c.	n.c.
6	GND	GND
7	RxD +	TxD +
8	TxD –	RxD –
9	Chassis	Chassis

MADI MAIN / MADI AUX (8pin RJ45) (on Cat5 version only)



Pin	Signal
1	MADI TxD +
2	MADI TxD –
3	MADI RxD +
4	WCLK TXD/RXD +
5	WCLK TXD/RXD –
6	MADI RxD –
7	reserved
8	reserved

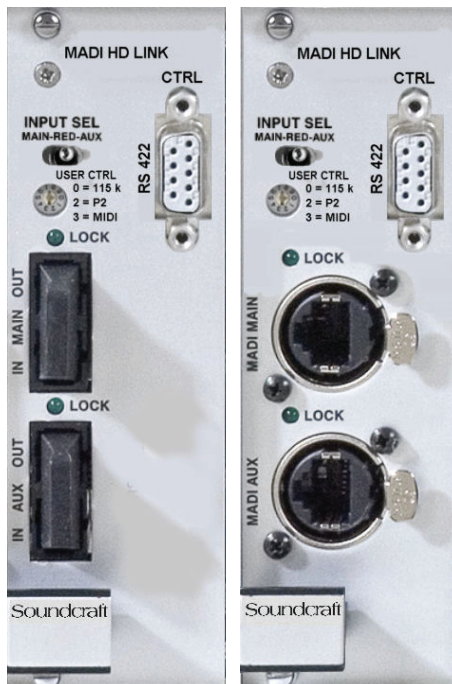
LEDs

LOCK

On if a valid MADI signal is available at the input that is locked to the system clock.

MADI HD CARDS

RS2448 (optical multimode) RS2434 (Cat5) RS2562 (Optical single mode)

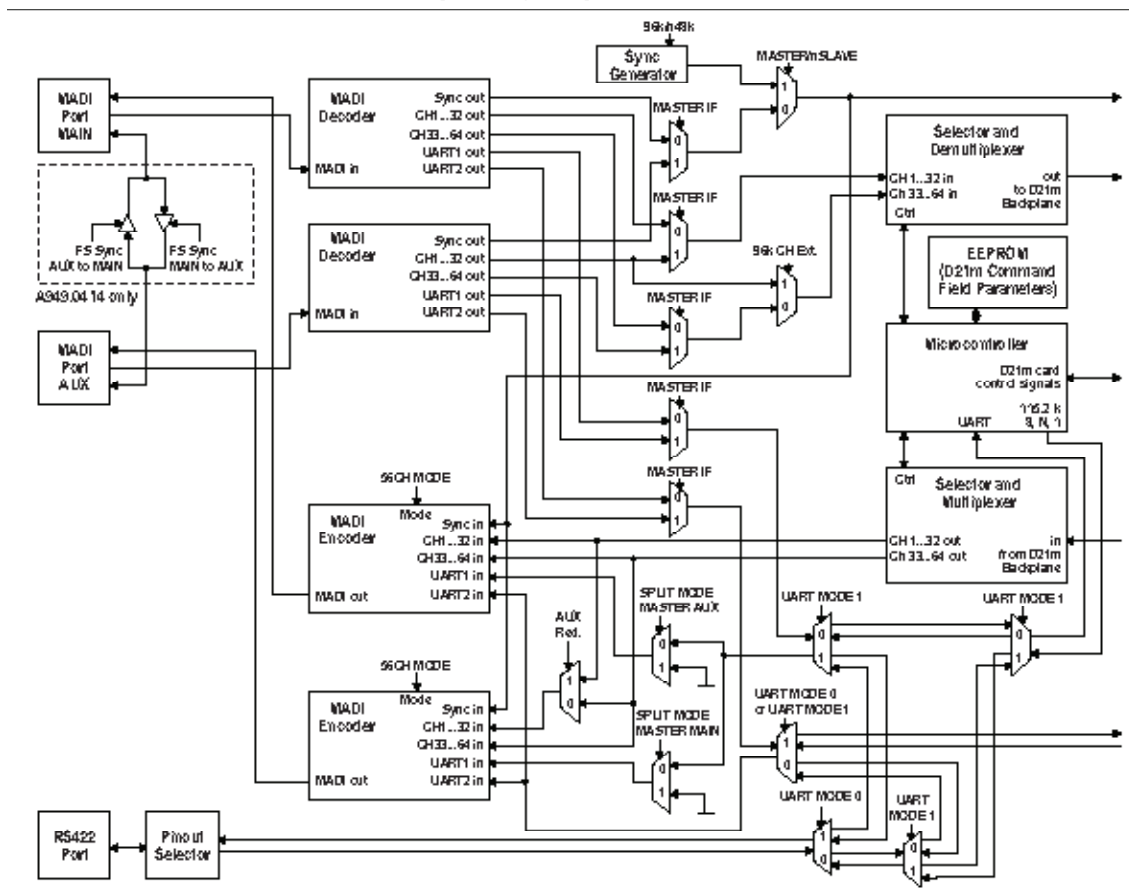


The MADI HD card is plugged into the HD card slot in the Stagebox and provides the link to the Local Rack frame. The two interfaces offer up to 64 audio channels with 48kHz operation, together with embedded control and user-accessible serial connection in each direction.

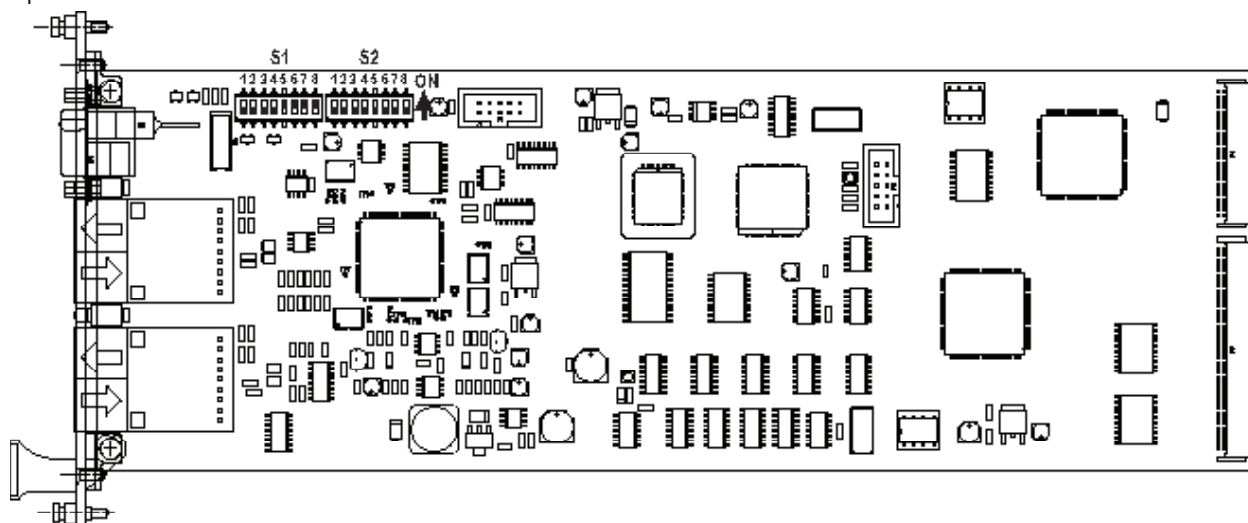
The auxiliary interface can be used as a redundant link.

In slave mode, the card extracts the system clock from the incoming MADI signals and provides it to the entire remote I/O box. It detects all other I/O cards that are inserted into the Stagebox and displays their presence on the front panel of the frame. Once all audio interface cards are plugged in, pressing the RECONFIG key on the front panel confirms the configuration to the system. Then all cards are activated and their audio signals are fed into the MADI link.

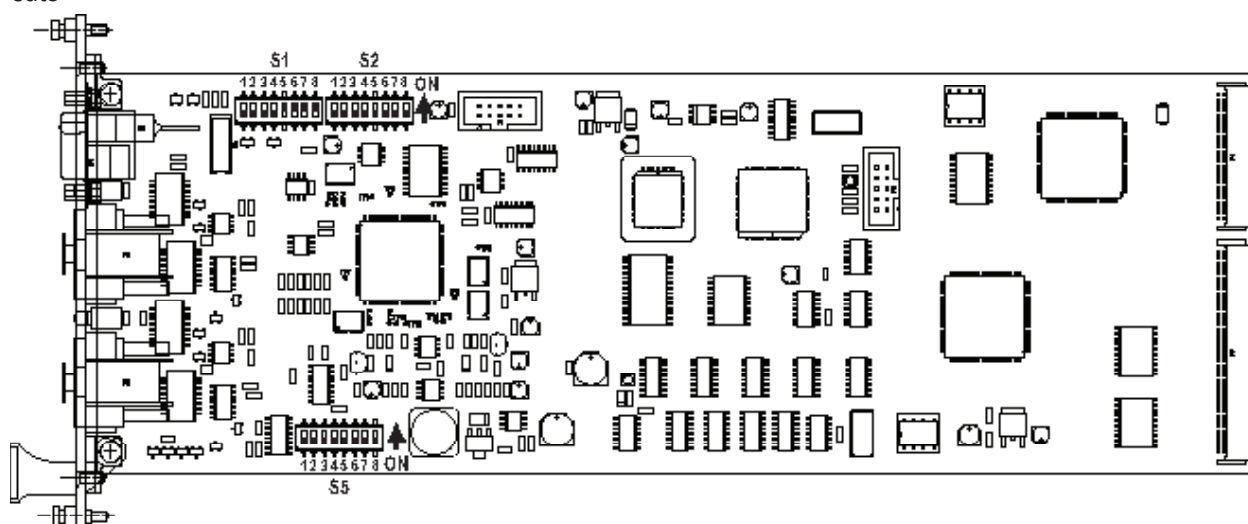
Cable length	multi-mode fibre	<2 km
	single-mode fibre	<15 km (<40 km on request)
	CAT5e or better, flexible braid	<75 m
	Can be up to 100m if recommended cable used - contact Soundcraft	
	CAT7, solid core	<120 m
Input frequency		48kHz \pm 100 ppm
Current consumption (3.3 V/5 V)		0.9 A/0.25 A
Operating temperature		0...45° C



Optical



Cat5



LEDs:

On if a valid MADI signal is present at the input.

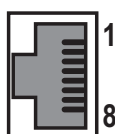
Switches:

S1 DIP switch for pinout selection of the front-panel RS422 connector:

1	2	3	4	5	6	7	8	
ON	ON	ON	ON	OFF	OFF	OFF	OFF	Device pinout
OFF	OFF	OFF	OFF	ON	ON	ON	ON	Controller pinout (factory default)
NO OTHER SETTINGS ALLOWED!								

MADI MAIN / MADI AUX (8pin RJ45)
(on twisted-pair cable version only)

Socket View



Pin	Signal
1	MADI RxD +
2	MADI RxD -
3	MADI TxD +
4	WCLK TxD/RxD +
5	WCLK TxD/RxD -
6	MADI TxD -
7	reserved
8	reserved

S2 DIP switch for MADI setting:

Switch	Setting
1	OFF: AUX is used as CH33...64 at 88.2 / 96 kHz (factory default) ON: AUX is used as redundant port at 88.2 / 96 kHz
2	OFF: 64 MADI channels (factory default) ON: 56 MADI channels (standard setting for legacy products)
3, 4	3 4
	OFF OFF MADI1 – Microcontroller / MADI 2 – Front connector (factory default)
	ON OFF MADI1 – Microcontroller / MADI 2 – Backplane
	OFF ON Microcontroller – Front connector / MADI 2 – Backplane
	ON ON MADI1 – Front connector / MADI 2 – Backplane
[Block diagram: UART MODE 1]	
[Block diagram: UART MODE 0]	
5	OFF: Slave – clock from MADI signal (factory default) [Block diagram: MASTER/nSLAVE = 0]
	ON: Master – clock from local generator [Block diagram: MASTER/nSLAVE = 1]
6	OFF: Master mode sampling frequency 48 kHz (factory default) [Block diagram: 96k/n48k = 0]
	ON: Master mode sampling frequency 96 kHz [Block diagram: 96k/n48k = 1]
7, 8	reserved (factory default: OFF)

- S3 3-position toggle switch for input selection (MAIN / REDundant / AUX).
 MAIN: MADI input is forced to MAIN port (split mode master AUX = 0)
 RED*: MADI input is used from either MAIN or AUX port
 AUX: MADI input is forced to AUX Port (split mode master MAIN = 1).

S4 Rotary switch for baud rate selection of the MADI 2 link:

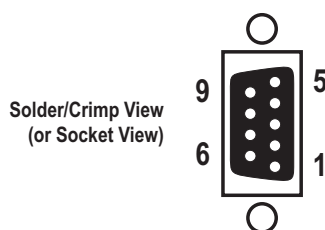
Position	Setting
0	115'200 bps (factory default)
1	57'600 bps
2	38'400 bps (9-pin)
3	31'250 bps (MIDI)
4	19'200 bps
5	9'600 bps
6...9	Reserved for future use

S5 DIP switch for FS Sync forward selection (Cat5 only)

1	2	3	4	5	6	7	8	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	No forward (factory default)
ON	ON	ON	ON	OFF	OFF	OFF	OFF	Main to AUX
OFF	OFF	OFF	OFF	ON	ON	ON	ON	AUX to Main
NO OTHER SETTINGS ALLOWED!								

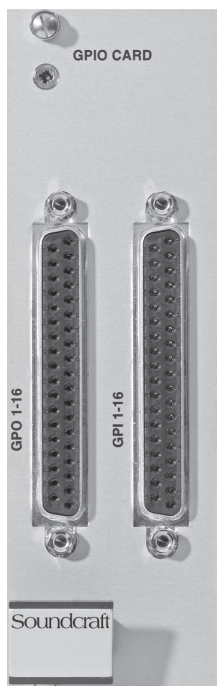
Connector Pin Assignments:

RS422 (9pin D-type, female, UNC 4-40 thread)



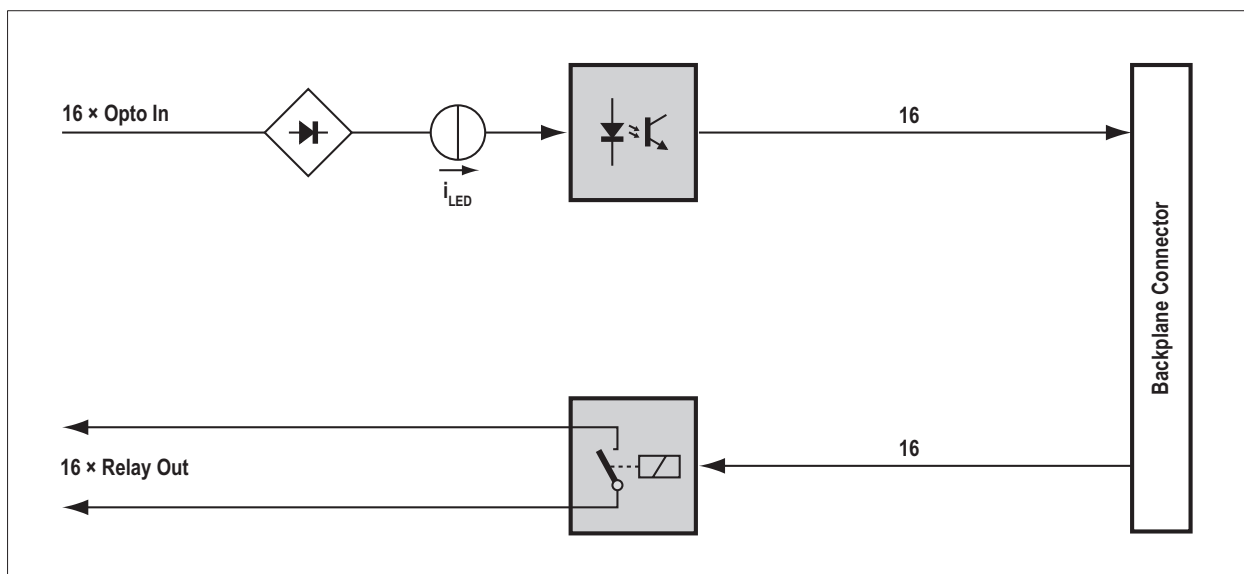
Pin	RS422 Controller	RS422 Device
1	Chassis	Chassis
2	RxD –	TxD –
3	TxD +	RxD +
4	GND	GND
5	n.c.	n.c.
6	GND	GND
7	RxD +	TxD +
8	TxD –	RxD –
9	Chassis	Chassis

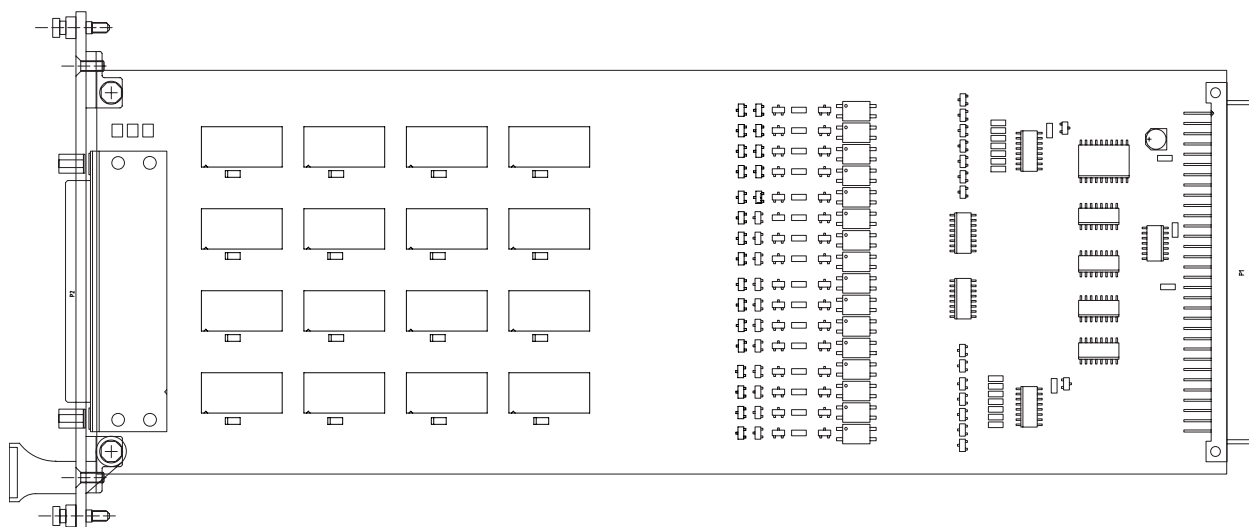
GPIO CARD WITH RELAY OUTPUTS RS2429



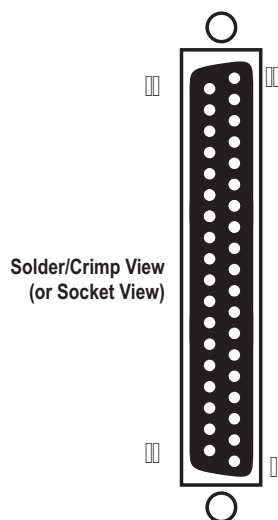
For general-purpose applications requiring total electrical isolation, this card provides 16 electrically isolated opto-coupler inputs with integrated current sink (5...24 VDC) and 16 electrically isolated outputs using SPST relay contacts. 5 VDC supply pins are available. Inputs and outputs on standard 37-pin D-type connectors (female).

Current consumption (5 V) 0.8 A max. (earlier version: 1.1 A max.)
Operating temperature 0...45° C
Output contact rating 0.5 A/125 VAC; 0.7 A/30 VDC; 0.3 A/100 VDC





Connector Pin Assignment: (37pin D-type, female)



Pin	Signal "GPI 1-16"	Signal "GPO 1-16"	Pin	Signal "GPI 1-16"	Signal "GPO 1-16"
1	GPI 1a	GPO 1a	20	GPI 1b	GPO 1b
2	GPI 2a	GPO 2a	21	GPI 2b	GPO 2b
3	GPI 3a	GPO 3a	22	GPI 3b	GPO 3b
4	GPI 4a	GPO 4a	23	GPI 4b	GPO 4b
5	GPI 5a	GPO 5a	24	GPI 5b	GPO 5b
6	GPI 6a	GPO 6a	25	GPI 6b	GPO 6b
7	GPI 7a	GPO 7a	26	GPI 7b	GPO 7b
8	GPI 8a	GPO 8a	27	GPI 8b	GPO 8b
9	GPI 9a	GPO 9a	28	GPI 9b	GPO 9b
10	GPI 10a	GPO 10a	29	GPI 10b	GPO 10b
11	GPI 11a	GPO 11a	30	GPI 11b	GPO 11b
12	GPI 12a	GPO 12a	31	GPI 12b	GPO 12b
13	GPI 13a	GPO 13a	32	GPI 13b	GPO 13b
14	GPI 14a	GPO 14a	33	GPI 14b	GPO 14b
15	GPI 15a	GPO 15a	34	GPI 15b	GPO 15b
16	GPI 16a	GPO 16a	35	GPI 16b	GPO 16b
17	GND (0 V)	GND (0 V)	36	V _{CC} (+5 V) *	V _{CC} (+5 V) *
18	GND (0 V)	GND (0 V)	37	V _{CC} (+5 V) *	V _{CC} (+5 V) *
19	GND (0 V)	GND (0 V)	* 600 mA max. total		

Application:

Inputs Control inputs (GPI Xa/b) are completely independent and electrically isolated. They may be used either with the internal +5 VDC supply voltage, or with external voltages of 5...24 VDC, regardless of the polarity. Total current supplied by all +5 VDC pins of one card must not exceed 600 mA.

Outputs Control outputs (GPO Xa/b) are completely independent, electrically isolated relay contacts, closed if active. Contact rating is 0.5 A for 125 V_{AC}, 0.7 A for 30 VDC, or 0.3 A for 100 VDC. The +5 VDC supply voltage or the ground (GND) terminals, together with the relay contacts, may be used to generate an output signal. Total current supplied by all +5 VDC pins of one card must not exceed 600 mA.

EXT. SYNC. CARD

RS2430



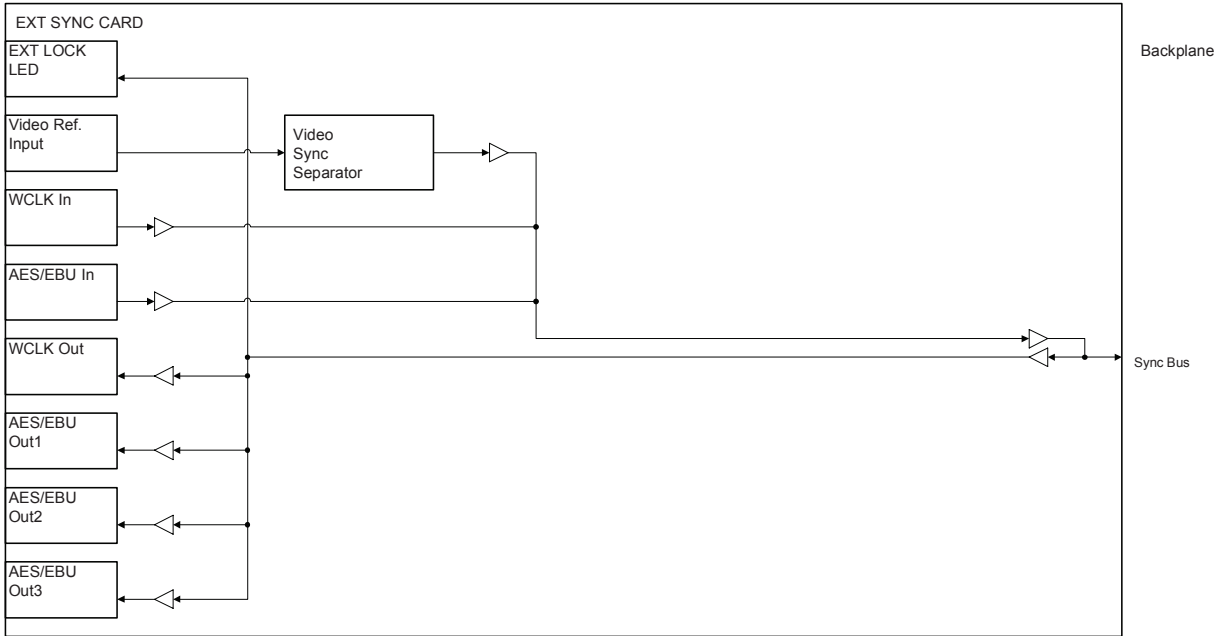
The Ext. Sync card acts as a connector panel for audio clock synchronization inputs and outputs. Three inputs (VIDEO IN, WCLK IN, and AES SYNC IN) can be used; their signals are sent to the sync bus on the backplane. While the video sync is separated on the card, the other signals are just driven onto the bus. A green LED indicates that the applied external sync is used by the system. The system clock can be used from the WCLK OUT and AES 3x OUT outputs.

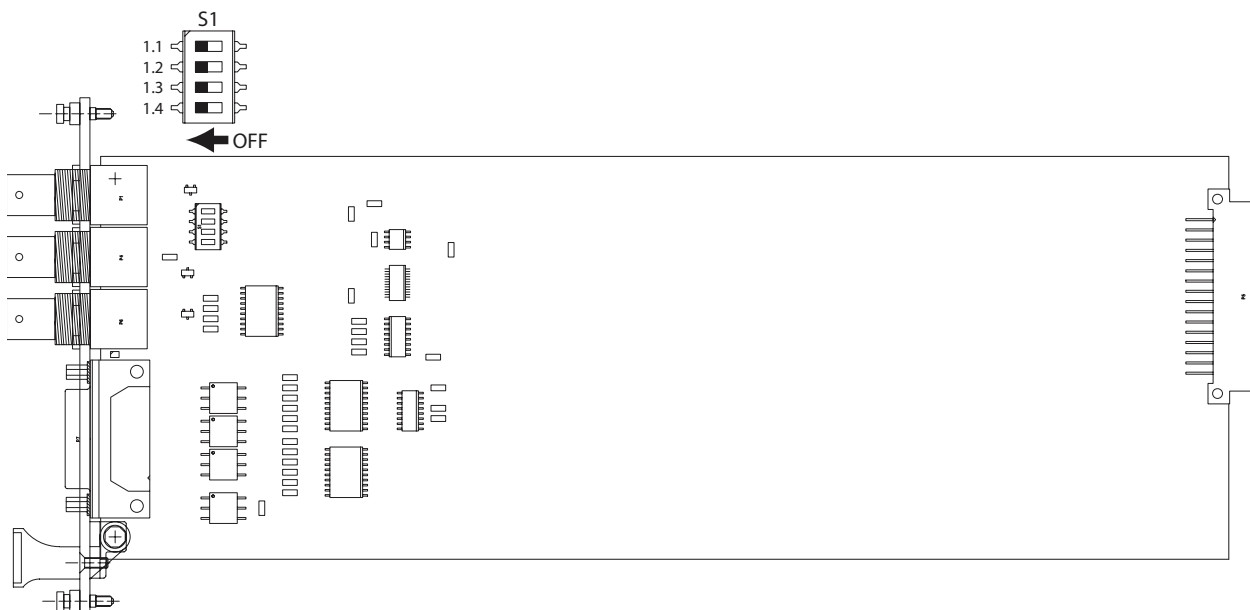
Important: If the system is using MADI links, the deviation of the external sync signal from the nominal clock frequency must not exceed ± 100 ppm. If no MADI links are used, a deviation of ± 2500 ppm is tolerated.

Sync Priority The sync source is automatically selected according to the following table:

Clock Source	Priority
Video	1
AES/EBU	2
Wordclock	3
Internal	4

Ext. clock frequency deviation (system with MADI links) ± 100 ppm
(system without MADI links) ± 2500 ppm
Current consumption (5 V) approx. 100 mA
Operating temperature 0...45° C



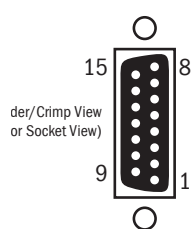


LED: EXT LOCK Indicates that the applied external sync is used by the system.

DIP Switch:

S2	Setting
1.1	VIDEO IN termination (<i>default setting OFF: High-Z / ON: 75 Ohms</i>)
1.2	reserved (default setting OFF)
1.3	reserved (default setting OFF)
1.4	WCLK IN termination (<i>default setting OFF : HIGH-Z / ON : 75 Ohms</i>)

Connector Pin Assignment: AES SYNC IN + 3x OUT (15-pin D-type, female)



Pin	Signal	Pin	Signal
1	AES In 1 +	9	AES In 1 -
2	Screen	10	Screen
3	AES OUT 3 -	11	AES OUT 3 +
4	n.c.	12	n.c.
5	AES OUT 2 +	13	AES OUT 2 -
6	Screen	14	Screen
7	AES OUT 1 -	15	AES OUT 1 +
8	n.c.		

Vi Series Optional I/O Cards

CobraNet™ Interface Card
Aviom A-NET® Interface Card
EtherSound® Interface Card
ADAT I/O Card
SDI In Card
SDI I/O Card
Dolby® D/E Decoder Card



This card allows sending and receiving of up to 32 audio channels to/from a CobraNet®. DIP switches on the card allow setting the number of input or output channels seen by the console. Default setting is 32 output and no input channels. All settings of the CobraNet® module are made through SNMP. Per default, the module is configured to be the conductor (synchronization master) and providing multicast bundles 1...4 to the CobraNet® network. This setting is ideal for e.g. providing audio channels to a PA, installed sound, or monitoring system using CobraNet®.

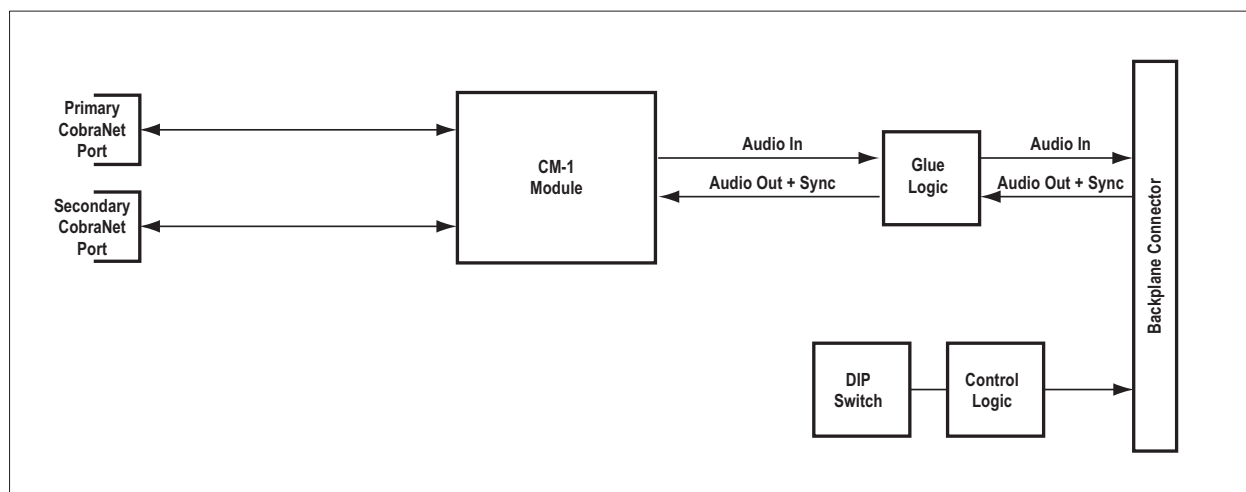
For further information on CobraNet®, please refer to the CobraNet® user's manual or to www.cobranet.info.

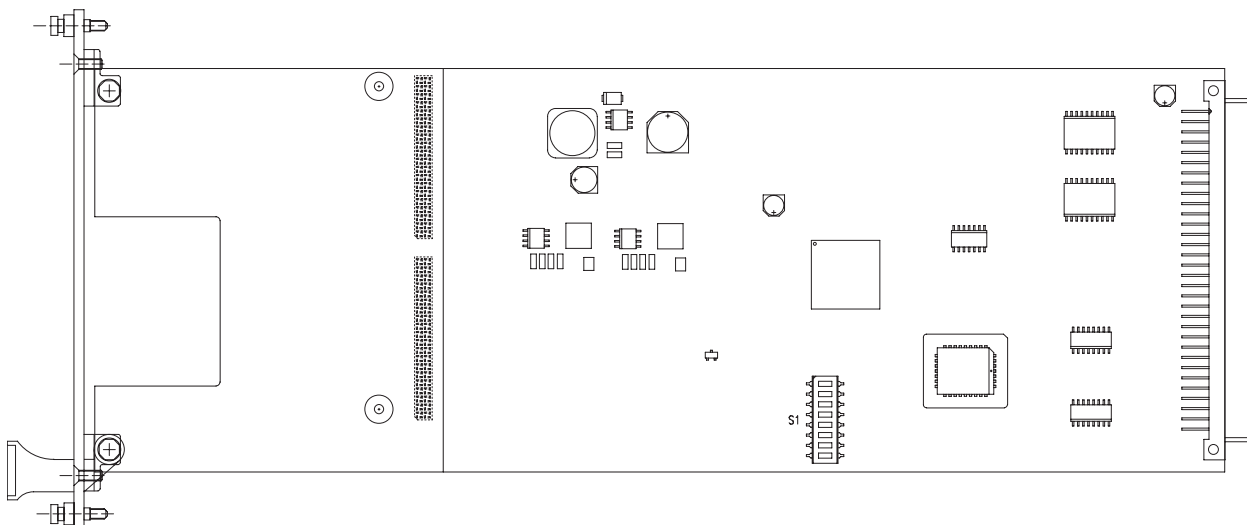
Current consumption (5 V)

800 mA

Operating temperature

0...45° C





DIP Switch:

S1 DIP switch for D21m channel count setting:

1	2	3	4	5	6	7	8	Number of Channels
OFF	OFF	OFF	OFF	-	-	-	-	0 inputs (factory default)
OFF	OFF	OFF	ON	-	-	-	-	8 inputs
OFF	OFF	ON	OFF	-	-	-	-	16 inputs
OFF	OFF	ON	ON	-	-	-	-	24 inputs
OFF	ON	OFF	OFF	-	-	-	-	32 inputs
OFF	ON	OFF	ON	-	-	-	-	NOT ALLOWED
:	:	:	:	-	-	-	-	
ON	ON	ON	ON	-	-	-	-	
-	-	-	-	OFF	OFF	OFF	OFF	0 outputs
-	-	-	-	OFF	OFF	OFF	ON	8 outputs
-	-	-	-	OFF	OFF	ON	OFF	16 outputs
-	-	-	-	OFF	OFF	ON	ON	24 outputs
-	-	-	-	OFF	ON	OFF	OFF	32 outputs (factory default)
-	-	-	-	OFF	ON	OFF	ON	NOT ALLOWED
-	-	-	-	:	:	:	:	
-	-	-	-	ON	ON	ON	ON	

Aviom A-Net® CARD

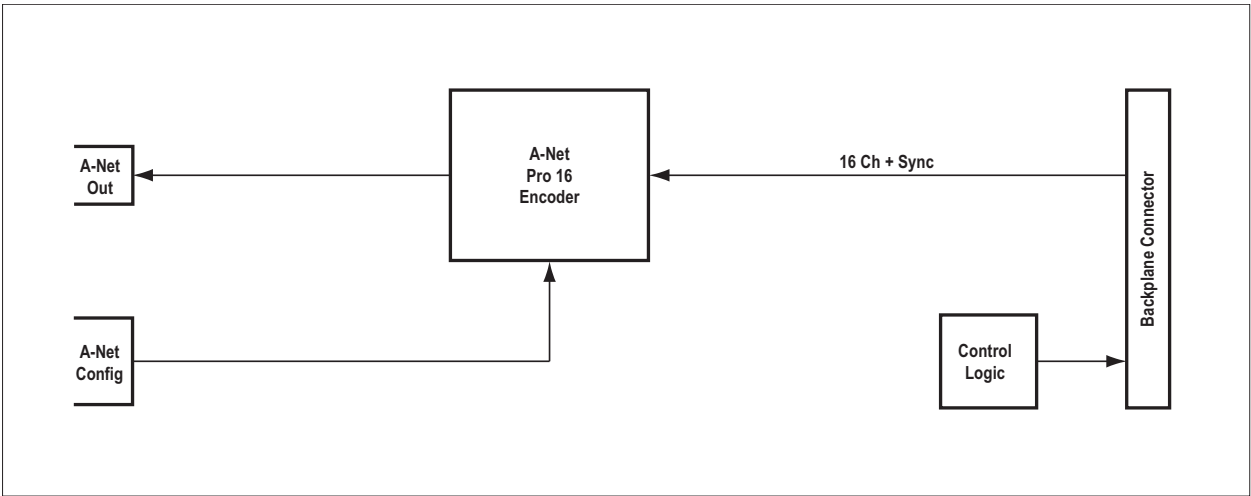
RS2497 (Local Rack) RS2498 (Stagebox)

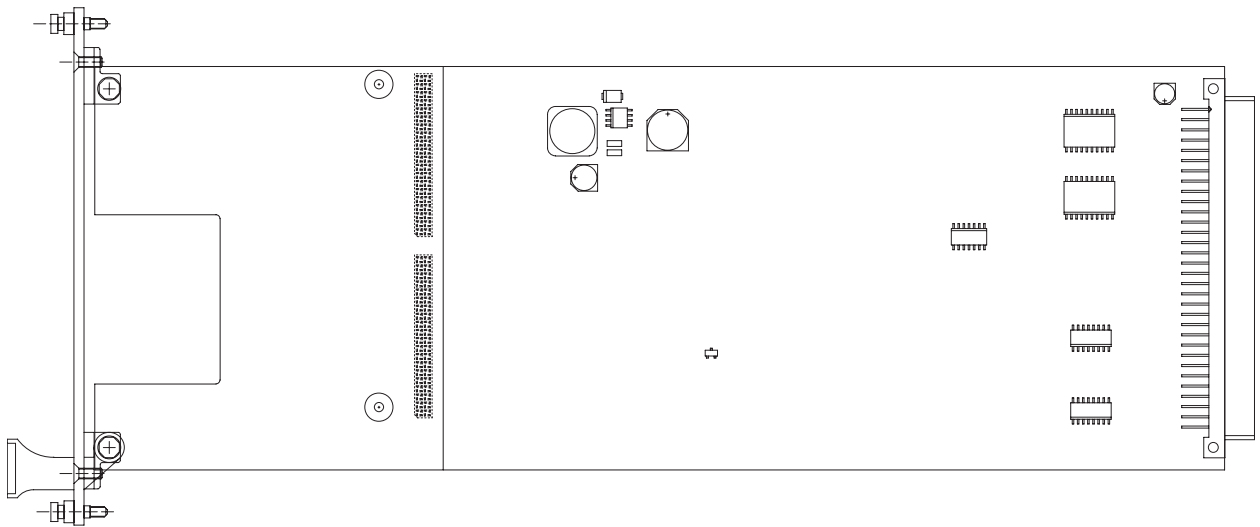


This card allows implementing the head of an Aviom A-Net® Pro-16 chain. With this standard, 16 mono signals can be fed to an infinite number of Aviom personal mixers (such as the A-16 II) may be connected in a daisy chain configuration. The D21m A-Net® card will be the start of the chain and provide the audio and synchronization data to the chain. DIP switches on the front panel allow grouping two adjacent channels to one stereo channel, and generating a test tone.

This card is available for both Local Rack and Stagebox.

Current consumption (5 V)	250 mA
Operating temperature	0...45° C



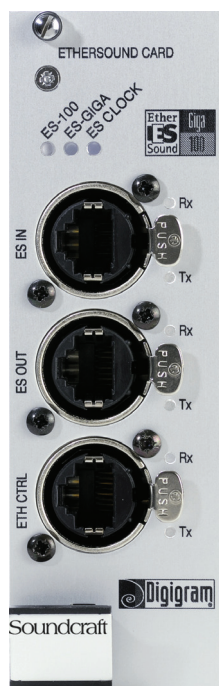


Front-Panel Switch:

Position	Setting
1	OFF: Channels 1 and 2 are mono (factory default) ON: Channels 1 and 2 are a stereo group
2	OFF: Channels 3 and 4 are mono (factory default) ON: Channels 3 and 4 are a stereo group
3	OFF: Channels 5 and 6 are mono (factory default) ON: Channels 5 and 6 are a stereo group
4	OFF: Channels 7 and 8 are mono (factory default) ON: Channels 7 and 8 are a stereo group
5	OFF: Channels 9 and 10 are mono (factory default) ON: Channels 9 and 10 are a stereo group
6	OFF: Channels 11 and 12 are mono (factory default) ON: Channels 11 and 12 are a stereo group
7	OFF: Channels 13 and 14 are mono (factory default) ON: Channels 13 and 14 are a stereo group
8	OFF: Channels 15 and 16 are mono (factory default) ON: Channels 15 and 16 are a stereo group
9	OFF: Test tone generator off (factory default) ON: Test tone generator on

EtherSound® CARD

Note: only available via Digigram distribution network. Please contact www.digigram.com for further details.



The EtherSound® card allows the connection of the Vi console to an EtherSound® network. Towards the desk, it acts similarly to a MADI card combined with a GPIO card. The number of audio channels used can be configured with DIP switches. The included, virtual GPIO card allows, e.g., routing a GPO of the mixing console to the GPO of a distant EtherSound® device on the network. Configuration of the EtherSound® network is performed either through the ETH CTRL connector or from a remote location on the EtherSound® network, e.g. using the EtherSound® EScontrol software.

The EtherSound® card works with EtherSound® ES-Giga System Transport networks or with EtherSound® ES-100 Audio Transport networks. The operating mode of the card (ES-100 or ES-Giga) is selected by setting jumper J22 (see opposite page). The selected mode will be displayed on the front panel LEDs.

The audio clock of the EtherSound® network must be synchronous with the Vi console's audio clock. This is ensured either by using the EtherSound® card as clock source of the EtherSound® network, or by feeding the device that is actually the EtherSound® network clock source with a word clock synchronous with the D21m I/O system's audio clock.

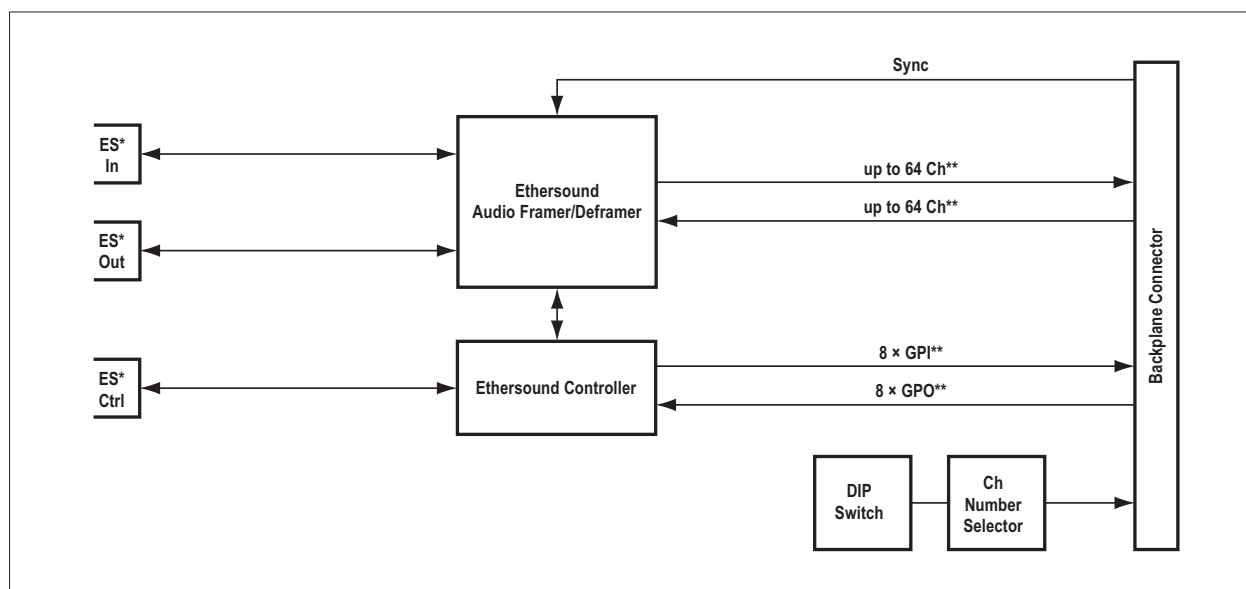
This card is available for both Local Rack and Stagebox.

Current consumption (5 V)

750 mA max.

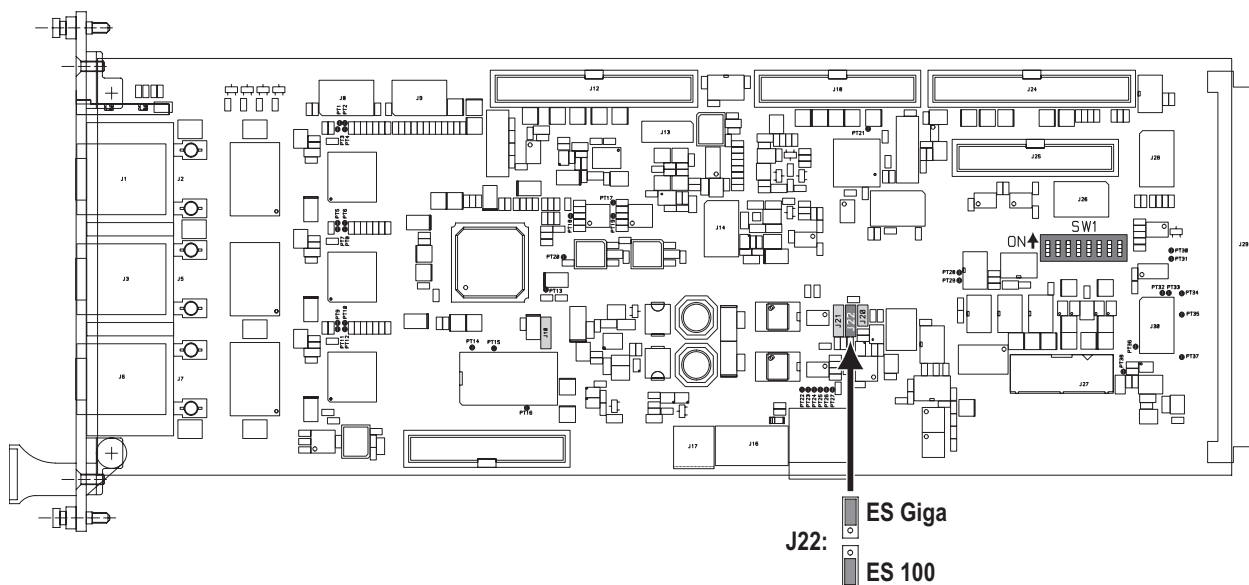
Operating temperature

0...45° C



* For more information on network topology and possible connections, please refer to the Ethersound documentation (www.ethersound.com).

** GPIs are GPOs on the Ethersound network, and vice versa. Audio outputs are audio inputs on the Ethersound network, and vice versa.



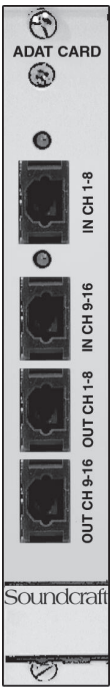
LEDs: ES-100 / ES-GIGA Indicate the mode selected with jumper J22.
 ES CLOCK *Green:* The card is the clock source of the EtherSound® network.
 Red (only in case of a ring network topology): The card was defined to be the clock source of the EtherSound® network, but it is not, due to a device or cable failure in the ring.
 Flashing red (only in case of a ring network topology): The card was not defined to be the clock source of the EtherSound® network, but it actually is, due to a device or cable failure in the ring located just next to the card.
 Dark: The card is not the EtherSound® clock source.

DIP Switch: SW1 DIP switch for D21m channel count setting:

1	2	3	4	5	6	7	8	Number of Channels
OFF	OFF	OFF	OFF	-	-	-	-	0 inputs
OFF	OFF	OFF	ON	-	-	-	-	8 inputs
OFF	OFF	ON	OFF	-	-	-	-	16 inputs
OFF	OFF	ON	ON	-	-	-	-	24 inputs
OFF	ON	OFF	OFF	-	-	-	-	32 inputs
OFF	ON	OFF	ON	-	-	-	-	40 inputs
OFF	ON	ON	OFF	-	-	-	-	48 inputs
OFF	ON	ON	ON	-	-	-	-	56 inputs
ON	OFF	OFF	OFF	-	-	-	-	64 inputs (factory default)
ON	OFF	OFF	ON	-	-	-	-	NOT ALLOWED
:	:	:	:	-	-	-	-	
ON	ON	ON	ON	-	-	-	-	
-	-	-	-	-	-	-	-	
-	-	-	-	OFF	OFF	OFF	OFF	0 outputs
-	-	-	-	OFF	OFF	OFF	ON	8 outputs
-	-	-	-	OFF	OFF	ON	OFF	16 outputs
-	-	-	-	OFF	OFF	ON	ON	24 outputs
-	-	-	-	OFF	ON	OFF	OFF	32 outputs
-	-	-	-	OFF	ON	OFF	ON	40 outputs
-	-	-	-	OFF	ON	ON	OFF	48 outputs
-	-	-	-	OFF	ON	ON	ON	56 outputs
-	-	-	-	ON	OFF	OFF	OFF	64 outputs (factory default)
-	-	-	-	ON	OFF	OFF	ON	NOT ALLOWED
-	-	-	-	:	:	:	:	
-	-	-	-	ON	ON	ON	ON	

ADAT I/O CARD

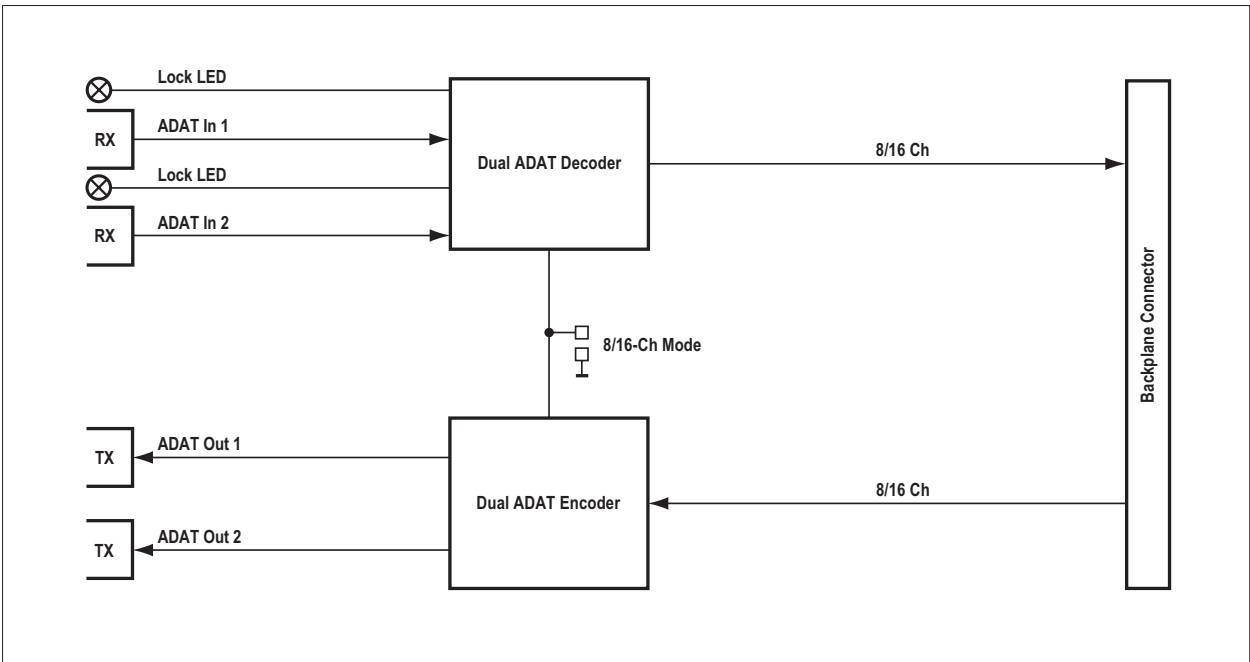
RS2360

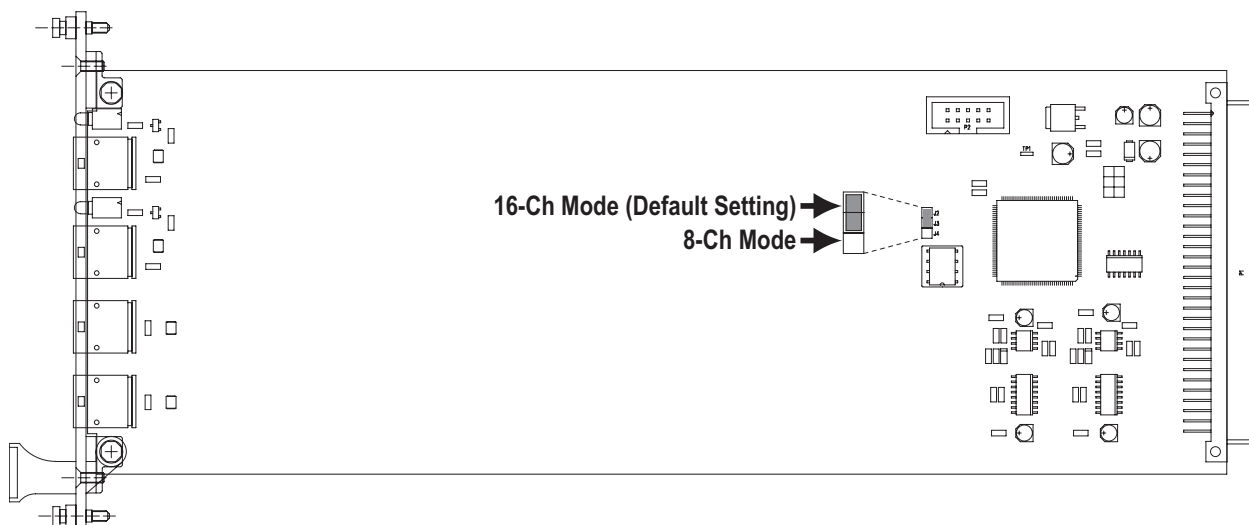


Two optical eight-channel ADAT inputs and outputs. 48kHz operation; Optical inputs and outputs are provided on TosLink connectors.

This card is only available for the Local Rack.

Maximum distance		5m
Current consumption	(3.3 V)	0.1A
	(5 V)	0.2A
Operating temperature		0...45° C





LEDs:

IN CH 1-8, 9-16 These LEDs indicate that valid ADAT signals are available at the respective inputs.

Jumper:

8/16 Ch Mode It is possible to restrict the number of channels to 8 from 16 with this jumper.

Jumper Setting	Channels on Backplane	Interface 1	Interface 2
16-Ch Mode (factory default)	16 in, 16 out	48 kHz: Ch 1...8	48 kHz: Ch 9...16
		96 kHz: Ch 1...4	96 kHz: Ch 5...8
8-Ch Mode	8 in, 8 out	48 kHz: Ch 1...8	48 kHz: unused
		96 kHz: Ch 1...4	96 kHz: Ch 5...8



The HD/SD SDI (serial digital interface) 16-channel de-embedder card is able to de-embed eight or 16 audio channels from SDI-SD as well as from SDI-HD video streams. For the D21m I/O system it acts as an eight-or 16-channel audio input card. These two modes are determined by hardware switches located on the card.

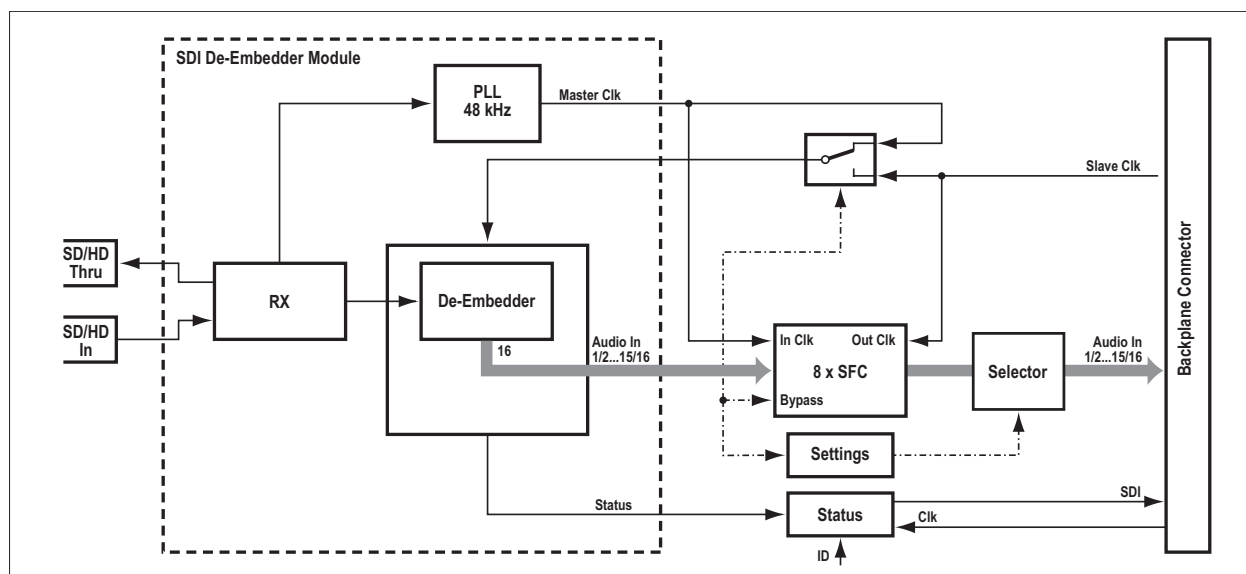
The SDI standard defines up to 16 audio channels transmitted within a video signal. These 16 channels are divided into four groups of four each. The user can determine by hardware switches whether all four groups, or only groups 1+2, or only groups 3+4 will be de-embedded.

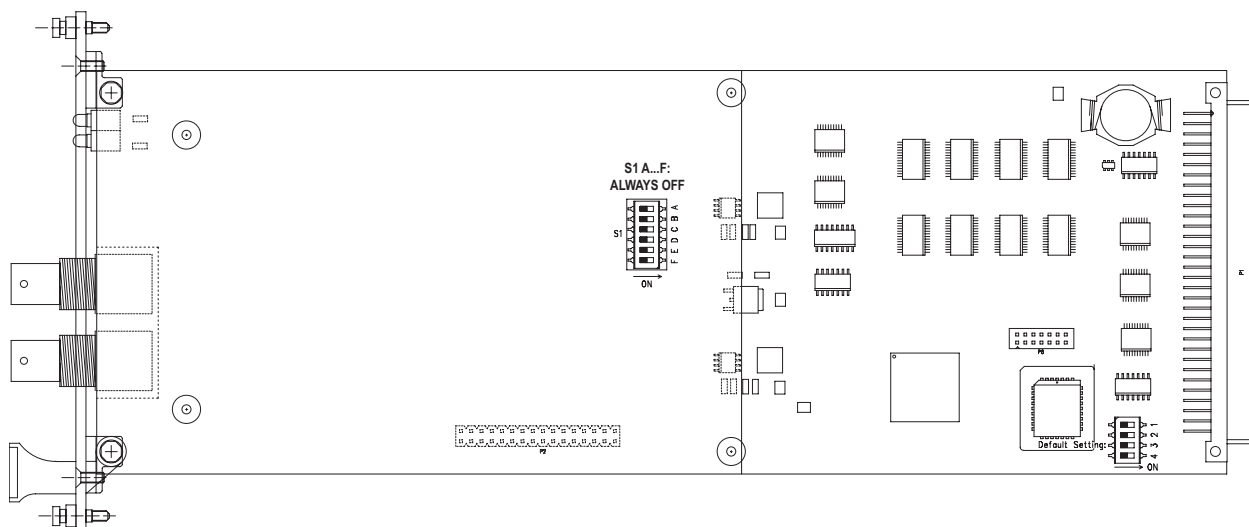
The card hosts SFCs (sampling frequency converters) that are bypassed per default. When bypassed, the SDI card is fully compatible to receiving embedded Dolby® E audio data. The SFCs can be enabled in case the audio extracted from the SDI stream is not in sync with the local system. This means that the mixing console can run fully independent of the video sync used for SDI.

This card works at a sampling frequency of 48 kHz only.

Note: only available for the Local Rack.

Modes	8- or 16-ch console input (de-embedder)
Selectable SDI groups	1&2, 3&4, or all
Video connectors	IN, THROUGH (BNC, 75 Ω)
Current consumption (5 V)	1 A
Operating temperature	0...40° C





LEDs

SDI LOCK Indicates a valid SDI signal at the input.

HD Indicates a valid HD SDI signal at the input.

DIP Switches:

S1	Switch	Setting
	1	OFF: 16-channel mode (factory default) ON: 8-channel mode
	2	OFF: Group 1/2 used in 8-channel mode (factory default) ON: Group 3/4 used in 8-channel mode
	3	OFF: SFC disabled (factory default) ON: SFC enabled
	4	reserved (must always be OFF; factory default)
S1	Switch	Setting
	A...F	reserved (default: OFF)

SDI I/O CARD

Special Order Only



The HD/SD SDI (serial digital interface) embedder/de-embedder card is able to handle video signals according to the SD as well as the HD standard. It can act as an eight-channel embedder, an eight-channel de-embedder, or as a combination of the two. Therefore, for the D21m I/O system it may act as an eight-channel audio input card, an eight-channel audio output card, or an eight-channel input and output card. These three modes are determined by hardware switches located on the card.

The SDI standard defines up to 16 audio channels transmitted within a video signal. These 16 channels are divided into four groups of four channels each. The user can select which two groups are to be embedded or de-embedded by hardware switches on the card: either groups 1&2, or groups 3&4. It is also possible to clear the SDI data structure possibly present in the incoming video signal and to allocate the groups from scratch. The Vi SDI card hosts sampling frequency converters for both the audio inputs (de-embedding) and outputs (embedding). So the mixing console can run independent of the video sync used for SDI. The sampling frequency converters can be bypassed. When bypassed, the SDI card is fully compatible to transmitting the Dolby® E audio format. If power is switched off, the input is hardware-bypassed to output A. *Note: only available for the Local Rack.*

This card works at a sampling frequency of 48 kHz only.

Modes

8-ch console output (embedder)
8-ch console input (de-embedder)
or 8-ch console input and 8-ch console output
(de-embedder/embedder)

Selectable SDI groups

1&2, or 3&4

Video connectors

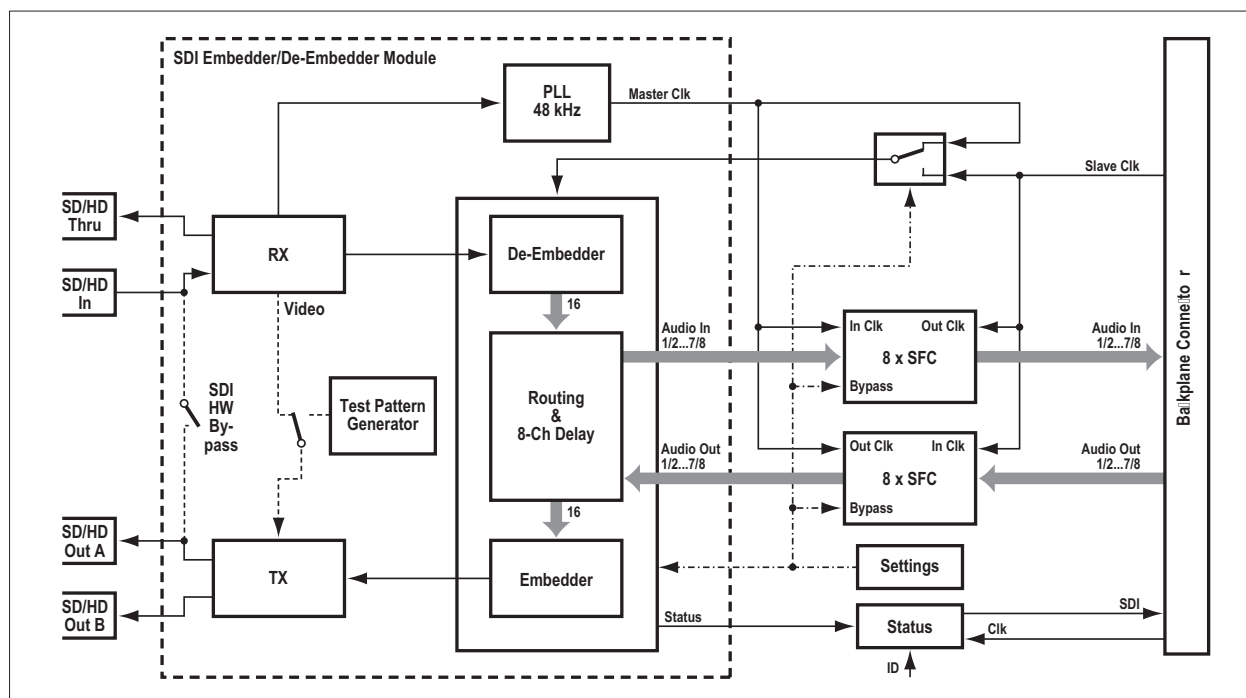
IN, OUT A, OUT B, THROUGH (BNC, 75 Ω)

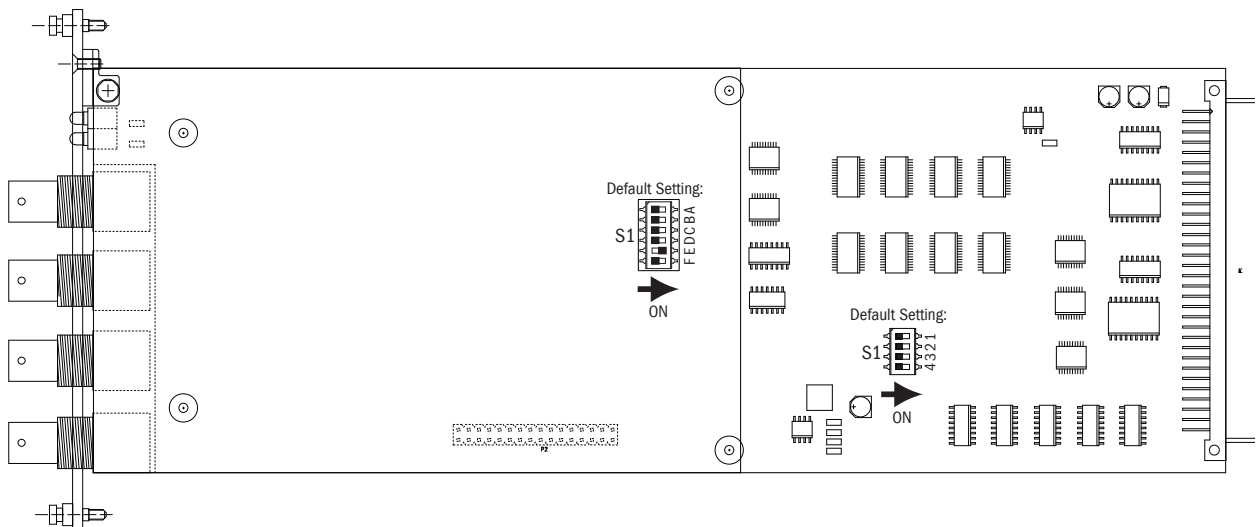
Current consumption (5 V)

1A

Operating temperature

0...40° C





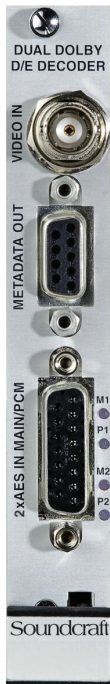
LEDs: SDI LOCK Indicates a valid SDI signal at the input.
 HD Indicates a valid HD SDI signal at the input.

DIP Switches

S1	Switch	Setting
	1	OFF: Enable de-embedder (factory default)
	2	OFF: Enable embedder (factory default)
	3	OFF: SFC bypass (factory default)
	4	reserved (must always be OFF)

S1	Switch	Setting
	A	OFF: De-embedder groups 1&2 (factory default) ON: De-embedder groups 3&4
	B	OFF: Embedder groups 1&2 (factory default) ON: Embedder groups 3&4
	C	ON: All audio data in SDI will be cleared (factory default: OFF)
	D	OFF: no delay (factory default) ON: 40 ms delay on all 8 SDI in channels
	E	OFF: transparent for channel status bit ON: generate channel status bit (factory default)
	F	OFF: NTSC 525 test pattern is generated if no SDI input signal is present (factory default) ON: NTSC 1080i60 test pattern if no SDI input signal is present

DOLBY® E/DIGITAL DECODER CARD RS2553 (dual decoder)



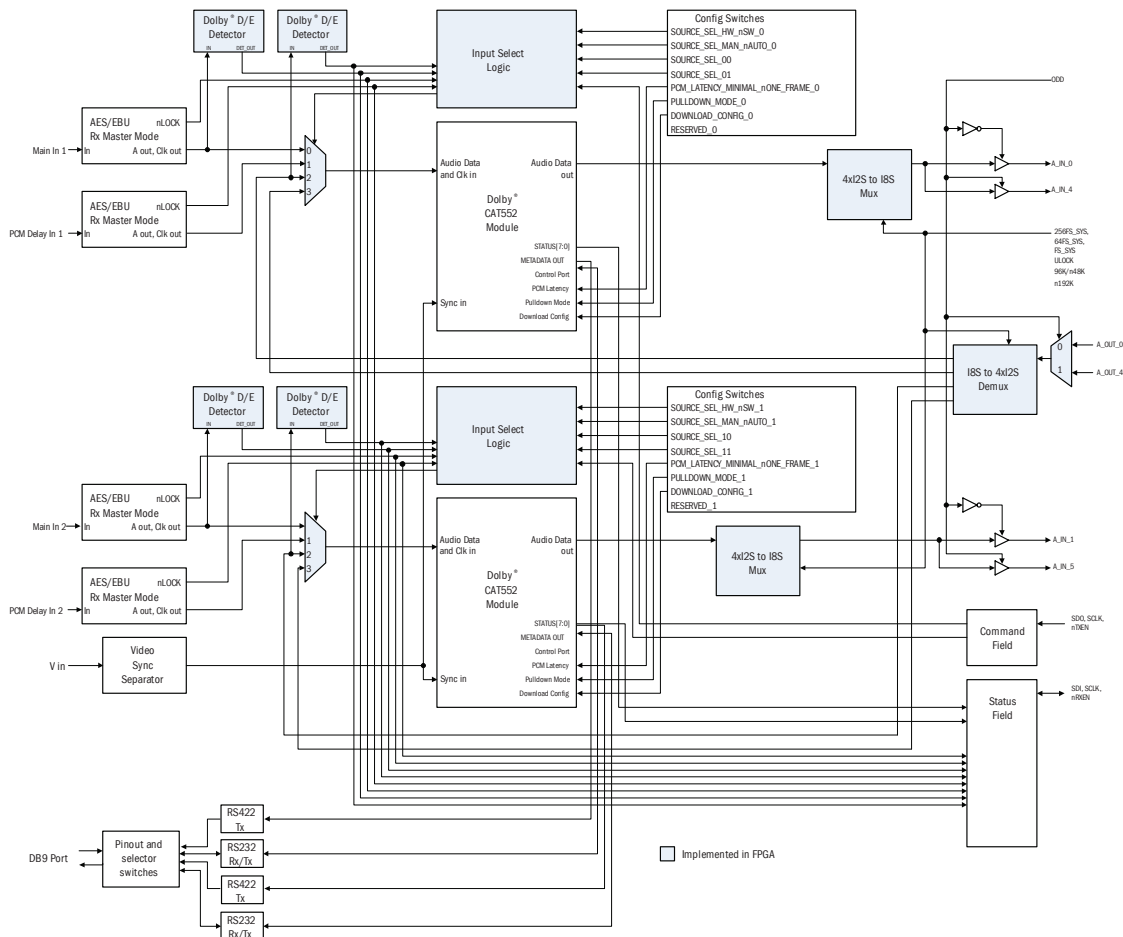
About Dolby® E

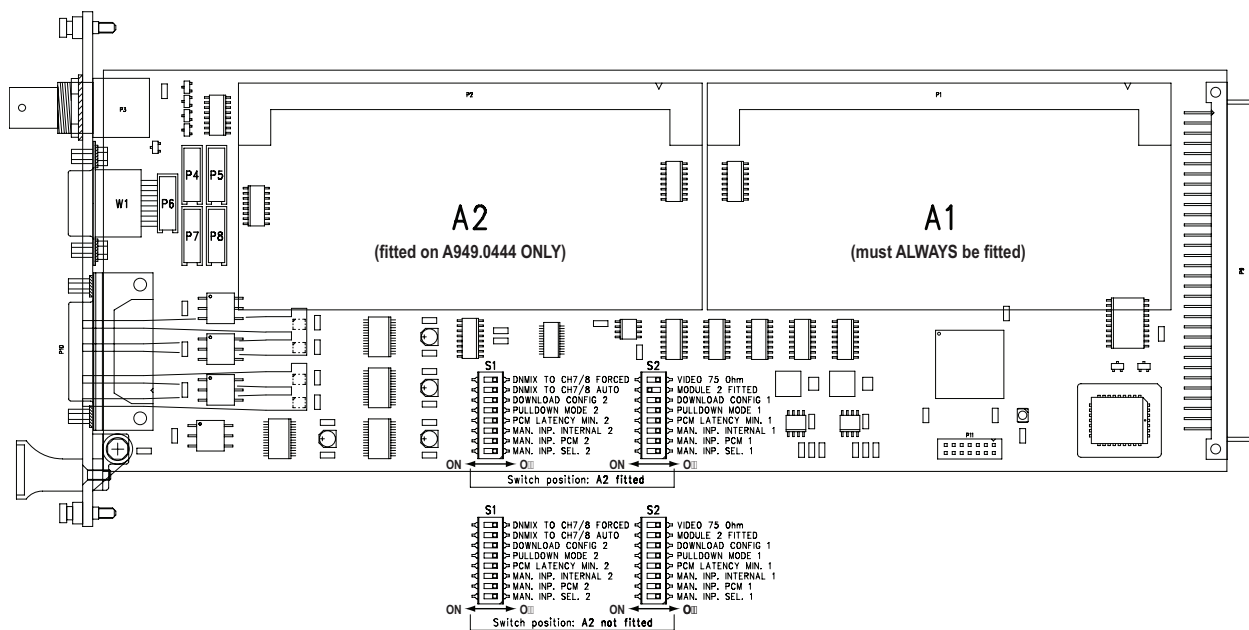
Dolby® E allows encoding of up to 8 mono audio channels and some meta-data into a pair of two channels (e.g. AES/EBU) by using 20 audio bits thereof. Both encoding and decoding processes create one video frame of delay. Since the encoded data is packaged in sizes of one video frame it is possible to “edit” the encoded stream, as long as the edits are synchronized with the video frames and the stream is not modified in any way (e.g. level changes applied). For more details on Dolby® E please refer to www.dolby.com.

The Decoder card

The Vi Dolby® E/Digital card hosts two Dolby® E decoder modules. Each one is functionally very similar to one Dolby® DP572 decoder. Both are operating independently, and the information given below is valid independently for both decoders as well. The dual-decoder card receives four AES/EBU pairs the front panel input, or eight mono channels from the console-internal patch (showing up as patch destinations). Each pair may contain a Dolby E or Dolby Digital encoded signal. The card returns a total of max. 16 channels to the console patch (showing up as patch sources).

The card is available for the Local Rack only.





LEDs: M1 / M2 Indicates that a valid AES/EBU signal is detected on main input 1/2.
P1 / P2 Indicate that a valid AES/EBU signal is detected on fallback input 1/2.
Note: These LEDs do not indicate Dolby® E status, but just the lock status of the AES/EBU inputs on the front panel.

DIP Switches: S2.1 ... S2.3

S2.1	S2.2	S2.3	Module 1 Input Select
x	x	OFF	Automatic source selection (factory default: All OFF)
OFF	OFF	ON	Front port main
OFF	ON	ON	Front port PCM delay
ON	OFF	ON	Rear (backplane) main
ON	ON	ON	Rear (backplane) PCM delay

While it is possible to manually select individual inputs both from the front panel connectors as well as from the console-internal patch, the card hosts an automatic source selection mode where the inputs are chosen automatically according to the following priorities:

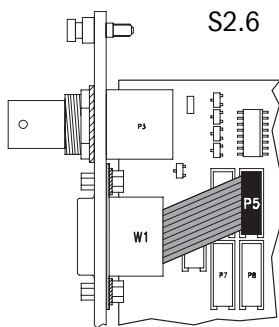
1. Whenever a valid AES/EBU signal is detected (“locked” status) on the 15-pin front panel connector, this input has priority over the console-internal patch sources. Hence if it is requested to feed the decoder with a console-internal signal selected via the patch window, no valid AES/EBU input signal is allowed on the front panel connector
2. However, if no valid AES/EBU signal is detected on the front panel inputs, the card is getting its inputs from the console-internal patch. These inputs are referred to as “Rear/Backplane Inputs”. Selection is as follows:
 - Input 1, 2: Main priority input for Dolby® E signal, decoder 1.
 - Input 3, 4: Backplane input of decoder 1; is automatically selected in case no Dolby® E signal is present on main input (1, 2). Please note that a Dolby® E signal can be fed into this input, too, and it will be decoded correctly. However, if a Dolby® E signal is detected on the main input, this will be taken with higher priority.

S2.4	S2.4 PCM Latency (Module 1 only)	
	OFF	PCM signal is delayed by 1 video frame (factory default)
	ON	PCM signal is minimally delayed

Decoding a Dolby® E stream always causes a delay of one video frame. In case a regular PCM signal is fed to the card, this can be delayed by one video frame, too. If required, this delay may be de-activated in order to pass through a PCM signal with a minimal delay. The front panel VIDEO IN sync input is used to detect video frames in order to delay the PCM signal accordingly. The video sync input doesn't necessarily have to be connected in case of Dolby® E , since the sync is indicated within the Dolby® E stream.

S2.5	S2.5 Module 1 Pulldown Mode	
	OFF	Pulldown mode is off (factory default)
	ON	Pulldown mode is on

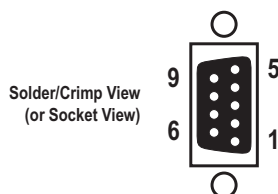
Pulldown mode ON allows the input of audio signals with a “drop frame” sampling frequency of 47.952 kHz instead of 48 kHz. The output, however, always runs at 48 kHz.



S2.6	S2.6 Module 1 Configuration Download	
	OFF	Standard operation (factory default)
	ON	Configuration download via RS232

If firmware download to decoder module 1 is required, plug the short flat cable (W1) coming from the METADATA OUT front-panel socket to the PCB socket P5 (labeled UPDATE1).

The pin assignment of the METADATA OUT socket (9pin D-type, female, UNC 4-40 thread) in this case is as follows:



Pin	Signal	Pin	Signal
1	n.c.	6	n.c.
2	DOUT_1	7	n.c.
3	DIN_1	8	n.c.
4	n.c.	9	n.c.
5	n.c.		

S2.7	S2.7 Module 2 Installed	
	OFF	No (factory default if not installed, i.e., for A949.0443)
	ON	Yes (factory default if installed, i.e., for A949.0444)

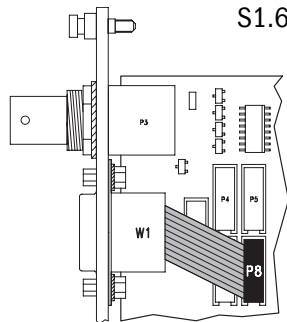
S2.8	S2.8 Video Termination	
	OFF	Hi-Z (factory default)
	ON	75 Ω

S1.1..1.3	S1.1	S1.2	S1.3	Module 2* Input Select
	x	x	OFF	Automatic source selection (factory default: All OFF)
	OFF	OFF	ON	Front port main
	OFF	ON	ON	Front port PCM delay
	ON	OFF	ON	Rear (backplane) main
	ON	ON	ON	Rear (backplane) PCM delay
	* if installed			

Same as S2.1..S2.3 above but for module 2 (if installed).

S1.4	S1.4	PCM Latency (Module 2 only)
	OFF	PCM signal is delayed by 1 video frame (factory default)
	ON	PCM signal is minimally delayed

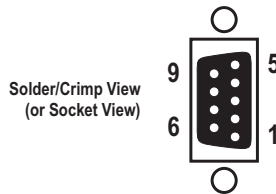
S1.5	S1.5	Module 2 Pulldown Mode
	OFF	Pulldown mode is off (factory default)
	ON	Pulldown mode is on



S1.6	S1.6	Module 2 Configuration Download
	OFF	Standard operation (factory default)
	ON	Configuration download via RS232

If firmware download to decoder module 2 is required, plug the short flat cable (W1) coming from the METADATA OUT front-panel socket to the PCB socket P8 (labeled UPDATE2).

The pin assignment of the METADATA OUT socket (9pin D-type, female, UNC 4-40 thread) in this case is as follows:



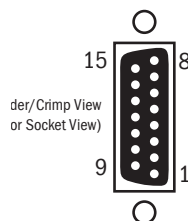
Pin	Signal	Pin	Signal
1	n.c.	6	n.c.
2	DOUT_2	7	n.c.
3	DIN_2	8	n.c.
4	n.c.	9	n.c.
5	n.c.		

S1.7/1.8	S1.7	S1.8	Downmix to Ch 7/8 (or 15/16, resp.)
	OFF	OFF	No downmix (factory default)
	ON	OFF	Automatic downmix
	OFF	ON	Forced downmix

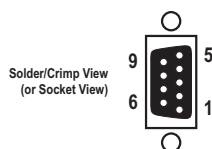
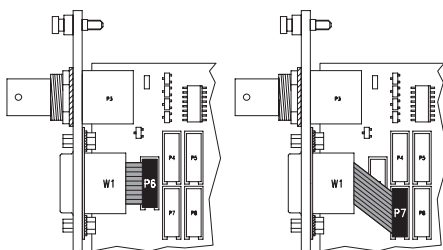
Metadata and Downmixing: A Dolby® E stream contains metadata with various information on the encoded signal. This information can be read out from the front panel connector. The D21m Dolby® E decoder card only uses this information in case a 2-channel stereo downmix is required from a 5.1-channel surround signal within the Dolby® E stream; then the decoder interprets the center and surround channel levels and uses them for the internal downmixer that is activated by the DIP switches S1.7 and S1.8. The downmix can be made constantly available and, subsequently, overwriting any audio data that was contained on these channels beforehand (“forced downmix”), or it is possible to “fill” the channels 7/8 or 15/16 only if the metadata indicate that these channels are not being used otherwise (automatic downmix).

Connector Pin Assignments:

2x AES IN MAIN/PCM (15pin D-type, female, UNC 4-40 thread)



Pin	Signal	Pin	Signal
1	Main In 1 +	9	Main In 1 –
2	Main In 1 Chassis	10	PCM Delay In 1 Chassis
3	PCM Delay In 1 –	11	PCM Delay In 1 +
4	n.c.	12	n.c.
5	Main In 2 +	13	Main In 2 –
6	Main In 2 Chassis	14	PCM Delay In 2 Chassis
7	PCM Delay In 2 –	15	PCM Delay In 2 +
8	n.c.		

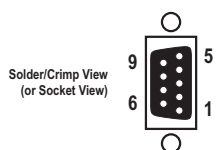
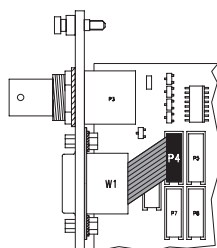


METADATA OUT (9-pin D-type, female)

The Metadata Out socket allows sending the meta data of either module or of both modules at once. If the meta data of either decoder module 1 or 2 is required, plug the short flat cable (W1) coming from the METADATA OUT front-panel socket to the PCB socket P6 (labeled META1; factory default), or to PCB socket P7 (META2), respectively.

The pin assignment of the METADATA OUT socket (9pin D-type, female, UNC 4-40 thread) in this case is as follows:

Pin	Signal	Pin	Signal
1	Chassis	6	GND
2	n.c.	7	n.c.
3	META_1+ / META_2+	8	META_1- / META_2-
4	GND	9	Chassis
5	n.c.		



If the meta data of both decoder modules is required, plug the short flat cable (W1) coming from the METADATA OUT front-panel socket to the PCB socket P4 (labeled META1+2).

Please note that in this case the pin assignment of the METADATA OUT socket (9pin D-type, female, UNC 4-40 thread) is non-standard:

Pin	Signal	Pin	Signal
1	Chassis	6	GND
2	n.c.	7	META_2-
3	META_1+	8	META_1-
4	META_2+	9	Chassis
5	n.c.		

Possible Pitfalls with Dolby® E

In order to transmit or record a Dolby® E encoded signal, the whole signal path must be 100% transparent, regarding the 20 audio bits contained within the data stream. In case of problems with decoding the Dolby® E signal and possibly getting white noise instead of the decoded signal, the whole signal path should be checked. It may be worthwhile verifying the following points:

- Are there any sampling frequency converters (e.g. when using the D21m Dolby® E decoder card together with the D21m SDI card) in the signal chain? If so, they must be bypassed; otherwise the Dolby® E stream is modified and cannot be decoded anymore.
- In case the signal is sourced from a video tape machine: Is the machine set up to be transparent for the recorded audio signals? Several machines require setting the tracks to "DATA" mode in order to guarantee unity gain while recording or playing back Dolby® E streams.
- Is the card receiving the Dolby® E stream from the console-internal patch? If so, are both tracks patched to the correct two inputs of the card? (Decoder 1 main: channels 1 and 2; decoder 1 PCM: channels 3 and 4; decoder 2 main: channels 5 and 6; decoder 2 PCM: channels 7 and 8).
- If getting a wrong signal or no signal at all: Are any AES/EBU signals present at the front panel while console-internal streams should be decoded? If the card is in "automatic source selection" mode, the front inputs have top priority, regardless whether a Dolby® E stream is recognized or not.