

# I/O SOLUTIONS & SPECIFICATIONS

**STUDER**<sup>®</sup>  
by HARMAN

# I/O Overview

Studer provides a comprehensive line of audio I/O systems for professional broadcast facilities and outside broadcast providers. With a wide range of analog, digital, and IP-based input/output options, Studer's products are designed to solve a multitude of audio routing needs. The modular D2 I m and D23m I/O Systems host a variety of special purpose cards, enabling operators to configure the I/O to meet their specific needs. The Studer Compact Stagebox is a cost-effective, high-density expansion solution that can supplement the I/O of a D2 I m or D23m System. Studer delivers premium quality, reliable products, and the breadth of I/O products within Studer's portfolio gives broadcasters immense flexibility and extensibility.



# D21m

## I/O System

The Studer D21m I/O system is a flexible, cost-effective I/O solution. The high-density audio interface system was designed to provide the highest quality analog, digital, and signaling interconnections between external equipment and Studer DSP cores.

The 19" 3RU frame has 12 slots for I/O interface cards and can be configured to fit the specific needs of the customer. With support for both single and double-width cards, the frame can also host one or two HD Link cards, which provide the main

audio connection to the DSP core. Two power supply units are possible for secure, redundant operation.

With the extensive line of cards available, the D21m supports both analog and digital audio signals. When using MADI format digital I/O, redundant audio connections are possible for fail-safe operation. The system will automatically switch to the redundant connection should the primary MADI connection fail. Alternatively, the second MADI link can be used to extend

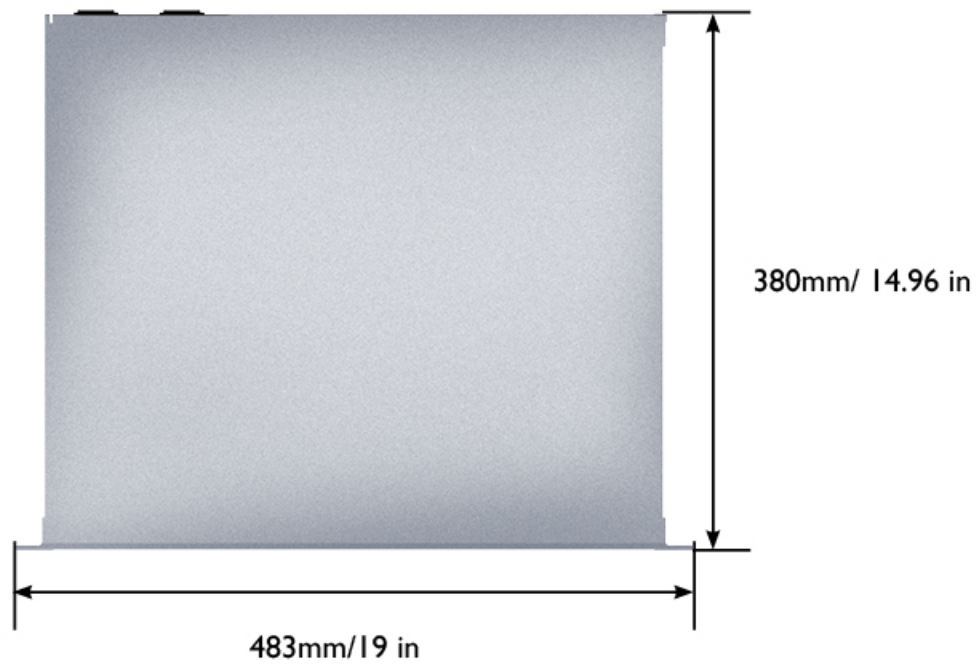
the channel count to 64 MADI channels when operating at 96 kHz sampling rate.

All functions and configurations of the D21m are remotely controllable from the connected console or a workstation. This cost-effective I/O solution also scales elegantly as multiple D21m units may be connected via MADI in a star configuration to provide higher channel counts and multi-location operations.



# D21m

## Dimensions





# D23m

## The Next Generation I/O System

With increasing demands for higher channel counts, the D23m delivers. By leveraging Studer's A-Link interface and Infinity Core technology, the D23m is a powerful I/O system that offers an enhanced channel count architecture. D23m serves as a scalable, modular I/O frame, providing cost-effective inputs and outputs with maximum flexibility – all while maintaining the well-known Studer sound quality.

D23m is fully compatible to D21 systems already in the field. All existing D21m I/O-cards are fully compatible and can be used in the new D23m frame, protecting your existing investments and offering a cost effective solution. Mix and match

I/O modules for a tailor-made system that addresses your unique requirements.

The D23m can host up to 12 I/O cards with a total of 1,536 inputs and 1,536 outputs. When used as a small stand-alone router, the D23m frame provides a huge I/O matrix of  $3,072 \times 3,072$  inputs and outputs. The D23m I/O system comes with two A-Link ports and two hot swappable power supplies (including secondary regulators) for secure, redundant operation. Status displays on the front panel indicate the status of the frame and installed cards.

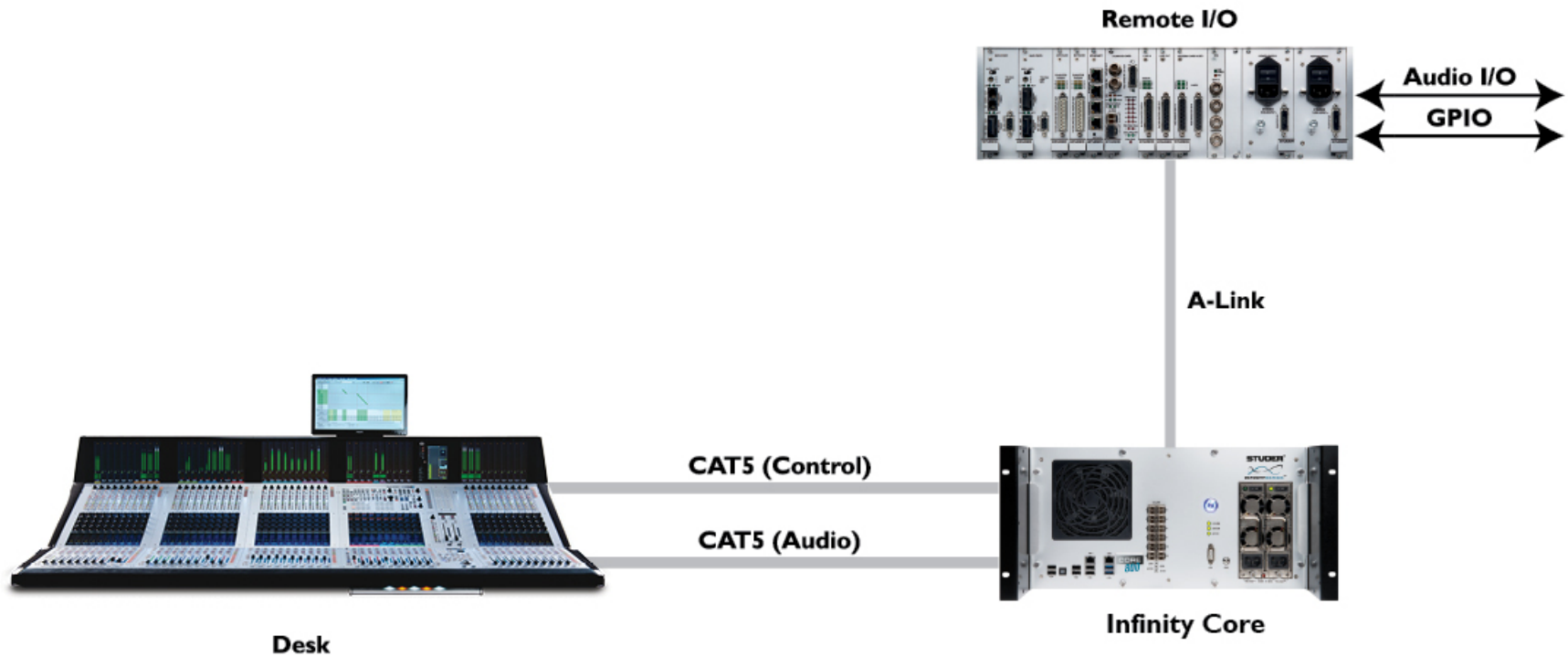
The audio between the mixing console or router system and the D23m frame

connects via the A-Link interface. The A-Link HD card hosts a powerful processor to operate all required patching and may be used as the sync master to the system, or it may be slaved to a variety of external synchronization signals. With the new D23m 256-channel AoIP card (AES67/Ravenna/AVB), control data is sent from the media network directly to the HD card over the backplane. Due to its internal routing matrix, the D23m can be used as a system independent AoIP I/O frame and can be accessed by any Vista mixer in your network (requires Studer's DIOS system).



# D23m

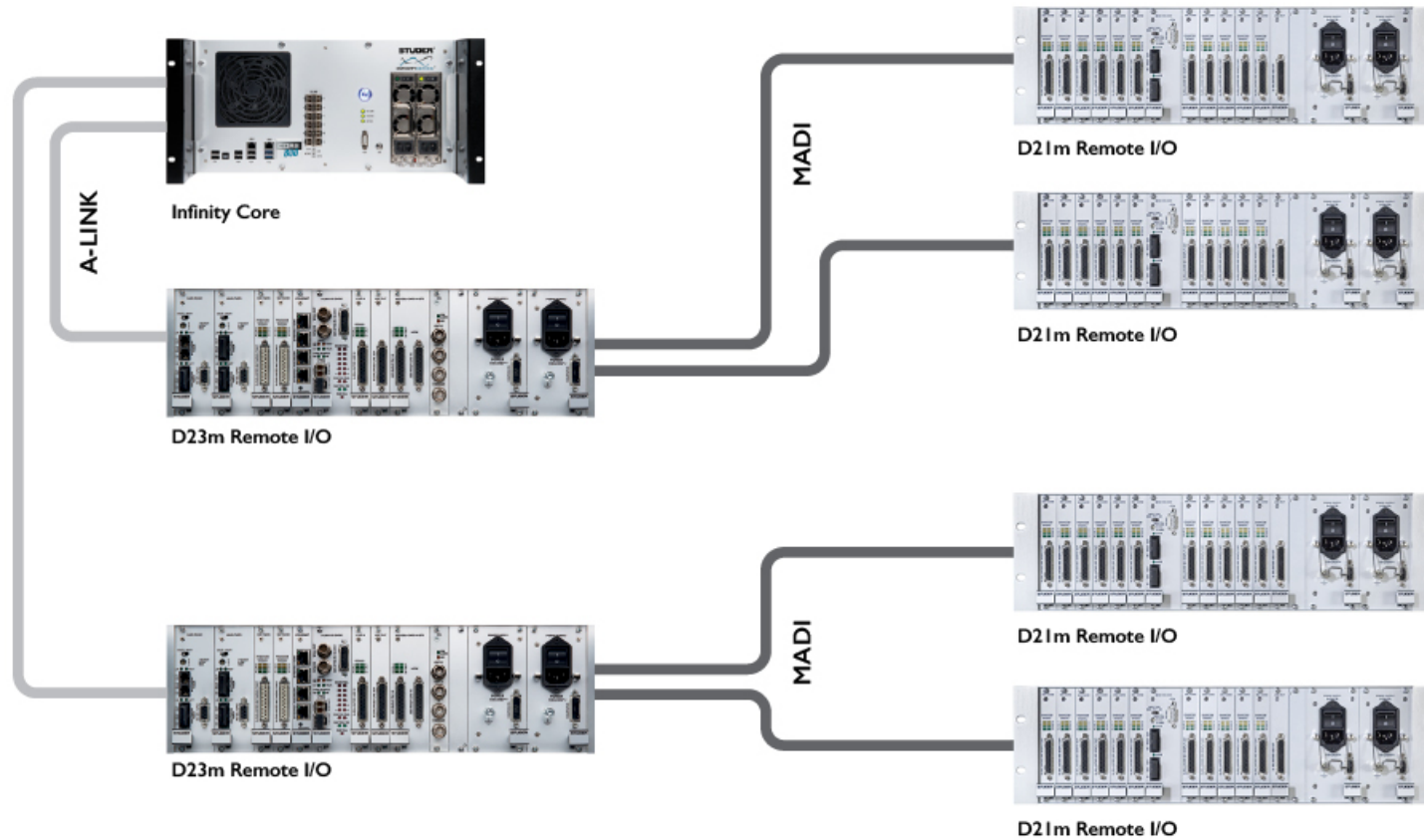
## Basic Audio Mixing System





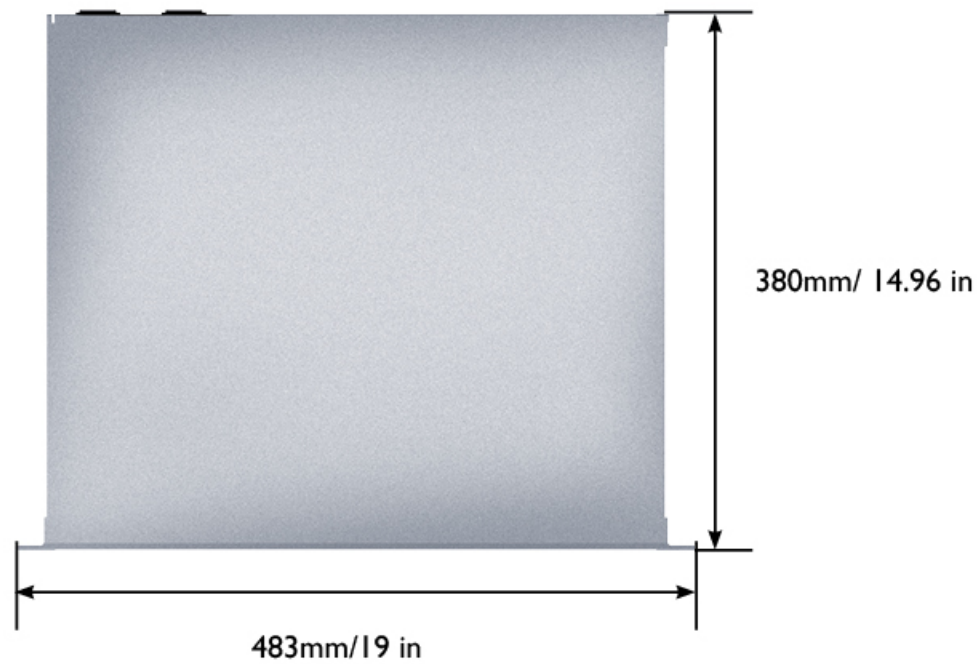
# D23m

## System Expandability



# D23m

## Dimensions





# Compact Stagebox

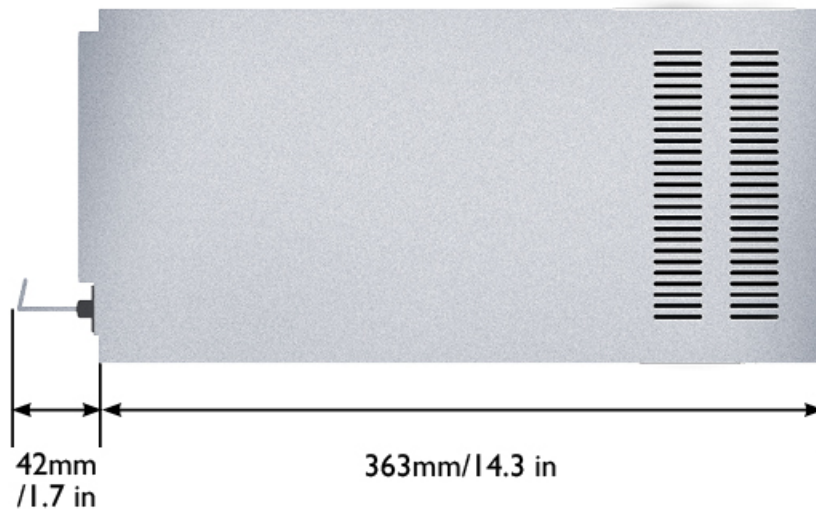
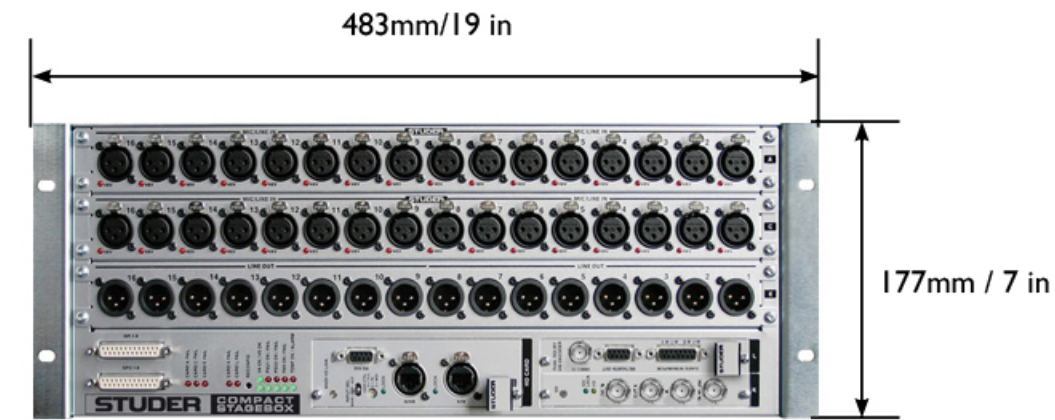
The Compact Stagebox adds a cost-effective expansion option, offering a high density of I/O connections in only 4U of rack space. The modular unit is fully configurable, and comes with a standard configuration of 32 mic/line inputs and 16 line outputs. It is possible to equip the Compact Stagebox with additional cards, including AES I/O, Dante, and more.

The Compact Stagebox connects to the host console or any D2Im and D23m frame via CAT5/7 or optical-fibre MADI, and it shares the same redundant MADI cable capability. The unit comes complete with twin redundant power supplies, and full LED status monitoring. An 8-channel GPIO interface is also included.



# Compact Stagebox

## Dimensions





# Compact Stagebox

## Technical Specifications

HQ MIC / LINE INPUT MODULE	CONDITIONS / DETAILS	VALUE
<b>GENERAL CONDITIONS:</b>	<b>GAIN SETTING 15 DBU 0 DBFS UNLESS OTHERWISE NOTED.</b>	
INPUT IMPEDANCE	4	6
GAIN	4	6
MAXIMUM INPUT LEVEL	4	6
FREQUENCY RESPONSE	8	6
THD + NOISE	-	6
EQUIVALENT INPUT NOISE / NOISE FIGURE (NF)	8 stereo (16 mono)	7
CROSSTALK	8 stereo (16 mono)	7
INPUT DELAY	8 stereo (16 mono)	7
COMMON MODE REJECTION RATIO (CMRR)	4 stereo	9

LINE OUTPUT MODULE	CONDITIONS / DETAILS	VALUE
OUTPUT IMPEDANCE	(electronically balanced)	50Ω
FREQUENCY RESPONSE	20Hz to 20kHz	+0dB / -0.3dB
THD + NOISE	4 -1 dBFS, 1kHz	-90dB
	-30 dBFS, 20Hz to 20kHz	-103dB
CROSSTALK	1kHz	-115dB
OUTPUT LEVEL	RL ≥ 600Ω; globally adjustable with hardware switches (steps: +24, +22, +20, +18, +15, +12, +9, +6 dBu)	+6 to +24dBm for 0dBFS
OUTPUT DELAY		10.4 samples 217μs @ 48kHz

AES / EBU INPUT / OUTPUT MODULE	CONDITIONS / DETAILS	VALUE
INPUT/OUTPUT IMPEDANCE		110Ω
INPUT SENSITIVITY		min. 0.2 VRMS
OUTPUT LEVEL	into 110Ω	4.0 VRMS
THD + NOISE		max. -115dB
SRC RANGE		22-108kHz

POWER SUPPLY	CONDITIONS / DETAILS	VALUE
PRIMARY INPUT VOLTAGE RANGE	Power supply auto-ranging with power factor correction (PFC); EN/UL approved	100 to 240 V AC $\pm$ 10% 50 to 60 Hz
POWER CONSUMPTION	Dependant on installed modules/cards	max. 300W

AMBIENT CONDITIONS	DETAILS	VALUE
OPERATING TEMPERATURE RANGE		-5 to 45°C / 23 to 113°F
RELATIVE HUMIDITY	non-condensing	95%

WEIGHTS (APPROX.)		VALUE
STUDER COMPACT STAGEBOX, RECOMMENDED STANDARD CONFIGURATION	2 $\times$ HQ mic/line input modules 1 $\times$ line output module 1 $\times$ D21m MADI HD card (optical or RJ45) no D21m I/O cards (2 $\times$ blank panels only)	10 kg / 22 lbs





# Complete List of Cards

NAME	I/O FORMAT	# OF CONSOLE INPUT CHANNELS	# OF CONSOLE OUTPUT CHANNELS	CONNECTOR TYPE	WIDTH (SLOTS)	ORDER NO.	COMPATIBILITY
<b>ANALOG I/O CARDS</b>							
*MIC/LINE INPUT (INCL. DIR. OUTS)	Mic/Line	4	(4 Dir. Outs)	D25f	single	A949.0427	
*HD MIC/LINE INPUT WITH INPUT TRANSFORMERS (INCL. DIR. OUTS)	Mic/Line	4	(4 Dir. Outs)	D25f	single	A949.0447	
*ANALOG INSERT	Line	4	4	D25f	single	A949.0428	
ANALOG LINE OUT	Line	—	8	D25f	single	A949.0420	
ANALOG LINE IN	Line	8	—	D25f	single	A949.0421	
<b>DIGITAL I/O CARDS</b>							
AES I/O M1 (NO SRCS)	AES/EBU	8 stereo (16 mono)	8 stereo (16 mono)	2 x D25f	double **	A949.0422	
AES I/O M1 (INPUT SRCS)	AES/EBU	8 stereo (16 mono)	8 stereo (16 mono)	2 x D25f	double **	A949.0423	
AES I/O M1 (IN/OUT SRCS)	AES/EBU	8 stereo (16 mono)	8 stereo (16 mono)	2 x D25 f, ext. sync XLR	double **	A949.0424	
ADAT I/O	ADAT	16 at 48kHz (8 at 96kHz)	16 at 48kHz (8 at 96kHz)	TOSLINK (optical)	single	A949.0425 A949.0429	
3G/HD/SD SDI INPUT	3G/SD/HD	8/16	—	2 x BNC	single	A949.0452	
DOLBY® E/DIGITAL DECODER	AES/EBU	8/16	2 stereo (4 mono) 4 stereo (8 mono)	D15 f	single	A949.0443 A949.0444	
3G/HD/SD SDI I/O	3G/SD/HD	8/16	8/16	4 x BNC	single	A949.0451 A949.0457	
COBRANET® I/O	CobraNet	32	32	2 x RJ45	single	A949.0445	
AVIOMA-NET® OUTPUT	A-Net	—	16	RJ45	single	A949.0446	
TDIF I/O	TDIF	16 at 48kHz (8 at 96kHz)	16 at 48kHz (8 at 96kHz)	2 x D25f	double **	A949.0426	
BCD DTMF DEC./GLITS GEN.	Internal	16	8	—	single	—	
ETHERSOUND® I/O ***	EtherSound	64	64	3 x RJ45	double **	—	
INTERCOM BNC	AES	4 stereo	4 stereo	4 x BNC	single	5037475	
INTERCOM SUB-D	AES	4 stereo	4 stereo	D25 f	single	5037474	
AXIA LIVEWIRE™	—	32	32	2 x RJ45	single	5014376	
BLU LINK CARD	BLU link	32	32	2 x Ethernet	single	5033340	
DANTE CARD	Dante	64	64	Ethernet	double	5045044-01	
ROCKNET	—	48	48	—	double **	—	
D23M DUAL MADI-IO BOARD (HUB) SFP	MADI	128	128	SFP	double	5045304-01	Compatible with the D23m Only and the Vista I
D23M AOIP CARD	AES67 / Ravenna	256	256	4 x SFP	double	5081122	Compatible with the D23m Only
D23M QUAD MADI-IO (HUB)	MADI	Up to 256	Up to 256	8 x SFP	double	5045305-02	Compatible with the D23m Only

# Complete List of Cards

NAME	I/O FORMAT	# OF CONSOLE INPUT CHANNELS	# OF CONSOLE OUTPUT CHANNELS	CONNECTOR TYPE	WIDTH (SLOTS)	ORDER NO.	COMPATIBILITY
<b>DIGITAL I/O CARDS</b>							
MADI I/O ***/*	MADI	64 at 48kHz (32 with red., 64 without red. at 96kHz)	64 at 48kHz (32 with red., 64 without red. at 96kHz)	SC (optical) SC (optical) 2 x RJ45	double **	A949.0430 A949.0431 A949.0433	
TDIF I/O	TDIF	16 at 48kHz (8 at 96kHz)	16 at 48kHz (8 at 96kHz)	2 x D25f	double **	A949.0426	
BCD DTMF DEC./GLITS GEN.	Internal	16	8	—	single	—	
BCD BLITS/GLITS GEN.	Internal	—	8	—	single	—	
BCD MINIMIXER	Internal	16 (with GP inputs) 32 (without GPIO)	16 32	—	single single	—	
<b>GPIO CARDS</b>							
GPIO W. OPEN-COLLECTOR OUTP.	GPIO	16	16	2 x D25 f	double **	A949.0435	
GPIO W. RELAY OUTPUTS	GPIO	16	16	2 x D25 f	double **	A949.0436	
<b>HD CARDS</b>							
D21M HD S	HD Link	max. 192	max. 192	4 x RJ45	single	A949.0412	Works only with Studer OnAir Consoles
D21M MADI HD	MADI	64 at 48kHz (32 with red., 64 without red. at 96kHz)	64 at 48kHz (32 with red., 64 without red. at 96kHz)	SC (optical) SC (optical) RJ45	double **	A949.0411.3x A949.0413.3x A949.0414.3x	
D23M A-LINK CARD	A-Link MADI	Up to 1536	Up to 1536	Various	double	5037063-01	Compatible with the D23m Only
D21M HD RS422	AES/EBU	max. 192	max. 192	4 x RJ45, D9 f	double **	A949.0415	Works only with Studer Vista Consoles
<b>SPECIAL CARDS</b>							
SERIAL	RS422	—	—	D9 f	single	A949.0437	Compatible with the D21m Only
SERIAL MERGER	RS422	—	—	2 x D9 f	single	A949.0438	Compatible with the D21m Only
SERIAL RJ45	RS422	—	—	RJ45	single	A949.0439	Works only with Studer OnAir Consoles & Compatible with the D21m Only
DUAL MERGER RJ45	RS422	—	—	4 x RJ45	single	A949.0440	Works only with Studer OnAir Consoles & Compatible with the D21m Only

\* The Analog Insert card is fitted to the left of the Mic/Line Input card A949.0427. The insert send signal is always present and may be used as an additional direct output. The insert return is activated from the console. Please note that the Analog Insert card does not communicate with the HD card, and it is not supported by the HD Mic/Line Input card A949.0447.

\*\* Double-width cards must be inserted into odd slot numbers (e.g. slots 1, 3, 5...).

\*\*\* The number of channels transmitted to and from a card may be defined in steps of 8 channels by using DIP switches on the card.

\*\*\*\* Regardless of the number of channels defined with the DIP switches, a switch on the front panel switches the MADI protocol between the standard 56-channel format and the extended 64-channel format. Therefore this switch may have to be set to '56 channel' protocol in order to operate correctly with third-party MADI devices. In this case the number of channels set internally should not exceed 56.

# Analog I/O Cards



## Mic/Line In Card

**A949.0427**

Four analog microphone/line inputs, electronically balanced, with 24bit, 44.1/48/88.2/96kHz delta-sigma A/D converters. Four analog split outputs, electronically balanced. Mic/line sensitivity, gain setting in 1dB steps, lowcut filter, soft clipping and 48 phantom power on/off are controlled by the console software.

Input sensitivity (for 0dBFS)	-60...+26dBu
Input impedance	1.8k $\Omega$
Split out gain (input sensitivity -60...+3dBu) (input sensitivity +4...+26dBu)	0dB -20dB
Split out impedance	50 $\Omega$
Equivalent input noise (Ri 200 $\Omega$ , max. gain)	-124dBu
Crosstalk (1 kHz)	< -110dB
Frequency response (30 Hz-20 kHz)	-0.2dB
THD&N (1kHz, -1dBFS) (20Hz-20kHz, -30dBFS)	< -97dBFS < -111dBFS
CMRR (30Hz-20kHz, all gain settings) (1kHz, input sensitivity -10 to +26dBu for 0dBFS)	> 55dB typ. 100dB
Low-cut filter	75Hz / 12dB/oct.
Input delay (local) (remote)	38 samples (0.79ms @ 48kHz) 45 samples (0.94 ms @ 48kHz)
Current consumption (7V) ( $\pm 15V$ )	0.2A 0.25A
Operating temperature	0-40°C



## HD Mic/Line In Card

**A949.0447**

Four analog microphone/line inputs, transformer balanced, with 24-bit, 44.1/48/88.2/96 kHz delta sigma A/D converters. Four analog split outputs, electronically balanced. Mic/line sensitivity, gain setting in 1 dB steps, hi-pass filter, soft clipping and 48 V phantom power on/off are controlled by the console software. Inputs and split outputs on a standard 25-pin female D-type connector (female).

As opposed to the Mic/Line Input card A949.0427, the gain of the split outputs is always unity, i.e., 0 dB. This card does not support the Analog Insert Card A949.0428.

Input sensitivity (for 0 dBFS)	-60...+26 dBu
Input impedance	2.2 k $\Omega$
Split out gain	0 dB
Split out impedance	100 $\Omega$
Equivalent input noise (Ri 200 $\Omega$ , max. gain)	-124 dBu
Crosstalk (1 kHz)	< -110 dB
Frequency response (30 Hz-20 kHz)	-0.2 dB
THD&N (1 kHz, input level -6 dBu) (40 Hz-20 kHz, input level -30 dBu)	< -88 dB < -100 dB
CMRR (30 Hz-20 kHz, all gain settings)	> 60 dB
High-pass filter	75 Hz, 12 dB/oct.
Input delay (local) (remote)	38 samples (0.79 ms @ 48 kHz) 45 samples (0.94 ms @ 48 kHz)
Current consumption (7 V) ( $\pm 15 V$ )	0.2 A 0.25 A
Operating temperature	0-40 °C



## Analog I/O Cards



### Analog Insert Card

**A949.0428**

This card is intended for use with a D21m Mic/Line In card (A949.0427) and features four electronically balanced analog inserts. The insert sends are always active, return on/off is controlled by the console software (default off). Insert sends and returns on standard 25-pin D-type connector (female).

In/out level (for 0dBFS)	-60...+26dBu
Input impedance	1.8k $\Omega$
Output impedance	0dB
Current consumption ( $\pm 15V$ )	50 $\Omega$
Operating temperature	-124dBu



### Line In Card

**A949.0421**

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

Input level (for 0 dBFS)	15/24 dBu (fixed, jumper-selectable), or 7-26 dBu (adjustable)
Input impedance	> 10k $\Omega$
Frequency response (20Hz-20kHz)	-0.2dB
THD&N (35 Hz-20 kHz, -1 dBFS, 15dBu setting) (1 kHz, -30dBFS, 15dBu setting)	< -111dBFS < -110dB
Input delay (local) (remote)	38 samples (0.79ms @ 48kHz) 45 samples (0.94ms @ 48kHz)
Current consumption (7V) ( $\pm 15V$ )	0.42A 0.1A
Operating temperature	0-40°C



### Line Out Card

**A949.0420**

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

Output level (for 0dBFS)	15/24dBu (fixed, jumper-selectable), or 7-26 dBu (adjustable)
Output impedance	40 $\Omega$
Min. load (at +24dBu)	600 $\Omega$
Frequency response (20Hz-20kHz)	-0.2dB
THD&N (20Hz-20kHz, -1dBFS, jumper at 15dBu fixed) (1kHz, -30 dBFS, jumper at 15dBu fixed)	< -90dBFS < -110dBFS
Crosstalk (1 kHz)	< -110dB
Output delay (local) (remote)	28 samples (0.58ms @ 48kHz) 2 samples (0.67ms @ 48kHz)
Current consumption (7V) ( $\pm V$ )	0.23A 0.25A
Operating temperature	0-40°C

# Digital I/O Cards



## AES/EBU M1 Cards

**A949.0422, A949.0423, A949.0424**

AES/EBU input/output card with 16 Ch I/O, available in 3 different versions:

A949.0422xx	without SRCs (Sampling Rate Converters; Vista only)
A949.0423xx	with input SRCs only
A949.0424xx	with input and output SRCs (see adjacent picture).
Selectable output sampling rates: 96 kHz, 48 kHz, 44.1 kHz, or external	
Input / output impedance	110Ω
Input sensitivity	min. 0.2 V
Output level (into 110Ω)	4.0 V
THD + noise	max. -115dB
SRC range	22-108kHz
Current consumption (3.3V) A949.0454: 0.43 A/.0455: 0.67 A/.0456: (5V)	0.94A 0.45A
Operating temperature	0-40°C



## MADI I/O Cards

**A949.0430, A949.0431, A949.0433**

The MADI I/O cards can establish a 64-channel MADI input and output to the D21m frame, with 44.1/48/88.2/96 kHz operation. Three different versions are available:

A949.0430xx	Optical / multi-mode fibre
A949.0431xx	Optical / single-mode fibre
A949.0433xx	Cat5e twisted-pair (+additional word clock out)

Optical inputs and outputs are provided on SC connectors. The Cat5e version with RJ45 connectors for twisted-pair cable features an additional word clock output on a BNC socket.

The auxiliary interface can be used as a redundant link or, in 96 kHz operation, to extend the number of channels from 32 back to 64.

<b>Max. cable length</b>	
(A949.0430, multi-mode fibre, wavelength 1300nm*, ø either 62.5 or 50µm)	2km
(A949.0431, single-mode fibre, wavelength 1300 nm*, ø 9 µm)	15km
(A949.0433, CAT5e or better, flexible braid)	75m
(A949.0433, CAT7, solid core)	120 m
Input frequencies	44.1/48/88.2/96kHz ±100ppm
Current consumption (3.3V) (5V)	0.4A 0.4A
Operating Temperature	0-40°C

\* different wavelengths on request  
Compatible with the D23m Only

## Digital I/O Cards



### ADAT I/O Cards A949.0425, A949.0429

These cards feature two optical eight-channel ADAT inputs and outputs with 44.1/48/88.2/96 kHz operation. Two versions are available:

A949.0425xx	Standard version for all-plastic fibre (APF)
A949.0429xx	Long-distance version for plastic-clad fibre (PCF; optional).

Optical inputs and outputs are provided on TosLink connectors available in APF (980/1000 µm all plastic fibre) and PCF (200/300 µm plastic-clad fibre) versions. In 96 kHz operation, the number of channels is limited to eight, i.e. four per I/O.

<b>Maximum distance</b>	
(A949.0425, APF version)	5m
(A949.0429, PCF version)	300m
	(on request: up to 1000m)
<b>Transmitter wavelength</b>	
(A949.0425, APF version)	660nm
(A949.0429, PCF version)	800nm
<b>Transmitter aperture</b>	
(A949.0425, APF version)	980/1000µm
(A949.0429, PCF version)	200/300µm
<b>Receiver wavelength (both versions)</b>	
	660 or 800nm
<b>Receiver aperture (both versions)</b>	
	200/300µm*
<b>Current consumption (3.3V)</b>	
	0.1A
<b>(5V)</b>	
	0.2A
<b>Operating temperature</b>	
	0-40°C

\* use with 980/1000 µm AP fibre possible for distances up to 5m.



### 3G SDI Input Card A949.0452

The 3G/HD/SD SDI (serial digital interface) de-embedder card is able to handle video signals according to the 3G (full HD), HD and SD standards; both level A and B versions of 3G signals are supported. The card acts as an eight- or 16-channel de-embedder, i.e. an eight- or 16-channel audio input card.

Operating modes	8- or 16-ch console input (de-embedder)
Selectable SDI groups	Groups 1&2, 3&4 or all
Connectors	IN, THROUGH (BNC, 75Ω)
Cable length	max. 50m
Latency* (de-embedder)	< 360µs + D (D = SRC delay if active; s. above)
Current consumption (5 V)	0.9A
Operating temperature	0-40°C

\* Audio latency times are identical for all channels and all groups.



### Dolby® E/Digital Decoder Card A949.0443, A949.0444

The D2 Im Dolby® E/Digital decoder card is available in 2 versions:

A949.0443xx	with one, or
A949.0444xx	with two Dolby® E decoder modules.

Each one is functionally similar to a Dolby® DP572 decoder. Both operate independently; the information given below is valid independently for both decoders as well.

<b>Current consumption (3.3V)</b>	
	0.2A
<b>(5 V)</b>	
	0.8 A (A949.0443); 1.3 A (A949.0444)
<b>Operating temperature</b>	
	0-40°C



## Digital I/O Cards



### 3G SDI I/O Card A949.0457

The 3G/HD/SD SDI (serial digital interface) embedder/de-embedder card is able to handle video signals according to the 3G (full HD), HD and SD standards; both level A and B versions of 3G signals are supported. The card can act as an eight- or 16-channel embedder (output), an eight- or 16- channel (input), or any combination thereof. It can be an eight- or 16-channel audio input card, an eight- or 16-channel audio output card, or an eight- or 16-channel input/output card.

Operating modes	8- or 16-ch console output (embedder) and/or 8- or 16-ch console input (de-embedder)
Selectable SDI groups	Groups 1&2, and/or 3&4
Connectors	IN, OUT A, OUT B, THROUGH (BNC, 75Ω)
Cable length	max. 50m
Video delay	max. 4 frames (3G); 8 frames (HD); 15 frames (SD)
Audio latency* (de-embedder + embedder)	3G/HD: <800µs; SD: <2.6ms
Current consumption (5 V)	1A
Operating temperature	0-40°C

\* Latency times are identical for all channels and all groups.



### CobraNet® Card A949.0445

This card allows sending and receiving 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.

Current consumption (5V)	800mA
Operating temperature	0-40°C



### Aviom A-Net® Card A949.0446

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.

***This card works at sampling rates of 44.1 or 48 kHz only.***

Current consumption (5V)	250mA
Operating temperature	0-40°C

## Digital I/O Cards



### TDIF I/O Card

**A949.0426**

This card provides two eight-channel TDIF I/O interfaces with 96 kHz, 88.2 kHz, 48 kHz, or 44.1 kHz operation with wordclock sync outputs on BNC connectors. Inputs and outputs are provided on standard 25-pin D-type female connectors

In 96/88.2 kHz operation, the number of channels is limited to eight, i.e. four per I/O.

#### TDIF inputs/outputs according to TDIF specifications

Current consumption (3.3V)	5mA
(5V)	0.1A
Operating temperature	0-40°C



### EtherSound® Card

**Details: [www.digigram.com](http://www.digigram.com)**

The EtherSound® card allows the connection of the D2Im I/O System to an EtherSound® network. It acts in a similar manner 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 routing a GPO of the mixing console to the GPO of a distant EtherSound® device on the network.

Current consumption (5V)	750mA max.
Operating temperature	0-40°C



### BCD DTMF / GLITS / BLITS / Minimixer Cards

**Details: [www.bcd-audio.co.uk](http://www.bcd-audio.co.uk)**

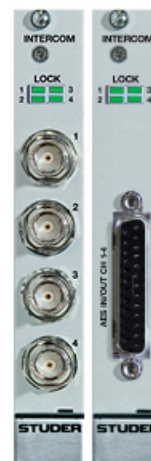
Three versions of this card are available, differing only by their firmware.

**DTMF:** This version is used to detect DTMF tone on up to 16 incoming lines and will generate 16 corresponding internal GPI signals when #1 is detected.

**GLITS/BLITS:** This version provides stereo and surround tone sequences according to EBU and UK standards. Tone generator level is adjustable between -24 and -9dBfs in one dB steps.

**Minimixer:** This version provides up to 32 small fixed mixes. These are useful for adding talkback, mono summing and similar.

Current consumption (5V)	0.5W
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### Intercom Cards

**BNC - 5037475, Sub-D - 5037474**

This single-width I/O card is intended for intercom applications via a Studer D2Im system. It allows embedding of the intercom audio and control signals into the standard digital multi-channel link (such as MADI) between Studer Vista or OnAir DSP cores and a remote stagebox.

See flyer 5034584. Available December 2013.

No. of channels	4 stereo inputs and outputs
Connectors	4 × BNC (option: 25-pin D-type)
I/O Impedance	75Ω (BNC) or 110Ω (D-type)
Sample rate	48kHz
C/U bits	Transparent

## Digital I/O Cards



### Axia Livewire™ Card 5014376

The Axia Livewire™ card is a single-slot unit accommodating two Livewire SIM modules. Each Livewire SIM module can send and receive up to eight stereo signals to and from the Livewire network. This Livewire audio clock may be used as clock reference for a Studer OnAir or Vista console, or, if required, the mixing console can be the Livewire clock master.

Current consumption	7.2 / 6.25W (Audio Configuration / no Ethernet connection and AES In not connected)
(24V)	
(5V)	0W (on board generated from 24V)
(3.3V)	0.2W
Operating temperature	0-40 °C



### BLU link Card 5033340

The BLU Link Card is a 32 x 32 interface for the D2Im frame, supporting the Soundweb London digital audio bus known as BLU Link. BLU Link is a low latency, fault tolerant digital audio bus of 256 channels, which allows a distance of 100m between compatible BLU Link enabled devices using standard CAT5e cabling.

Input Sampling Rate	48kHz
Max CAT5e cable length	100m
I/O format	BLU link
Console input channels	32
Console input channels	32
Connector types	2 Ethernet jacks Wordclock Out, 9-pin D-type
Slot width	Single



### Dante Card 5045044-01

The Studer Dante card is 64 x 64 channel interface for the Studer product line including the D2Im and D23m I/O frames. It distributes multiple streams of DANTE format digital audio plus integrated control data and clock, with sub millisecond latency, sample-accurate playback synchronization and high channel count. The card makes any Studer Vista, On-Air, or I/O frame part of a Dante Audio over IP network.

Dante uses standard Internet Protocols over 100 Mbps and 1 Gbps Ethernet	
On-Air support with OnAir SW v6.1	
I/O format	Dante
Console input channels	64
Connector types	
Primary Dante connection	Ethernet
Secondary Dante connection	Ethernet
Word Clock Out	



### Riedel RockNet Card Details: [www.riedel.com](http://www.riedel.com)

The RN.343.VI enables a Studer Vista or OnAir console to become a part of the RockNet digital audio network and enables remote control of any RockNetmicrophone pre-amplifier. It fits into a console's SCore Live or D2Im card expansion slot and gives access to 64 input and 64 output channels. A wordclock input is featured via the backplane connector, while a wordclock output is available at the front panel.



# Digital I/O Cards



## D23m Dual MADI-IO Board (HUB) 5045304-01

This I/O card is fitted with two redundant MADI interfaces and provides dual 64-channel MADI input and output link to a D23m frame. Each of the two MADI interfaces provides dual outputs and will automatically switch to the reserve input if there is corrupt data or a failed connection, thus providing full cable redundancy.

Input Sampling Rate	4 stereo inputs and outputs
Max cable length, multi-mode SFP	4 × BNC (option: 25-pin D-type)
Max cable length, single-mode SFP	75Ω (BNC) or 110Ω (D-type)
I/O format	48kHz
Console input channels	Transparent
Connector types	SFP Optical, multi-mode SFP Optical, single-mode SFP electrical, BNC 75Ohm
Slot width	Double

Compatible with the D23m and Vista I Only



## D23m Quad MADI-IO Board (HUB) 5045305-02

The Quad MADI I/O card features 4 fully redundant MADI interfaces that will provide up to 256 channels of input and output to the D23m frame. A fully loaded D23m with 6 Quad MADI cards would provide 1,536 channels across 24 redundant MADI interfaces.

Input Sampling Rate	44.1 kHz, 48kHz with full redundancy
Input Sampling Rate	88.2 kHz and 96kHz no redundancy
Max cable length, multi-mode SFP	2km
Max cable length, single-mode SFP	10km
I/O format	MADI
Console input channels	Up to 256
Console input channels	Up to 256
Connector types	8 (4 × 2) SFP connections, options for both optical (MM/SM) or electrical (mini BNC)
Slot width	Double

Compatible with the D23m Only



## Digital I/O Cards



### D23m AoIP Card

#### 5081122

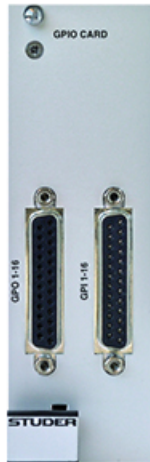
The D23m AoIP Card connects Studer D23m I/O frames to single or redundant audio over IP networks with automatic redundancy switching. The card can run in both AES67 and in Ravenna mode and is SMPTE 2110 and AVB ready. If control data (e.g. Mic Pre-Amps) and audio streams are sharing the same network, the card will forward the control data to the D23m's HD-Card.

- 256 Ch bi-directional AES67/Ravenna (SMPTE 2110 and AVB ready)
- Wordclock Out (e.g. to sync system from PTP)
- 2 x SFP 10 GB media network connectors (Redundant) to RJ45 or optical MM
- 2 x SFP 10 GB (currently not used)
- Long distance optical connection possible (MM up to 400m, SM on request)
- Ethernet (100 MB) connection to D23m backplane (control data forwarding)
- Width (Slots): Double  
*Compatible with the D23m Only*





# GPIO Cards



## GPIO Card **A949.0435**

For general-purpose input/output control signals, this card provides 16 electrically isolated opto-coupler inputs (5-12 VDC) and 16 open-collector outputs. 5V DC supply pins are available. Inputs and outputs on standard 25-pin female D-type connectors.

Current consumption (5V)	max. 0.65A
Operating temperature	0-40°C



## GPIO Card with Relay Outputs **A949.0436**

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. 5V DC supply pins are available. Inputs and outputs on standard 37-pin female D-type connectors.

Current consumption (5 V)	0.8A max. (earlier version: 1.1 A max.)
Operating temperature	0-40°C
Output contact rating	0.5 A/125 VAC; 0.7 A/30 VDC; 0.3 A/100 VDC





# HD Cards

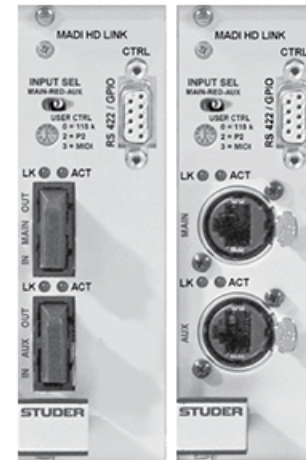


## D2Im HD Card S A949.0412

The D2Im HD card S provides the link to the OnAir DSP core systems. Each input and output can handle up to 96 channels in each supported sampling rate (in combination with the Performa core, the number of I/O channels is restricted to 48). The system clock used is taken from the host DSP system, so no extra synchronization is needed.

Host link interface cable type	CAT-5 UTP Cable
Cable length	up to 10 m
Connector	RJ-45
Capacity of one CAT-5 connection	96 channels
Current consumption (3.3V) (5.0V)	approx. 600mA <50mA
Operating temperature	0-40°C

*Works only with Studer OnAir Consoles*



## D2Im MADI HD Cards A949.04113x, A949.04133x, A949.04143x

The D2Im MADI HD card is plugged into an HD card slot in the remote I/O box and provides the link to the hub frame. 3 versions are available:

A949.04113x	Optical / multi-mode fibre version
A949.04133x	Optical / single-mode fibre version
A949.04143x	Twisted-pair version

The two interfaces offer up to 64 audio channels with 44.1/48/88.2/96 kHz operation, together with embedded control and user-accessible serial connection in each direction.

### Max. cable length

(A949.0411, multi-mode fibre, wavelength 1300 nm*, ø 62.5 or 50µm)	2km
(A949.0413, single-mode fibre, wavelength 1300 nm*, ø 9µm)	15km
(A949.0414, CAT5e or better, flexible braid)	75m
(A949.0414, CAT5e or better, flexible braid)	120m

Input sampling rates	44.1/48/88.2/96 kHz ± 100ppm
Current consumption (3.3 V/5 V)	0.9 A/0.25A
Operating temperature	0-40°C

\* different wavelengths on request

## HD Cards



### D23m A-Link HD Card 5037063-01

The A-Link HD Card provides the main audio connection between the D23m I/O Frame and the DSP Processing Core. Signals from the A-Link card are redirected to the different I/O cards in the frame. A-Link is a MADI point-to-point audio interface capable of handling up to 1536 mono audio channels at 48kHz. The card has DSP processing for all the necessary for patching and routing signals, and can also be the sync master for the system or may be slaved to external clocking sources.

I/O format	A-Link MADI
Console input channels	up to 1536
Connector types	BNC for Word clock output BNC for Ext. Sync (Video Bi-/Tri-Phase & Word Clock) Optical MM & SM SFPs for A-Link (Main & Redundant) AES Sync In, 3x AES Sync Outslot width: Double
Slot width	Double

Compatible with the D23m Only

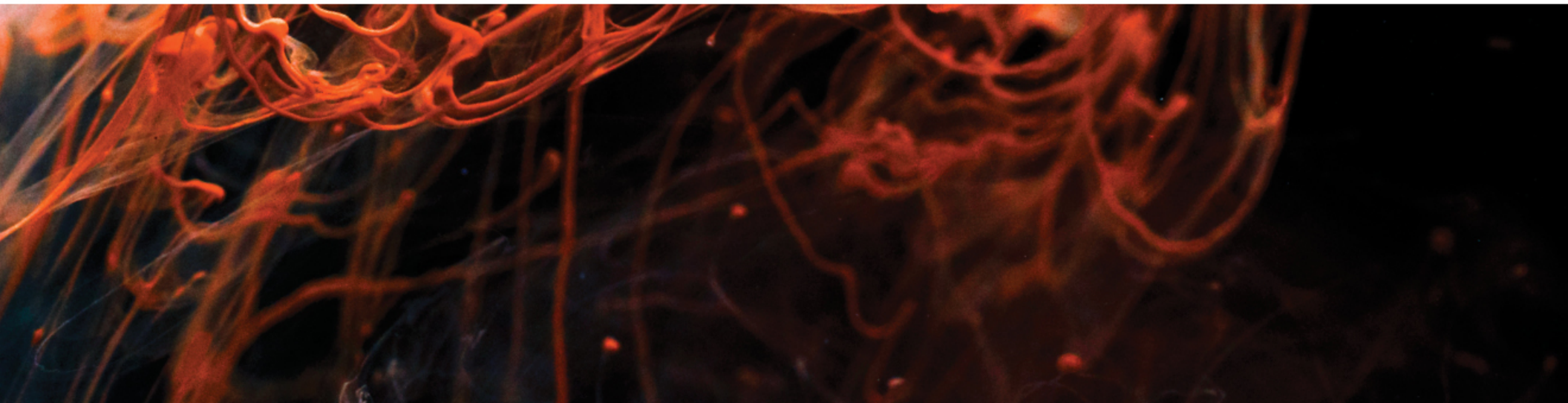


### D21m HD RS422 Card A949.0415

Vista DSP core systems. Each input and output can handle up to 96 channels in each supported sampling rate (in combination with the Performa core, the number of I/O channels is restricted to 48). The system clock used is taken from the host DSP system, so no extra synchronization is needed.

Host link interface cable type	CAT-5 UTP Cable
Cable length	up to 10 m
Connector	RJ-45
Capacity of one CAT-5 connection	96 channels
Max. RS422 cable length	1000m
Current consumption (3.3V) (5.0V)	approx. 600mA <50mA
Operating temperature	0-40°C

Works only with Studer Vista Consoles



# Special Cards



## Serial Card

**A949.0437**

It is possible to transmit any RS422 serial signals, such as MIDI or Sony 9-pin (machine control) through a MAD1 connection without losing any audio channels or microphone control of the remote I/O box.

Max. RS422 cable length	1000m
Current consumption (5V)	20mA
Operating temperature	0-40°C

*Compatible with the D21m Only*



## Serial Merger Card

**A949.0438**

This card is used to feed any Studer internal control signals into the hub I/O frame. A serial connection is made between the Studer product (such as a Vista or OnAir 3000 console) and the MASTER connector of the card.

Max. RS422 cable length	1000m
Current consumption (5V)	20mA
Operating temperature	0-40°C

*Compatible with the D21m Only*



## Serial RJ45 Card

**A949.0439**

It is possible to transmit any RS422 serial signals, such as MIDI or Sony 9-pin (machine control) through a MAD1 connection without losing any audio channels or microphone control of the remote I/O box.

Max. UTP (CAT5) cable length	25m
Current consumption (5V)	20mA
(5V, 24V supply loaded)	5A
Operating temperature	0-40°C

*Works only with Studer OnAir Consoles and Compatible with the D21m Only*



## Dual Merger Card

**A949.0440**

This card is used to feed any Studer-internal control signals into the hub I/O frame. A serial connection is made between the Studer product (such as Vista or OnAir 3000 consoles) and the HOST connector of the card. In certain SCore applications the host port is connected internally through the backplane. The non-host ports may be used to connect other local I/O frames. OnAir 3000 desk modules connected to the RJ45 connectors may be supplied by the card (24 V; 20 W total per Dual Merger card), can be activated with a DIP switch.

Max. CAT5 cable length	25m
Current consumption (5V)	160mA
(5 V, 24 V supply loaded)	5.16A
Operating temperature	0-40°C

*Works only with Studer OnAir Consoles and Compatible with the D21m Only*



## Special Cards



### D23m Ethernet Card

**5042095**

This optional card holds two network switches (main and redundant) to manage Ethernet control data between the D23m's different network ports. Both of the built-in switches handle 9 network ports: 2 x external, 6 x card slots (odd #) 1 x HD card. The 2 external ports are gigabit Ethernet while the D23m internal distribution is fast Ethernet. The card is required if control data for device status, internal routing, Mic control, and GPIO are not embedded in the HD card's A-Link stream.

Max. CAT5e cable length	100m
Power consumption	< 5W
Operating temperature	0-40°
Connector Type	4 x RJ45
Width (Slots)	Single dedicated slot

*Compatible with the D23m Only*







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