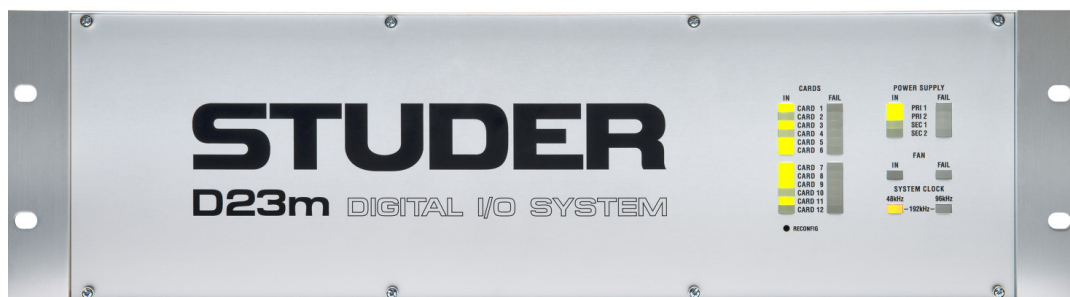


## Product Information

# D23m Digital I/O System



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D23m is Studer's next generation I/O-system especially developed for the Infinity Series large scale mixing consoles, but operates also with SCore Live based Vista mixing systems.

With increasing demands for higher channel counts and the introduction of Studer's A-Link interface and Infinity Core there was a need for an improved and more powerful I/O-system.

D23m serves as a scalable, modular I/O frame providing cost-effective inputs and outputs with maximum flexibility, maintaining the well-known Studer sound quality.

- A new backplane and new host card enables the transfer of a significant higher channel count between a D23m frame, Infinity Core and a Studer Vista console.
- New D23m-only I/O cards feature higher channel counts.
- Ethernet or IP based audio cards will take advantage of access to Ethernet, which is distributed over the backplane.
- A new power supply combining primary and secondary supply improves reliability.
- D23m is the same dimensions as its predecessor the D21m frame.
- A variety of different I/O modules can be plugged into one frame, providing I/O systems that covers a large range of customer needs.
- D23m is backwards compatible to all existing D21m I/O cards but offers as well the new platform for the next generation of Studer I/O cards covering new technologies, new interfaces or higher capacities.
- Optical-fibre links (SFP modules) allow connections to multiple locations, up to several kilometres away.

D23m comes with a newly developed backplane to connect the different I/O cards.

This new backplane supports a higher channel count for I/O interfaces - internally via card slots and in addition over two A-Link ports on the A-Link HD host card.

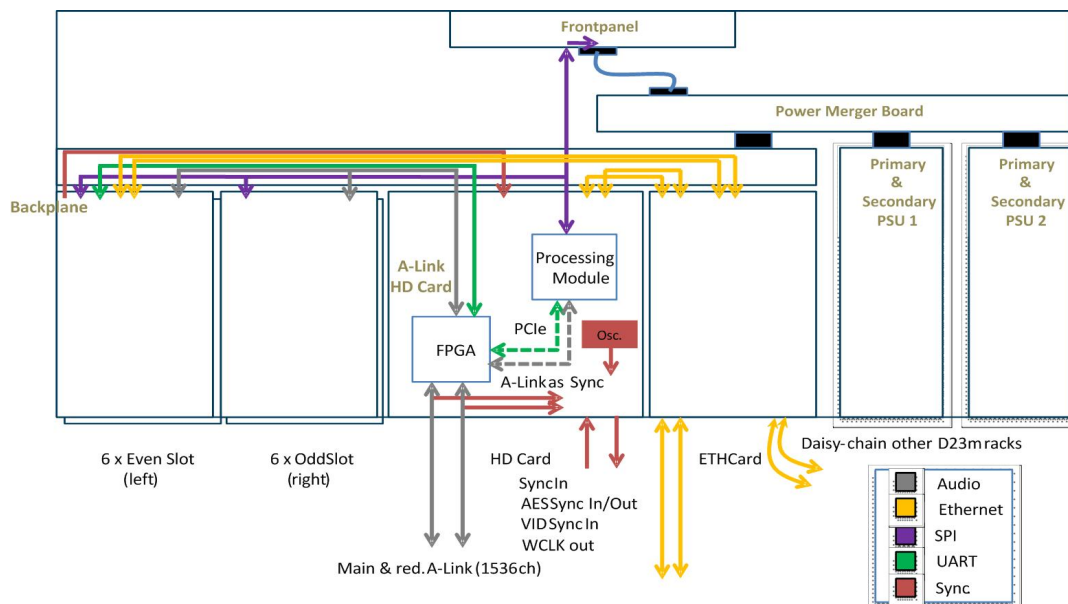
In addition, the host card with A-Link interfaces includes a powerful CPU enabling more advanced control functionalities.



D23m offers DSP processing power provided by the signal processor on the host card. This allows processing for all necessary patching and signal routing directly on the host card.

Plugged-in into the D23m frame each double-width I/O card is able to operate 8 audio lines to the backplane in each direction - which sums up to 256 channels.

The D23m Ethernet card receives and sends control data distributed by the backplane between sources and receiver.



### 3 Sync/Clocking

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The D23m sync signal is either internally generated by one of the D23m frames, or an external sync signal is connected to one of the D23m frames.

In this case the sync signal is transmitted from the 23m to the Core via A-Link. All other D23m frames will be synced from the Core.

A D23m system is able to be connected to external sync sources for synchronisation.

Following sync sources can be used:

- Video
- Word Clock
- AES/EBU
- A-Link (main or redundant)

For Video 50 Hz, 59.94 Hz, and 60 Hz are supported. For all other sync sources 48 kHz, 96 kHz, 192 kHz, 44.1 kHz, 88.2 kHz, and 176.4 kHz are supported.

External Clocks have higher priorities than internal clocks and an automatic process scans for available sync sources in corresponding to the list above in its priority.

Once a switch over to a different sync source has been processed, the system will automatically switch back to the original source, as soon as this sync signal is restored.

If a D23m system installation consists of multiple D23m frames and redundant Infinity Cores, the system process provides an audio clock redundancy.

### 4 Ethernet and Control

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D23m is able to process and transfer control parameter, for example to control Mic Pre-Amps.

Therefore the Ethernet card is used to establish a control data link between the backplane of a D23m frame and the control system, e.g. a Vista desk. This is achieved by a Cat5 cable between the frame and the desk.

#### Note:

From Vista software V5.3 and beyond, it will be possible to tunnel the Ethernet control link data into the A-Link stream sent to the Infinity Core (*requires Infinity Core software version 1.2.*).

Infinity Core then needs to be networked to the control desk.

## 5 Power and Status

### 5.1 Power Supply and power consumption

The D23m I/O frame may be equipped with either one or, for redundancy purposes, two power supply units. These units are hot swappable (including secondary regulators).

The module used is a primary switching AC/DC converter with an input voltage range of 90-264 VAC/50-60 Hz, automatic power factor correction and a standard IEC mains inlet.

Input Voltage 90V – 264V

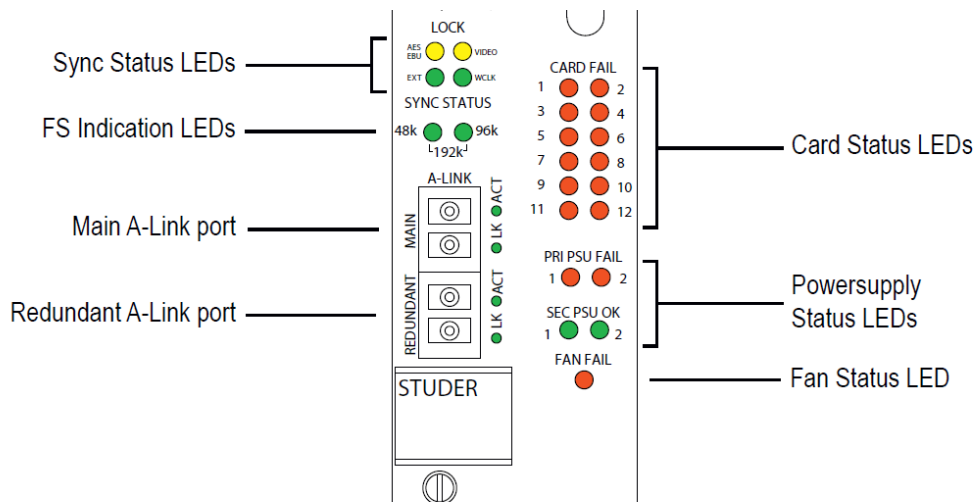
Power Consumption:

Rack with A-Link HD card and Ethernet card: 32 W

Output Current	Output Voltage
0.8A	-12V
3.5A	-5V
25A	3.3V
49A	5V
	12V

### 5.2 Status LEDs on front panel

Status displays on the front panel are indicating the status of the frame or the status of installed cards.



#### Sync Status LEDs

- only 'EXT' is lit : the system locks to A-Link
- 'EXT' and 'WCLK' is lit : the system locks to Word clock
- 'EXT' and 'AES/EBU' is lit : the system locks to AES/EBU
- 'EXT' and 'VIDEO' is lit : the system locks to Video reference

## 6 Redundancy

D23m offers an optimum of redundancy by full PSU redundancy, with easily replaceable secondary power supply. In addition the use of A-Link offers a solid level of security in combination with the Infinity Core to ensure a seamless production.

### 6.1 A-Link Quality of Service

Every A-Link line carries its individual Quality of Service (QoS) indication, depending on the state of the source that generates the A-Link signal. Checking for this QoS indication, a D23m system will switch from the main A-Link to the redundant A-Link signal. For more details please refer to the D23m Operating Instructions.

If at least one of these relevant criteria are not met, the QoS of the A-Link signal is reduced. Each D23m frame then switches to the A-Link port (main or redundant) with the better QoS value.

Main preferred - once a switchover has occurred, and the problem is resolved – which means that all QoS values are restored to the maximum - the D23m system immediately switches back to the main A-Link signal without any notable audio distortion.

### 6.2 Redundancy with Infinity Core

D23m combines with Infinity Core to set the level of required redundancy.

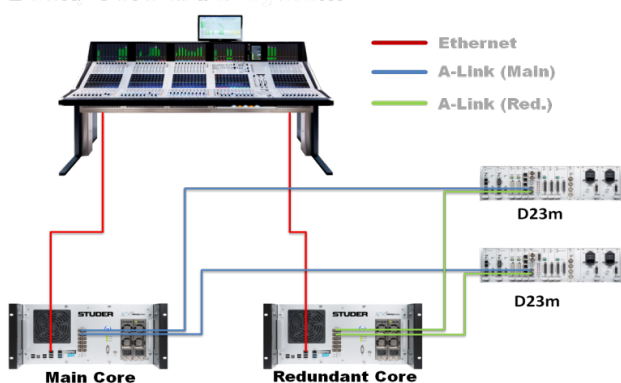
If A-Link cable redundancy is wanted, two Infinity Cores have to be deployed.

When operating with two Cores, full redundancy is provided:

Should an audio dropout occur within the main core, the QoS of the A-Link signal is reduced and therefore the D23m frame switches to the redundant port that is connected to the redundant Core.

In this case, also the active Core would be switched from main to the redundant.

Desk, Core & I/O System



As the D23m host card offers two A-Link ports (main and redundant with automatic switching) the system switches automatically to the redundant connection, in case the primary connection fails.

If D23m operates with more than one D23m frame and a redundant Infinity Core system, there is as well an audio clock redundancy.

If the host card fails, other connected units are not affected.

Using a single Infinity Core only, currently no A-Link cable redundancy is provided.

## 6.3 Redundancy with SCore Live

Not only Infinity Core systems can take advantage of the capabilities of the new D23m units, a new A-Link DSP card for SCore Live also features main and redundant A-Link ports. If both ports are equipped with a SFP and connected to a D23m frame - cable redundancy is provided.

If the main cable connection fails, the D23m frame automatically switches to the redundant port without any loss of audio.

For example for OnAir 3000 mixing systems with SCore Live and A-Link DSP cards parameters are offered (to be specified in the configuration tool) that allow to control the redundancy mechanisms for an OnAir system. For details please refer to the latest OnAir Operating Instructions.

## 7 STUDER A-Link

### 7.1 A-Link HD Card

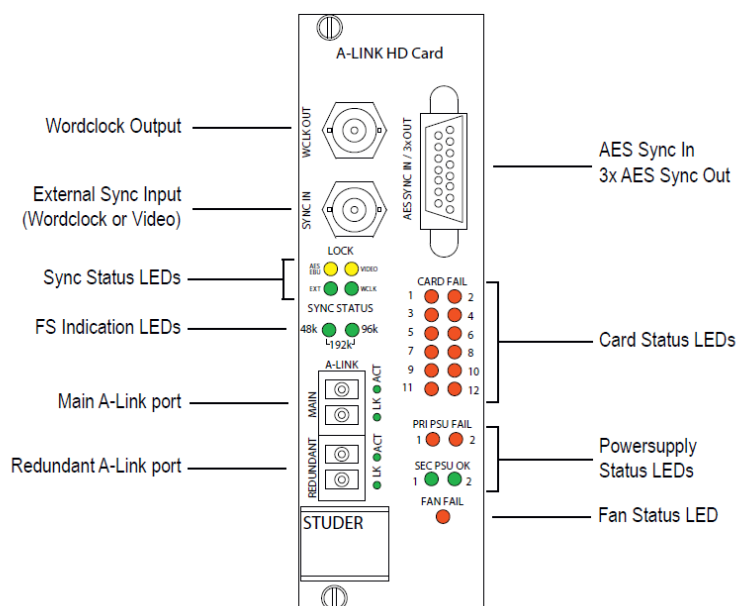
Like Studer's Infinity Core the D23m I/O system uses A-Link interfaces to secure a safe connectivity and transfer bandwidth between the I/O frame and the signal processing core.

A-Link is a super fast MAD1 point to point audio interface capable of handling up to 1536 x 24 bit linear mono audio channels at 48 kHz.

The D23m frame hosts one A-Link card in the middle of the frame, providing the main audio connection to the DSP core. From the A-Link card signals are redirected to the different types of I/O cards in the frame.

D23m offers some DSP processing power provided by the signal processor on the A-Link card. This allows processing for all necessary patching and signal routing directly on the A-Link host card and may be used as the sync master to the system or may be slaved to a variety of external synchronization signals.

This offers a new and robust I/O frame for all upcoming Studer mixing consoles using A-Link technology wherever a high channel count is required.





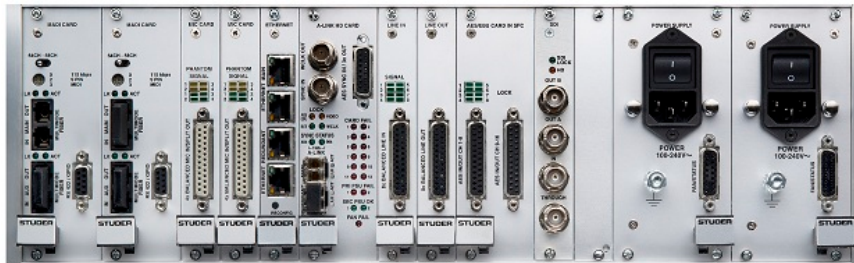
### 8.1 Legacy Support

D23m supports legacy interfaces and is compatible with cards developed for operation in the D21m. The use of different I/O modules, either existing D21m cards or new I/O high capacity, new format interfaces will provide an I/O system tailor-made for customer needs and grows with requirements for higher channel counts.

The D23m is able to host up to 12 I/O cards with a total of 1,536 inputs and 1,536 outputs (dependent on fitted I/O cards). This could sum up to a huge I/O routing matrix of 3,072 x 3,072 inputs and outputs.

User bits are transferred fully transparent wherever supported by the interface.

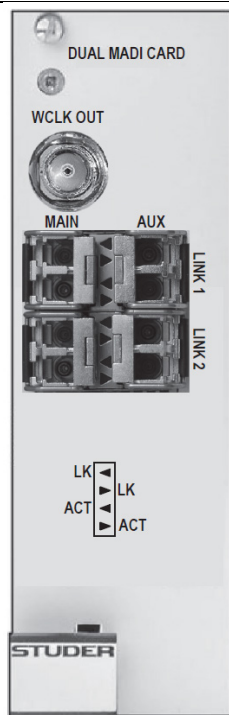
New D23m cards will be able to use the full capabilities of a D23m and will operate together with legacy versions (D21m).



### 8.2 D23m Dual Madi interface

A first new development utilizing D23's larger bandwidth is Studer's Dual Madi card.

The D23m Dual MADI I/O card can establish a fully redundant dual 64-channel MADI input and output link to the D23m frame with 44.1/48/88.2/96 kHz operation (at 88.2/96 kHz, MADI links are not redundant).



The D23m Dual MADI I/O card can establish a fully redundant dual 64-channel MADI input and output link to a D23m frame or Vista1, with 44.1/48/88.2/96 kHz operation.

(At 88.2/96 kHz, MADI links are not redundant).

**SFP** modules are used for the front panel MADI interfaces, these hot plug-gable devices are available in a variety of optical and electrical formats :

- SFP optical, multi-mode, wavelength 310nm, for 50/125 or 62.5/125  $\mu$ m fiber
- SFP optical, single-mode, wavelength 1310nm, for 9/125  $\mu$ m fiber
- SFP electrical, BNC 75 $\Omega$

MADI channel count to the D23m backplane may be set for the two interfaces in 8 channel steps individually from 8 channels to 64 channels. MADI outputs may be set to 56 channel mode for compatibility with legacy equipment. MADI inputs may be in either 64 or 56 channel mode.

**Max. cable length**

(multi-mode fiber SFP) 2 km

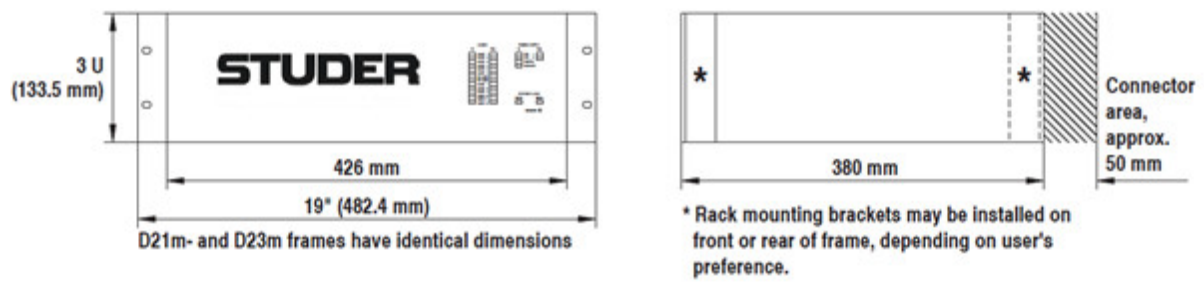
(single-mode fiber SFP) 10 km

(electrical SFP) 100 m

**Input sampling rates** 44.1/48/88.2/96 kHz  $\pm$ 100 ppm

## 9 System Specs

- D23m 3 HU I/O frame
- Dual Power Supply (hot swappable)
- 12 card slots
- A-Link HD card with DSP processing
- A-Link main and redundant ports (SFP modules)
- 1'536 I/Os from D23m and/or D21m cards (128 I/O per card slot)
- 1'536 I/Os on A-Link
- 3'072 x 3'072 Router Matrix
- Compatible with all Studer D21m cards
- Ext. clock reference:
  - AES
  - Word Clock
  - Video Clock
  - In combination with Infinity Core two D23m frame provide clock redundancy
- Ethernet card including switch or Ethernet tunneling through A-Link connection
- 44.1 kHz, 48 kHz, 88.4 kHz, 96 kHz, *192 kHz ready*



### Weights

- Rack incl. Power Supplies ca. 5 kg
- Rack incl. Power Supplies and A-Link HD card ca. 5.5 kg
- Rack incl. Power Supplies, A-Link HD card, 6 Mic, 6 Line in cards: ca. 8.5 kg
- Fully equipped D23m frame might sum up to ca. 9 kg