DIGITAL-AUDIO COMPONENTS

XMF04 MADI BOARD

MADI MULTICHANNEL-I/O BOARD

- 64 channels (max.) @ 48 KHz, 32 channels (max.) @ 96 KHz
- Automatic channel-count detection
- Optical and Coax combo interface (LC, BNC)
- Switchable pass-through mode for format conversion (optical <> BNC) and cascading
- Adjustable I/O gain
- Synchronisation to input-signal wordclock
- SRC modules (2 × XSRCA02) available optionally
- Dolby E signal transmission officially certified by Dolby® Dolby and the double D are registered trademarks of Dolby Laboratories.

MADI-FORMAT I/O BOARD

The NEXUS **M**ADI **F**ormat (XMF) board connects to the MADI serial interface (**M**ultichannel **A**udio **D**igital Interface). It includes a MADI port providing 64 inputs and 64 outputs in just 4 width units.

The board is used, for example, to connect multichannel audio recorders or external mixing consoles.

In addition to the operating modes specified by the MADI standard (AES 10-2008, AES 10id-1995 and AES 10-1991/ANSI S4.43-1991), the XMF04 board has the following features:

- The maximum number of simultaneously transferable channels is 64 on both the input and the output side (@ 48 KHz). If the interface board is run in 96-KHz mode, the number of channels is reduced to 32. Legacy systems using 56 or 28 channels are also supported.
- The input signal can be used as the sync source for the NEXUS audio network.
- Gain is adjustable per channel on both transmit and receive.
- Supports legacy and double-frequency mode at 96 KHz.

• Sample-rate converters (SRCs) are available optionally for both transmitters and receivers.

INPUTS AND OUTPUTS

The duplex board features BNC ports (75 ohm, coaxial) and optical ports (LC, 1.300 nm, $62.5/125\,\mu$ m). The optical ports employ the SFP system which supports a variety of optical-port modules.

Both electric and optical interface-port types are available. The output signals are generated in optical and electrical formats simultaneously. The desired input is selected either manually, using the NEXUS operating software, or automatically.

The BNC input and output ports are galvanically isolated from the system. (This feature exceeds the MADI standard.)

INPUT DATA

The XMF04 board receives audio on up to 64 input channels. This allows for transferring 64 channels from one RMF*/XMF to another using just a single MADI port. The number of input channels is detected automatically.

All inputs are equipped with individual gain controls, enabling the input gain to be adjusted by $\pm 20 \, \text{dB}$. User data is forwarded transparently on the NEXUS system, for example to AES/EBU, SDI, or other MADI-interface boards.

The XMF04 board recognises the following information and ancillary data in the data stream:

- Number of input channels
- Sampling rate
- The first four bytes of channel-status data containing Multichannel Descriptor, Emphasis, Sampling frequency, Channel mode, and Audio-sample word length
- Channel parameters (On/off, A/B, Validity)

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The XMF board sends all audio channels in MADI standard – 64 channels (max.) in 48-KHz mode, or 32 channels (max.) in 96-KHz mode. In transparent mode, all ancillary information is forwarded from the source signal (MADI, AES/EBU, SDI).

The number of transmit channels (56 or 64 @ 48 KHz, 28 or 32 @ 96 kHz) can be set by the user. In 96-KHz operation, legacy and or double-frequency modes are available.

SAMPLE-RATE CONVERTERS (SRC)

The XMF04 can be equipped with optional SRCs. It accommodates up to two SRCA02 modules which enable up to 64 audio channels to be converted; however, the XMF04 transfers up to 128 signals. Therefore, the user has to decide whether to convert either all input channels, all output channels or the first 32 input and output channels.

A second XMF04 board is required if all 64 input channels and 64 output channels are to be provi-

* RMF is the MADI-board version for the NEXUS STAR

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nexus Digital Audio Routing and Interconnect System

ded with SRCs. For this purpose the board supports a »pass-through« mode to enable two boards to be cascaded.

Pass-Through Mode

In pass-through mode, incoming MADI data is forwarded directly to the respective output; however, the boards do not pass through data from the NEXUS system. The pass-through mode enables boards receiving the same signal to be cascaded. In addition, it can be used to convert between BNC and optical interface formats.

LOOP MODE

In practice, loops are sometimes created for testing purposes or for the creation of specific signal-processing flows; in such set-ups, the output signal of a board is connected to the input of the same or another board. The XMF04 enables allows such a loop to be set up without an additional cable.

LEGACY MODE

In order to use legacy external 48-KHz machines for 96-KHz productions, the XMF04 inputs and outputs support the legacy mode. This enables 96-KHz audio to be recorded by, or played back from, 48-KHz systems.

ERROR DETECTION

In order to ensure reliable operation the input-signal validity is monitored continuously and parameters such as the sample rate are determined. When errors are detected or connections are unstable (for example, when the signal is missing or asynchronous, or when jitter, format errors, or parity errors have occurred), the board automatically stops forwarding the input signal to the NEXUS network.

Notes

All versions of the RMF04 incorporate optical and coaxial I/O ports. (Note that the optical port modules are not installed when shipped.) Both port types can be used at the same time.

The pinout of the BNC electrical ports is MADI compliant. Owing to the use of SFP modules, the optical ports can be custom-populated. User-configurable LC duplex ports are used typically.









XMF 04 Specifications		
	All relevant specifications comply with the following standards: AES 10-1991 (ANSI S4.43-1991), AES 10id-1995, AES 10-2008.	
Data formats	MADI: 24-bit audio	
XMF inputs	1 port, optical (LC) and electrical (BNC) formats	
	1-64 channels (@ 48 KHz), 1-32 channels (@ 96 KHz)	
	Legacy mode supported, automatic and manual switchover	
XMF outputs	1 port, optical (LC) and electrical (BNC) formats	
	1-64 channels (@ 48 KHz), 1-32 channels (@ 96 KHz)	
	Legacy mode supported (enabled using the control software)	
Cabling recommendations	Coaxial	Cable length: 50 m (max.)
		Impedance: 75 ohm (nom).
		Attenuation: 0.1 dB/m (@1-100 MHz)
	Optical (IEC-793 and FDDI compliant)	Cable length: 2 km (max.)
		Bandwidth: 500 MHz*km (max., @ 1,300 nm)
		Attenuation: 0.9 db/km (max., @ 1.300 nm; only cabling)
Data rate	125 Mbps (typ.)	
Sample rates	44.1, 48, 88.2, 96 KHz	
Power supply	Voltage	+4.75 to 5.25 V
	Current intake	 approx. 300 mA (BNC only) approx. 400 mA (with SFP module installed) approx. 1,250 mA (BNC, with SFP and SRCs installed)
Operating conditions	Temperature range	0 to +70 °C
	Humidity	90% (max.), non-condensing
Storage conditions	Temperature range	-35 to +70 °C
	Humidity	90% (max.), non-condensing
Physical properties	General	Plug-in board for 19" module frame; 3 U, 340 mm
	Front panel	4 HP (20.02 mm × 128.5 mm)
	Slot requirements	1
	Weight	0,21kg

Versions		
XMF-B/LC	BNC/LC combo I/O board, MADI compliant	
SFP module XMF-B/LC	XMF-SFP-01: Multimode version, LC 1,310 nm, 1,500 m (50/125 $\mu m)$	
	XMF-SFP-02: LC special version, 1,310 nm, 2 km (9/125 μm), single-mode	
	XMF-SFP-03: LC special version, 1,310 nm, 15 km (9/125 μm), single-mode	
SRC module XMF-B/LC	2 x XSRCA 02	

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