ANALOGUE-AUDIO COMPONENTS

XMIC+ MICROPHONE INPUT BOARD

8-CHANNEL MICROPHONE-INPUT BOARD FEATURING 32-BIT TRUEMATCH A/D CONVERTERS

- 8 channels
- Dynamic range: 158 dB(A) (typ.) @ 24 dBu
- THD&N.: <0.003% @ 24 dBu
- Negligible converter inaccuracies
- Optimised aliasing rejection
- · Inputs isolated galvanically by transformers
- Ultra-low 0.5 ms latency with exceptional impulse response performance
- Auto-mute function when connecting or disconnecting phantompowered microphones
- · Four integrated split outputs per analogue input channel
- Integrated splitter amplifiers provide four independent outputs
- P48 standard phantom power
- Provides DI-box functionality

The 8-channel NEXUS Microphone-Input Board features A/D converters with 32-bit resolution, a maximum input level of 24 dBu, and exceptionally high dynamic range of 158 dB (A). Digital gain can be set within the range 0 – 70 dB.

Stage Tec's patented TrueMatch technology enables optimum audio quality to be achieved. The analogue input stage is an integral part of the 32-bit converter. This architecture confers many benefits since all signal processes such as subsonic filtering, phase inversion, overload protection, and gain adjustment are performed entirely in the digital domain. All of these digital functions can be applied with independent settings for each of the four splitter outputs on each of the eight channels. The XMIC+ provides P48 standard phantom power complying with DIN EN 61938, IEC 1938, DIN 45596 (obsolete).

The input stage has a noise level of -132.5 dBu (with 0-ohm source impedance) and can accept signal levels of up to 24 dBu, thus providing an overall dynamic range of 156.5 dB. In theory, this dynamic range could have been achieved using only 28 bits. One advantage of Stage Tec's strategy of using the 32-bit conversion method on the XMIC+ board is that the intrinsic noise acts as a »natural« dither, which moves the quantisation noise far below the noise level of the connected source.

XMIC+ microphone A/D converter features in brief:

- The TrueMatch converter dynamic range exceeds the usable dynamic range of any conventional microphone.
- Due to the generous 32-bit resolution, the microphone's overall dynamic range, from the capsule's intrinsic noise level to the threshold of clipping, can be transferred without gain switching.
- With a maximum input level of 24 dBu (at 0-dB gain), it is almost impossible to overdrive the converter. 24 dBu is also the maximum output level of standard studio devices. As the XMIC+ board can handle such levels without any problem, it can also be used as linelevel input board.
- Even low levels are digitised with high resolution.
- Gain and signal-processing takes place in the digital domain after the A/D conversion, thus having minimal effect on signal quality. The settings merely adjust the signal level to make it suitable for subsequent processing and recording.



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TARGET FORMATS

The NEXUS system is adaptable to suit all standard digital and analogue target formats. Internally the system always uses 24-bit resolution, which can be down-converted, for example, to 16 bit for CD productions.

One should be aware, however that this process restricts the dynamic range considerably. Only 96 dB of dynamic range is available when using 16 bit. Working with NEXUS and especially when using the XMIC+ board, it is recommended that the conversion to 16 bit is only undertaken at the end of a production after all recording and mixing has taken place.

With this strategy, the recording process is much easier and the signal quality much higher. In fact, the signal supplied by the microphone can be recorded with no extra processing. Fine gain adjustment, equalisation, and subsonic filtering can be shifted to the post-recording stage. Digital clipping spoiling recordings is now a thing of the past, making the XMIC+ perfect for live recording, live interviews and reports, and theatres – and for general use in OB vehicles.

TRANSFORMER-ISOLATED INPUT STAGE

Thanks to its innovative and sophisticated circuit design, the XMIC+ board features transformer-isolated balanced inputs which avoid the disadvantages of conventional circuit design. Their completely floating nature (when phantom power is disabled) allows them to be used as balanced or unbalanced inputs.

Compared with conventional circuits based on input transformers or on electronic balancing, XMIC+ boards provide the following benefits:

- · Insusceptibility to magnetic fields
- Extremly low THD&N. at both low and high levels and even at low frequencies
- Low input impedance
- Highly symetrical balancing
- True galvanic isolation

LIMITER

In order to avoid clipping of amplified signals, a limiter is provided that can be enabled as required. This ultra-fast limiter (attack time: 0 samples) only responds at a level of -0.06 dBFS, so unwanted effects on audio signals at normal levels are excluded.

SUBSONIC FILTER

The subsonic filter is adjustable in 5Hz increments up to 155 Hz.

MICROPHONE SPLITTER FUNCTION

The XMIC+ board can either be used in the traditional manner with a single output, or by using the splitter function with up to four independent outputs per microphone input.

The splitter functionality is available only on NEXUS systems running Matrix 5 software or later. The NEXUS system is config-ured in such a way that each user can see and access only one of the four splitter outputs.

Each splitter output is controlled completely independently: the other outputs are never affected.

For phantom power (DIN EN 61938, IEC 1938, DIN 45596 [obsolete]), the software uses an »OR« function. Thus: microphones are only supplied with phantom power if at least one user has enabled it.

The microphone splitter function is available as an option.

VARIANTS

The following A/D converters can be supplied for the Stage Tec mixingconsole and NEXUS systems:

- XAD+ (8-channel version, 24-dBu max input level)
- HXAD (8 stereo channels, 15-dBu max input level)

VERSIONS	
XMICplus-X	XLR port, 3-pole, female (2 front panels with 8 HP each)
XMICplus-R	$2\times RJ45$ ports (for all channels), (1 front panel with 4 HP)
XMICplus-D	1×25 -pin D-Sub port (1 front panel with 4 HP)

With the XLR-port version, only channel 1 to 4 are made available on the front panel. The channel 5 to 8 are made available on an additional 8-HP front panel which is connected to the board via an internal RJ45 cable.



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APPLICATION NOTES

The NEXUS XMIC+ board features fully galvanically isolated inputs which act as ideal audio transformers. These inputs are isolated and can be used for balanced floating sources, actively balanced sources, as well as for unbalanced sources.

External conversion of signals from unbalanced to balanced is unnecessary. Thus, the inputs offer DI box functionality.

With microphone inputs, any upstream electronic components (passive splitters, active splitter amplifiers, and passive as well as active DI boxes) introduce significant signal degradations such as harmonic distortion, noise, and hum into the transmission chain. Some active DI boxes continue to draw phantom-power current until the collapsing voltage level of the phantom power corresponds to the supply voltage of the DI box. This can trigger the phantom-power anti-surge fuse.

Stage Tec recommends that external DI boxes should not be placed ahead of microphone inputs as this may distort the signal or can even render it useless. Experience has shown that the sound quality is significantly higher without the use of an additional external DI box. All Stage Tec inputs already include DI functionality.

Gain adjustment is not required as the XMIC+ inputs handle levels of up to 24 dBu (approx. 12 V RMS).

A simple ¼" Jack to XLR adapter is sufficient. On request before shipment, all XLR input ports can be equipped with combo jacks which accept both XLR and ¼" jacks.

Wiring Diagram:

1/4"	XLR
Тір	Pin 2
Shield	Pin 3

Leave pin 1 not connected for ground-lifting.

If an earth connection is required, the shield of the $\frac{1}{4}$ " plug needs to be wired to pin 1 of the XLR plug. (In this case, there's a risk of an earth loop!)



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XMIC+03 SPECIFICATIONS

Unless otherwise indicated, all specifications are based on the following conditions: All measurements comply with the IRT standards (»IRT Pflichtenheft 3/2«, issued in July 1982 and »IRT Pflichtenheft 3/5«, issued in October 1990) and AES standards (AES-17, issued in 1998). Reference frequency: 1 kHz. Sample rate: 48 kHz. Full-scale level: 0 dBFS = 24 dBu.

Inputs	8 channels per boar	d, balanced; floating transformer isolation		
	XLR-3 (female), gold-plated contacts; or RJ45 ports, EN 50173-compliant wiring, for S/STP (CAT5) line			
Channel configuration	Adjustable digital gain, 48-V phantom power, subsonic filter, test-tone generation, phase inversion, lim- iter (requires XCPU 08 and NEXUS Matrix 5 software)			
Limiter	Threshold	-0.06 dBFS		
	Attack Time	0 Samples		
	Hold Time	10 ms		
	Release Time	0.5 s		
	Ratio	Limiter		
Input level	24 dBu balanced (max.); unbalanced input signal (up to 24 dBu) with phantom power disabled			
Dielectric strength	< ±200 VDC (common-mode signal, with disabled phantom power)			
Frequency response	20 to 20,000 Hz	< 0.05 dB (typ. < ±0.1 dB)		
	@ 20 Hz	-3 dB (typ.) (HPF; below 18-dB/oct. slope in compliance with IRT specifications)		
Subsonic filter	20 Hz, 40 Hz, 60 Hz; 80 Hz			
Input impedance	12.5 kohm with phantom power disabled			
	6.4 kohm with phantom power			
Input-Impedance CMR	125 dB @ 50 Hz (typ.)		
	105 dB @ 1 kHz (typ.)			
	80 dB @ 20 kHz (typ.)			
Gain	up to 70 dB (click-free digital adjustment in 1-dB steps)			
THD&N.	0.003% (typ.), < 0.004 % (guaranteed) @ 24 dBu			
	0.003% (typ.), < 0.004 % (guaranteed) @ -500 dBFS			
Dynamic range (0-dB	> 144 dB (rms) limited by the 24-bit output format			
gain; 0 dBFS = 24 dBu)	> 147 dB(A) limited by the 24-bit output format			
Idle-channel noise	155.5 dBFS CCIR-RMS @0 ohm input impedance (typ.)			
Equivalent input-noise	<-129.5 dBu (A) @ 200 ohm input impedance			
level	< -126 dBu (RMS) @ 200 ohm input impedance			
	< -115 dBqp CCIR1K @200 ohm input impedance			
Crosstalk attenuation	> 140 dB (20 to 20,0	00 Hz)		
	> 170 dB @ 1 kHz (typ.)			
	> 150 dB @ 20 kHz (typ.)			
Phantom power:	P48 compliant (DIN EN 61938, IEC 1938, DIN 45596 [obsolete])			
Phantom-power cur-	10 mA (when the maximum supply current is exceeded or a short-circuit occurs between an audio wire			
rent (max.)	and GND, phantom power will be disabled)			
HF resistance	HF-demodulation resistant according to IRT standards (»IRT-Pflichtenheft 3/5«) and European standards			
A/D conversion	Stage Tec TrueMatch	n Delta-Sigma converter		
	Resolution	32 bit, 128 times oversampling		
	Sample rates	44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz (system-specific)		
Latency	395 μs (@48 kHz sample rate)			
Power supply	Voltage	+4.75 to 5.25 V		
	Current	1.2 A without phantom power		
Operating conditions	Temperature range	0 +50 °C / 32 to 122 °F		
	Humidity	90% (max.), non-condensing		
Storage conditions	Temperature range	-35 to +70 °C / -31 to 158 °F		
	Humidity	90% (max.), non-condensing		
Physical specifications	General	board for 19" module frame; 3 U, 340 mm / 13.39"		
	Front panel	4/8 HP (20.02 or 40.2 mm \times 128.5 mm / 0.8 or 1.58" \times 5.06"), version-specific		
	Required space	1		
	Weight	0.32 kg		

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