XCPU Controller Board

Main Controller Board for NEXUS Base Devices

- Base Device and routing control and monitoring
- Control-computer communication via Ethernet, RS 232, RS 422, or USB
- Synchronisation and clock-generation control
- Sample rates of up to 96 kHz
- Stores the current system status independently of the control computer
- Wordclock I/O, internal clock generator
- Test tone and noise generator
- Metering-information gathering
- Loudness metering and spectrum analysis (option)
- Temperature monitoring

The XCPU board is the main controller of NEXUS Base Devices and is primarily designed for controlling the routing, including redundant lines. It also handles the communication with an external control computer, system management, and controls and monitors all system components including power-supply units and backplanes. The external control computer providing the graphical user interface is connected via an RS 232/422 or USB port. The changeover to the USB port occurs automatically.

The XCPU 09 now features an Ethernet port simplifying integration into existing computer networks.

The USB port can now be used in parallel with the RS 232/422 interface. (The previous XCPU versions only allowed for either the USB or RS 232/422 formats to be used at one time.) A total of three RS 232/422 ports are available: one onboard interface plus two extra ports on the optional XDEM expansion. You select the RS format (RS 232 or RS 422) using a quadruple jumper.

The XCPU 09 includes an exceptionally powerful processor providing substantially more power than its predecessors. Therefore, the board can now perform extra tasks which used to be handled by external peripherals.

The XCPU implements two critical new functions as optional modules: EBU-R 128 compliant loudness metering and spectrum analysis. (Refer to the specifications sheet for details.)

Synchronisation

The XCPU board supports internally generated or externally referenced standard sample rates (44.1, 48, 88.2, or 96 kHz; other rates can be implemented on request). Synchronisation and clock generation are achieved using a PLL with an extended time constant for a low-jitter system clock.

The system provides the following sync modes:

- **Internal sync** – The generated wordclock is output via a BNC port for use as studio master clock.
- **Synchronisation to an external wordclock.** The board features a dedicated port for this purpose.
- **Synchronisation to any digital port or to a fibre-optic line.**
- **Video-burst sync.** Requires an optional XSYNC interface board.

Multiple sync sources can be set up. In the event of a sync source failure these sources are automatically selected according to a user-programmed priority list.

Test tone Generator

The XCPU comprises a precision digital test tone generator with adjustable rate and level. In addition, the generator can produce white and pink noise. The digital audio signals are produced by a DSP. A D/A converter incorporated on the board makes the signal available in an analogue format.

Metering

The board provides a peak-metering function that uses a DSP to detect the data of all 256 time slots and transfers this to the connected PC for viewing purposes.

Memory

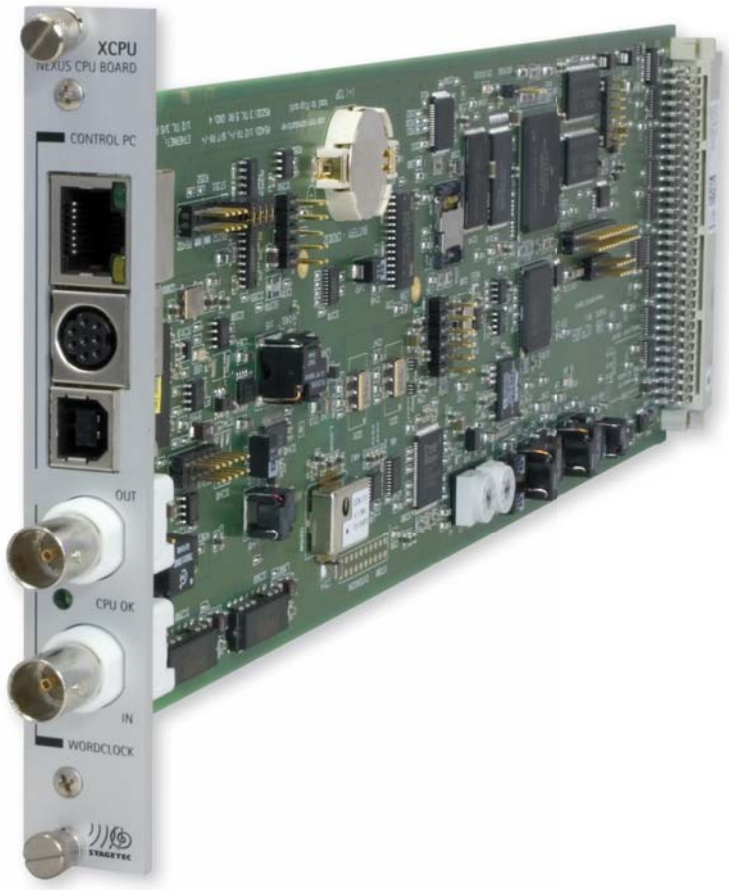
The XCPU-board firmware is stored in flash memory and can therefore be updated using a service program running on the PC.

All volatile data is stored to a battery-backed SRAM. This ensures the most recent Base Device and system statuses are restored after power failure or shutdown. The SRAM is backed-up by a conventional user-replaceable lithium battery. The system displays a message when the battery needs replacement.

The XCPU also provides a micro-SD slot for future expansion.

Board ID

All Base Devices on the NEXUS audio network feature unique IDs. The IDs are selected using encoder switches on the physical XCPU board.



XCPU09 Specifications		
CPU	Type	Motorola MCF547x
	Clock rates	Core: 200 MHz, Bus: 50/100 MHz
Memory	Working memory	2 Mbyte SRAM, battery-buffered; 64 Mbyte SDRAM
	Flash	16 Mbit; 64 Mbit max.
	Micro-SD card	32 GB max. (at the time of writing)
RS 232 Interface	Port	Mini DIN, 8-pole, galvanically isolated
	Baud rate	38.4 kBaud (typ.), 115.2 kBaud (max.)
	Cable length	10 m / 33' (max., recommended)
RS 422 Interface (option)	Port	D-Sub terminal (9-pole), galvanically isolated
	Baud rate	38.4 kBaud (typ.), 115.2 kBaud (max.)
	Input level	–7 to 12 V (max.)
	I/O impedance	120 Ohm
	Cable length	100 m / 330' (max.) @110-ohm line (±20 %)
USB-Interface	Type	compliant to USB Rev. 1.1, type B; standard pinout; galvanically isolated
	Baud rate	12 Mbps, typ. 38.4 KBaud; 115.2 KBaud (max.)
	Recommended cable length	5 m / 16.4' (max.) @ 90-ohm line (±15 %); 25 m / 82' with active extension
Ethernet	Port	RJ 45, 10/100 Base TX, galvanic isolation
	Data rate	10/100 Mbps
	Cable length	100 m max., CAT5e
Workclock Input	Port	BNC, galvanically isolated
	Level	1 to 5 V
	Impedance	75/500 ohm, configurable
	Rate	44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz
	Required frequency stability	min. < ±150 ppm (typ. ±50 ppm; compliant with AES 11, Grade 2)
Workclock Output	Port	BNC, galvanically isolated
	Level	2.4 V on 75 ohm
	Rate	44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz
	Frequency stability	min. ±10 ppm (typ. ±5 ppm, internal oszillator)
Sample rates	Supported default rates	44.1 kHz, 48 kHz, 88.2 kHz and 96 kHz
Test tone Generator	Frequency range	20 to 20,000 Hz, adjustable in 1-Hz steps, white and pink noise
	Frequency deviation	< 0.01 Hz
	Level	–34 to +6 dBu in 1-dBu steps
	Level deviation	± 0.3 dB @ 1 kHz
	THD&N.	< 0.1 %
Metering	Type	digital multichannel metering; audio-bus time-slot metering, consideration of the 14 most significant audio bits
	Channels	256
	Measuring type	peak
	Resolution	0.25 dB
	Retrace	20 dB / 1.5 s
Power supply	Power supply	+4.75 to 5.25 V
	Current	1.1 A
Operating conditions	Temperature range	0 °C to +50 °C / 32 to 122 °F
	Humidity	90 % (max.), non-condensing
Storage conditions	Temperature range	–35 °C 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 XCPU	4 HP × 3 U (20.02 × 128.5 mm / 0.8 × 5.06")
	Required space	1 dedicated slot
	Weight	0.245 kg