RCX Controller Board

NEXUS STAR Controller Board and Routing Matrix

- Main-controller board and routing matrix for NEXUS STAR routers
- Controls and monitors all components of a NEXUS STAR
- Organises routing and sync functions plus clock generation
- Handles up to 16 lines with 256 inputs and 256 outputs each
- Transparent forwarding of 24-bit audio
- Stores the current system status separately from the control computer
- Operation and status indicator LEDs
- Clock generation + synchronisation to various sync sources
- Connects the system to control computers (RS 232/422, USB, or Ethernet)

The RCX integrates two functions of the NEXUS STAR router on a single board: the main CPU formerly contained on the RCPU board and the audio-routing matrix (formerly provided by the RMX board).

The RCX as the central control unit is a mandatory component of the NEXUS STAR router.

The NEXUS RCX and XCPU boards are the basic components of large NEXUS audio networks. The combination of a NEXUS STAR central router and distributed NEXUS Base Devices offer an overall matrix capacity of 4,096 × 4,096 crosspoints – more than 16 million crosspoints in total.

Like with the NEXUS system, all volatile data of the RCX board is stored to battery-backed SRAM. This ensures that the most recent status can be recovered after power failure or shutdown.

To provide redundancy it is possible to install two RCXs to a single RBPR backplane. In this case, one board is in live operation while the other one remains in hot standby mode. If the active RCX fails, switchover occurs automatically; however, it can also be performed manually.

CPU Functionality

The CPU handles communication with external control computers, system management, and control and monitoring of all system components including the router backplanes and the power-supply units. Connectivity to control computers is provided via two RS 232/422 ports, one USB port, or one Ethernet port (10/100).

Synchronisation and clock generation are achieved using a PLL with extended time constant to provide a low-jitter system clock. Standard sample rates of 44.1, 48, 88.2, and 96 kHz are supported. (Other rates are available on request.)

The CPU features a wordclock input for external synchronisation and a wordclock output sending the synchronised internal clock. The following sync sources are available: internal source, the wordclock input, any digital input (including inputs from NEXUS Base Devices), any optical input, the optional RSYNC board (video, WCLK, AES/EBU), and MADI (RMF) if available.

The CPU not only provides control functions but also monitoring features. It continuously monitors the battery status and checks for device failure. A thermal sensor is mounted on the RCX board and continuously monitored by the CPU.

The firmware is stored in a flash memory soldered onto the CPU and can be updated using a utility program running on the PC. No physical components need to be replaced for this purpose.

Router Functionality

The audio-routing matrix is adjacent to the CPU on the RCX board. It is the switching centre for all audio signals on the NEXUS STAR. In contrast with the bus structure in a standard NEXUS system, here the audio is transmitted using an active routing matrix.

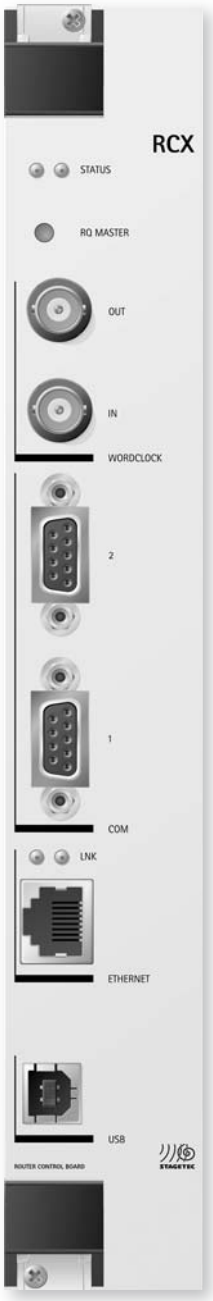
The audio-routing matrix manages all audio channels of the up to 16 audio-interface boards that can be installed into a NEXUS STAR. It makes 256 inputs and 256 outputs available to each of the interface boards, thus providing a routing capacity for 4,096 paths. In addition, it also allows single input signals to be routed to multiple outputs. Data is forwarded to many outputs from one input.

The routing options of cascaded NEXUS STAR Base Devices depend on the system configuration: The number of audio channels transmitted between Base Devices relies on the number of RFOC fibre-optic interface boards reserved for this transmission.

The data resolution is consistently 30 bits (including 24 audio bits) on the NEXUS STAR and the NEXUS system. The matrix routes all data fully transparently with regard to their standards – the data is neither evaluated nor modified.

The matrix operates in full sync with the word-clock and has a locking latency of just 3 samples.

Both mono channels and grouped signals can be routed.



RCX Specifications		
	Compatible with RBPRxx only!	
CPU	Type	Motorola MCF547x
	Clock rate	Core: 200 MHz. Bus: 50/100 MHz
Ports	2 × 9-pole D-Sub port, RS 232/RS 422 (for connecting the control computers)	
	1 × USB (control-computer port)	
	2 × BNC (wordclock I/O)	
	1 × RJ 45 (Ethernet, 10/100Base-TX)	
RS 232C interface	Ports	9-pin D-Sub ports, female, galvanically isolated
	Data rate	38.4 kbps (typ.), 115.2 kbps (max.)
	Cable length	10 m (max., recommended)
RS 422/485 interface	Ports	9-pin D-Sub ports, female, galvanically isolated
	Data rate	38.4 kbps (typ.); 115.2 kbps (max.)
	Input level	–7 to 12 V (max.)
	Impedance	Input and output: 120 ohm
	Cable length	100 m/330' (max.) over 110-ohm line; ±20 %
USB interface	Version	Compliant with USB 1.1, Type B; standard-compliant wiring, galvanically isolated
	Data rate	38.4 kbps (typ.); 115.2 kbps (max.)
	Cable length	5 m/16.4' (max.) over 90-ohm line; ± 15 %
Wordclock in	Ports	BNC, galvanically isolated
	Level	1 to 5 V
	Impedance	75/500 ohm (switchable)
	Rates	44.1, 48, 88.2, and 96 kHz
	Required frequency stability	< ±150 ppm min. (±50 ppm typ., compliant with AES 11, Grade 2)
Wordclock out	Ports	BNC, galvanically isolated
	Level	2.4 V on R_L = 75 ohm
	Rates	44.1, 48, 88.2, and 96 kHz
	frequency stability	±10 ppm (max.), ±5 ppm (typ.) (internal generator)
	Output port adjustable to AC or DC	
RJ45 Ethernet	Data rate	10/100 Mbps
	Cable length	100 m/330' (max.), CAT5e or better recommended
Power supply	Voltage	+4.75 to 5.25 V
	Current	1 to 3 A (configuration specific)
Operating conditions	Temperature range	0 °C to +70 °C / 32 to 158 °F
	Humidity	90 % (max.), non-condensing
Storage conditions	Temperature range	0 °C to +70 °C / 32 to 158 °F
	Humidity	90 % (max.), non-condensing
Physical properties	Appearance	Board for 19" mainframe, 8 HP/6 U
	Front panel	6 U × 8 HP (approx. 40 mm × 262 mm/ 1.58" × 10.31")
	Slot requirements	2 dedicated slots per backplane