

NAT-MCH-PHYS / NAT-MCH-PHYS80

MTCA CARRIER HUB FOR MTCA.4 AND MTCA.4.1

DESIGNED BY N.A.T. GMBH

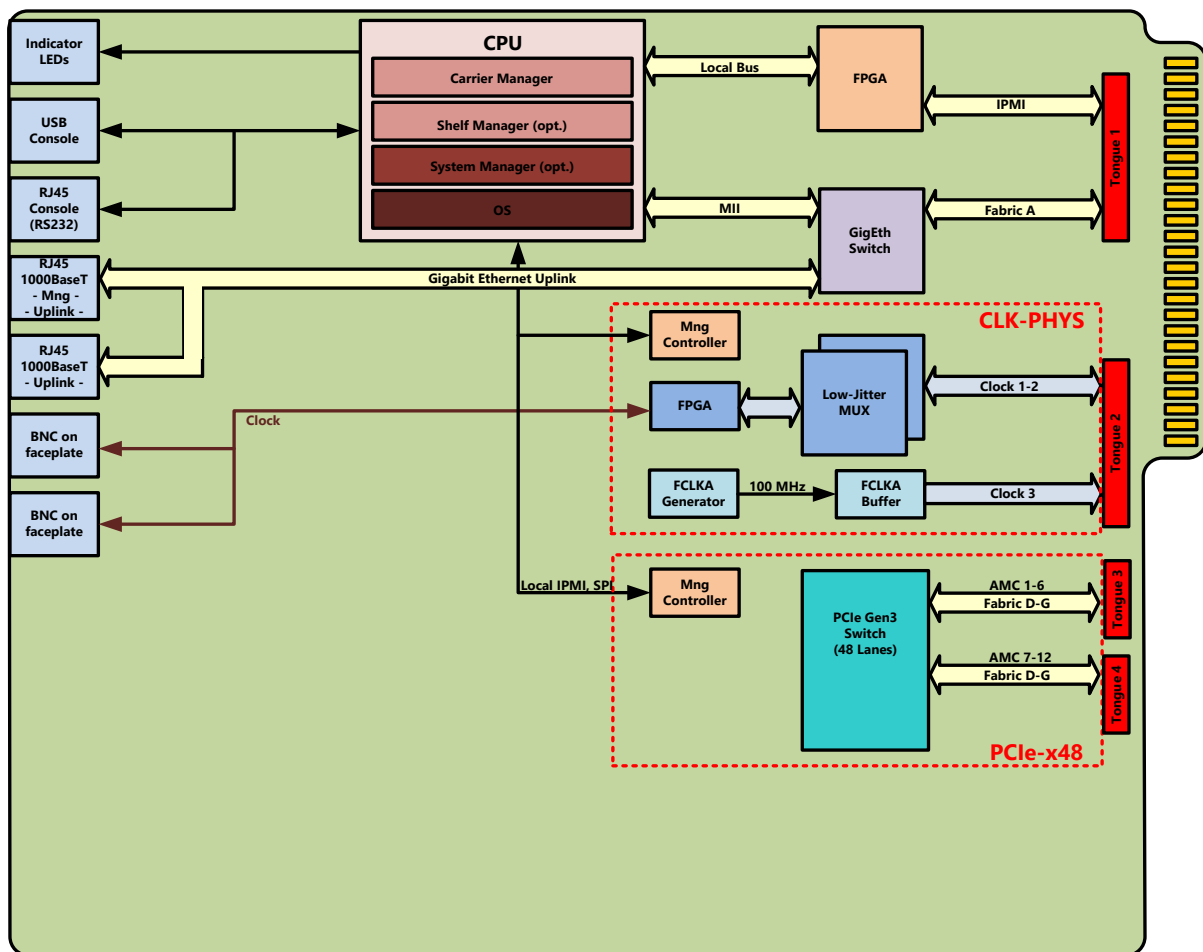


FACT SHEET V1.8

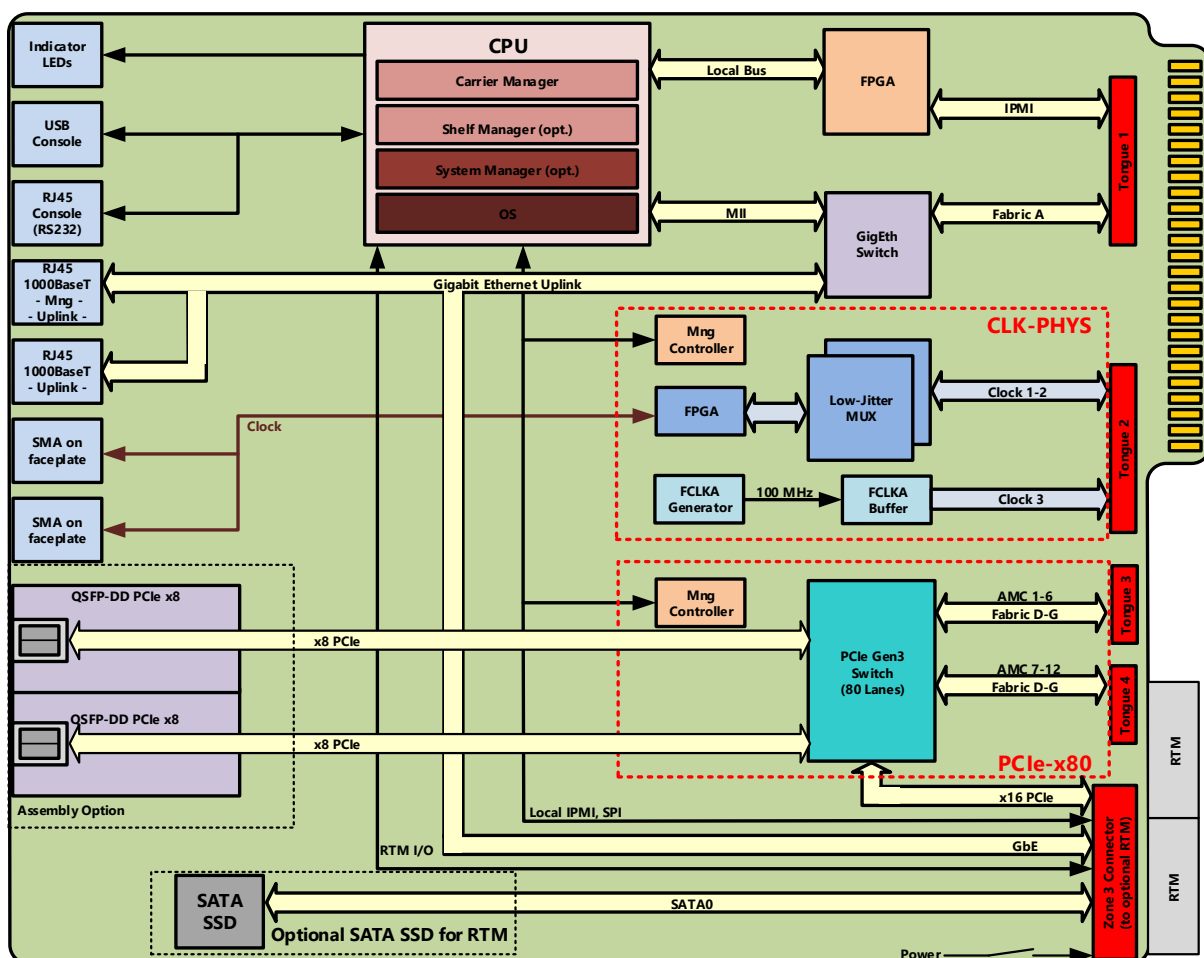
HW REVISION 2.X

NAT-MCH-PHYS

The **NAT-MCH-PHYS** is based on the **NAT-MCH-M4**, a double-width MCH baseboard for MicroTCA.4 systems, combined with the **NAT-MCH-CLK-PHYS**, a special low latency and low jitter clock module, and the **NAT-MCH-PCIex48** PCIe Gen3 hub module. It addresses the requirements for management and high bandwidth switching to AMCs in PCIe based MTCA.4 systems, targeting large control and data acquisition applications.



The **NAT-MCH-PHYS80**, which consists as well of the **NAT-MCH-M4** base plus the **NAT-MCH-CLK-PHYS**, is moreover equipped with the **NAT-MCH-PClex80** hub module, which features an 80-port PCIe Gen3 switch. Combined with the Rear Transition Module with quad-core Intel Xeon E3 CPU, this is the most powerful single-slot solution for management, data switching, and processing that is available for MTCA.4 and MTCA.4.1 systems. The option for optical uplinks via QSFP-DD makes it ideal for large control and data acquisition applications such as high and low energy physics research institutions.



Redundant Management

The **NAT-MCH-PHYS/PHYS80** fully supports redundant management and power environments. Frequent exchange of the internal databases with the secondary MCH and a heartbeat mechanism ensure an immediate switch-over from the primary to the secondary MCH whenever it becomes necessary (PCIe fat pipe switch over may require additional precautions).

The **NAT-MCH-PHYS** can handle up to four power modules, such as the **NAT-PM-DC840** or **NAT-PM-AC600**, for N+1 configurations.

The **NAT-MCH-PHYS80** can handle up to four - 48V, +24V or AC power modules, such as **NAT-PM-DC840**, **NAT-PM-DC600LV**, **NAT-PMAC600**, **NAT-PM-AC600D**, **NAT-PM-1000**, or a combination of them for N+1 configurations.

The **NAT-MCH-PHYS80** together with the **NAT-MCH-RTM-BM** (LLRF backplane management) can handle in addition up to two rear power modules, such as **NAT-RPM-AC600** (providing variable bipolar voltages for the LLRF backplane), or any standard MTCA power supply.

Clocking

The clock module **NAT-MCH-CLK-PHYS/PHYS80** has been specially designed for physics and scientific research applications, providing very low jitter and constant latency.

PCIe Gen3 Switching

The PCIe hub module provides a 48-port PCIe Gen3 switch that allows each of the 12 AMCs in a MicroTCA.4 system to be connected by an x4 link.

The PCIe hub module provides an 80-port PCIe Gen3 switch that allows each of the 12 AMCs in a MicroTCA.4.x system to be connected by an x4 link. It provides either two x8 or one x16 optional optical PCIe uplink(s) to external high performance servers or other MTCA.4 systems.

Software Support and Updates

Apart from the Java GUI NATview, the **NAT-MCH-PHYS/PHYS80** also supports external management solutions, which are based on the Remote Management Control Protocol (RMCP), such as NATview or the open-source tool ipmitool.

Furthermore, using the **NAT-MIB** the **NAT-MCH-PHYS/PHYS80** can also be integrated into environments based on the Simple Network Management Protocol (SNMP). The **NAT-MCH-PHYS/PHYS80** can be configured using either uploadable text based script files or via the integrated web interfaces using a standard web browser. Finally, the integrated debug and configuration facilities can be accessed via a serial console or using Telnet.



	NAT-MCH-PHYS	NAT-MCH-PHYS80
Form Factor	• Double-width, full-size AMC • Width: 147 mm, Depth: 180.6 mm	
CPU	• NXP (Freescale) ColdFire MCF54452 CPU @ 266 MHz	
Memory	• DDR2 RAM: 32 / 64 MB • FLASH: 16 / 32 / 64 MB	• DDR2 RAM: 32 / 64 MB • FLASH: 16 / 32 / 64 MB • SATA-SSD (optional) • 1x Half-Slim SSD
IPMI and Compliance	• 13 AMCs • 2 front and 2 rear cooling units • 1-4 power modules incl. N+1 redundancy • PICMG AMC.0 • PICMG 2.9 • Update to 2nd MCH	
Fabric A Gigabit Ethernet	• 12 AMCs + optional AMC13 in 2nd MCH slot • PICMG AMC.2 R1.0 • PICMG SFP.1 R1.0	
Fabric D-G	• PCI Express Gen3 to 12 AMCs • x1 or x4 to 12 AMCs • PICMG AMC.1 R1.0	• PCI Express Gen3 to 12 AMCs • x1 or x4 to 12 AMCs • One x16 or two x8 to optical uplinks (optional) • x16 to RTM or to one AMC slot (requires backplane support) • PICMG AMC.1 R1.0
Clock Distribution NAT-MCH-CLK-PHYS	• CLK1 and CLK2 by special low jitter and low latency circuitry (NAT-MCH-CLK-PHYS) • CLK3 fixed mean 100 MHz PCIe clock (HCSL)	
Carrier Manager	• Management of up to 13 AMCs, 4 cooling units, and 1-4 power modules • Supports redundant architectures and fail-over procedure • Supports configurable emergency shutdown of AMCs or entire system	• Management of up to 13 AMCs, 4 cooling units, and 1-4 power modules • Management of 4 eRTMs and 2 rear power modules via LLRF backplane • Supports redundant architectures and fail-over procedure • Supports configurable emergency shutdown of AMCs or entire system
System and Shelf Manager	• For detached or stand-alone operation, both managers are available on-board, hook-in for external managers via 1 GbE port at front panel	
Operating System Support	• O/S: OK1 • API: HPI compliant	
Indicator LEDs	• 3 standard AMC LEDs • 12 bi-color LEDs for AMC slot states • 2 bi-color LEDs for cooling units • 4 bi-color LEDs for power modules • 12 bi-color LEDs for PCIe links status (failed, Gen1, Gen2, or Gen3)	• 3 standard AMC LEDs • 12 bi-color LEDs for AMC slot states • 2 bi-color LEDs for cooling units • 4 bi-color LEDs for power modules • 12 bi-color LEDs for PCIe links status (failed, Gen1, Gen2, or Gen3) • 2 bi-color LEDs for PCIe-Uplink • 2 bi-color LEDs for RTM-PCIe-Link
Front Panel Connectors	• 2x 1GbE for management connection and Fabric A system up-link (load sharing supported) • External clock reference (bi-directional) • Serial and USB console connectors	• 2x 1GbE for management connection and Fabric A system up-link (load sharing supported) • External clock reference (bi-directional) • Serial and USB console connectors • Fabric D-G uplink (two x8 or one x16)



Order Code NAT-MCH-PHYS		
NAT-MCH-PHYS	• Double-wide full-size MCH for MTCA.4 applications featuring PCIe x48 HUB module	
Order Codes NAT-MCH-PHYS80 – [Q] – [Cable]		
	• Double-width full-size MCH for MTCA.4 applications featuring PCIe x80 HUB module, RTM functionality, and two QSFP-DD cages for front uplink	
Q	• - 0	• without transceivers
	• - 1	• 1x optical transceiver
	• - 2	• 2x optical transceivers
Cable	• - 0	• without optical cable
	• - 1	• with optical cable
Operating Environment	• Default: 0°C to +55°C (with forced cooling) • Humidity: 10% to 90% at +55°C (non-condensing)	
Storage Environment	• Default: -40°C to +85°C • Humidity: 10% to 90% (non-condensing)	

