

NAT-MCH



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The N.A.T. MicroTCA Carrier Hub **NAT-MCH** is the central management and data switching entity for all MicroTCA systems.

The **NAT-MCH** is designed to provide any functionality as defined by the MicroTCA specification MTCA.0 R1.0, serving up to the maximum of 12 Advanced Mezzanine Cards (AMCs) and 1-N power units and two cooling subsystems.

Because of its scalable and flexible design the **NAT-MCH** can be used in any kind of MicroTCA system, supporting telecom and non-telecom environments as well as redundant and non-redundant architectures.

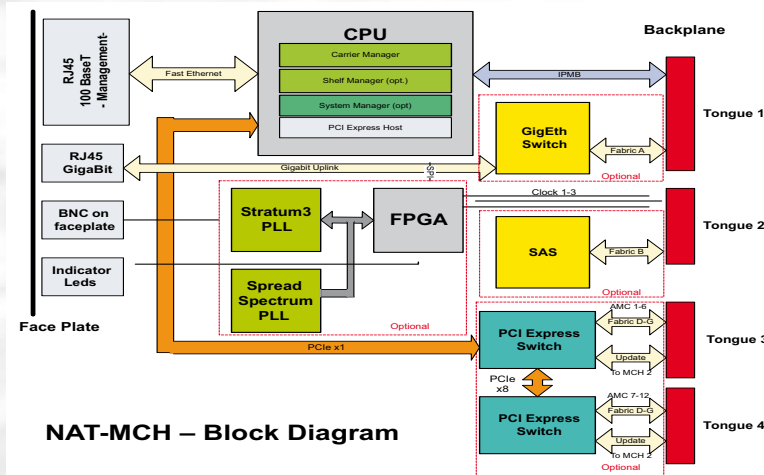
The mandatory carrier manager is realized utilizing the on-board Freescale ColdFire CPU.

For MicroTCA systems operated in a detached or stand-alone mode a shelf manager as well as a system manager can be provided, too.

Besides the management functionality the MCH base module incorporates an unmanaged, non-blocking and low-latency Gigabit Ethernet hub for base channel connectivity. Numerous options like a fabric switch module for PCI-Express (PCIe), Serial Rapid I/O (SRIO), Serial Attached SCSI (SAS) or a clock distribution module for telecom environments are available as mountable daughter boards.

Following the building block model the **NAT-MCH** can be individually arranged to meet the exact system requirements. A comprehensive software support like a Java based GUI interfacing to the Open HPI top level API of the **NAT-MCH** completes the product and makes it an ideal choice for any AMC based MicroTCA solution.

Technical Data



Overview and Purpose

The **NAT-MCH** is a MicroTCA Carrier Hub in the form factor of a single width double height Advanced Mezzanine Card (AMC). It provides the central management and data switching entity for all MicroTCA systems. The **NAT-MCH** comprises of a base module and numerous optional daughter cards which can be mounted on the base module.

The NAT-MCH is MicroTCA.0 R1.0 compliant and delivers switching and hub functionality for the various system fabrics as defined in the AMC.x standard series, i.e. Gigabit Ethernet, PCI-Express (PCIe), Serial Rapid I/O (SRIO) or Serial Attached SCSI (SAS). The NAT-MCH can also provide a centralized clock distribution to all AMCs in the system.

CPU, memory and O/S

The NAT-MCH base board is equipped with a CPU of the Freescale ColdFire family of processors. The CPU operates at core frequency of 200 MHz.

The **NAT-MCH** provides 16MB SDRAM and 16MB FLASH memory. The operating system used with the **NAT-MCH** is Linux.

Gigabit Ethernet Hub and Switch

The Gigabit Ethernet Switch incorporated in the NAT-MCH provides a layer 2, non-blocking, low-latency Gigabit Ethernet switch, supporting VPN as well as a port based rate control. The **NAT-MCH** supports Fabric A according to MicroTCA.0 R1.0 and PICMG SFP.1 R1.0, serving up to 12 AMCs as well as the update channel from the second MCH in redundant environments. Also supported is an uplink port at the front panel of the **NAT-MCH** in order to interconnect to other carriers, shelves or systems.

PCI Express Hub and Switch

The PCI Express Switching option allows PCIe connectivity for up to 12 AMCs at PCIe rates from x1 to x4. The used PCIe chipsets provide a Quality of Service (QoS) module and are configurable in terms of a non-transparent port for multi-Host support. The PCIe option can optionally provide a PCIe clock by a Spread Spectrum Clock (100MHz mean) or a fixed 100MHz clock.

Clock Distribution

Besides the PCIe clocks the **NAT-MCH** also offers a sophisticated clock distribution module for special requirements, i.e. as by comms applications. Thus the module allows a flexible selection of the telecom and non-telecom clocking structures as defined in MicroTCA.0 R1.0. The on-board Stratum 3 type PLL sources its clock reference configurable from either any of the 12 AMCs or from an external clock via the front panel BNC type connector.

Management

The **NAT-MCH** incorporates a MicroTCA Carrier Management Controller (MCMC) which supports and manages up to two 12 AMCs, 2 cooling units and 1-N power units. Special care has been taken to support numerous aspects of system architectures, i.e. E-Keying, redundancy, clocking, fail-over scenarios or system integrity. In order to connect the MCH to an external shelf or system manager the **NAT-MCH** offers a 100BaseT port at the front panel. The management interface to these instances and the available N.A.T. remote control and visualization application μ View is based on the HPI recommendation of the Service Availability Form (SAF).

CPU and memory

Freescale ColdFire 547x @ 200MHz
 DRAM: 16MB
 FLASH: 16MB

IPMI and Compliance

12 AMCs,
 2 cooling units
 1-N power units
 PICMG AMC.0 R1.0
 PICMG 2.9 R1.0

Supported Fabrics and Compliance

Fabric A: **Gigabit Ethernet**
 12 AMCs
 PICMG AMC.2 R1.0
 PICMG SFP.1 R1.0

Fabric B: **Serial Attached SCSI**
 Serial ATA
 PICMG AMC.3 R1.0
 option available Q1/07

Fabric D-G: PCI Express

12 AMCs, x1-x4 each
 PICMG AMC.1 R1.0
Serial Rapid I/O
 PICMG AMC.4
 standard has not yet been adopted

Clock Distribution

Telecom: Stratum 3 PLL with reference from either 1 of the 12 AMCs or external clock via front panel

PCIe: Spread Spectrum Clock (100MHz mean) or oscillator (100MHz fixed)

Carrier Manager

Management of up to 12 AMCs, 2 cooling units and 1-N power units, supports redundant architectures and fail-over procedure

Shelf and System Manager

For detached or stand-alone operation both managers are available on-board, hook-in for external managers via 100BaseT port at front panel

Operating System and API

O/S: LINUX
 API: HPI compliant

Indicator LEDs

4 standard AMC LEDs
 12 bicolour LEDs for AMC slot stati
 2 bicolour LEDs for cooling units
 2 bicolour LEDs for power units

Front Panel Connectors

100 BaseT management connection
 1GbE system up-link
 external clock reference
 serial debug connector

