

OVERVIEW AND PURPOSE

NATView is an easy to use visualisation tool for any MicroTCA system that includes a NAT-MCH. NATView is operating system independent and runs on any host computer internal or external to the MicroTCA system. NATView allows the user to view and manipulate the components of the MicroTCA system in a graphical way.

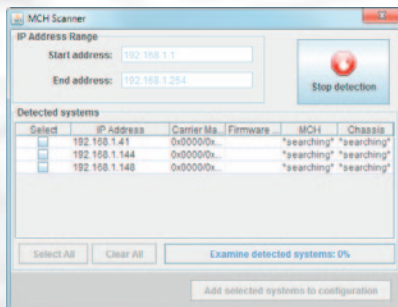
OPERATING SYSTEM

NATView is a JAVA based tool that can run on an host PC or AMC CPU card if it can execute Oracle JAVA 1.6.

KEY FEATURES

- System Overview

- Tree structured sensor data including fans and temperatures
- Display the current sensor values
- Animation of hot-swap process of AMC modules
- Sensor threshold setting
- MCH Scanner – finding MicroTCA system IP address in a network

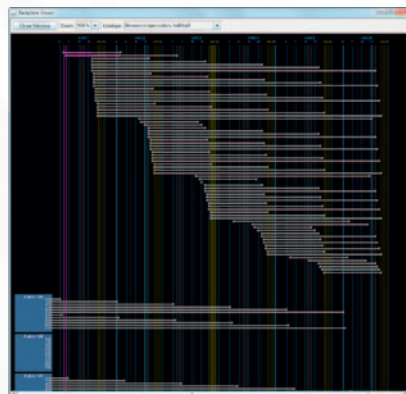


- Events and Alarms

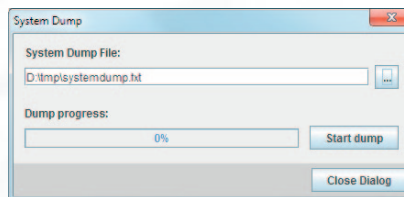
- intelligent alarm monitoring and prioritization
- logging of events, incidents and alarms
- access to the system event log

- FRU Information

- FRU Editor – viewing and editing Field Replaceable Unit (FRU) information
- Backplane Viewer – show connection between MCH and AMC resp. AMC and AMC



- System Dump – Collect system information easy as 1-2-3 with a single mouse click.



- Customization – Easily add new system components, including custom designs.

Technical Data NAT-MCH

CPU and memory

- Freescale ColdFire MCF54452
- CPU @ 266MHz
- DDR2 RAM: 32/64MB
- FLASH: 16/32/64MB

IPMI and Compliance

- 13 AMCs
- 2 cooling units
- 1-4 power modules
- PICMG AMC.0
- PICMG 2.9
- update to 2nd MCH

Supported Fabrics and Compliance

Fabric A: Gigabit Ethernet

- 13 AMCs
- PICMG AMC.2
- PICMG SFP.1

Fabric D-G:

- Serial Rapid I/O Gen 2, x1 or x4 (PICMG AMC.4)
- PCI Express Gen 3, x1 or x4 (PICMG AMC.1)
- 10GbE (XAUI) (PICMG AMC.2)
- 12 AMCs

Clock Distribution

- Telecom: Stratum 3/3E 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), HCSL or MLVDS signaling

Carrier Manager

Management of up to 13 AMCs, 2 cooling units and 1-4 power modules, 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 1GbE port at front panel or backplane GbE

Operating System and API

- O/S: OK1
- API: HPI compliant

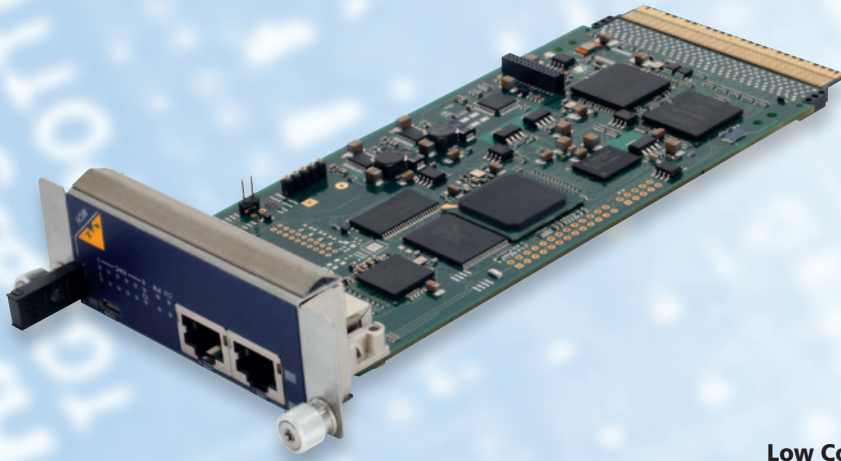
Indicator LEDs

- 3 standard AMC LEDs
- 12 bi-colour LEDs for AMC slot state
- 2 bi-colour LEDs for cooling units
- 2 bi-colour LEDs for power modules

Front Panel Connectors

- 1GbE management connection
- 1GbE system up-link for Fabric A
- external clock reference (bi-directional)
- serial debug connector (USB)
- Fat Pipe uplink for Fabric D-G





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

The **NAT-MCH** is designed to provide any functionality as defined by the MicroTCA specifications MTCA.0, MTCA.1 and MTCA.4, serving up to the maximum of 13 Advanced Mezzanine Cards (AMCs), 1-4 Power Modules and two Cooling Units.

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.

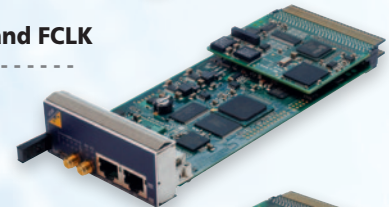
The mandatory carrier manager is implemented in the on-board Freescale ColdFire CPU. For MicroTCA systems operating in a detached or stand-alone mode, a shelf manager as well as a system manager can be provided.

Alongside the processor, the MCH base module incorporates a managed, non-blocking and low-latency Gigabit Ethernet L2 switch for base channel connectivity. Numerous options like a fabric switch module for PCI-Express (PCIe Gen 3), Serial Rapid I/O (SRIO Gen 2), 10 Gigabit Ethernet or a clock distribution module for telecom and non-telecom environments are available as daughter boards.

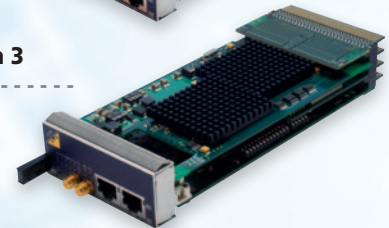
Low Cost (1GbE)



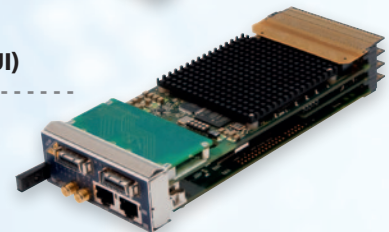
Telecom Clock and FCLK



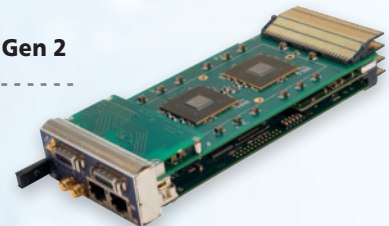
PCI Express Gen 3



10GbE ETH (XAUI)

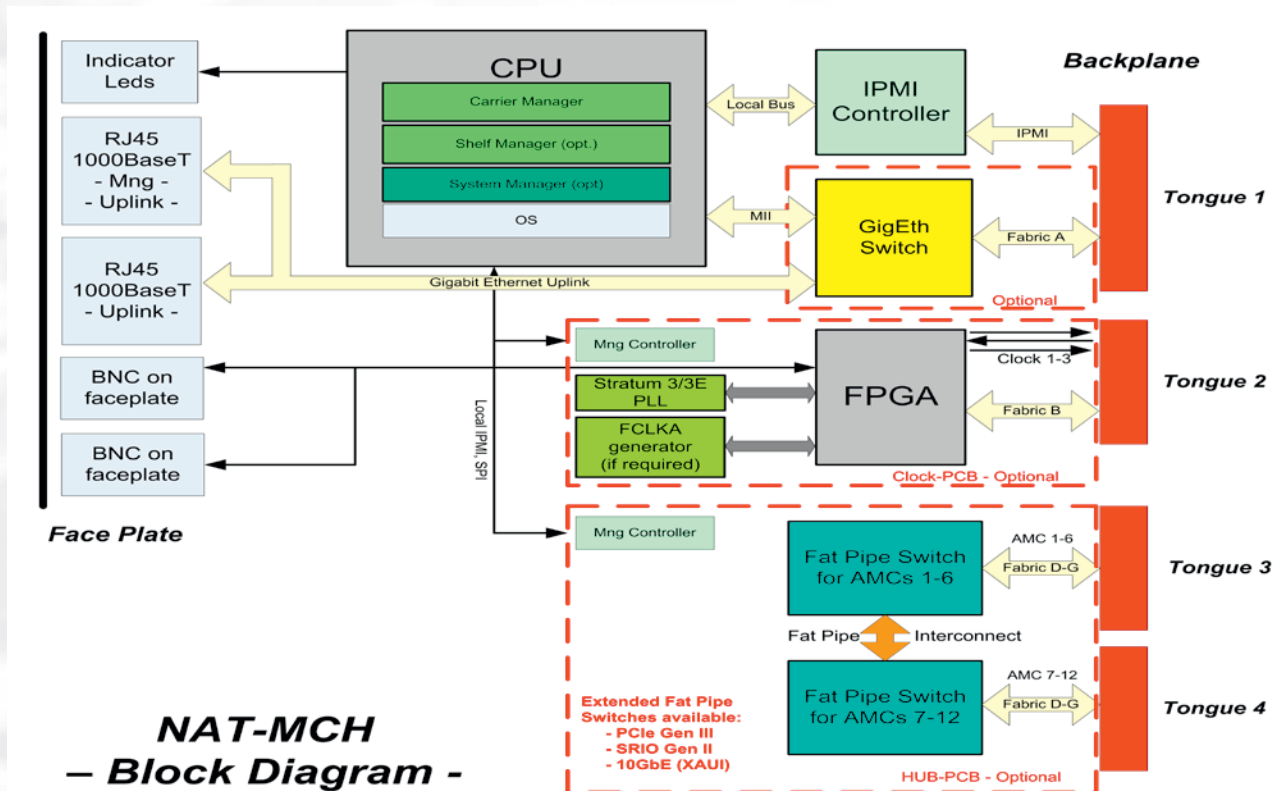


Serial Rapid I/O Gen 2



Following the building block model the **NAT-MCH** can be individually configured to meet exact system requirements. Comprehensive software support like a Java based GUI interfacing to the Open HPI compliant 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 (uTCA®/MTCA) Carrier Hub in the form factor of a single width and mid-size or full-size Advanced Mezzanine Card (AMC). It provides the central management and data switching 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 MTCA.0, MTCA.1 and MTCA.4 compliant and delivers switching and hub functionality for the various system fabrics as defined in the AMC.x standard series, i.e. 1Gigabit Ethernet (GbE), PCI-Express (PCIe Gen 3), Serial Rapid I/O (SRIO Gen 2) or 10Gigabit Ethernet (XAUI). 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 from the Freescale™ ColdFire family of processors. The CPU operates at a core frequency of 266 MHz. The NAT-MCH provides 32/64MB SDRAM and 16/32/64MB FLASH memory. The operating system used with the NAT-MCH is OK1 or Linux.

Gigabit Ethernet Switch and 10GbE (XAUI) Support

The Gigabit Ethernet Switches incorporated in the NAT-MCH both provide layer 2, non-blocking, low-latency operation, supporting VLAN as well as a port based rate control. The NAT-MCH supports Fabric A (1GbE) and Fabrics D-G (10GbE-XAUI) according to MTCA.0, MTCA.1 and MTCA.4 and PICMG SFP.1 R1.0, serving up

to 13 AMCs as well as the update channel from the second MCH in redundant environments. Also supported are uplink ports at the front panel of the NAT-MCH in order to interconnect to other carriers, shelves or systems.

PCI Express Gen 3 Switch

The PCI Express Switching option allows PCIe Gen 3 connectivity for up to 12 AMCs at PCIe rates from x1 to x4. The 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 Spread Spectrum Clock (100MHz mean) or a fixed 100MHz clock. The clock can be provided compliant to HCSL or MLVDS signaling levels. The PCIe hub provides clustering support for 6 independent clusters.

SRIO Gen 2 Switch

Alternatively the NAT-MCH can be equipped with a Serial Rapid I/O (SRIO Gen 2) daughter board to support uncontended point-to-point connectivity between up to 12 AMC pipes. The SRIO hub supports x1 and x4 fat pipes. A mixture of AMC modules with SRIO Gen 1 & Gen 2 is supported.

Clock Distribution

Besides the PCIe clock the NAT-MCH also offers a sophisticated clock distribution module for special requirements, such as comms applications. Thus the module allows a flexible selection of telecom and non-telecom clocking structures as defined in MTCA.0. The on-board Stratum 3/3E type PLL sources its clock reference from any of

the 12 AMCs or from an external clock, via the front panel BNC type connector. With respect to the PCIe clock, the NAT-MCH supports both signal levels, HCSL (as required by PCI-SIG) and MLVDS (as requested by the MTCA.0 specification).

Management

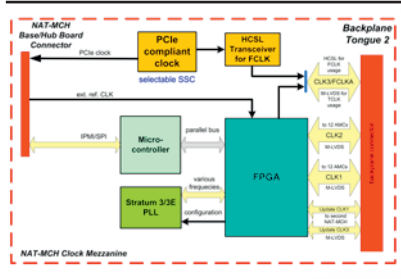
The NAT-MCH incorporates a MicroTCA Carrier Management Controller (MCMC) which supports and manages up to two 13 AMCs, 2 cooling units and 1-4 power modules. The support of a 13th AMC requires a redundant system where the redundant MCH slot is used by this AMC. Special care has been taken to support numerous aspects of system architectures, i.e. E-Keying, redundancy, load sharing, clocking, fail-over scenarios or system integrity. External system or shelf managers can connect to the NAT-MCH through any of the Ethernet front panel ports. For remote control and visualization N.A.T. has its JAVA based application NATview. Like any other remote management tool (i.e. ipmitool (open source) or any tool based on the HPI recommendation of the Service Availability Form (SAF)) NATview accesses the NAT-MCH via the Remote Management Control Protocol (RMCP) as required by the MTCA.0 specification.

Configuration

The NAT-MCH can be comfortably configured using the included web interface with any standard web browser or by the command line interface via serial connection (USB) or a Telnet connection.

NAT-MCH-Mezzanine Modules

Clock Mezzanine

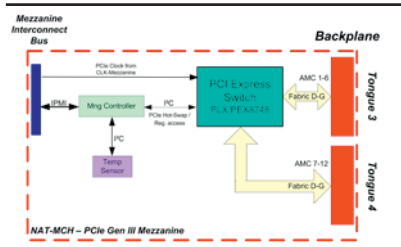


The Clock Mezzanine Module allows a flexible selection of the telecom and non-telecom clocking structures as defined in MTCA.0. The on-board Stratum 3/E type PLL sources its clock reference from either of the 12 AMCs or from an external clock via the front panel BNC type connector. In conjunction with the PCIe Hub module it provides a PCIe compliant fabric clock (FCLKA) to all AMC slots. This can be either a 100MHz fixed or 100MHz Spread Spectrum clock (SSC). The PCIe clock can be provided complying to HCSL or MLVDS signaling levels.

Key Features:

- support of AMC clocks CLK1, CLK2 and CLK3 for up to 12 AMCs
- update clock for a second NAT-MCH in redundant systems
- reference clock In/Output on front panel
- stratum 3/E type PLL clock source for telecom applications
- variable switching and distribution of clocks by onboard FPGA
- reference for the Stratum 3/E PLL can be either CLK1 or CLK2 from any AMC or sourced from the front panel
- PCI Express compliant clock signal can be distributed via FCLKA to all 12 AMCs

PCIe Gen 3 Switch



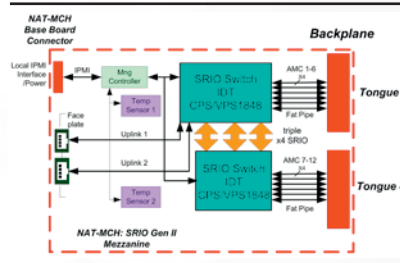
The PCI Express Switching Mezzanine is an AMC.1 compliant module for the NAT-MCH that enables users to add scalable high bandwidth, non-blocking interconnection to a wide variety of applications including servers, storage, video streaming, blade servers and embedded control products.

The PCIe Hub module supports full non-transparent bridging functionality to allow implementation of multi-host systems and intelligent I/O modules in applications such as communications, storage and blade servers.

Key Features:

- support for 6 (option -x24) or 12 (option -x48) AMC modules, Fabrics D-G
- non-blocking switch fabric
- upstream port configurable to any of the 12 AMC slots
- PCIe hot plug support for each AMC slot
- secondary (failover) host possible
- clustering support; 6 clusters can be operated individually, each having its own root complex
- supports x1 and x4 width ports to any AMC
- configuration option for Spread Spectrum Clock (SSC) or 100MHz fixed PCIe clock
- PCIe clock can be provided as Fabric Clock (FCLKA) to the AMC slots

SRIO Gen 2 Switch

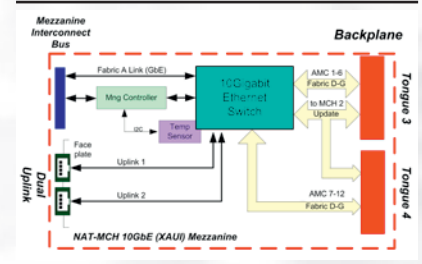


The SRIO Gen 2 Mezzanine module provides a non-blocking high performance data switching functionality for up to 12 AMCs. The non-hierarchical structure of SRIO allows for superior bandwidth between each end point. Additionally, SRIO data integrity and health checks are performed in hardware.

Key Features:

- flexible port width: x1 and x4
- 20 Gb/s bandwidth per port (x4)
- operating baud rate per data lane 1.25 Gbaud, 2.5 Gbaud or 3.125 Gbaud, 5.0 Gbaud and 6.25 Gbaud
- transport layer error management
- low latency packet transport
- power down modes and routing capabilities per port
- decentralised communication model: pere-to-pere

10GbE (XAUI) Switch



The NAT-MCH 10GbE Hub Mezzanine provides high performance, low latency and robust Ethernet packet switching service for MTCA systems.

Key Features:

- 10GbE Ethernet port for 12 AMC slots
- 2 uplink ports on the front panel on front panel
- per port selection of:
 - 10GbE (XAUI)
 - 2.5 GbE
 - 1 Gb
- link aggregation (802.3 ad)
- 240 Gbps bandwidth

Layer 2 Bridging Features:

- VLAN priority (802.1Q,P)
- link aggregation (802.3 ad)
- duplex flow control (802.3x)
- user defined monitoring and filter rules
- Jumbo Frame Support
- 2 uplink ports on front panel per Port selection of:
 - XAUI - 10GBase-CX4/-SFP+
 - 2.5 GbE
 - 1 Gb
- 240 Gbps bandwidth

Security:

- MAC address security port access control (802.1x)