

easy, flexible and meeting your needs
The MicroTCA Concept by N.A.T.



The expert of high performance connectivity products for data and telecommunication solutions.

What you have to know about MicroTCA

What is MicroTCA?

MicroTCA or MTCA or μ TCA stands for Micro Telecommunication Computing Architecture. MicroTCA is an open standard published by PICMG (PCI Industrial Computer Manufacturers Group) in 2007. It is both a system and a board level standard, covering all aspects, i.e. form factors and topologies, system and board management, cooling units and power modules.

Who uses MicroTCA?

MicroTCA customers are looking for the benefits of hot-swap devices, failure detection and isolation, redundancy, power budgeting, cooling management, bandwidth, blocking-free communication, etc..

Why choose MicroTCA?

MicroTCA combines the advantages of VME and cPCI with today's technology of high-speed serial communication, leveraging system interconnects like PCI Express, Serial RapidIO, 1Gbps and 10Gbps Ethernet with bandwidths up to 20Gbps.

Where is MicroTCA deployed?

MicroTCA is used in markets such as (tele-)communication, medical, energy, defense&aerospace, automation, industrial controls, transportation, test&measurement, and research.

How you can benefit from **N.A.T.**

N.A.T. offers extensive expertise and experience combined with solid product quality with traditional German standards. This has made us the preferred choice for a large number of international customers for both standard and custom solutions.

N.A.T. manufactures the leading and most advanced MicroTCA Carrier Hub, the NAT-MCH. We offer a wide range of standard Advanced Mezzanine Cards (AMC) as well as a complete IPMI suite for AMCs, cooling units and power management modules.

N.A.T. provides turn-key solutions based on our own hard- and software products, combined with a selection of products from leading 3rd party vendors. Individual requirements can always be catered by customizing any part of the system.

N.A.T. ensures interoperability with components from other vendors and is able to guarantee interoperability with any standard compliant part of a MicroTCA system.

NATIVE-SX

size

- 197 x 134mm table top
- depth: 252 mm

slots

- 2 full- and 3 mid-size AMCs
- 1 full-size MCH for fat pipe support

power supply

- 110-240VAC, 300W output, front pluggable

cooling unit

- single fan (integrated)

backplane configuration

- direct SATA / SAS connections
- single star base fabric and fat pipe, PICMG compliant



MicroTCA Infrastructure Products

NATIVE-C1

size

- 1U 19" rack-mounted
- depth: 206 mm

slots

- 6 mid-size AMCs, horizontally-mounted
- 1 full-size MCH for fat pipe support

power supply

- 110-240VAC, 300W or 600W or 900W output, front pluggable, **or**
- -48VDC, 380 or 760W output, front pluggable

cooling units

- 2 redundant hot-swap fan trays for AMCs

backplane configuration

- direct SATA / SAS connections
- single star base fabric and fat pipe, PICMG compliant



NATIVE-C2

size

- 2U 19" rack-mounted
- depth: 206 mm

slots

- 12 mid-size AMCs, horizontally-mounted
- 2 full-size MCHs for fat pipe support

power supply

- 2 power modules
- 110-240VAC, 300W or 600W or 900W output, front pluggable, **or**
- -48VDC, 380 or 760W output, front pluggable

cooling units

- 2 redundant hot-swap fan trays for AMCs

backplane configuration

- direct SATA / SAS connections
- dual star base fabric and fat pipe, either SCOPE or PICMG compliant



NATIVE-R5

size

- 5U, 213,36 mm table top
- depth: 373,3 mm

slots

- 6 double mid-size AMCs
- 1 MCH with fat pipe support
- 6 RTM slots according MTCA.4

power supply

- 110-240VAC, 300W output, front pluggable

cooling units

- 4 fans for AMCs (integrated)
- 2 fans for RTMs (integrated)

backplane configuration

- direct SATA / SAS connections
- single star base fabric and fat pipe, PICMG compliant
- p2p connections at AMC ports 12-15 according to MTCA.4
- trigger, clock and interlock signals



NATIVE-R9

size

- 9U 19" rack-mounted
- depth: 373.3 mm

slots

- 12 single/double width mid-size AMCs
- 2 MCH with fat pipe support
- 12 RTM slots according MTCA.4

power supply

- up to 4 power modules
- 110-240VAC, 300W or 600W or 900W output, front pluggable, **or**
- -48VDC, 380 or 760W output, front pluggable

cooling units

- 2 redundant hot-swap fan trays for AMCs and RTMs

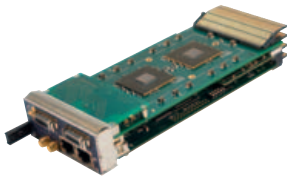
backplane configuration

- direct SATA / SAS connections
- dual star base fabric and fat pipe, PICMG compliant
- p2p connections at AMC ports 12-15 according to MTCA.4
- trigger, clock and interlock signals



MicroTCA

N.A.T. MCH MicroTCA Carrier Hub



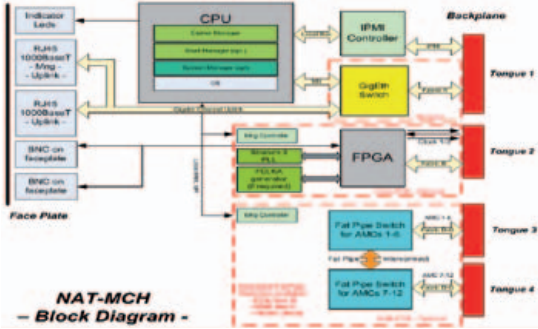
Central management and data switch (GbE, XAUI, SRIO, PCIe) with clock distribution and generation in compact- or mid- or full-size form factor

base-board

- central mgmt. for 1-12 AMCs, 2 CUs, 1-4 PMs
- e-keying, redundancy, load sharing
- on-board and external carrier and shelf managers
- layer 2, non-blocking, low latency GbE switch, supporting VLAN, port base rate control and RSTP (Rapid Spanning Tree Protocol)

clock mezzanine

- on-board Stratum 3/3E type PLL, supporting GPS and telecom frequencies
- source of clock reference configurable from either on-board PLL or any of the 12 AMC or from an external clock via the front panel connectors



fat pipes switch mezzanine

- SRIO (Gen2)
- PCIe (Gen3)
- 1GbE and 10GbE (XAUI)

software support

- configuration via web browser or Command Line Interface (CLI) or scripting
- Java based visualization tool NATview with FRU Editor
- remote management support
- comprehensive debug support

front panel interfaces

- 2x GbE links supporting port trunking
- 2 clock connectors (input and output)
- 2 fat pipe uplinks (CX-4 and SFP+)
- status indicator LEDs for AMCs, CUs, and PMs
- console interface via USB

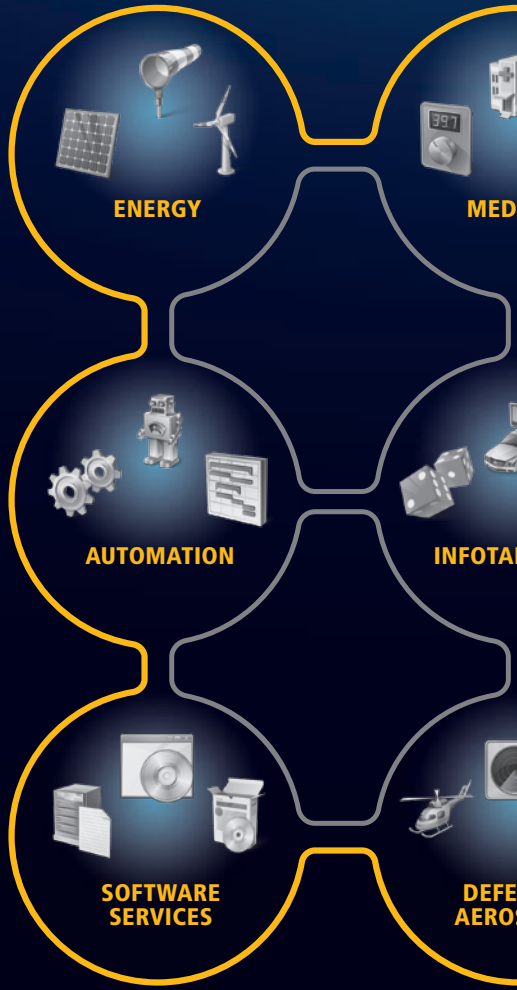
NATview

User friendly graphic tool to view and control the components of the MicroTCA system.

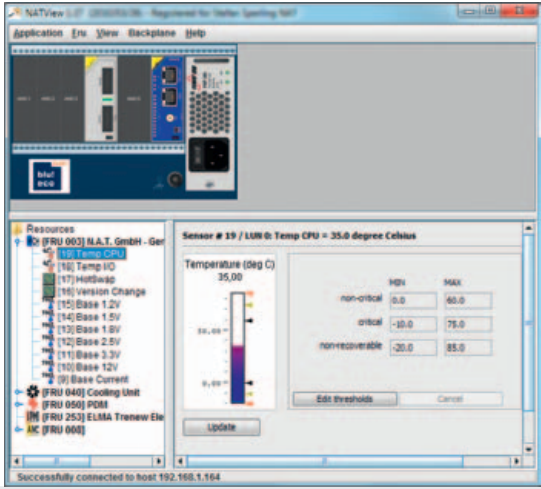
independent of any operating system

supporting key features

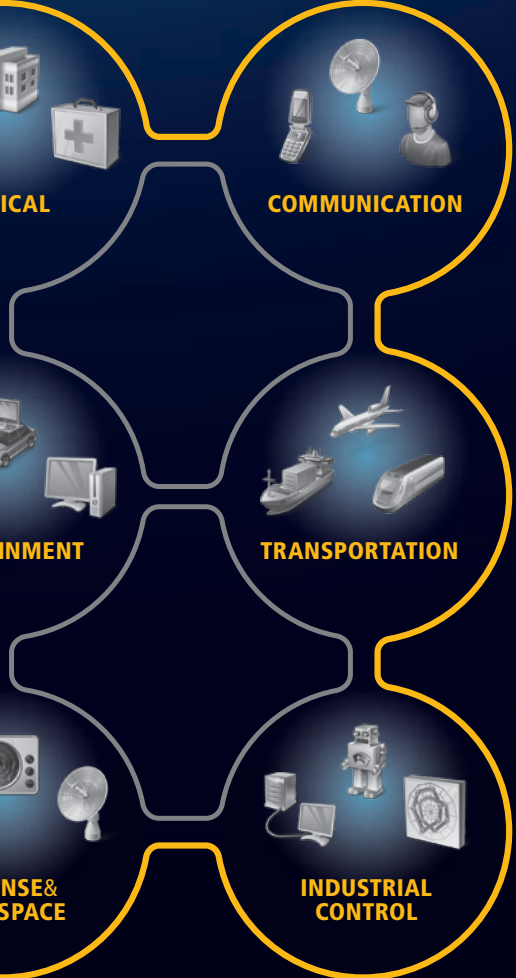
- animation of hot-swap process of AMC modules
- tree structured representation of sensor and actor data including fan speed and temperatures



INNOVATION IN C



- sensor threshold setting
- intelligent alarm monitoring and prioritization
- logging events, alarms
- viewing and editing FRU (Field Replaceable Unit) information via FRU editor
- visual verification of correct FRU information
- visualization of backplane connections
- visualization of established backplane links



COMMUNICATION

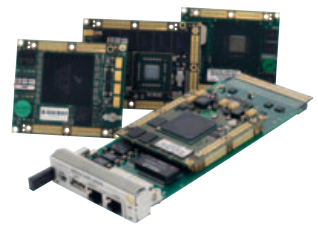
NAMC-8569-CPU



Multi-service, low cost, low power, general purpose PrAMC for 1GbE, PCIe and/or SRIO application providing USB, RS232 and 2x GbE at front panel in mid-size form factor.

- front panel interfaces**
 - GbE, RS232, USB
- backplane interfaces**
 - 2x GbE and either of the following combinations: SRIO x4, PCIe x4, 2x SRIO x1, PCIe x1 and SRIO x1
- on-board**
 - PowerQUICC III MPC8569 (1,3 GHz)
 - Lattice FPGA

NAMC-MPX



Versatile carrier module for MPX compliant mezzanines in mid-size form factor, together with MPX processor module serving as a full featured PrAMC.

- front panel interfaces**
 - 2x GbE, 1x USB
- backplane interfaces**
 - fat pipe: SATA, PCIe, SRIO and XAUI
 - base fabric: 2x GbE
- on-board** (by MPX mezzanines)
 - Freescale PowerPC™**
 - QorIQ™ P1011
 - QorIQ™ P2020
 - PowerQUICC III MPC8548
 - PowerQUICC II Pro MPC8349
 - Intel® Atom™**
 - Intel® Atom™ E6xx

NAMC-QorIQ NAMC-QorIQ-ECO



Powerful packet processing engine in mid-size form factor, designated for today's packet oriented telecom applications like LTE or VoIP.

- front panel interfaces**
 - XAUI (SFP+), 2x GbE, 1x USB, 1x RS232
- backplane interfaces**
 - fat pipe: PCIe, SRIO, or XAUI
 - base fabric: 2x GbE
- on-board**
 - QorIQ™ P3041
 - QorIQ™ P4080
 - QorIQ™ P5020

NAMC-QorIQ-V6



Powerful packet processing engine similar to NAMC-QorIQ but with high-performance FPGA designated for applications requiring extensive multi-processing resources combined with a free programmable data path engine.

- front panel interfaces**
 - XAUI (SFP+), 2x GbE, 1x USB, 1x RS232
- backplane Interface**
 - fat pipe: PCIe, SRIO, or XAUI
 - base fabric: 2x GbE
- on-board**
 - QorIQ™ P3041
 - QorIQ™ P4080
 - QorIQ™ P5020
 - Xilinx Virtex 6 FPGA

Advanced Mezzanine Cards



NAMC-ADSP-8/16

Multi-purpose telecommunication resource board in mid-size form factor for applications with extensive need for voice or data computation.

- **front panel interfaces**
- 8 or 16 LEDs depending on ADSP
- **backplane interfaces**
- GbE, PCIe x1, IPMI
- **on-board**
- 8 or 16ADSP-BF535P (350MHz)
- 32MB SDRAM and 1MB FLASH per DSP
- boot loader via PCI
- I-TDM (1000BX), TDM cross connect

NAMC-STM1/ NAMC-STM4



STM1/SDH or STM4/SDH line interface providing add/drop functionality at DS0 and subrates level including TDM cross connect and I-TDM interworking for termination and monitoring in mid-size form factor.

- **front panel interfaces**
- 2 single or multi mode OC-3 or OC-12 transceivers
- **backplane interfaces**
- 2x GbE, PCIe
- **on-board**
- single or dual add-drop multiplexer for STM1/SDH
- quad add-drop multiplexer for STM4/SDH
- TDM cross connection, TDM to I-TDM interworking

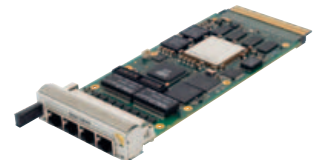
NAMC-8569-ATM



Multi-service ATM board featuring conversion between optical OC-3/STM1 ATM traffic, Ethernet and TDM data designated to connect systems to ATM legacy networks.

- **front panel interfaces**
- OC-3, OC-12, DS3 or Ethernet
- **backplane interfaces (opt.)**
- 2x GbE and either of the following combinations: SRIO x4, PCIe x4, 2x SRIO x1, PCIe x1 and SRIO x1, IPMI
- **on-board**
- PowerQUICC III MPC8569
- AAL1, AAL2 and AAL5 processing engine

NAMC-8569-xE1/T1



Signalling processing engine providing 8 or 16 E1/T1 line interfaces including TDM cross connect and I-TDM interworking in mid-size or full-size form factor.

- **front panel interfaces**
- 8 E1/T1 (mid-size) or 16 E1/T1 (full-size)
- **backplane interfaces**
- 2x GbE and either of the following combinations: SRIO x4, PCIe x4, 2x SRIO x1, PCIe x1 and SRIO x1, IPMI
- **on-board**
- TDM cross connection, TDM to I-TDM interworking
- PowerQUICC III MPC8569
- Firmware: ISDN, SS7

NAMC-xE1/T1



Cost efficient AMC providing 8 or 16 E1/T1 line interfaces including TDM cross connect and I-TDM interworking in mid- or full-size form factor.

- **front panel interfaces**
- 8 E1/T1 (mid-size) or 16 E1/T1 (full-size)
- **backplane interfaces**
- 2x GbE, PCIe
- **on-board**
- TDM cross connection, TDM to I-TDM interworking

N.A.T. Innovation Enabler – the **NATIVE** selection

The **NATIVE-Starter**

The **NATIVE-Starter** is aimed at any application in industry, research, telecommunication and medical, where engineers need to start right away with their development. Being off-the-shelf and application ready it saves time and costs. Its features are:



- table top chassis with integrated cooling and power units
- full-size MCH with 1GbE and fat pipe support for PCIe or XAUI or SRIO
- mid-size Core II Duo processor AMC
- mid-size or full-size AMCs for graphic and HDD
- 3 mid-size or 2 full-size slots for free usage
- AMC extender for own AMC developments

The **NATIVE-RTM**

The **NATIVE-RTM** reflects the latest revision of MicroTCA intended to be used with any application that requires rear transition modules or excessive board space. Its features are:



- xTCA chassis with integrated cooling and power units
- full-size MCH with 1GbE and fat pipe support for PCIe or XAUI or SRIO
- mid-size Core II Duo processor AMC
- mid-size AMC for graphic and HDD
- optional 3 or 9 mid-size slots for free usage
- AMC extender for developments of own AMCs or RTMs

The **NATIVE-COM**

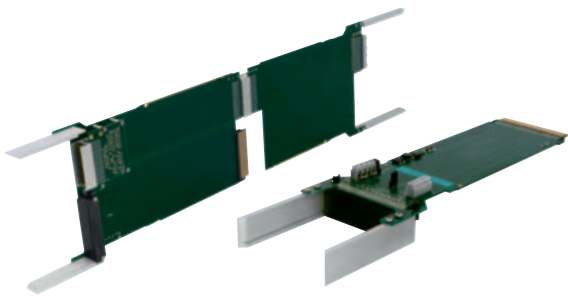
The **NATIVE-COM** is based on 19" technology and targeted at applications requiring key features such as low latency, high bandwidth up to 20Gb/s, multiprocessing and telecom I/Os with the capability to build a redundant system. Further features are:



- 2U chassis with integrated cooling and power units
- full-size MCH with 1GbE and fat pipe support for PCIe or XAUI or SRIO
- mid-size Core II Duo processor AMC
- intelligent and non-intelligent telecom I/Os (opt.)
- AMC extender for own AMC developments

MicroTCA being an open standard individual MTCA systems can be configured by any combination of MTCA components out of the MTCA eco system.

N.A.T. offers adaptors to connect PCI, cPCI, VME, PMC and IP modules to a MTCA system.



NAMC-EXT-RTM/PS **NAMC-EXT/PS** for MTCA.4 for MTCA.0

Both extender kits provide a versatile means to speed up the development process and to trouble shoot AMC cards within an ATCA or MTCA environment.

- **wire bridge** for management and payload power measurements
- **test pads for backplane and RTM signals**
- **pads to connect JTAG equipment**

Variants:

- NAMC-EXT-RTM-PS and NAMC-EXT-PS offer an additional on-board 3.3V power supply for stand-alone operation of AMC



NAMC-PMC

A single-width, mid- or full-size AMC carrier for one PMC module.

- usage of standard off-the-shelf PMC boards in MTCA environments
- deployment of a rich variety of available PMC modules
- extension of PMC product life cycle

About **N.A.T.** (Network and Automation Technology)

N.A.T. is the expert for turn key systems and high performance connectivity products for data and (tele-)communication solutions. The product portfolio is dedicated to the embedded markets such as medical, energy, communication, defense&aerospace, industrial controls, automation, transportation, test&measurement, and research.

Nature | N.A.T. was founded in 1990 with the aim of developing high-performance network solutions. From the beginning the goal has been to base these on an individual combination of hardware and software modules, e.g. the **N.A.T. InnoVation Enabler**, short **NATIVE**, family of products. Constant growth during the last 20 years and substantial knowledge in networking technologies have brought **N.A.T.** to the forefront of the embedded and (tele-)communications market.

Advantage | Comprehensive expertise and solid product quality have made **N.A.T.** the preferred choice for a large number of customers in the domestic and international markets. Based on both standard and customized hardware and software that are designed to traditional **German quality standard**, **N.A.T.** provides a complete product range from board level products up to turn-key systems. "Made in Germany" and **N.A.T.**'s ISO 9001 certified Quality Management System guarantee consistent product quality.

Technology | Our product range is based on common hardware standards such as **AMC, MicroTCA, VME, compactPCI, PMC, PCI/PCIe** and others. **N.A.T.** embedded platforms are complemented by sophisticated protocol stack solutions i.e. **ISDN, SS7, ATM or IP** adapted to common real time operating systems to build an optimal solution.

Make our expertise your solution - talk to us... we care.

N.A.T. GMBH | Konrad-Zuse-Platz 9 | 53227 Bonn | Germany

Fon: +49 228 965 864 0 | Fax: +49 228 965 864 10 | info@nateurope.com | www.nateurope.com

