

## MicroTCA in Real Life



Let Your **Application** benefit

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## MicroTCA.4 Configuration and Maintenance

### Motivation

- Configuration Tools
  - Command Line Interface
  - Java-App
  - Web interface
- Examples of Configurations
  - Ethernet and PCIexpress Configurations
  - Emergency Configuration
- Maintenance Tools
  - Analysis locally: LEDs
  - Analysis remotely: inventory, current, revision
  - Firmware update

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## About N.A.T. Network and Automation Technology

- Founded in 1990, privately owned
- Hard- and Software design and manufacturing
- Focus on **innovation in communication**
- international and worldwide operations
- Headquarters
  - Konrad-Zuse-Platz 9
  - 53227 Bonn
  - Germany
- Presenter:
  - Vollrath Dirksen, vollrath@nateurope.com
  - Heiko Körte, heiko@nateurope.com



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## About N.A.T. Network and Automation Technology



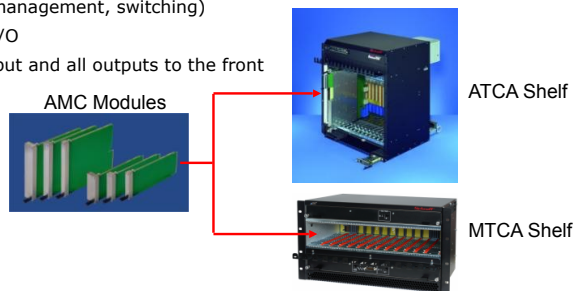
## MicroTCA.4 Configuration and Maintenance

- About N.A.T.
- Comparison of Standards
- Configuration Tools
  - Command Line Interface
  - NATView
  - Web interface
- Examples of Configurations
  - Ethernet and PCIexpress Configurations
  - Emergency Configuration
- Maintenance Tools
  - LEDs
  - Analysis remotely: inventory, current, revision
  - Firmware update

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## AMC Pluggable in ATCA and MTCA Shelf

- The basic idea of MTCA is to have a shelf that contains just AMC modules
- Backplane directly accepts AMC modules
- AMCs are interchangeable between ATCA and MTCA
- The infrastructure of a ATCA Carrier was adapted into the MTCA shelf (power, management, switching)
- No rear I/O
- power input and all outputs to the front



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## Comparison of Standards Differences in latest specs

	VPX	ATCA	MTCA
<b>Common size</b>	<b>3U, 6U</b>	<b>2U, 3U, 12U</b>	<b>1U, 2U, 3U, 5U, 9U</b>
<b>Backplane</b>	passive, switched	passive, switched	passive, switched
<b>topologies</b>	single star, dual star (1/2 switch), full mesh, daisy-chain, ring	dual star, dual-dual star, full meshed	single star, dual star
<b>profiles</b>	yes	no	no
<b>Voltages</b>	MP: 3.3V PP: 3.3V, 5.0V, 12.0V optional: ±3.0V, ±12.0V	MP: 3.3V PP: 48.0V	MP: 3.3V PP: 12.0V
<b>Slot budget (PP)</b>	115W@5V, 384W@12V 768W@48V	400W@48V	80W@12V
<b>Pins per slot</b>	<b>728 (6U), 168 (3U)</b>	<b>234/414</b>	<b>170 (AMC) 260(AMC+RTM)</b>
<b>Link speed (Gbaud)</b>	1.25, 2.5, 5, 6.25, 8.0	1.25, 2.5, 5, 6.25, 8.0	1.25, 2.5, 5, 6.25, 8.0
<b>Link width</b>	<b>x1, x2, x4, x8</b>	<b>x1, x2, x4, x8</b>	<b>x1, x2, x4, x8</b>
<b>Fabrics</b>	GbE, XAUI, PCIe, SRIO	GbE, XAUI, PCIe, SRIO	GbE, XAUI, PCIe, SRIO
<b>Markets</b>	<b>Mil, Aerospace</b>	<b>Mil, Aerospace, core Net</b>	<b>all</b>

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 PICMG is the leading specification development organization in the embedded computer market.



## Markets

Our diverse membership allows PICMG to develop compelling specifications in multiple markets. PICMG technologies are widely used in a broad swath of industries including industrial automation, military/aerospace, transportation, communications, test/measurement, physics/research, energy, medical, and more!

	COM Express	AdvancedTCA	CompactPCI	CompactPCI Serial	HPM	MicroTCA / AMC	SHB
Industrial Automation	X		X	X			X
Gaming	X						
Telecommunications	X	X			X	X	
Aerospace	X		X	X	X	X	
Defense	X	X	X	X	X	X	X
Railway	X		X	X	X	X	
Energy	X		X	X	X	X	X
Medical	X		X	X	X	X	
Test / Measurement	X	X	X	X	X	X	
Physics		X			X	X	X
Drones / UAV	X		X	X	X	X	

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## MicroTCA

### Architectural features - I/II



- simple backplane architecture
  - ✓ reduces costs and risks, is re-useable in future
- all signals at same signal level (MLVDS)
  - ✓ no electrical clash
- switched connections
  - ✓ no blocking transfer
  - ✓ type of backplane connection depends on kind of switch
- all slots managed and controlled
  - ✓ detection of incompatibilities and faults
  - ✓ health management and fault isolation
  - ✓ hot-swap and hot-plug

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## MicroTCA

### Architectural features - II/II



- all data transfer are
  - independent
  - simultaneous
  - bidirectional
- data connections determined by one switch card:
  - **base/common options** fabric: GbE
  - **storage** fabric: SATA
  - **fat pipe** fabric: PCIe or XAUI or SRIO
  - **extended fat pipe** fabric: XAUI or SRIO

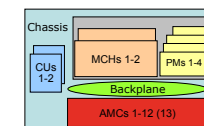
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## MicroTCA Architecture

### Advanced Mezzanine Cards (AMCs)



- AMC eco system
  - single and multi-core CPUs (Intel, Freescale, ARM, etc.)
  - single and multi-core GPP, NPUs, GPGPUs
  - communication line interfaces (E1/T1,SDH,ATM,3G/4G/5G)
  - antenna interfaces (CPRI, OBSAI)
  - FPGAs (Xilinx, Intel-Altera, etc.)
  - DSPs (TI, Freescale, Octasic, etc.)
  - analogue and digital IO (ADCs, DACs, TTLs, etc)
  - industrial busses (EtherCAT, Profibus, CANbus etc.)
  - SSD and HDD storage
  - Carrier Boards (FMC, XMC, PMC, IP)
  - Cross-Link (cPCI, PCIe, PCI)
  - Reference MMC, EMMC, AMC, RTM system
  - Timing Modules



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## MicroTCA.4 Configuration and Maintenance

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- Configuration Tools**
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## JAVA Tool OS independent

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## Your Maintenance Tools Examples of command line interface (CLI)

- sdrrrep\_info - SDR repository information
- sel\_info - System Event Log information
- show\_ekey - Show all activated connections
- show\_fru - Show all FRUs
- show\_fruinfo - fru\_id FRU contents
- show\_cu - Show cooling unit
- show\_pm - Power Module Status
- show\_sensorminfo - Show sensors for FRU
- version - Print firmware version information
- ni - Print network configuration
- history

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## MicroTCA.4 Configuration and Maintenance

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### Examples of Configurations

- Ethernet and PCIexpress Configurations
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## Web Interface Source of IP address

### Change MCH Configuration

MCH global parameter	Configuration
<b>remote interfaces:</b>	
Management interface at GbE port	disabled
RMCP access	enabled
telnet access	enabled
<b>WEB access</b>	
IP address source for management port	no IP address board configuration DHCIP ShM IP link record CM IP link record
IP address source for GbE port	
RMCP session activity timeout minutes	0 min
RMCP session activity timeout seconds	60 sec
default fan level	30 percent
<b>MCH configuration flags:</b>	
enable backward compatibility V2.4	no
Enable alternative cooling scheme	no
Control rear transition module fans	yes
PM Assignment strategy	strict

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## Emergency Shutdown Only switch of the faulty FRU

Shelf manager parameter	Configuration
<b>configuration flags:</b>	
allow shelf FRU invalid	yes
temperature management	disabled FRU on critical event FRU on non recoverable event
emergency shutdown	FRU on non recoverable event
Send SEND_MSG confirmation to SMS	SYSTEM on critical event SYSTEM on non recoverable event
use external shelf manager	no

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## NAT-MCH by N.A.T.

### Setup

- Base Configuration
- Switch BASE MODE
- Age Time
- Port on/off
- Port VLAN
- 802.1Q VLAN
- 802.1X
- 902.1p
- Port Mirroring
- Jumbo Frame
- Link Aggregation
- Rapid Spanning Tree
- Link Status
- BCM5396 counters
- Configure PCIe Virtual Switches

### Maintenance

- Board Information
- System Information
- Reboot NAT-MCH
- Update MCH
- Change Password
- N.A.T. Webpage
- Home

### Port on/off (enable/disable)

Slot	A	A	A	A	A	A	A	A	A	A	A	F	F	U	R	C
Port	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Enable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Apply Discard  
You need to click apply to save your changes.  
The following table will be reloaded by clicking apply.

### Port based VLAN Configuration

Slot	A	A	A	A	A	A	A	A	A	A	F	F	U	R	C
Port	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
AMC1/0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC2/0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC2/1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC3/0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC3/1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC4/0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC4/1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC5/0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC5/1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC6/0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC7/0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AMC7/1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FRT_1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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<b>Ethernet switch parameter</b>	<b>Configuration</b>
configuration source	<input checked="" type="checkbox"/> No configuration <input type="checkbox"/> load from FLASH
Ignore Backplane FRU Info	
<b>Clock module parameter</b>	<b>Configuration</b>
configuration source	no configuration
<b>PCIe parameter</b>	<b>Current Configuration</b>
configuration flags:	
upstream slot power up delay	15 sec
PCIe hot plug delay for AMCs	0 sec
hot plug support	enabled
PCIe early ekey (before payload)	disabled
Use PCIe on MCH-RTM(disable AMC12)	yes
<b>Time Protocol/SNTP parameter</b>	<b>Current Configuration</b>
Time server IP	195 . 145 . 119 . 188
'Check for Time' delay minutes	0 min
'Check for Time' delay hours	0 h
local time offset	1 h
configuration flags:	
SNTP or Time Protocol	Time Protocol
Time client	enabled
<b>DHCP parameter</b>	<b>Current Configuration</b>
Host name	MTC44TRAINING

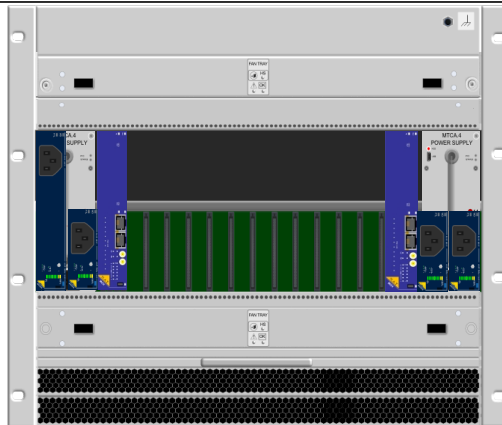
## Configuration and Setting of Multiple MCHs Backup Settings

Backup current configuration settings to the onboard FLASH or an external file, or load settings from the onboard FLASH or an external file.

- Save
- Restore
- Generate
- Upload
- Verify

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## Backplanes with 4 Power Module Sites 1, 2, 3, 4 PMs: Redundancy, Load Sharing



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## NATView Power Configuration Manager Redundancy

Power Channel:	1 MCH1	2 MCH2	3 CU1	4 CU2	5 AMC1	6 AMC2	7 AMC3	8 AMC4	9 AMC5	10 AMC6	11 AMC7
Max. Power Output (mA):	7000	7600	7600	7600	7200	7200	7200	7200	7200	7200	7200
Required Power (mA):	3500	n/a	7600	7600	n/a	7200	n/a	n/a	n/a	800	n/a

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# NATView PCM n+1 Redundancy

Power Configuration Manager

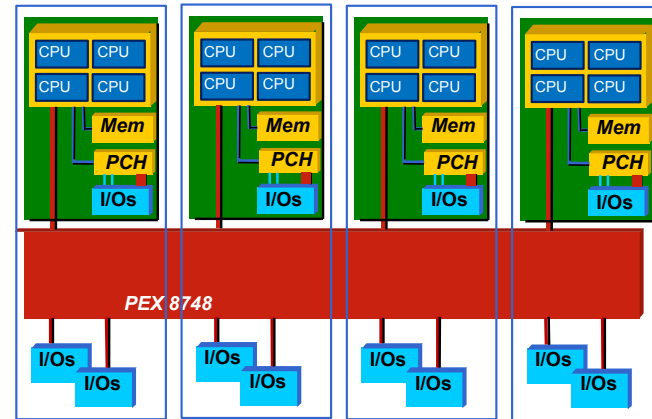
Status: OK

Power Channel:	1 MCH1	2 MCH2	3 CUI1	4 CUI2	5 AMC1	6 AMC2	7 AMC3	8 AMC4	9 AMCS	10 AMC6	11 AMC7
Max. Power Output (mA):	7000	7600	7600	7600	7200	7200	7200	7200	7200	7200	7200
Required Power (mA):	3500	n/a	7600	7600	n/a	7200	n/a	n/a	n/a	800	n/a

PM enable

PM1	PM2	PM3	PM4
sum: 116200 mA max: 50000 mA primary (0)			
	sum: 116200 mA max: 50000 mA primary (0)		
		sum: 116200 mA max: 50000 mA primary (0)	
			sum: 116200 mA max: 50000 mA secondary (1)

# PEX8748 Multi-Host Configuration: up to 6 Cluster



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## NAT-MCH by N.A.T.

Setup

Base Configuration

Switch:

Age Time

Port on/off

Port VLAN

802.1Q VLAN

802.1X

802.1p

Port Mirroring

Jumbo Frame

Link Aggregation

Rapid Spanning Tree

Link Status

BCMS396 counters

Configure PCIe Virtual Switches

Maintenance

Board Information

System Information

Reboot NAT-MCH

Update MCH

Change Password

N.A.T. Webpage

Home

### PCIe Virtual Switch configuration

Select Host AMCs (Upstream) for each virtual switch that shall be enabled first.  
Select Host AMCs (Non-Transparent Upstream) for each virtual switch that shall be enabled afterwards.  
Select which AMCs shall be connected to each virtual switch as downstream in the end.

Virtual Switch	Upstream AMC	NT- Upstream AMC	A M C 1	A M C 2	A M C 3	A M C 4	A M C 5	A M C 6	A M C 7
none			4.7	4.7	4.7	4.7	4.7	4.7	4.7
Virtual Switch 0	RTM	none							
Virtual Switch 1	AMC6_4								
Virtual Switch 2	none								
Virtual Switch 3	none								
Virtual Switch 4	none								
Virtual Switch 5	none								
Max. Link Speed			8.0 GT/s	8.0 GT/s	8.0 GT/s	8.0 GT/s	8.0 GT/s	8.0 GT/s	8.0 GT/s

Note: You need to click apply before you can save your changes to EEPROM.

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# PCIexpress Configuration Command Line Interface

```

nat> mchcfg
MCH CFG: configuration modes
[ 2 ] reset to defaults
[ 9 ] modify PCIe configuration
Enter configuration mode (RET=0/0x0): 9
PCIe parameter:
-----
PCIe Virtual Switch configuration
change via web-interface
VS # | Host | NT-Host | Members
0 | RTM | none | AMC01_4 AMC02_4 AMC03_4 AMC04_4 AMC05_4 AMC07_4 AMC12_4
1 | AMC06_4 |
Upstream slot power up delay: 15 sec
PCIe hot plug delay for AMCs: 0 sec
PCIe configuration flags:
hot plug support: enabled
PCIe early ekey (before payload): disabled
'no ekey' for PCIe: disabled
PCIe clustering: enabled
    
```

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## MicroTCA.4 Configuration and Maintenance

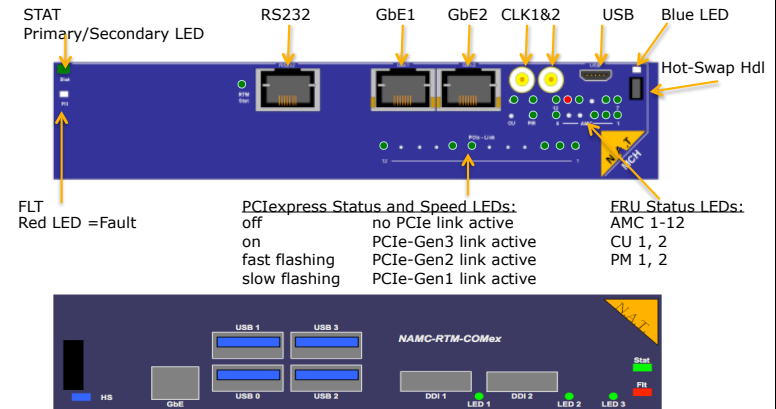
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### Maintenance Tools

- Analysis locally: LEDs
- Analysis remotely: inventory, current, revision
- Firmware update

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## Analysis locally LEDs



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## Analysis remotely: Webinterface Complete Systeminformation in seconds

- Complete System Information output of the following commands collected in text file:
  - history, version, bi, mch, show\_pm, show\_sensor\_info for all FRU-IDs
  - show\_fruinfo 253 (backplane)
  - show\_ekey, show\_link\_state, .....

Setup

NAT-MCH System Information

Show MCH Configuration

Change MCH Configuration

Switch

General settings

Port VLAN

802.1Q VLAN

802.1X

802.1P

Port Mirroring

Jumbo Frame

Link Aggregation

Rapid Spanning Tree

Link Status

BCM5396 counters

Configure PCIe Virtual Switches

Maintenance

Backup Settings

System Information

Web Interface Release: V1.27 Final (12-01-19 Jun 26 2014)

collecting information about your system please wait ...

Please download file(s) below and attach them to your support request

nat\_mch\_sysinfo.txt

\*\*\*\*\* End of History Buffer \*\*\*\*\*

\*\*\*\*\* Version Information \*\*\*\*\*

\*\*\*\*\* Board Information \*\*\*\*\*

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## Analysis remotely Ethernet Link Status

Setup

Base Configuration

Switch

Age Time

Port on/off

Port VLAN

802.1Q VLAN

802.1X

802.1p

Port Mirroring

Jumbo Frame

Link Aggregation

Rapid Spanning Tree

Link Status

BCM5396 counters

Configure PCIe Virtual Switches

Maintenance

Board Information

System Information

Reboot NAT-MCH

Update MCH

Change Password

N.A.T. Webpage

Home

Web Interface Release: V1.30 Final (11.05.04 Nov 26 2014)

Link States of Ethernet Connections

Slot	A	A	A	A	A	A	A	A	A	A	A	A	F	F	U	R	C
Port	1	2	2	3	3	4	4	5	5	6	7	7	1	2	B	M	U
Links	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	DIS	EN	EN	EN

Legend:

- Link is up
- Link is down
- EN - Interface is enabled
- DIS - Interface is disabled

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## Analysis Remotely: CLI inventory, max. current, actual power consumption



- **show\_fru**

```
FRU Information:
-----
```

FRU	Device	State	Name
0	MCH	M4	NMCH-CM
3	mcmc1	M4	NAT-MCH-MCMC
6	AMC2	M4	SIS8300
7	AMC3	M1	NAMC-LM
8	AMC4	M4	TAMC220-10
9	AMC5	M4	TAMC651
10	AMC6	M1	CCT AM 310/302
40	CU1	M4	Schroff uTCA CU
50	PM1	M4	NAT-PM-AC600
60	Clk1	M4	MCH-Clck
61	Hub1	M4	MCH-PCIE
64	RTM1	M4	MCH-RTM-ComEx
93	RTM4	M1	TAMC220-RTM

```
-----
```

- **show\_pm**

- **show\_sensorinfo 50**

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```
nat> show_pm
```

```
-----
PM1: - online, primary(fru 50) : budget 50.0 A (alloc 23.5 A
avail 26.5 A)
PM2: - unknown
PM3: - unknown
PM4: - unknown
```

```
-----
```

chan	FRU	FruId	primPM	secPM	PS1	POn	ENA	MP	PP	Amps
1	MCH1	3	1	-	Y	Y	Y	Y	Y	5.5
2	MCH2	4	-	-	-	-	-	-	-	-
3	CU1	40	1	-	Y	-	Y	Y	Y	4.5
4	CU2	41	-	-	-	-	-	-	-	-
5	AMC1	5	1	-	-	-	-	-	-	-
6	AMC2	6	1	-	Y	-	Y	Y	Y	5.0
7	AMC3	7	1	-	Y	-	Y	Y	Y	(overcurrent)
8	AMC4	8	1	-	Y	-	Y	Y	Y	4.5
9	AMC5	9	1	-	Y	-	Y	Y	Y	4.5
10	AMC6	10	1	-	Y	-	Y	Y	Y	-
11	AMC7	11	-	-	-	-	-	-	-	-
12	AMC8	12	-	-	-	-	-	-	-	-
13	AMC9	13	-	-	-	-	-	-	-	-
14	AMC10	14	-	-	-	-	-	-	-	-
15	AMC11	15	-	-	-	-	-	-	-	-
16	AMC12	16	-	-	-	-	-	-	-	-

```
-----
```

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```
nat> show_sensorinfo 50
```

```
Sensor Information for FRU 50 / PM1
```

```
-----
```

#	SDRType	Sensor	Entity	Inst	Value	State	Name
30	MDevLoc		0x0a	0x61			NAT-PM-AC600
1	Full	Temp	0x0a	0x61	33 C	ok	T_CPU
2	Full	Temp	0x0a	0x61	48 C	ok	T_XFrm
3	Full	Temp	0x0a	0x61	35 C	ok	T-PSB
4	Full	Temp	0x0a	0x61	54 C	ok	T-PFC1
5	Full	Temp	0x0a	0x61	49 C	ok	T-REC
6	Full	Voltage	0x0a	0x61	264 V	ok	VINAC
7	Full	Voltage	0x0a	0x61	444 V	ok	VINDC
8	Full	Voltage	0x0a	0x61	12.4 V	ok	12V
9	Full	Voltage	0x0a	0x61	3.4 V	ok	3.3V
10	Full	Current	0x0a	0x61	5.50 A	ok	I_Sum
11	Compact	Current	0x0a	0x61	2.20 A	ok	I_CH01
12	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH02
13	Compact	Current	0x0a	0x61	0.50 A	ok	I_CH03
14	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH04
15	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH05
16	Compact	Current	0x0a	0x61	2.20 A	ok	I_CH06
17	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH07
18	Compact	Current	0x0a	0x61	0.30 A	ok	I_CH08
19	Compact	Current	0x0a	0x61	0.30 A	ok	I_CH09
20	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH10
21	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH11
22	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH12

## MTCA.4 Debugging E-Keying



- **show\_ekey**

```
EKeying information - activated Links:
```

```
-----
```

AMC	FRU	State	Channel	Type	Port
AMC1	5	M4	0	PCIe	4 <-> MCH1 Fabric D downstream Gen 1, no SSC
					5 <-> MCH1 Fabric E downstream Gen 1, no SSC
					6 <-> MCH1 Fabric F downstream Gen 1, no SSC
					7 <-> MCH1 Fabric G downstream Gen 1, no SSC
AMC2	6	M4	0	PCIe	4 <-> MCH1 Fabric D downstream Gen 1, no SSC
					5 <-> MCH1 Fabric E downstream Gen 1, no SSC
					6 <-> MCH1 Fabric F downstream Gen 1, no SSC
					7 <-> MCH1 Fabric G downstream Gen 1, no SSC
AMC3	7	M4	0	PCIe	4 <-> MCH1 Fabric D downstream Gen 1, no SSC
					5 <-> MCH1 Fabric E downstream Gen 1, no SSC
					6 <-> MCH1 Fabric F downstream Gen 1, no SSC
					7 <-> MCH1 Fabric G downstream Gen 1, no SSC

```
.....
```

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# MTCA.4 Debugging

## Result of PCIexpress Training



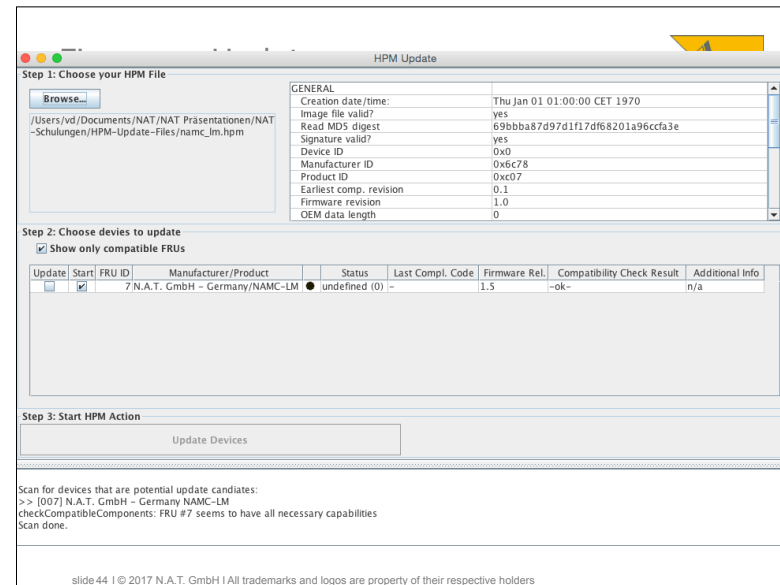
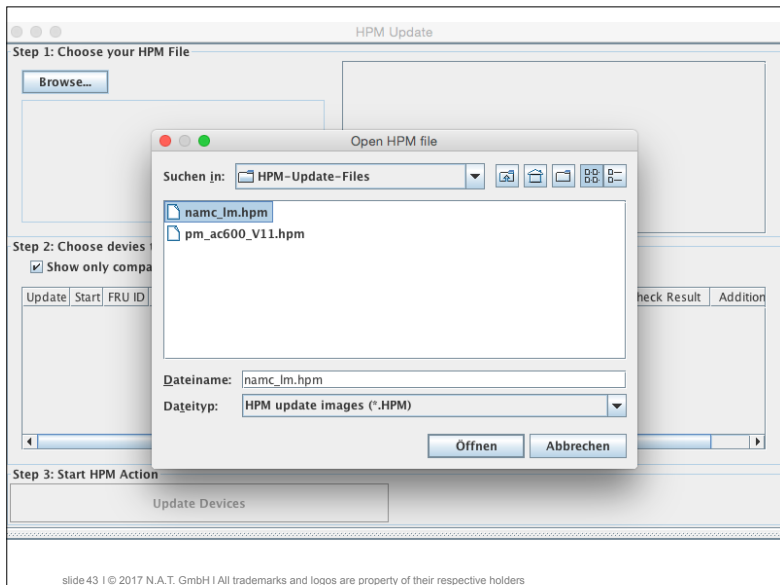
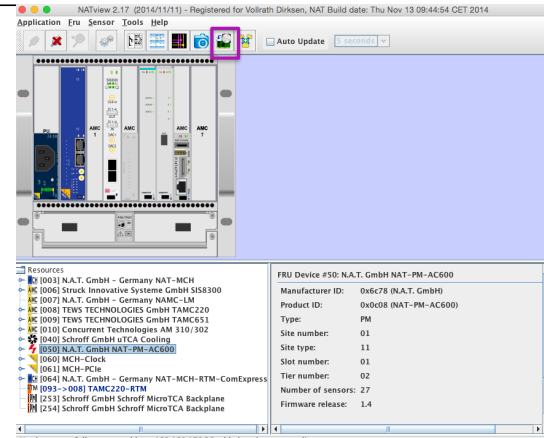
- show\_link\_state

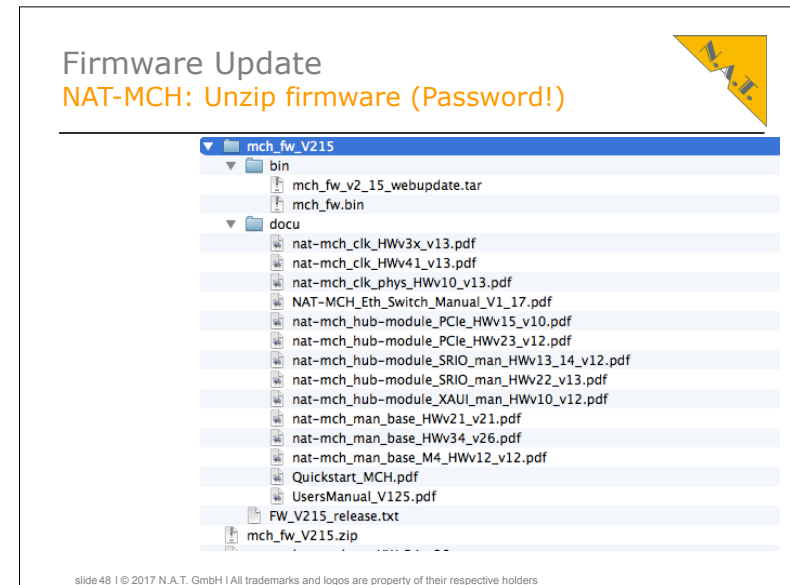
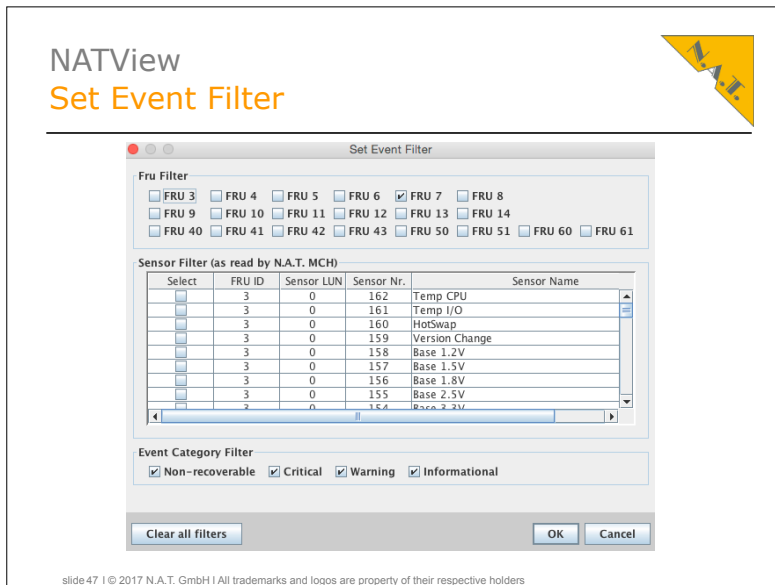
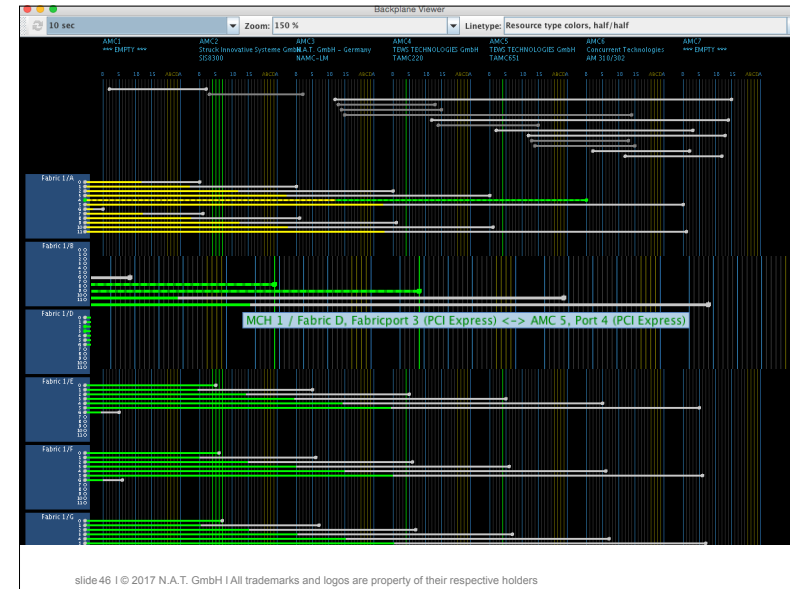
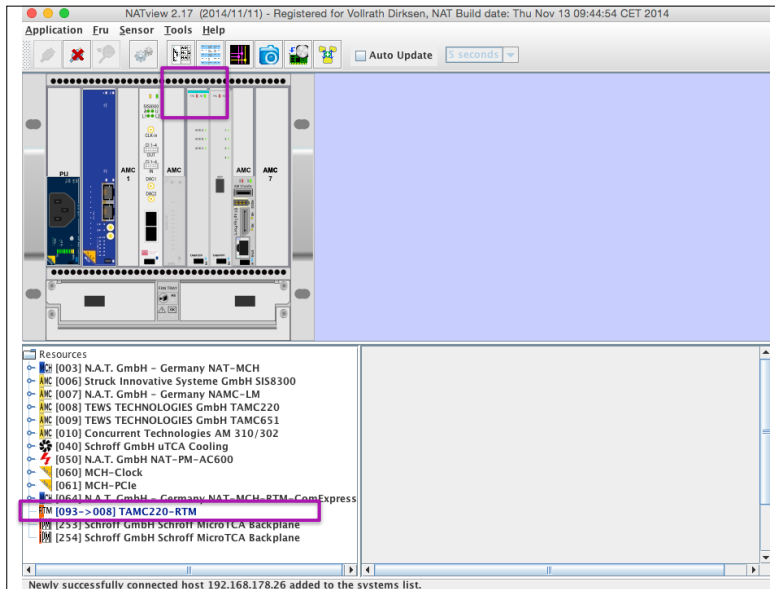
```

AMC 1 Port 4 is PCIe - x4 - 2,5 GT/s
AMC 1 Port 5 is PCIe - x4 - 2,5 GT/s
AMC 1 Port 6 is PCIe - x4 - 2,5 GT/s
AMC 1 Port 7 is PCIe - x4 - 2,5 GT/s
AMC 2 Port 4 is PCIe - x4 - 2,5 GT/s
AMC 2 Port 5 is PCIe - x4 - 2,5 GT/s
AMC 2 Port 6 is PCIe - x4 - 2,5 GT/s
AMC 2 Port 7 is PCIe - x4 - 2,5 GT/s
AMC 3 Port 4 is PCIe - x4 - 2,5 GT/s
AMC 3 Port 5 is PCIe - x4 - 2,5 GT/s
AMC 3 Port 6 is PCIe - x4 - 2,5 GT/s
AMC 3 Port 7 is PCIe - x4 - 2,5 GT/s
AMC 4 Port 4 is PCIe - x4 - 2,5 GT/s
AMC 4 Port 5 is PCIe - x4 - 2,5 GT/s
AMC 4 Port 6 is PCIe - x4 - 2,5 GT/s
AMC 4 Port 7 is PCIe - x4 - 2,5 GT/s
local RTM link status:
Ethernet - 1000Base-BX
PCIe - x16 - 8 GT/s
    
```

# Firmware Update of all System Components

## Easy with NATview Firmware-Update-Function





## MCH Firmware Update Web Interface

**Setup**

**Base Configuration**  
Switch BASE 1GBE  
Age Time  
Port on/off  
Port VLAN  
802.1Q VLAN  
802.1X  
802.1p  
Port Mirroring  
Jumbo Frame  
Link Aggregation  
Rapid Spanning Tree  
Link Status  
BCM5396 counters  
Configure PCIe Virtual Switches

**Maintenance**  
Board Information  
System Information  
Reboot NAT-MCH  
**Update MCH**  
Change Password  
N.A.T. Webpage  
Home

**Firmware Update for NAT-MCH**

• Upload TAR archive for NAT-MCH:

Select file:  |

**Notes:**  
Select only a .tar-file here, do not select a .zip or .bin file.  
After clicking Upload you can select the components to be updated.

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## MCH Firmware Update Web Interface

Device	Current FW version	Update FW version	Update this device?
<b>Base board</b>			
Firmware	V2.15	V2.16	<input checked="" type="checkbox"/>
<b>Clock module</b>			
<b>Hub module</b>			
PCIe Atmel	V1.9	V1.9	<input type="checkbox"/>
PCIe HUB Module FPGA	V1.5	V1.5	<input type="checkbox"/>

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## MicroTCA.4 Configuration and Maintenance

- About N.A.T.
- **Comparison of Standards**
- **Configuration Tools**
  - Command Line Interface
  - Java-App
  - Web interface
- **Examples of Configurations**
  - Ethernet and PCIeexpress Configurations
  - Emergency Configuration
- **Maintenance Tools**
  - Analysis locally: LEDs
  - Analysis remotely: inventory, current, revision
  - Firmware update

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## It is time ... to change your Computing Platform!



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Thank you very much!  
Questions?



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**MTCA.4 Training:**

<https://techlab.desy.de/services/training/>

[www.nateurope.com/services/support.html](http://www.nateurope.com/services/support.html)