Get Started
& Basic Debug of a System

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- Front Panel of MCH
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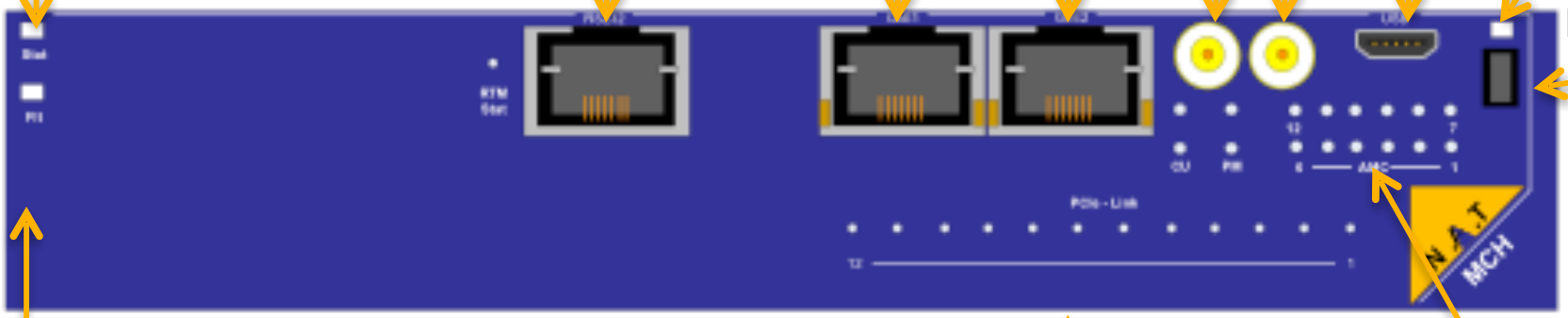
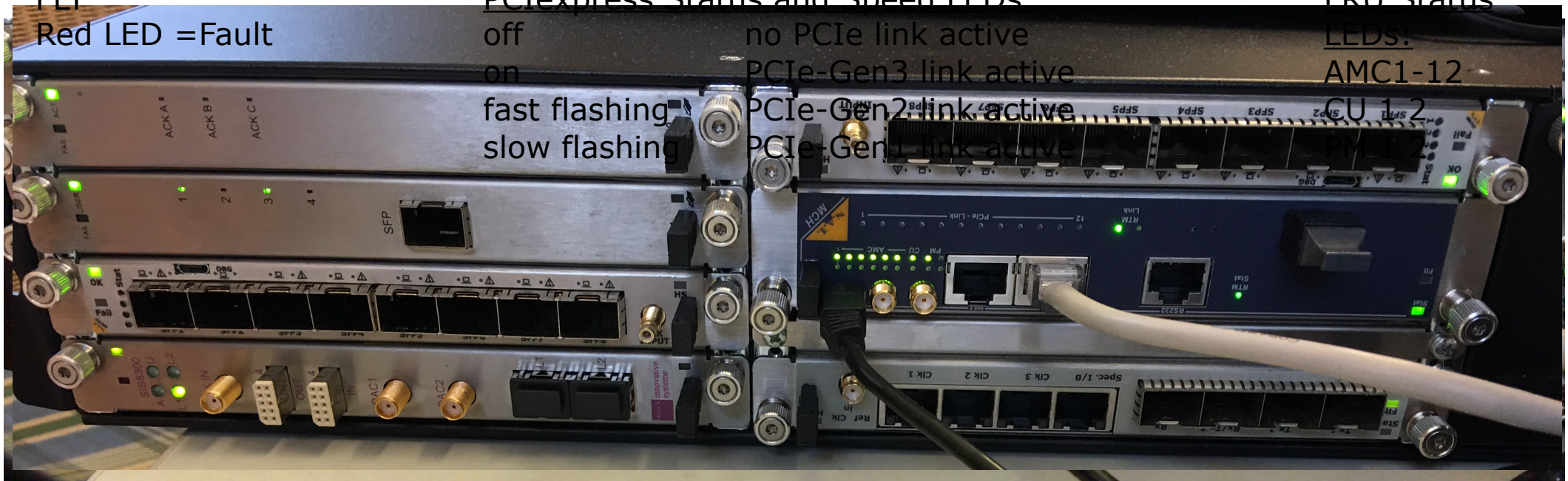
  - see PCIe Switch, see PCIe endpoints
- Webinterface
  - check PCIe link
  - check PCIe configuration
- Command Line Interface
  - show_link_state
  - show_fru
  - show_pm
  - show_sensorinfo 40, show_sensorinfo 50

Power-Status, PCIe-Link-Status

LEDs at Front Panel of MCH





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Ubuntu Desktop
De
10:53
NAT_documents
NAT documents updating via Filezilla
NAT-minicom-dev-ttyACM0-19200
NAT-Telnet
NATview licensed
NATview unlicensed
NAT-Webserver
Start PDE.sh
show_fru
Show_must_go_on
NAT-MCH_ Commands
tar
mch_fw_2_20_1m_ webupdate.tar

Does Linux see PCIe devices?
lspci -v, sudo lspci -v, lspci -s, lspci -t

sudo lspci

[sudo] password for nat:

Does Linux see PCIe devices?
lspci -s, lspci -t

nat@nat-bCOM6:~$ **lspci -s 03:00.0**
03:00.0 Communication controller: Research Centre Juelich Device 0018

Does Linux see PCIe devices?
lspci -s, lspci -t

nat@nat-bCOM6:~$ sudo **lspci -s 04:00.0 -vvv**
[sudo] password for nat:
04:00.0 Signal processing controller: Xilinx Corporation Device 0038 (rev 03)
	Subsystem: Xilinx Corporation Device 0007
	Physical Slot: 3
	Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DisINTx-
	Status: Cap+ 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort- >SERR- <PERR- INTx-
	Latency: 0, Cache Line Size: 64 bytes
	Interrupt: pin A routed to IRQ 10
	Region 0: Memory at f4000000 (32-bit, non-prefetchable) [size=16M]
	Region 1: Memory at f3000000 (32-bit, non-prefetchable) [size=16M]
	Region 2: Memory at f5010000 (32-bit, non-prefetchable) [size=64K]
	Region 3: Memory at f5000000 (32-bit, non-prefetchable) [size=64K]
	Capabilities: [40] Power Management version 3
		Flags: PMEClk- DSI- D1- D2- AuxCurrent=0mA PME(D0+,D1+,D2+,D3hot+,D3cold-)
		Status: D0 NoSoftRst+ PME-Enable- DSel=0 DScale=0 PME-
	Capabilities: [48] MSI: Enable- Count=1/1 Maskable- 64bit+
		Address: 0000000000000000 Data: 0000
	Capabilities: [60] Express (v2) Endpoint, MSI 00
		DevCap:	MaxPayload 1024 bytes, PhantFunc 0, Latency L0s <64ns, L1 <1us
			ExtTag- AttnBtn- AttnInd- PwrInd- RBE+ FLReset-
		DevCtl:	Report errors: Correctable- Non-Fatal- Fatal- Unsupported-
			RlxdOrd- ExtTag- PhantFunc- AuxPwr- NoSnoop+
			MaxPayload 128 bytes, MaxReadReq 512 bytes

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NAT-MCH by N.A.T.

Setup

- Base Configuration
- JSM
- 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
  - Serdes/SGMII
  - Link Status
  - BCM5396 counters
- Switch PCIe x80
  - PCIe Virtual Switches
  - Error Counters
  - Link Status

Maintenance

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

Welcome to the HTML based NAT-MCH configuration tool.

Setup Functions:

Base Configuration:	- Changes Base Configuration.
Age Time:	- MAC Table setup: set the aging of the MAC Table Entries.
Port VLAN:	- Port based VLAN setup and port enable/disable.
802.1Q VLAN:	- 802.1Q VLAN setup.
802.1X:	- 802.1X security setup.
802.1p:	- 802.1p Quality of Service setup.
Port Mirroring:	- Mirroring of the inbound and outbound traffic on a port
Jumbo frames:	- Support of the Jumbo frames on a port
Link Aggregation:	- Support of up to four the Link Aggregation groups
Rapid Spanning	- Support of the Rapid Spanning Tree by 1GbE-Switch
IGMP Snooping	- Support of the IGMP Snooping by 10GbE-Switch (FM4000 only)
Link Status:	- Show the current status of the Ethernet links
Counter Statistic:	- Show the counter statistic of the Ethernet switch

Maintenance Functions:

Script Management:	- Backup/Restore settings to/from flash memory or file.
Board Information:	- Provides hardware information of this NAT-MCH.
System Information:	- Collect hardware information of this system.
Reboot NAT-MCH:	- Allows rebooting over the Web-Interface.
Update MCH:	- Allows updating several components over the Web-Interface.
Change/Reset Password:	- Allows changing or resetting of the MCH Password over the Web-Interface.
N.A.T. Webpage:	- Opens the N.A.T. webpage in a new browser window.
Home:	- Shows this page.

MCH Configuration

192.168.1.144/index.asp

You must log in to this network before you can access the Internet. Open Network Login Page

NAT-MCH by N.A.T.

Setup

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Link States of Ethernet Connections

Slot	AMC1	AMC1	AMC2	AMC2	AMC3	AMC3	AMC4	AMC4	AMC5	AMC5	AMC6	AMC6	FRT1	FRT2	UPDB	RTMB	CPU1
Port	0	1	0	1	0	1	0	1	0	1	0	1	-	-	-	-	-
Links	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	DIS	EN	EN	EN

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

MCH Configuration

192.168.1.144/index.asp

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PCIe Link Status Menu

	AMC1	AMC2	AMC3	AMC4	AMC5	AMC6	OPT1	RTM
	4..11	4..11	4..11	4..11	4..11	4..11		
	x1	x1	x4	x4	x4	x1	-	x16
Link Speed	2.5 GT/s	2.5 GT/s	2.5 GT/s	2.5 GT/s	2.5 GT/s	2.5 GT/s	-	8 GT/s

MCH Configuration

192.168.1.144/index.asp

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NAT-MCH by N.A.T.

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	AMC4		AMC3	
	8..11	4..7	8..11	4..7
○	x4	x4	x4	x4
○	x4	x4	x8	
○	x8		x4	x4
●	x8		x8	
○	x16			

	AMC6		AMC5	
	8..11	4..7	8..11	4..7
○	x4	x4	x4	x4
○	x4	x4	x8	
○	x8		x4	x4
●	x8		x8	
○	x16			

	AMC1		AMC2	
	8..11	4..7	8..11	4..7
○	x4	x4	x4	x4
○	x4	x4	x8	
○	x8		x4	x4
●	x8		x8	
○	x16			

Apply Discard

Note: You need to click apply before you to configure new width of links.

PCIe Virtual Switch configuration

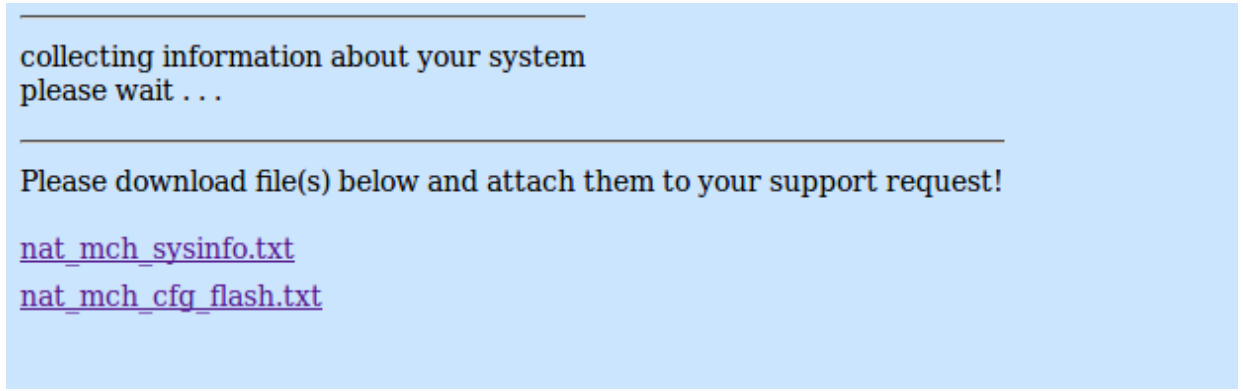
Select Host AMCs (Upstream) for each virtual switch that shall be enabled first.
Select Host AMCs (Non-Transparent Upstream) for each virtual switch that shall be enabled afterwards.
Select which AMCs shall be connected to each virtual switch as downstream in the end.

			AMC1	AMC2	AMC3	AMC4	AMC5
			4..11	4..11	4..11	4..11	4..11
Link Width			x8	x8	x8	x8	x8
Virtual Switch	Upstream AMC	NT-Upstream AMC					
none			○	○	○	○	○
0	RTM	- none -	●	●	●	●	●
1	OPT1		○	○	○	○	○
2	- none -		○	○	○	○	○

Fix your Problem as Non-Expert

Help your Support and Avoid Tons of Emails

- How to make a backtrace?
- How to list your configuration?
- How to list all your components including serial number, version?
- How to note all the sensor values?
- How to show the error and warning messages?
- How to show the interconnection of your backplane?



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NAT-MCH System Information

---

collecting information about your system
please wait . . .

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

nat_mch_sysinfo.txt

nat_mch_cfg_flash.txt

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  - show_fru
  - show_pm
  - show_sensorinfo 40, show_sensorinfo 50

Link Width Configuration

	AMC4		AMC3	
	8..11	4..7	8..11	4..7
○	x4	x4	x4	x4
○	x4	x4	x8	
○	x8		x4	x4
◉	x8		x8	
○	x16			

	AMC6		AMC5	
	8..11	4..7	8..11	4..7
○	x4	x4	x4	x4
○	x4	x4	x8	
○	x8		x4	x4
◉	x8		x8	
○	x16			

	AMC1		AMC2	
	8..11	4..7	8..11	4..7
○	x4	x4	x4	x4
○	x4	x4	x8	
○	x8		x4	x4
◉	x8		x8	
○	x16			

Apply Discard

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			AMC1	AMC2	AMC3	AMC4	AMC5	AMC6	RTM	OPT1
			4..11	4..11	4..11	4..11	4..11	4..11		
Link Width			x8	x8	x8	x8	x8	x8	x16	x8
Virtual Switch	Upstream AMC	NT-Upstream AMC								
none			○	○	○	○	○	○	○	○
0	RTM	- none -	◉	◉	◉	◉	◉	◉	◉	○
1	OPT1		○	○	○	○	○	○	○	◉
2	- none -		○	○	○	○	○	○	○	○
3	- 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	8.0 GT/s

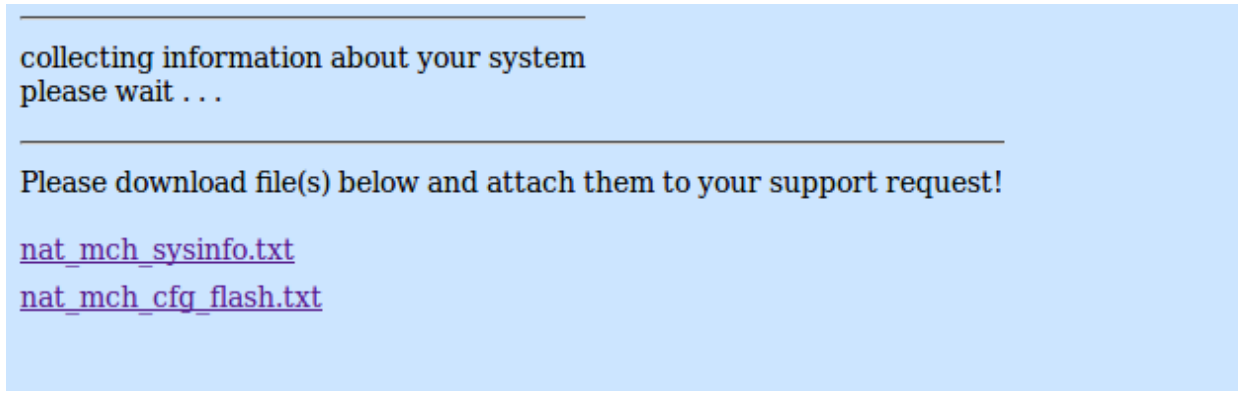
Apply

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

Save **current configuration to PCIe EEPROM**

Fix your Problem as Expert
Key commands

- `sdrrep_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_sensorinfo` - Show sensors for FRU**
- `version` - Print firmware version information
- `ni` - Print network configuration
- **`history`**



Fix your Problem as Expert

putty/minicom USB, or ssh/telnet MCH-IP-Address

nat@nat-bCOM6: **telnet 192.168.1.41** or telnet msk_mch_4

```
nat> show_fru

FRU Information:
----------------
 FRU  Device   State  Name
=========================================
  0   MCH       M4    NMCH-CM
  3   mcmc1     M4    NAT-MCH-MCMC

  5   AMC1      M4    TAMC220-10
  6   AMC2      M4    TAMC651
  7   AMC3      M4    DAMC-TCK7
  8   AMC4      M4    SIS8300
  9   AMC5      M4    DAMC-TCK7
 10   AMC6      M4    X2TIMER

 40   CU1       M4    Schroff uTCA CU
 50   PM1       M4    NAT-PM-AC600D

 60   Clock1    M4    MCH-Clock
 61   HubMod1   M4    MCH-PCIe
```

```
nat> show_pm
-------------------------------------------------------------------
PM1: - online, primary(fru 50)    : budget 50.0 A (alloc 39.9 A avail 10.1 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   6.0
  2   MCH2     4   -       -
  3    CU1    40   1       -      y    -    y    y    y   4.0
  4    CU2    41   1       -      -    -    -    -    -
  5   AMC1     5   1       -      y    -    y    y    y   4.0
  6   AMC2     6   1       -      y    -    y    y    y   4.5
  7   AMC3     7   1       -      y    -    y    y    y   6.5
  8   AMC4     8   1       -      y    -    y    y    y   5.0
  9   AMC5     9   1       -      y    -    y    y    y   6.5
 10   AMC6    10   1       -      y    -    y    y    y   3.4
 11   AMC7    11   -       -
 12   AMC8    12   -       -
 13   AMC9    13   -       -
 14  AMC10    14   -       -
 15  AMC11    15   -       -
 16  AMC12    16   -       -
|-----------------------------------------------------------------|
```

```
nat> show_fruinfo 7
----------------------------------------
FRU Info for device 7:
----------------------------------------
Common Header    : 0x01 0x01 0x00 0x04 0x0b 0x15 0x00 0xda
----------------------------------------
Internal Use Area : 0x01 0x03 0x00 0x00 0x00 0x00 0x00 0x00
----------------------------------------
Chassis Info Area : -
----------------------------------------
Board Info Area          : at offs=32, len=56
Manufacturer(08)         : NAT/DMCS
Board Name(09)           : NAMC-TCK7
Serial Number(12)        : D88039D52384
Part Number(03)          : 1.0
FRU file ID(10)          : 2017-07-26
----------------------------------------
Product Info Area        : at offs=88, len=80
Manufacturer(08)         : NAT/DMCS
Product Name(09)         : NAMC-TCK7
Product Number(03)       : 1.0
Part Version(04)         : 2.2B
Product Serial Number(12): D88039D52384
Asset Tag(21)            : D.Makowski_2017.07.26
FRU file ID(10)          : 2017-07-26
----------------------------------------
Multi Record Area  : at offs=168

Record(0): Type ID=0xc0, PICMG Record ID=0x16, offset=0x000, len=11
```

nat> **show_sensorinfo 50**

Sensor Information for FRU 50 / **PM1**

#	SDRType	Sensor	Entity	Inst	Value	State	Name
-	MDevLoc		0x0a	0x61			**NAT-PM-AC600D**
1	Full	Temp	0x0a	0x61	39 C	ok	T_CPU
2	Full	Temp	0x0a	0x61	52 C	ok	T_XFrm
4	Full	Temp	0x0a	0x61	39 C	ok	T-PSB
5	Full	Temp	0x0a	0x61	51 C	ok	T-PFC
6	Full	Temp	0x0a	0x61	49 C	ok	T-REC
7	Full	Voltage	0x0a	0x61	230 V	ok	VINAC
8	Full	Voltage	0x0a	0x61	386 V	ok	VINDC
9	Full	Voltage	0x0a	0x61	12.4 V	ok	12V
10	Full	Voltage	0x0a	0x61	3.5 V	ok	3.3V
11	Full	Current	0x0a	0x61	**11.00 A**	**ok**	**I_Sum**
12	Compact	Current	0x0a	0x61	3.75 A	ok	I_CH01
13	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH02
14	Compact	Current	0x0a	0x61	0.40 A	ok	I_CH03
15	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH04
16	Compact	Current	0x0a	0x61	0.35 A	ok	I_CH05
17	Compact	Current	0x0a	0x61	0.25 A	ok	I_CH06
18	**Compact**	**Current**	**0x0a**	**0x61**	**1.45 A**	**ok**	**I_CH07**
19	Compact	Current	0x0a	0x61	2.40 A	ok	I_CH08
20	Compact	Current	0x0a	0x61	1.15 A	ok	I_CH09
21	Compact	Current	0x0a	0x61	1.35 A	ok	I_CH10
22	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH11
23	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH12

Fix your Problem as Expert

putty/minicom USB, or ssh/telnet MCH-IP-Address

```
nat> show_cu
System has 1 Cooling Unit(s)
-----------------------------------------------
Site  FRU   i2c    MIN  NORM  MAX   Level
 CU1  40    0xa8   0    3     15    4(26%)
-----------------------------------------------

Triggered Temperature Sensors
-----------------------------------------------
 FRU   SenNum  Thresh   Sensor Name
-----------------------------------------------
-----------------------------------------------
```

Summary
& Basic Debug of a System

- No Tools
  - Watch LEDs
- Non-Expert
  - lspci
  - NAT-MCH Web Interface
    - GbE-Links, PCIe Links
    - System Information File
- Expert
  - NAT-MCH Web- Interface
    - MCH configuration
    - PCIe setup
    - MCH Command Line interface
      - show_link_state, show_ekey
      - show_fru, show_fruinfo
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