MTCA.4 Workshop :

Easy Power Redundancy and Load Sharing Configuration of MTCA.4 System

Vollrath Dirksen
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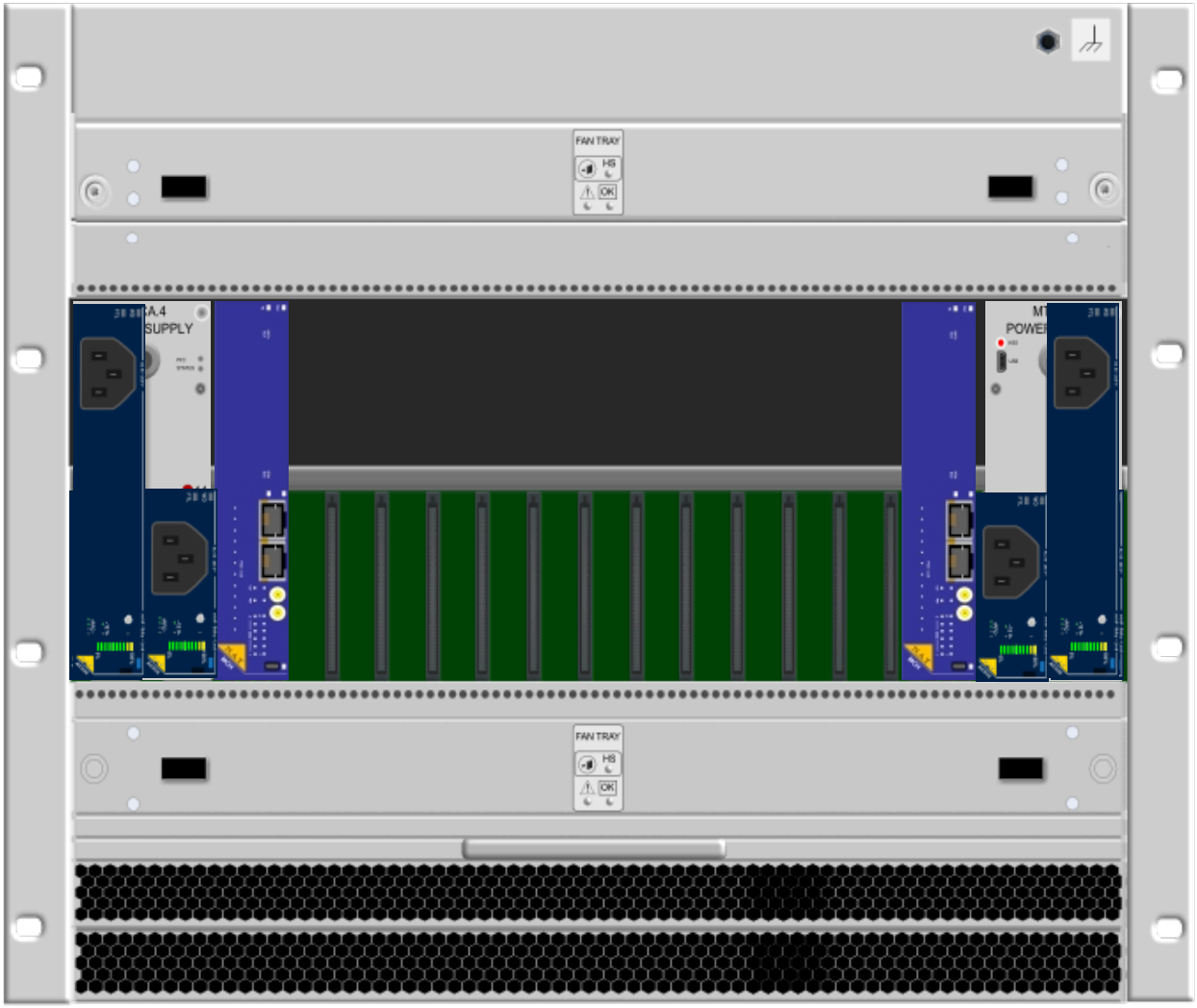
MTCA.4 Workshop : Easy Power Redundancy and Load Sharing Configuration of MTCA.4 system

- Power Modules in MTCA.4 Backplanes
  - Firmware Update of Power Module
- Maintenance
  - Power Budget, Overcurrent
  - Actual power consumption
- Power Configuration setting in Backplane
- Easy Configuration with Power Module Configurator
- Summary

Backplanes with 4 Power Module Sites

1, 2, 3, 4 PMs: Redundancy, Sharing?



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MTCA.4 Debugging
inventory, max. current, actual power consumption

- **show_fru**

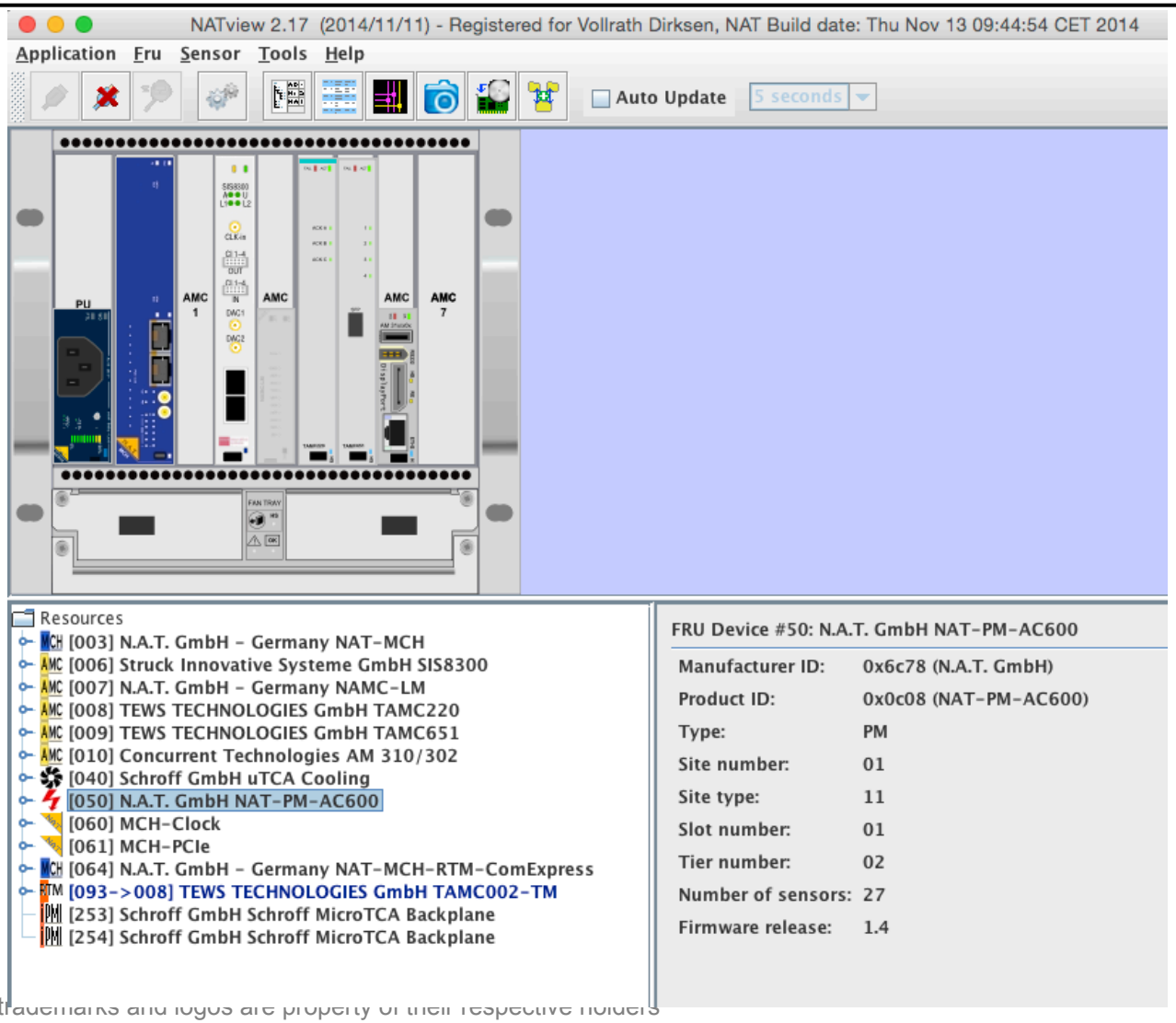
```
FRU Information:
---------------
 FRU  Device  State  Name
=========================================
  0   MCH      M4    NMCH-CM
  3   mcmc1    M4    NAT-MCH-MCMC
  6   AMC2     M4    SIS8300
  7   AMC3     M1    NAMC-LM
  8   AMC4     M4    TAMC220-10
  9   AMC5     M4    TAMC651
 10   AMC6   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

- show_pm
- show_sensorinfo 50


```
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   -  (overcurrent)
  8   AMC4     8   1       -      y    -    y    y   y   4.0
  9   AMC5     9   1       -      y    -    y    y   y   4.5
 10   AMC6    10   1       -      y    -    y    y   -
 11   AMC7    11   -       -
 12   AMC8    12   -       -
 13   AMC9    13   -       -
 14  AMC10    14   -       -
 15  AMC11    15   -       -
 16  AMC12    16   -       -
|-----------------------------------------------------------|
```

```
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
```

NATview
Power-Module Current Sensors



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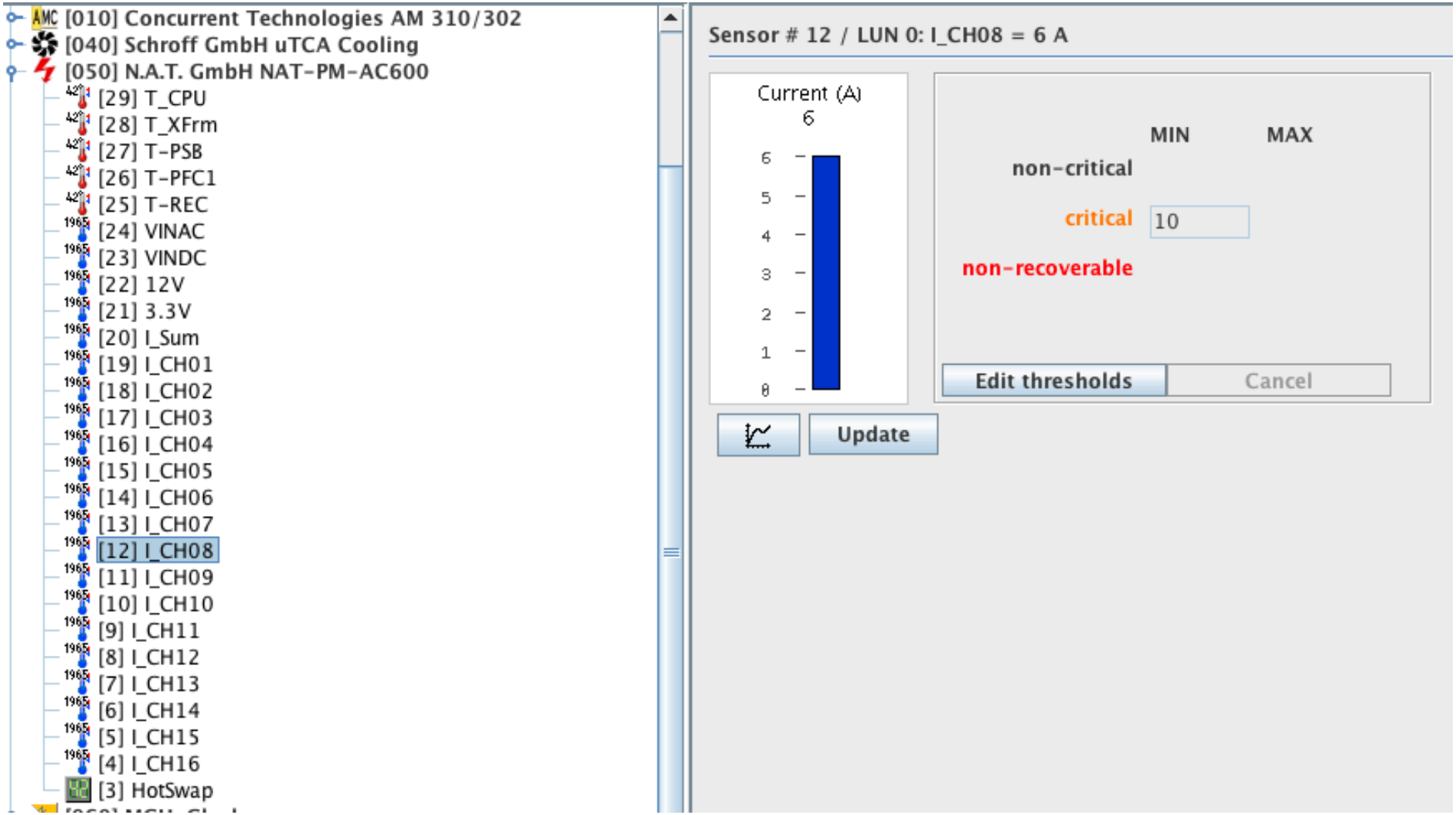
Power-Module Current Sensors



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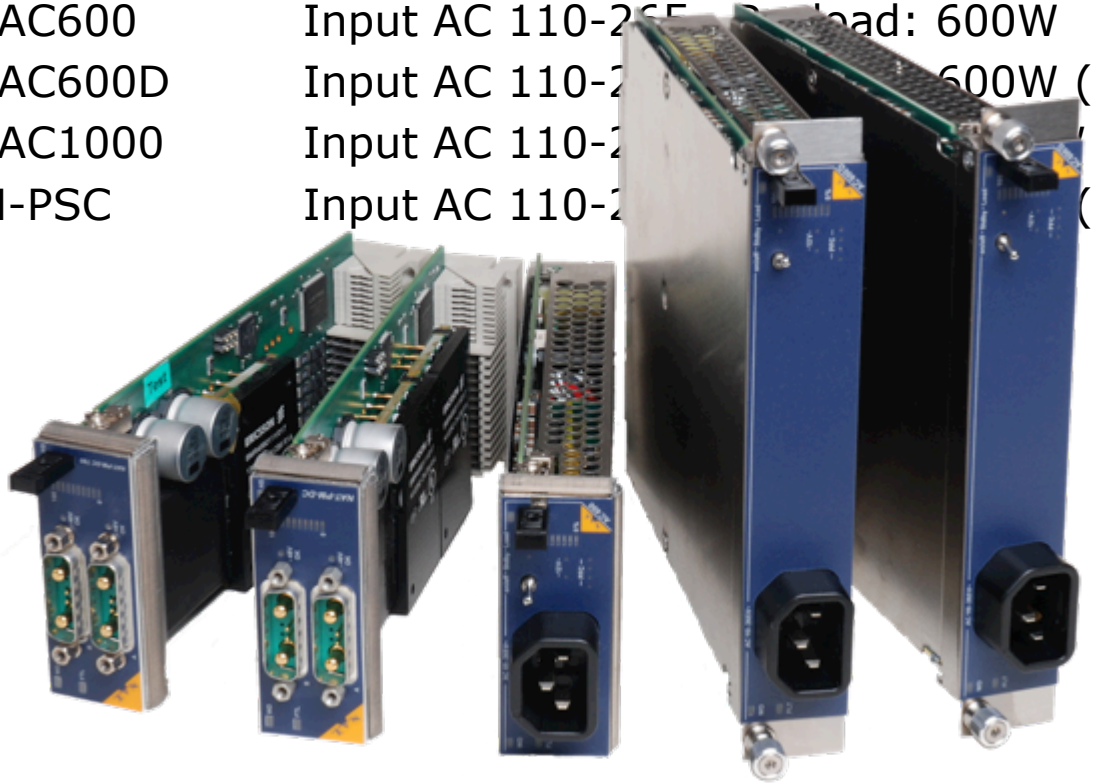
Power for MTCA.0 and MTCA.4
Power Solutions by N.A.T.

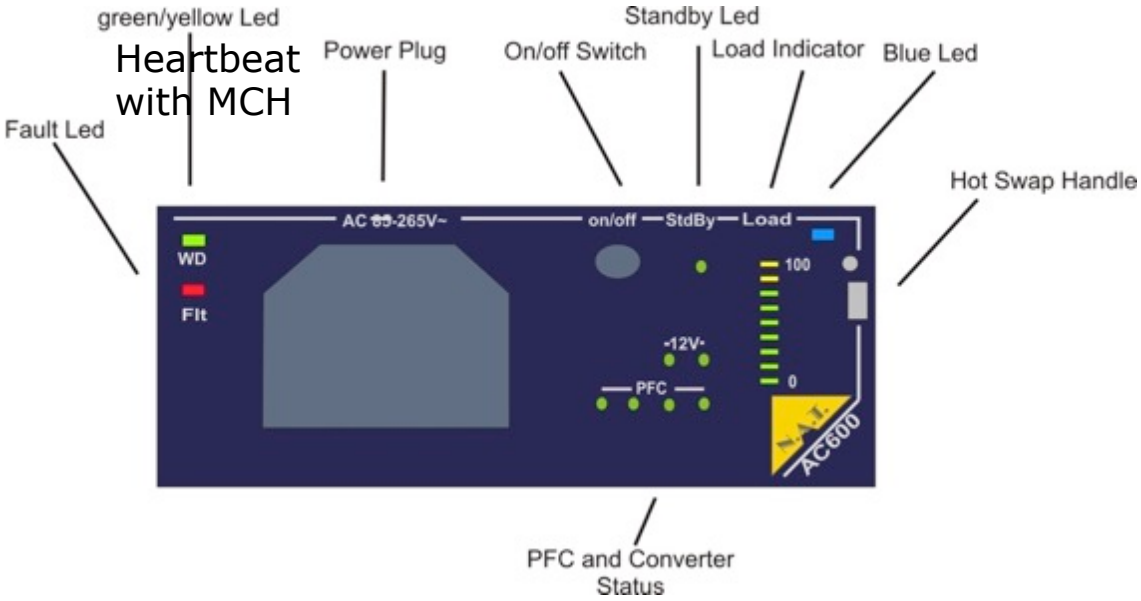
- NAT-PM-DC420 Input DC -48V Payload: 420W
- NAT-PM-DC840 Input DC -48V Payload: 840W
- NAT-PM-AC600 Input AC 110-2[illegible] [illegible]oad: 600W
- NAT-PM-AC600D Input AC 110-2[illegible] 600W (double width)
- NAT-PM-AC1000 Input AC 110-2[illegible] (double width)
- NAT-RPM-PSC Input AC 110-2[illegible] (double width)



DC420 DC840 AC600 AC600D AC1000 (2015)

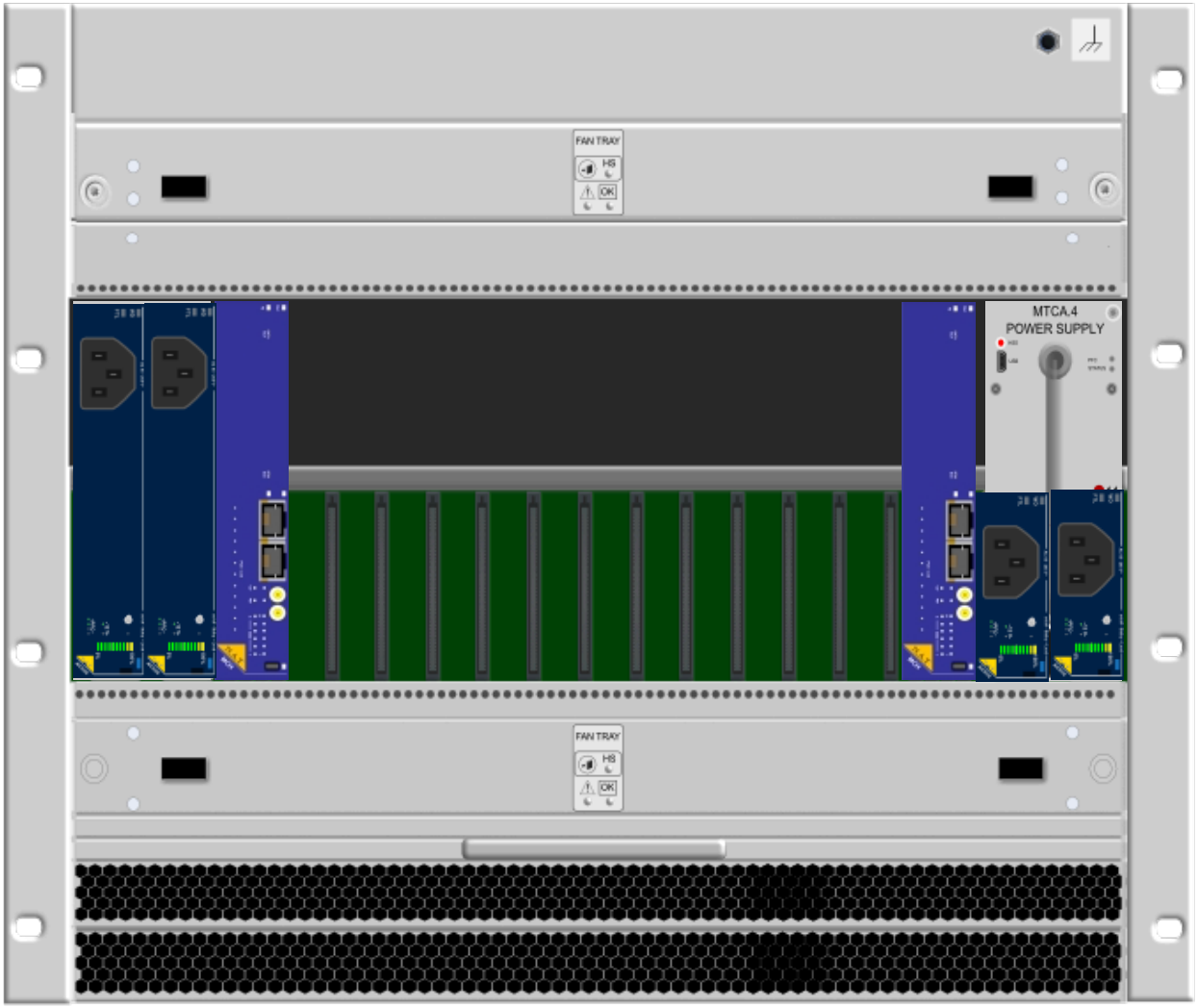
Power Solutions by N.A.T.
Features

- Unique Features:
  - Load Indicator
  - On/off switch (AC Variants only)
- Load sharing and redundancy:
  - All modes supported: N+1 (N=1..3), 2+2
- Firmware Upgrade via HPM



Backplanes with 4 Power Module Sites

1, 2, 3, 4 PMs: Redundancy, Sharing?



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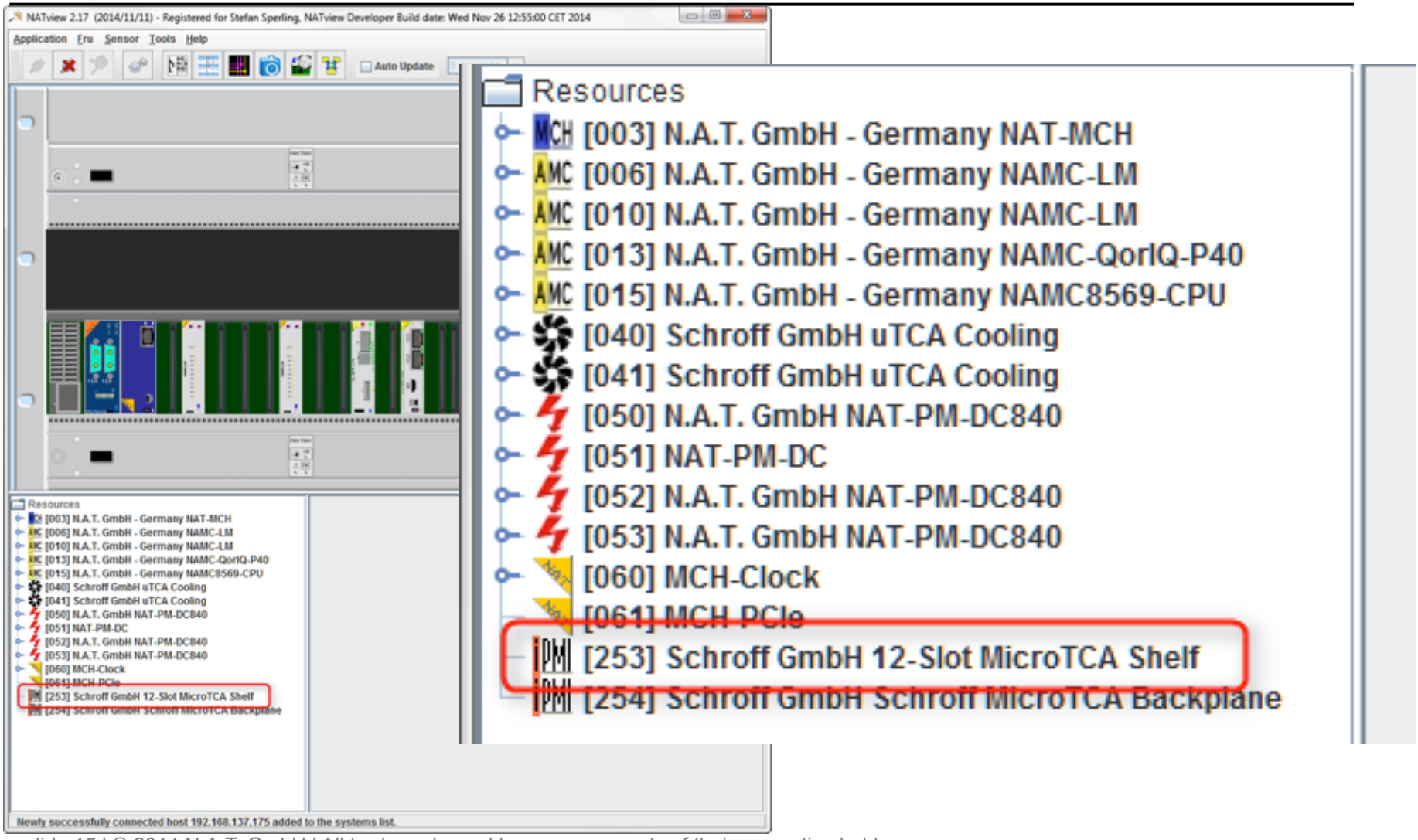
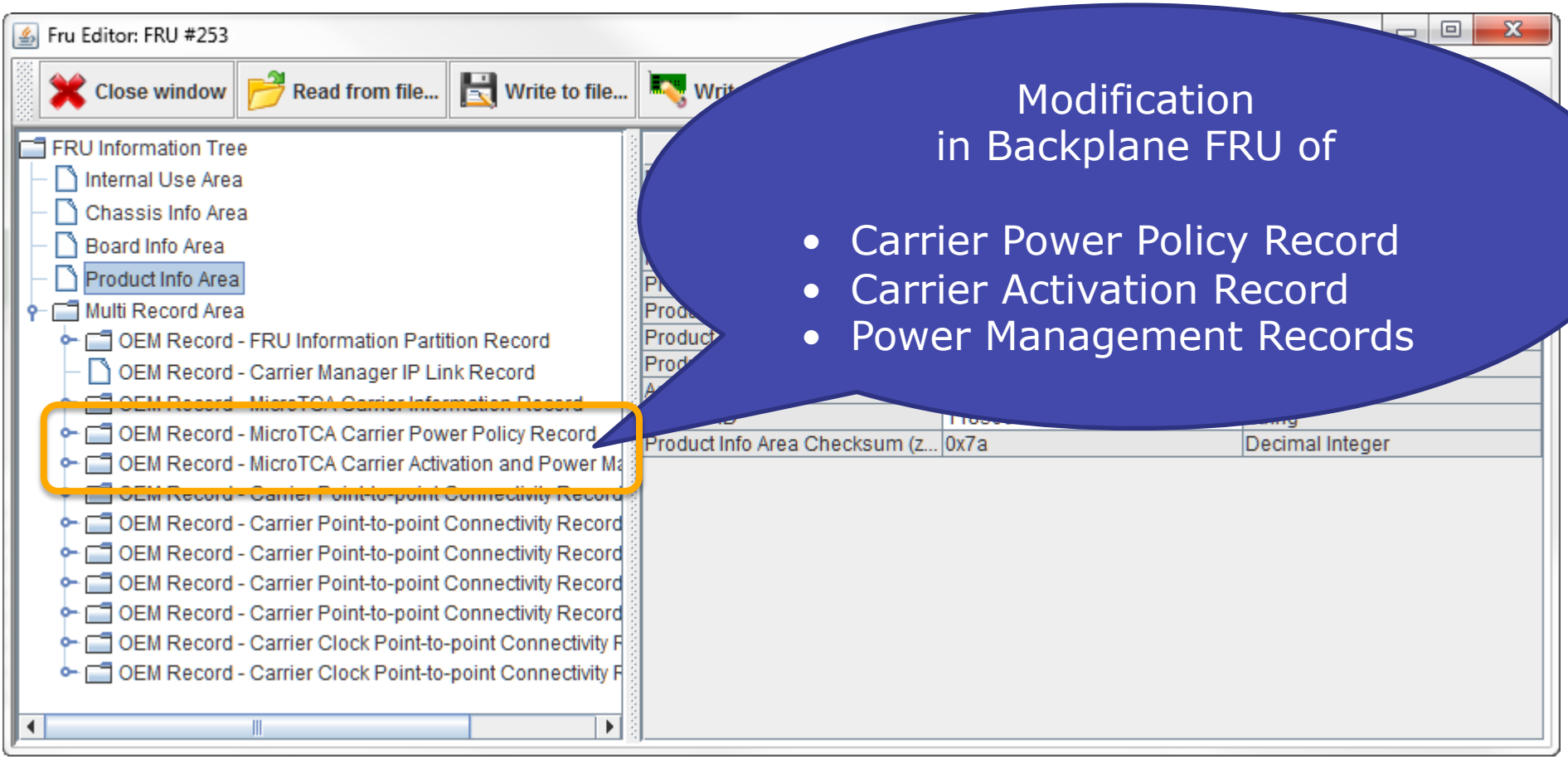
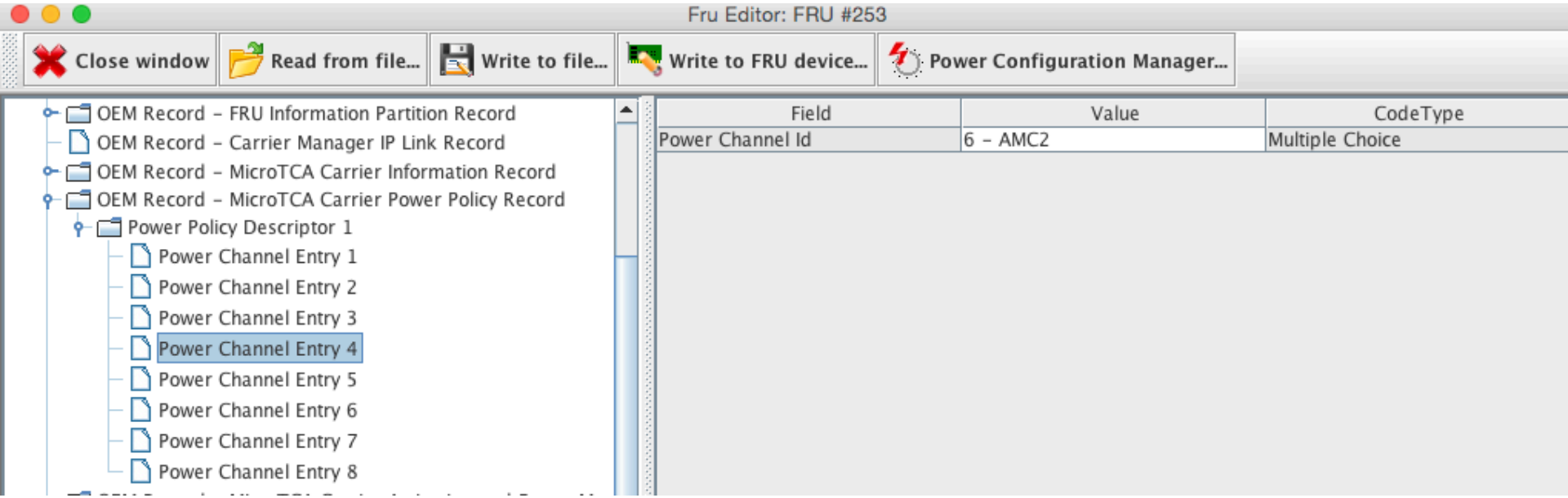
NATview
FRU Editor of Backplane FRU



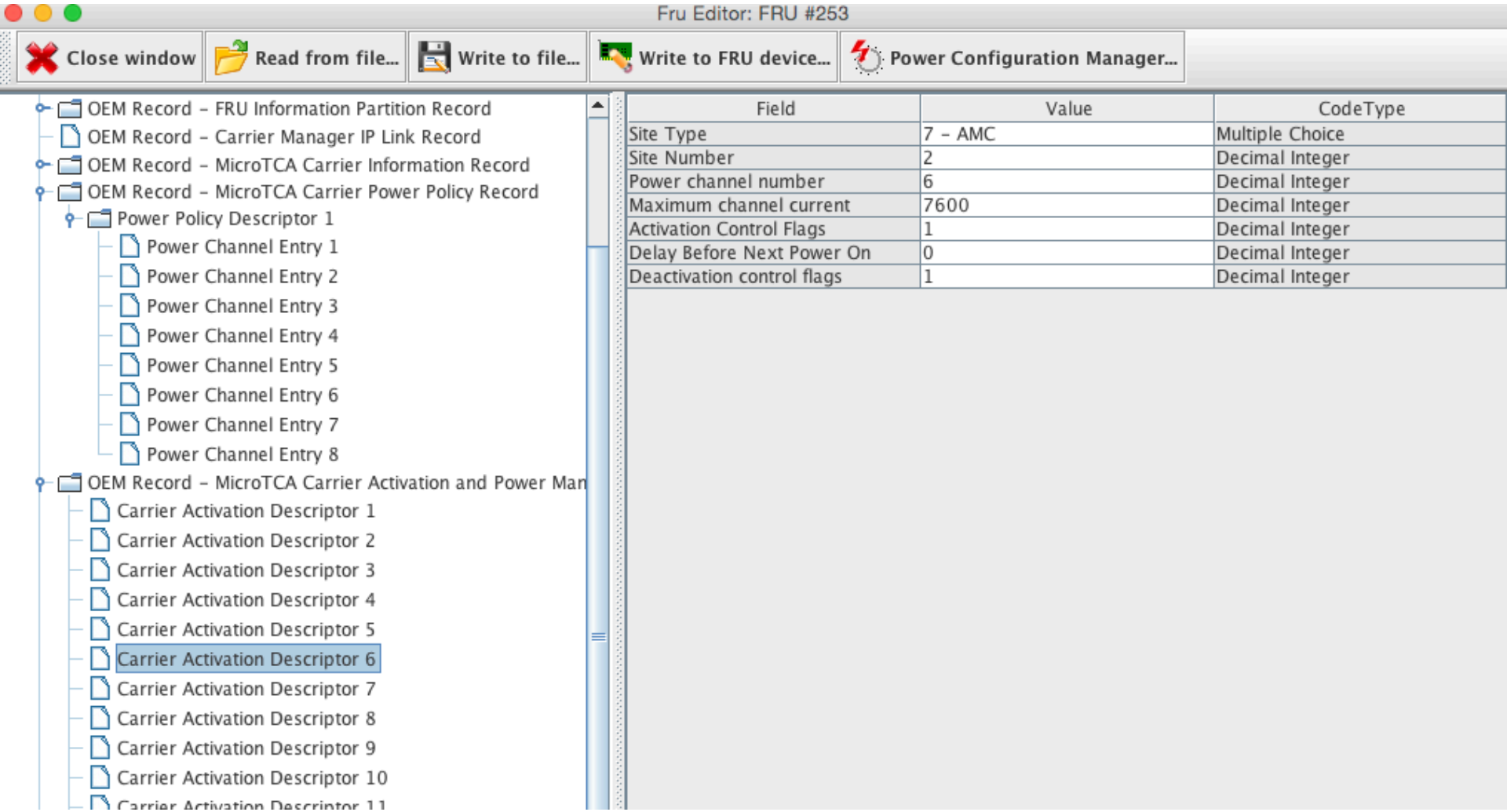
NATview Backplane FRU Editor
Power Configuration



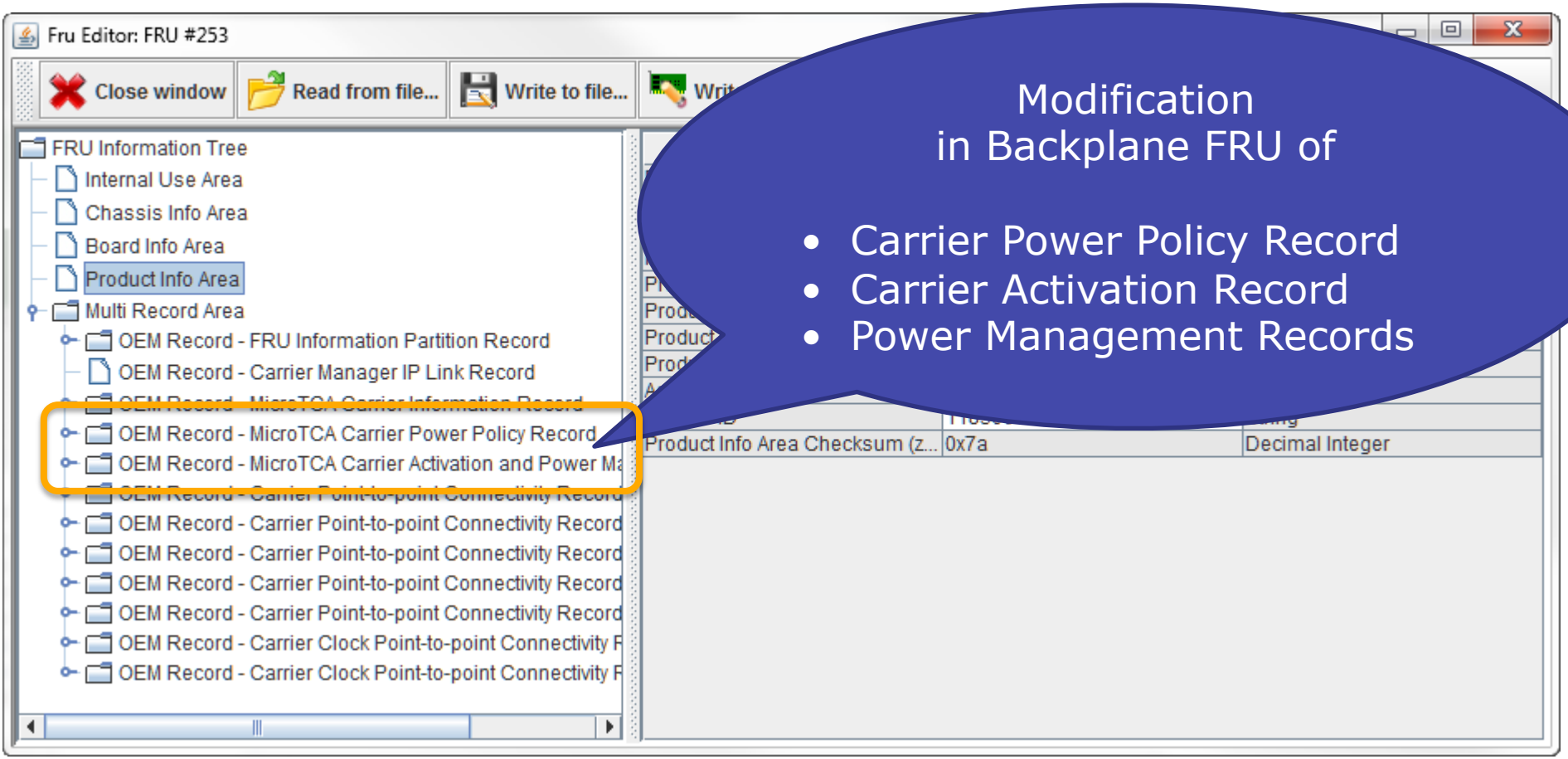
NATview
FRU Editor of Backplane FRU



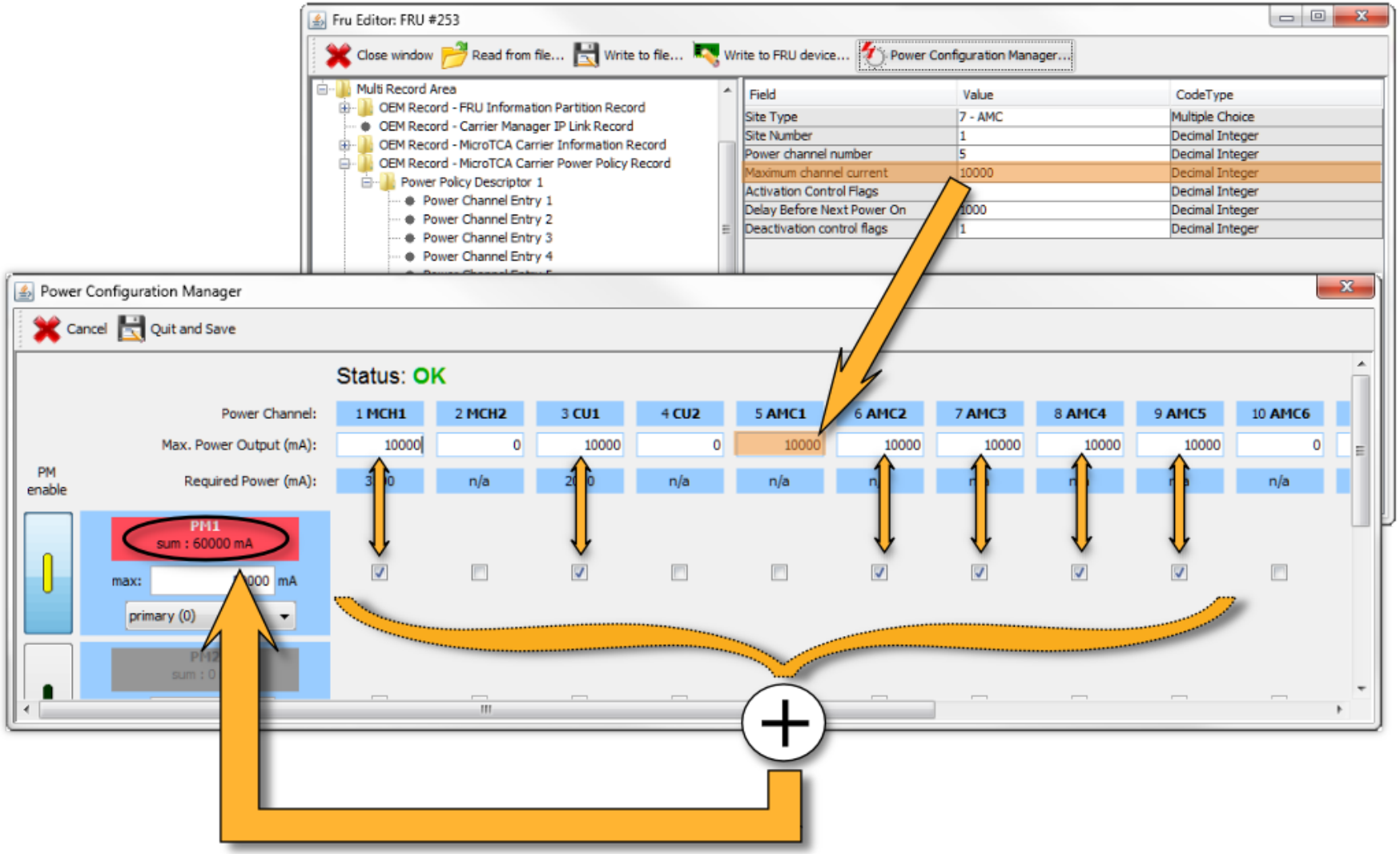
NATview
FRU Editor of Backplane FRU



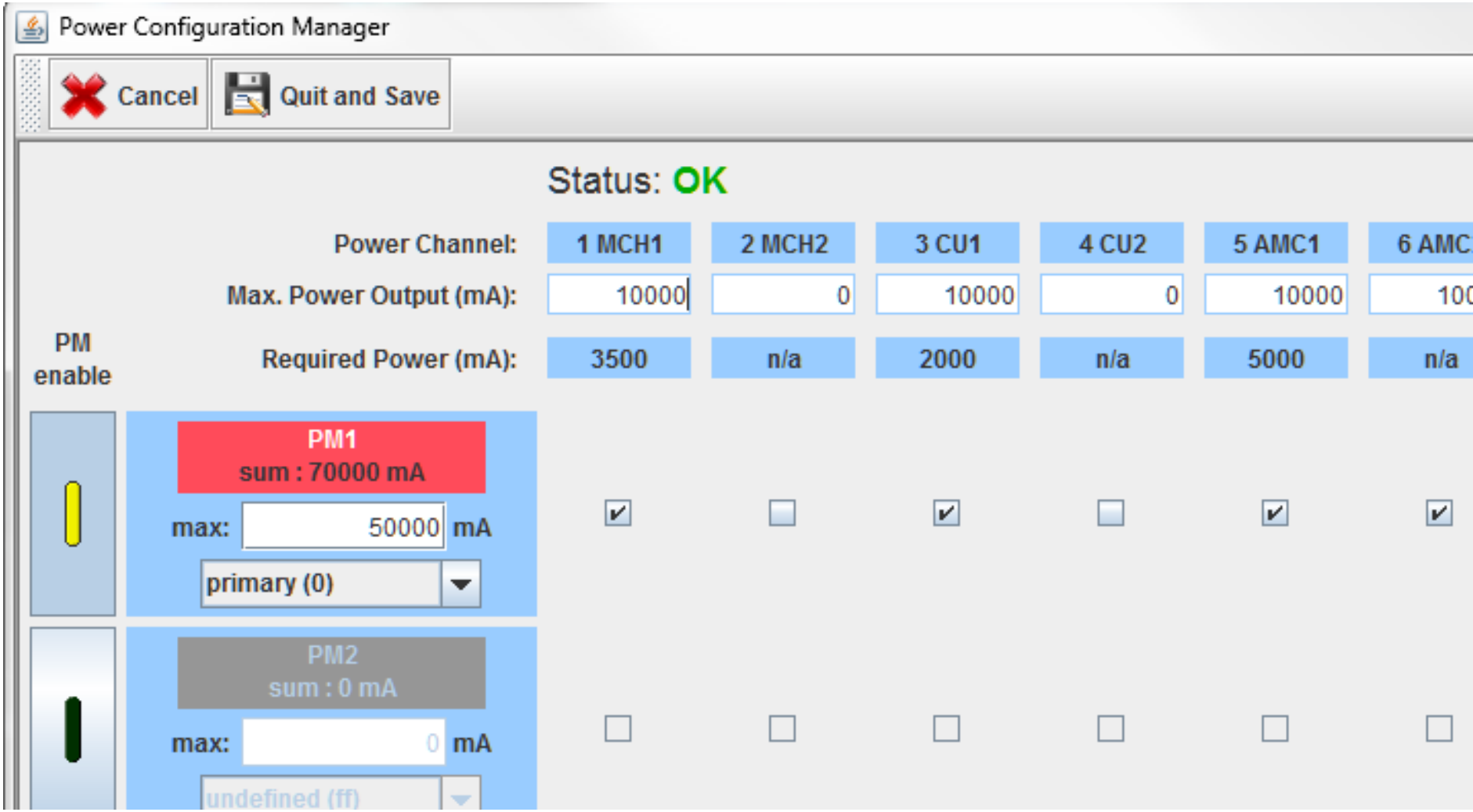
NATview Backplane FRU Editor
Power Configuration Manager



NATView Power Configuration Manager
Power Calculation

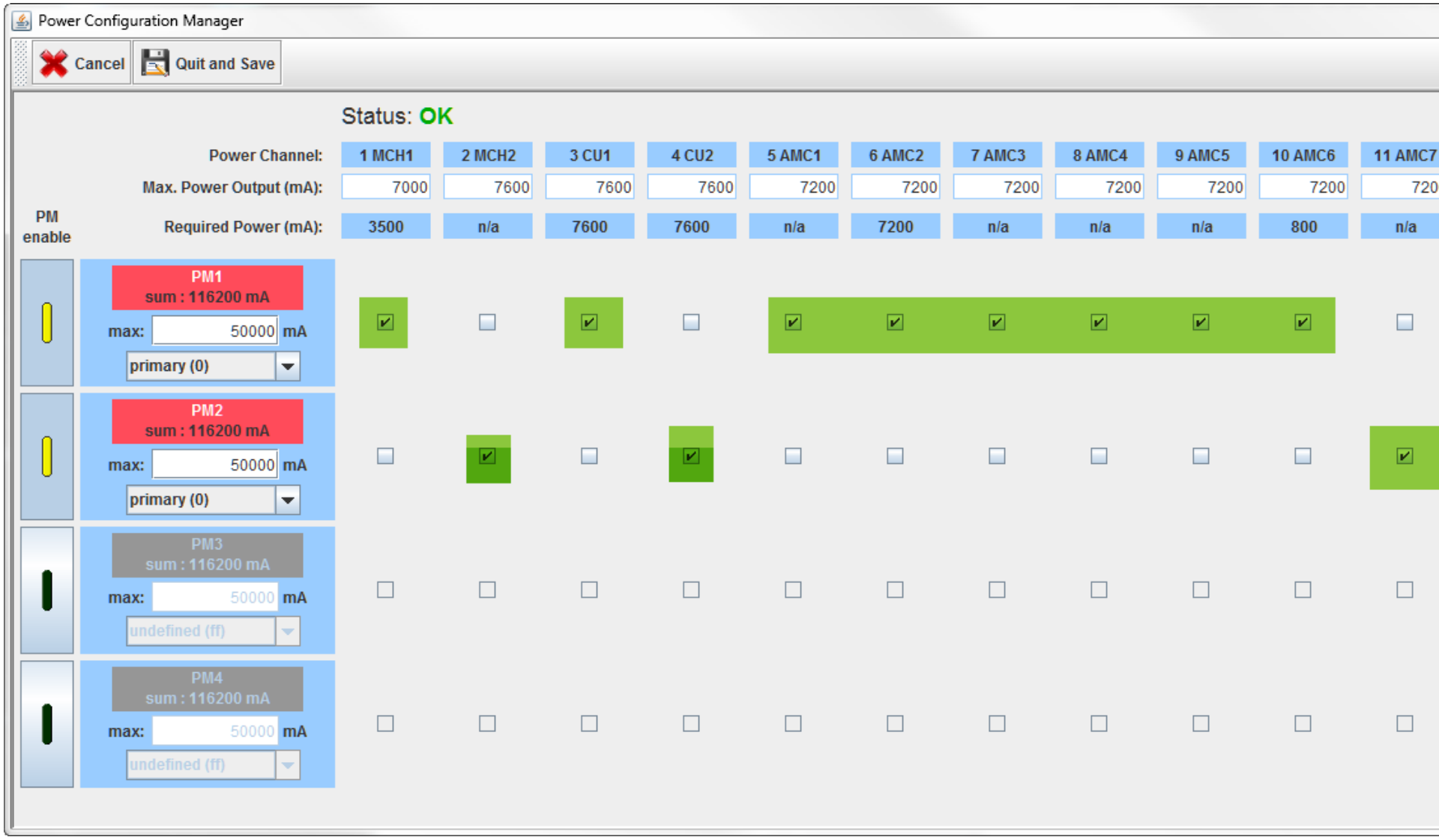


NATView Power Configuration Manager
No Redundancy

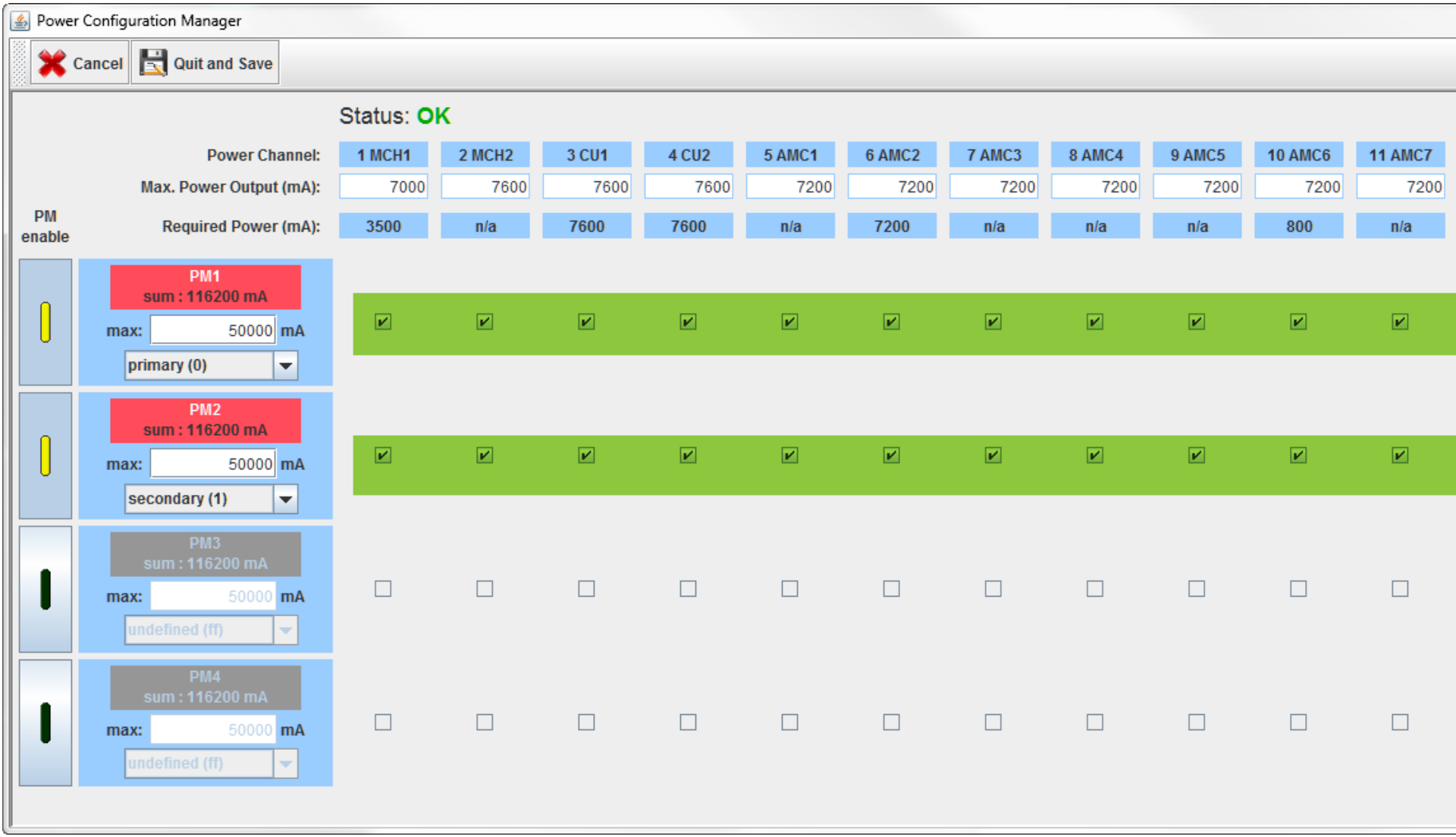


NATView Power Configuration Manager

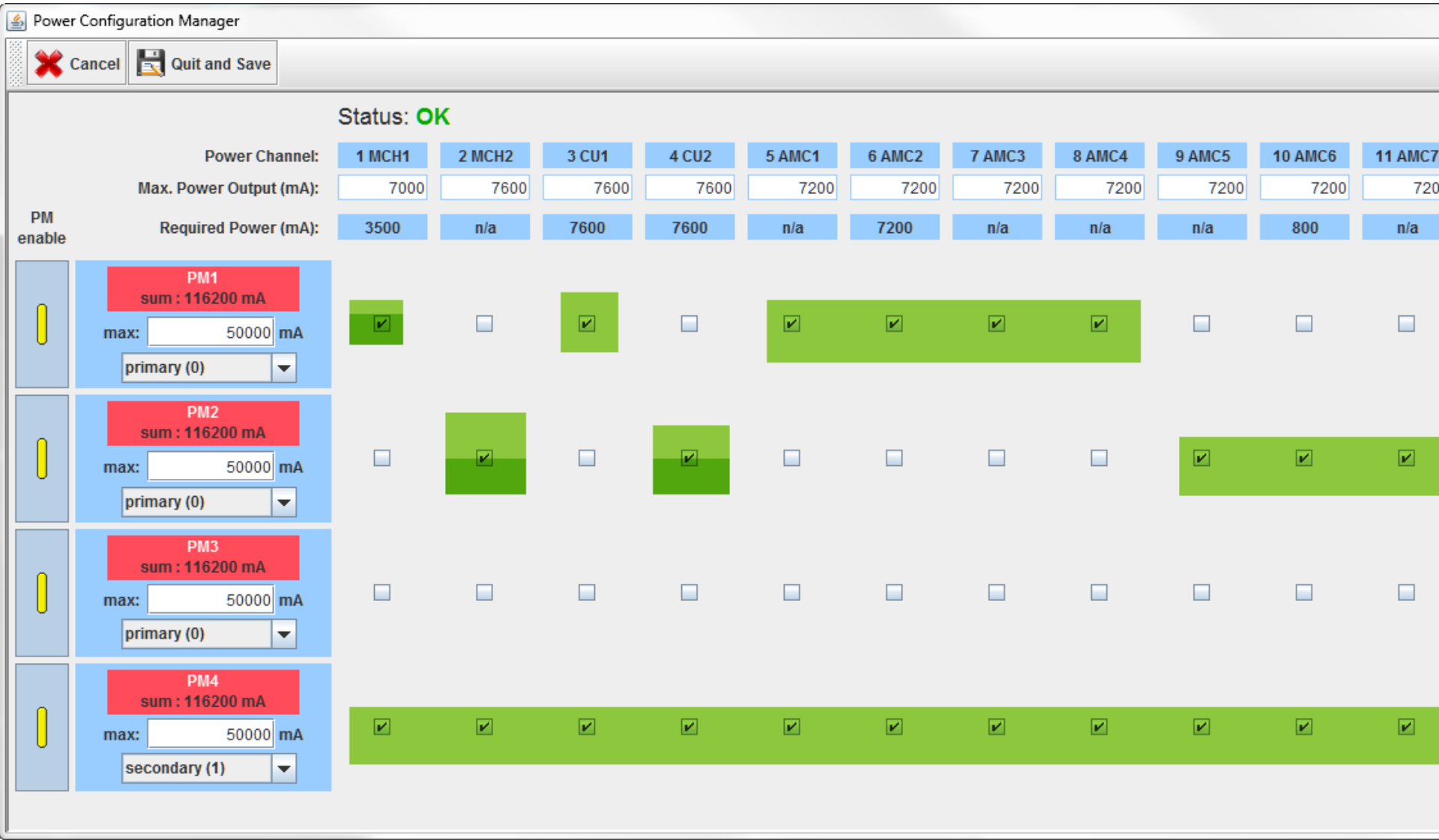
Load Sharing



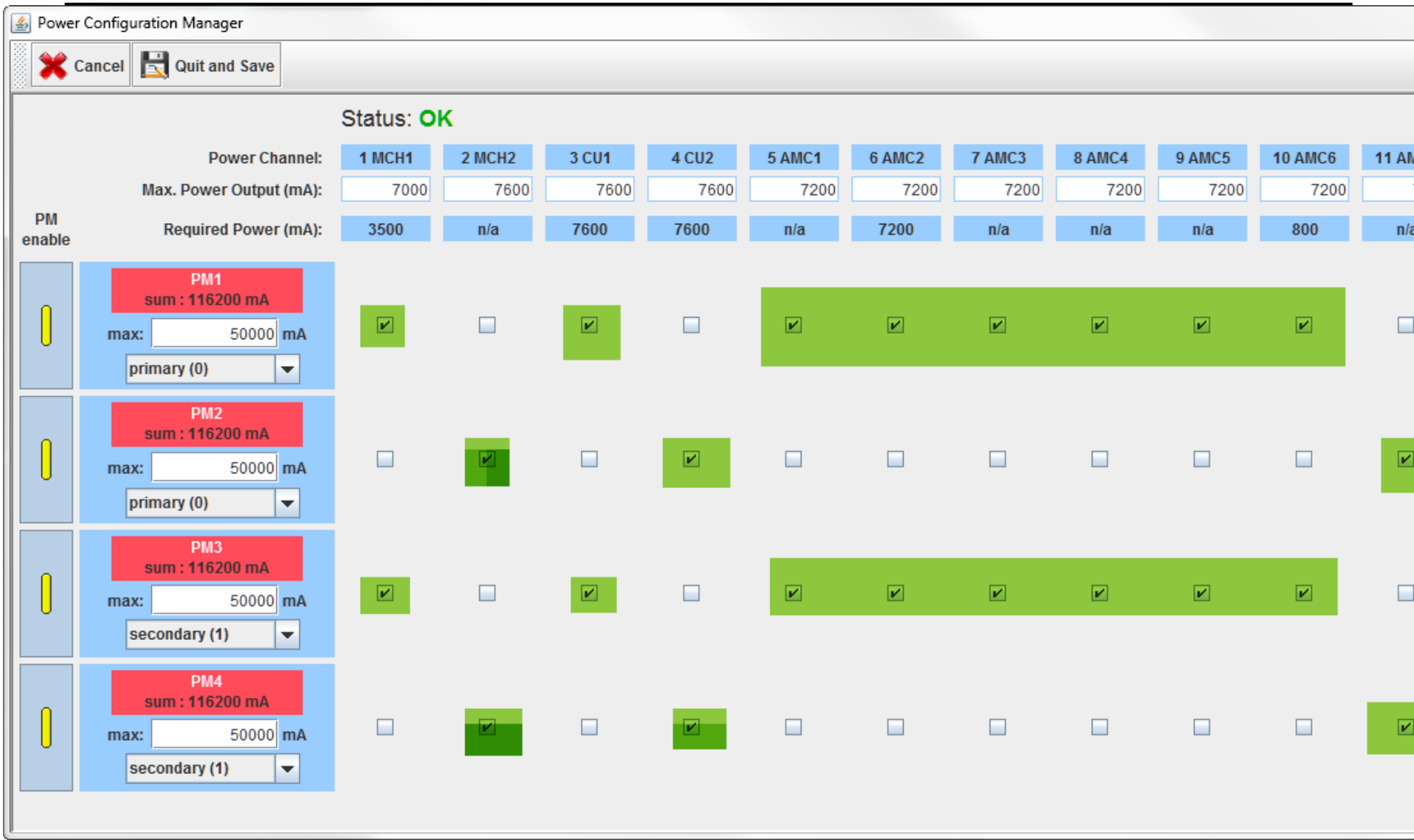
NATView Power Configuration Manager
Redundancy



NATView PCM
n+1 Redundancy

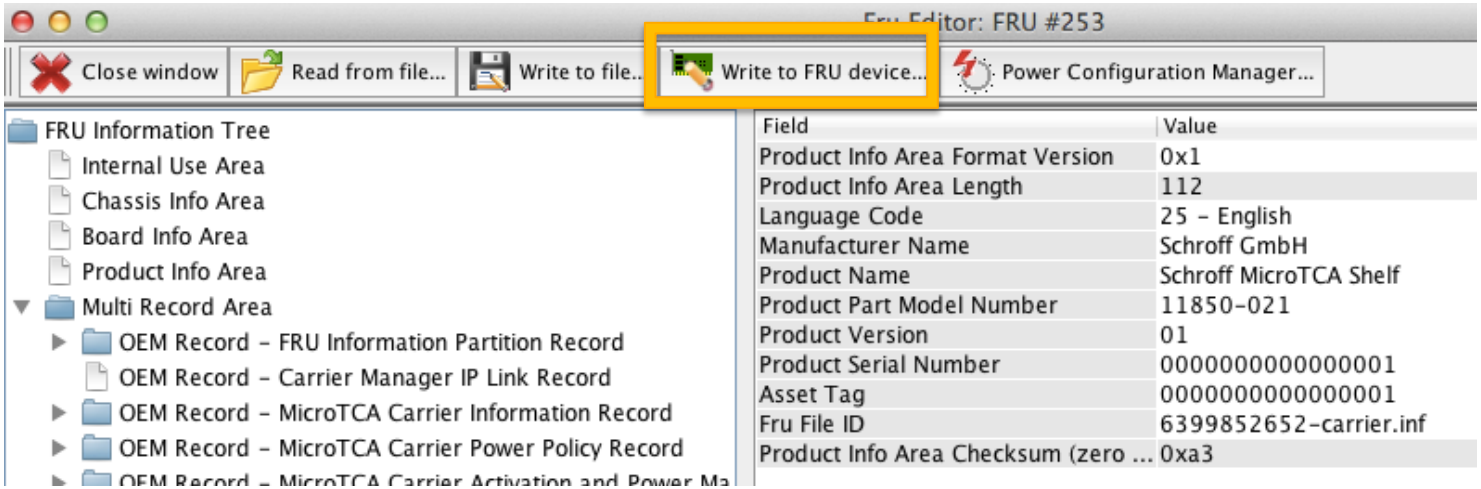


NATView PCM
Redundant-Sharing



Maintenance Backplane
Power Configuration Management

- Save your configuration in Backplane Flash EEPROM
- Restart your system



MTCA.4 Debugging
in Backplane defined Power Configuration

- Doublecheck with Command Line Interface of MCH

```
nat> show_pwrconf
Backplane power policy:   -  backplane channel assignment:
-------------------------------------------------------------------------
PChannel: |   1    2    3    4    5    6    7    8    9    10   11   12
PM1(prim) |   x    -    x    -    x    x    x    x    x    x    -    -
PM2( -  ) |
PM3( -  ) |
PM4( -  ) |
BP Amps:  |  7.6  0.0  7.0  0.0  7.6  7.6  7.6  7.6  7.6  7.6  0.0  0.0
-------------------------------------------------------------------------
nat>
```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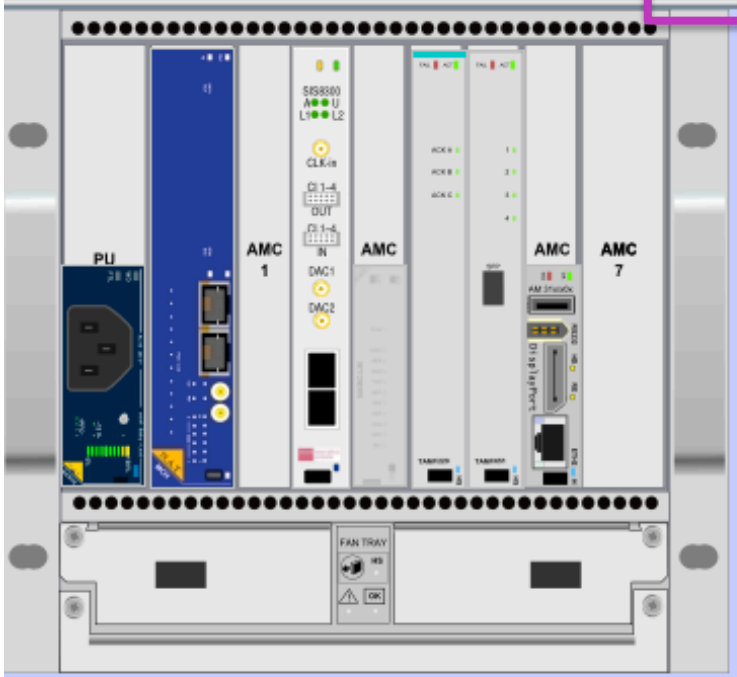
NATview 2.17 (2014/11/11) - Registered for Vollrath Dirksen, NAT Build date: Thu Nov 13 09:44:54 CET 2014

Application Fru Sensor Tools Help

Auto Update 5 seconds

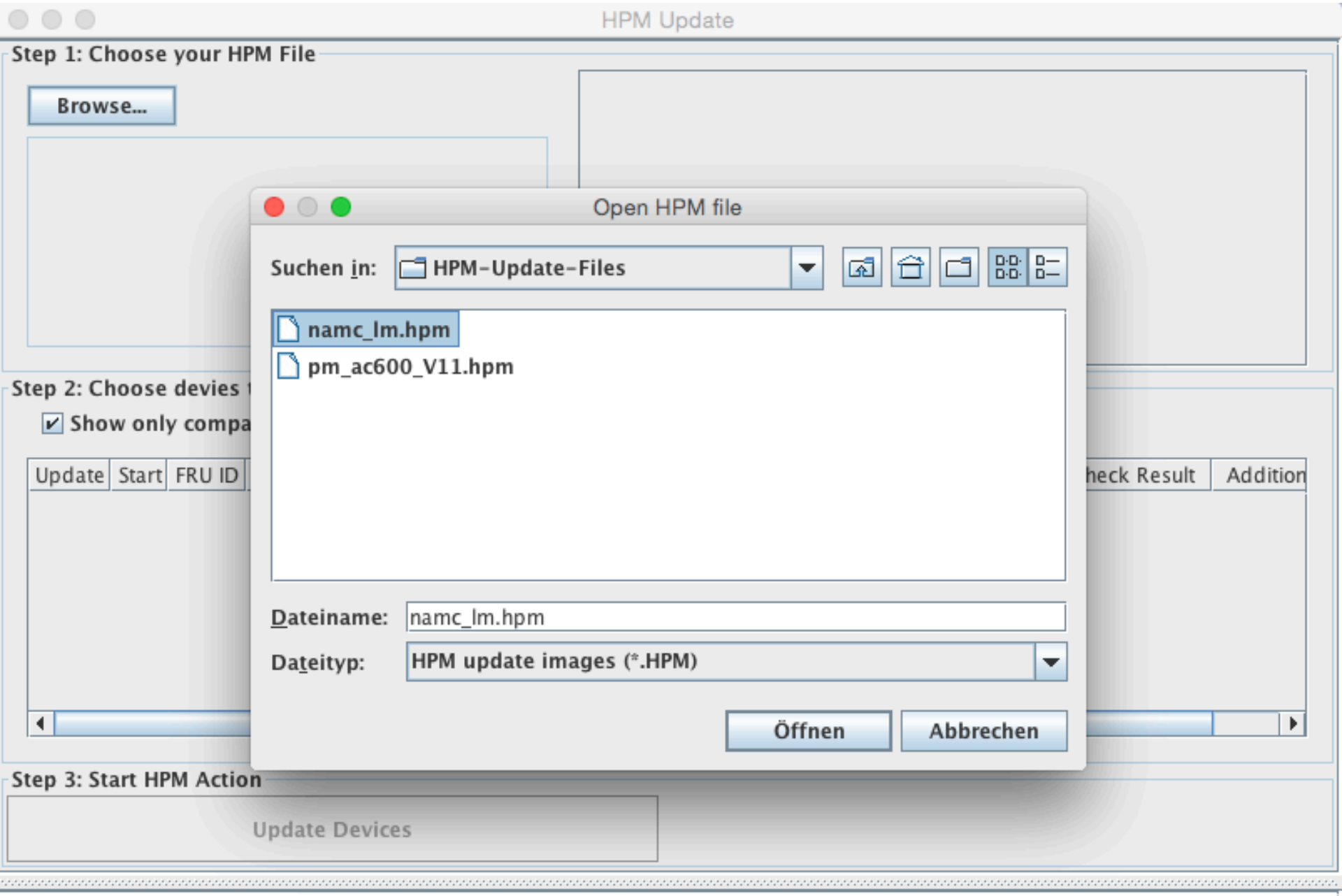


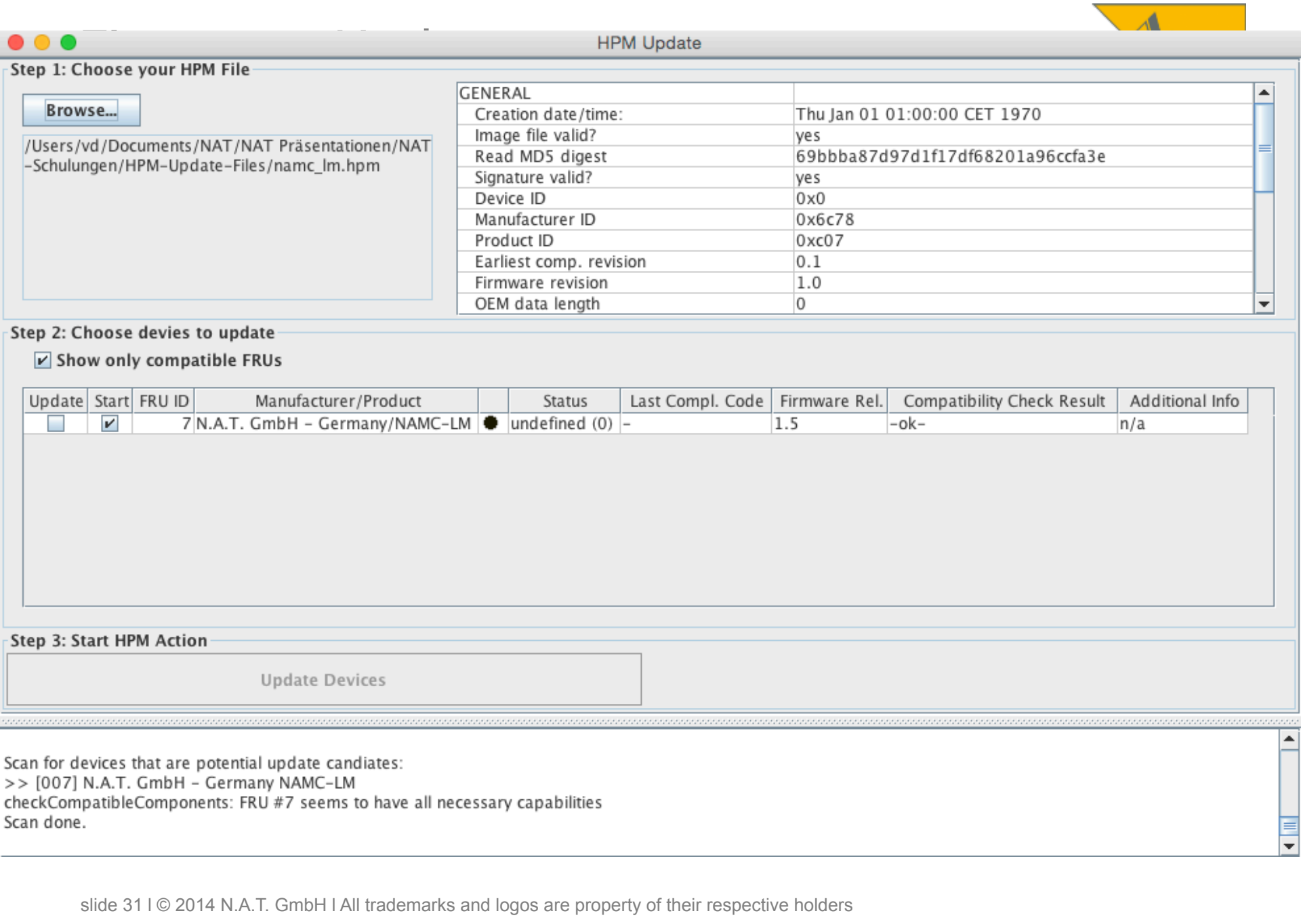
Resources
- [003] N.A.T. GmbH - Germany NAT-MCH
- [006] Struck Innovative Systeme GmbH SIS8300
- [007] N.A.T. GmbH - Germany NAMC-LM
- [008] TEWS TECHNOLOGIES GmbH TAMC220
- [009] TEWS TECHNOLOGIES GmbH TAMC651
- [010] Concurrent Technologies AM 310/302
- [040] Schroff GmbH uTCA Cooling
- [050] N.A.T. GmbH NAT-PM-AC600
- [060] MCH-Clock
- [061] MCH-PCIe
- [064] N.A.T. GmbH - Germany NAT-MCH-RTM-ComExpress
- [093->008] TAMC220-RTM
- [253] Schroff GmbH Schroff MicroTCA Backplane
- [254] Schroff GmbH Schroff MicroTCA Backplane

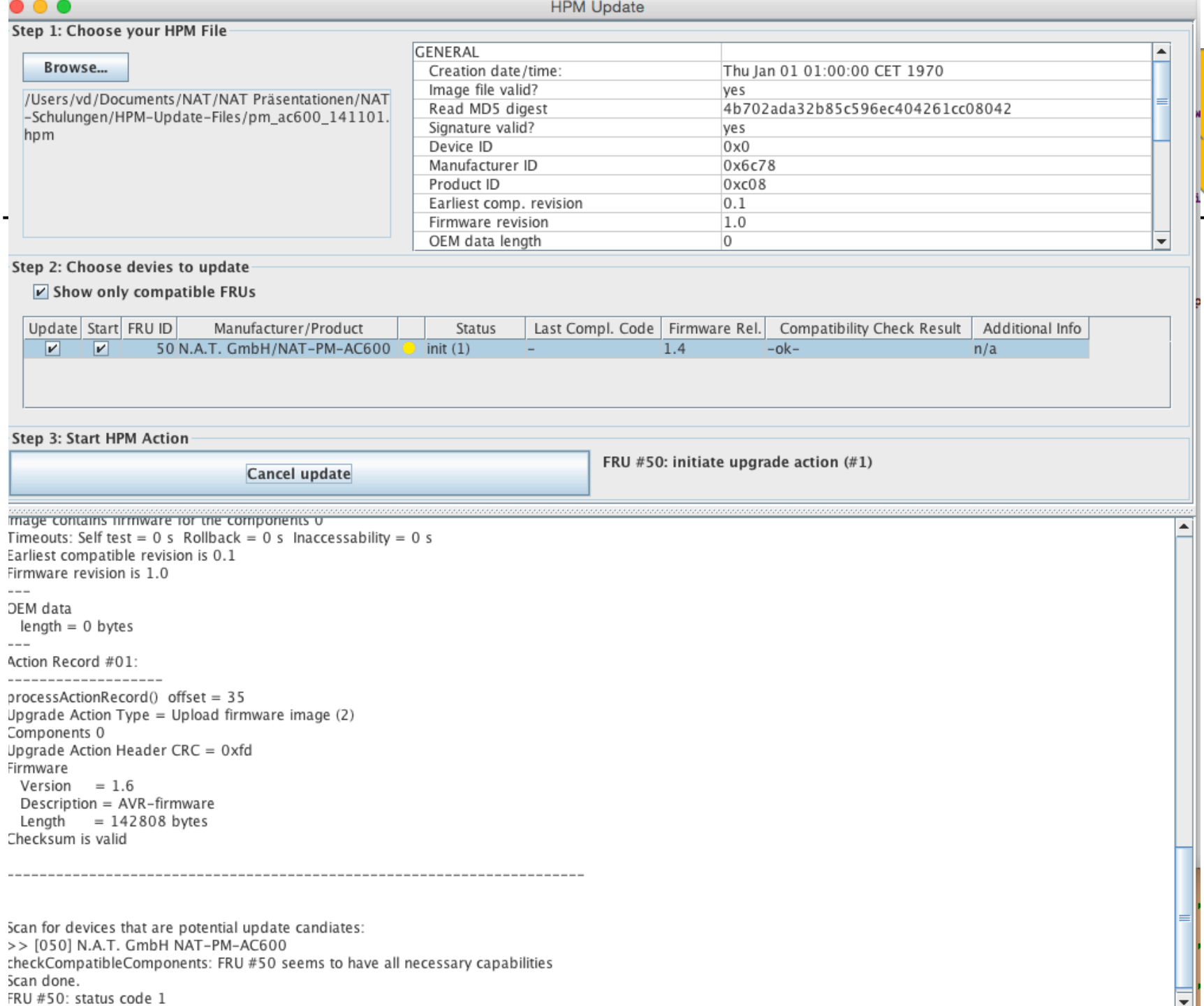
FRU Device #50: N.A.T. GmbH NAT-PM-AC600

Manufacturer ID:	0x6c78 (N.A.T. GmbH)
Product ID:	0x0c08 (NAT-PM-AC600)
Type:	PM
Site number:	01
Site type:	11
Slot number:	01
Tier number:	02
Number of sensors:	27
Firmware release:	1.4

Newly successfully connected host 192.168.178.26 added to the systems list

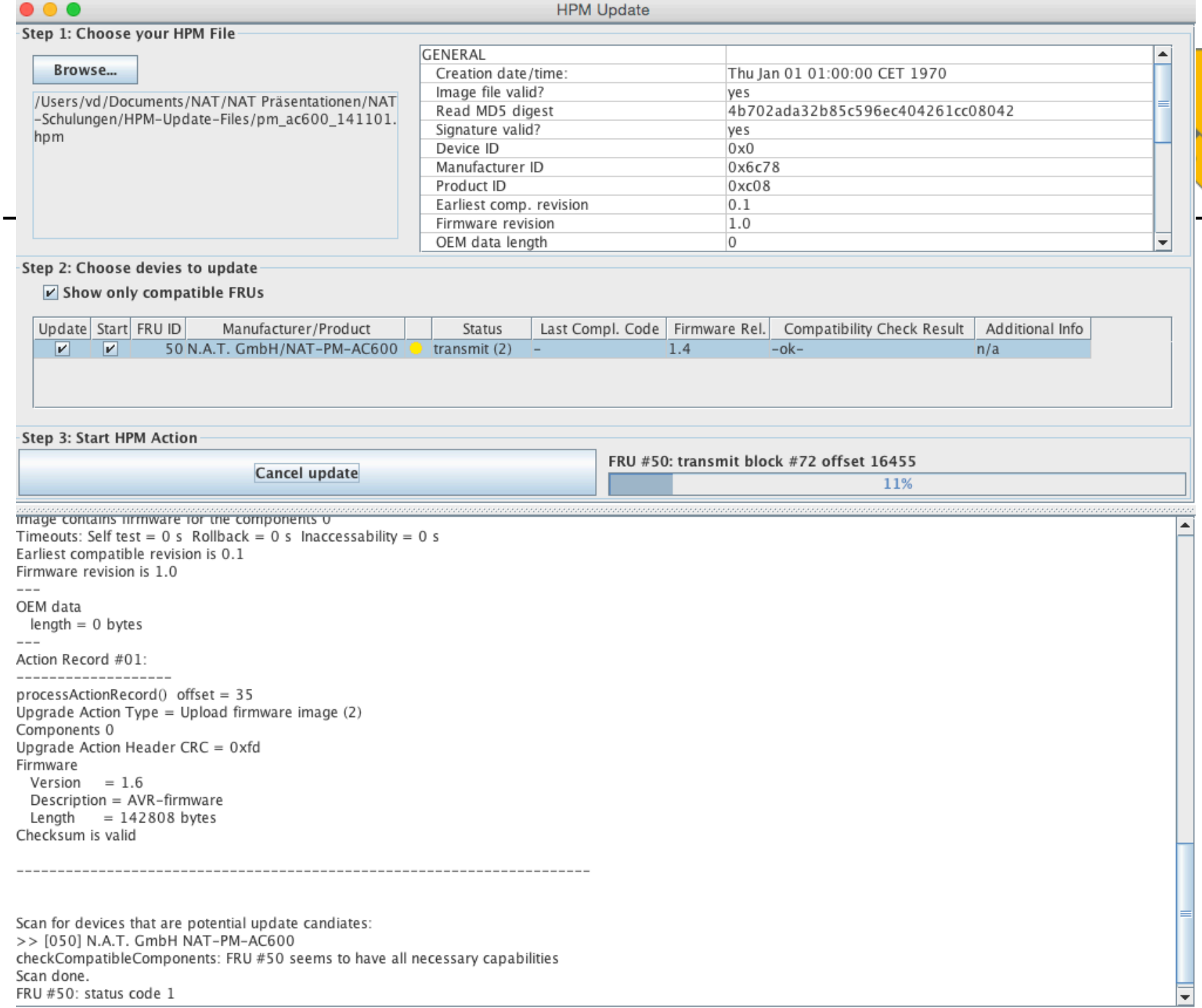





HPM Update
Step 1: Choose your HPM File
Browse...
/Users/vd/Documents/NAT/NAT Präsentationen/NAT-Schulungen/HPM-Update-Files/pm_ac600_141101.hpm
GENERAL
Creation date/time: Thu Jan 01 01:00:00 CET 1970
Image file valid? yes
Read MD5 digest 4b702ada32b85c596ec404261cc08042
Signature valid? yes
Device ID 0x0
Manufacturer ID 0x6c78
Product ID 0xc08
Earliest comp. revision 0.1
Firmware revision 1.0
OEM data length 0
Step 2: Choose devies to update
Show only compatible FRUs
Update Start FRU ID Manufacturer/Product Status Last Compl. Code Firmware Rel. Compatibility Check Result Additional Info
50 N.A.T. GmbH/NAT-PM-AC600 init (1) - 1.4 -ok- n/a
Step 3: Start HPM Action
Cancel update
FRU #50: initiate upgrade action (#1)
Image contains firmware for the components 0
Timeouts: Self test = 0 s Rollback = 0 s Inaccessability = 0 s
Earliest compatible revision is 0.1
Firmware revision is 1.0

OEM data
length = 0 bytes

Action Record #01:
processActionRecord() offset = 35
Upgrade Action Type = Upload firmware image (2)
Components 0
Upgrade Action Header CRC = 0xfd
Firmware
Version = 1.6
Description = AVR-firmware
Length = 142808 bytes
Checksum is valid
Scan for devices that are potential update candiates:
>> [050] N.A.T. GmbH NAT-PM-AC600
checkCompatibleComponents: FRU #50 seems to have all necessary capabilities
Scan done.
FRU #50: status code 1

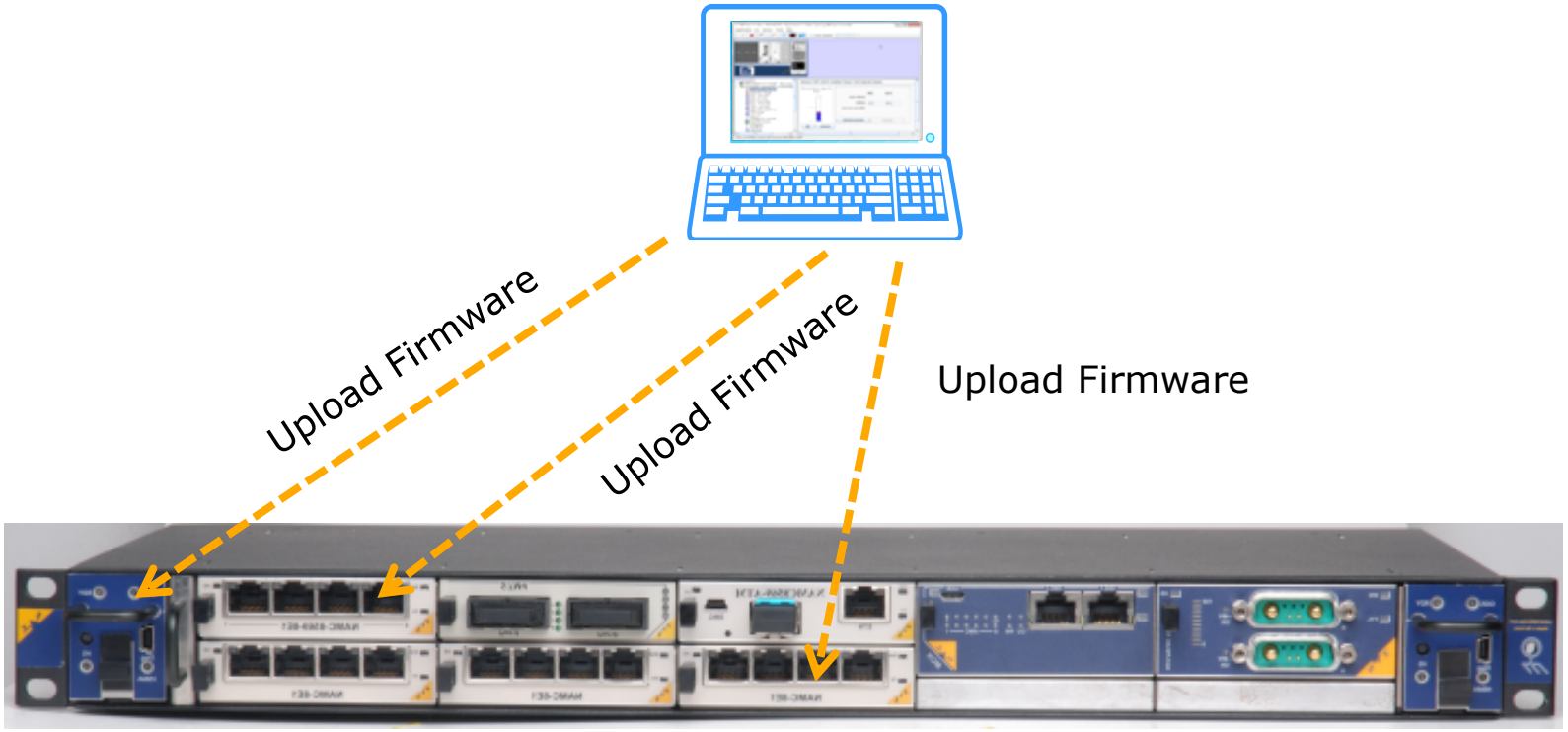

HPM Update
Step 1: Choose your HPM File
Browse...
/Users/vd/Documents/NAT/NAT Präsentationen/NAT-Schulungen/HPM-Update-Files/pm_ac600_141101.hpm
GENERAL
Creation date/time: Thu Jan 01 01:00:00 CET 1970
Image file valid? yes
Read MD5 digest 4b702ada32b85c596ec404261cc08042
Signature valid? yes
Device ID 0x0
Manufacturer ID 0x6c78
Product ID 0xc08
Earliest comp. revision 0.1
Firmware revision 1.0
OEM data length 0
Step 2: Choose devies to update
Show only compatible FRUs
Update Start FRU ID Manufacturer/Product Status Last Compl. Code Firmware Rel. Compatibility Check Result Additional Info
50 N.A.T. GmbH/NAT-PM-AC600 transmit (2) - 1.4 -ok- n/a
Step 3: Start HPM Action
Cancel update
FRU #50: transmit block #72 offset 16455
11%
Image contains firmware for the components 0
Timeouts: Self test = 0 s Rollback = 0 s Inaccessability = 0 s
Earliest compatible revision is 0.1
Firmware revision is 1.0

OEM data
length = 0 bytes

Action Record #01:
processActionRecord() offset = 35
Upgrade Action Type = Upload firmware image (2)
Components 0
Upgrade Action Header CRC = 0xfd
Firmware
Version = 1.6
Description = AVR-firmware
Length = 142808 bytes
Checksum is valid
Scan for devices that are potential update candiates:
>> [050] N.A.T. GmbH NAT-PM-AC600
checkCompatibleComponents: FRU #50 seems to have all necessary capabilities
Scan done.
FRU #50: status code 1

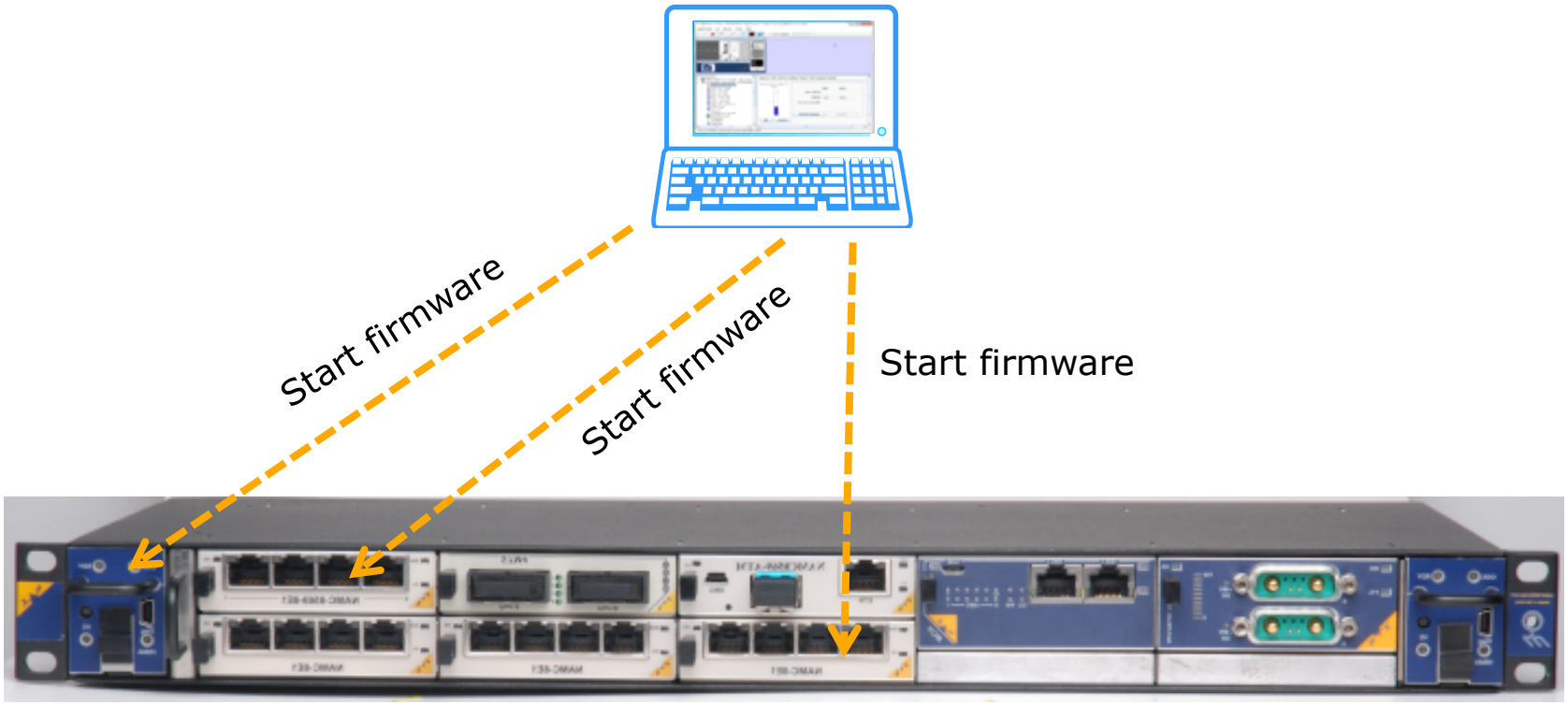
HPM with NATview
Multiple Card Update (1/2)

- 1. Transfer firmware to all selected targets,
  - one by one.



HPM with NATview
Multiple Card Update (2/2)

- 2. Start firmware together



=> Minimizes overall system downtime

Thank you very much!
Questions?

Vollrath Dirksen
Strategic Business Development

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Konrad-Zuse-Platz 9
53227 Bonn, Germany

www.nateurope.com

MTCA.4 Training:

mtca.desy.de/support/training

2015: PowerBridge N.A.T.

