

MicroTCA Hardware Concepts and Developments for the Accelerator

Kay Rehlich

WP 28



Outline



- Modules = AMCs & RTMs
- Crates
- Clocks, Triggers, Interlocks



PICMG MTCA.4



Connector:

Analog or digital signals, power and management

Cables from rear e.g. SMA 1.3GHz





Ethernet and PCIe, Clock and Trigger

Standard front **AMC**: FPGA with high speed data links,

μRTM:

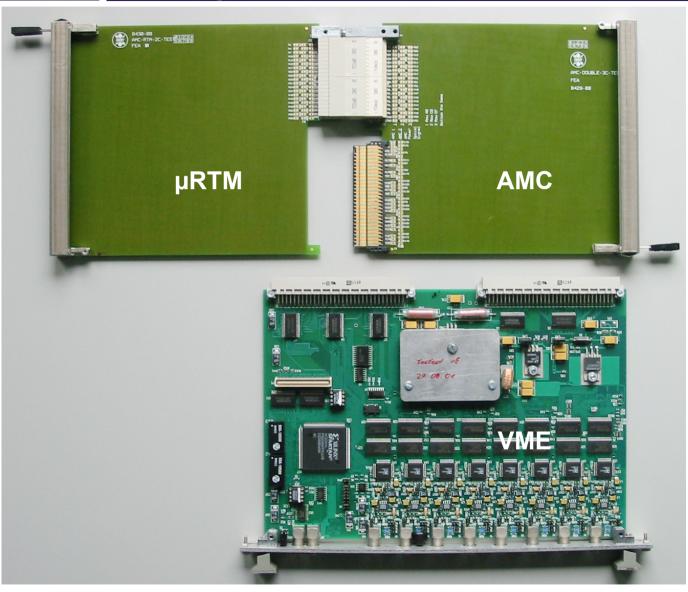
I/O adapter,
Application specific signal conditioning and cable adapters





VME - µTCA Board Sizes





AMC and RTM: ~ 457 cm²

VME:

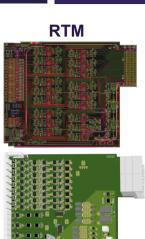
~ 345 cm²





Hardware Status: AMC's and RTM's









AMC

Digital Front

Analog Front

RTM









AMC



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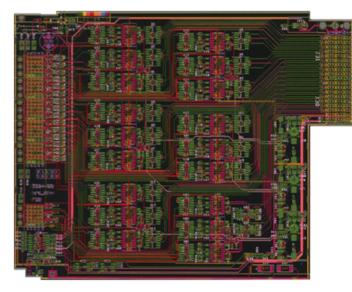
XFEL DAMC2: Versatile Digital AMC

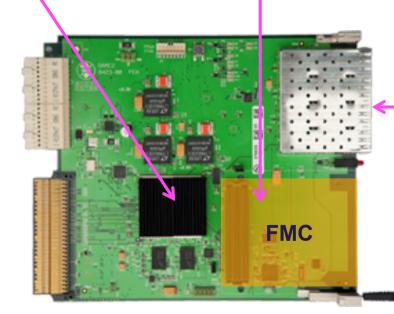


- 2nd revision
 - Almost ready
 - Starting ordering components

- Front AMC = DAMC2
 - ~700 modules required
 - 4 Fiber optic links
 - Logic in Virtex5 FPGA
 - Mezzanine slot for radiation monitor



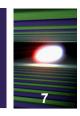








MTCA.4: Available Shelfs





12 Slot



ELMA 2

6 Slot



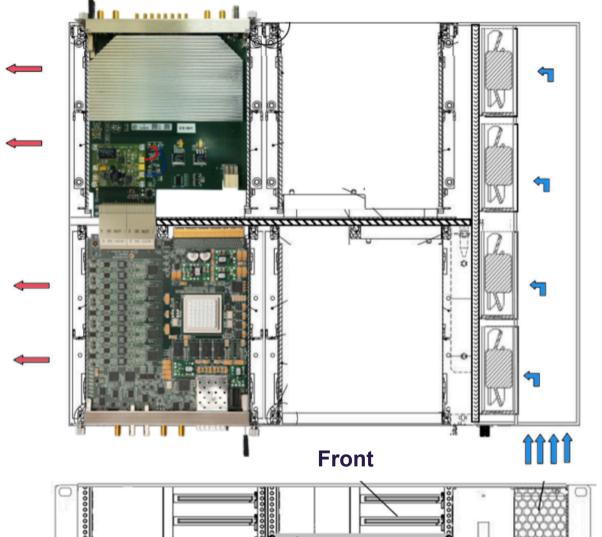
Elma Schroff





New 2HE 6 Slot Crate





- MTCA.4 crate
 - Almost ready
 - 4 slots w/ RTM
 - 2 slots w/o RTM
 - Std. PowerSupply from rear

2 HE = 8.8 cm



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Recent developments



- Power supplies
 - Double size modules from two companies in progress
- MCH
 - Clock distribution with ps precision in test phase
 - First PCIe gen3 available
- CPU
 - Single size i7 works nice

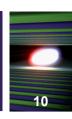
Kay Rehlich, DESY

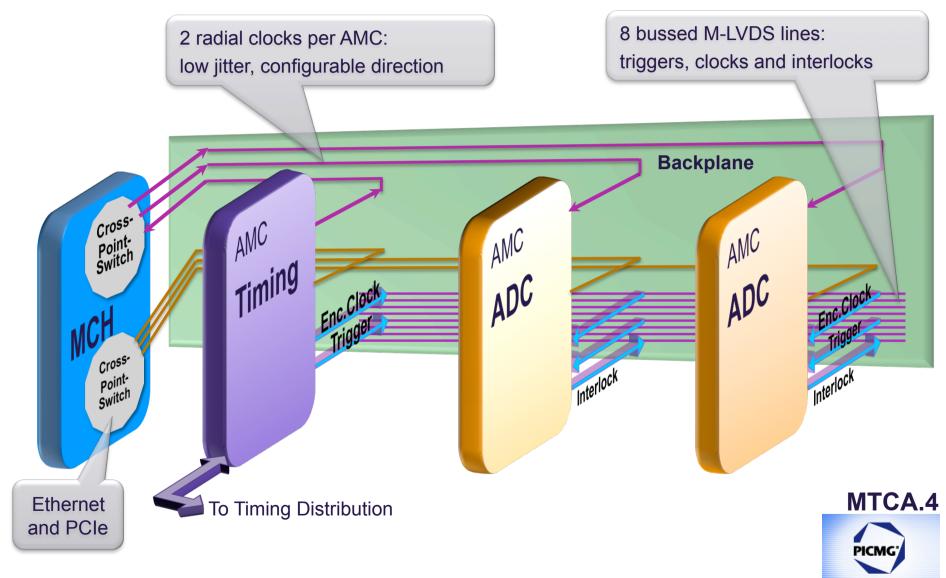
Double size i7 with redundant disk in September





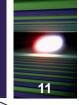
XFEL µTCA: Clocks, Triggers and Interlocks

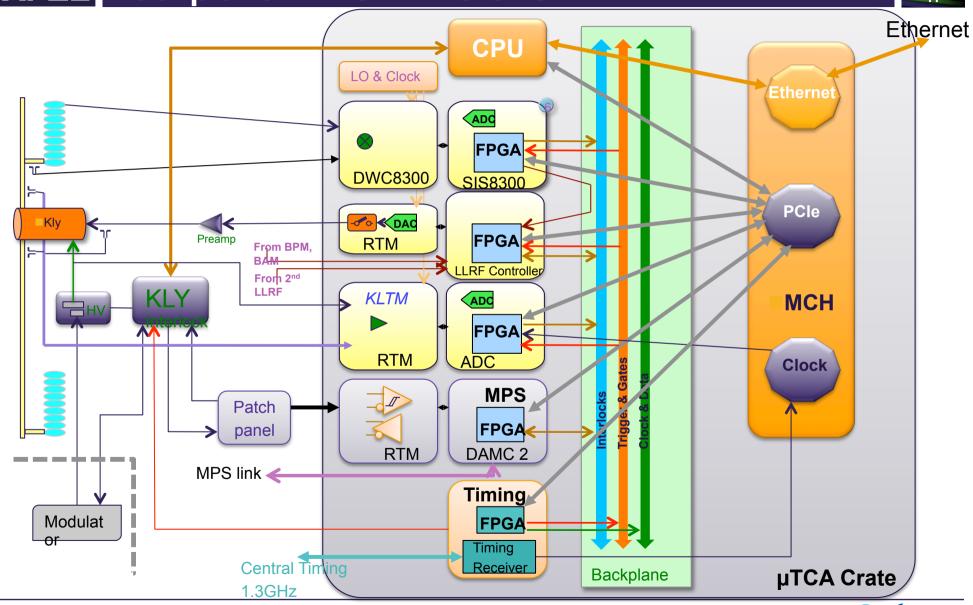






Backplane Links in MicroTCA



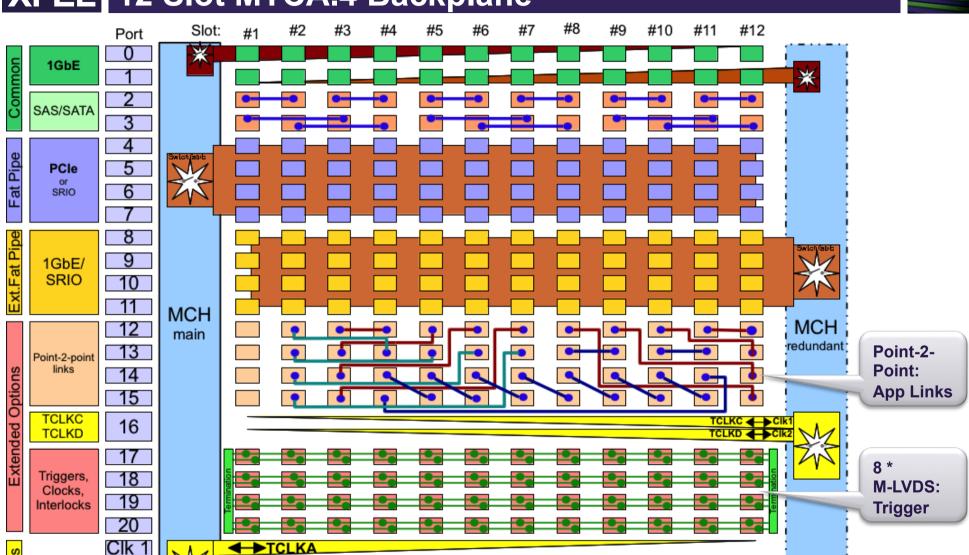


Status of the Control System for the European XFEL

◆TCLKB

FCLKA

12 Slot MTCA.4 Backplane



HELMHOLTZ | ASSOCIATION

PCIe Clock

Clk 2

Clk 3



8 Clock, Trigger and Interlock Lines



- Multi-Point LVDS
- Can be used for:
 - Clocks
 - Triggers
 - Interlocks
 - Data transfer
- All AMCs can be
 - Receiver
 - Transmitter
 - Or disabled

2 lines out of 8 shown

