From µTCA to ATCA

Scalability issues for data acquisition systems

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EMBEDDED INTEGRATED CONTROLLED SYSTEMS
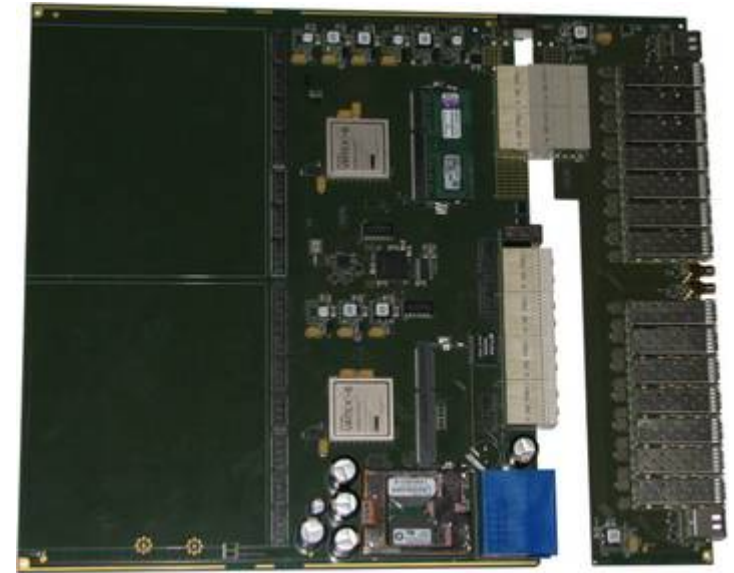
Content

- ▶ Carriers for ATCA and MicroTCA
  - ◦ ATCA FEC Blades
    - • ADC FEC Board
  - ◦ ATCA FMC Blades
  - ◦ MicroTCA FEC   Carrier
  - ◦ MicroTCA FMC Carrier
- ▶ Scales of MicroTCA Systems from Eicsys
  - ◦ 1U ;2 Slot   MTCA.4
  - ◦ 2U, 6 Slot   MTCA.0
  - ◦ 5U, 6 Slot   MTCA.4
  - ◦ 9U, 12 Slot   MTCA.4
- ▶ Scales of ATCA Systems from Eicsys
  - ◦ 3U; 2Slot   Standard ATCA
  - ◦ 5U; 6 Slot   Standard and LVDS
  - ◦ 13U; 14 Slot Standard and LVDS

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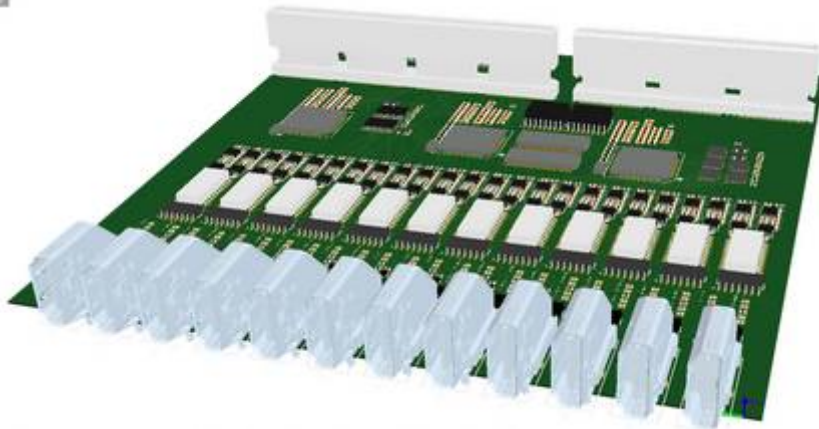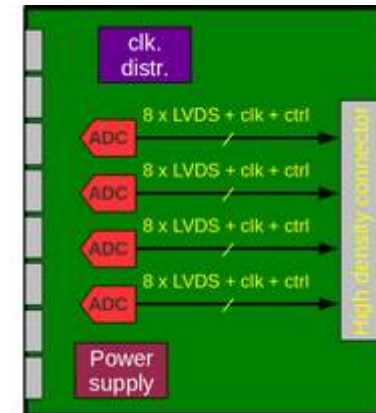EMBEDDED INTEGRATED CONTROLLED SYSTEMS

ATCA/MicroTCA Boards

▸ ATCA Blade

- 2Virtex 6 FPGA

- 16 GBT/VersatileLink/… per blade

- Decoding, data flow and buffering in FEC FPGA

- Many high-speed links (GBT/LOC/VersatileLink/…) per board

- Low-latency connection to FEC-FPGA via parallel LVDS bus

- Decoding (and buffering) in mezzanine FPGA/ASIC

- Data flow and buffering in FEC FPGA
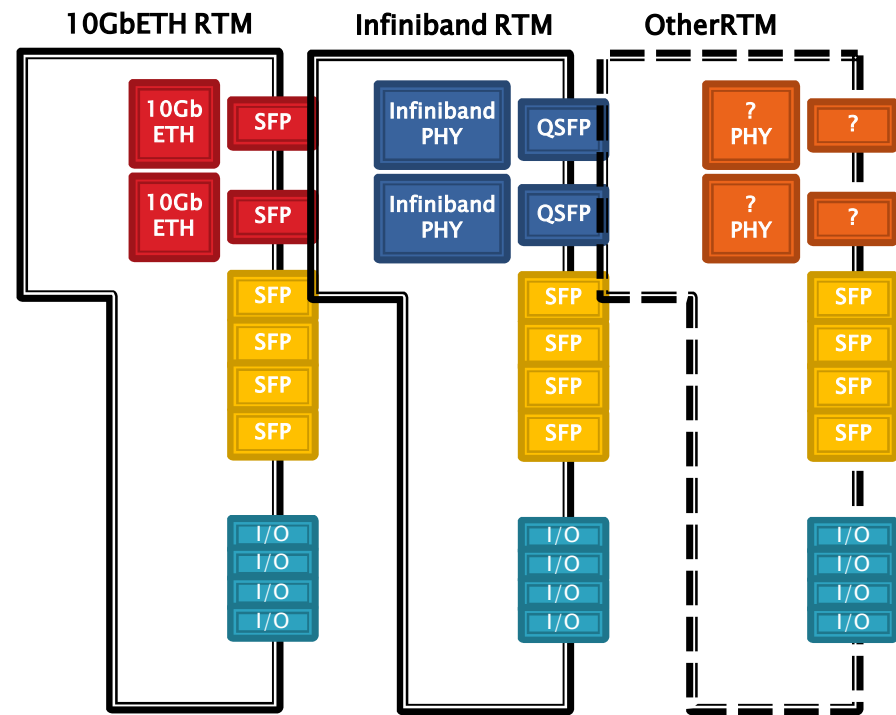
FEC ADC Mezzanine Board

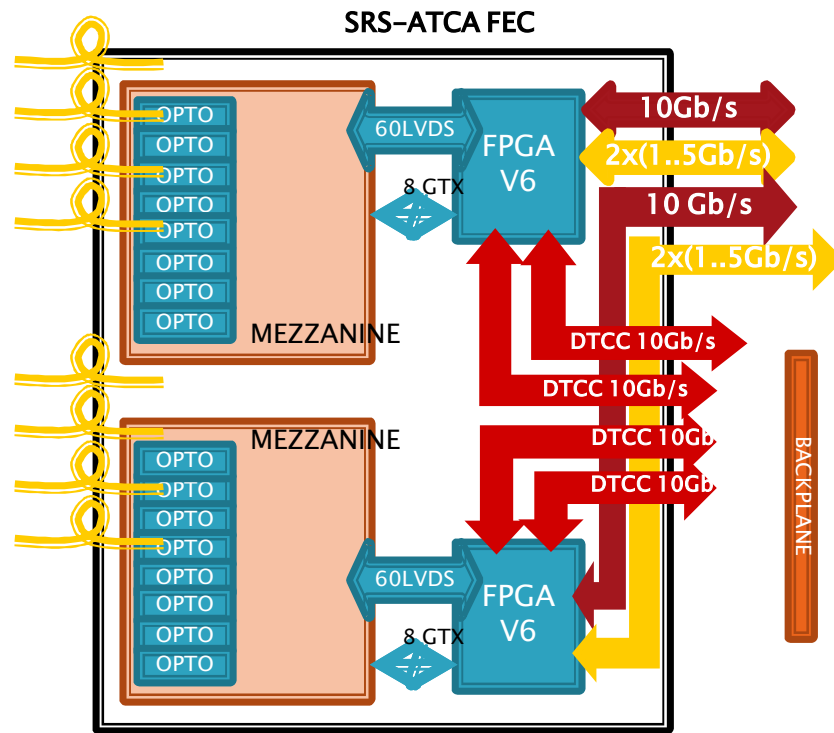▶ FEC Board

- ◦ Serial, fast links
- ◦ 24 analog channels
- ◦ 12 HDMI connectors
- ◦ 4 Low Power 8-Channel, 12-Bit, 50MSPS ADC with Serialized LVDS Interface

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ATCA FEC Blade

▶ FEC Blade

ATCA FEC Blade

Developed for CERN

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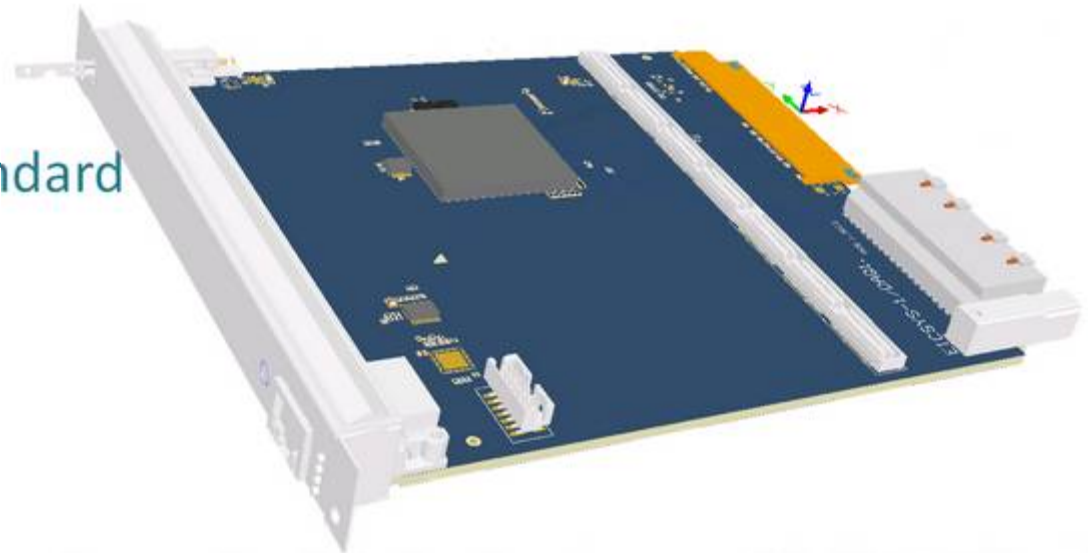
ATCA FMC Blade

- FMC Blade developed by Fermilab seems like similar to our FEC Board.
- With 4 FMC interfaces,
- RTM with SFP´s
- 2 FPGA´s for transfer management.
- Separate power to RTM

Source: Fermilab

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MTCA.4 FEC Carrier

▸ MTCA Carrier

   ◦ Board Dimension >> double width, full size

   ◦ Infrastructure on Board:

      • Similar to the ATCA Blade to handle up to 40 Channels FEC Boards

   ◦ 1 FPGA, Virtex 6

   ◦ RTM Interface

   ◦ Following MTCA.4 Standard

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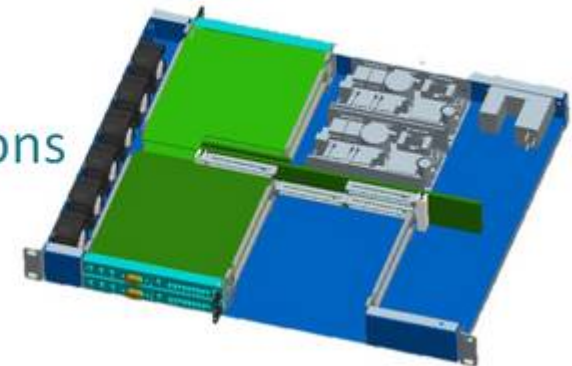
MTCA.4 FMC Carrier

Licensed by
DESY
DFMC 20

- Double width, mid-size MTCA.4 form factor
- Advanced Mezzanine Card (AMC)
- Dual-FPGA processing
- XC6SLX45T for serial communication including PCIe
- XC6SLX150 for signal processing and connectivity to RTM and FMCs
- Rear IO connected to FPGA, Class D1.0 compatible
- Supports 2 FMCs: One HPC module and one LPC module
- ANSI/VITA 57.1 compliant
- Extra power connector for FMCs
- IPMI 1.1 compliant MMC

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Scales of MicroTCA Systems from Eicsys

▸ 1 U 2 Slot MTCA .4 System
  ◦ 2 MTCA.4 Slots double width Compact Size
  ◦ 1MTCA.0 Slot single or double width
  ◦ 1 Management Slots for MCH
  ◦ 1 Interface Slot
  ◦ Cooling from side to side
  ◦ Power Supply certified for med. Applications
    • Optional red. Power supply

Scales of MicroTCA Systems from Eicsys

▶ **2U MicroTCA .0 System**

- ◦ 12 Slots Single width, Midsize µTCA.0
- ◦ Fullsize MCH with 1GbE and fat pipe support for PCIe or XAUI or SRIO
- ◦ Fullsize Quadcore Processor AMC
- ◦ ADC/DAC Boards single or double width
- ◦ Storage Boards a.s.o.
- ◦ The Integration follows customers request.

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Scales of MicroTCA Systems from Eicsys

▸ **5 U MTCA.4 System**

  ◦ 6 Slots MTCA.4 Standard with RTM

  ◦ 2 red. Power Supplies

  ◦ 1MCH MTCA.4 Standard with Processor AMC as RTM

  ◦ Eicsys UNI DAQ1 Board

  ◦ Eicsys FMC Carrier

  ◦ Eicsys ADC Carrier

  ◦ Integration follows customers request

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Scales of MicroTCA Systems from Eicsys

▸ 9U MTCA.4 System

- 12 Slots MTCA.4 Standard with RTM
- 2 Powersupplies up to 1200 Watts
- 1 MCH
- 1 double width CPU
- 1 ADC Carrier
- 1 FMC Carrier
- The Integration follows customers request
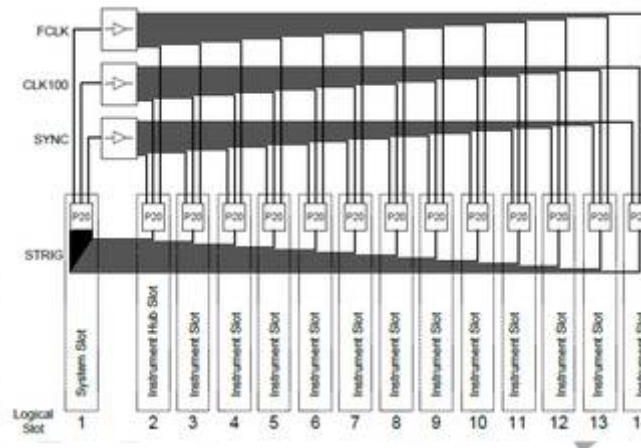
Scales of ATCA Systems from Eicsys

▸ 3U, ATCA System

- 2 Slots 8U, 1" ATCA with Rear Transition Slots
- 110-230 V AC Power 850 Watts, opt. redundant
- 2 Fan Cassettes
- Shelf Manager, opt. redundant

Scales of ATCA Systems from Eicsys
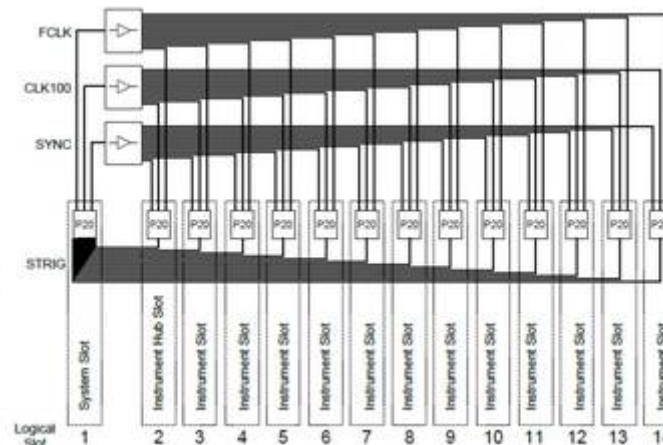
▶ 6U, ATCA System

◦ 6 Slots 6U, 1" ATCA with Rear Transition Slots

◦ 90-264 V AC Power, max. 850 Watts, up to 4 Power supplies

◦ 2 Fan Cassettes

◦ Shelf Manager, opt. Redundant

◦ Full Mesh Backplane

◦ Opt. LVDS Lines on P20 to connect the management Blade via Backplane

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Scales of ATCA Systems from Eicsys

▸ **13U, ATCA System**

- 14 Slots 13U, 1" ATCA with Rear Transition Slots

- -48 V DC Power Entry Modules

- 2 Fan Cassettes

- Redundant control boards for Pigeon Point SHMM500 shelf manager, RS232 and Ethernet at front panel, hot swappable

- Redundant Shelf FRU Data boards with Telco Alarms functionality

- 40Gbps capable Split backplane design
  (power and high speed sections are separated)
  Full Mesh, Dual Star or Dual-Dual Star backplane topology

- Opt. LVDS Lines on P20 to connect the management Blade via Backplane.

Scalability from MicroTCA to ATCA

▸ Common FEC Board fit to apply
- ◦ on MTCA.4 Carrier
  - • 1U, 2 Slots up to 12 Slots
- ◦ on ATCA Carrier
  - • 2 Slots, with 4 FEC Board up to 14 Slots with 28 FEC Boards

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Scalable Systems

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Thank You for Attention

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