Towards Migration from VME to MicroTCA in Accelerator Control Systems at SuperKEKB and Linac

Hitoshi Sugimura (KEK)

Current Control Hardware

CAMAC

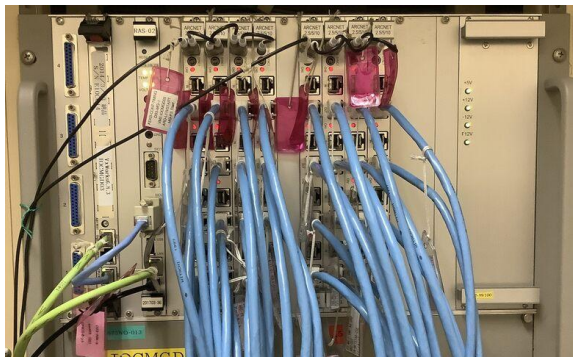
- For RF system
- Will move to MicroTCA by the RF team if budget allows
- Not mentioned in this talk.

PLC

- For Vacuum system, Safety system, etc.
- A robust and reliable system

VME

- For Monitor and Timing and Magnet
- Old, but still widely used



Current Issue of VME system

Old OS and CPU

- VxWorks 6.8(6.9) on MVME5500
  - MVME5500 has already discontinued.
  - BSP of VxWorks on MVME5500 is only supported version 6.9
- EPICS community will end support for VxWorks starting with version 7.1
  - Current latest release: EPICS 7.0.9

If continue VME system

- Move to new VME CPU

Or migrate MicroTCA system

- I'd like to talk about this contents

History of MicroTCA Introduction

2018 – First Trial

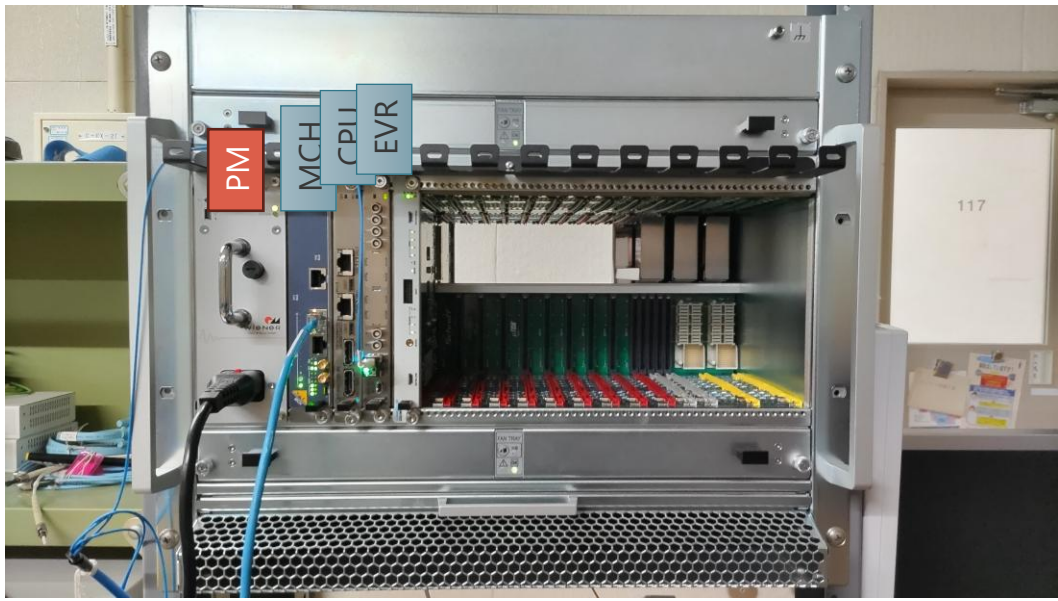
- Purchased a small MicroTCA crate from Vadatech
  - Chassis: VT814 (2U, 6 AMC slots, 500W PM (UTC017), w/ JSM)
  - MCH: UTC004
  - CPU: AMC725 (Xeon E3-1125)
- Also purchased mTCA-EVR-300U
- Started tests with Event Timing System
  - Could not read out properly (CPU issue or incompatibility?)

History of MicroTCA Introduction

Collaboration and Information Gathering

- Collected information from ESS (European Spallation Source)
  - ESS successfully operates control system with MicroTCA
  - They use “Concurrent AMC-CPU”

Around 2020 - Second Setup



- Adopted Concurrent AMC-CPU(AM G6x/msd)
- Changed crate to Schroff (nVent)
  MicroTCA.4 (9U, 12 AMC, 12 RTM, 11850-026)
- Power Supply: Wiener MTCA.4 (1000W)
- MCH: NAT-MCH-PHYS
- Achieved Successful readout of the Timing System

History of MicroTCA Introduction

Since 2024 – Ongoing Work

- Work has been taken over by Di Wang
- Continuous and active testing is ongoing
- Please check Di Wang's talk tomorrow for the latest results

Future Outlook

Now also working with Vadatech crate

- See Di Wang's talk tomorrow

Focus: Event Timing System

- Next: ADC, DAC, etc.

Challenge: high cost & limited budget

- Development will proceed slowly

Still, an investment for the future

Summary

- VME is still the main platform for accelerator control at SuperKEKB and Linac
- MicroTCA introduction started in 2018, with significant progress around 2020.
- Since 2024, Di Wang has been leading the ongoing testing
- Although there are challenges such as cost and budget limitations, we are gradually preparing for a future migration to MicroTCA.