

Overview & Specifications

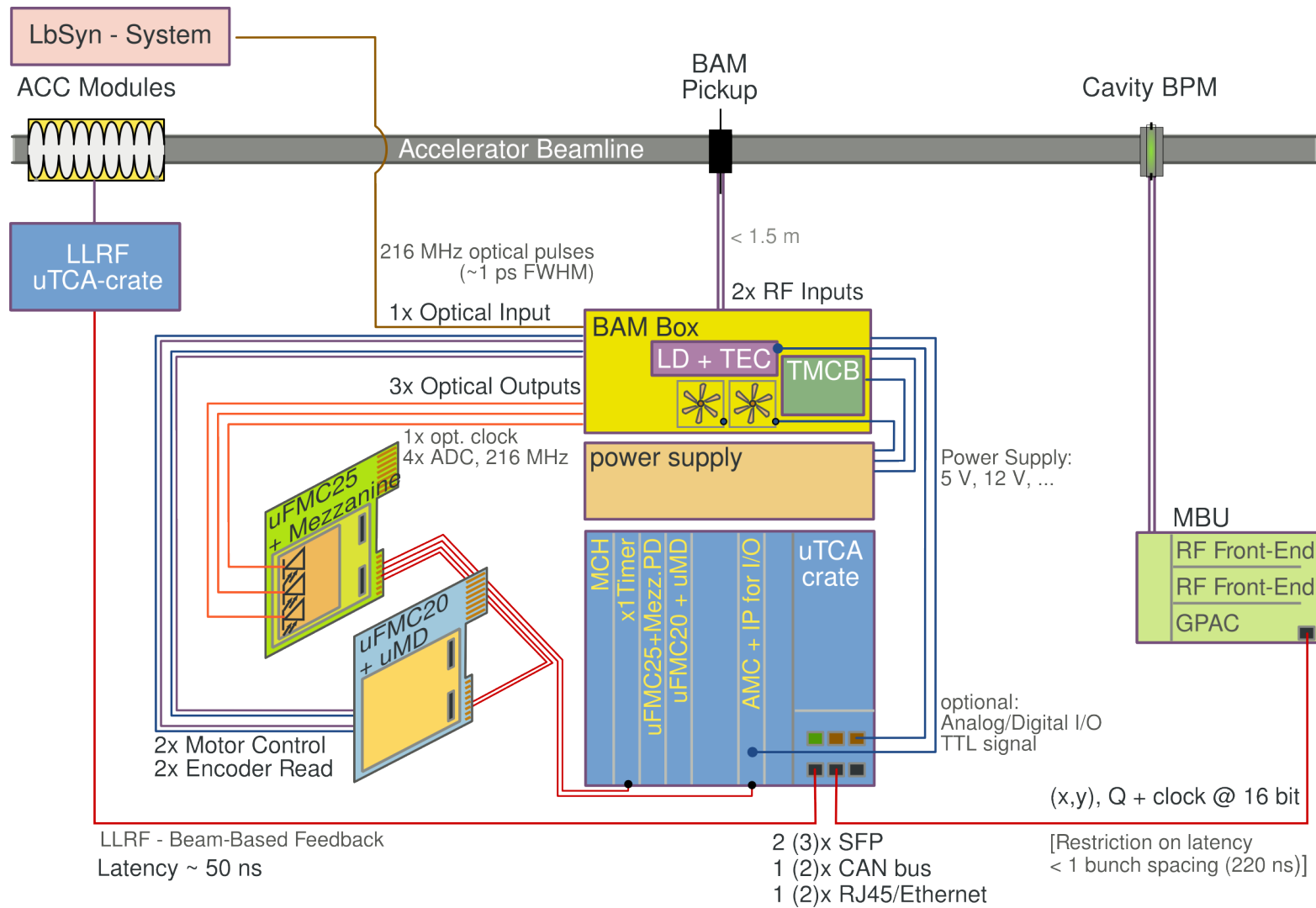
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BAM Generation 3 – Overview on Specifications for Electronic System

Advanced Techniques in LLRF control for XFEL – Collaboration Workshop

19. - 21. February 2013, Otwock-Swierk

System Overview & Interfaces



Interfacing: open questions

> uFMC25 ↔ MD22

- communication via standard backplane
- which ports
- No. of signals for controlling both motors and reading back encoder data
 - > MD22: control of 2 Stepper motors + read-out of position encoder: EnDat2.2 data format
- data rates: 10 Mbit/sec

> uFMC25 ↔ I/O cards

- Option: control of optical switch (e.g. via TTL signal)
 - > via backplane → which ports
 - > Or: with RTM card
- synchronised to machine trigger



> Challenge:

- Conversion of laser pulses (\sim ps FWHM) to electr. Signal (clear pulse w/ flat baseline)
- Sampling rate of 216 MHz (laser rep. Rate):
 - > 2 channels
 - > 2x ADCs per channel (peak & baseline)

> Requirements & Current Status:

- PD input:
 - > PD output power level wrt optical input power
 - > set diff.. amplifier according to expected opt.power wrt. PD
 - > characterisation of pulses (pronounced separation between peak & baseline)
 - > amplitude jitter at peak & baseline
- ADC performance:
 - > dynamic range
 - > buffer current for optimal SFDR
 - > employment of time shifters
 - > SNR
 - > ENOB
 - > max. clock jitter wrt to full BW signals
 - > amplitude jitter (peak & baseline)

> Basic firmware

- clock shifter
- communication: PCI, IPMI
- read-out of ADC1-4

> Data processing in firmware

- divider implemented
- ratio A to B implemented
- sampling point
- calibration of unscaled data
- read-out of BPM data → correction of data

> Connection to timing system and remote access

- x2timer clock & trigger signal received
- stable trigger implemented
- remote trigger shift
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Rough timeline

> Boards ready for installation

- FLASH /FLASH II:

- > 1x needed June **2013**

- » Test system for BAM.18(15)ACC7

- » Server development & tests

- > at least 2 more until August/September **2013**

- » BAM.3DBC2 & 4DBC3 → connection to LLRF for Feedback

- > 3 more by end of this year

- » BAM.1UBC2 and 2x FLASH II BAMs

- Europ.XFEL:

- > 1x for September **2014**

- » XTIN: BAM.47.I1

