

Fiber Link Stabilization & MTCA

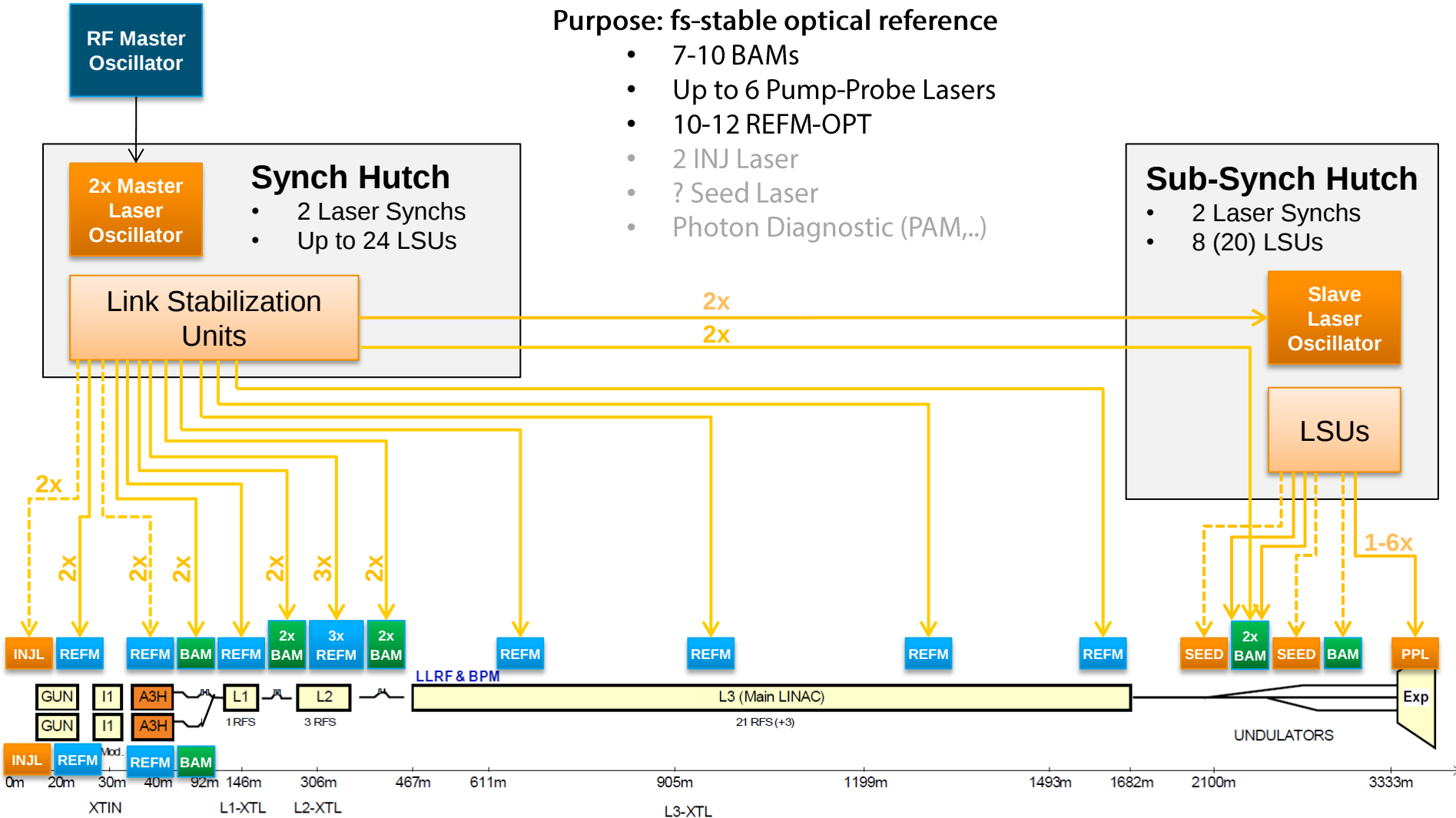
Matthias Felber

MSK Collaboration Workshop

DESY

12th May, 2013

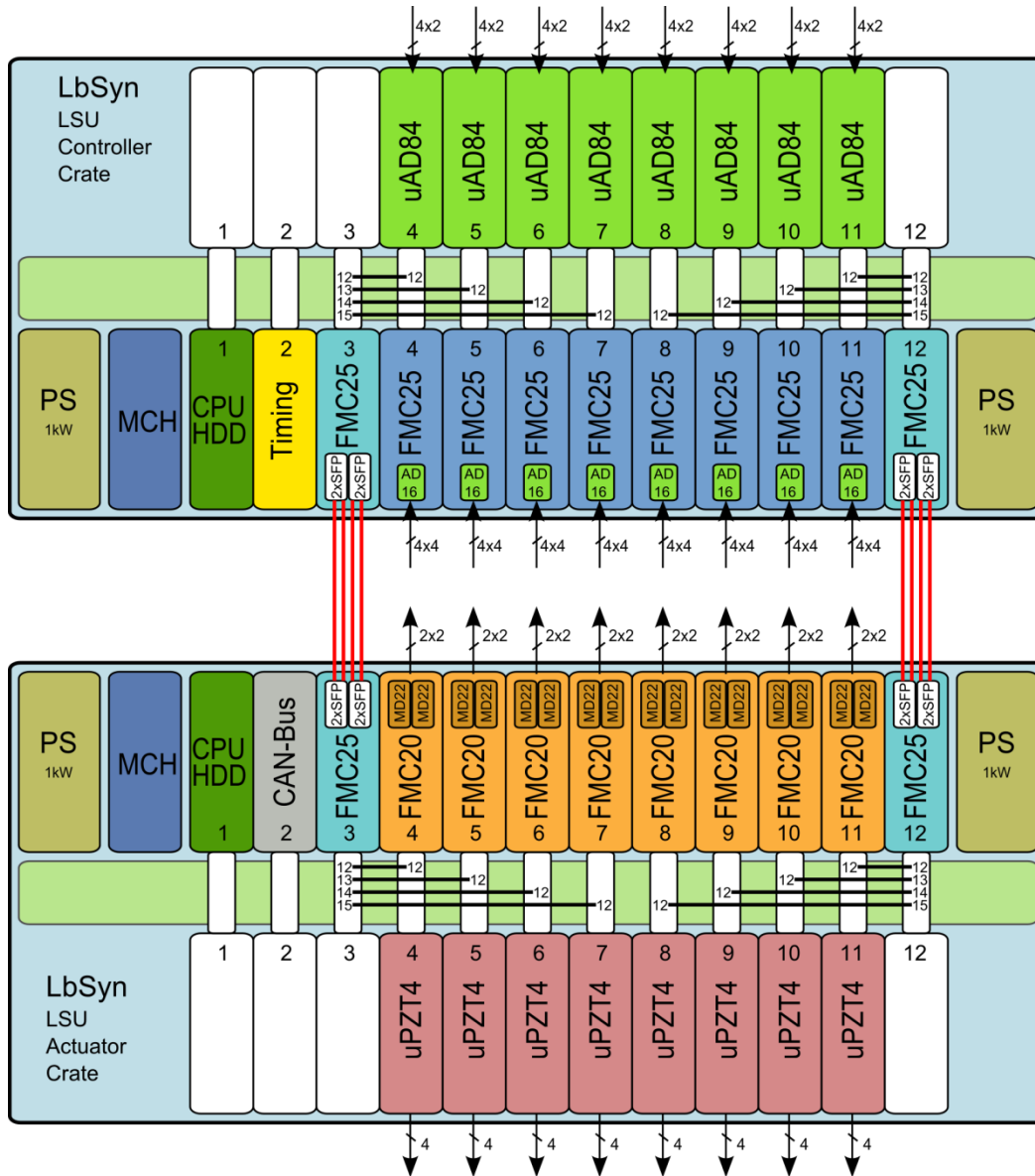
Introduction - Optical Links at the European XFEL



MTCA Hardware



LSU Control: Crate Configuration (max. 32 LSUs)



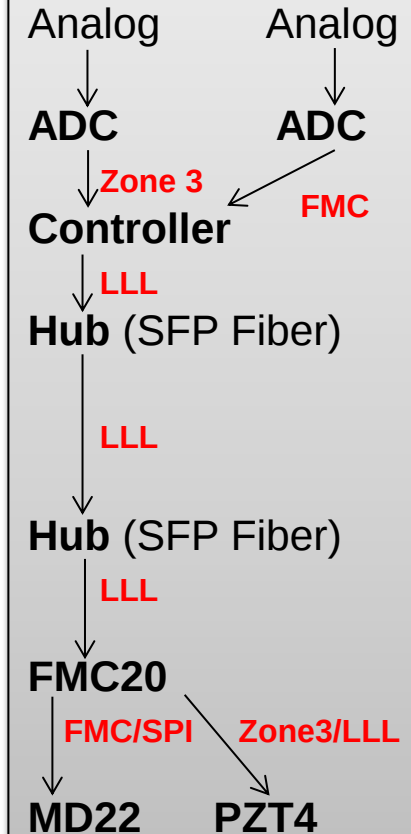
ADCs

Controllers

Motor Actuators

Piezo Actuators

Data Flow:



LSU Control: Crate Configuration (max. 32 LSUs)

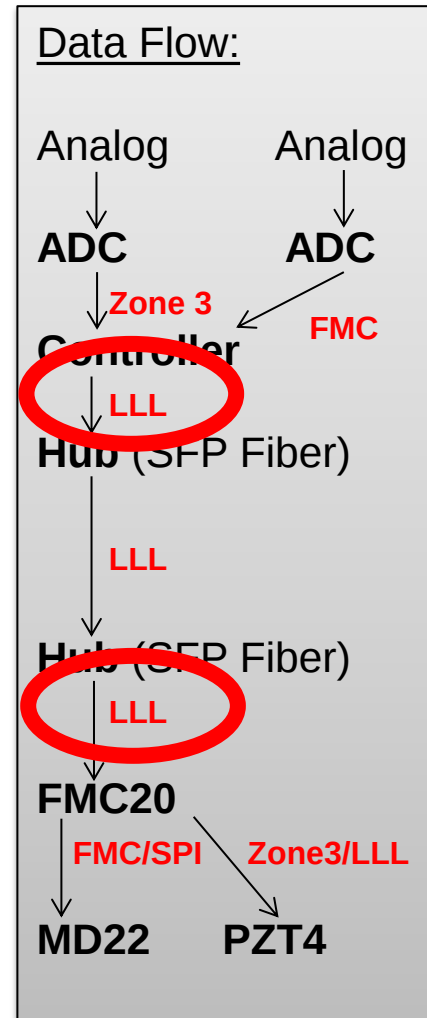


ADCs

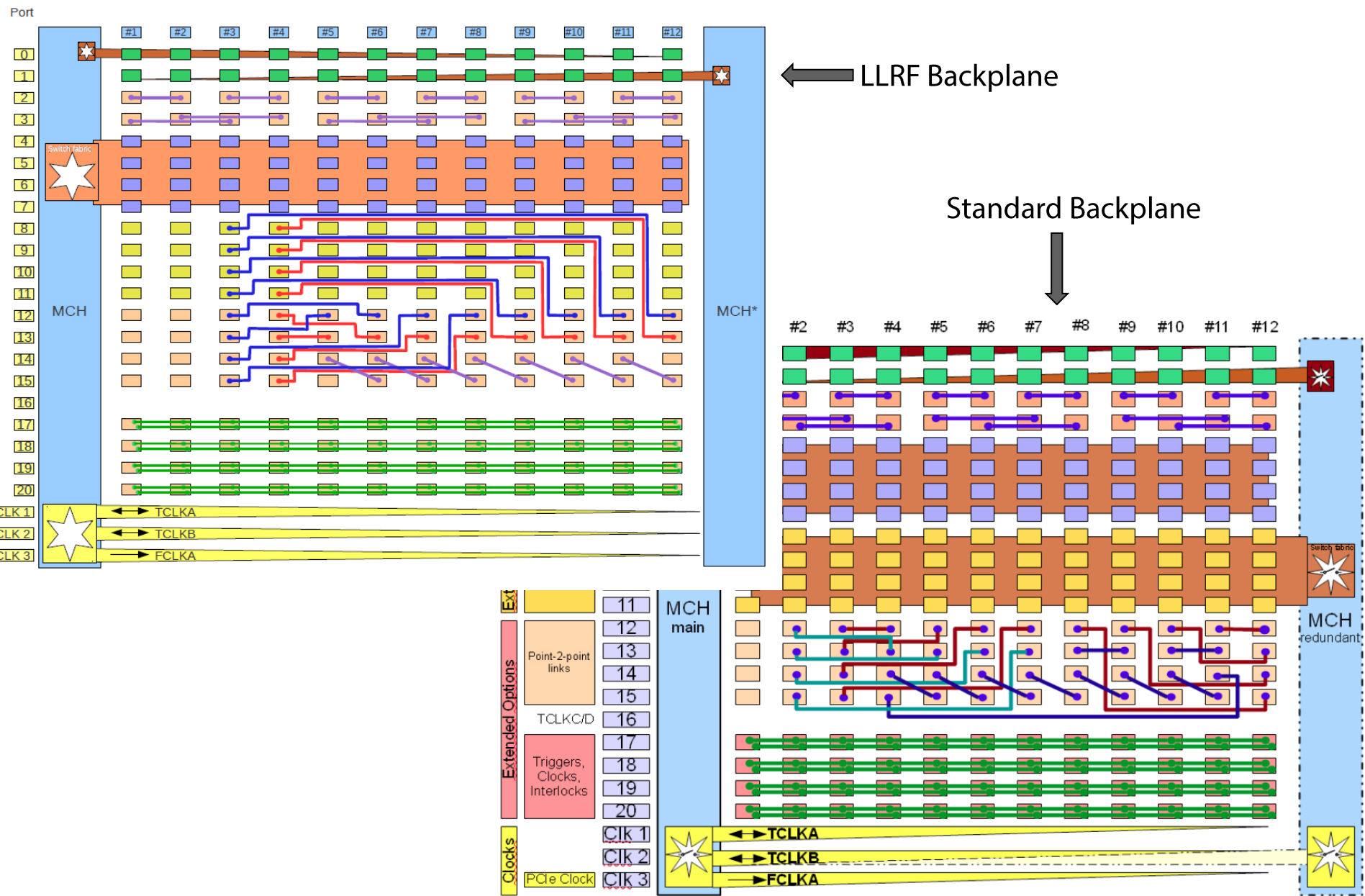
Controllers

Motor Actuators

Piezo Actuators



Standard vs. LLRF Backplane



Communication and Data Rates (64 Channels = 32 LSUs)

> AD84	ZONE3	FMC25 Ctrl.	8 x 160 Mbit/s (10 MSPS x 16 Bit) (x 8 controller boards)
> FMC25	LLL on Bckpl Point2Point Ports 12-15	FMC25 Hub	4 x 8 Mbit/s (4 Links x 100 kSPS x 18 Bit) (x 2 hubs)
> Hub MGT	FMC	SFP	4 x 8 Mbit/s (2 SFPs per FMC → 4 SFPs per hub) (x 2 hubs)
> SFP	Fiber	SFP	4 x 8 Mbit/s (2 SFPs per FMC → 4 SFPs per hub) (x 2 hubs)
> SFP	FMC	Hub MGT	4 x 8 Mbit/s (2 SFPs per FMC → 4 SFPs per hub) (x 2 hubs)
> Hub	LLL on Bckpl Point2Point Ports 12-15	FMC20 MGT	4 x 8 Mbit/s (4 Links x 100 kSPS x 18 Bit) (x 2 hubs)
> FMC20	LLL on ZONE3	PZT4 DAC	2 x 4 Mbit/s (2 DACs x 200 kSPS x 18 bit) (x 8 actuator boards)

➔ **Speed is not the issue but we need low latency!**



Hardware Status

- > **AD84 V3.0:** 6x produced and assembled. Ready to use. 
- > **FMC25 V3.0:** 6x produced and assembled. No serious mistakes found. This week assembly of few missing components (info from HW-meeting minutes 05.05.) 
- > **FMC20 V2.0:** 10x produced, 5x assembled. Small mechanical issue, tests on-going 
- > **PZT4 V2.0:** 5x produced, 3x assembled. No major mistakes found, tests on-going 
- > **AD16 V1.0:** 5x produced and assembled. Functioning, performance test needed. Redesign after performance test for 2.5 V version. 
- > **MD22 V2.0:** 5x produced and assembled. Ready to use on FMC20. Redesign for 2.5 V version ready, but not produced. 
- > **SFP4:** Design started 

Next Steps, further plans

1. Tests of FMC25 (Stefan, Jarek)
2. Adaptation of FMC25 firmware structure to comply with our framework (Łukasz, Jarek)
3. Adaptation of AD84 support firmware to comply with our framework (Łukasz, Konrad)
4. Introduction of support for those components in the Simulink library (Paweł)
5. Installation of complete card-set in 26a (Paweł, Matthias)
6. Development of control firmware (using the library) for FMC25 (Paweł)
7. Server development (Paweł)
8. After SFP4 is ready, implementation and test of 2-crate setup (Paweł)
LLL on backplane → Hub → SFP → SFP → Hub → LLL on backplane
9. **Synchronize the XFEL**

