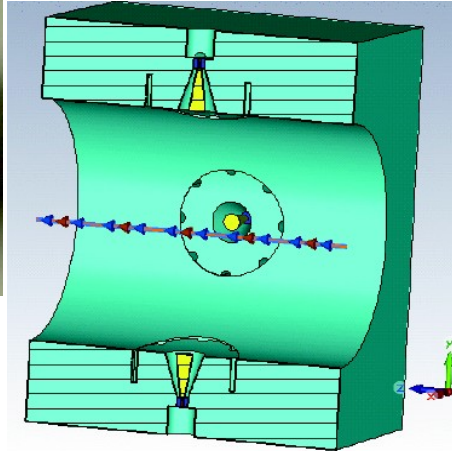


Bunch Arrival Time Monitor : Overview and Timeline



Marie Kristin Czwalińska

Bunch Arrival Time Monitor : Overview and Timeline

MSK collaboration workshop
Hamburg, 12. - 13. May 2014

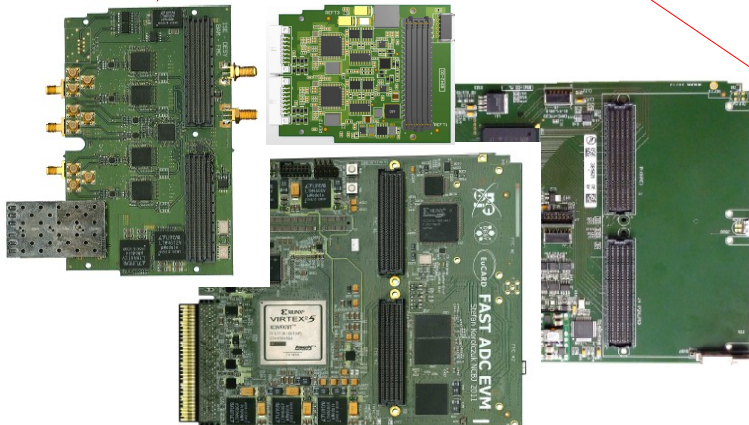
BAM : General Layout

- BAM = Bunch Arrival Time Monitor
- measurement of electron bunch timing with femtosecond resolution (< 10 fs)
(relative to optical timing reference)
- complex system, comprises 3 sub-units:

- RF Unit (broad-band up to 40 GHz)
- Electro-Optical Unit
- Electronics

(read-out, control, general I/O, ...)

FMC25 + DSBAM
FMC20 + MD22 (2x)



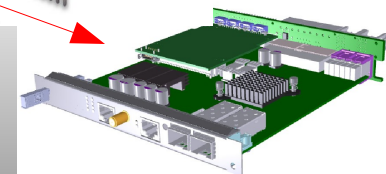
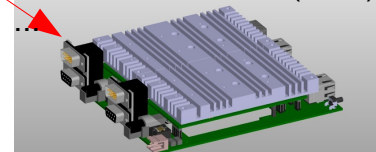
40 GHz pick-up
design by TU Darmstadt,
housing made by DESY



Electro-Optical Modulator
Telecomm. standard → 40 Gbps
Intensity Modulator



TMCB2
Temp. controller
Laser-Diode Driver (LDD)



BAM : Components

RF Unit

RF pickup

low-loss, phase-stable cables

power combiner

power limiter (50 GHz BW)

optional power amplifier

optional attenuator, voltage-controlled

EO Unit

connected to stabilised fibre link (fs synchronisation system)

2x motorised, optical delay line

1x motorised (static) optical delay

2x electro-optical modulators: 20 GHz and 40 GHz BW
optical switch (50 ns rise-time)

diverse, polarisation maintaining fibre-optical components

- circulator
- combiner/splitter
- optical amplifier
- optical power coupler

Electronics

MTAC.4

- FMC25 + DSBAM
- FMC20 + 2x MD22

TMCB2 + backplane

FRED

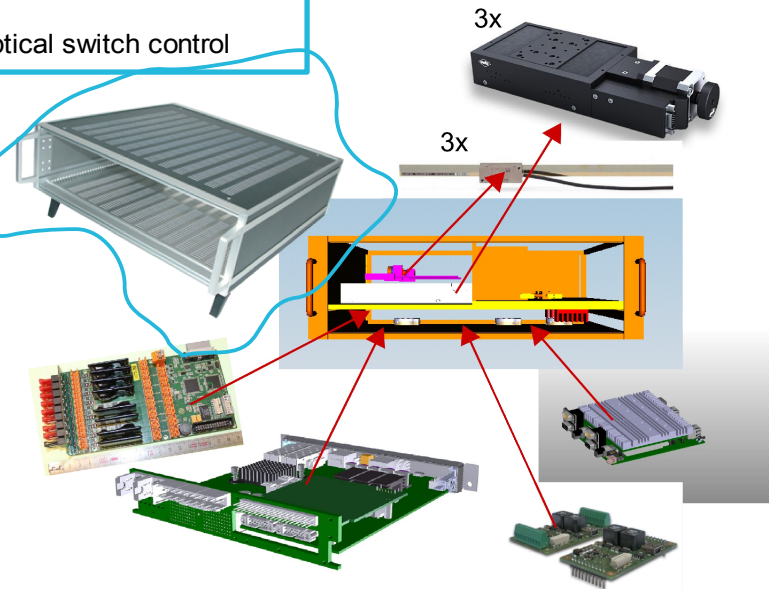
LDD (1 channel)

temperature controller

optional fan control

optical switch control

BAM Box :
19" module, 4U, 530 mm depth



Installations

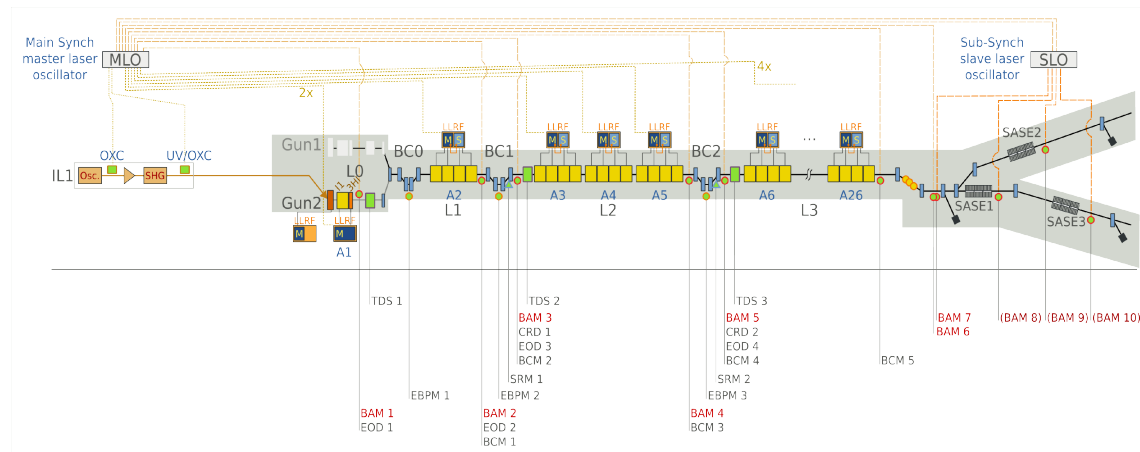
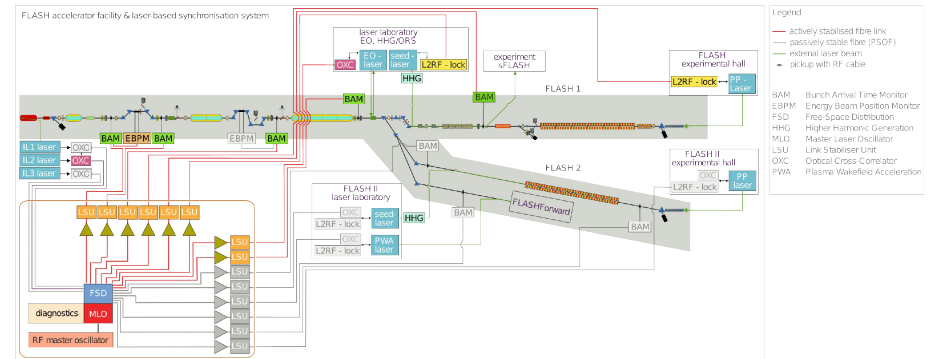
- 1st BAM installed at FLASH in 2006
- until 2012 , 3 more followed, further planned

➤ final stage : 8 BAMs at FLASH

- 4 in FLASH linac
- 1 in FLASH1 beamline
- 2 in FLASH2 beamline
- 1 in FLASH3 beamline

➤ planned : 8+1+2 BAMs at XFEL

- 1 per injector
- 4 in linac
- 1+1 in collimation section
- up to 3 in SASE beamlines (min. 1)



Timeline

ORIGINAL PLAN

(from Feb. 2013)

listed all installations which needed at least **FMC25+DSBAM**

BAM Locations	Deadline	# Electronics required
FLASH ACC7	2013 Jun.	1x
FLASH DBC2/DBC3	2013 Aug./Sep.	2x
FLASH UBC2/SFELC	2013 Dez.	2x
FLASH2	2014 Jun.	2x
XFEL XTIN	2014 Sep.	1x



Timeline... seriously

THE PLAN

(from May. 2014)

listed all installations which need FMC25+DSBAM, FMC20+MD22
& partly TMCB2+backplane, FRED, LDD,

BAM Locations

FLASH DBC2

FLASH DBC3/ACC7

FLASH UBC2/FLASH2

FLASH SFELC/XFEL XTIN

Deadline

2014 Jun.

2014 Aug./Sep.

2014 Dez.

2015 Jan.

Electronics required

1x

2x

3x

2x

