Overview on Linac LLRF System

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for the LLRF - Team

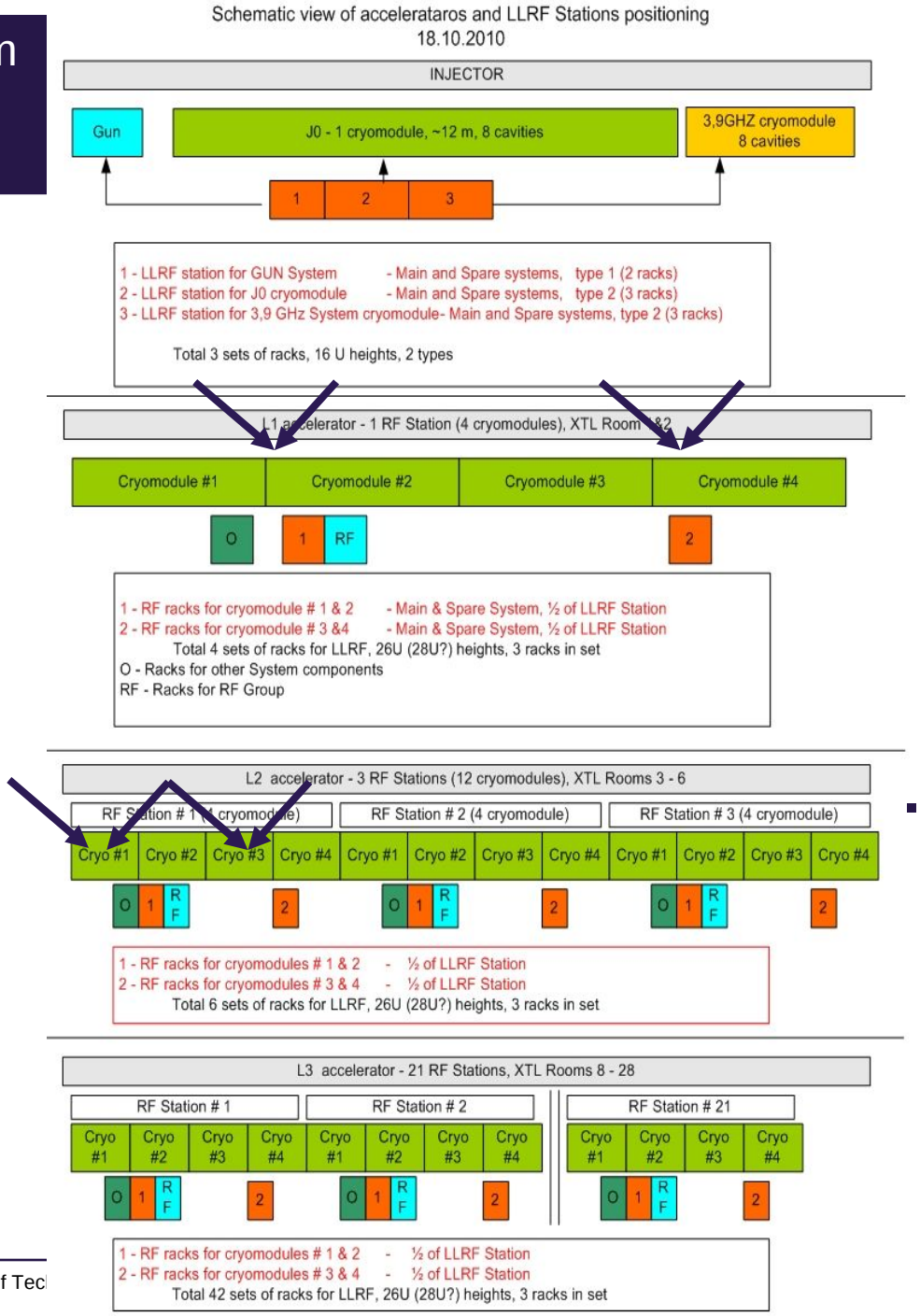
Overview on Linac LLRF System

Crate distribution

1 RF-station L1

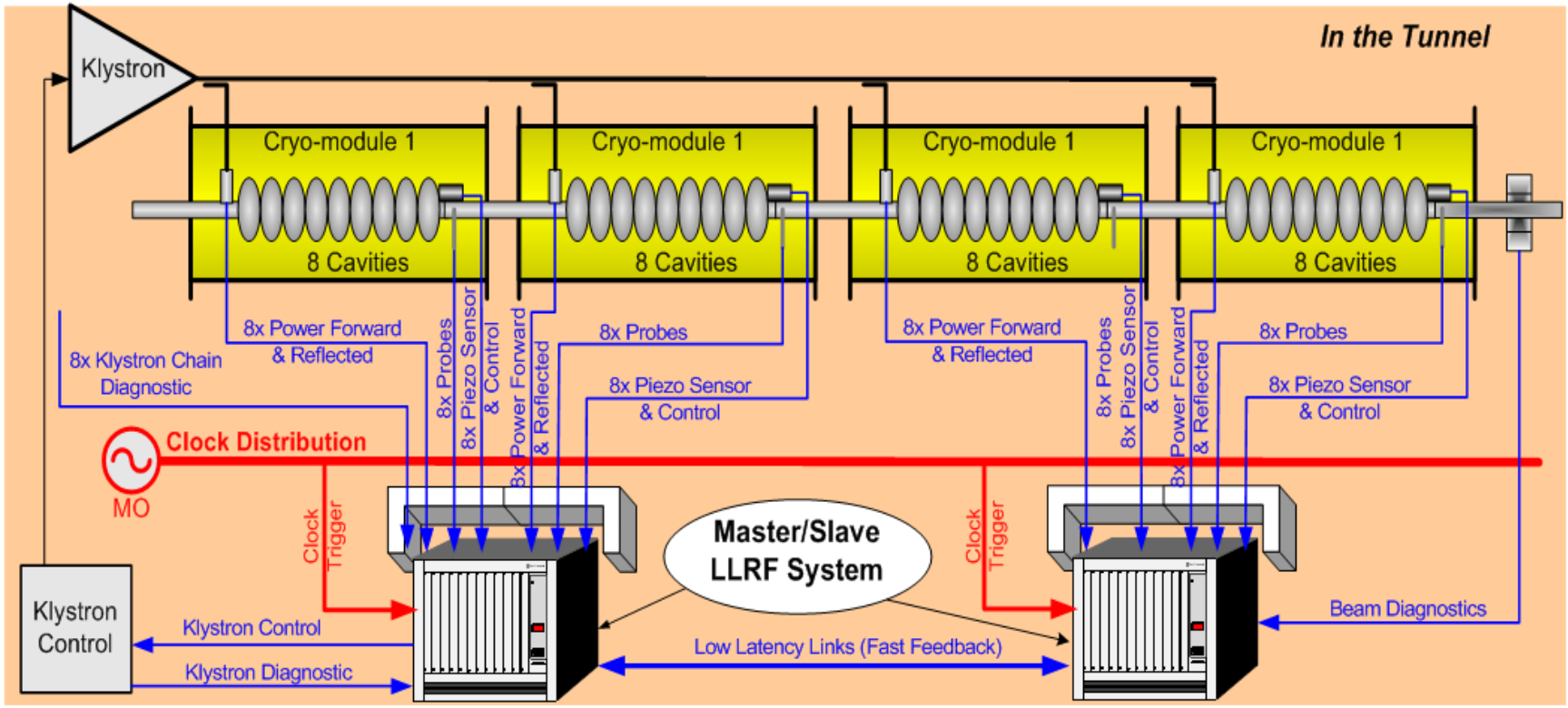
3 RF-stations L2

21 RF-stations L3

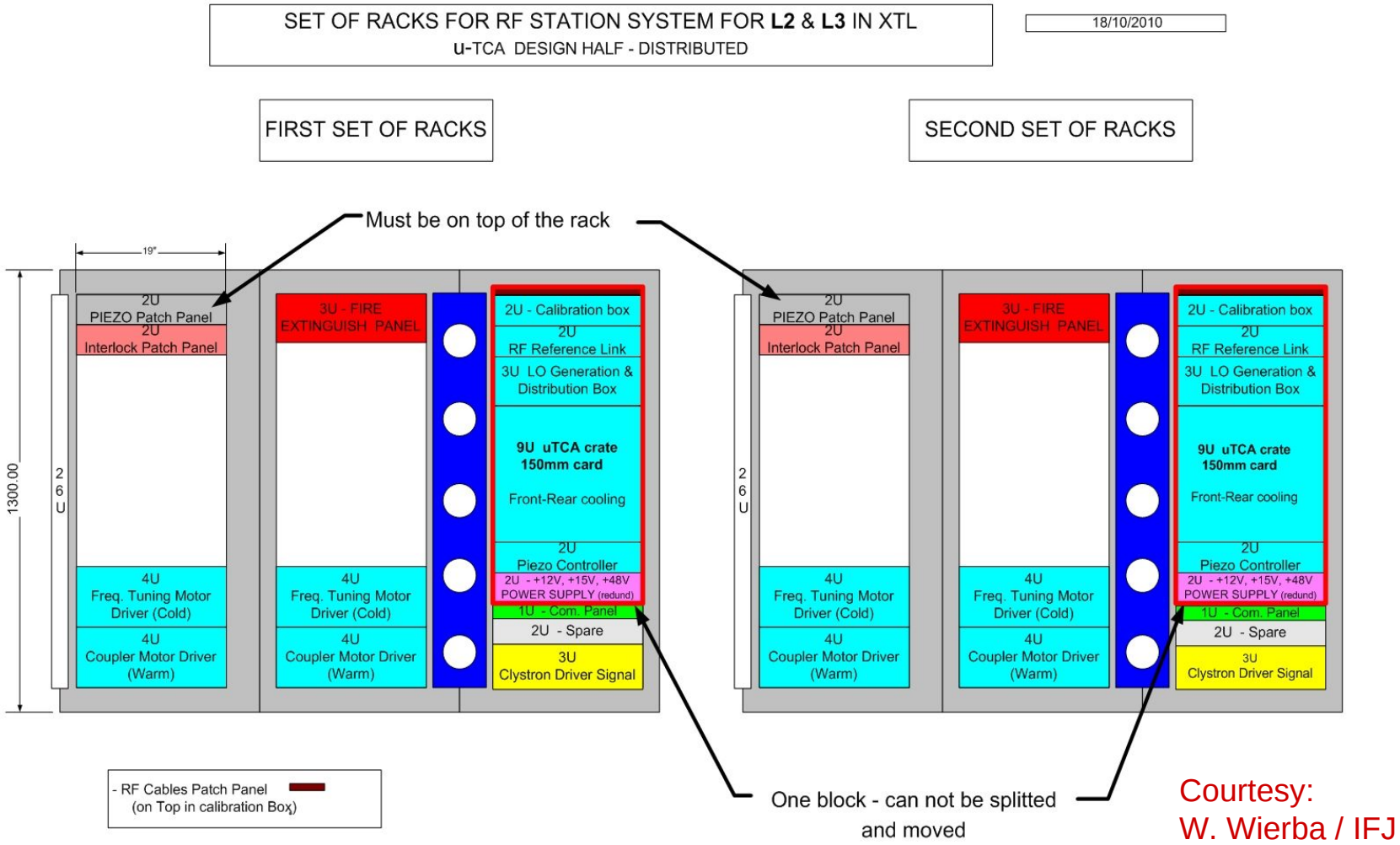


Courtesy:
W. Wierba / IFJ

LLRF system for EU-XFEL

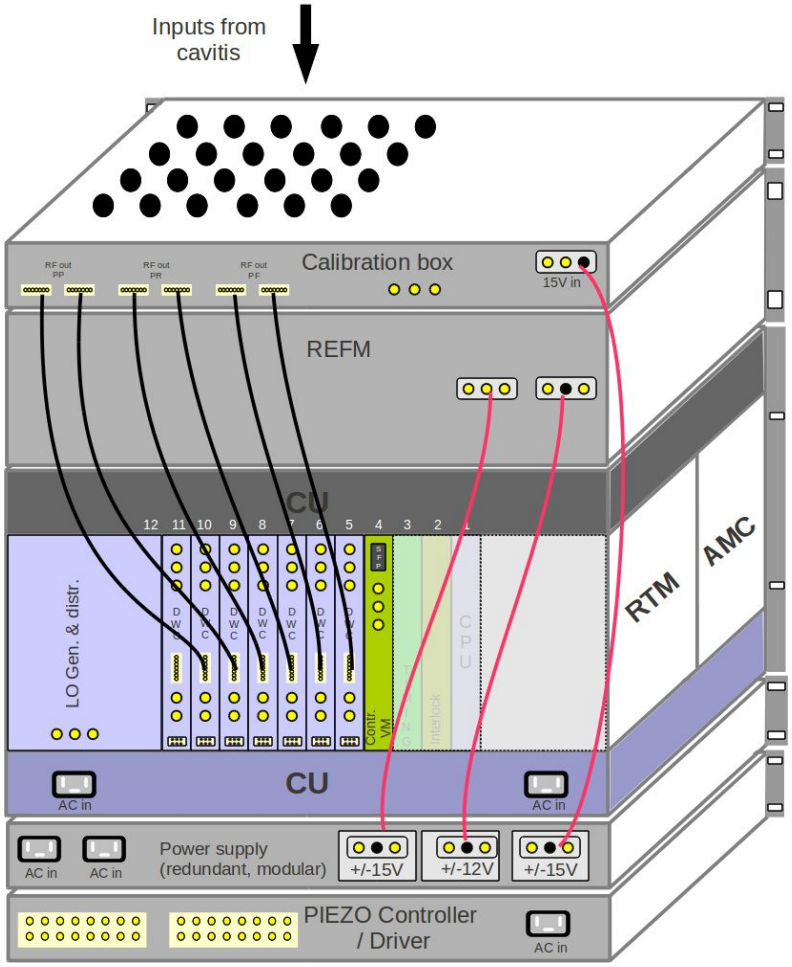


L3 - LLRF rack occupation

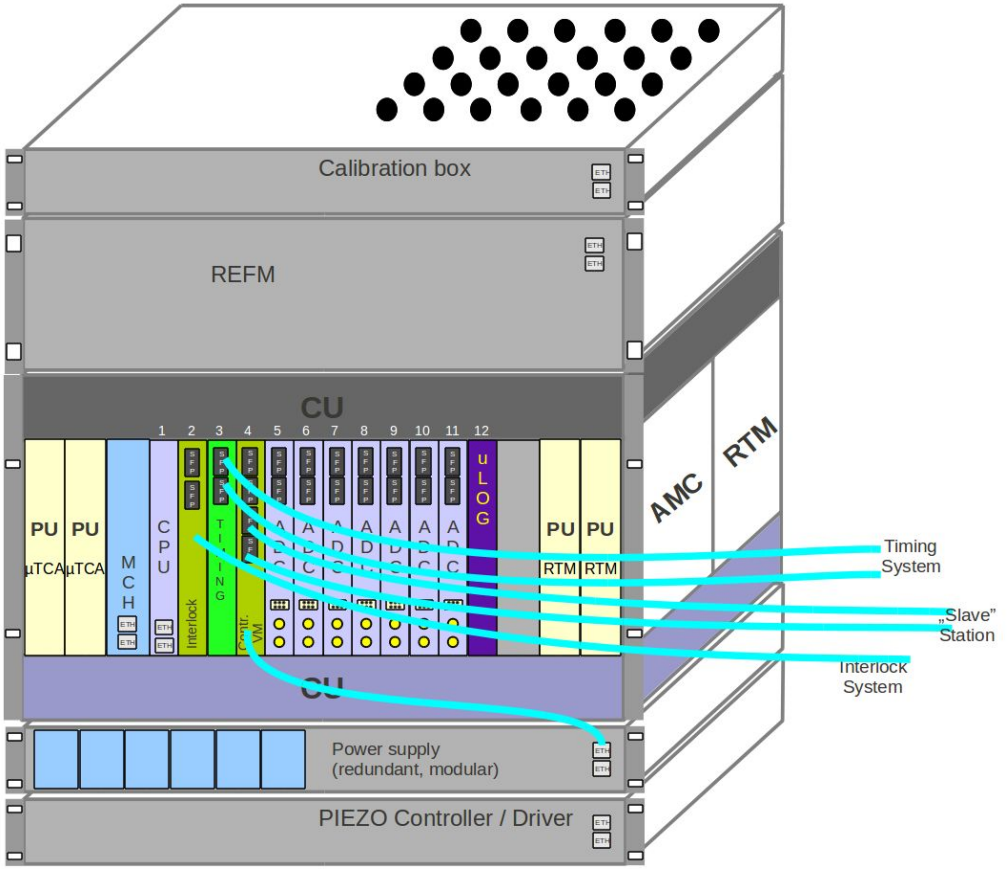


Courtesy:
W. Wierba / IFJ

LLRF in xTCA Crate

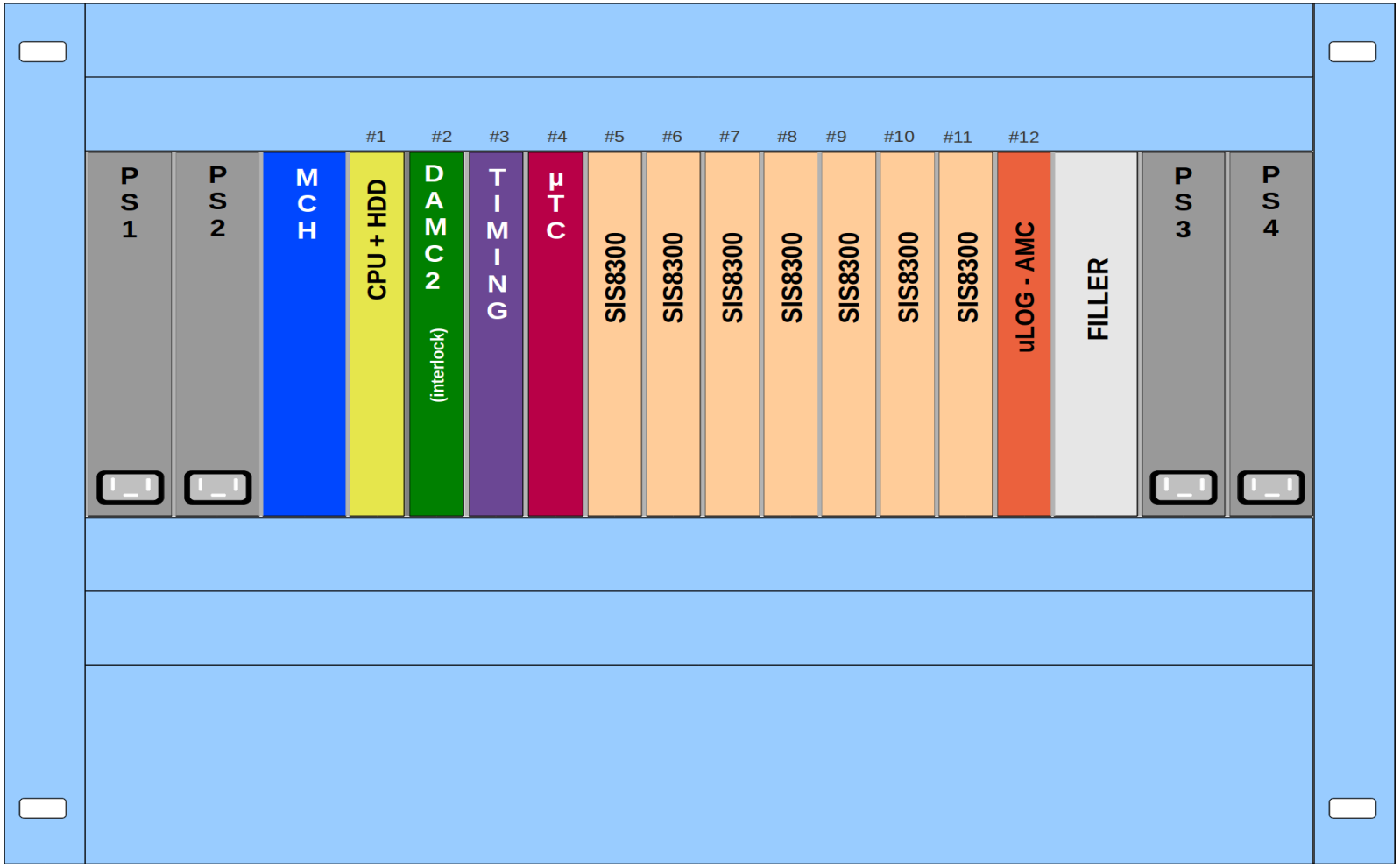


rear

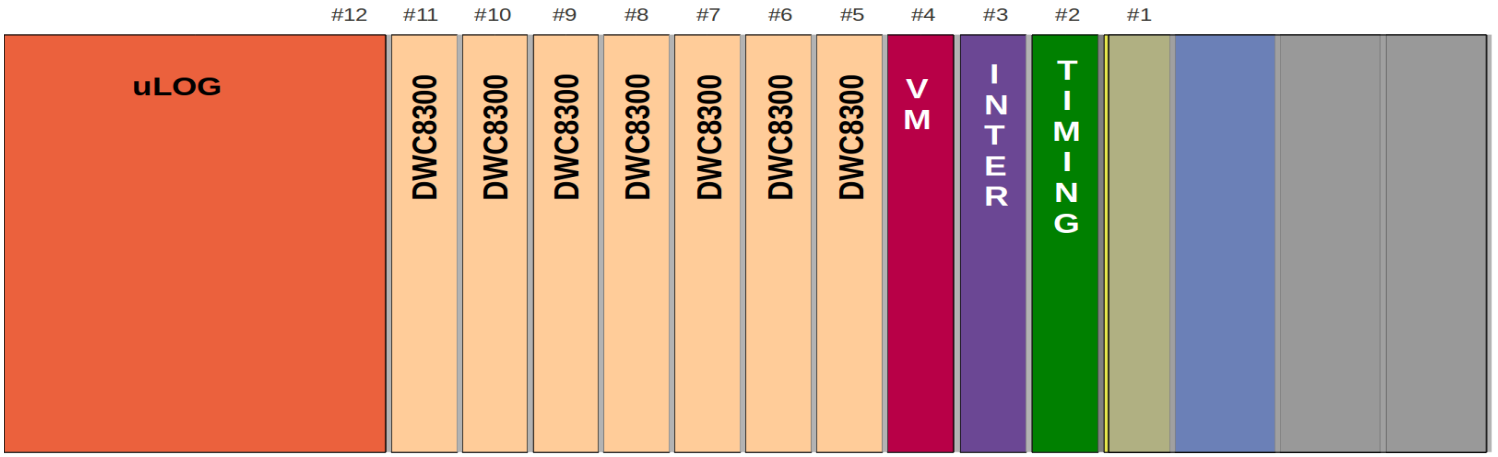


front

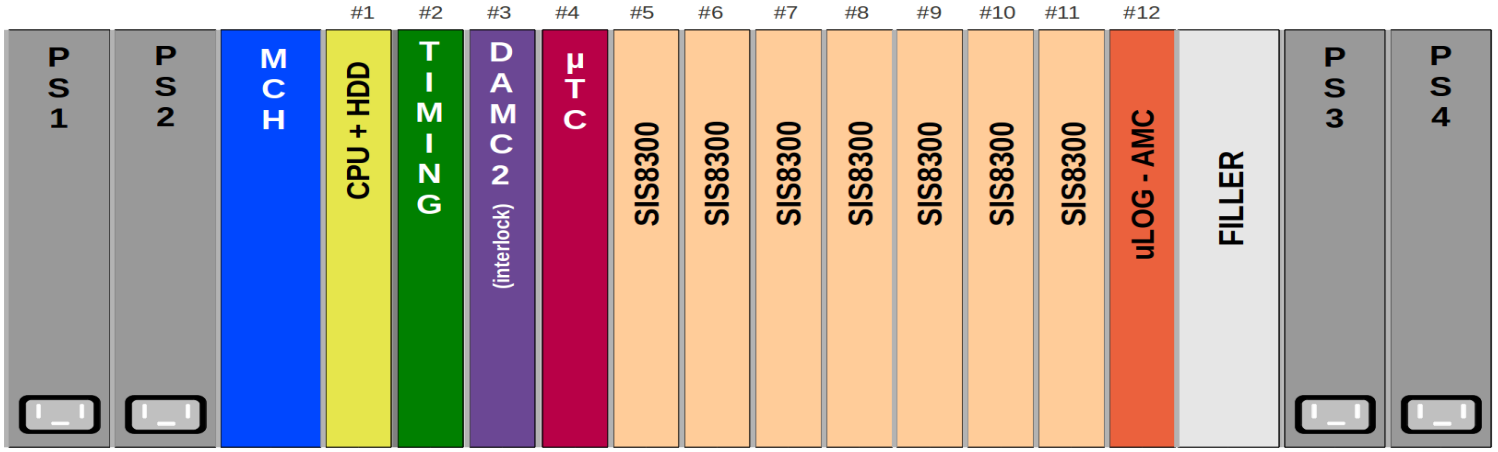
LLRF Crate


#1
#2
#3
#4
#5
#6
#7
#8
#9
#10
#11
#12
PS 1
PS 2
MCH
CPU + HDD
DAMC 2
(interlock)
TIMING
µTC
SIS8300
SIS8300
SIS8300
SIS8300
SIS8300
SIS8300
SIS8300
uLOG - AMC
FILLER
PS 3
PS 4

LLRF Crate & Modules

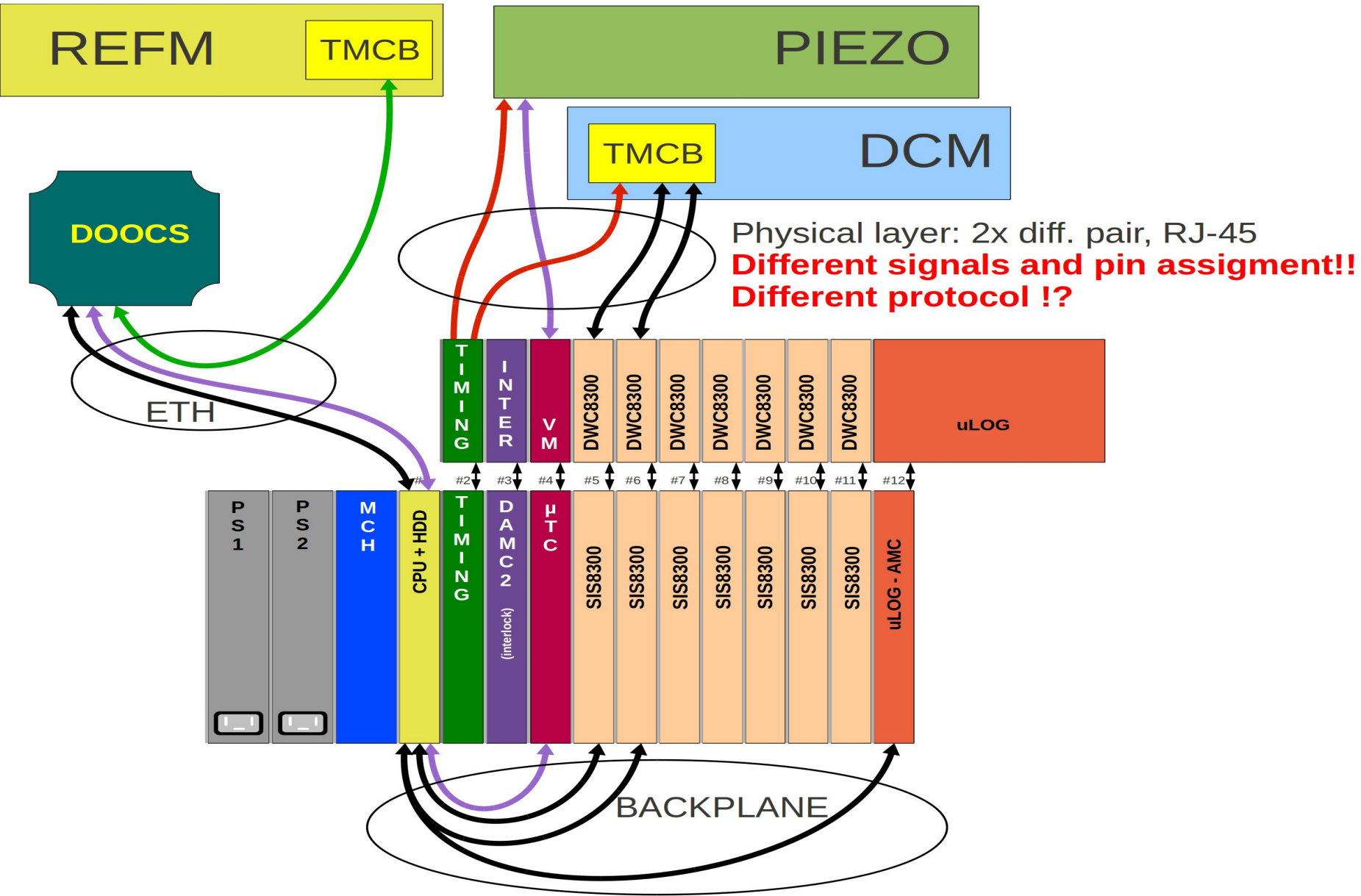


rear



front

Connections between modules



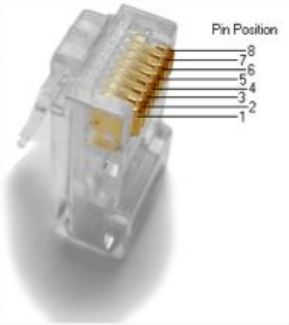
Timing and Data Signals to Boxes

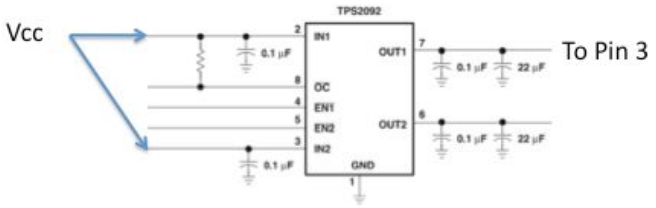
Timing

RJ45 as IO Connector

	Pin	T568A Pair	T568B Pair	Wire	T568A Color	T568B Color
Clock or Trigger	1	3	2	tip	white/green stripe	white/orange stripe
	2	3	2	ring	green solid	orange solid
5 Volt	3	2	3	tip	white/orange stripe	white/green stripe
Clock or Trigger	4	1	1	ring	blue solid	blue solid
	5	1	1	tip	white/blue stripe	white/blue stripe
GND	6	2	3	ring	orange solid	green solid
Clock or Trigger	7	4	4	tip	white/brown stripe	white/brown stripe
	8	4	4	ring	brown solid	brown solid

Pins on plug face (socket is reversed)

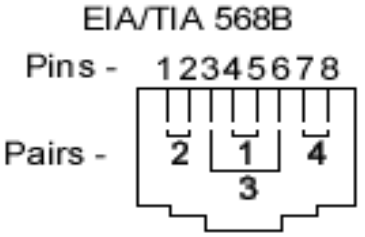




TPS2092:
Power switch with 250mA current limiter.
Quad version: TPS2097

November 25, 2011 Kay Rehlich, !!!!! PRELIMINARY !!!!!!! 23

Data

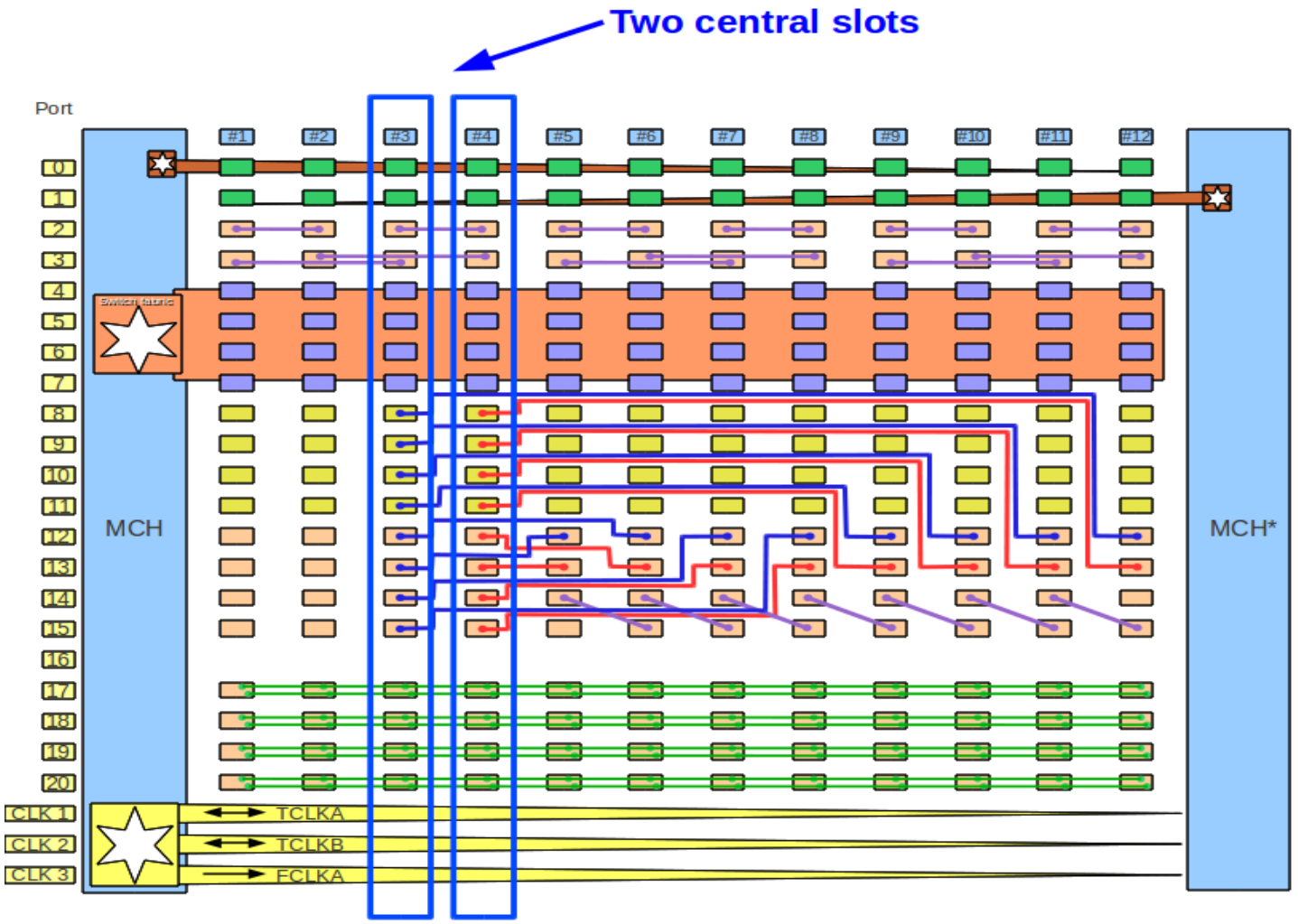


Pin Colours
1 White and Orange
2 Orange
3 White and Green
4 Blue
5 White and Blue
6 Green
7 White and Brown
8 Brown

Pair 2: CLOCK
Pair 4: TRIGGER
Pair 1: Data
Pair 3: Data

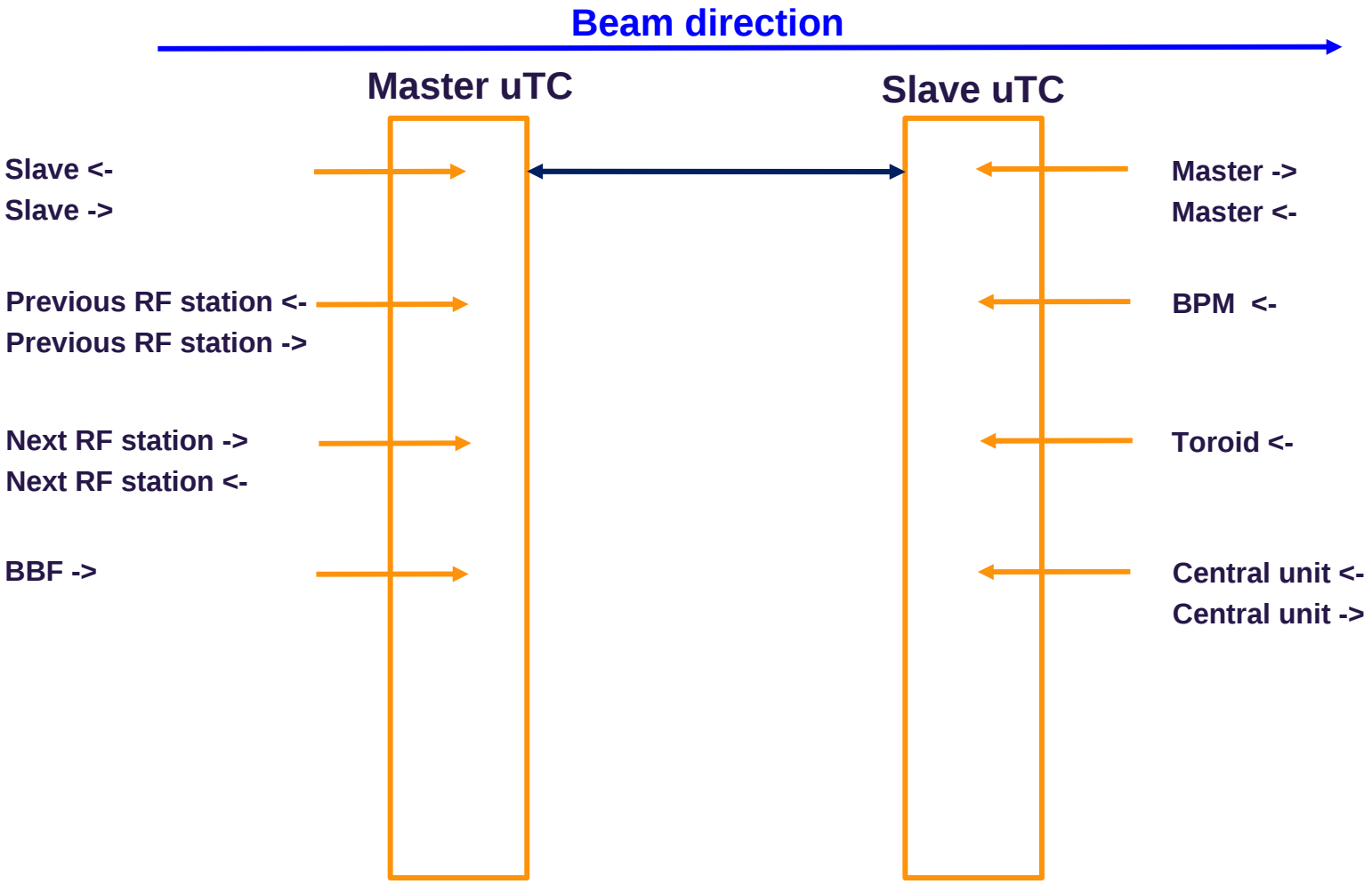
Pins 1,3,5 and 7 are positive pole of the pair

xTCA Crate - LLRF Backplane

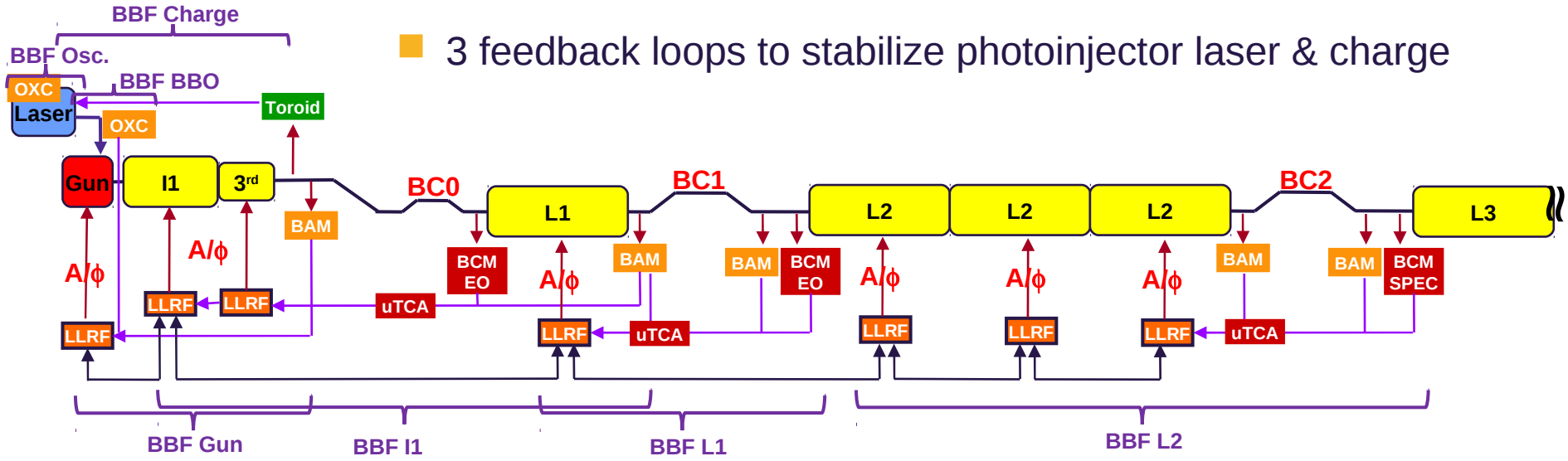


Star configuration : Controller to IQ detectors

LLRF SFP connections (new)

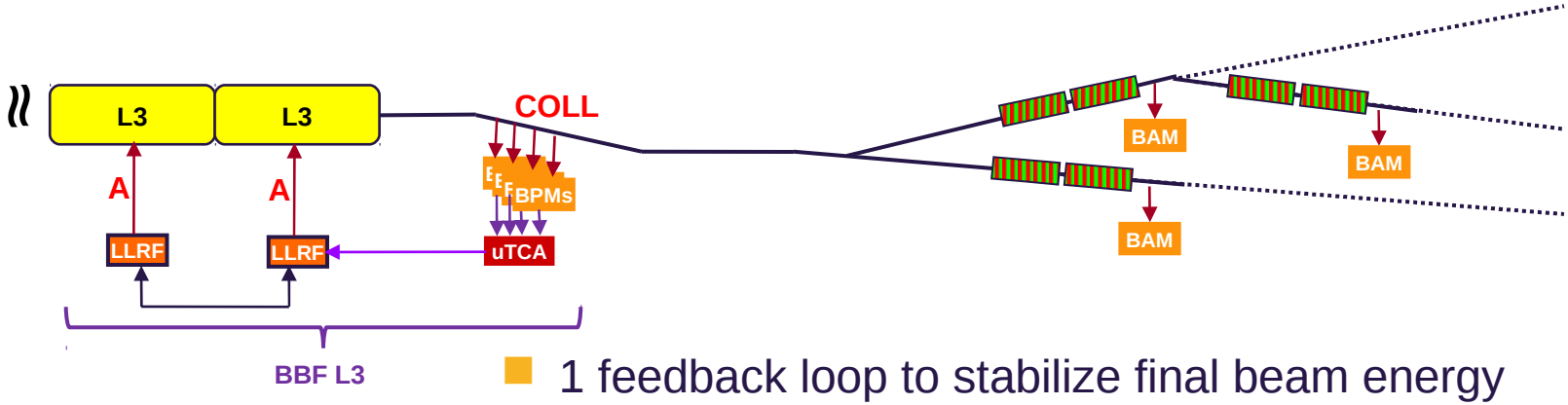


Layout longitudinal FBs for European XFEL



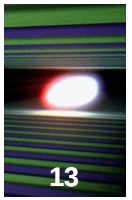
- 3 feedback loops to stabilize photoinjector laser & charge

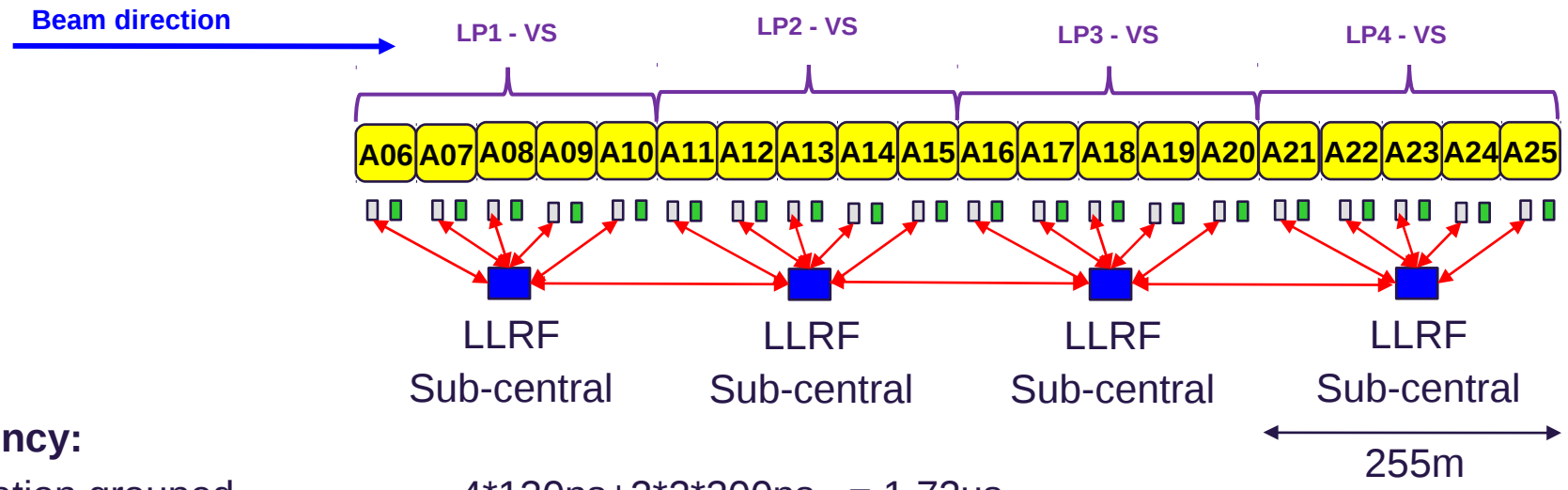
- 4 feedback loops to stabilize arrival times, compression, shape & energy



- 1 feedback loop to stabilize final beam energy

Central control unit for RF stations

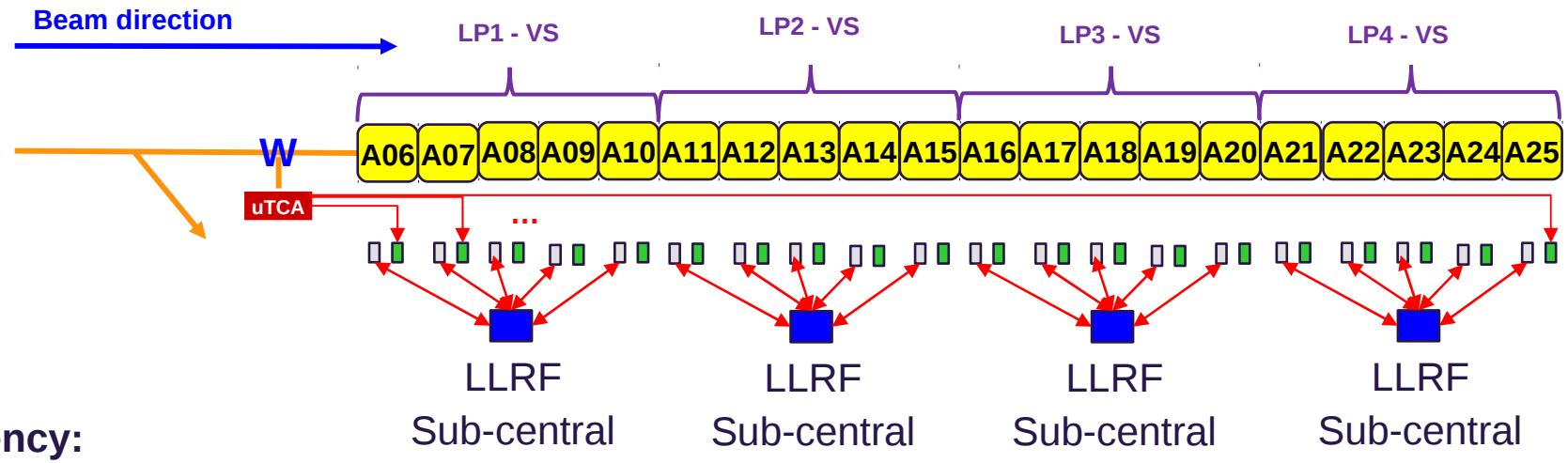




Latency:

5 Station grouped	4*130ns+2*2*300ns = 1.72us
10 stations grouped	4*130ns+2*5*300ns = 3.5 us
20 station grouped	4*130ns+2*10*300ns = 6.5 us

Charge signal from toroids



Latency:

Direct: 1*130ns+4000ns – 2660ns =1.46us + Toroid Elect.