

Some thoughts on using tracking detectors for CREAMTEA



From information mulling over anyway....

July 16, 2011

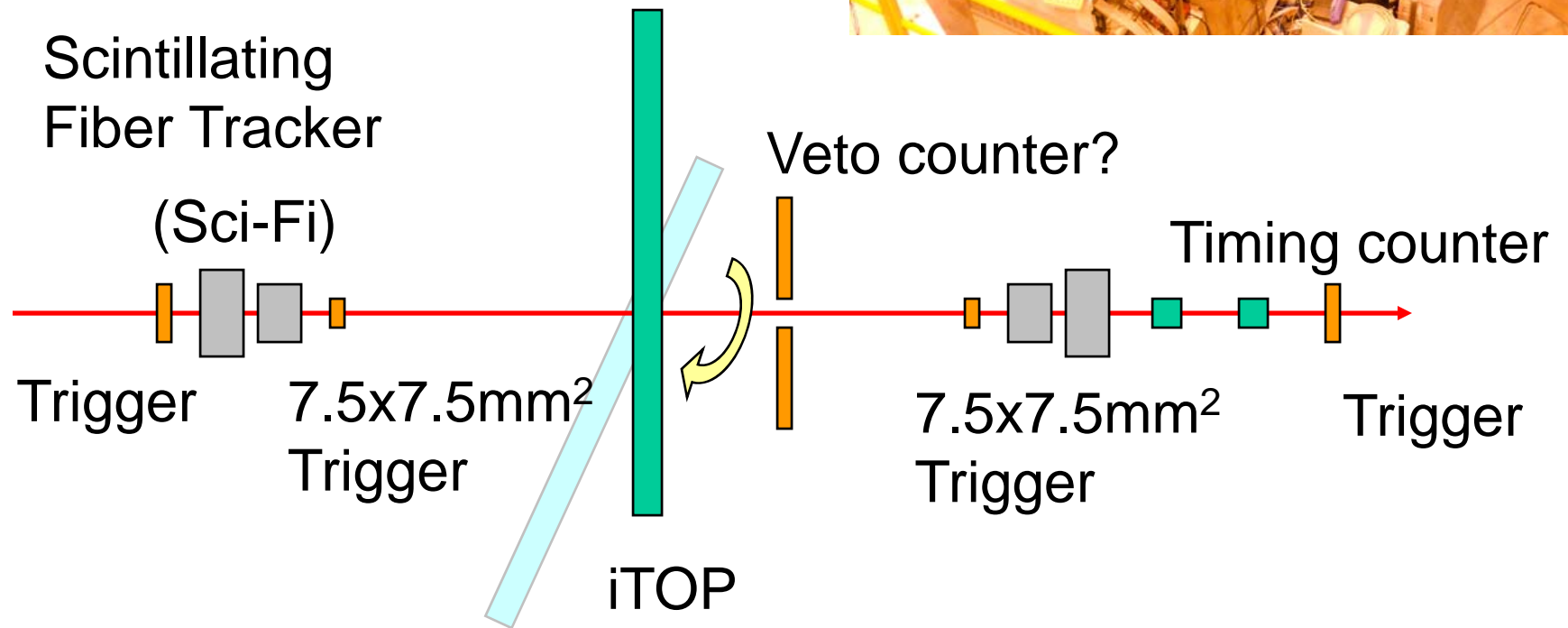
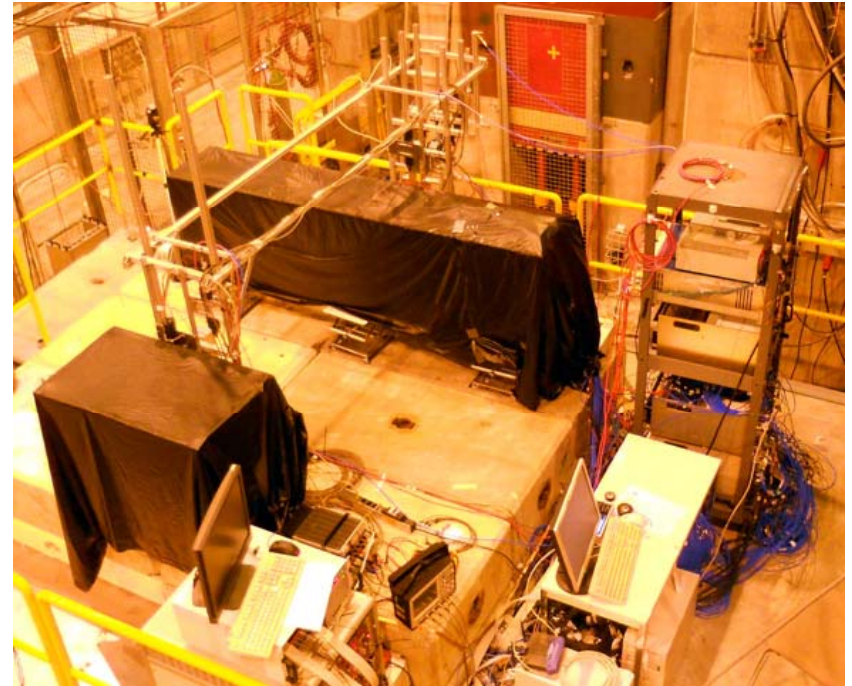
Ryan: for your information, since we are planning to develop 2x of these readouts for upcoming CERN/FNAL beam tests

2nd round (Belle II iTOP detector commissioning) will use 12x of these readouts (1800 channels)

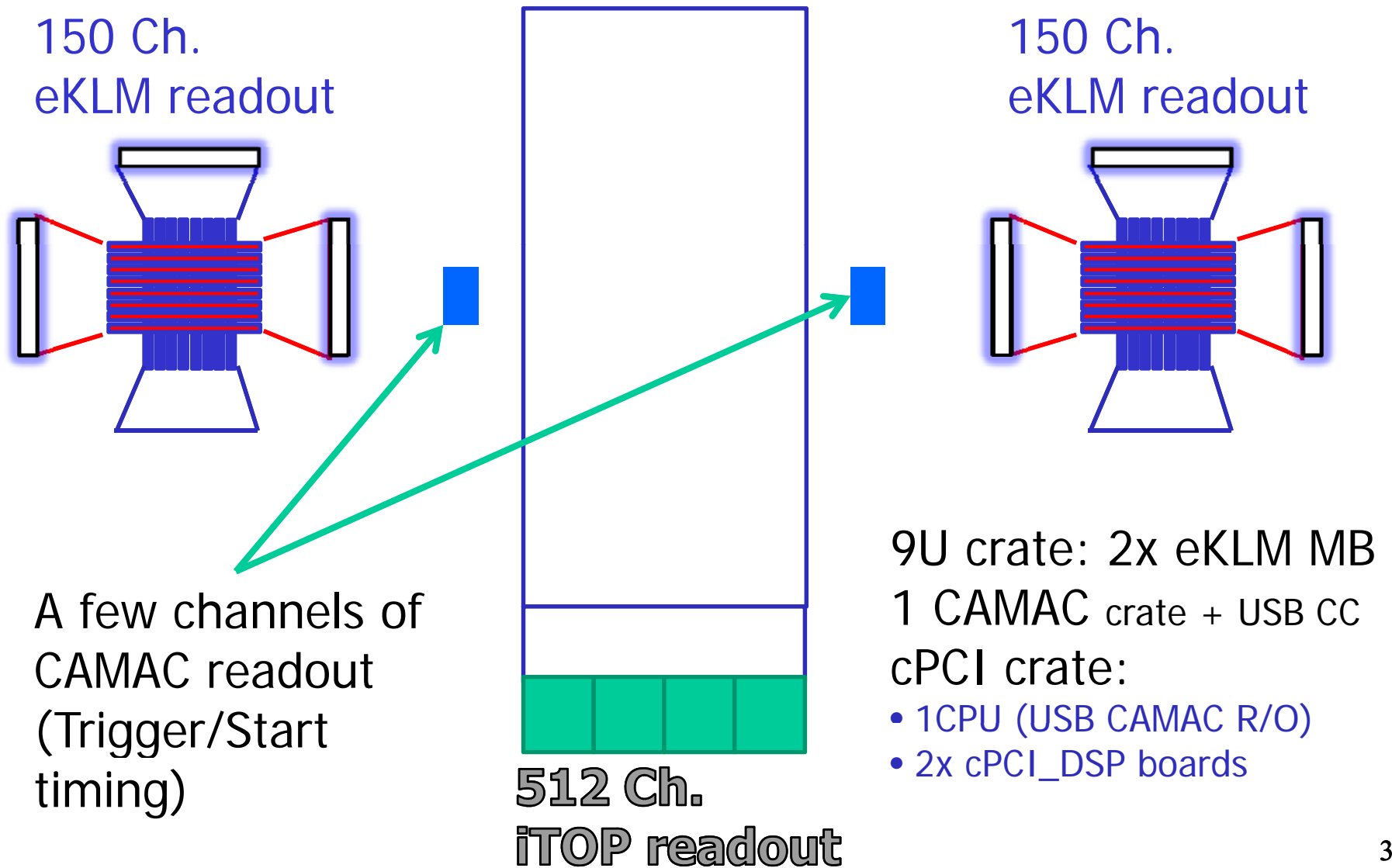
And endcap KLM readout will use 16,800 channels

Autumn 2011 beam test

- CERN SPS T4-H6B or FTBF
 - 120GeV hadrons/p
 - DAQ rate: ~100Hz?
 - 25MB/s (PCI bus limited)
 - ~250kB/event (non Zero-Supr.)

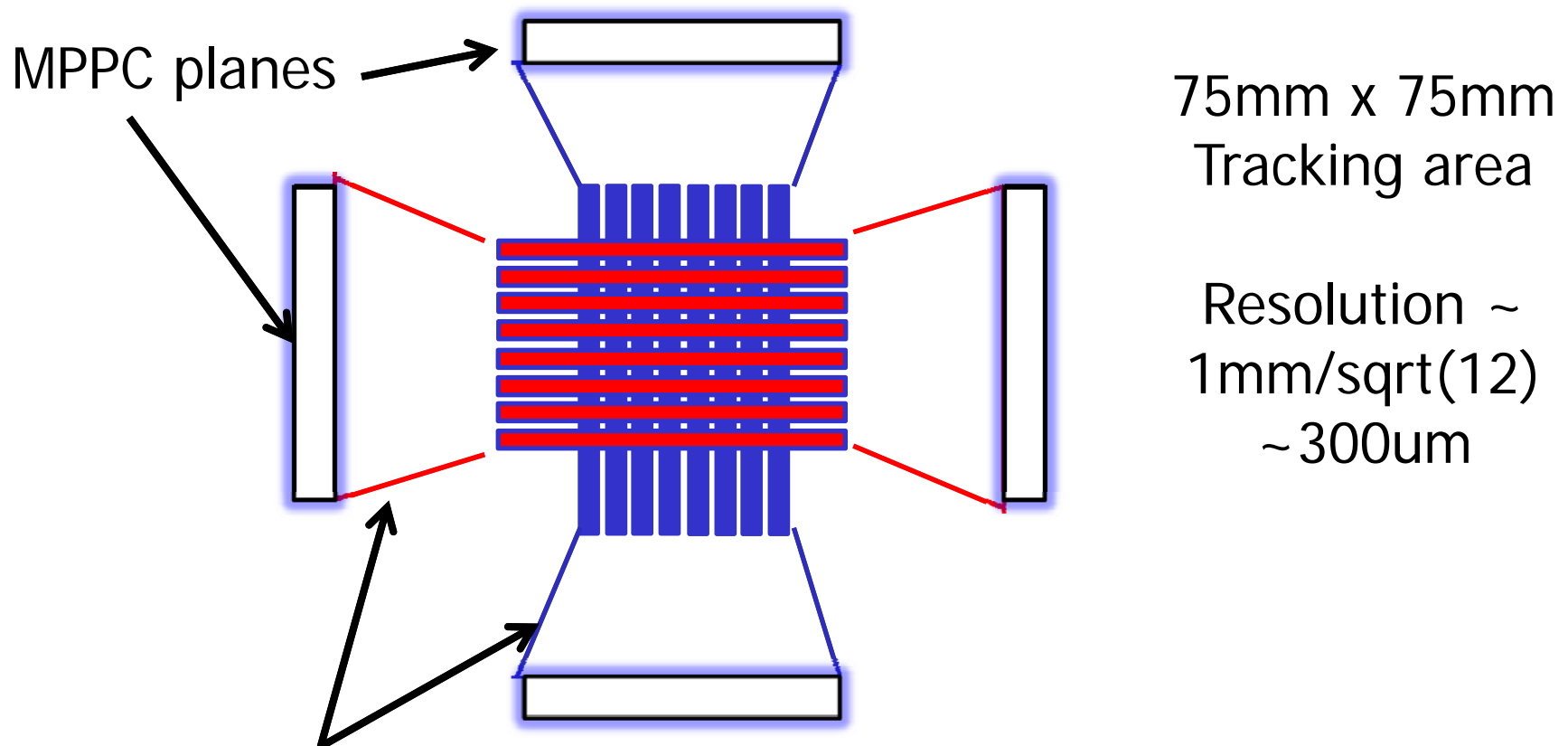


Readout system – Component



SciFi Tracker (overview)

A pair of x and y (orthogonal planes)
of 2mm dia Scintillating Fiber,
Offset 1mm pitch (for better resolution)

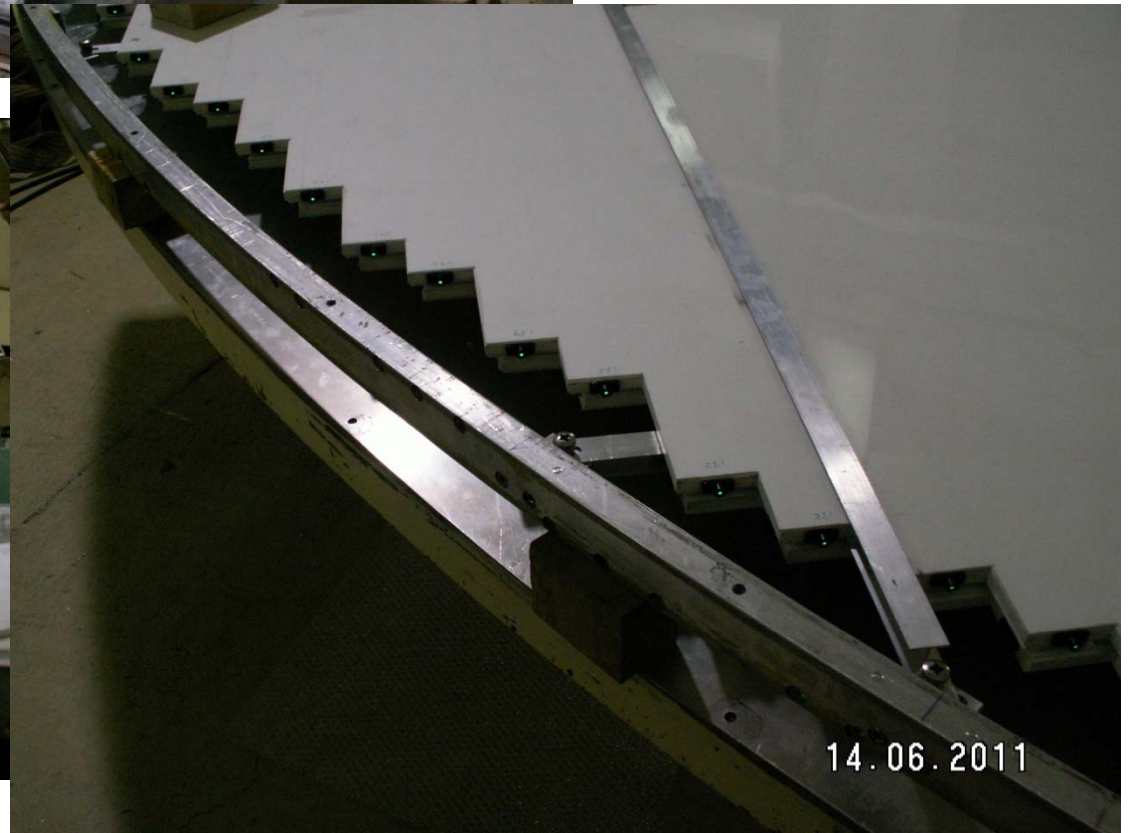
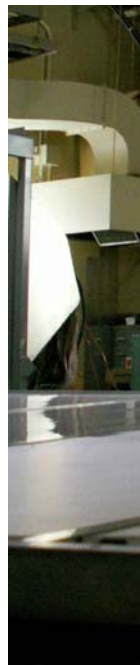


Expansion taper to match MPPC readout pitch



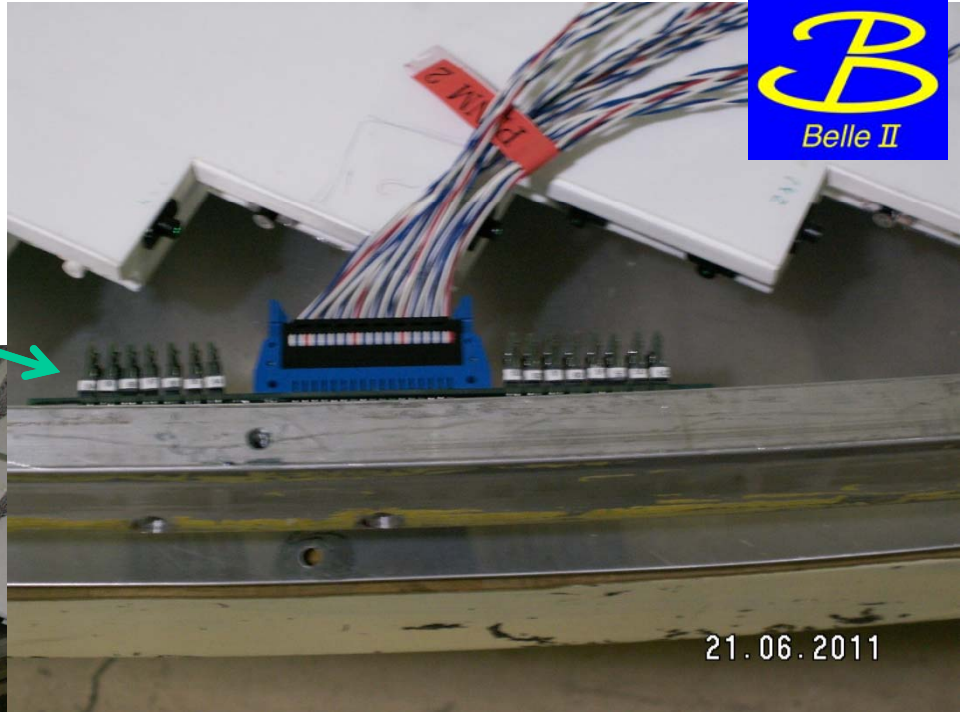
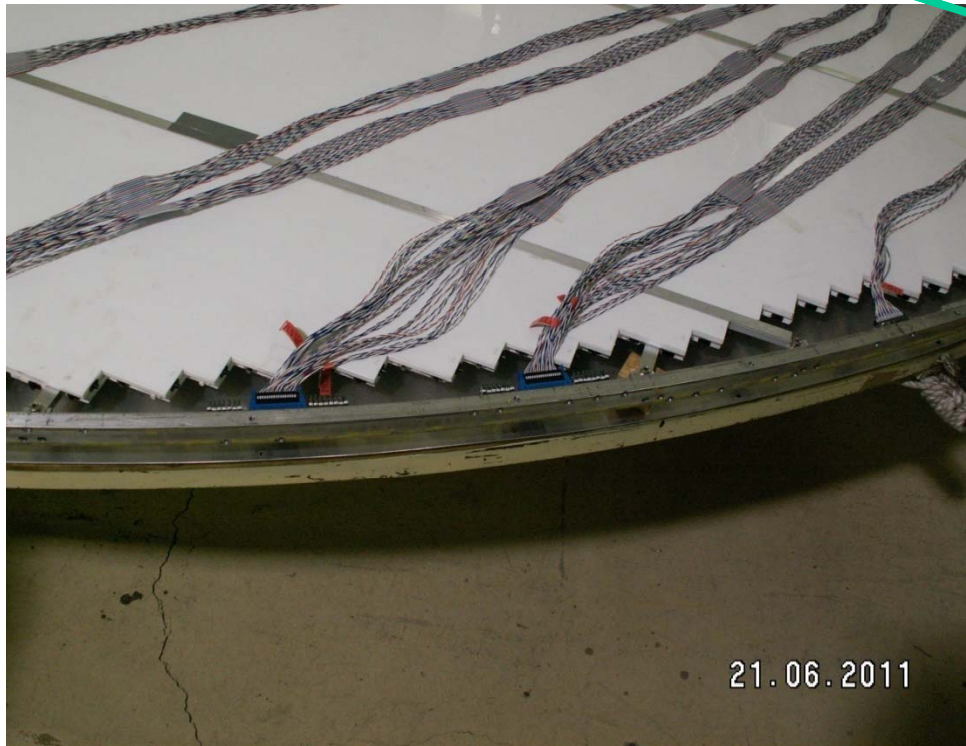
✘ Similar readout to endcap muon replacement for Belle II (was RPCs now scint + WLF + MPPCs)

✘ 75x and 75y strips in each quadrant



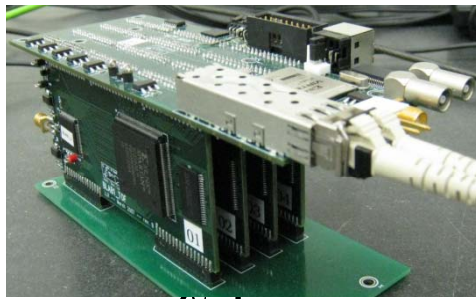
14.06.2011

- ✘ Equip with SiPMs
 - ✘ Fix preamplifiers
- (Hawaii made)

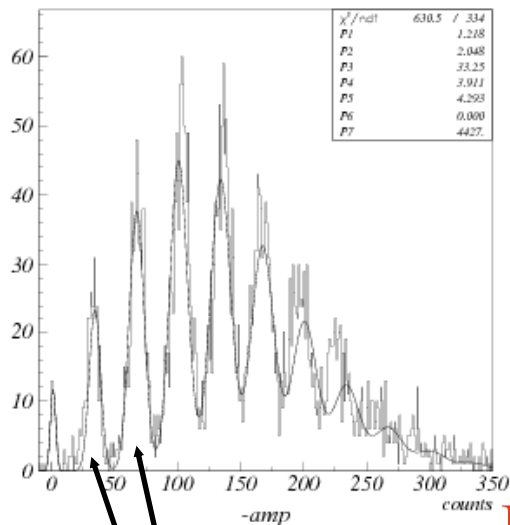


- ✘ Checked:
 - ✘ the gap between I-beam net and Al cover sheet is OK for cables

Endcap KLM Readout

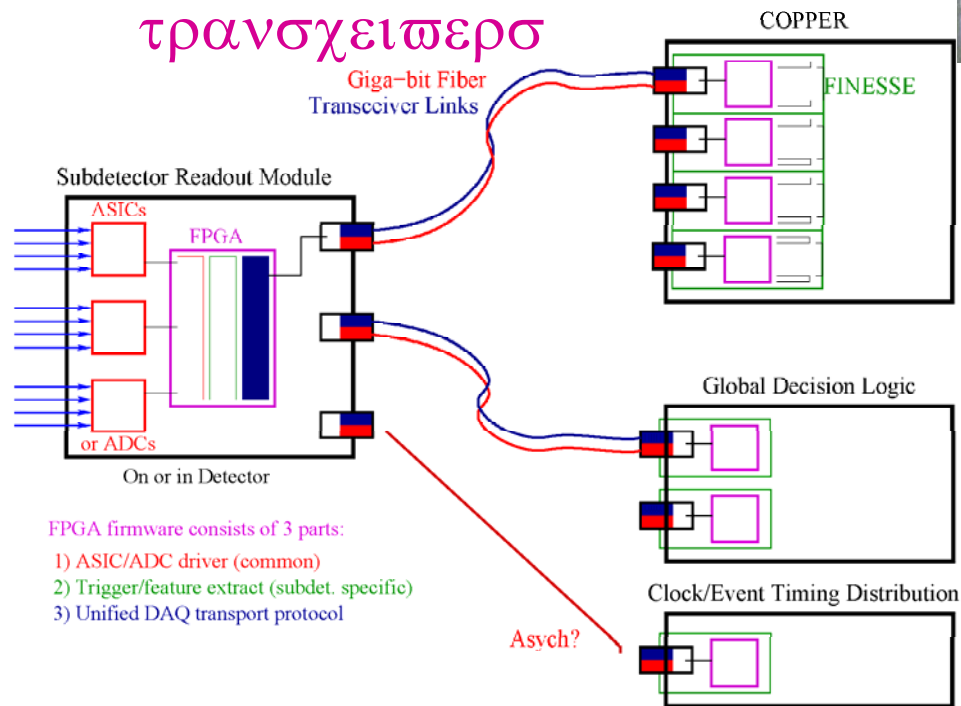


1.8κ TARGET2
110 ΣΡΜ



Ρεσολwege ινδιπιδυαλ π.ε.

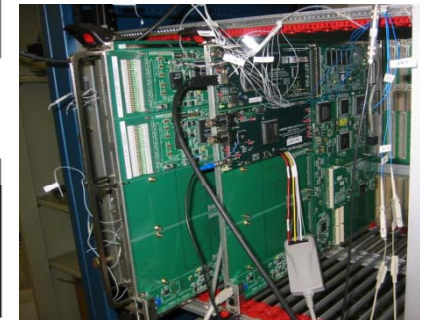
110 ΔΑΘ φιβερ
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FPGA firmware consists of 3 parts:
1) ASIC/ADC driver (common)
2) Trigger/feature extract (subdet. specific)
3) Unified DAQ transport protocol



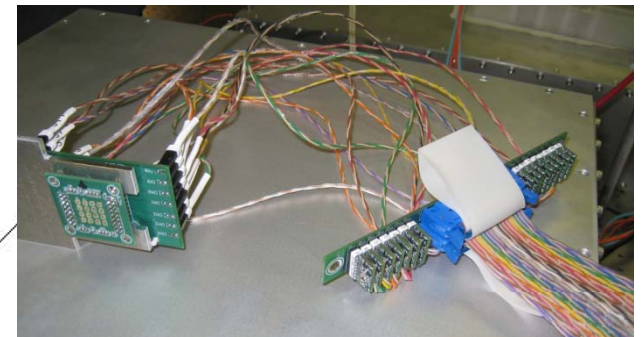
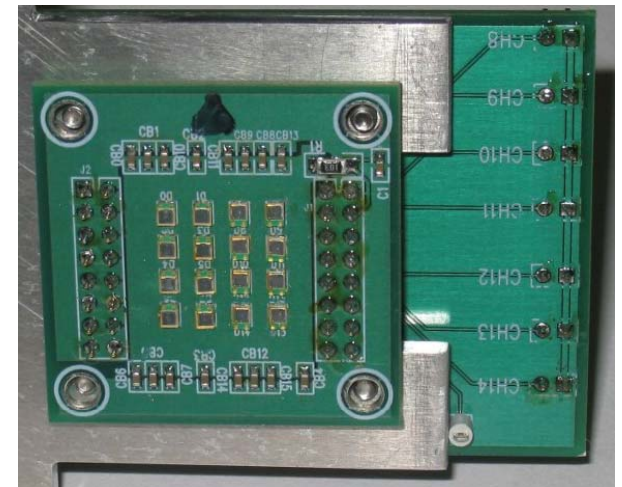
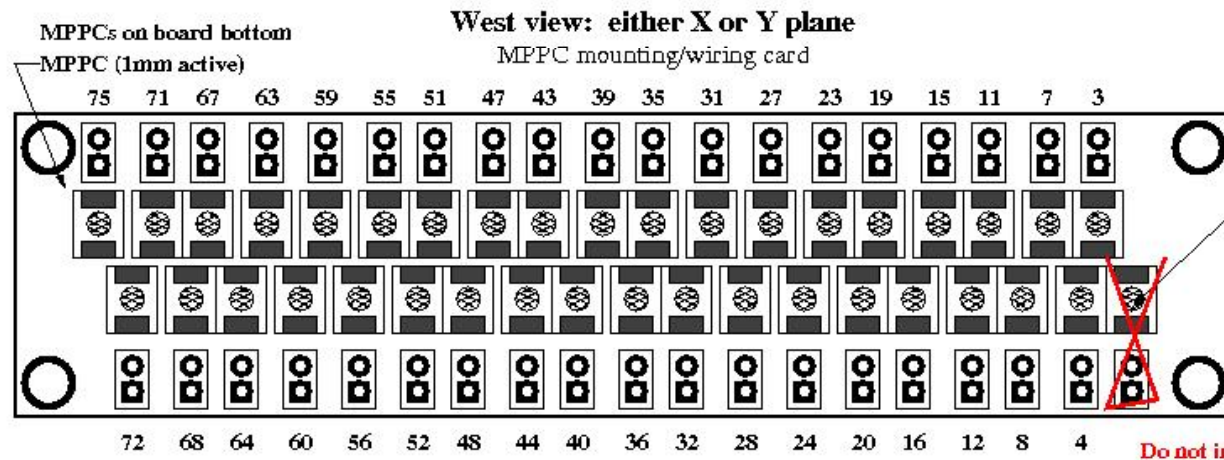
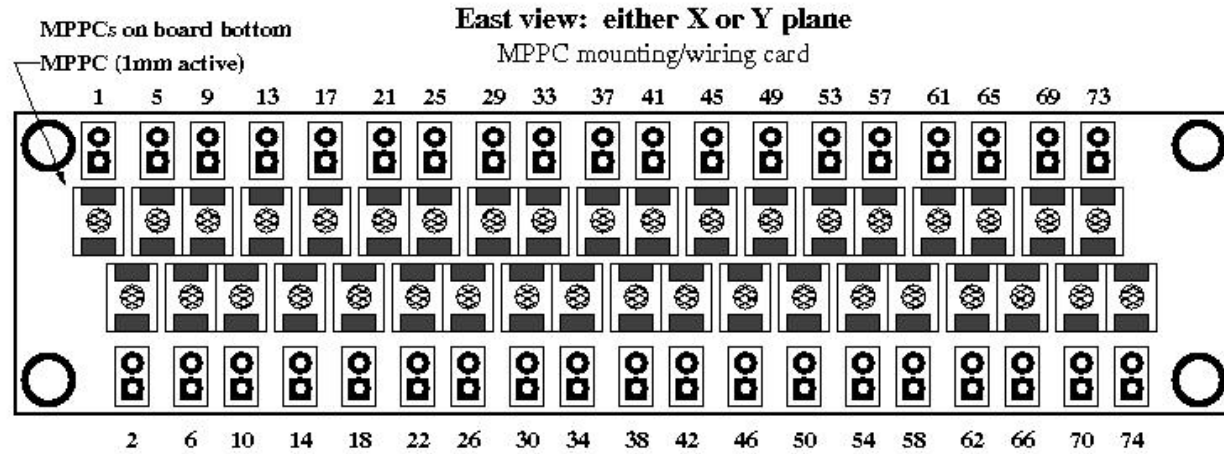
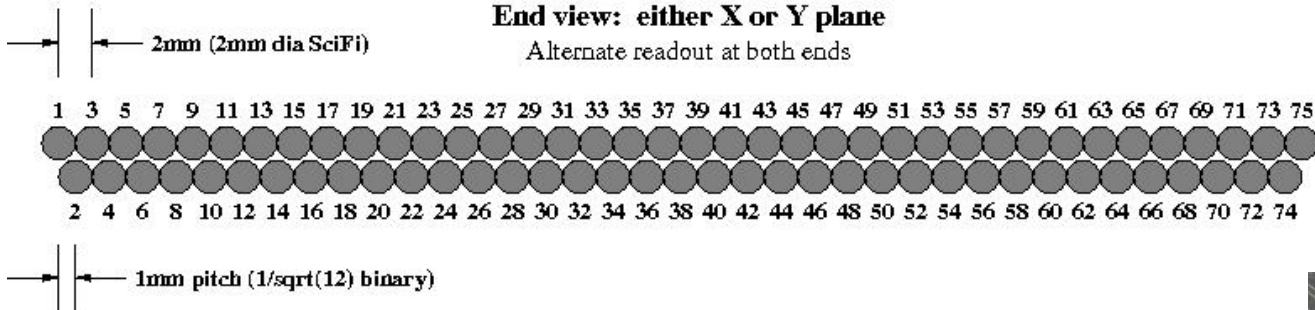
28 ΦΙΝΕΣΣΕ
7 ΧΟΠΠΕΡ



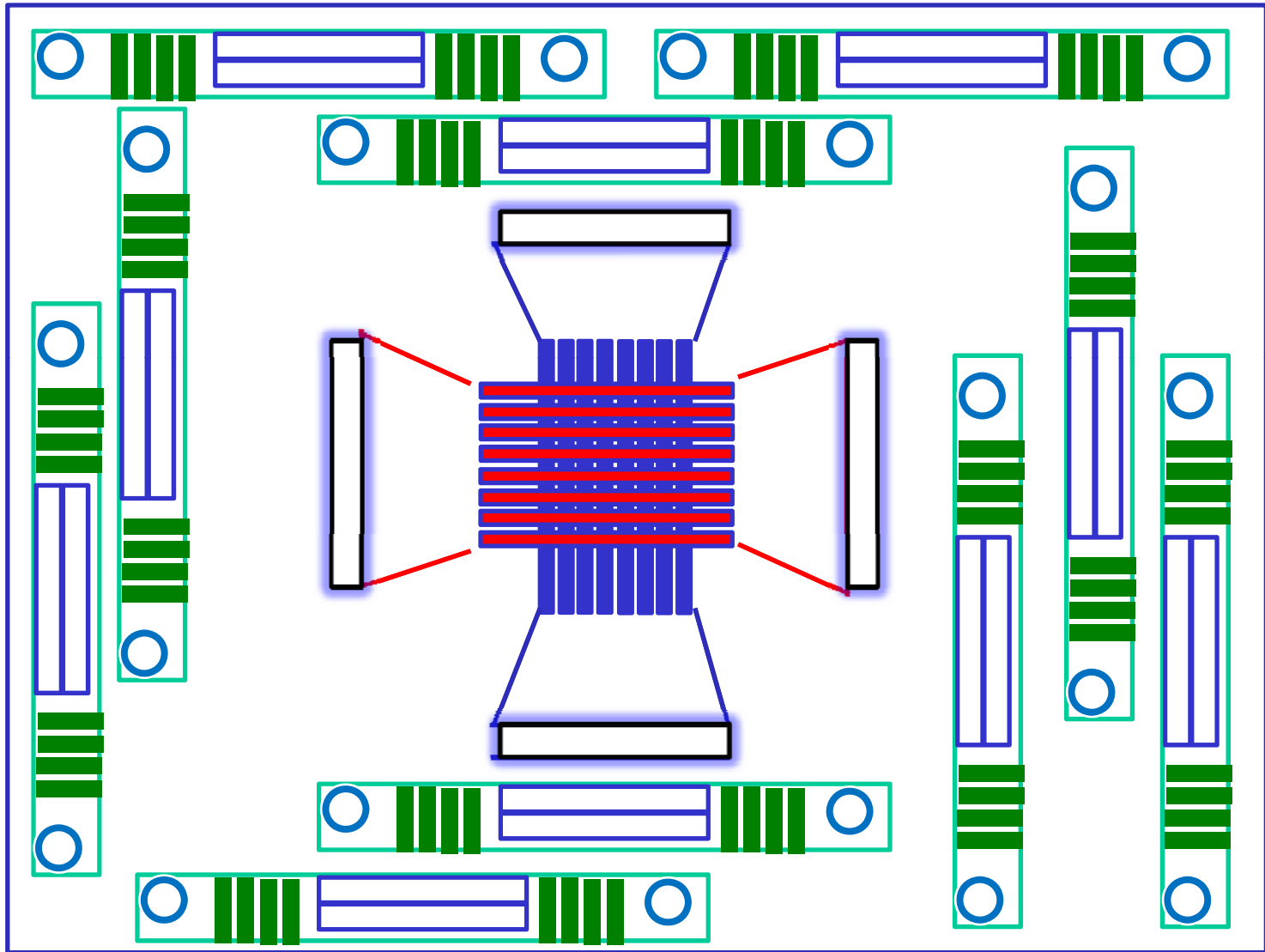
TARGET

ΚΑΜ □ Σι-ΠΜσ

SciFi Tracker readout = eKLM



SciFi Tracking Chamber



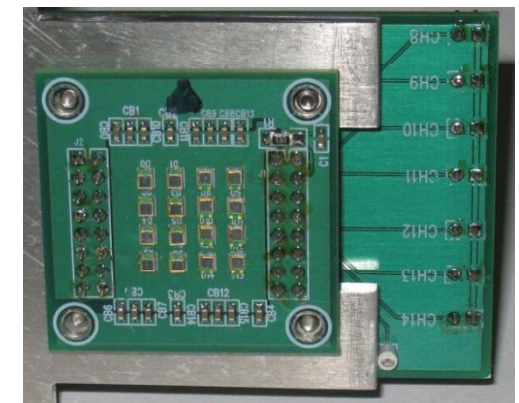
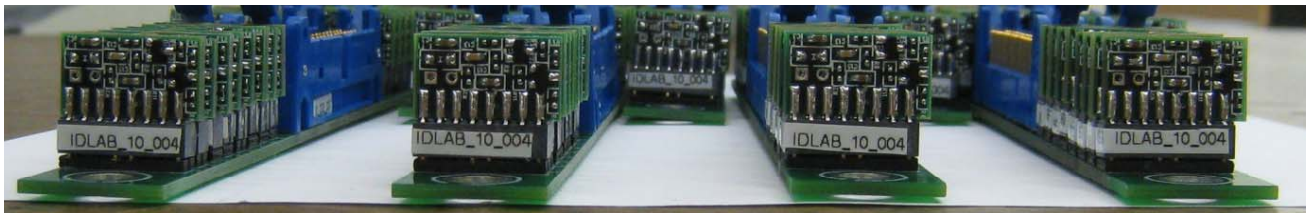
Mounting/support frame

Brackets needed: amps, SciFi

Beamtest system: tracking boards

Front-End system

Item	Needed	Spares	Comments
eKLM Rev. B amplifiers	300 (~190)	32	Stencil, external assy?
Amp carrier Rev. C	20	2	Stencil, external assy?
SciFi tracking chamber	2	--	SciFi, 300MPPCs
38 channel MPPC cards	8	2	Design needed



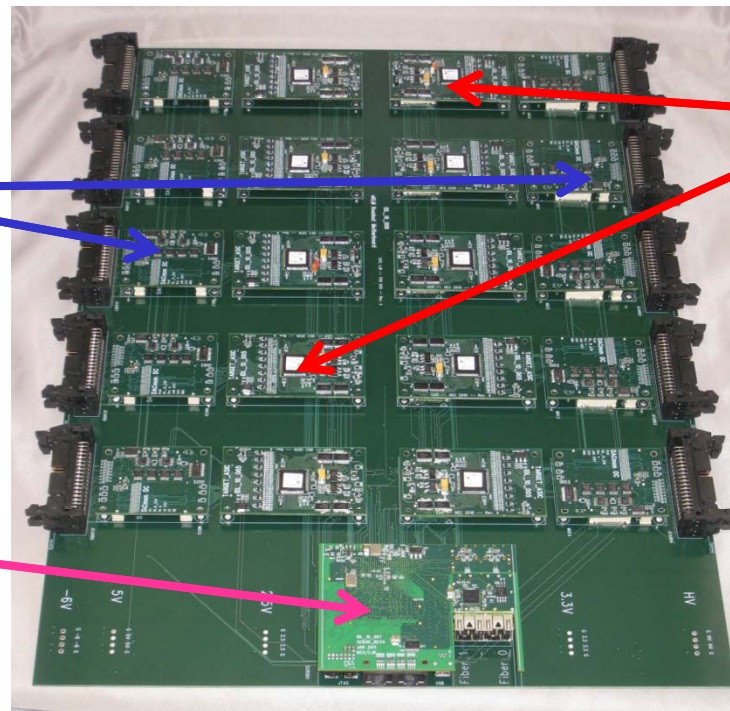
Beamtest system: tracking boards

Back-End system

Item	Needed	Spares	Comments
9U eKLM Motherboard	2	1	Design needed (anyway for eKLM)
DAC_MON	20	2	Stencil, external assy?
TARGET3 DC	20	2	Design needed
cPCI_DSP	1	--	Board stack R/O spare?

DAC_MON
(10x)

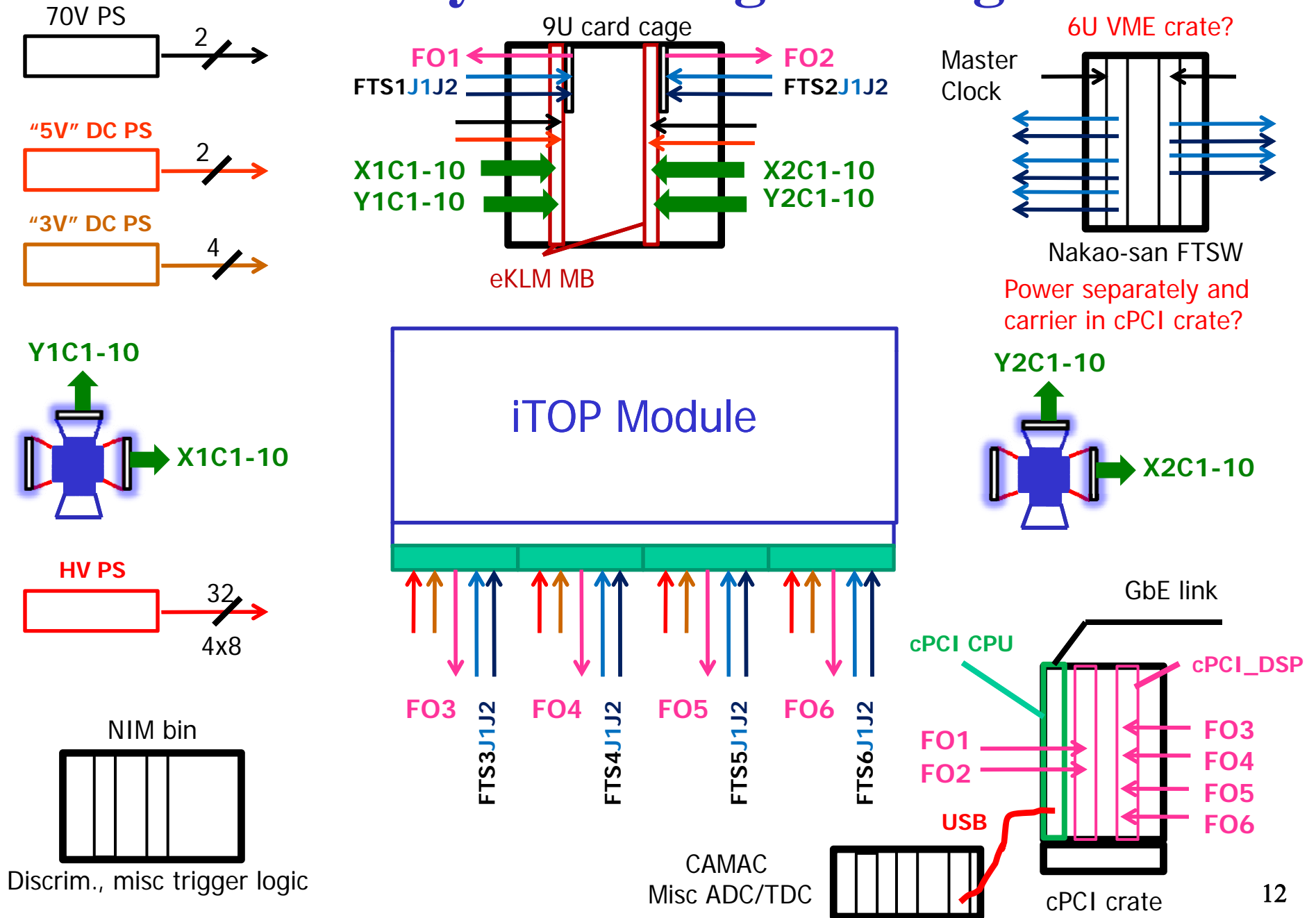
SCROD



TARGET DC
(10x – replace with
TARGET3 DC)

Re-package card as
9U form factor

Readout system – logical diagram



Discussion items

- How many channels might a logical CREAMTEA module comprise?
- Need to post TARGET3 data sheet
- No rush on this, and you are wise to let the DOE pay for some of the development – just useful to know for planning purposes
 - Rough timeline next batch of readout?
 - MPPCs are more cost effective in large numbers
 - Major system integration = how many channels?

