

# Cosmic trigger meeting

# MWPC chambers M1

Three types:

- M1R2, manufacturer CERN, 24
- M1R3, manufacturer LNF, 48
- M1R4, manufacturer PNPI, 196

All chambers have two layers,

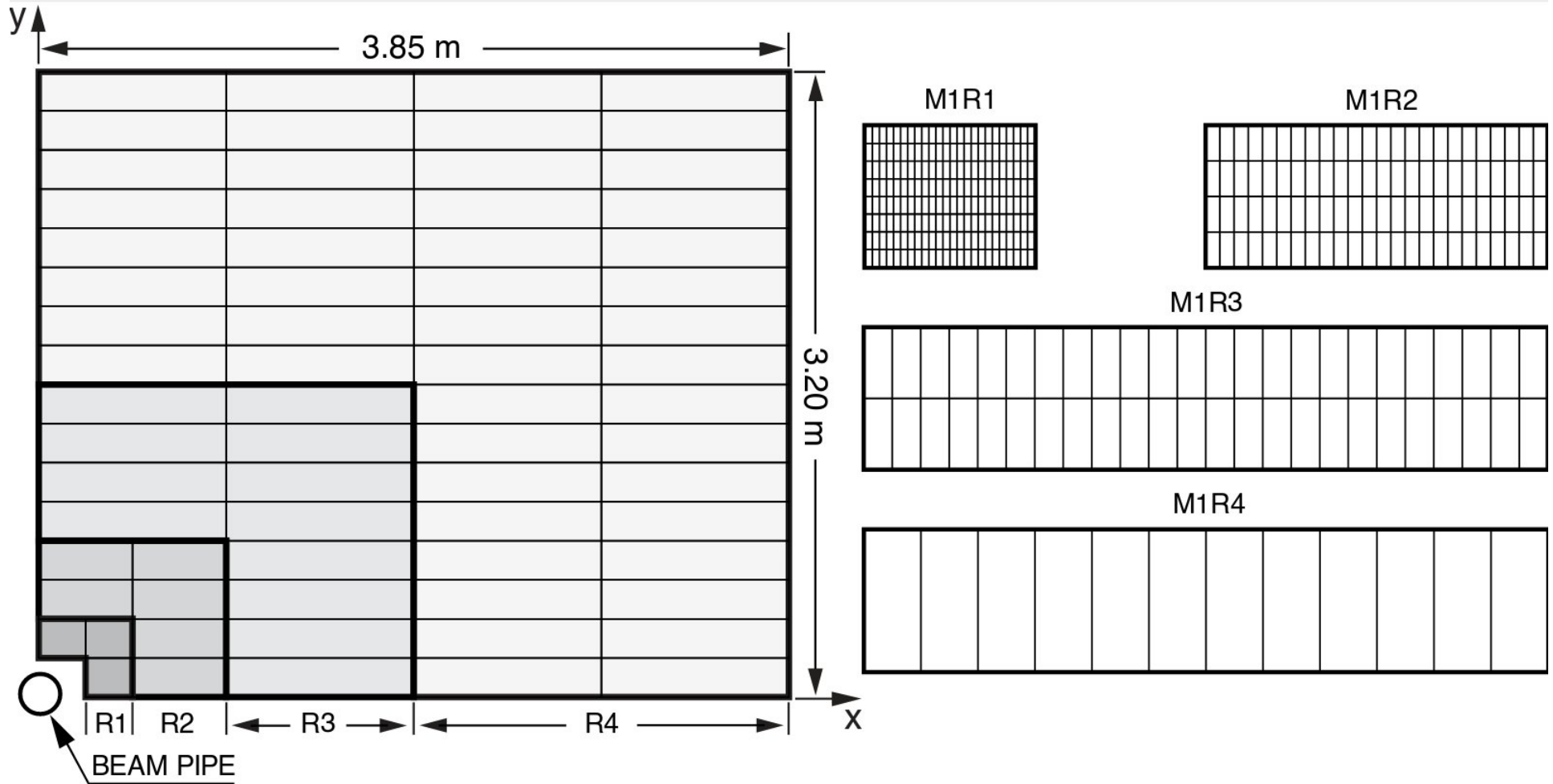
Equipped by standard electronics (CARDIACs)

Output - LVDS, signal width 4-20ns

LV - 5V bipolars

HV - 2650-2850V

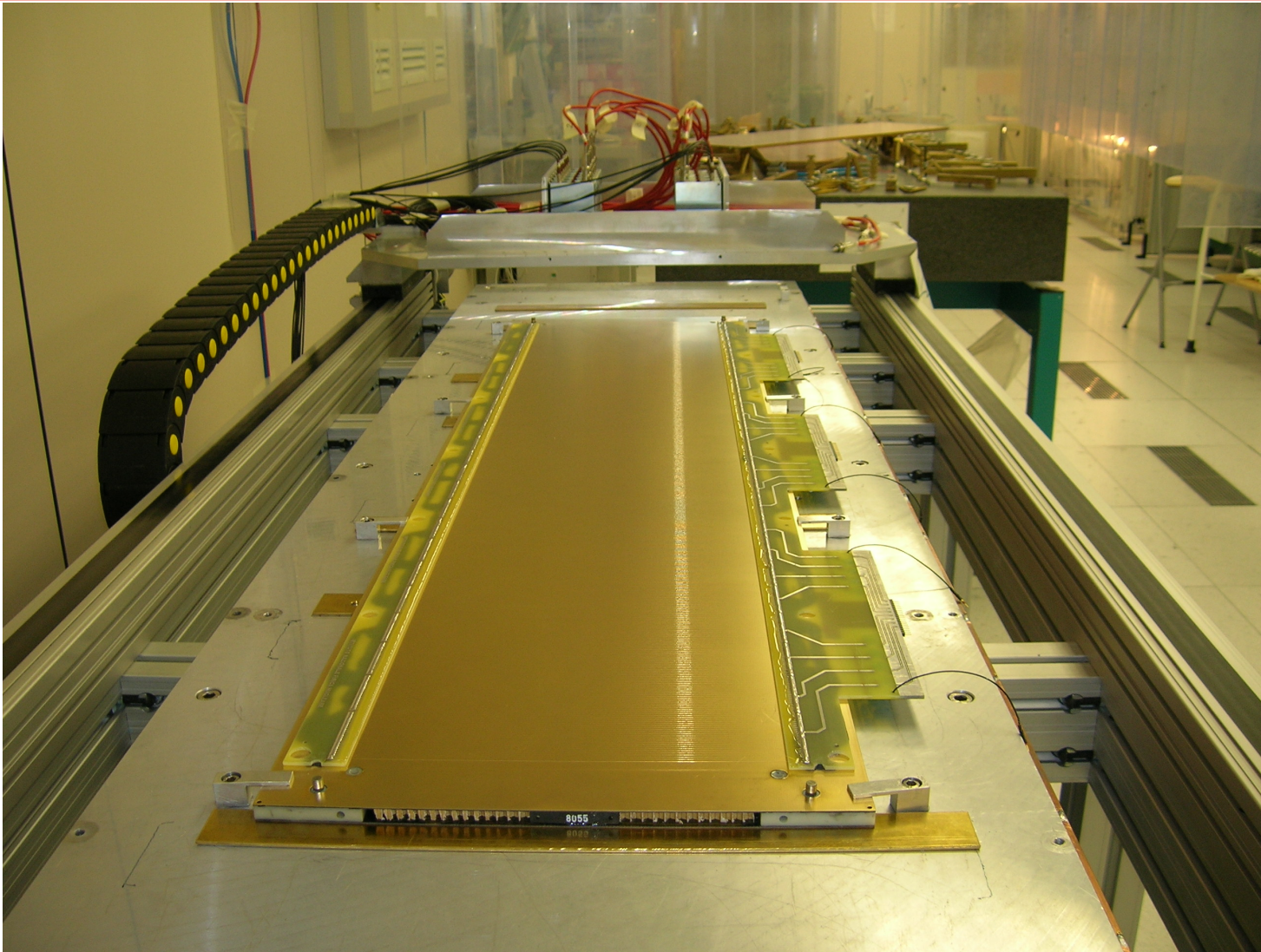
# Geometry of wall



# Chamber geometries

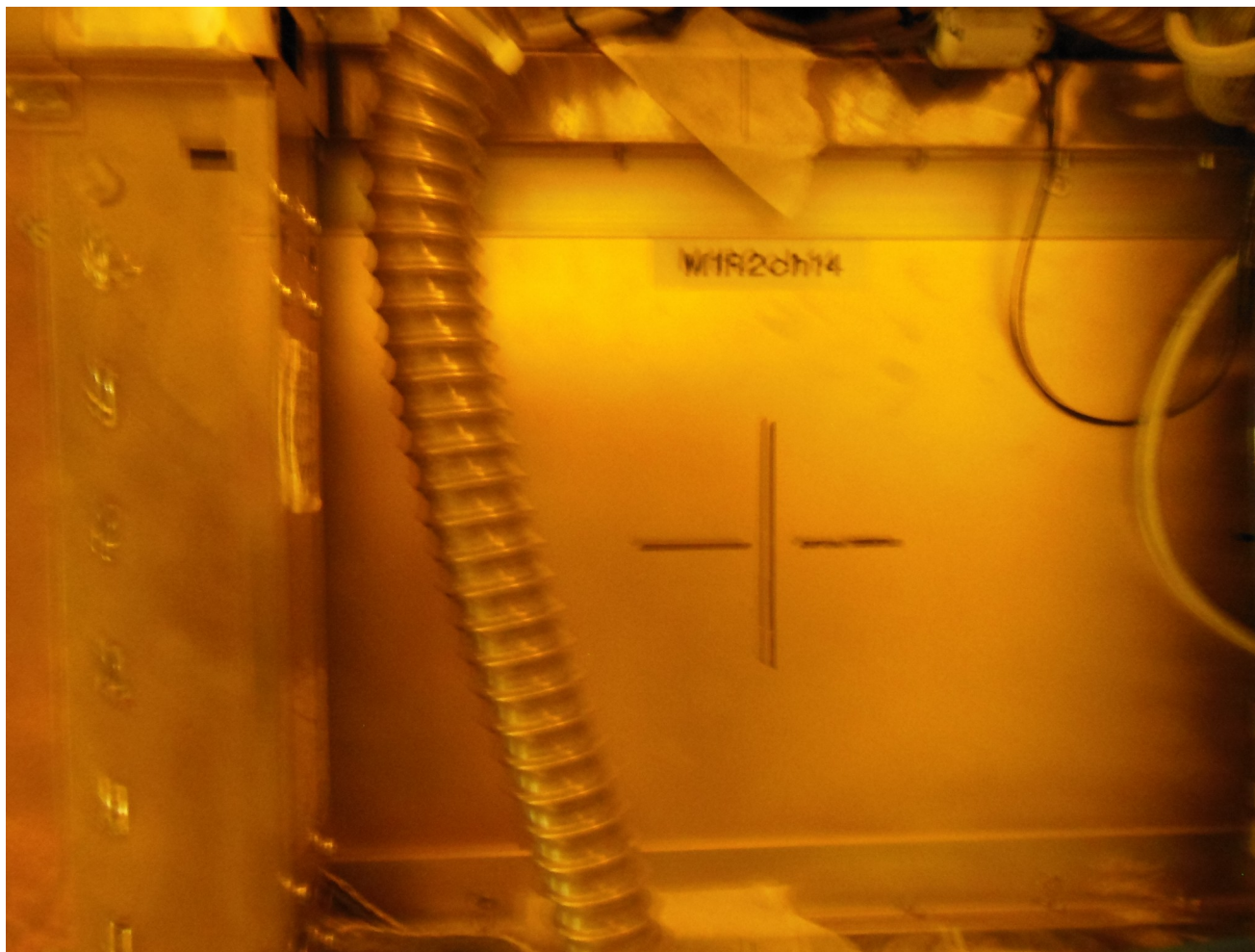
Type	Count of channels	Sensitive area (mm <sup>2</sup> )	Wire pads # and area (mm <sup>2</sup> )	Cathode pads # and area (mm <sup>2</sup> )	# FE boards per Chamber
M1R2	24	484x200		2x24x8 20x25	24
M1R3	48	968x200		2x48x2 20x100	12
M1R4	192	968x200	2x24 40x200		3

# M1R4 photo





# M1R2 photo (on wall)



# Service board

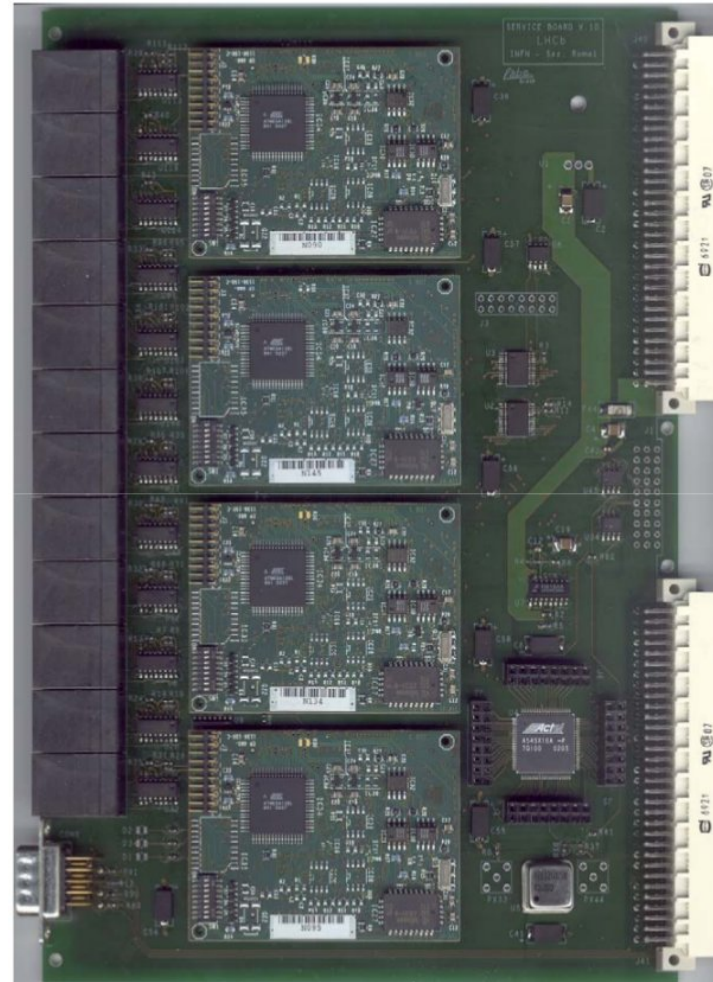
Front end boards communicate with ecs via multi port canbus to custom interface bridge.

Bridge board can be installed at VME crate.

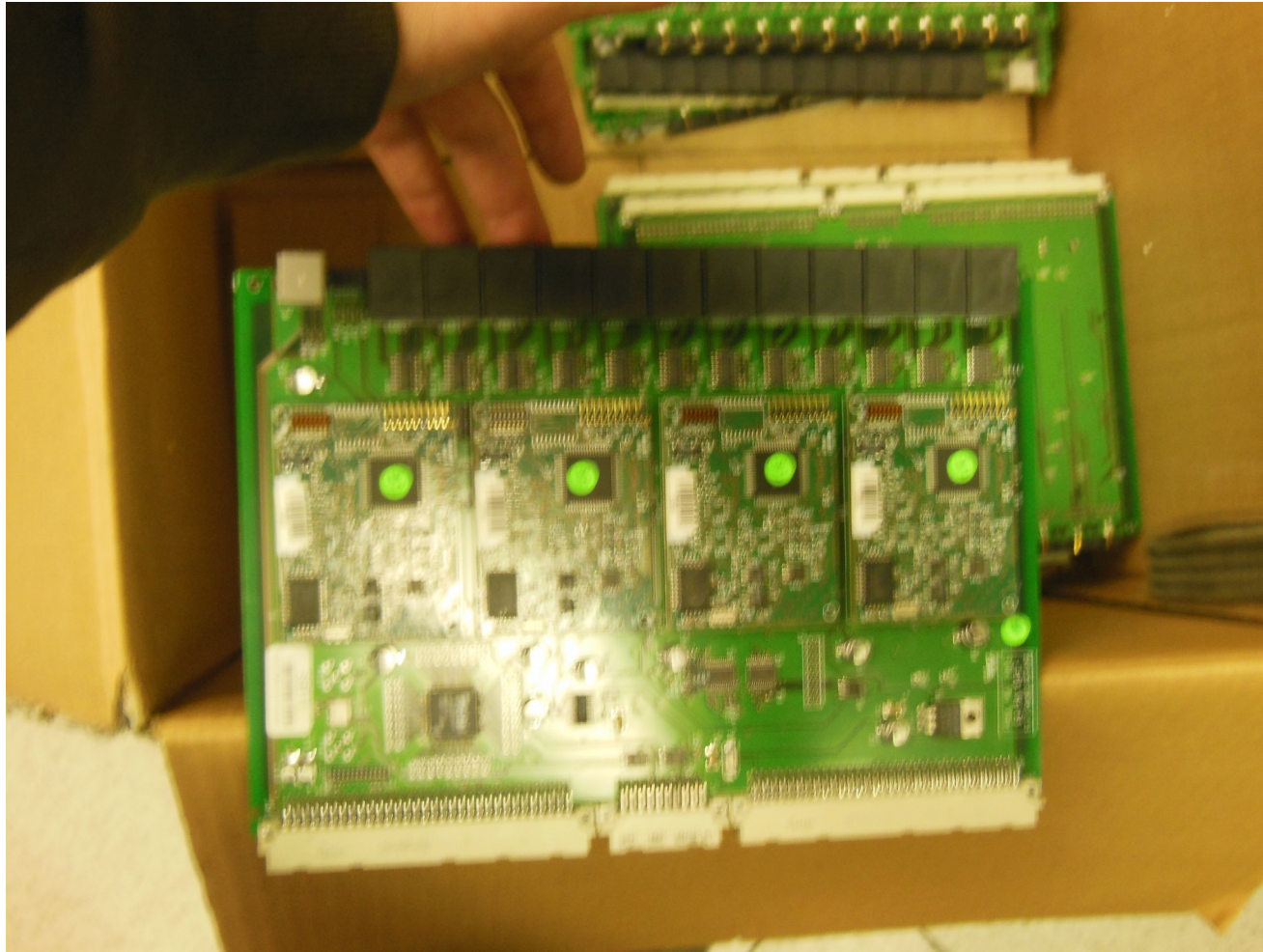
Each board can control up to 12 lines with 8 front end boards at line

Details:

[http://lhcb-muon.web.cern.ch/lhcb-muon/electronics/VB\\_SB\\_PDM\\_PRR\\_15\\_July.pdf](http://lhcb-muon.web.cern.ch/lhcb-muon/electronics/VB_SB_PDM_PRR_15_July.pdf)



# Service boards at storage area





# Service boards at storage area



# Control line cables

We are going to save  
control line cables  
(typical length ~20m)

Let us know how many do  
you need?





# Off detector board (ODE)

L0 trigger board.

Inputs: 192 lvds channels

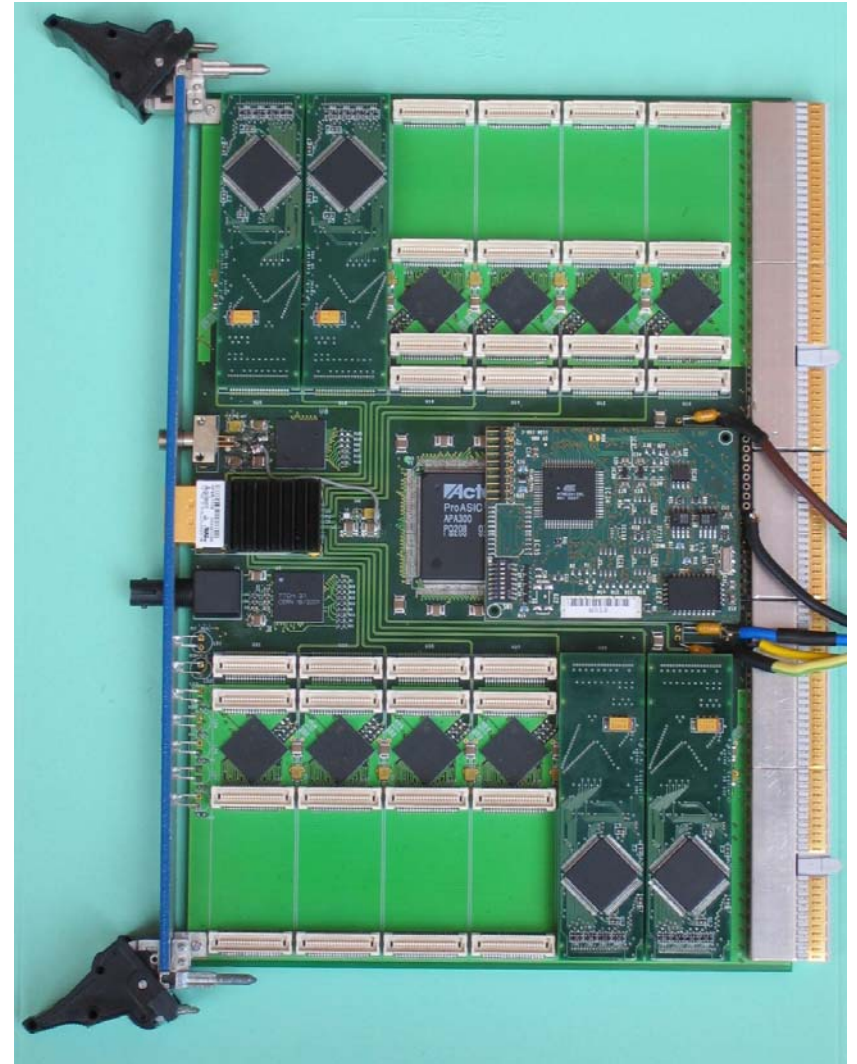
External sync (fiber)

Output: transceiver (fiber)

Control: canbus.

Simply logic receive-check-pack-send

Detailed description at  
[http://lhcb-muon.web.cern.ch/lhcb-muon/electronics/ODE\\_PRR.pdf](http://lhcb-muon.web.cern.ch/lhcb-muon/electronics/ODE_PRR.pdf)



# ODE photo





# TELL1

TELL1 is receiver & computing unit.

It was basic board of hardware trigger part of LHCb

Logic of work:

Receive all signal, basic reconstruction of event & check at FPGA, send outside as udp-packet

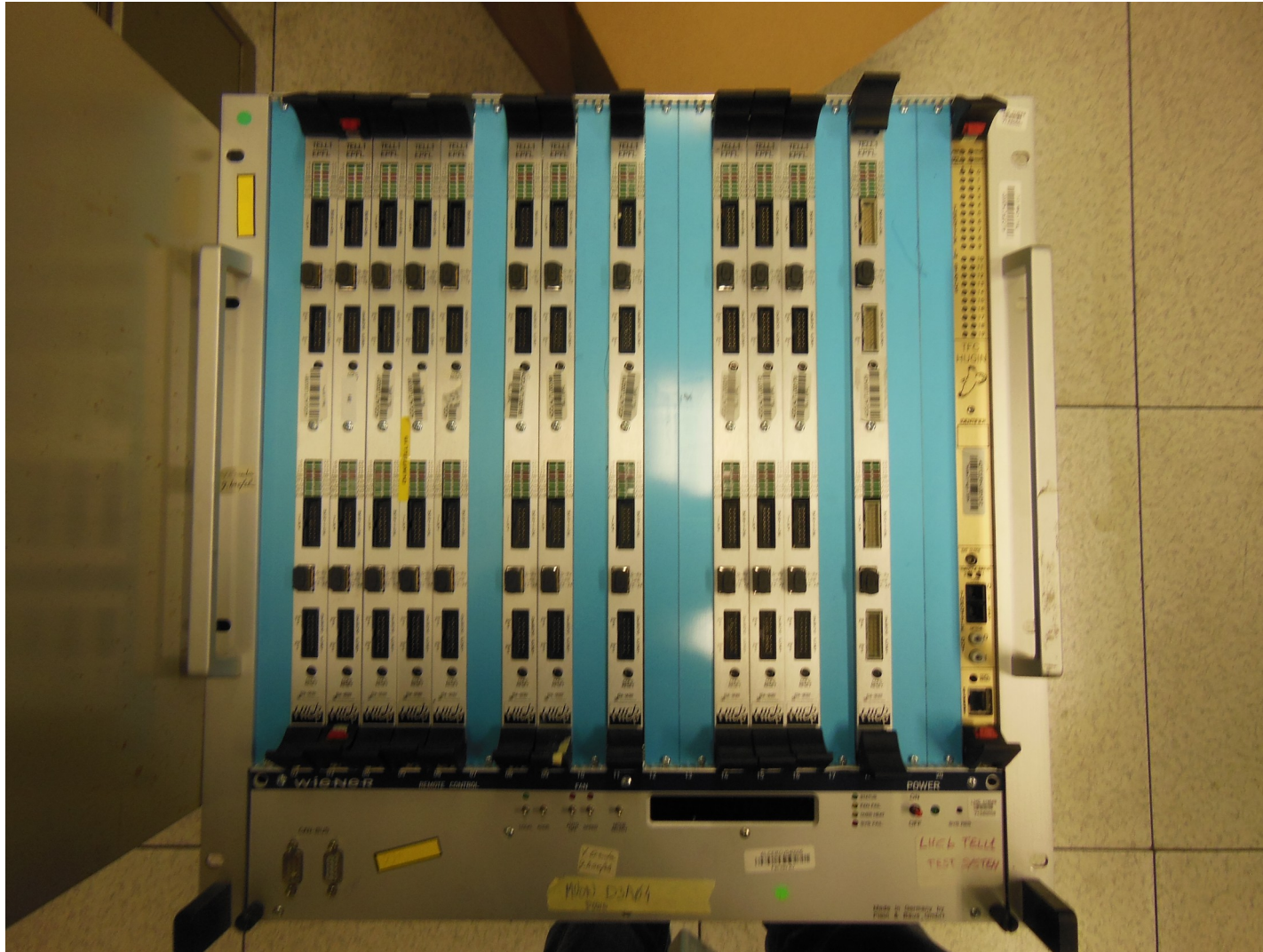
Trigger can be generated as well but it has delay  $>1\text{mks}$

Full information

<https://lhcb-elec.web.cern.ch/lhcb-elec/html/notes.html>



# Tell1 in storage area

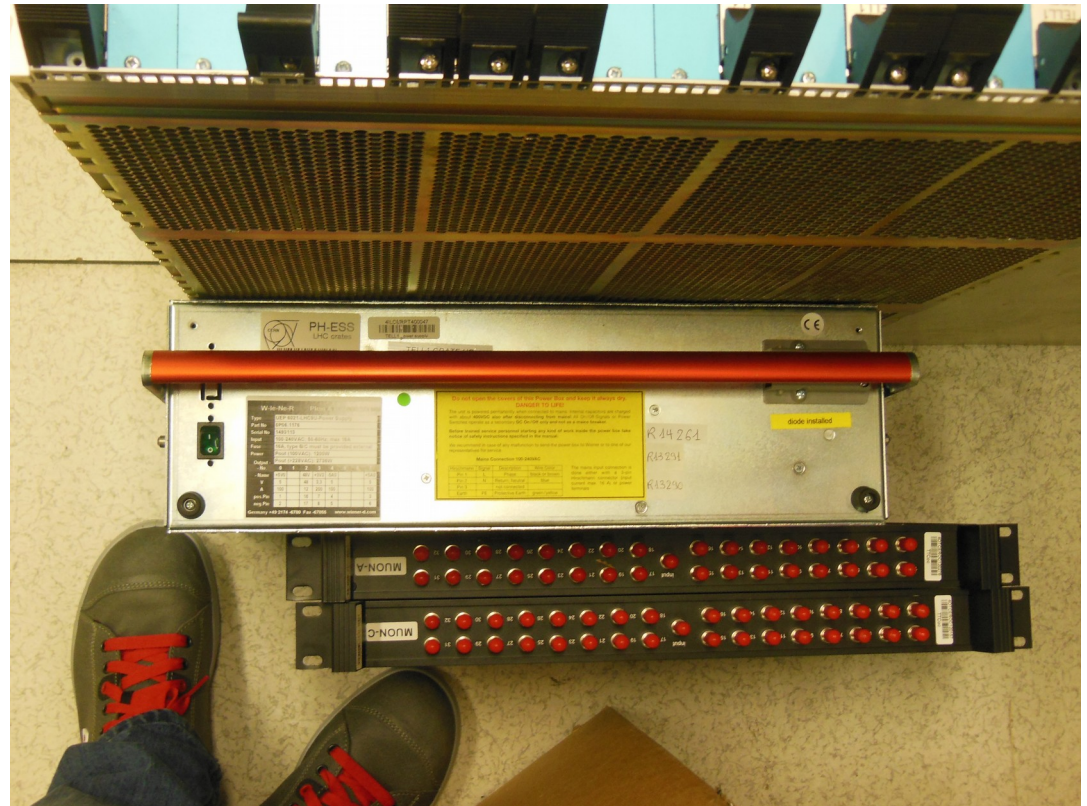




# Additional equipment

It is also possible to provide:

- Maraton LV power supply
- 1U optical splitter for ODE fibers
- optical fibers for ODE boards
- gas distributors
- multiport usb-to-canbus systemec 1U module



# Conclusion

Main question for today:  
What type and how many chambers are we going to use in cosmic trigger?

Secondary:  
Are we going to use lhcb-ode & lhcb-tell1 electronics in cosmic trigger project?

Thank for your attention.