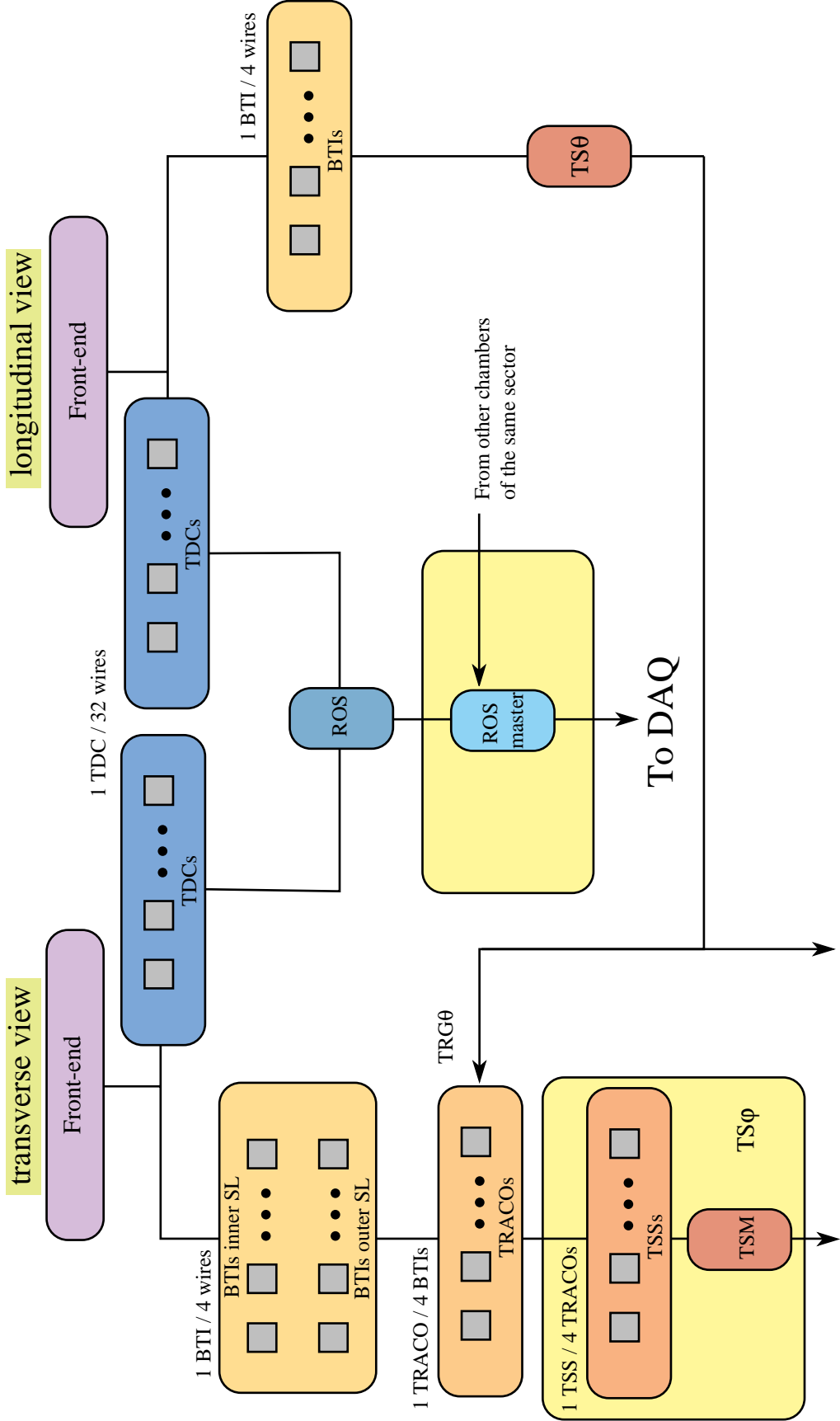


Barrel Drift Tubes Trigger Electronics Review

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CERN november 13, 1998

Overview of the electronics layout of a chamber



To Muon Regional Trigger

Trigger ASICs	BTI	50000
	TRACO	4400
	TSS	1100
	TSM	240

BARREL CHAMBERS ELECTRONICS

- I. The baseline proposal to install Trigger and Readout electronics in crates on the CMS balconies has the drawback of a high cost because of the long cables connecting the front-ends to the crates.**

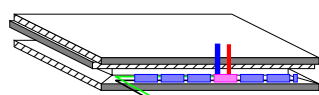
- II. The possibility to lodge electronics on chamber has been investigated and a proposal is ready for discussion.**
 - A. The chamber electronics is organized in 128 channel units consisting in a Readout Board and a Trigger Board sandwiched together. A small unit of 32 channels is necessary in order to match the channel number of some station. One Server and Control unit is necessary for local controls/monitoring and for data collection and transmission.**

 - B. An additional Sector Collector unit, where data coming from the four chambers of a sector are collected, is the detector interface with DAQ and Global Trigger.**

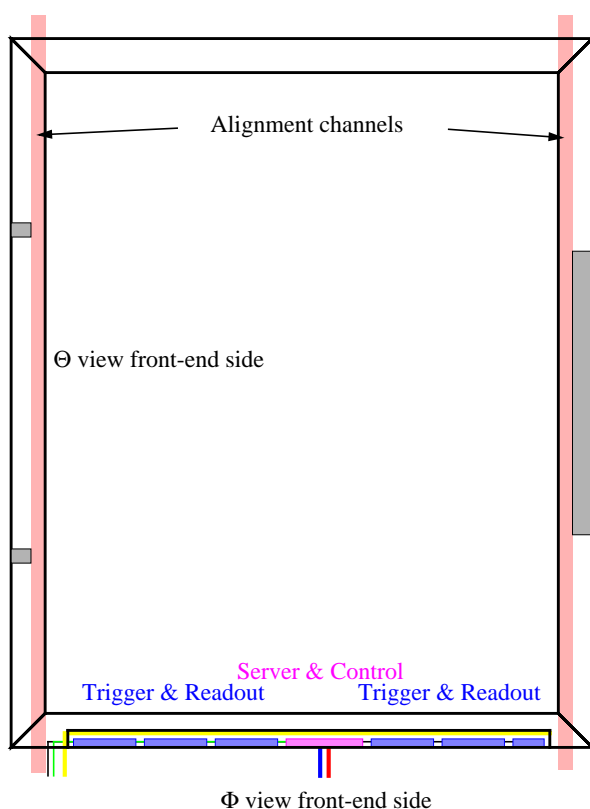
 - C. Chamber electronics is assembled in a mini-crate fixed in the C-profile.**

CHAMBER ELECTRONICS LAYOUT

ELv15st: Padova, 2 nov 1998



- Cooling pipes
- LV power
- Slow controls
- Fast alarming
- Trigger & Readout links



MB1 Chamber plan sketch

Chamber Trigger and Readout electronics is lodged in a mini-crate fixed in the front-end side of the C-profile.

The electronics consists of 128 channels Trigger and Readout boards sandwiched together: two units are needed for the θ side and three units plus a small 32 channel unit are used for the ϕ view

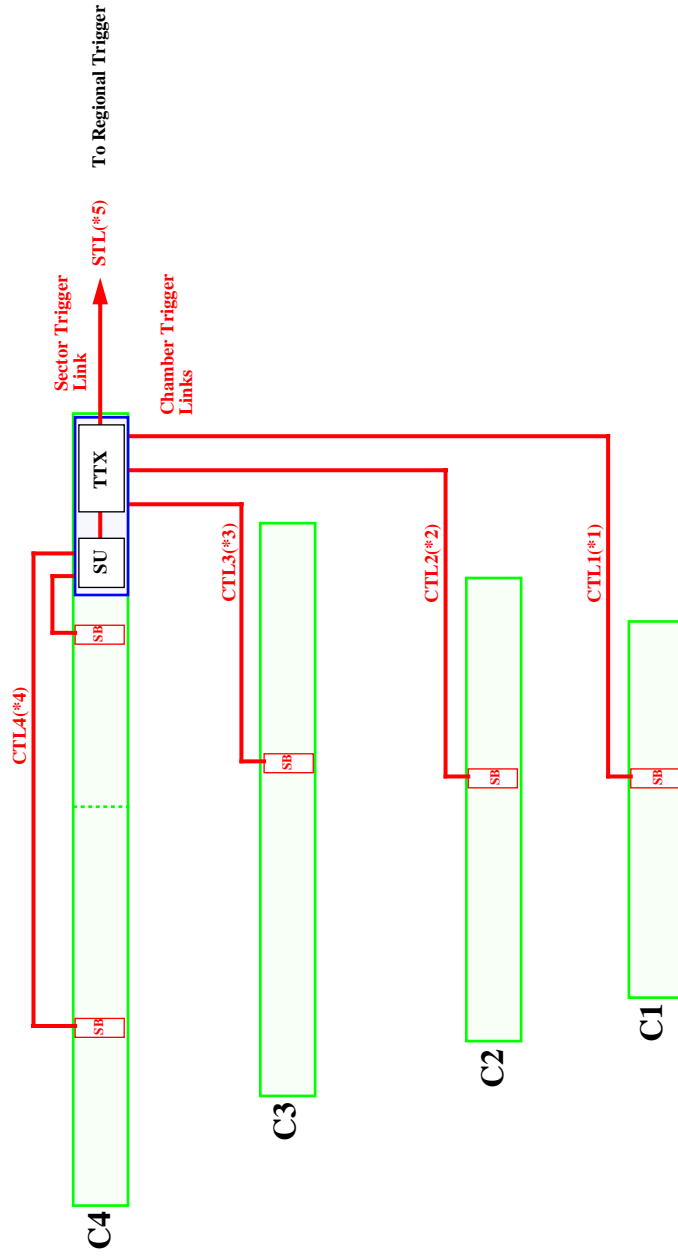
One Server and Control performing data collection/transmission and local controls is located in the middle.

MBI

CHAMBER TRIGGER LINKS: system interconnections

CTL1v11: Padova, 28 oct 1998

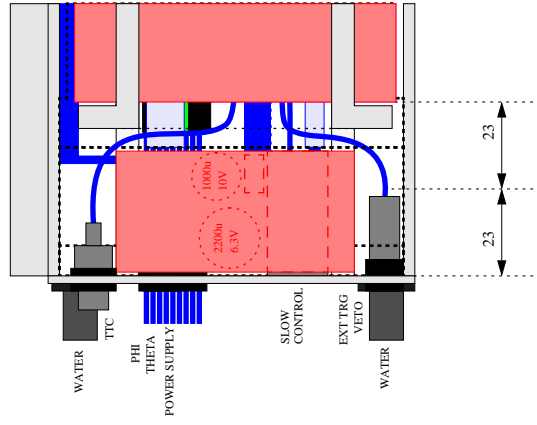
SB: Server Board
 SU: Sorting Unit
 TTX: Trigger Transmitter



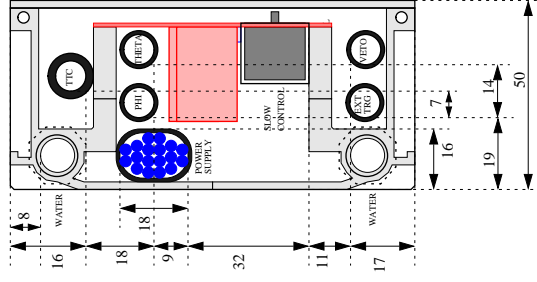
Link Name	Signal List	Cable Type
(*1) Station 1 Trigger Link	$\Phi 1(0:11)$ Radial of first track $\Phi b1(0:9)$ Bending of first track $Q1(0:2)$ Quality of first track $\Phi 2(0:11)$ same for second track $\Phi b2(0:9)$ $Q2(0:2)$ $\Theta(0:31)$ Theta SL hits $Q\Theta$ Quality of theta SL trigger	3x20 wires twisted flat cable
(*2) Station 2 Trigger Link	$\Phi 1(0:11)$ Radial of first track $\Phi b1(0:9)$ Bending of first track $Q1(0:2)$ Quality of first track $\Phi 2(0:11)$ same for second track $\Phi b2(0:9)$ $Q2(0:2)$ $\Theta(0:31)$ Theta SL hits $Q\Theta$ Quality of theta SL trigger	3x20 wires twisted flat cable
(*3) Station 3 Trigger Link	$\Phi 1(0:11)$ Radial of first track $Q1(0:1)$ Quality of first track $\Phi 2(0:11)$ same for second track $Q2(0:1)$ $\Theta(0:15)$ Theta SL hits $Q\Theta$ Quality of theta SL trigger	2x20 wires twisted flat cable
(*4) Station 4 Trigger Link	$\Phi 1(0:11)$ Radial of first track $Q1(0:1)$ Quality of first track $\Phi 2(0:11)$ same for second track $Q2(0:1)$	20 wires twisted flat cable
(*5) Sector Trigger Link		2x12 fibers ribbon cable

Chamber Electronics Box

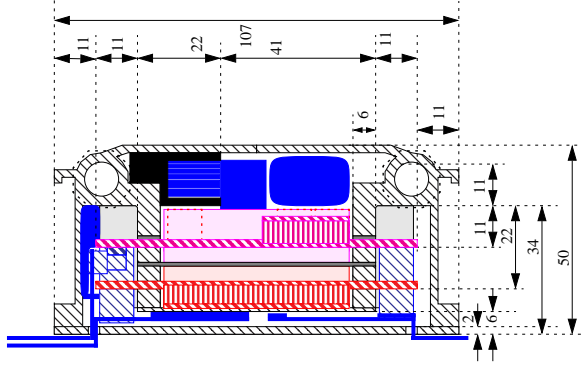
BOXv10, Padova 2 nov 1998



IO side:
 Power supply decoupling board
 Power supply cable outlet
 Water connections
 TTC, Trigger sync IOs, Slow Control



Box section:
 Panel IOs



Electronics section:
 Trigger and Readout boards
 Internal cabling
 Cooling system

TRIGGER ELECTRONICS STATUS

- I. The design of the mini-crate extrusion profile is ready.**

- II. Channels allocation will be done according to actual chambers layout.**

- III. The functionalities of θ and Φ Trigger Boards and the Control Board are well defined while the Server Board is still under study.**
 - A. The Trigger Board is under development**
 - 1. first samples by 3/99
 - 2. final version by 9/99

 - B. The Control Board is in the prototyping phase**
 - 1. a reduced performance prototype has been tested
 - 2. final version by 6/99

 - C. The Server Board is under study**
 - 1. the design is expected by 6/99
 - 2. first sample by end 1999

- IV. The Sector Collector is under study**
 - 1. the design is expected by 6/99
 - 2. the first trigger optical link prototype is expected by 6/99
 - 3. first prototype by end 1999

V. The trigger ASICs have been almost fully designed:

A. BTI, the front-end trigger device, is in the production phase

1. prototypes successfully tested
2. first production lot of 100 pieces in plastic package tested
3. second production lot of 200 pieces in die form tested by 6/99
4. preproduction of 10k pieces could start by end 1999

B. TRACO is in the signoff phase

1. prototypes arrival by 3/99
2. first production lot of 40 pieces in plastic package tested by 9/99

C. TSS is in the prototyping phase

1. prototypes have been tested on the test bench
2. functional test expected by 6/99
3. preproduction could start by end 1999

D. TSM is under study

1. the design is expected by 6/99
2. first prototypes are expected by end 1999

VI. BTI multichip modules are in the prototyping phase

1. first FR4 version prototypes tested
2. final version prototypes under production (end 98)
3. full performance prototypes tested by 6/99
4. preproduction of 1k pieces could start by end 1999

Chamber Trigger and Control Electronics Schedule

