

Results from May 2003 Test Beam

First test of all the electronics integrated in a MB1 Minicrate

Items tested:

•Hardware

- Front End Boards
- Read Out Boards
- Trigger Boards and devices

BTI TS

TRACO SC

•Software

- Synchronization
- Autotrigger
- Acquisition and Control s/w

Emphasis on items that need further investigations

FEB

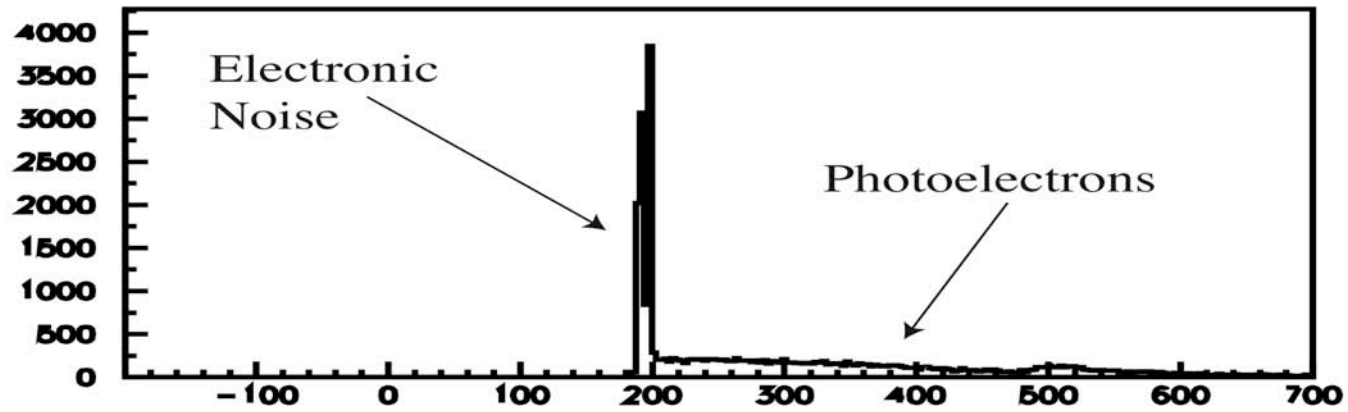


Front End Boards.

Already fully validate in past tests.

In this test there was evidence of an unexpected noise (afterpulses), maybe due to the minicrate layout, not yet optimized.

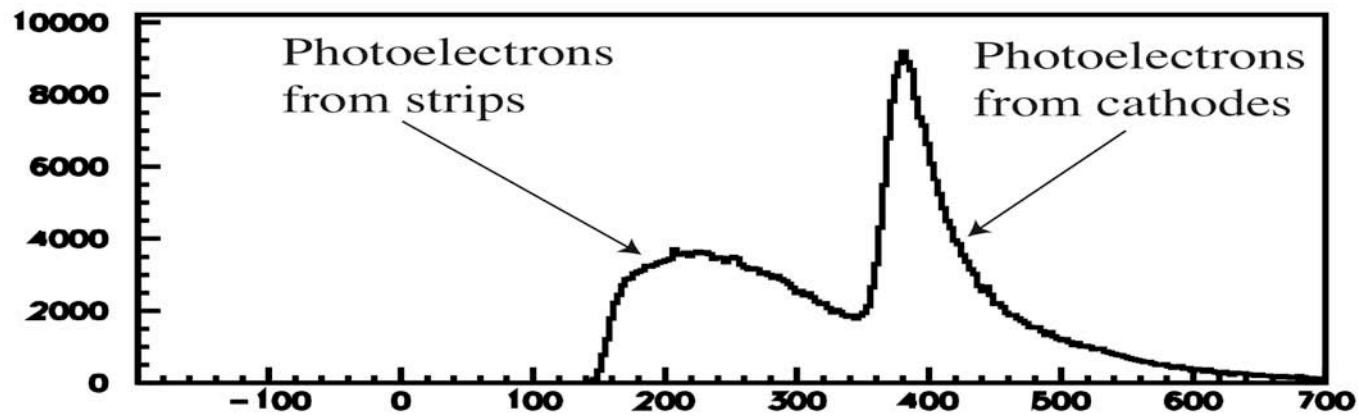
TDC in Minicrate



Distance between 1st and 2nd hit

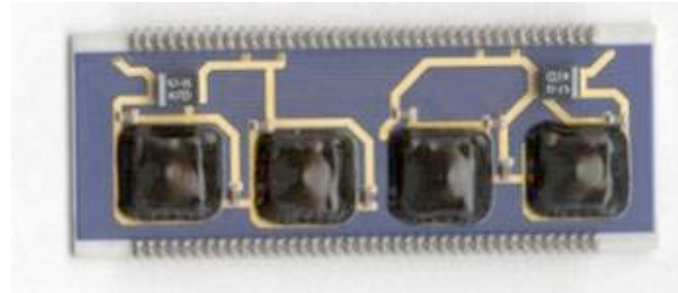
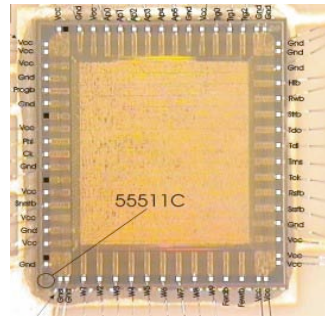
The channels with noise are always the same

LNL with external TDC readout



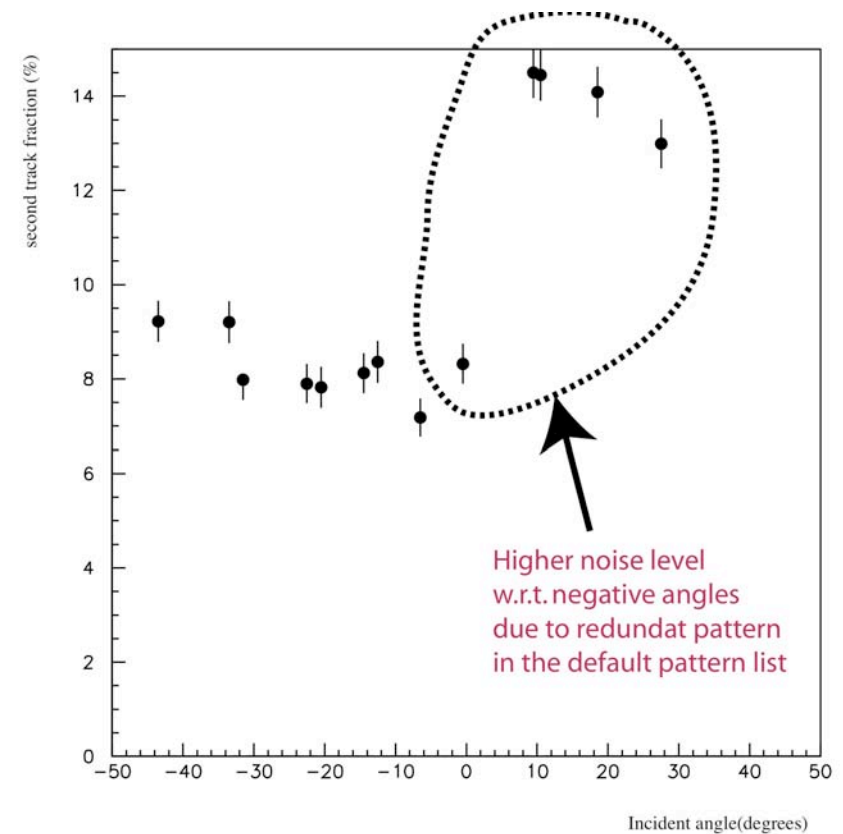
A. Meneguzzo

BTI and BTIM



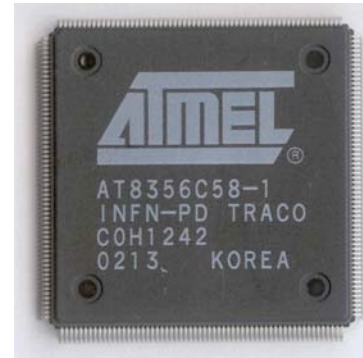
The BTI chip was already validated in 1999 test.
Integrated in the whole system for the first time.
Most of the BTI features successfully tested, with
some exceptions:

- The test gave an asymmetrical (w.r.t. incidence angle) background of second tracks. This was recognized as an error in the definition of the default pattern list. The correct list was found, but not applied.

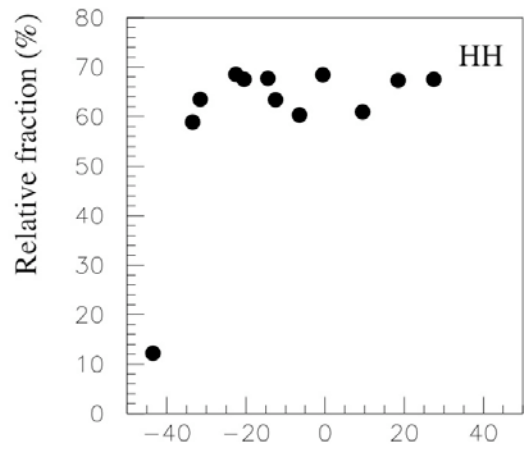


- The test of min/max alignment tolerance was not successful, as wrong configurations were loaded into the device

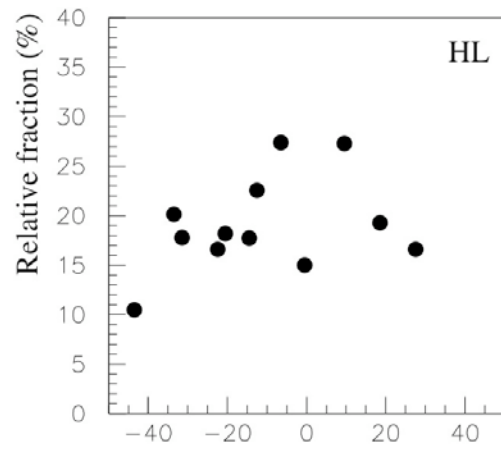
TRACO



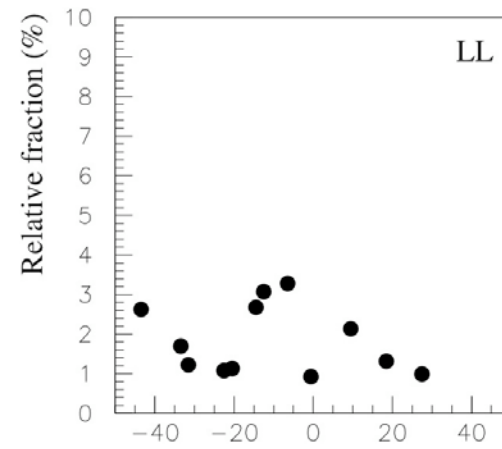
All the relevant parameters successfully tested, except the *Shift Bit*, that requires a couple of left and right chambers for validation.



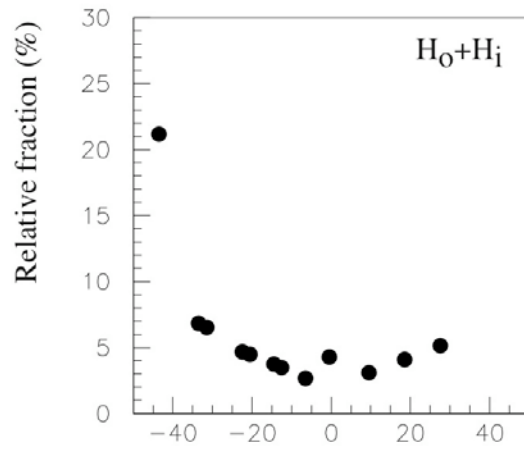
Angle of incidence(degrees)



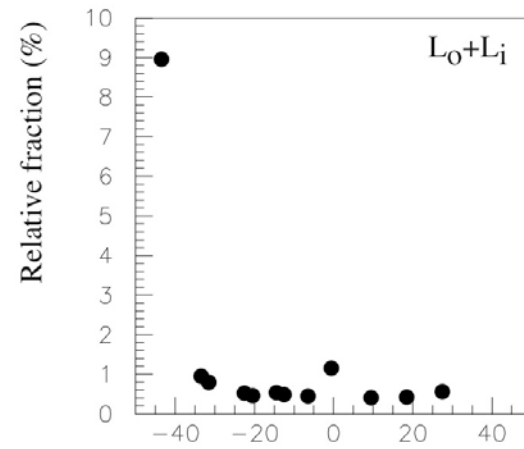
Angle of incidence(degrees)



Angle of incidence(degrees)



Angle of incidence(degrees)



Angle of incidence(degrees)

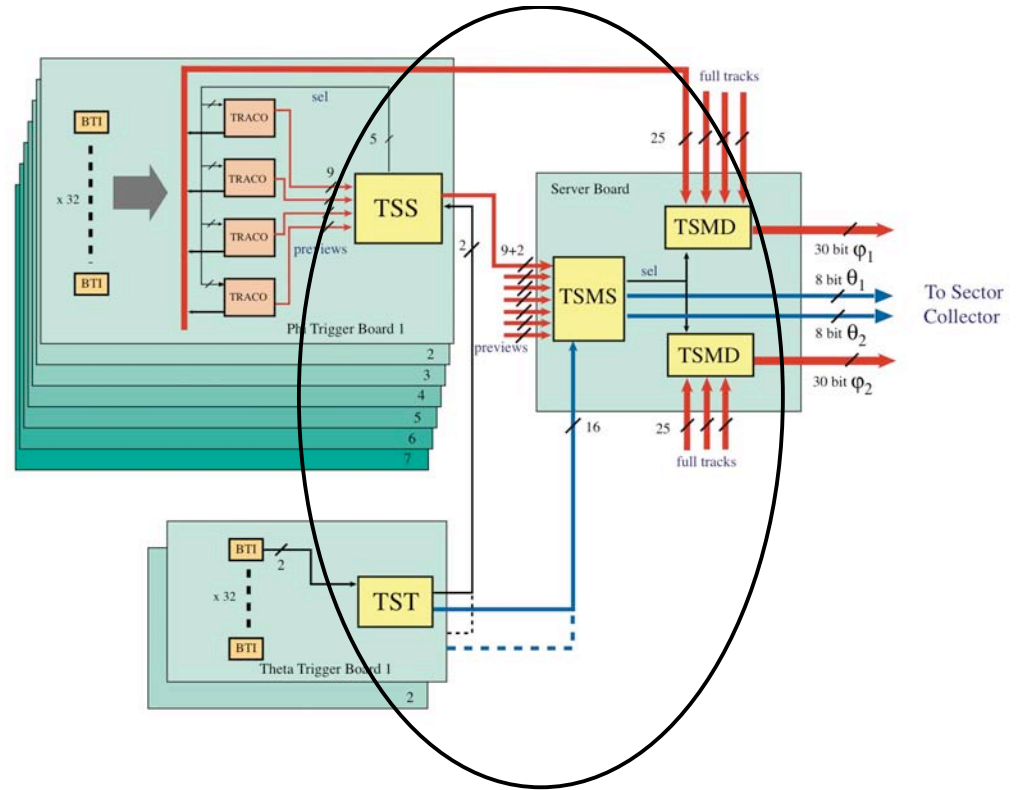
TS

Trigger Server.

Performs track selection inside one chamber.

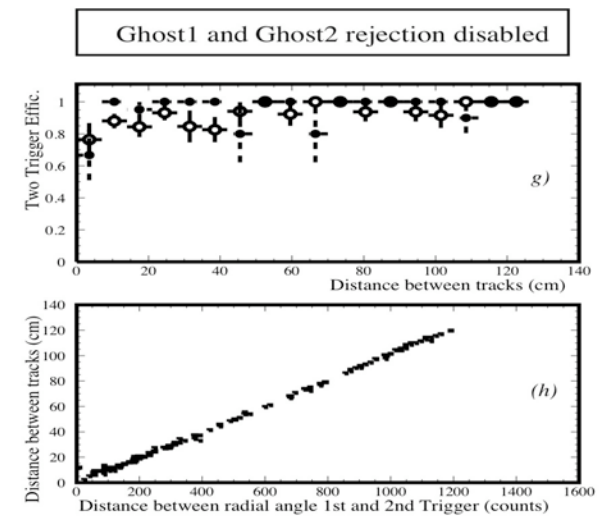
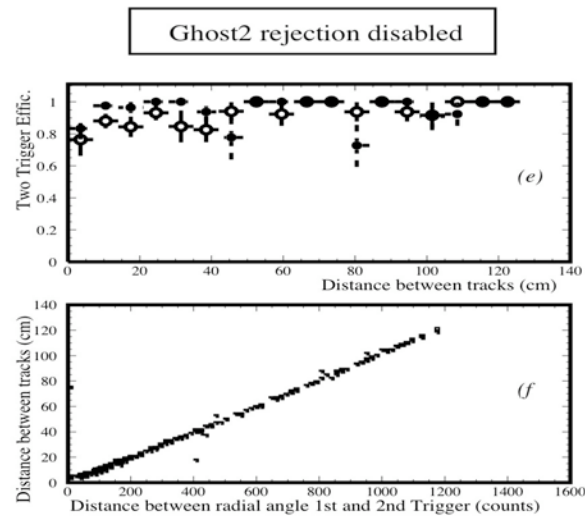
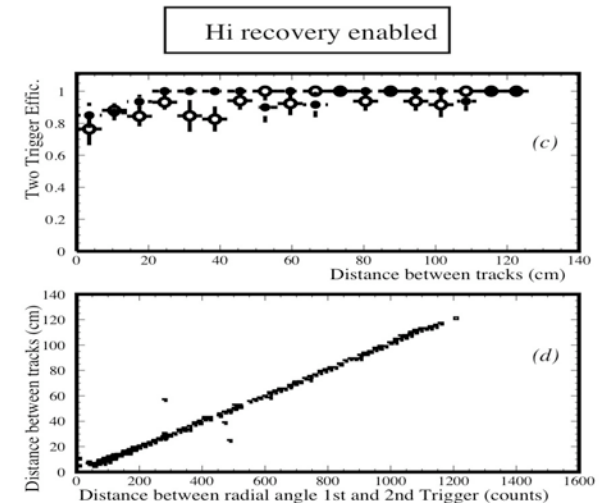
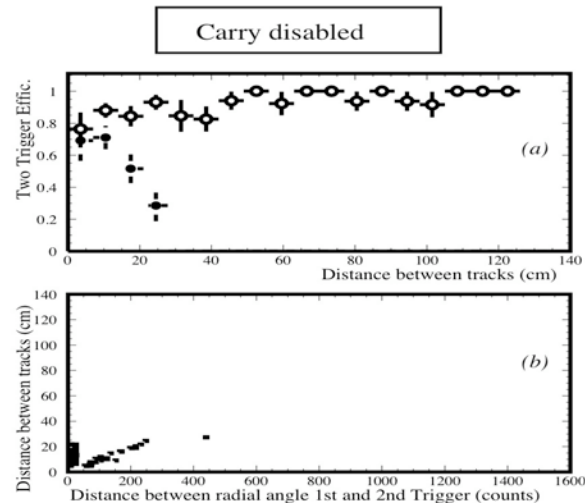
It's a distribute system composed by:

- TSM = Track Sorter Master
- TSS = Track Sorter Slave
- TST = Track Sorter Theta

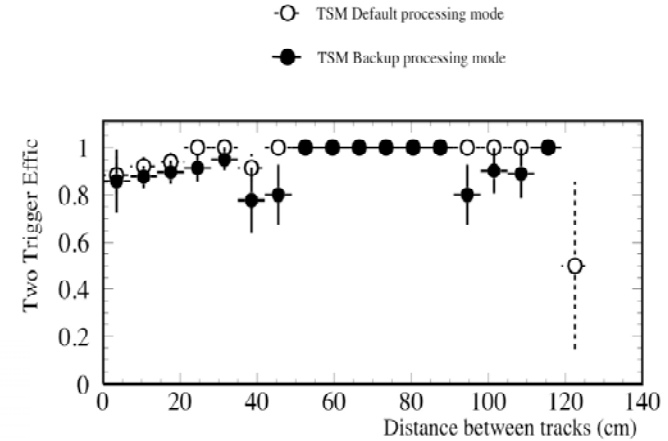
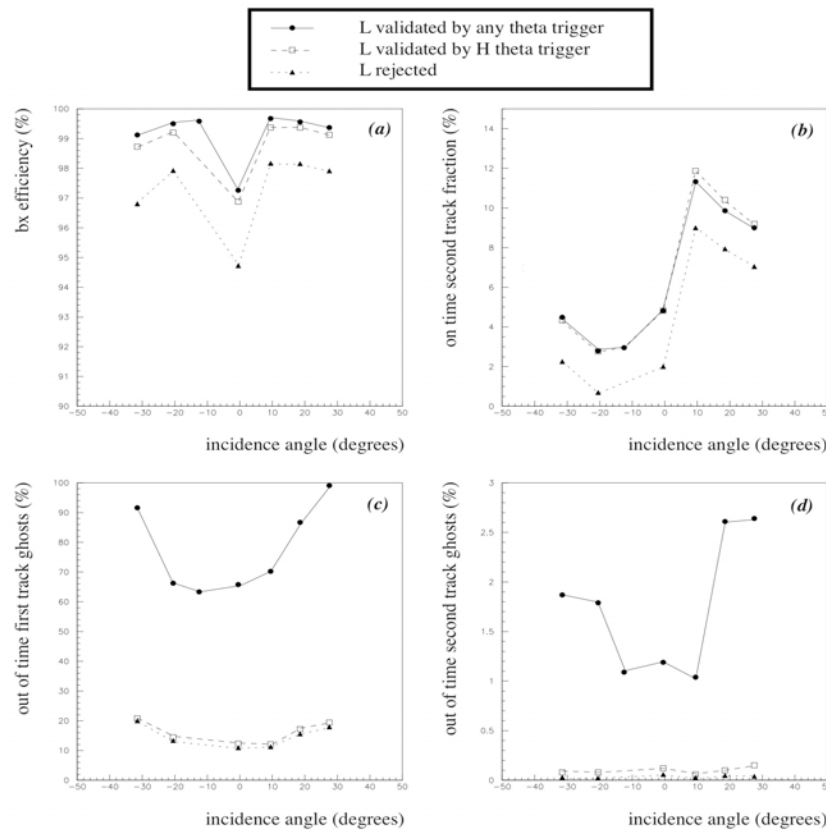


White dots = Default configuration

Fully validate in all configuration of TSM Default-Mode, although with low statistics of di-muons



Test of TSM Backup-Mode really successful.



TST validation system for uncorrelated triggers fully verified

Sector Collector

Serializer/Deserializer tested successfully.

The validation of the optical transmission to DTTF and the trigger/readout data spying by the DCS is still missing (hardware not yet available).

AUTOTRIGGER

This is an important feature of CCB firmware.

The basic performances seems to be correct and the behavior looks as expected, in spite of some errors done in the test:

1. The scintillator signal was not readout, and therefore a cross check of the trigger efficiency was not possible.
2. The H/L bit from TS was wrongly interpreted.
3. Moreover, it was not a true autotrigger test, as the L1A signal was generate outside of the TRB: i.e. the board was actually in normal status, and not in Autotrigger status.

Finally, the verification of the veto logic for a possible cosmic ray trigger was not performed (as two chambers are required).

SYNCHRONIZATION

Synchronization runs were done both with scintillators trigger and autotrigger.

Synchronization was done using scintillator trigger and maximizing HH/HL trigger efficiency.

This method will not be applicable in CMS, and scintillators will not be available, therefore an autotrigger based method is under development, using data acquired with autotrigger runs (the scintillator signal is missing, but the drift-times data seems not corrupted).

CONTROLL SOFTWARE

Many software packages was available for configuring different parts of the system, causing complications; all this software requires integration in a common framework.

A major bug was done in the calculation of the LUTs for TRACO, due to incoherent drift velocity parameters loaded into TRACO and BTI. This is a serious hint towards the opportunity to calculate table outside the CCB, where all consistency checks can be more easily, also in view of application of alignment constants.

