Tranfer Line Issues

- Shared power converter for TI8 / CNGS

- Screen interlocks.

- TED dump interlocks.
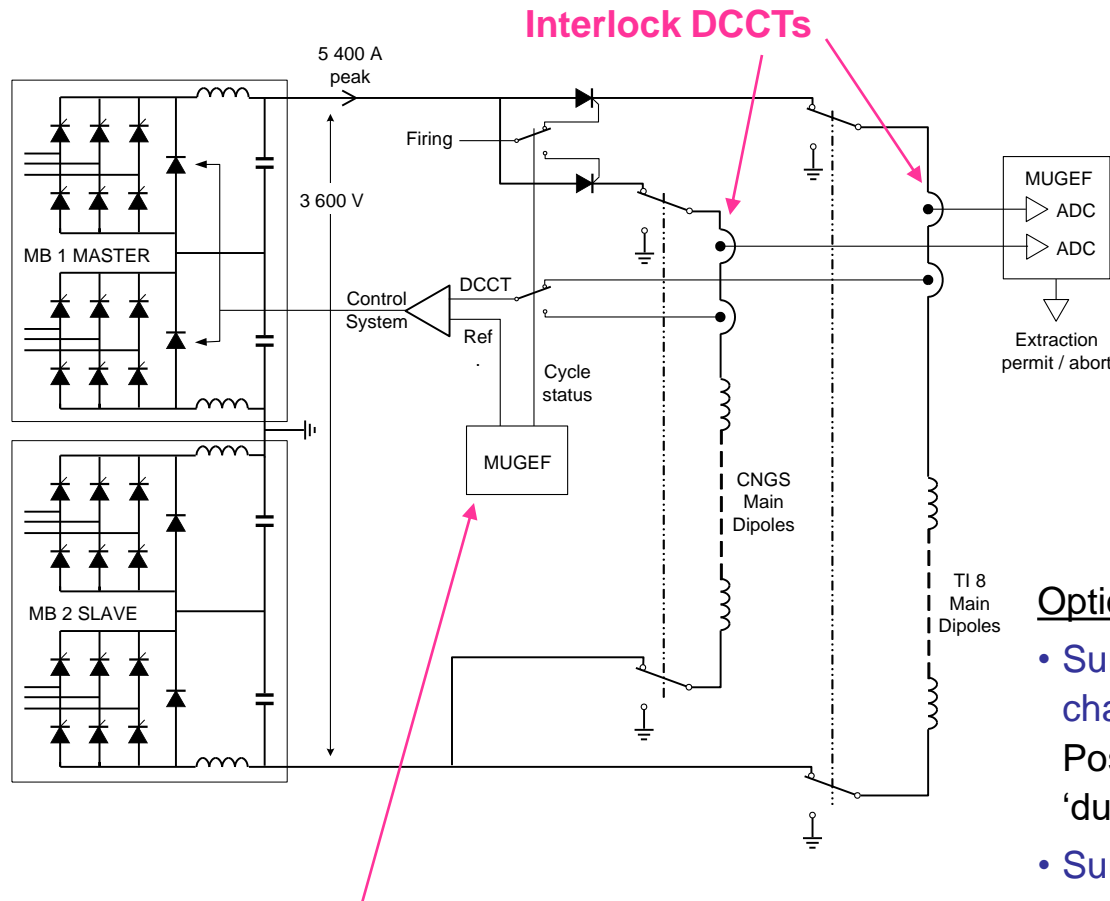
From discussions with :

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Shared main dipole PC for CNGS/TI8

Interlock DCCTs

5 400 A peak

3 600 V

Firing

MB 1 MASTER

Control System

DCCT

Ref.

Cycle status

MUGEF

MB 2 SLAVE

CNGS Main Dipoles

TI 8 Main Dipoles

MUGEF
ADC
ADC

Extraction permit / abort

MUGEF for 'standard' surveillance

- Former LEP main dipole converter, shared between CNGS/TI8.

- Electronic switching (2006 ?).

- 'Standard' surveillance of PC cannot resolve a switching error.

- **There is one DCCT in each branch that is 'reserved' for interlocking.**

Options for special DCCT surveillance :

- Survey each DCCT with a reserved MUGEF channel and use the standard surveillance. Possible, but PO does not really like such 'dummy' MUGEF PC channels.

- Survey each DCCT with a Fast Current Decay Monitor – only possible if the **absolute current is also surveyed** (and not just the V change) !

- Build a 'low-tech' (no high accuracy needed !) comparator to check each DCCT against a ref.

- …

18.03.2005   MPWG / J. Wenninger

# Screens

A screen in the tranfer lines will be SAFE for :

- OUT position.

- OTR (Ti/12 μm or C/100 μm) position.

An interlock is generated if :

- Screen is in Alumina (thick screen) postion.

- Screen is moving.

The interlock will be maskable with Safe Beam Flag.

- The interlock is generated directly from the FPGA that controls the screen motor and that has access to all signals (switches).

- One (or more tbc) interlock signal will give for each VME crate.

- Note that the command to move the screen is always given in the period of the SPS cycle without beam ('beam-out' segments) : normally the beam should never intercept the frame of the screen
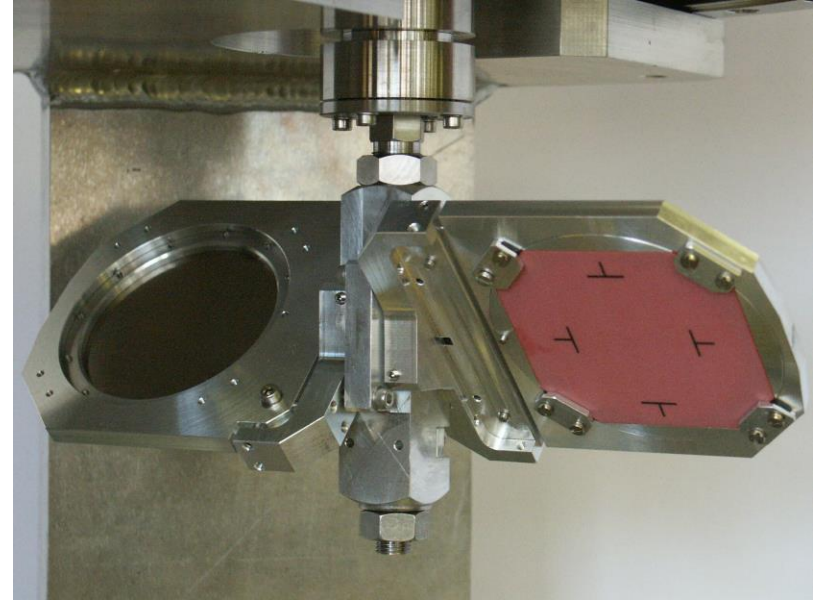
TEDs / I

For each TED dump the following permit signals must be provided

1. <u>'TED-in' permit signal</u>

   - Permit = TRUE ONLY if TED is IN-BEAM.
   - Permit = FALSE in all other conditions (OUT, moving, intermediate…).

   Used to mask interlocks arising from equipment **DOWSTREAM** of the TED.

2. <u>'TED-not-moving' permit signal</u>

   - Permit = TRUE if TED is IN-BEAM or OUT-BEAM.
   - Permit = FALSE in all other conditions (moving, intermediate).

   Used to inhibit the beam in the region **UPSTREAM** of the TED.
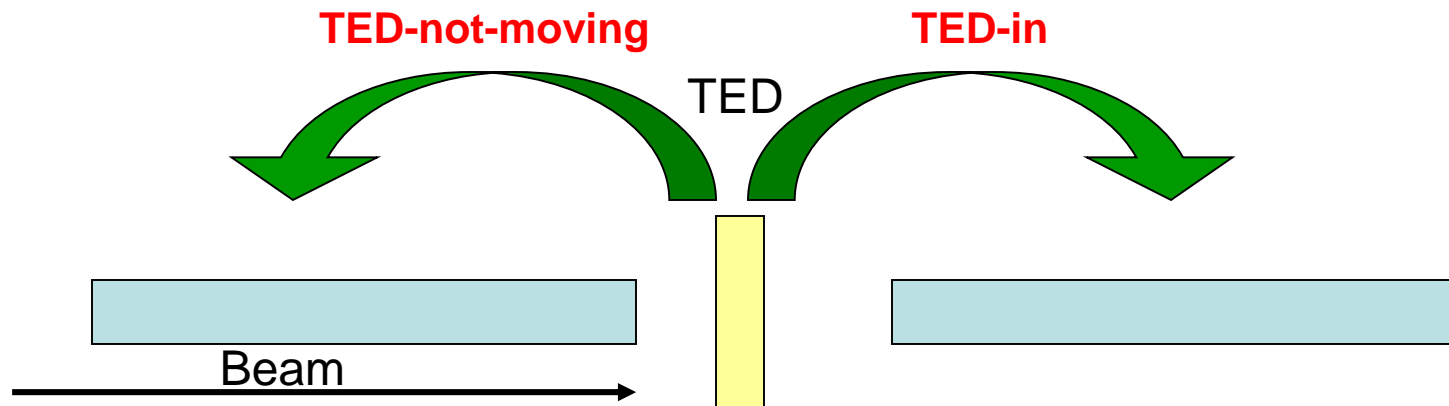
TEDs / II

- Those 2 signals are sufficient for protection. I do not see the need for a signal indicating TED OUT.

- For beam permit, the TED maybe IN or OUT, since both are SAFE positions.

- Software interlocks will be used to handle inconsistent TED positions by cheking the consistency between

  - The **beam destination** (beam-to-TED, beam-to-target, beam-to-ring1…) as distributed by the timing system and set in the timing sequence

  and

  - The **actual TED position**

  as is already the case today. A SW interlock (that can be bypassed to allow fast checks…) is generated in case of inconsistency.