

## Electronics for Module Irradiation in T7

*K. Einsweiler, LBNL*

### **Proposal for electronics for T7 module irradiation:**

- Agreed in Dec to mount modules in trimmed FlexHolder cards onto carbon plates.
- Modules will be operated with Type 0 micro-cables as the only connection.
- All connections would be fanned out from PP0 Support Card. This provides the interface to all signals, power supplies, and temperatures. It can also provide an opto-board interface for irradiation of modules with opto-readout.
- Two TPLL/TPCC systems would be used for readout during the May 2003 (FE-I1 module) and July 2003 (FE-I2 module) irradiation, as was done for the May 2002 FE-I1 single chip irradiation. The TPCC were located 7m from the modules, under a concrete shielding block to reduce their dose. This allows the modules to be constantly clocked, with one module out of four being constantly monitored.
- Supplying power over reasonable size 30m cables requires the use of a local Milano regulator board, operating in remote sense mode over the last 7 meters. Since the board is radiation-tolerant, this should work well at the PS.

## PP0 Support Card

### Layout of board:

- Logically, this board acts as a combined PP1/PP0 to allow connection of a disk sector or half stave to all of the necessary services.
- It provides an interface to two TPCC (7 50-pin connectors), or the ROD via a SimpleBOC (80-pin Flex cable from opto-connector) or the ROD via an opto-board.
- Board uses a laminated PP0v2b Kapton, loaded with all connectors, to provide basic connectivity.
- NTC can be readout out via TPCC cables, or via separate headers to ELMB boards.
- External VCal access is provided via RS1b pin of Elco connector.
- XCKR is generated locally for the TPCC, with a small patch-panel to allow tuning delays to match the length of the micro-cables used for each module. If all cables are the same length, this can be a flat cable. Uses rad-hard LVDS Buffer.
- It provides a standard remote-sense LV connection to each module via an 8-pin Molex (same family as the one used for the TPCC). This is our standard connection for system testing in LBL.
- It provides a standard HV connection via LEMOs to each module.
- Board was submitted for fabrication in the beginning of Feb, and will be ready when we return from the pixel week. It will immediately be used for system testing.



## Irradiation Software:

- This will again be based on TDAQ.
- For May 2002, we had a series of scans that were automatically performed under control of the TDAQ “irradiation panel”. This will be slightly generalized this time. In particular, we will use the 16-bit SRAM mode to run long digital inject scans looking for the effects of SEU on the FE and MCC readout. We would also expect to try to re-tune the module thresholds at least once during the irradiation
- There will be more extensive SEU-testing capability implemented, particularly for FE-I2, which includes support for the Hit Parity, and includes two different versions of the SEU-latch as well as an SEU-DFF for parts of the Global Shift Register.
- We want to integrate support for the ISEG HV supply into TDAQ, so that the logging of voltages and currents is correlated with the testing activity. The vendor supplies the basic library for this, but another layer of software is needed to make access more reliable. This is under discussion with Wuppertal.