Recent Developments in Hardware/Firmware

- Clock and Control Board (CCB2004)
- Muon Port Card (MPC2004)
- Muon Sorter (MS2005)

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Clock and Control Board Status

• 95 boards exist: 80 at CERN, 1(2) at UCLA, 1 at OSU, 1(2) at UF, 10 at Rice

• Hardware bug in the VME decoder was fixed early in 2006 on almost all boards (with the exception of #2, #5, #6, #10, #14, #15, #16, #18, #65, #70, #71)

• Two modifications in firmware since January 2005 for the “FPGA” mode:
  1. Generate L1A on rising (instead of falling) edge of the TMB_L1A_Request (= SP_L1A_Request in the TF crate) (request from Lev Uvarov, February 2006)
  2. Possibility to generate L1A on DMB_CFE_B_Calibrate[2:0] pulses from VME or TTC (request from Martin von der Mey to allow comparator calibration with the CCB2004, September 2006)

• The manual and configuration files are available at http://bonner-ntserver.rice.edu/cms/projects.html#ccb
Muon Port Card Status

• 77 boards exist: 70 at CERN, 1 at UCLA, 1 at UF, 5 at Rice

• No change in hardware

• Several recent modifications in firmware:
  1. 8-bit programmable Board_ID[7:0] number is sent to SP on L1Reset (request from Lev Uvarov, March 2006)
  2. Two new CSR7 and CSR8 registers added to mask out all incoming LCT[1..18] individually (request from Martin, October 2006)
  3. Allow LCT’s with Quality[3:0]=0 and VPF=1 to participate in sorting (October 2006)
  4. Allow storing of incoming LCT[1..18] in FIFO_A on MPC input (previously FIFO_A was used only for internal testing purposes to check the sorting unit) (November 2006)

• The manual and configuration files available at http://bonner-ntserver.rice.edu/cms/projects.html#mpc
Muon Sorter Status

• Five MS2005 boards exist: two at CERN, one at UF, two at Rice

• No change in hardware

• One recent modification in firmware:
  - Same functionality with reduced (from 6BX to 5 BX) latency (July 2006)

• The manual and configuration files are available at
  http://bonner-ntserver.rice.edu/cms/projects.html#ms
Test Stand 1 at Rice

- Peripheral Crate with pre-production (rev.2) 9U custom backplane, 2 Kepco power supplies, OSU_CC, CCB2004, nine TMB2005, MPC2004, two DMB

- Track Finder Wiener 6023 crate with the revision 2 6U custom backplane, CAEN V2718 crate controller, CCB2004, two SP05, MS2005, TTCvi, TTCvx
Test Stand 2 at Rice

- We have another older peripheral crate with the 3U VME64x and pre-production (rev.1) custom backplanes.

- Upper portions of the DMB and SP connectors (CCB interface) are electrically and mechanically compatible.

- So we can plug in the SP05 into the dedicated (and slightly modified) DMB slot and run the TMB-to-MPC-to-SP chain test in one crate!

- We can even run this test without TTC modules (CCB2004 internal 80.157MHz oscillator allows the QPLL on SP05 board to lock to the backplane clock).
Hardware Failures

• **Broken optical connector on TTCrq mezzanine #1014**
  - Photodiode replaced

• **One 3D7408 delay chip on MS2005 board #2 has died during MTCC 1**
  - Chip replaced

• **One Finisar FTRJ-8519 optical receiver on SP05 board #4 has died during extensive tests at Rice**
  - Module replaced
• Companion document to the CCB2004, MPC2004 and MS2005 specifications

• Comprehensive 37-page (version 1.3) User’s Guide on:
  - Board initialization
  - Step-by-step programming in various modes
  - Instructions on how to run chain tests
  - Firmware downloading
  - Updated pin assignment for all slots in the peripheral and TF crates

• Available at http://bonner-ntserver.rice.edu/cms/users_guide_13.pdf