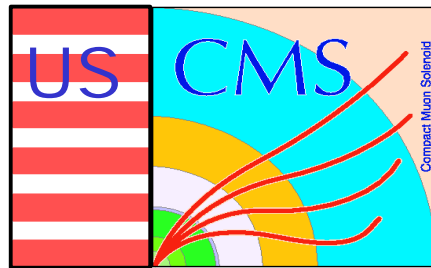


UF Beam Test 2002



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CMS-EMU Meeting, Gainesville
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Test Goals

- **Goals**

- **Simultaneous operation of 3 CSCs**
 - **Production versions of on-chamber electronics**
 - **Common gas, cooling, HV, LV, Slow Control and DAQ systems**
 - **Implement TTC and DDU**
- **Synchronization, calibrations, continuous slow control monitoring**
- **Two crate operation modes**
 - **All CSCs readout on one full backplane**
 - **CSCs readout on 3 individual small backplanes**
 - **Simulates multi-crate operation**
- **Final pre-production versions of crate electronics**
- **Trigger and data quality analysis**

- **Test categories**

- **System Integration tests**
- **Performance tests**



System Integration Tests

- **Basic operation: ~1 week, this month?**
 - HV tuning, LV operation tests, on-chamber cooling
- **Trigger timing/tuning: begin in 1-2 weeks with TMB**
 - Cosmic/scintillator and calibration pulse timing
- **Slow Control, configuration and monitoring: now?**
 - Inside run control for now, implement DCS later
 - Board initialization
 - hard/soft resets, load constants (DAC, masks, etc)
 - Calibration setup and pulse generation
 - LVDB power on/off control
 - Add crate and HV power control later
 - Status monitoring: board errors & temperature/voltage/current
- **DAQ/Run Control**
 - Trigger control (TTC/CCB communication): this month?
 - Event readout (CAMAC/VME/PCI), storage and display: now?
 - Communicate with Slow Control: later, when DCS is ready



Performance Tests

- **What can be done at UF?**
 - **Calibration tests**
 - Readout rate capabilities
 - **Pulse pattern generation for trigger testing**
 - Trigger performance
 - **Cosmic ray testing**
 - Scintillator trigger mode
 - Self-trigger mode
 - A/CLCT trigger threshold/efficiency tests
 - ALCT.and.CLCT & ALCT.or.CLCT operation tests
 - ALCT/CLCT/TDC BX timing variance
 - HV threshold effects on efficiency
 - Position resolution studies?
 - **Continuous Slow Control monitoring**
 - Includes FMM functionality too? (just for now via VME)



Equipment Needs

When to deliver and contact person responsible for each of the following:

digital oscilloscope with probes		UF	already there?
pulse generator for random trigger		UF	already there?
BNC/Lemo cables, tees, terminators and BNC-Lemo adapters		UF	already there?
scintillator trigger system		UF	when ready?
3 CSCs and gas system	UF		when ready?
HV supplies and cables	UF/PNPI		when ready?
cooling and tubing	UF/UW		when ready?

Instrumentation for 3 CSCs**: already at UF? CSCs available, set up and ready for testing? When?

AFEBs	CMU
AFEB-ALCT cables	CMU
15 CFEBs	OSU
15 CFEB-DMB cables	OSU
3 DMBs	OSU
3 TMBs	UCLA
15 CFEB-TMB cables	UCLA
3 ALCTs	UCLA
ALCT-TMB cables	UCLA
3 LVDBs	UW
power cables to LVDB	UW
power cables from LVDB	UW
LV power (400 Hz source?)	UW
3 LVMBs	UCD



Equipment Needs

Crate equipment**:

VME peripheral crate(s)	UF	when ready? More than one?
full and 3 partial VME backplanes	UF	when ready? Build more?
Dynatem (slow control VME computer)	OSU	already there? Order more?
1 10-base-T switch, cables/Tees/terminators	UF	need to order?
3 CCBs	RICE	when ready?
1 DDU with fiber spools for DMB readout	OSU	ready by end of April: fiber length?
1 Linux PC with gigabit/S-Link to readout DDU (1-2 fast hard drives, dual CPU with 64-bit/66MHz PCI)	UF/OSU	will ship from OSU when needed
TTCvi/vx and support, for 3 CCBs	Rice?	when ready?
NIM crates & Modules (delays, logic, etc)	UF	already there?
CAMAC crate & controller, TDCs, etc	UF	already there?
signal cables, short and long (Lemo/BNC)	UF	already there?

Software:

DCS Slow Control (Dynatem/VME/JTAG routines)	Bob Clare	later, but when?
Temporary Slow Control (Dynatem/VME/JTAG routines)	UF/OSU	work in progress, ready soon?
Trigger/Run Control	UF	ready now?
DAQ (CAMAC/VME/G-bit readout & storage)	UF	when ready?

****Some equipment may already be present at UF FAST site.**



Proposed Schedule

- **All equipment delivered to UF by April 26**
 - Before then if possible, especially for critical items
 - TMB/DMB integration next week? TTC/CCB the week after?
- **April 27 – May 5: Assembly and Setup**
 - Over 1 full week to ramp up
 - Experts needed on-site for smooth startup!
- **May 6 – May 19: Integration Tests**
 - 2 full weeks to work out any bugs
- **May 20 – June 2: Performance Tests**
 - 2 full weeks
 - One week for each crate readout mode
- **June 3 – June 16**
 - Additional testing possible



Large CSC Network Software (1) **– S. Durkin**

**System contains 60 D360's talking to
20 VME slots \Rightarrow 1200 VME Slots !
Software better be prepared !**

Communications with the D360

- **Each Dynatem has a TCP and a UDP
“inetd” Server Daemon**

TCP (mainly written)

- **address single crate (read write)**
- **multiple sockets connections to other crates**
- **broadcast writes to all within VME crate**

**Uses: firmware upgrades, prom constants,
debugging, single crate/card calibration**



Large CSC Network Software (2) ***– S. Durkin***

UDP (barely started, simple LV readout only)

- broadcast to all crates
- up to 1500 words returned from each crate
- broadcast writes within VME crate

**Uses: pulser setup, slow control readout,
local system reset, fast constant loading**



Data Logging/Computation Computers

~18 Rack PCs

- 2 gigabit Ethernet channels/computer

New Gigabit Ethernet Driver Written

- uses **KERNEL** large memory patch
- presently stores data in 600 MB memory
(more memory easily added, new Linux 64 GB limit)
- tested at ~700 Mbit/s
- blocking/non-blocking reads

Kernel Memory to Disk

- we presently write to disk at 200 Mbit/s