



GlueX Collaboration  
Meeting  
Electronics Manpower  
27-29 April 2006  
Jefferson Lab

R. Chris Cuevas  
Jefferson Lab  
Physics Division  
Group Leader -- *Fast Electronics*

Topics:

- Manpower

## Electronics Manpower

- Manpower issues and recommendations have been presented before:
  - Electronics Review -> July 2003
  - Electronics Workshop -> December 2004
  - Electronics R&D -> June 2005
  - Electronics Workshop -> April 2006

**Committee comments:** The committee expressed concern about the need for more manpower. They also pointed out that the analog front-end electronics are not adequately specified.

**Our response:** The collaboration is well aware of the shortage in manpower and has taken steps to address this. Indeed during the period since the electronics review the group from U of Alberta has joined the collaboration including two engineers (Lars Holm and John Schaapman) and an engineer from IUUCF (Gerard Visser) has joined GlueX to work on the FADC's for the central and forward drift chambers. Also, it is likely that the U of Tennessee and a group from Oak Ridge will work on the Cerenkov counter and associated electronics. The collaboration has requested that the JLab management immediately add staff to the JLab electronics and DAQ groups to work on GlueX associated projects as the initial phase of building up a Hall D/GlueX group. The need to start such a group, along with appointing a Project Manager as soon as possible, was also emphasized by the GlueX Detector Review Committee chaired by J. Alexander (Cornell) in November, 2004.

With regard to specifications for the front-end electronics, Jim Pinfeld (Alberta) is collecting specifications for front-end electronics from other experiments and in consultation with Mitch Newcomer at the University of Pennsylvania and John Oliver of Harvard University. The table summarizing GlueX detector specifications is being updated.

*Does the collaboration have a sensible plan for management?*

*Are their estimates of manpower needs realistic?*

**Committee comments:** The committee pointed out that the manpower resources shown at the time of the review would not be adequate and that they anticipated that the collaboration will need to work with the lab and funding agencies for additional manpower.

**Our response:** This is work in progress – see above.

*Do they have a realistic milestones as we prepare for the Lehmann review and beyond to construction?*

**Committee comments:** The Committee estimates that a project of the overall scale of GlueX will require about 6 years to complete after CD-3a is achieved. Approximately two years are available between obtaining CD-0 and CD-3A, during which the CDR must be developed and all groups involved in the construction of GlueX be put in place. This requires that by FY2006, all major R&D issues should have been addressed.

**Our response:** There has been some slippage in the schedule for moving to CD-3. R&D issues regarding TDC's have been addressed and the Indiana and JLab groups are close to addressing issues associated with the FADC's for calorimetry and PID. Work has started on the FADC's and pre-amp specifications for the drift chambers and major R&D issues should be addressed by FY2007. Another area of R&D involves the use of SiPM's for read-out of the BCAL in the high magnetic field region. The groups from Regina and Alberta are working with industry (SensL) on this issue. In summary, we feel that major issues will have been addressed by 2007. We also feel that we can complete the electronics within three years after CD-3A.

## Electronics Manpower

- **Manpower issues have been addressed [ GlueX-Doc-525]**
- Collaboration groups have been identified to deliver crucial electronics for several detector sub-systems.
- Two new job postings have been sent to the 12GeV office [Jan2006]
  - Electronics Engineer
  - Electronics Technician/Designer
- The positions have not been approved yet,,,,,

## Personnel

Personnel working on these projects include the JLAB electronics group, Ed Jastrzembski of the JLAB DAQ Group, and Dave Doughty from CNU. Currently there are three design engineers working on these projects - all part time. The JLAB DAQ and Electronics groups have additional responsibilities involving maintenance and support of the running 6 GeV program. To maintain the proposed development schedule it has been determined that a 4th design engineer will be needed to sufficiently cover the overlapping requirements of all these designs. In addition, as prototyping moves to production, more help will be needed in the form of an electrical tech who will be able to support testing, debugging and repair. Support for all these designs will be ongoing as they are built and put into production. It is important that the proper expertise in these various new technologies be maintained in house, and that it stay.

Software support for these boards must also be developed as these designs are built. This effort falls under the responsibility of the DAQ group. This code must be integrated with the general CODA software toolkit.

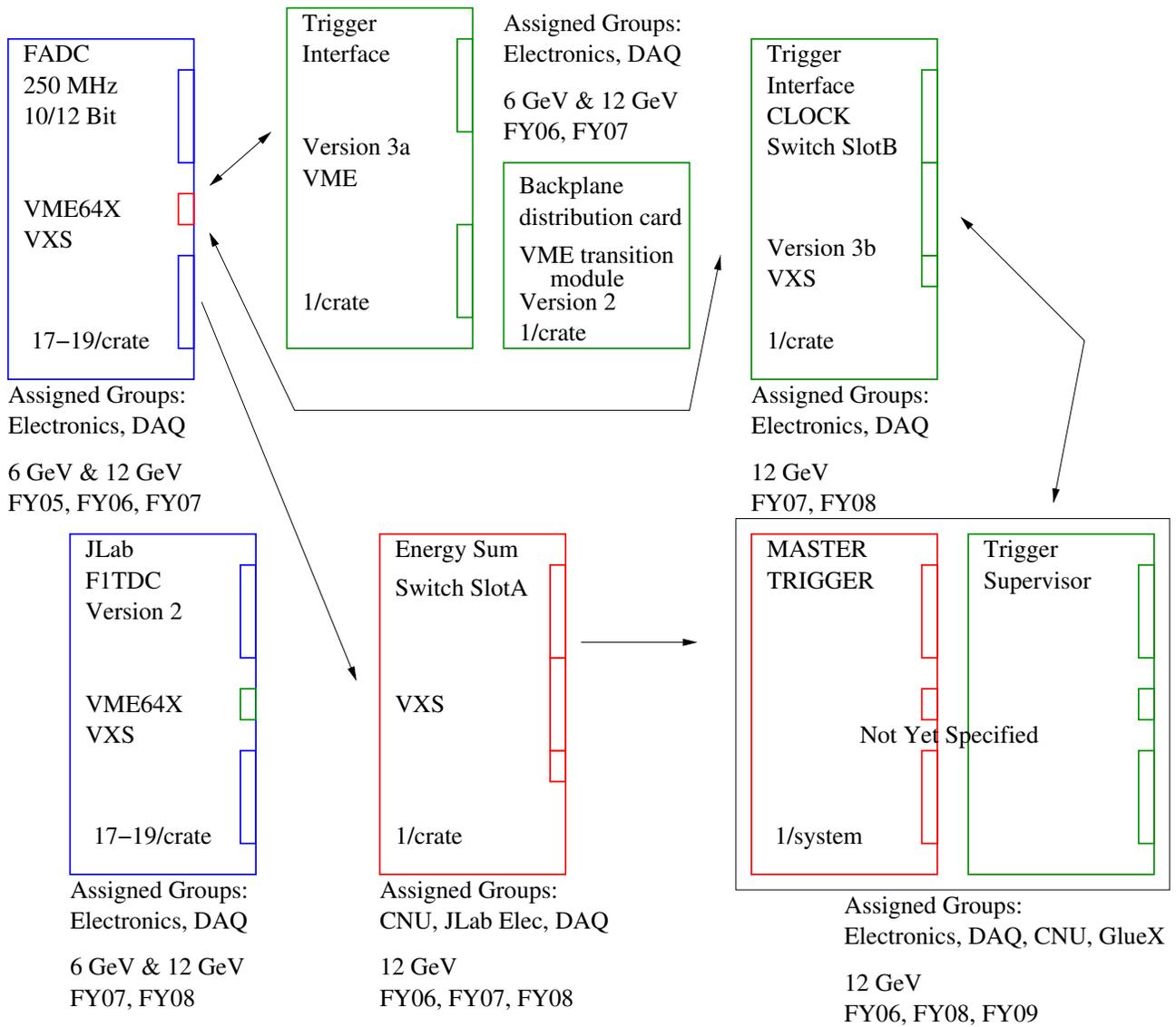


Figure 1: Schematic of the electronic boards that are required to support the plans for GlueX pipeline electronics and data acquisition. Indicated are the module classifications, responsible groups, expected use in the 6 or 12GeV program, and estimate of time frame for design and prototyping.



## Electronics Manpower

- **Electronics Plan Document [ GlueX-Doc-614 ]**
- This plan clearly defines the projects and proposed delivery schedule for the electronics 'modules' required for the Readout, Trigger, and DAQ systems of the Hall D detectors.
- The proposed delivery schedule of the electronics defined in the plan cannot be met IF new manpower is not hired soon.



## Electronics Manpower

- The JLAB Physics Division's Fast Electronics Group is presently 5 Staff members:
  - C. Cuevas – Group Leader
  - F. Barbosa – Staff Engineer
  - J. Wilson – Designer/Associate Coordinator
  - W. Taylor – Designer/Associate Coordinator
  - W. Gunning – Sr. Electronics Technician

## Electronics Manpower

- As shown in the “Electronics Plan” document, the 250Mhz Flash ADC module is the primary design focus for the electronics group.
- The success of the 250Mhz Flash ADC module depends on manpower from:
  - E. Jastrzembski – DAQ Group
  - J. Proffitt – Detector Group
  - H. Dong – Accelerator Group
  - D. Curry – Accelerator Group

## Electronics Manpower

- The additional manpower is needed to meet the aggressive schedule for the prototype 250Mhz Flash ADC, slated for end of summer, 2006.
- The additional manpower is contributing to the Fpga firmware designs required for the ADC data processing and summing, on board trigger processing & high speed serial transfer of the module sum, and the VME64x control/interface.
  - \*These engineers are NOT working full time on the 250Mhz Flash ADC, but the progress is significant.



## Electronics Manpower -- Summary Hall D Group?

- Every detector system (obviously) contains electronics for readout AND controls/monitoring.
- It is VERY important to hire technical Staff NOW because the new engineers and technicians must be involved during the development phase of the electronics required for the readout and trigger module designs.
- The readout and trigger electronics planned for the GlueX detectors is custom designed and will need to be supported for at least a decade after the initial commissioning phase.

## Electronics Manpower -- Summary Hall D Group?

- The Hall D Group must also consider Staff members that are responsible for the design and/or coordination of the following:
  - Electrical Power distribution
  - Grounding considerations for detectors
  - Beam line Instruments
  - Magnets
  - Network/Farm/Counting House

