

# GlueX tracking electronics conference call minutes

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P. Smith, scribe

Participants: Fernando Barbosa, Mike McCracken, Gerard Visser, Matt Shepherd, Elton Smith, Paul Smith

1) Listserv for tracking hardware should be available in a day or two

2) Mitch sent an email a few days ago describing a new CMOS process available at CERN. Mitch is currently at CERN and wasn't able to participate in this call. There are questions about migrating the tracking preamps to this process, and whether to still use MOSIS for the first batch of prototypes. The process is similar to the MOSIS 0.25 micron process, but Mitch will have to advise further.

3) Gerard has been investigating option for the cables from the tracking chambers to the tracking fADCs. He has posted a note to the GlueX portal, GlueX-doc-660. There is a new cable available from Amphenol called "SkewClear" that looked interesting. However, the performance advantage probably isn't enough to offset the price - it's almost twice the cost of standard Amphenol jacketed, shielded, round cross-section twisted pair cables currently used in Hall B. However, the other advantage is that it uses higher density connectors. The limitation on channel count for the tracking fADC modules is the number of connectors that will fit in the front panel space.

Ravi made a drawing quite a while ago which shows the possible FDC cable arrangement at the downstream end of the solenoid. However, this drawing assumes the cable diameter is 10 mm; these cables are actually 12.2 mm in diameter; this needs to be updated.

Gerard estimated the cables will need to be 22.5 meters long. There will be significant attenuation in this length of cable and some sort of equalization will likely be necessary. Perhaps this should be combined with the other required shaping and tail cancellation?

4) Elton reported that \$30K of ACD money has been shifted from FY07 to FY06; this money needs to be committed within a month or it will be lost. It can only be spent on the preamp project and needs to be spent by the spring of 2007.

This is somewhat problematic since the preamp chip design won't be ready to submit until August of 2006. We likely won't have the chips until October or November, and won't have any test results until February or March.

However, it seems reasonable to spend the additional funds on packaging and mounting the first batch of chips on boards that can replace the current CLAS preamp boards on the prototype chambers. This will allow us to test the chips on the prototype chambers right away. There will also be bench tests; this may require a different board.

5) Mike McCracken reported on the status of the CDC tests at CMU. There have been a lot of delays in getting a DAQ system going, but they are almost there. Gerard will send a transformer coupled differential to single ended scope adaptor to CMU. Mike will send sample scope traces to Gerard and Mitch.

6) We will schedule monthly conference calls to discuss tracking system electronics.

7) Fernando had some comments on the proposed preamp chip design. Specifically, he is interested in the baseline restorer section which is part of the UPenn ASDBLR chip used in the ATLAS TRT system. The BLR is probably not needed for the GlueX chip since the rates are much lower. However, it could make the GlueX chip more generally useful for other applications to include some sort of BLR section. Gerard pointed out that GlueX (and probably any future experiment) will measure the baseline for each event with the fADC. Thus, a BLR wouldn't have to be particularly "high performance", all it would need to do is keep the baseline from wandering outside the fADC dynamic range. So, the possible GlueX BLR could potentially be simpler than the one used in the ASDBLR chip.

There was a brief discussion of Mitch's suggestion of including a pin-enable comparator in the chip. The consensus was that this shouldn't be included in at least the first batch of chips. If the FDC people can demonstrate that TDCs are essential for the FDC anodes and that an all fADC system will not work for GlueX, this issue will be revisited.

8) There was a discussion of power requirements. The preamp chip is expected to use a 3.3 volt power rail, and consumption should be at most 100 mW per channel (hopefully less). However, this means something on the order of 1 kW of heat from the FDC system needs to be removed from inside the magnet. There are a number of integration issues related to the FDC including power, cooling, mechanical support, and cabling that have not been seriously dealt with yet. Since Ravi is no longer working on GlueX, it's not clear anyone is working on this part of the design. Another issue is extracting the CDC and FDC without uncabing; it was agreed that having the electronics racks move is the cleanest way to deal with this issue.

9) Gerard pointed out there will be 1132 ribbon cables from the FDC and CDC. If each is 22.5 meters (75 feet) long, the total is 85,000 feet. The estimated cost is \$1.64/ft for a total of \$140K (exclusive of connectors). Is this in the detector construction budget somewhere?