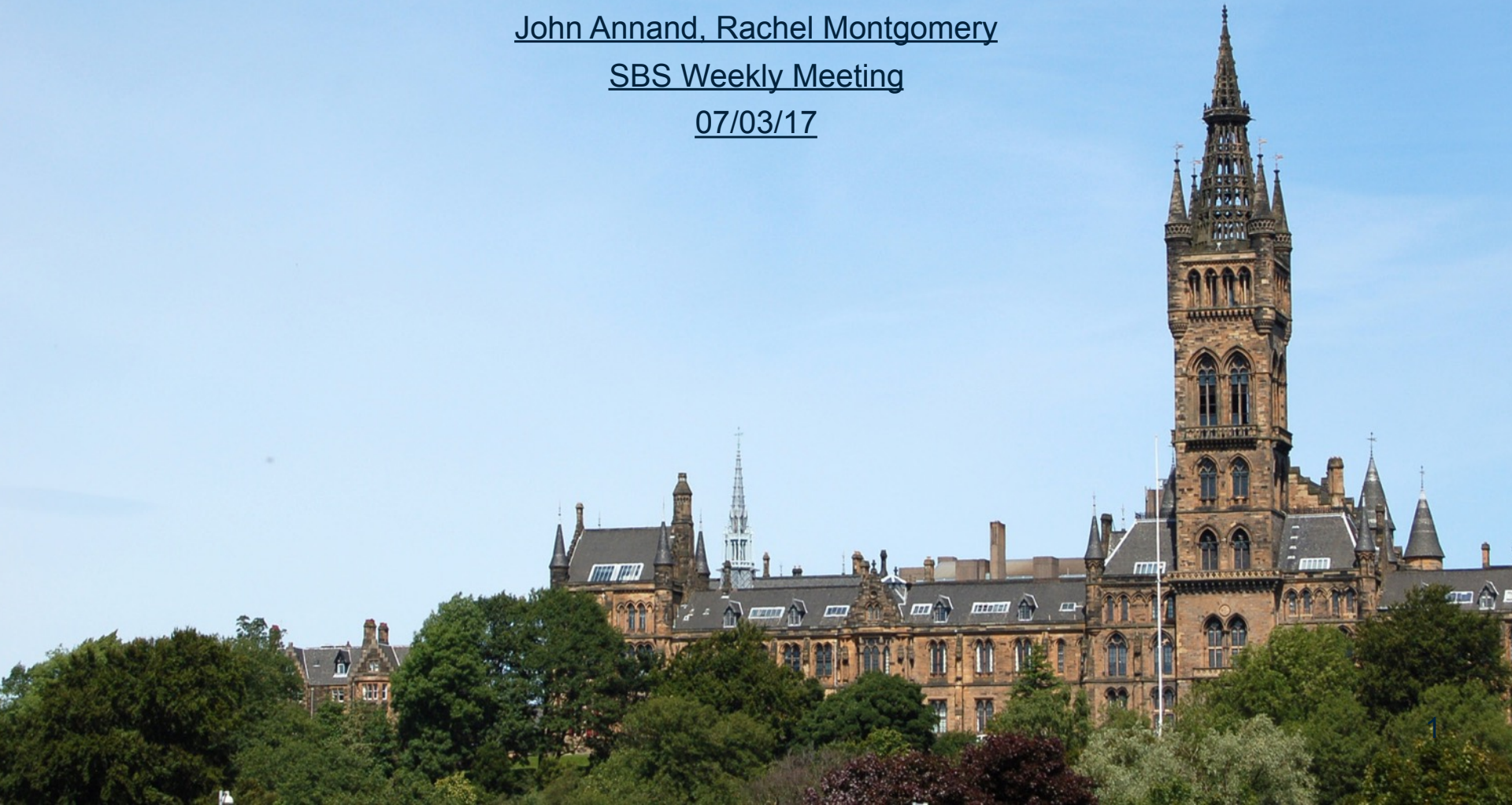


NINO Cards and BigBite Timing Hodoscope Update

John Annand, Rachel Montgomery

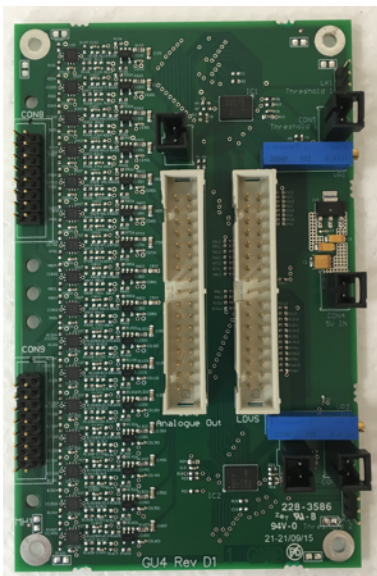
SBS Weekly Meeting

07/03/17



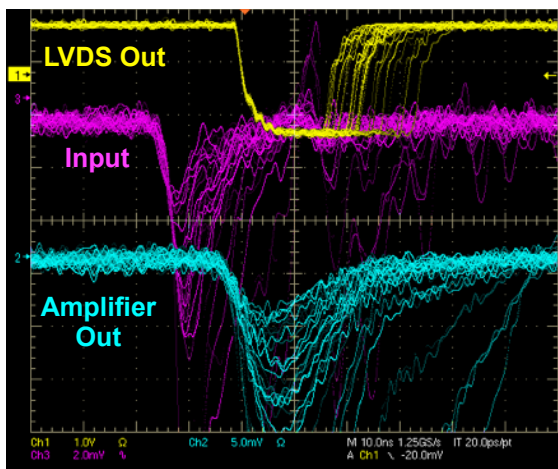
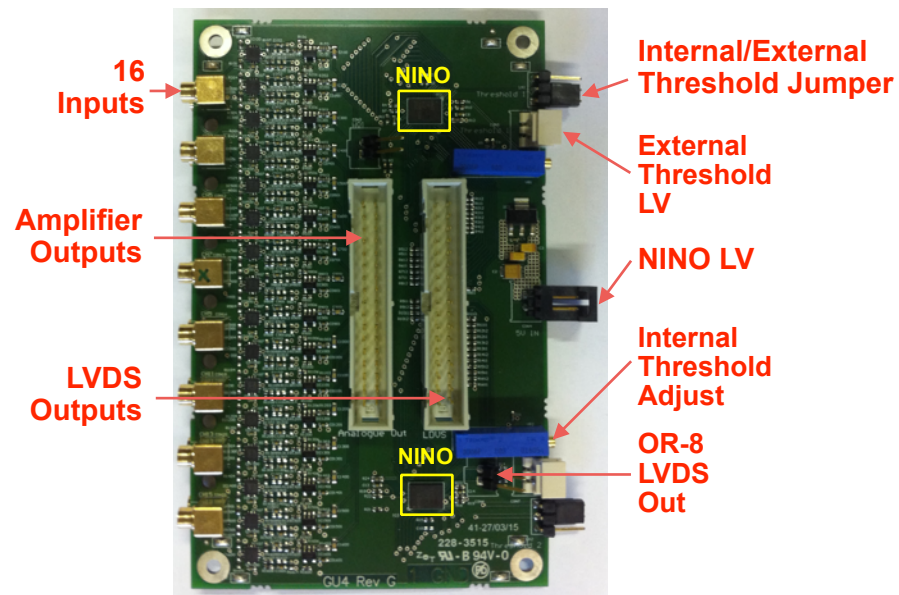
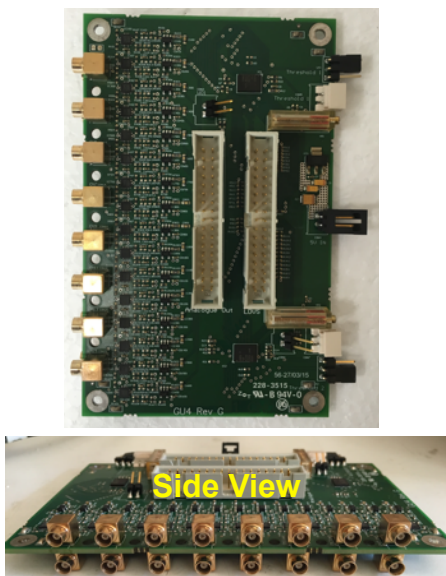
Rev D1

2 x 8-pair IDC connectors



Rev G

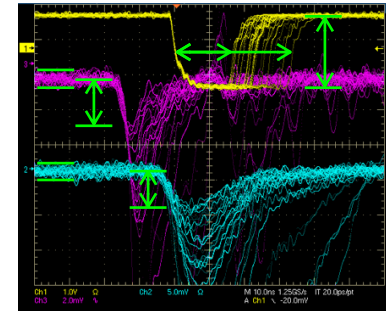
16 MCX co-axial connectors



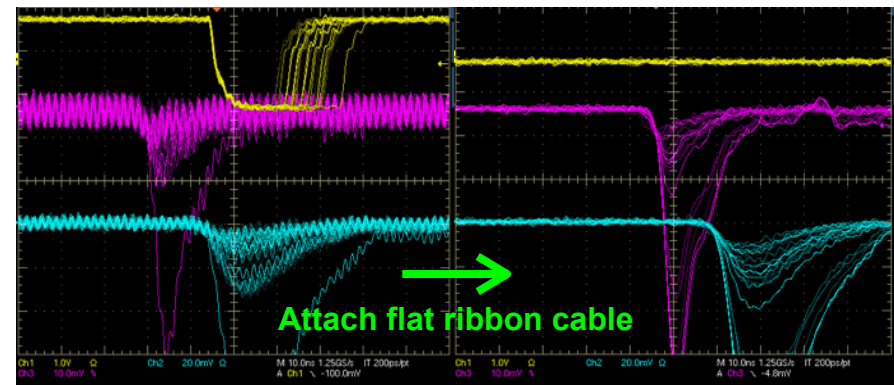
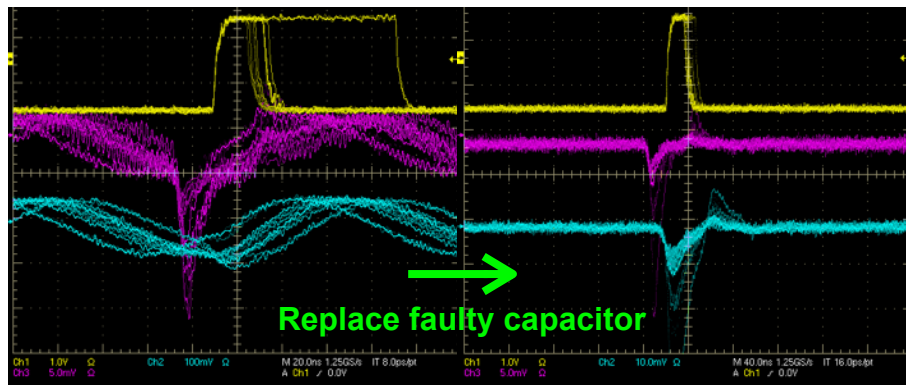
- **NINO**: fast, low-power, front-end differential amplifier/discriminator ASIC
- Single photon sensitive, scintillator signals may require attenuation
- 16-channel amplifier/discriminator cards (2 NINOs/card)
- Outputs: **amplified**; **LVDS** (time-over-threshold charge); **OR**
- Internal potentiometer or external LV for threshold circuit control
- Several BB/SBS detectors planning to use NINO based FE cards
- BB: GRINCH; timing hodoscope. SBS: CDet (RICH? HCal?).

- By end 2016: 28 cards produced and delivered to JLab for testing with 1st CDet Module
- Jan 2017 received a further 160 cards in Glasgow - completes CDet instrumentation (152 + 8 spare)

- **160 currently undergoing test**, using scintillation detector input and cosmics
- Checking:
 - LVDS amplitude and durations
 - Baseline noise on input and amplifier
 - Threshold levels on input and amplifier for two external threshold settings
 - Internal and external threshold control functionality for all channels



- **Test Status so far...**
- **62 cards good**
- **20 require re-test/fix (although NINO functionality is fine):**
 - most require replacement of a faulty capacitor component
 - some have high-frequency noise (mostly removed w/ flat ribbon cables attached, to be further checked)



NINO Card Production Status - Rev G

GRINCH:

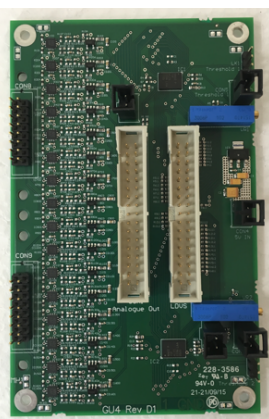
- 35 cards and corresponding sets of 1.5m MCX co-ax cables shipped to JLab/W&M for GRINCH prototyping/instrumentation

Timing Hodoscope:

- 15 cards and associated co-ax cables are in Glasgow for hodoscope instrumentation
- 11 require repairs due to mostly input connector issues (not a NINO chip issue)

NINO Card Future Production Plan

- **We are currently preparing orders for production of more cards**
- Provide spares for current detectors utilising NINO (especially hodoscope) and cards will also be available for other detectors which may use NINO (RICH? HCal?)

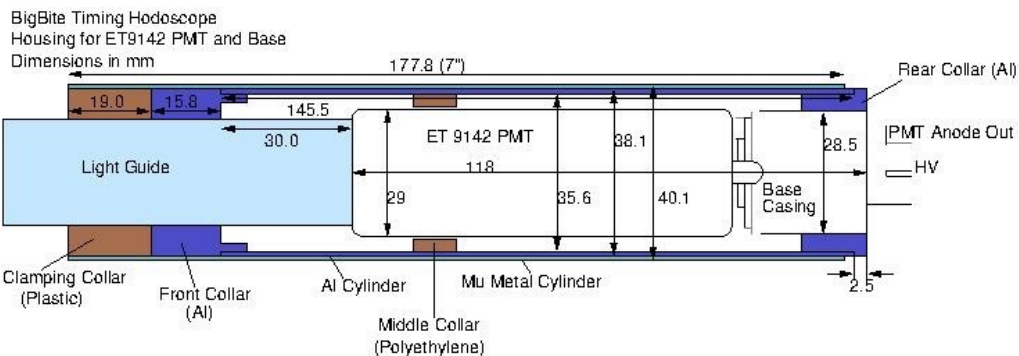
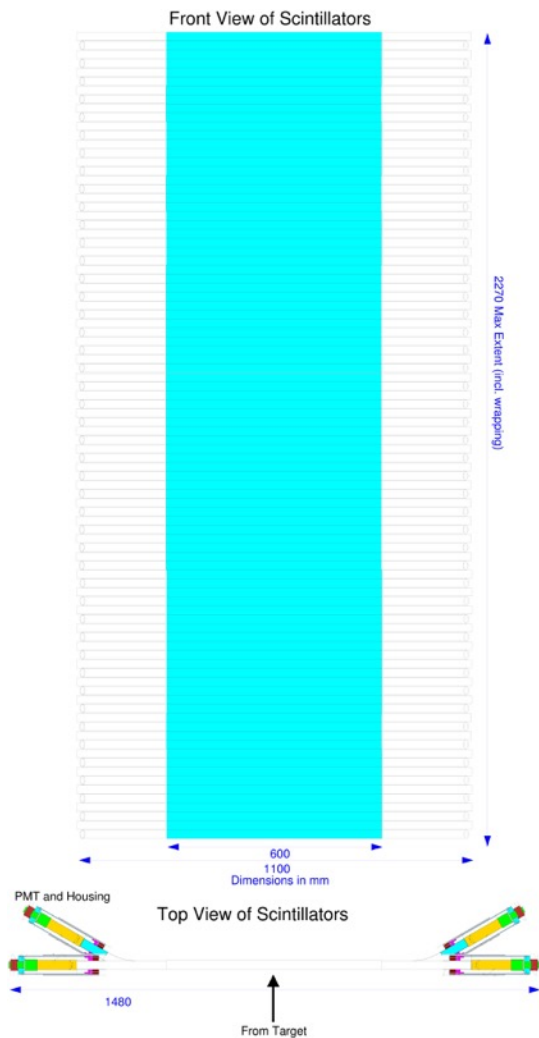


150 x Rev D1

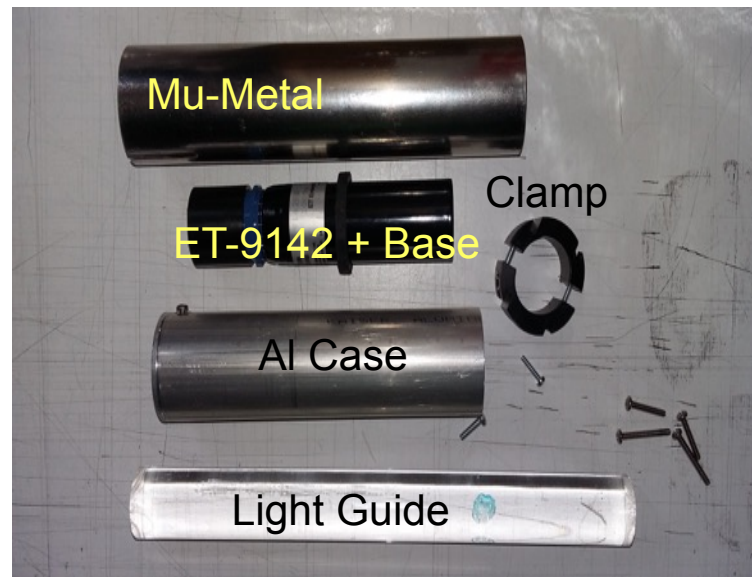


50 x Rev G

BB Timing Hodoscope



ET-9142 + Base



BB Timing Hodoscope Status

Timing hodoscope fitted between preshower and shower arrays. Final assembly when frame ready. Individual elements can be assembled and tested prior to final assembly....**summer of 2017 if space available?**

- Light guides epoxied to scintillator bars (stored at JLab).
- Wrapping to exclude external light remains to be done.
- 200 ET-9142 PMTs to be shipped to JLab before wrapping commences.
200 custom base chains under test in Glasgow.
- 180 PMT protective case assemblies require modification.
Use ET-9142 PMTs instead of original ET-9125.
9142 faster than 9125, same diameter but shorter.
Shorten Al cylinder of the PMT case and outer mu-metal shield.
Bore out rear collar to accommodate PMT base assembly.
Machine a middle collar to hold the PMT firmly within case.
- 200 MCX/RG179 cables manufactured to connect PMT anode to NINO card.
- 15 (12 + 3 spare) NINO cards produced for the hodoscope.

Modification of the PMT cases requires machine-shop time.
Test modification performed in Glasgow for one case assembly.
Now ready to work on the rest of the cases...**where to perform?**
HV and LV power supplies require to be found/procured and tested.