Minutes

Charissa Group Meeting

Meeting held on: 14 July 1993

Meeting held at: Oxford

Present:	DLW(Chair),WNC,NMC,MF,GJG,RAH,CDJ,ACM,VP,WDMR,RPW
	plus B. Brooks, D. Savory, S. Lawson, D. Smith, R. Wastie (present for Items 4, 5, 6, 7 and 8.)
Apologies:	RAC,BRF,SJAH,JK,JSL,GT,JZ
Distribution:	Those above plus DDW, all by e-mail/file-server.

Minutes

The meeting was preceded by a short demonstration of electronics. This included bias supplies in their rack, latest prototypes of amplifiers and channel control units, and a module used for testing the amplifiers.

1. **Minutes of meeting of 13 May:** accepted

2. **Matters Arising/ Actions:**

    - *Item 4: Detector Tests*
      DLW reported that Hamamatsu and Intertechnique executives had recently met with him in York to discuss detector performance. S. Chappell would produce a drawing of a new PCB mount for Hamamatsu detectors by 1 September, which would be distributed. **DLW**
      S. Chappell would also produce a report on detector performances by mid-September, for distribution to all groups. **DLW**
      It was planned to ask for quotes before 30 September, receive them by 30 November and place orders immediately for March 1994 delivery.
      NMC reported that drawings by N. Curtis were with the Birmingham workshop, and manufacture had begun, for a scintillator mounted behind the silicon in a hybrid detector.
    - *Item 5: New Array*
      DLW reported that work on the MEGHA prototype had restarted in York following completion of the ANU requirements.

- *Item 6: Gas Supply*
  DLW reported that the mechanical construction was underway, and testing with air was anticipated by 7 August.
- *Item 9: ANU detectors*
  The final design for the modified hybrid mounts had been agreed and three completed mounts had been shipped to the ANU. Detectors could be mounted 0–75 cm from the target. The T–piece for hermetically sealed Sealectro feedthroughs, with 4 inch Dependex coupling, had been completed and shipped. Spare grids and windows had been sent; a list provided by RAC was circulated at the meeting. This list included a series of detector tests recommended by RAC.
  The first shipment to the ANU had arrived satisfactorily on 6 July. The subsidiary air shipment was due to arrive on 19 July.
  It was agreed that the hybrid tests recommended by RAC should be carried out by RPW, CDJ and SJAH using the first beam time available at the ANU. **[RPW,CDJ,SJAH]**
  Reports from BRF had been received regarding progress by the team presently at the ANU. The setting up had advanced well, and cables were currently being laid.
  VP would be travelling to the ANU on 23 July, to stay 3 weeks and set up the data acquisition.
- *Item 10: Strasbourg* NMC reported that JSL had discussed with Strasbourg the requirements for the Charissa beam line. It appeared that one quadrupole doublet was sufficient, and enquiries were being made regarding power supplies.
- *Item 11: ANU timetable*
  Information on obtaining Australian visas had been distributed by RPW and was now on the server (CH/Doc/93/11).

3. **Update on NSC/SERC matters:**

   DLW reported that the NP committee was likely to be in the Engineering and Physical Sciences Research Council (EPSRC) when the new research council structure comes into force (April 1994).

   It was expected that the date for submission of new grant applications would be February 1994 or 15 March 1994.

4. **Progress Reports on Electronics:**

   (a) *Amplifiers and Channel Control Units*
   Dick Hunt reported. The aims of the new design had been

   i. Generate individual gating and walk times for each channel, allowing gated integrators to be used.
   ii. Provide remote control of amplifier gain, discriminator thresholds, pole zeros, walk duration (500–800 ns typical) and gate length (up to 15μs for integrator, down to 3μs for peak-sampling).

iii. Include conversion of amplifier output to time duration.

There were 32 completed amplifiers (prototypes).

For the production run of 320 units, the following changes are envisaged:

i. Move the integrator unit and/or Silena peak unit from the CCU to the back part of the amplifer, which will

   A. keep the analog electronics completely separate from CCU,

   B. make the backplane inter-connections easier and cheaper.

ii. Redesign the discriminator, as present components are obselete.

The gated integrator and sample circuits will be tested at Oxford using signals from Ge detectors.

Time constants: the requirements were discussed, viz. $0.75\mu s$ for gated integrators (followed by $\sim 10\mu s$ integrating gate) and about $2\mu s$ for gas and strips. Final decisions would be required for:

i. which time constants to provide, and

ii. what procedure to implement for changing time constants on amplifiers 'in the field', where large numbers may be involved.

Comments on time constants should be forwarded to RAH before the next meeting. $\boxed{\text{ALL}}$

(b) *Preamplifiers*

Barney Brooks reported. The assembly of components onto the back-plate of the array modules was demonstrated: a board with high voltage filters plugs into three vacuum feedthroughs; the motherboard plugs into three connectors on the filter boards; each motherboard holds 18 preamps servicing three telescopes; a shielding-can encloses each motherboard; an endcap on each can has 24 Sealectro slide-on connectors.

One motherboard has to be different — with hole for beam exit.

The individual preamps are small and difficult to handle and hence will be fabricated in group of 12 on a single PCB. They will be tested in this form and the individual preamps will only be removed when required for installation on the motherboard.

It was recommended that preamps should be conformally coated in order to avoid extreme touch-sensitivity. This may affect operation in gas.

(c) *Bias Supplies*

David Smith reported. Each supply module contained 2 supplies, and they were arranged with 8 modules (16 supplies) per rack. Polarity was switchable; it is anticipated that the majority will be used on positive.

Each rack also includes a mains/power supply unit and a controller.

The controller module in each rack could be switched to 'local' or 'remote' operation. In local operation each supply is addressed in hex 0–F. In remote operation an RS–485 serial link sends crate address, supply address and voltage demand. The software exists for manual control but not yet for remote control.

The controller is still in an early prototype stage and the PCB still needs to be laid out. The software to provide external control of the supplies for experimental use, including that required to provide compensation for leakage current variation, still has to be written. It was suggested that LAB-windows should be employed.

5. **Costings:**

   (a) *Amplifiers etc.:* RAH reported, with reference to Ch/Doc/93/09 which had been circulated previously. (It was noted that some copies of this document had $ signs instead of £ but all figures refer to £ prices.)

   Some estimates were necessarily uncertain. These were mainly: the PCB layout for the amplifiers, and the channel interfaces. The crate cost could drop when the CCU/amplifier rear cabling is modified. The integrator price could rise after prototyping; the Silena unit appeared quite expensive.

   (b) *Preamplifiers:* Barney Brooks reported. For 360 preamps the estimates were £10 for components and £4 for assembly, plus VAT, per unit. The interconnecting voltage filters were estimated at £45 each (60 off), mostly due to HV capacitors. The motherboards were £22 each (60 off).

   The endcaps for the cans have 24 Sealectro connectors. DLW reported that £6 per connector was anticipated, giving £150 per endcap (60 off).

   (c) *Bias Supplies:* David Smith reported, with reference to Ch/Doc/93/10 which had been circulated previously. Quotes had been obtained from Beorn, a local firm. It was agreed that the best option was to build 70 modules with crates, to take advantage of quantity savings.

   (d) *Data Acquisition:* RAH confirmed that sufficient units for 256 channels had been purchased last year. WDMR estimated that an extra £64K would be required to achieve 320 channels and instrument the full array.

Summary: all the estimates inclusive of VAT were collated:

Category	£
Amplifiers/CCU's etc.	200K
Bias supplies	20K
Preamplifiers	20K
Data acquisition	64K
TOTAL	300K

DLW agreed to check these figures against those in the Grants. **DLW**

6. **Division of Finance and Final Assembly/Testing:**

   DLW summarised the situation: at the time of the Grant proposals, it had been anticipated that Oxford would provide design and manufacturing effort, and York extra manufacturing effort. These plans needed revision following workshop restructuring pursuant to changes in methods of research funding. BB pointed out that, further to this, Dennis Savory (Oxford) would be retiring in July 1994.

   WDMR undertook that design would be completed at Oxford for all components.

   It was agreed that the meeting would address the division of responsibilities for ordering, construction and testing:

   (a) *Amplifiers:* It was agreed that these would be the responsibility of Oxford. Bulk orders would be placed with an external manufacturer, and depending on funds these could be placed jointly through different universities.

       Testing of amplifiers and channel control units would be split between Birmingham and Surrey primarily. Each of Birmingham, Surrey, York and Oxford would require a CAMAC system for testing, to which they could connect using an IBM PC. Testing would use the test module demonstrated before the meeting, with problem units being referred back to Oxford. RAH noted that there were CAMAC crates at Oxford, owned by Charissa, which could be utilised for testing at other sites.

   (b) *Preamplifiers:* It was agreed that Oxford would produce a working prototype with 18 preamps. They are having 20 preamps built, as suggested by BB. These will then be put in a single can. The main idea is to check there are no layout mistakes etc. on the PCB. When the prototype is working satisfactorily, York will take over responsibility for the preamps.

   (c) *Bias Supplies:* It was agreed that when a working prototype had been produced at Oxford then York would take over the responsibility for the manufacture (either in-house or contracted out) and testing. The York group would also look after the programme to control the supplies from an external computer.

7. **Timescales for Completion:**

   It was agreed to use March 1994 as the target date for one complete working module.

   DLW stated that the hardware construction would be completed by then.

   It was agreed to get preamplifiers for one module prepared in time, taking into account BB's suggestion under the previous Item that a trial batch be produced.

   RAH stated that prototype amplifiers could well be ready in time, but commercially produced units would not be available. WDMR proposed that it would be sensible to buy in effort to design the final PCB layout, rather than Oxford doing the artwork. It was agreed that RAH should pursue this by obtaining quotes from Beorn and one other company, on the basis of the final specification. **RAH**

RAH stated that the prototyping of CCU's could possibly be complete by December 1993. However, commercial CCU's would probably not be ready for April testing.

8. **Data Acquisition — Preliminary Discussion:**

WDMR introduced this topic: the aims were to partition responsibilities.

It was agreed that the CAMAC would be done by Oxford. **RAH**

The VME was agreed to be done by Oxford, Birmingham (SJAH) and VP. **RAH,SJAH,VP**

The trigger logic responsibility (handling of coincidences and multiplicities) was accepted by MF. **MF**

The software would be coordinated by VP. He would liaise with all four universities. The areas identified for attention were: **VP**

(a) fast on-line code in CAMAC to assemble data packages and send down FERA
(b) code in VME to handle the above
(c) control of the setup of CAMAC outstations using serial links
(d) control of channel interfaces
(e) control of bias supplies: code inside crates
(f) control of bias supplies: code in controlling computer
(g) changes to on-line and off-line sort programmes to handle possible new formats

The code for the bias supplies had been dealt with by P. Simmons so far; York would complete this, along with the hardware. **DLW**

The fast readout via FERA to VME was raised by VP. It transpired that Oxford had passed the specification to Golding and the code was expected for August. Thus, it would not be ready for running in September 1993. In the first stage, the header formats would not be changed.

9. **Any Other Business:**

(a) Any people anticipating language difficulties in Australia were recommended to read "Aussie English" by J. O'Grady, ISBN 0 7018 1585x.

(b) DLW raised the issue of detector stocks, with reference to the requirements for September running at the ANU. BRF had ascertained that present stocks were just sufficient. Reservations were expressed at the meeting, and it was generally agreed that the purchase of a small number of additional detectors would be appropriate. $\boxed{\text{DLW}}$

(c) Proposals for future runs at the ANU should be communicated to BRF. DLW anticipated a big demand on available beam time in order to satisfy committments to students at each university. He considered that the four days currently suggested for York experiments in April may not be sufficient. WNC agreed that demand for beam time was strong, noting that Surrey would certainly require one run in April.

(d) Offers to use the facilities of other laboratories had been received. DLW reported that Saclay had indicated an interest in housing an array for Charissa experiments. NMC reported that the Indra group were interested in collaboration at GANIL, and WNC reported other interest from researchers at GANIL. These possibilities would be explored.

(e) VP reported that additional memory was to be supplied to the workstations being installed at the ANU. These machines were running the Solaris 2.2 operating system. It was anticipated to change UK machines over to Solaris 2.2 at the end of 1993.

10. **Date of Next Meetings:**

Next Meeting: 1.15 p.m., Thursday, 9 September 1993 in York.

(To be preceded by a sub-meeting at 11.00 a.m. and a display of new modules during the morning.)

W.N. Catford, Secretary.
July 27, 1993
(released July 28, 1993)