Update

BNC Cables for ANU

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Date: 9 February 1993

Background

Information has been collected regarding the provision of cables at the ANU to take signals from the target chamber to the control room area.

Following enquiries made to Paddy Regan at ANU, it has been assumed that 150 coaxial cables, each of length 50 meters, are required.

The possibilities considered are: modifying cables obtained from the NSF, buying materials in the UK to make up new cables, buying ready-made cables in the UK, and buying ready-made cables in Australia.

The provision of patching cables between the chamber flanges and a BNC patch panel has also been considered.

Feedback is required on whether patch panels are needed both before and after the preamplifier units (as used presently at DL).

Cable Types — Patch Panel to Control Room

The cable normally used and recommended in Canberra is RG/58. The cable that we would probably prefer is the superscreen cable as used at the NSF, which has the code MM 11/50.

RG58C/U cable and its nearest BS equivalent have the following properties:

	UR No M76 to BS2316	RG58C/U
Overall diameter	5mm	5mm
Characteristic impedance	50Ω	50Ω
Capacitance	100 pF/m	100 pF/m
Max DC voltage	21 kV d.c.	
Max RF peak voltage	2.6 kV	3.5 kV
Attenuation per 10m	1.6 dB at 100 MHz	3.1 dB at 200 MHz
	5.3 dB at 1000 MHz	7.6 dB at 1000 MHz
		2 dB at 10 MHz

These can each be bought from RS in 500 meter reels, each costing approximately £105 + VAT.

The superscreen cable can be purchased from Permanoid Ltd., Hulme Hall Lane, Manchester, Tel: 061–205-6161. It is still a catalog item. In their catalog it is called MM 11/50. From an old DL order, the numbers RP6274 and the specification AESS TRG71181 part 2 (March 1977) are associated with it.

Cable Types — Chamber to Patch Panel

These are required to be 3 to 5 metres long according to Paddy.

According to WNC, the cable used on the existing Charissa chamber is RG178BU, which is approximately equivalent to M110 in the BS, 1.9mm outer.

Other small diameter cables used at DL are RG174A/U (non-vacuum, usually black, PVC, approx No. M116, 2.80 mm outer), and RG316/U (vacuum rated, brown, approx No. M109, 2.45 mm outer).

Connectors for Long Cable Runs

Standard 50Ω connectors can be bought from RS, for £0.80.

Connectors for the DL superscreen cable:

We have found only one manufacturer who has the exact connector in their catalog. This is Macom–Greenpar of Harlow in Essex (Tel: 0279–427192). We also spoke to Suhner (Tel: 0869–244676) and Radiall (Tel: 081–9978880), but they would need to recommend a suitable alternative when given full details. They do not supply the exact equivalent. On the other hand, Permanoid claim to sell quite a lot of this cable, so maybe there is another supplier of connectors.

For Greenpar (manufacturers of the DL connectors), the old model number is G35121D339, where 339 is the cable type. The new number is B35A21E339X99.

There is a problem with delivery: they would need to be made as a special order (cash in advance) and delivery would be 8—12 weeks. Approximate cost *per connector* would be £6.50 for 150 to 200 off.

Cost of 150 connectors (one end of each cable to be modified): £975.

Connectors for Sealectro–BNC Patch Panel

These can be purchased from ITT Sealectro (Tel: 0705–373211).

The BNC to snap-on sealectro bulkheads. Part number not yet found, but screw ons are 050–075–6801–220 and there are 37 spares at DL.

Conhex–conhex bulkheads are also available. Adaptors from BNC to conhex (either way round) are available.

Part numbers for most of these have been obtained.

Options for Procuring Coaxial Cables for Long Runs

1. Supposing we are successful in getting sufficient superscreen cable from DL, in addition to the runs associated with the Charissa chamber:

   Cost of connectors, approx. £1K. DLW estimates they could be put on at York in about two weeks (or less). We would need help, perhaps, in removing them from DL.

   Freight of these cables to Australia has been estimated by weighing a sample of cables. It is estimated that the total weight would be 545 kg, and a quote obtained with an independent company R.I.O. Freight Ltd. in Manchester. They quote £1500 assuming $1 \times 1 \times 2\text{m}^3$. There is also the possibility of discussing this with the company charged with decommissioning the NSF and shipping the LInac to Australia, viz. Union Air Transport.

2. If we purchase materials and make up our own RG58 cables in the UK, the cost is estimated as £2150 including VAT, for 50m cables (£14.50 per cable). Quote from Surrey physics staff, supply from RS.

   Freight would be similar to the above estimate.

3. If ready-made RG58 cables were to be purchased in the UK, it would be much more expensive. Only one quote has been obtained so far: £131 + VAT per cable according to Canberra Packard (for 65m cables; formula is £25 plus 50p per foot), or £23K.

   Freight would be similar to the above estimate.

4. If ready-made cable were purchased in Australia, the estimate for RG58 is $A67–75 per 45 metre cable, with connectors, plus 20% tax. For 150 cables, this translates to approximately £6K.

Installation of Cables in Canberra

According to Paddy Regan, this number of cables will fit in the available ducting. Clearly, it would take quite a time to actually install these cables, however.

The installation of cables between the chamber and the patch panel(s) requires further consideration by the collaboration, regarding the number of patch panels needed, etc. It may be advantageous to get the drawings of the panels made at DL, so that new copies can be manufactured. Alternatively, it may be possible to obtain the panels from Area 4 (this would require careful liaison with DL, regarding the Minor Equipment bids).

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9 Feb 93