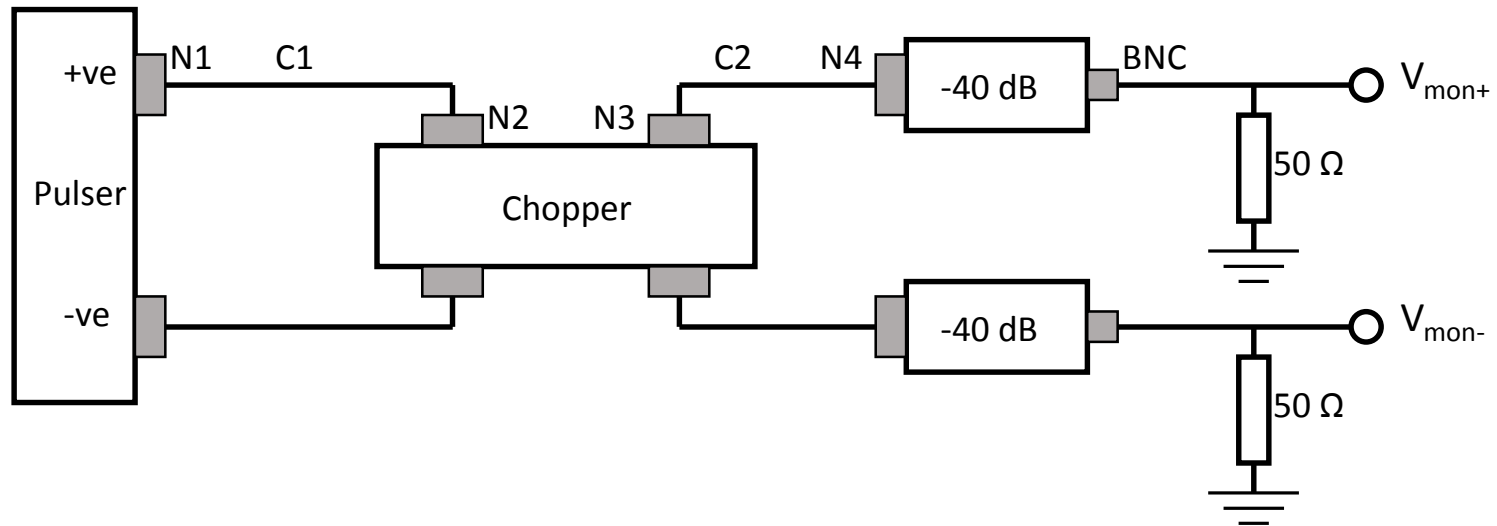


FETS Fast Chopper Cabling and Connectors

G Boorman RHUL

27th July, 2016

Cabling Challenge



Require V_{pk} at N2 1500 V; max V_{pk} from pulser is 1700 V

Max allowable loss factor therefore 0.88 or 1.09 dB

Cable C1 approx. 20 m $\rightarrow$ max loss 0.054 dB/m

For 1 ns rise-time, BW required is $(0.35/t_{rise}) = 350$ MHz

Challenging to find a appropriate cable: very low loss, high peak voltage, bendable, suitable for N-type connectors, reasonably priced...

Cable 'C1' Options

Cable Type	Dia (mm)	Vmax (rms)	Resistance	Vel. Prop. (%)	Attenuation 400 MHz	Loss/20m	Loss/15m	Loss/12m	Connector	Min. Bend (mm)
			$\Omega/1000$ ' Ω/km		$\text{dB}/100 \text{ ft}$ dB/m				N-male	
RG303	4.32	1400	16.3	70	8.2	0.27	5.4	4.05	3.24	50
RG58	4.95	1400	32.8	67	0.275	5.5	4.125	3.3		51
RG213	10.3	3700	1.7	66	4.1	0.134	2.68	2.01	1.608	127
RG218	22.1	11000		66	0.062	1.24	0.93	0.744		
LMR-600	15	4000	1.2	87	1.7	0.056	1.12	0.84	0.672	152 rpt, 38 static
LMR-900	22.1	5000	0.54	87	1.2	0.038	0.76	0.57	0.456	
LMR-1200	30.5	6000	0.32	88	0.9	0.028	0.56	0.42	0.336	
Sucofeed 1/2"	15.9	1600	1.6	88	0.05	1	0.75	0.6		125 rpt, 70 static
Sucofeed 7/8"	27.6	2900	1.55	88	0.03	0.6	0.45	0.36		250 rpt, 120 static

Candidates: LMR-600 and RG218 (if cable length shortened); LMR-900; Sucofeed ½"

LMR-900 seems a good choice: loss, V_{max} , size meet spec. Price about £8/m, connectors £50 each (4 off)

Lower loss means pulser can be run at a lower output -> good for pulser component lifetime!

UK Suppliers: Gem Cable Solutions; www.gemcable.co.uk; 01727 845 750

Scott Cable; www.scottcables.com; 023 9265 2552

Other Cabling

- Cable C2 and connectors N3, N4 can be off-the-shelf 1 m RG213 (Farnell or similar)
- 40 dB Attenuator to be situated within 1 m of chopper vessel
- Monitoring cables to exit blockhouse and run back to DAQ rack. Output of attenuators approx. $15 V_{pk}$. Loss in monitor cable will mean a few V at input to ADC card