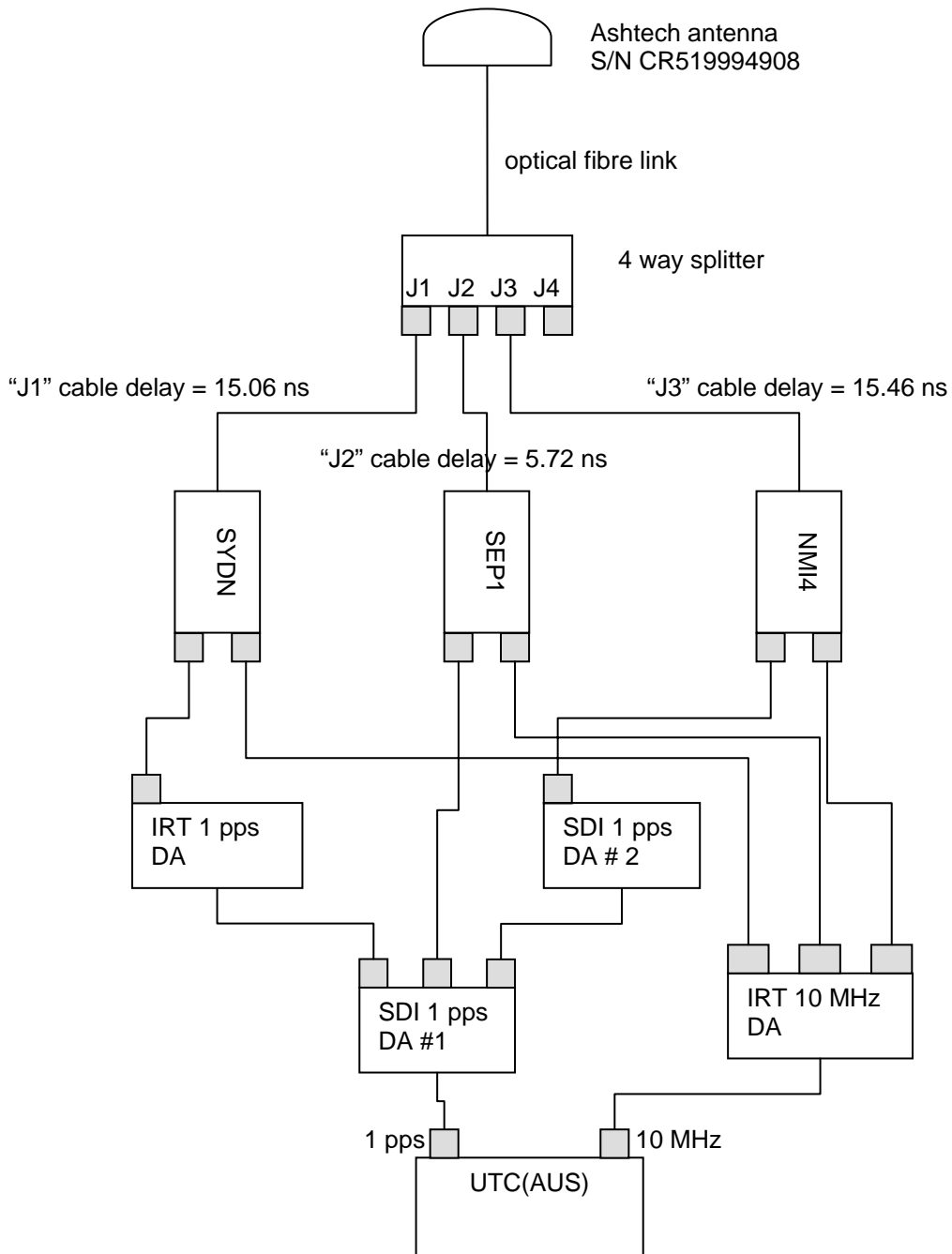


NMI Australia GPS receiver calibration October 2010

1. GPS receiver and signal connections



2. Event log

Date	Time (UTC)	Event
2010-09-30		BPOU commenced operation
2010-10-05	0000 - 0130	SYDN operation interrupted
	0320 - 0350	SEP1 operation interrupted
	2300 - 2400	NMI4 operation interrupted
2010-10-15	0000	BPOU shutdown
	0000 - 0100	NMI4 operation interrupted
	0000 - 0020	SYDN operation interrupted

3. NMI antenna information

Manufacturer	Ashtech
Model	Choke ring antenna 701945C_M
S/N	CR519994908
Coordinates	
Reference frame	ITRF2005
X	- 4648240.555
Y	2560636.481
Z	- 3526318.238

4. GPS receiver information and delays

SYDN

GPS receiver	
NMI RINEX identifier	SYDN
Manufacturer	Javad
Model	Euro GGD
S/N	AGE3MUO7TA8
Delay measurements	
J1 cable	15.06 ± 0.14 ns
REF 1 pps delay	90.13 ± 0.18 ns (Note 2)
1 pps – 10 MHz delay (D.3.3.1)	
before	52.58 ± 0.11 ns
after	52.59 ± 0.07 ns
Tare delay (D.3.3.2)	
before	21.98 ± 0.14 ns
after	21.92 ± 0.16 ns
1 pps in to 1 pps out delay (D.3.3.3)	
before	14.61 ± 0.17 ns
after	14.64 ± 0.16 ns

NMI4

GPS receiver	
NMI RINEX identifier	NMI4
Manufacturer	Javad
Model	Euro GGD
S/N	AGGTUM2251C
Delay measurements	
J3 cable	15.46 ± 0.14 ns
REF 1 pps delay	99.14 ± 0.21 ns (Note 2)
1 pps – 10 MHz delay (D.3.3.1)	
before	34.48 ± 0.10 ns
after	34.48 ± 0.07 ns
Tare delay (D.3.3.2)	
before	8.22 ± 0.11 ns
after	8.23 ± 0.12 ns
1 pps in to 1 pps out delay (D.3.3.3)	
before	6.13 ± 0.12 ns
after	5.95 ± 0.13 ns

Note that the receiver S/N as stated in the RINEX header is incorrect.

SEP1

NMI RINEX identifier	SEP1
Manufacturer	Septentrio
Model	PolarRx2eTR
S/N	3252
Delay measurements	
J2 cable	5.72 ± 0.09 ns
REF 1 pps delay	80.0 ± 0.24 ns (Note 2)
Tare delay (B.3.2.1)	
before	38.63 ± 0.11 ns (Note 3)
after	26.75 ± 0.09 ns
Internal delay measurement (B.3.2.1)	
before	276.12 ± 0.22 ns
after	263.57 ± 0.24 ns

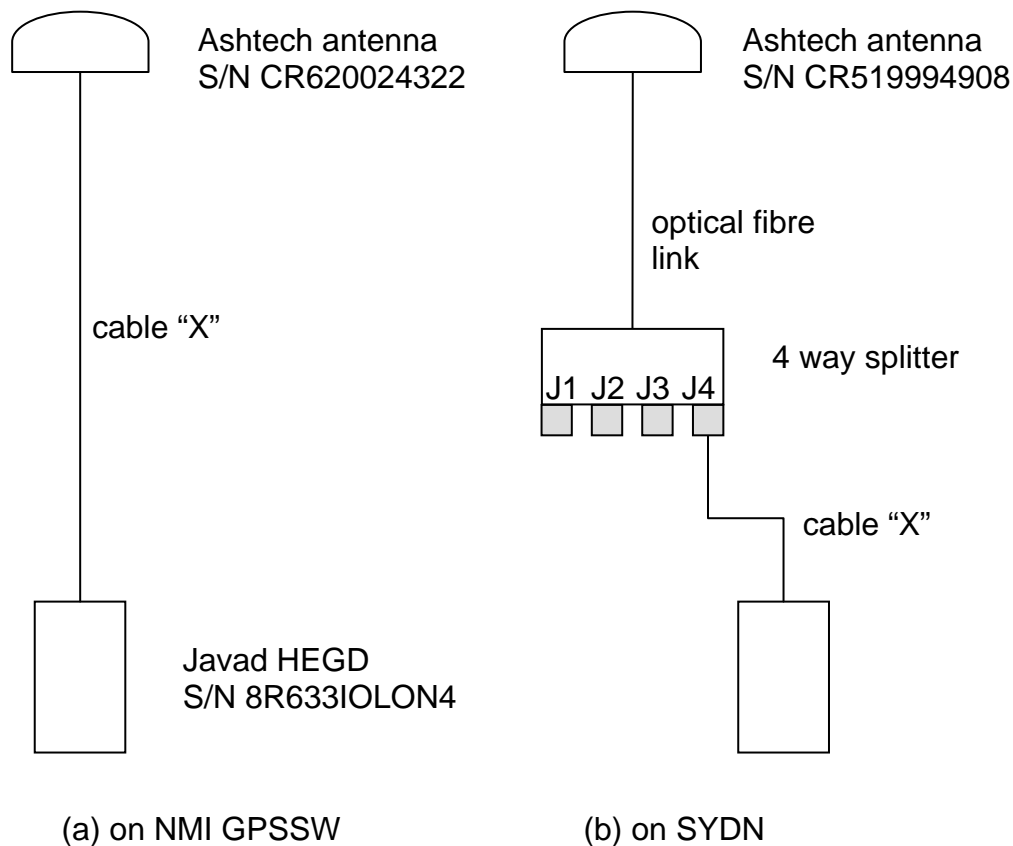
BPOU

REF 1 pps delay	95.65 ± 0.11 ns (Note 2)
Antenna cable delay	181.3 ± 0.12 ns

Notes:

- (1) Unless otherwise noted, delays are the mean of 100 measurements made with a counter/timer referenced to UTC(AUS) and the quoted uncertainty is the standard deviation.
- (2) The uncertainty is the quadrature sum of the uncertainty in two delay measurements.
- (3) Different ancillary cables were used for the “before” and “after” measurements.

Appendix: Measurement of the optical-fibre link delay



A Javad dual-frequency receiver S/N 8R633IOLON4 was operated on the NMI “GPSSW” antenna pole for 3 days with an Ashtech antenna S/N CR620024322 (a). The antenna cable was then connected to a port on the 4-way splitter connected to the SYDN antenna for three days (b). The optical fibre delay (antenna to the output of the splitter) is then obtained from the observed step in a short-baseline comparison of CCTF data with the primary NMI receiver.

The measured delay (antenna to J4 output) is:

$$2474.9 \pm 0.1 \text{ ns}$$