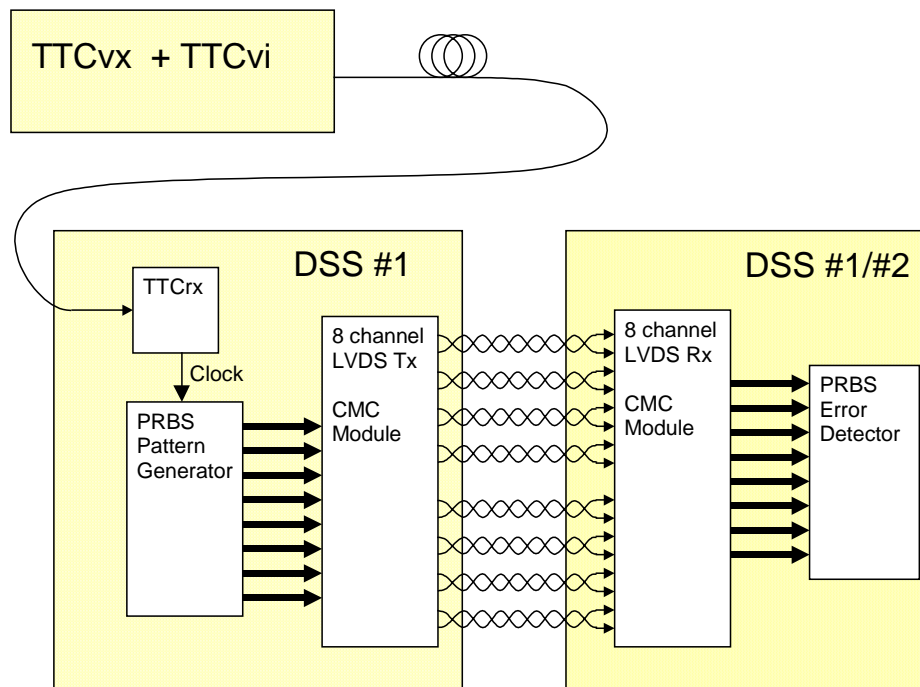# LVDS Link Tests at Birmingham

LVDS Link evaluation used the Data Source and Sink (DSS) VME modules clocked from a TTC test system:


Results using the original LVDS deserialiser DS92LV1210 operating at 40MHz (maximum frequency) showed a low tolerance to power supply noise and clock jitter.   (March 2000) $\rightarrow$

Error rates of $<10^{-12}$

The original deserialisers could only be used at 40MHz provided:
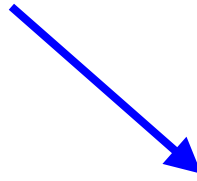
- Transmitters were clocked from a high stability source.

- Cable HF loss was over-compensated.

- Receiver supplies were heavily filtered:

Additional decoupling capacitors
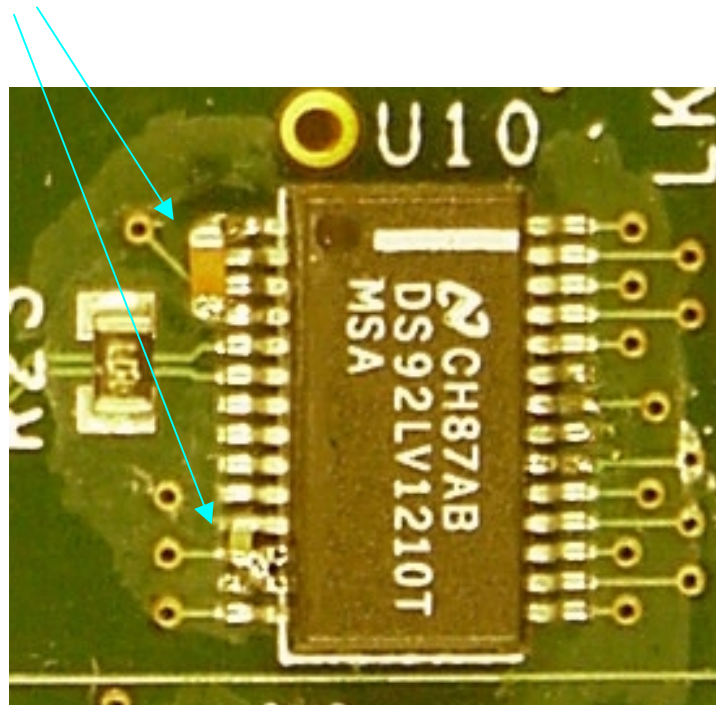
But now …

… faster LVDS chip-sets are available, operating at 40 - 66MHz word rates.

Parameter	Original device DS92LV1210	"High range" device DS92LV1224	Upgraded "Low range" DS92LV1212A
Frequency range	16 - 40MHz	40 - 66MHz	16 - 40MHz
Data Timing margin (min)	100ps	450ps	450ps
Receiver Threshold (max)	100mV	50mV	50mV
Power consumption (typ)	145mW	191mW	191mW
Latency	1.75 T	1.75 T	1.75 T

- The later devices have a much improved timing margin on incoming data when compared with the original part.

- With the newer devices available do not even consider using the DS92LV1210 device at 40 MHz !

Test results

LVDS link tests were repeated using the faster
40 - 66MHz Deserialiser part (DS92LV1224)

Several overnight tests on were run on various
cable assemblies:

- 4ch. 15m of compact AMP cable 1370754-1

- 8ch. 12m of Datwyler cable.

- 4ch. 20m of Datwyler cable.

No errors were detected

3×10^{13} bits were sent over each link.

Further overnight tests

High VME activity ,
   reading from the DSS status register:

8 ch. over 2 x 15m of AMP cable
                              (1370754-1)

Still No errors detected > 40Hrs

5×10^{13} bits sent over each link.

The new improved LVDS chipsets;

- do NOT need a high stability 40MHz clock source feeding the transmitter.

- are tolerant of supply noise. (fed from logic supply , without additional decoupling)

- allow cable equalisation to be relaxed, with particular component values now covering a much larger range of cable lengths.

Pic 'n' Mix works, but should we keep to one chip set?

	'1210	'1212A	'1024
	Low range Rx		Hi range
'1021 Low range Tx -die	✘	?	✓
'1023 High range Tx - ?			

- The complimentary 40 - 66 MHz serialiser is not (yet) available in die form. → PPr MCM.

Further Work

- Repeat Link Tests with system 'stressed'

- Produce LVDS Source module with Fanout:

  - Heidelberg L-FAN chip

  - Pericom Bus LVDS Crospoint / repeater (PI90LVB044)