4Links™

Update on SpW Related Developments

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Introduction

4Links™

We now offer 5 test/development functions ...

- ESL – Ether Space Link (1 active port to 500Mb/s)
    - 2 variants
- FSR – Flexible SpaceWire Routing Switch
- MSA – Multilink SpaceWire Analyser (4 links)
- DSI – Diagnostic SpaceWire Interface

All implemented on the SAME hardware – functions can be interchanged by simply replacing a CF card.

AND a new user interface, SpWIO, for simultaneous interactive and/or scripting sessions on one or more SpaceWire interfaces (as above and PCI/cPCI units).

ESL (RG variant)

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One active link

- Link speed (to 500Mb/s) selectable in small increments

- Precise time tags (resolution <10ns)

- Receive speed measurement

- Captures link waveforms (flexible triggers)

FSR

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Configurable routing switch – 8 ports

Highly flexible configuration allows construction of …

- Single or multiple ECSS switches

- Superset functions allow single and/or multiple units to implement

    – Larger ECSS switches

    – Concentrator / splitter

    – Multi-link tunnel

MSA

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Monitors 4 SpaceWire links displaying and logging activity

Front Panel

- Link status
- Token transfers

Remote

- Detailed statistics
  - Link state
  - All tokens (including SpaceWire error sequences)
- Captures link waveforms (flexible triggers)

MSA

4Links ™

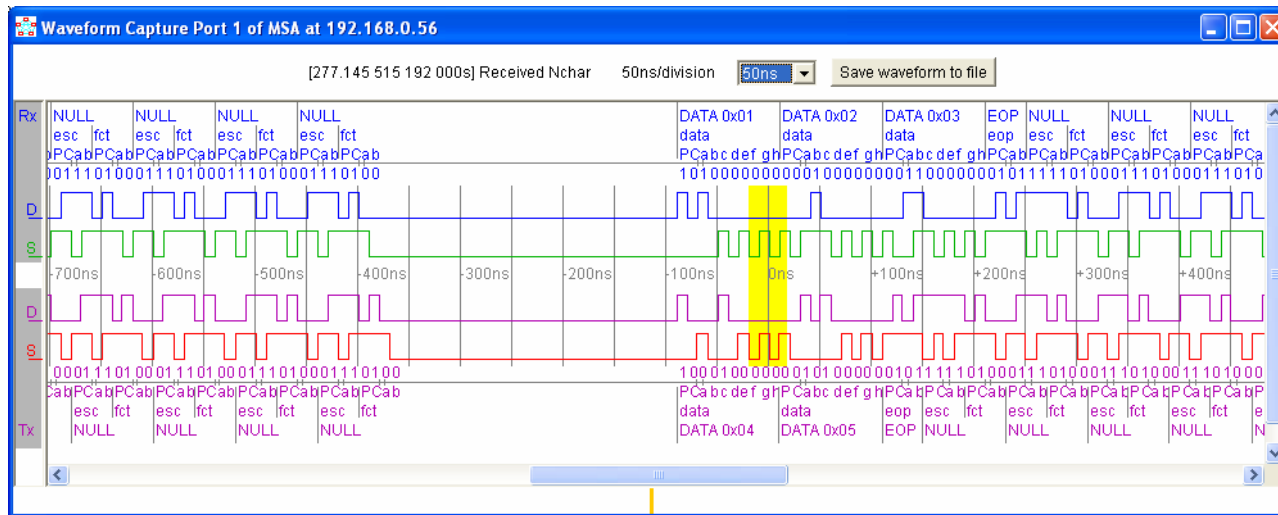| Rx port	1	2	3	4	5	6	7	8
Rx Speed	147Mb/s	147Mb/s	147Mb/s	147Mb/s				
Data byte	+0	+0	+0	+0	+0	+0	+0	+0
	Total 7	Total 3	Total 20	Total 3	Total 0	Total 0	Total 0	Total 0
EOP	+0	+0	+0	+0	+0	+0	+0	+0
	Total 1	Total 1	Total 2	Total 0	Total 0	Total 0	Total 0	Total 0
EEP	+0	+0	+0	+0	+0	+0	+0	+0
	Total 0	Total 0	Total 1	Total 0	Total 0	Total 0	Total 0	Total 0
Time code	+0	+0	+0	+0	+0	+0	+0	+0
	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0
NULL	+18 375 760	+18 375 761	+18 375 760	+18 375 760	+0	+0	+0	+0
	Total 1.017G	Total 1.017G	Total 1.017G	Total 1.017G	Total 0	Total 0	Total 0	Total 0
FCT	+0	+0	+0	+0	+0	+0	+0	+0
	Total 7	Total 8	Total 14	Total 17	Total 0	Total 0	Total 0	Total 0
First_Null	+0	+0	+0	+0	+0	+0	+0	+0
	Total 3	Total 1	Total 4	Total 3	Total 0	Total 0	Total 0	Total 0
Parity	+0	+0	+0	+0	+0	+0	+0	+0
	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0
Timeout	+0	+0	+0	+0	+0	+0	+0	+0
	Total 69	Total 117	Total 94	Total 35	Total 3	Total 2	Total 2	Total 2
ESC_EEP	+0	+0	+0	+0	+0	+0	+0	+0
	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0
ESC_EOP	+0	+0	+0	+0	+0	+0	+0	+0
	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0	Total 0
ESC_ESC	+0	+0	+0	+0	+0	+0	+0	+0
	Total 0	Total 0	Total 0	Total 1	Total 0	Total 0	Total 0	Total 0

MSA at 192.168.0.56

New baseline

DSI

4Links™

Multiple active links with detailed monitoring and control

- Link speed (to 500Mb/s) selectable in small increments

- Synchronised outputs (with controlled offsets)

- Full control over error injection

- Precise time tags (resolution <2ns)

- Receive speed measurement

- Front panel display of link status, activity and speed

- Can be synchronised to other units and/or external reference

DSI

Synchronized outputs

Conclusions

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We now have test equipment capable of ...

- Timetag resolution better than 2ns;
- Almost any link speed (up to 500Mb/s);
- Very closely synchronised outputs;
- Controlled error insertion;
- Multi-box synchronisation for testing a large number of ports.

... and are thus able to verify the function and temporal behaviour (both positive- and negative- testing) of SpaceWire components and systems.