



Spacewire Backplane

Technology Survey

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What's covered?

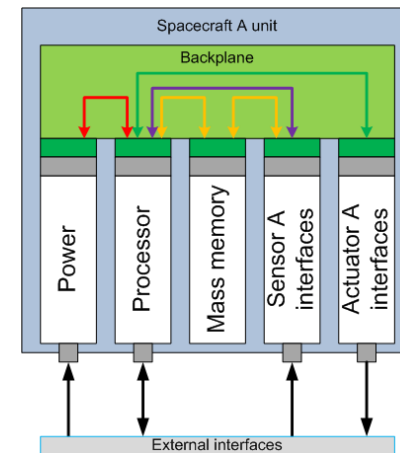
The technology survey part of the study covers:

- Backplane types – Active vs. Passive
- Recommended quantity and types of I/O
- Connector selection

Active vs. Passive backplane technologies

- Passive backplane advantages:
- Simpler and cheaper to manufacture and qualify.
- No single point of failure

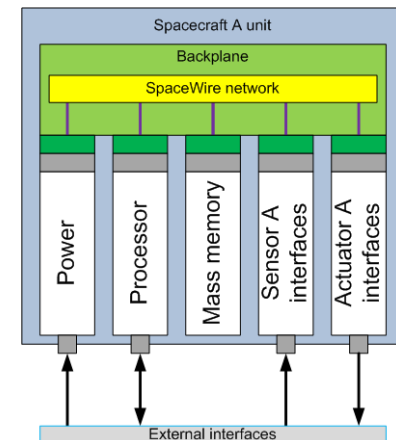
- Passive backplane disadvantages:
- “On-the-fly” re-configurability not possible



Active vs. Passive backplane technologies

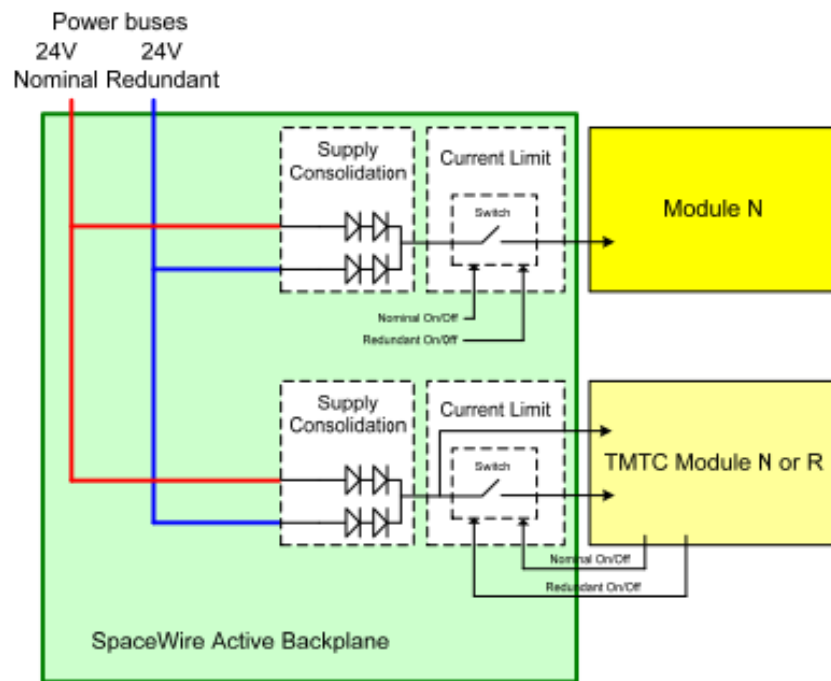
- Active backplane advantages:
- Allows for re-configurable system
- EGSE can be used to simulate any missing modules
- Data on backplane can be observed via a test port

- Active backplane disadvantages:
- High initial development and qualification effort and cost
- System could have single point of failure



Power distribution and Isolation

- An active backplane can handle power distribution and protection on the backplane PCB, therefore it is inherently more scalable
- Power control carried out by TMTC or processor module.
- Data isolation should be included into the backplane



Backplane PCB

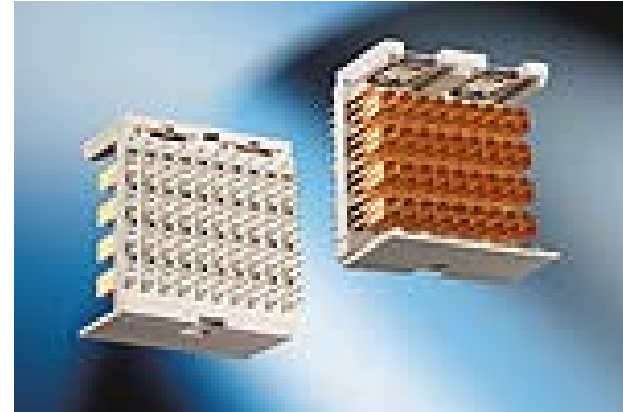
- A 3U (100mm) or 6U (266mm) Eurocard format, length dependant on number of slots.
- Using FR4 PCB materials, 2.5Gb/s can be achieved. Up to 5GB/s is highly dependant on the tolerance of components used and length of PCB traces on backplane.
- At current Eurocard sizes (100, 160, 220mm) this shouldn't be a significant factor.

I/O type and numbers

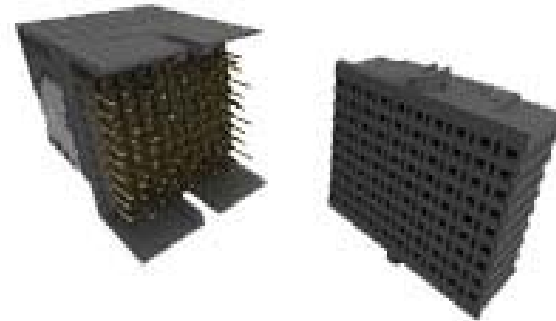
- Nominal and redundant high speed Spacewire links
16 links in total
- 36 generic I/O pins for power, ground, control, interrupt, etc, with a possibility to go up to 72 pins
- 6 used for power, 6 for ground, 24 for other functions.

Connectors

- Ermet ZD[®], developed for the telecoms sector, can run up to 10Gb/s. 100Ω differential impedance matched, high signal density.

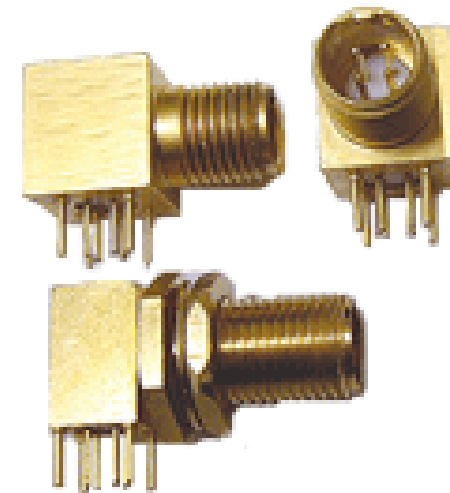
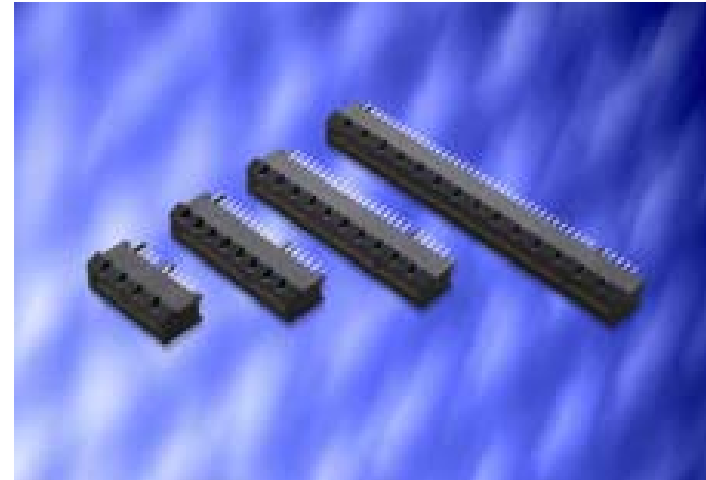


- Fortis ZD, developed for military backplanes, space compatible materials, 10Gb/s+, high signal density (6U version can contain 300 diff pairs)



Connectors

- PCI-express connector, based on popular backplane standard, >2.5Gb/s, can be ruggedised.
- Twinax, >2.5GB/s, 100Ω differential impedance matched, can be included in a larger connector body.





Thank you for listening

Questions?

