

SPACEWIRE-CPCI VXWORKS SUPPORT

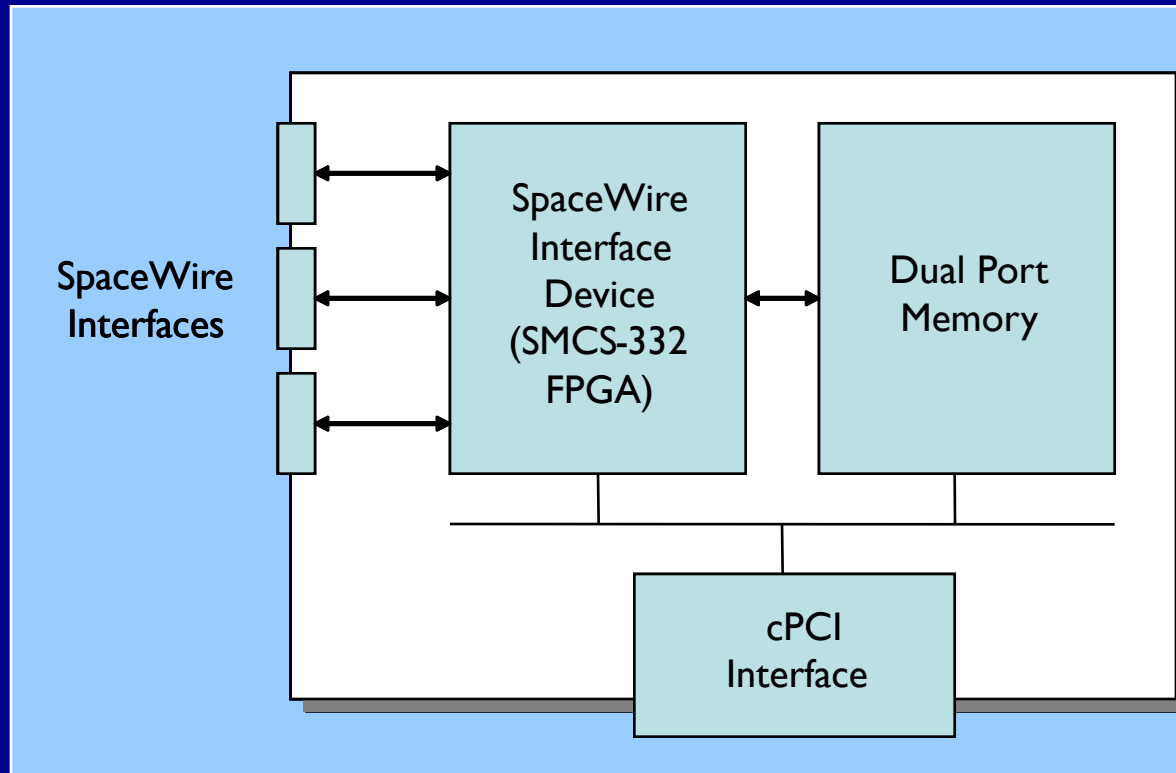
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STAR-Dundee



- Software components
- Initialisation issues
- Driver architecture overview
- Performance
- Example Jitter measurement test application

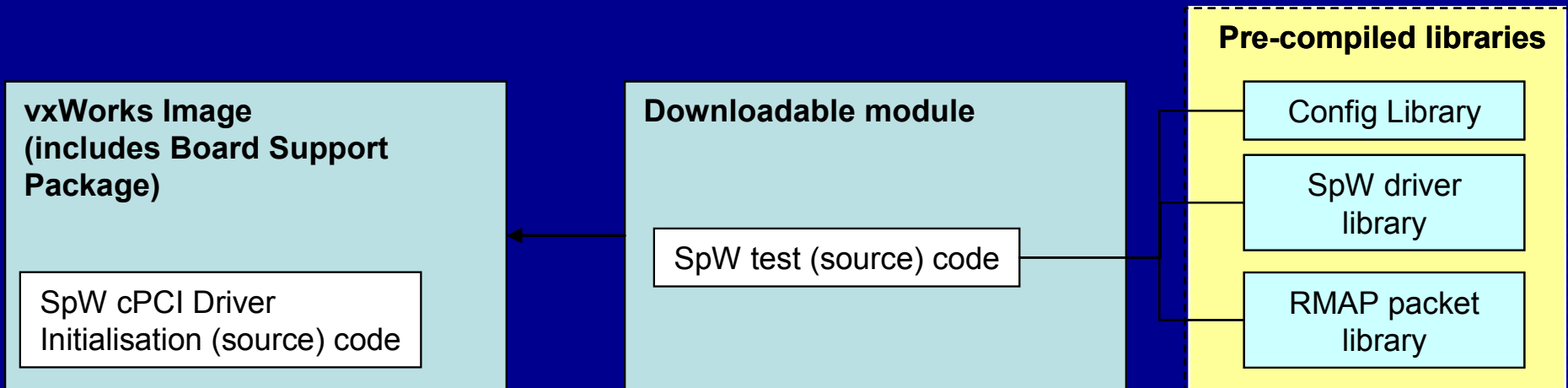


- Based on hardware design
 - SMCS332SpW
 - PLX9056
 - Dual port memory





- Similar to SpaceWire PCI-2 Windows and Linux drivers
- Test code almost identical
 - RTOS modifications
- Control of interrupt thread priority
- Ports of RMAP and Router Configuration Libraries





- Variation in Board Support Packages
- PCI Interrupt vector
- Board memory mapping
- DMA issues



Initialisation Approach

- Initialisation code provided as source
 - Easy to integrate with VxWorks build
 - Builds a table of detected SpaceWire cPCI devices
 - Calculate the interrupt vector
 - Memory map device space
 - Any non-standard I/O or DMA
- After VxWorks boot all cPCI devices detected with DMA



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Performance

- Deferred procedure call model
- Task usage
- Data transfer rate

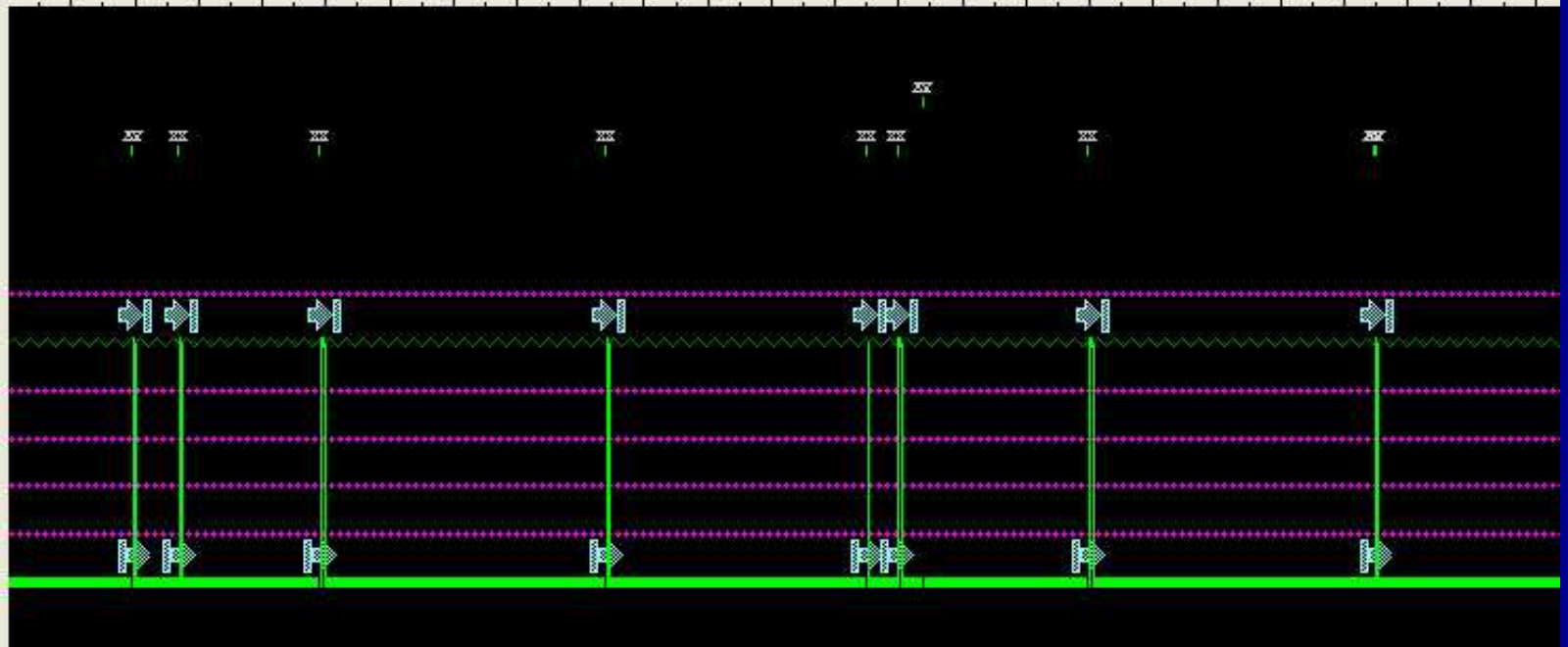


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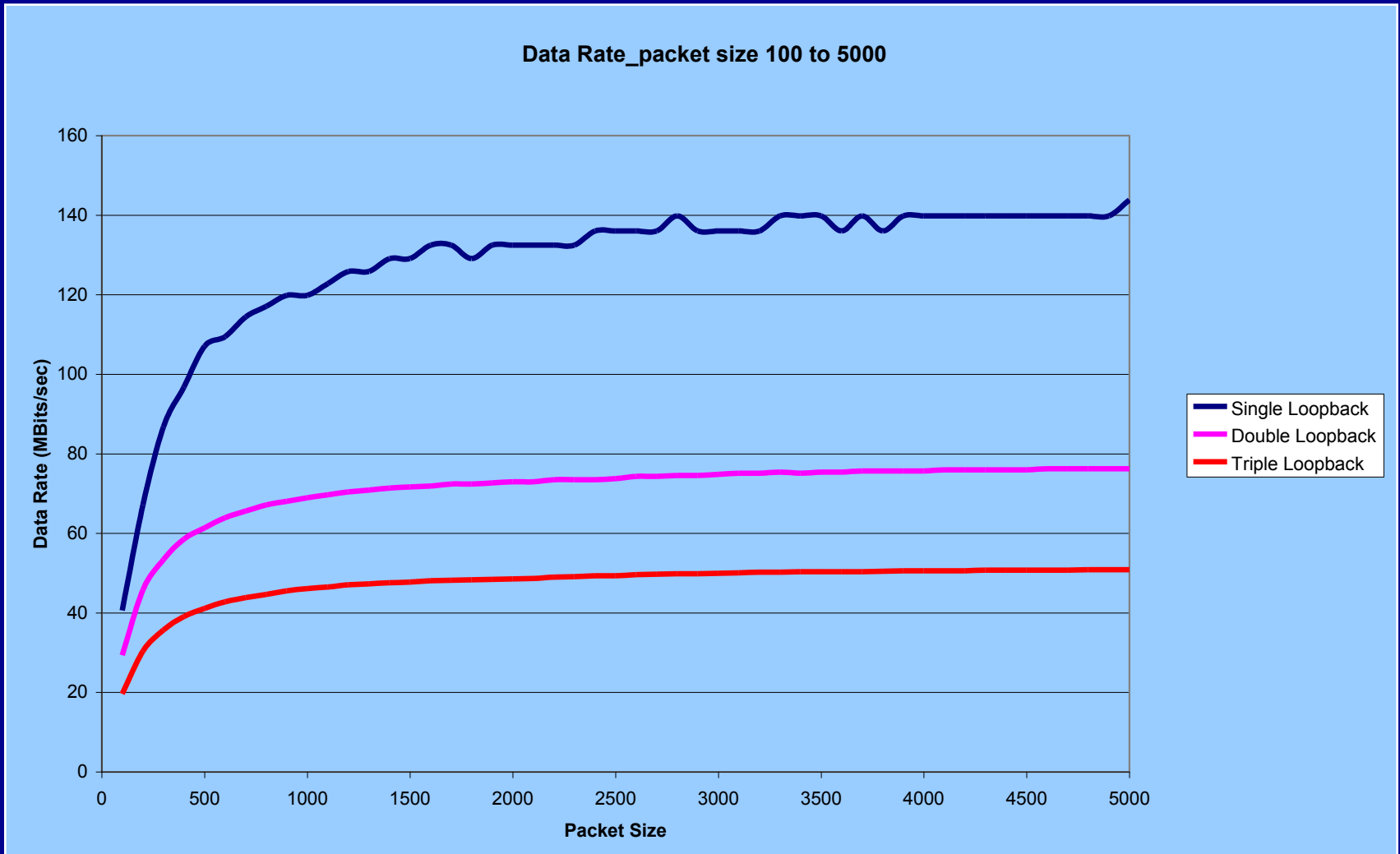
Interrupt Handling

1.9707 1.9709 1.9711 1.9713 1.9715 1.9717 1.9719 1.9721 1.9723 1.9725 1.9727 1.9729

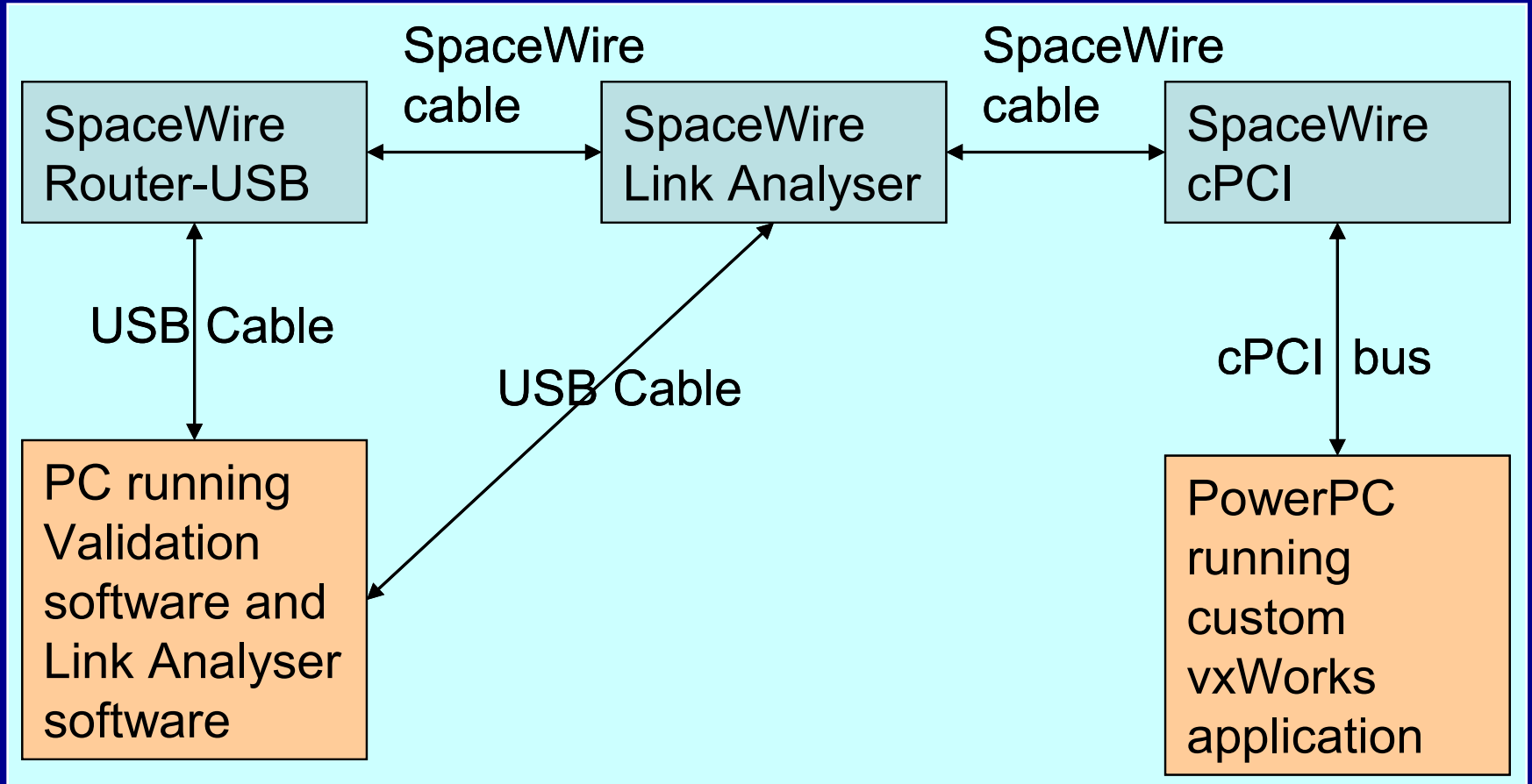
TimerInt
Interrupt20
Interrupt5
Interrupt4
tExcTask
tLogTask
tSW0
tWdbTask
t2
tNetTask
tWvRBufMgr
idle







Jitter Measurement Test Example





- Measuring the difference between the time code and the EOP detected on the SpaceWire Link.
- Jitter measured as the difference between the time to send each packet and the average.
- Maximum measured jitter measured as 1.5 microseconds



- Support current VxWorks versions
 - Current version tested with Tornado 2.2 using VxWorks 5.5.
- Improvements to small packet transfer rate
- Possible port to RTEMS