SpaceWire DSP

Steve Parkes, Iain Martin
Chris McClements, Ray Manston
Stuart Fowell (SciSys Ltd)
Main Components

• Analog Devices 21160 SHARC DSP processor

• Eight port SpaceWire Router
  – with external SHARC Link interface

• SHARC Links connecting the DSP to the router.
  – high-speed, bi-directional, half-duplex, point-to-point links
SpaceWireDSP Driver

• Coded using Analog Devices software
  – Visual DSP++ Version 3.0
  – Written in C and assembly
  – Implemented as a standard Visual DSP++ Kernel (VDK) driver

• Two driver interfaces are provided
  – A real-time driver API
  – An interface to a TCP/IP stack
    • TCP/IP MicroNet stack provided by SciSys
Driver Functionality

- Transmit message calls are processed by a thread-safe priority driven Q queue

- Receive message calls block on an incoming message
  - Only a single thread can receive data at any time
Priority Driver Transmit Q

User programs

Real-Time Driver

Hardware

User Thread

User Thread

User Thread

Transmit Packet

Transmit Q

SHARC Link

Adds packet to Q in priority order
Project Details

• Funded by British National Space Centre (BNESC)
  – As part of the Real-time Embedded CORBA over SpaceWire (RECS) project.

• Designed for research purposes
  – SpaceWire to DSP integration

• To be used by SciSys Ltd
  – To implement a lightweight, distributed object system (micro-ORB) running over SpaceWire