SpaceWire Demonstrator

ESTEC
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Agenda

- Overview of Demonstration System
  - Instruments
  - Mass Memory Unit
  - Processor
  - Telemetry and Telecommand
  - RMAP
  - Network Configurations
- Demonstration

The Demonstration System

- Simulation of onboard data handling network
- Four types of units:
  - Telemetry and Telecommand
  - Processor
  - Mass Memory Unit
  - Instruments
    - Camera Instrument
    - File Instrument
    - Pointer Instrument

Instruments

- Three different Instrument types currently defined:
  - Camera Instrument
  - File Instrument
  - Pointer Instrument

- The maximum data rate used by each Instrument can be configured

- Future Instrument types can easily be created using the base classes which provide much of the functionality

Camera Instrument

- Sends images generated by a camera to the MMU

- Can be set to send all images recorded by the camera

- Or can be commanded to send a single image

- The images can be displayed at the TM/TC

Camera Instrument

File Instrument

- Sends files read from a directory to the MMU

- Can be set to send all files in the directory

- Or can be commanded to send a single file

- If the files contain images, these can be displayed at the TM/TC unit

Pointer Instrument

- Sends mouse pointer position information to the MMU
- Can be set to send all mouse movements
- Or can be commanded to send a single position
- The mouse position can be displayed at the TM/TC unit
- Different from the other two Instruments as the data is not sent at a steady rate

Mass Memory Unit

- Allows channels to be created to store data from Instruments

- Can be commanded by the Processor to transfer data from the channels to the TM/TC

- Graphically represents the amount of data in each channel

Mass Memory Unit

Processor

- Can execute commands, e.g.:
  - Set-up routing tables
  - Configure Instruments
  - Configure MMU channels
  - Enable an MMU
  - Transfer data from an MMU
- May be instructed by TM/TC to execute these commands
- Read the status of the devices on the network

Processor
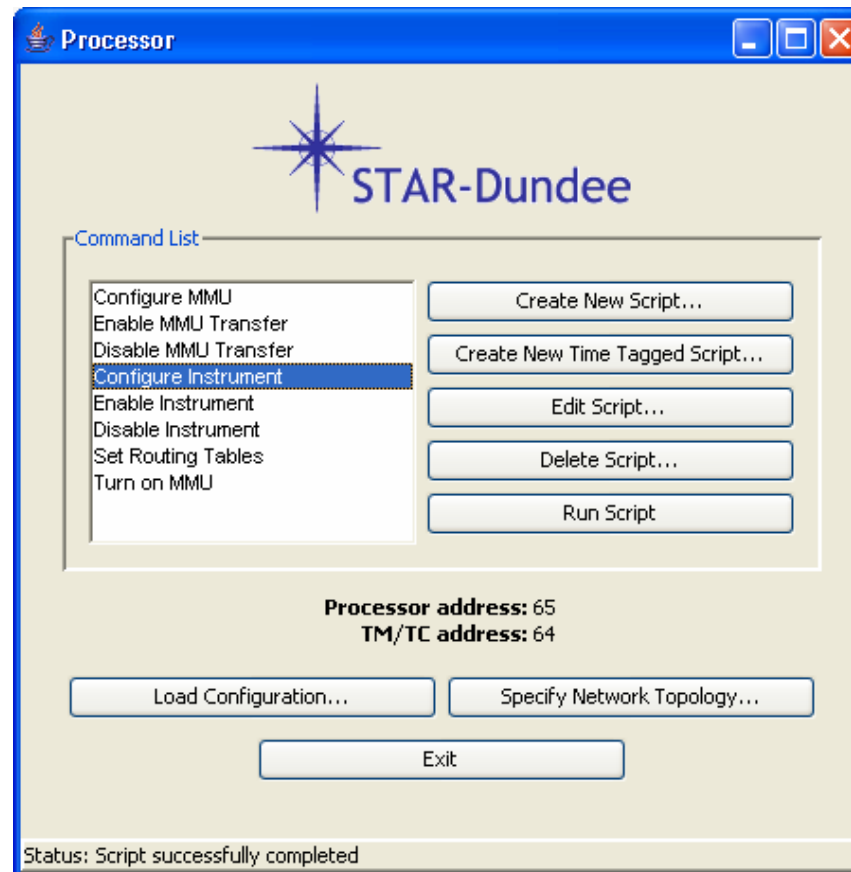
Telemetry and Telecommand

- Specify the Processors to communicate with

- Switch between prime and redundant configurations

- Issue commands to be executed at the Processor

- Upload commands to the Processor

- View the data transmitted from the MMU

- Display the status of the devices on the network

Telemetry and Telecommand
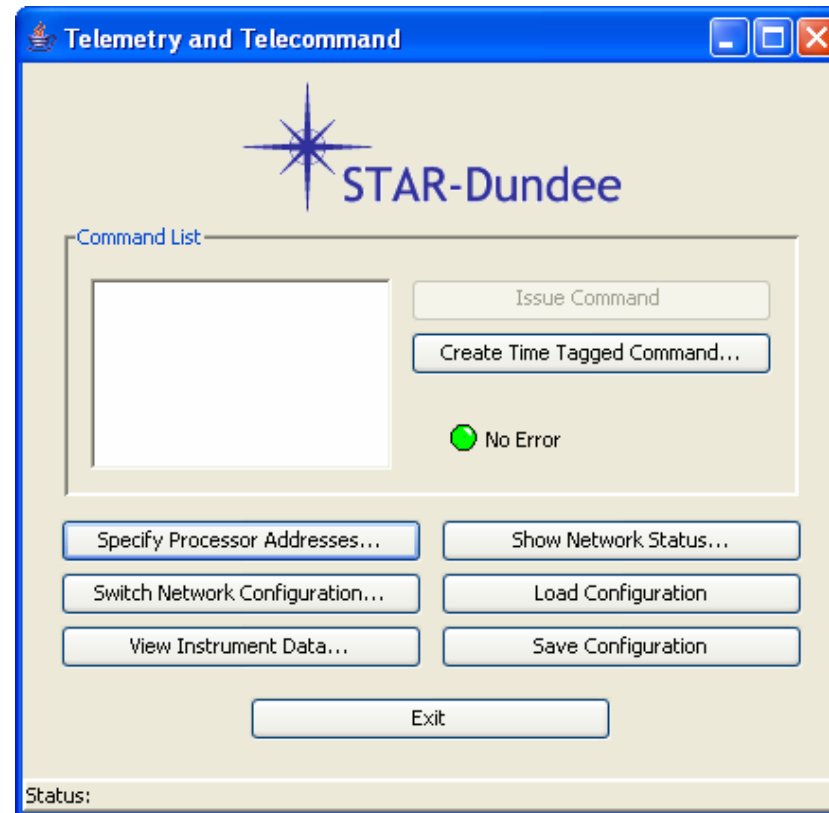
Remote Memory Access Protocol

- RMAP used for all communication
  - Read and write commands used
  - Incremental and non-incremental operations
  - Acknowledged and unacknowledged writes
  - MMU uses extended address field to indicate the channel number

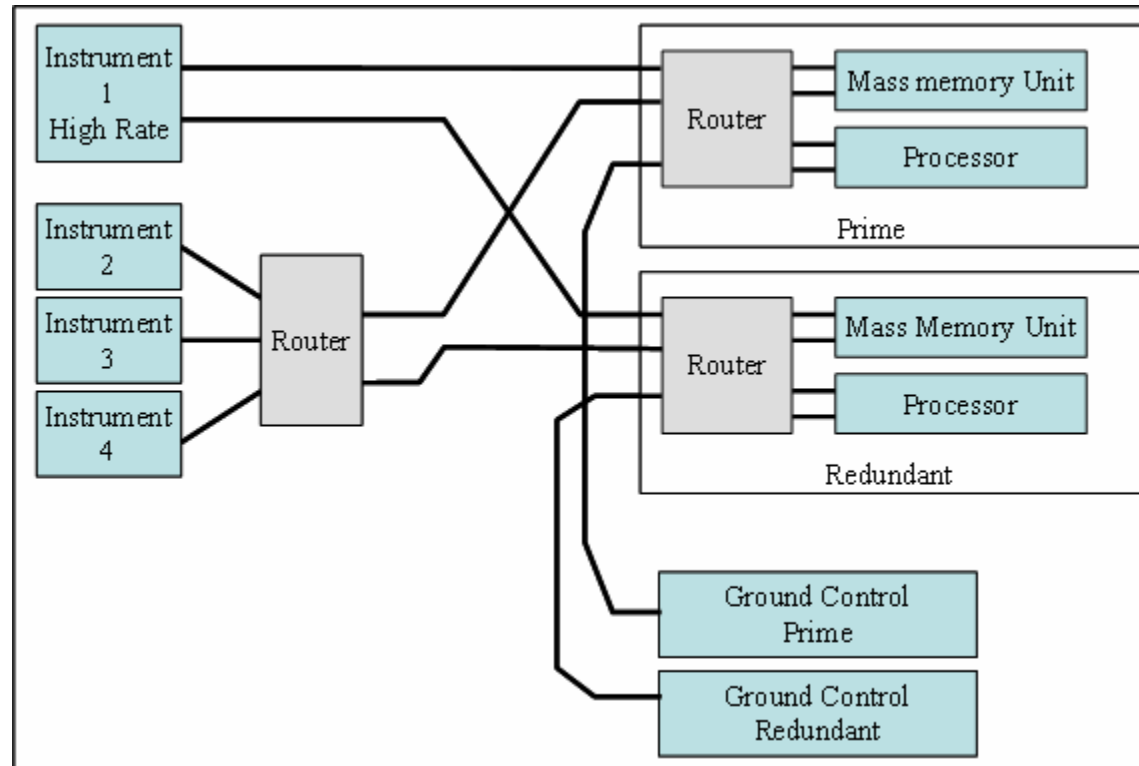- Latest draft (Draft F) with updated CRC used

Network Configurations
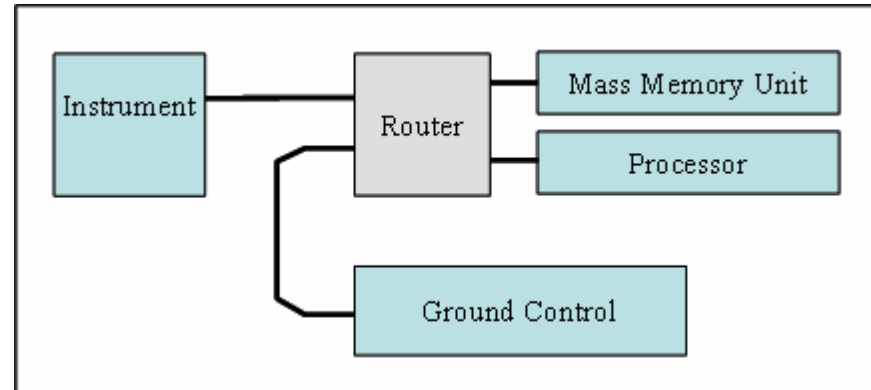
- Basic System
  - No redundancy
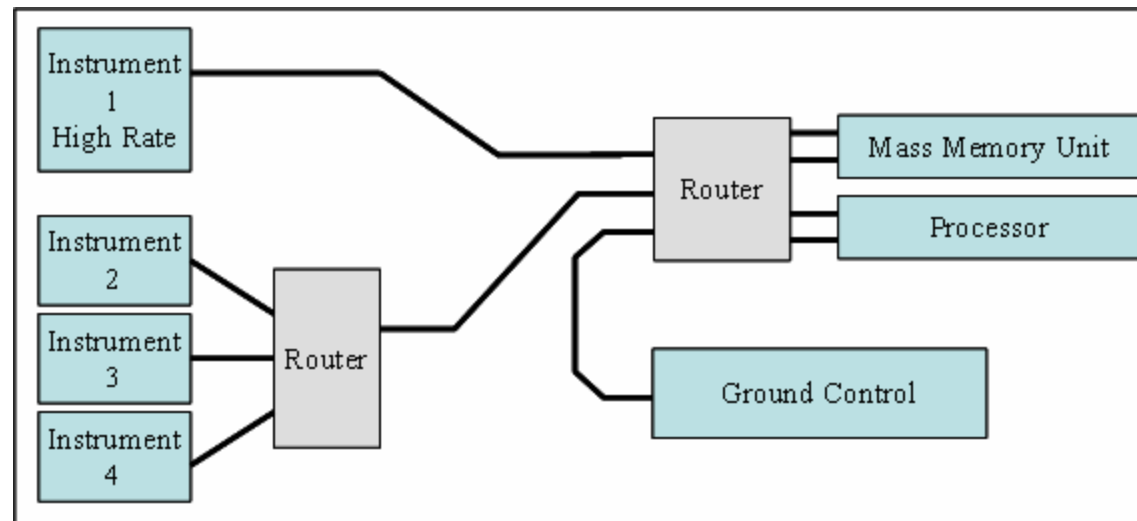 - One of each component
  - All exchanges through the router

Network Configurations

- ## System with redundancy
  - – Redundant MMU/Processor/router and TM/TC blocks

Network Configurations

- **Multiple Instrument System**
  - No redundancy of components
  - High rate Instrument connected directly to the MMU/Processor router
  - Multiple links to Processor and MMU

Demonstration