Digital Sub-System

Dorothy Gordon
Overview

- Digital Subsystem Overview/Block Diagram
- Developments Since PDR
- Design/Implementation Status
- Next
Digital Sub-System Data Flow

Cosmic Ray Telescope for the Effects of Radiation

27 June 2006

Digital Engineering
Digital Sub-System Block Diagram

Cosmic Ray Telescope for the Effects of Radiation
Developments since PDR

- **Requirements** – no significant changes
- **Parts Selection**
  - DDC BU-63705 for 1553 Bus, Actel SX72, Amptek PH300
  - DC-DC Converter Modules (International Rectifier)
- **Peak Stretcher (PH300):** Performance Verified via Breadboard
- **Functional Description/Specification**
  - Details of FPGA operation (Drawing # 32-03010)
- **Schematics**
  - Board Schematics: released (Drawing # 32-03003)
  - Chassis Schematics: released (Drawing # 32-03006)
  - High Voltage Power Supply (Drawing #32-03003.01)
    - (subcontracted) design complete – prototype in house
Since PDR (continued)

- **Peer Review** (GSFC, May 22, 2006)
  - Received/Answered 15 RFAs (for both analog and digital subsystems)
    - No change to fundamental design of either subsystem
    - Part type modification (to insure edge-rate compatibility)
    - Actel Programming Socket exchanged (for “ESD Friendly” replacement)
    - Actel Static Timing analysis to include asynchronous clocked path analysis
    - Signal Integrity and Ground bounce concerns (especially relative to the SX72 FPGA)

- **Analysis**
  - Parts Stress Analysis: released (Drawing #32-03010.03)
  - Worst Case Analysis: released (Drawing #32-04011.02)
Design/Implementation Status

• **FPGA Design**
  – VHDL Coding Complete (Drawing #32-03003.10)
  – Top Level functional simulation complete
  – Timing Verified (Static Timer and Dynamic Simulation)

• **Engineering Board (ETU) Layout and Fabrication completed**
  – Engineering layout is flight part footprint compatible
  – High Voltage Supply, implemented on hand-wired breadboard, will be integrated during the second layout stage

• **ETU Population**
  – Completion expected by last week of June
Board Layout
Cosmic Ray Telescope for the Effects of Radiation
Next

• **Design Complete** – ready for board level check-out

• **Next**
  – Test with GSE
  – Verify basic functionality/operation
  – Develop/run marathon diagnostics
  – Integrate with analog board

• **Flight Version**
  – Incorporate any modifications resulting from ETU debug
  – Add Bias (High Voltage) Supply