Proton300k™ FPGA Reconfigurable Computer

Space Micro has earned a strong reputation in the Space industry for innovative, affordable and high performance RF communication and digital computer products. We are an engineering driven small business focused on technology advancement and product implementation.

Space Micro’s Digital product heritage began with the development of our Proton 100k single board computer (SBC) which featured advanced VLIW processing and was launched on TACSAT-2 in 2006. This was followed by development of Proton 200k and 400k series computers; as well as the ProtonX-Box Avionics Suite which features various peripheral "slices" such as Analog I/O, Digital I/O, configurable FPGA, etc. for customized applications including C&DH, Sensor Management, Data Processing and various other payload management and processing functions.

The Space Micro Proton 300k™ is a FPGA based reconfigurable computer system. The number and type of FPGA's can be selected by the customer, the popular PCI-104S format is configured for either an Actel RTAX series or Virtex™ series from Xilinx. The Virtex Series FPGA's are mitigated for SEFI with Space Micro's patented H-Core II™ watch dog. SEU's are also improved with Space Micro's patented TTMR™. On-Board memory is 8GB, based on our flight proven NAND Flash module. Much of the circuitry is similar to the IPC-5000 Image processing computer which features flight heritage on the ORS-1 mission.

FEATURES

- Radiation hardening utilizes Space Micro’s patented mitigation technologies
- 3U, 6U PCI-104S Form Factors
- Applications include C&DH, Payload electronics, image processing
- Actel or Xilinx FPGA’s available
- Customizable parts level
## Proton300k™ FPGA Reconfigurable Computer

### SPECIFICATIONS

#### Radiation Tolerance

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<th>Value</th>
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<tr>
<td>SEL</td>
<td>&gt;63 (MeV·cm²/mg)</td>
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<tr>
<td>SEU</td>
<td>&lt; 1 per 1,000 days (1.0 E-4, 90%)</td>
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<tr>
<td>TID</td>
<td>100krad (Si), Orbit dependent</td>
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<tr>
<td>SEFI</td>
<td>100% recoverable</td>
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**TTMR™ technology for SEU detection/mitigation.**

**H-Core™ technology for SEFI detection/mitigation.**

#### Performance

- Xilinx XC5VX155T FPGA using either:
  - Xilinx Platform Flash Memory (Engineering Model)
  - Rad Hard TMR Flash (Flight Model)

- 2 Channels LVDS video
  - Each channel includes 14-bit Video Data and Video Clock
  - Each channel has Control Signals including Line Sync, Frame Sync, and Data Valid

- SGMII Gigabit Ethernet, 10/100/1000 BaseT Interface

- SDLC IMU via RS422 Interface

- Four 4M X 18 QDR2 +SRAM 200MHz (currently operating at 180MHz)

- 32-bit, 33/66MHz PCI-104 Interface (currently operating at 33MHz)

#### Mechanical Options

- PCI-104 stretch [3.6 x 5"] Standard
- 3U, 100x160 mm [3.74 x 6.3"] Option
- 6U, 233x160mm [9.2 x 6"] (option)
- other custom sizes available

#### Parts Level Options

- Commercial Space, NASA Levels I, II, III
- Class S / B (options)

#### Environmental

- -24 to +61°C Temp. Range

#### Hardware Models

- Software Development Unit (SDU)
- Engineering Model
- Flight

#### Services Available

- TTMR Software Optimization

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*Specifications Subject to Change Without Notice*

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