S750

Radiation Tolerant Gigabit Network Interface Card (NIC) / 4Port Switch Ethernet PMC

- **PMC Network Interface Card (NIC) with Four port, Layer-2 Gigabit Ethernet Switch designed for Space Environments**
- **Four 10/100/1000BaseT Full Duplex (FD) Ethernet ports One host (primitive) port provides network access for an Aitech SBC via the local PCI bus**
- **Provides MAC address translation for high-speed multipoint data distribution**
- **Buffer Memory with triple-voted algorithm provided for flight units (Available on -014 port option flight version only)**
- **FPGA managed reset of the local Ethernet physical interfaces**
- **All Ethernet ports rear I/O via the host SBC to the cPCI backplane**
- **Flight unit FPGA design incorporated with Triple Modular Redundancy (Available on -014 port option flight version only)**
- **32-bit PCI 2.1 compliant cPCI interface at 33.333 MHz with onboard DMA engines**
- **S750 power consumption - less than 8 Watts (typical)**
- **Grade-2 Parts Up-screened with NASA GSFC EEE-INST-002 as a guideline optional**

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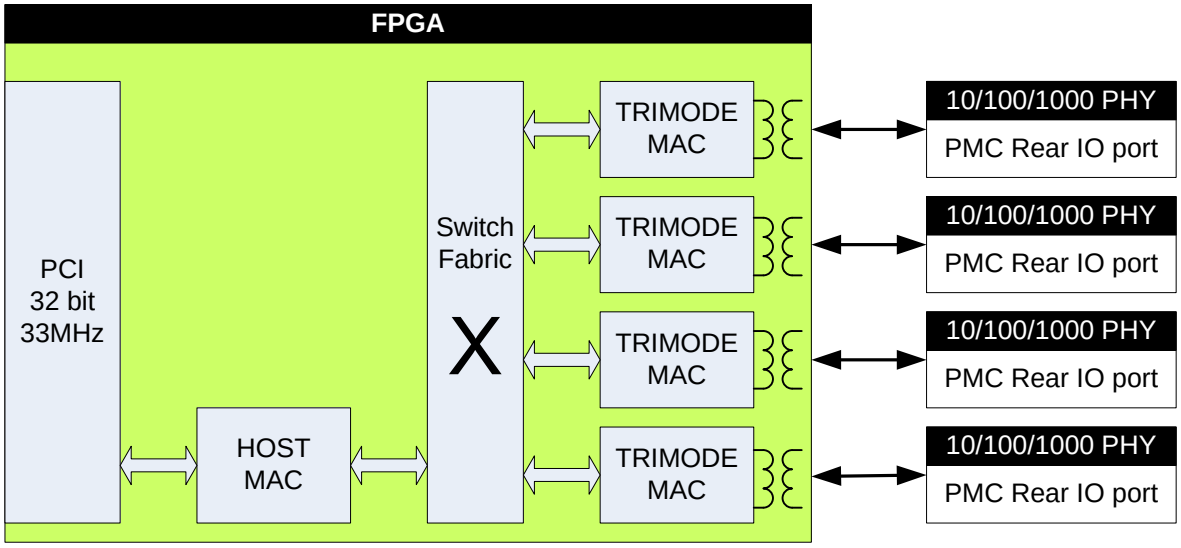

S750 Radiation Tolerant Gigabit Ethernet PMC

The S750 provides a four (4) port Gigabit Ethernet switch in a compact, single width, PMC form-factor. Based upon a large capacity, space-rated Xilinx FPGA, the S750 provides GbE switch performance in a radiation-tolerant, space-rated product. The FPGA based S750 provides the unique ability for the performance to be quickly customized to meet the most demanding Earth orbit or deep space applications.

The feature set provided by the S750 product is as follows:

- Designed to operate and host on the Aitech S950 or SP0 Single Board Computer (SBC)
- Optimized to switch and transfer data between the SBC and each S750 GbE network port
- Switches data between all ports based on the Media Access Control (MAC) Forwarding Table
- Stores dynamically learned host MAC addresses of devices connected to the S750 in the MAC Forwarding Table
- Provides real-time status to the SBC software using memory-mapped access over the local PCI bus
- Operational switch status and functions of each Ethernet port are presented to the SBC target software application via the Local PCI bus
- Onboard 1500-byte FIFO and DMA data fed directly into a pre-defined 8-MBytes buffer on the S950 triple-voted volatile memory for data traffic. VxWorks END driver provided for the host (primitive) port
- Supports transmit and receive Internet Protocol Version 4 (IPv4) RFC 791, User Datagram Protocol (UDP) RFC 768 (TBR 114) and Transmission Control Protocol (TCP) data packets
- Managed via software on the host carrier PMC mother board.

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- Configurable MAC address function provided for the host (primitive) port
- Host configuration remains unchanged across power cycles by storing configuration data in the SBC user Flash
- User application can save S750 configuration in Flash including address table(s)
- Provide a PCI interface to configure static entries in the forward lookup Media Access Control table
- MAC forwarding table with 64 user accessible dynamic entries and 16 user accessible static entries
- MAC translation table with 16 entries
- Supports dynamic destination MAC Address modification of a received Ethernet frame according to a configurable translation table prior to transmission to the destination port
- Memory mapped register to enable or disable the operation of each GbE Ethernet port or to enable or disable the MAC Address Translation function
- The Switch 100/1000Base-T ports are compliant to the IEEE-STD-802.3-2005 Clauses 2, 3, 4, 28, 35 and 40 (except for half-duplex support)

Mechanical Features

Conduction cooled form factor per ANSI/VITA20-2001 for installation on top of an IEEE 1101.2 or ANSI/VITA 30.1 conduction-cooled mother board such as the S950 or CM950.

Dimensions

Conduction-cooled 74mm X 149 mm form factor per ANSI/VITA 20-2001 standard.

Radiation Performance

- Radiation Tolerant with a minimum unshielded Total Ionization Dose (TID) of greater than 10 krad (Si). Higher TID tolerance is available upon request.
- Latch-up Immune tested to a minimum effective LET of 11 MeV•cm^2/mg
- Low SEU Rate – provided upon request

Power Requirements

+3.3V	(±5%)	2.42 A (typical)

Environmental Features

Please refer to Aitech Ruggedization Datasheet:

http://www.rugged.com/ruggedization.htm

Ordering Information

[ ] S 750 - [R] [ ] [ ] [ ] [ ] - [ ] [ ]

Ruggedization Level
1 = Development Unit , Series 100,
2 = Qual Unit , Series 200,
5 = Spacecraft Flight Unit , Series 500

Aitech Item Number

Cooling
R = Conduction

Components Screening Options (Flight Unit Only)
2 = Grade - 2 per Guidelines from EEE - INST - 002 and PEM - INST - 001

Port Options
- 014 Two 10/ 100 Base - T, one 1000 Full Duplex Ethernet ports , one Host Port
- 105 Four 10/100/ 1000 Base - T port Full Duplex , one Host Port

Configuration No .
To be assigned by Aitech

Example Configuration: 1S750-R-105-00

For more information about the S750 or any Aitech product, please contact Aitech Defense Systems sales department at (888) AITECH-8 (888-248-3248),

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