

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)
Space Systems and Architectures Featuring Cross-Platform Compatibility (7)

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A GENERAL PURPOSE POWERFUL PROCESSING BOARD FOR HIGHLY INTEGRATED
EQUIPMENTS

Abstract

The Sodern's General Purpose Processing Unit is a high performance and small form factor processing board designed for highly integrated embedded equipments.

It features the Atmel AT697 LEON2 processor operating at 96MHz, along with 16Mbits of EEPROM and 32Mbits of SRAM. The processor chipset (ASIC) offers the possibility to use either a MIL-STD-1553B RT or an AS16/CS16 dialog interface, and includes 3 SpaceWire links (uplink 20Mb/s, downlink 40Mb/s) and support for basic analog telemetries. It also manages the dual boot capability in case of EEPROM failure. This General Purpose Processing Unit is proposed with a "basic software" allowing the control of the hardware, the dedicated "application software" having to be developed by the user.

The Board dimensions are 120x140 mm, for a total mass of 245g and a typical power consumption of 3W. It has only one connector intended to be plugged on the user's motherboard allowing a completely free choice for external connectors.

The board is ITAR Free and can be offered in either Level 2 or Level 1 quality level. The processing unit is powered through a single 5V line. All necessary lower voltages (3.3V, 2.5V, 1.8V) are generated on the board. The board has been designed to withstand most of the LEO and GEO missions (thermal radiations) and has undergone a complete qualification.

The Board was initially developed for the Electronic Unit of SODERN's new Star Tracker HYDRA, but its versatility enables to use it for other applications. In particular a derivative version featuring a FPGA is used in the MEGHA-TROPIQUES Electronic Units developed by SODERN for CNES.

The paper presents the design of the General Purpose Processing Unit, its main characteristics and performances, and the qualification tests and results. A focus on its use in HYDRA and MEGHA-TROPIQUES will then demonstrate its capability of adaptation to various applications.