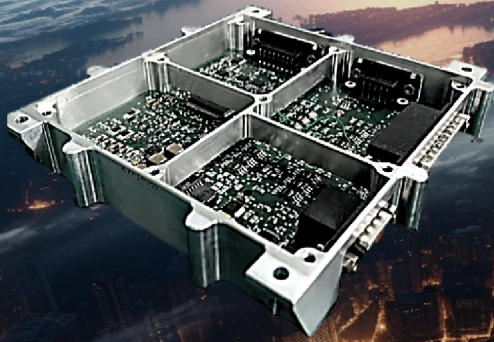


SCORPYOS

Supervisor concept for space systems

A breakthrough in space system supervision technology developed by EVOLEO Technologies



Processing

ARM Cortex M7
processor at 300 MHz

Interfaces

Multiple connectivity
options, including RS-422,
CAN, GPIO, SPI, and
analog/digital inputs

Design

Lightweight at 390g and
compact dimensions
(145x139x29.5 mm)

Introduction

The SCORPYOS project represents a groundbreaking initiative by EVOLEO Technologies, aimed at enhancing the supervision of small space subsystems.

Designed for Low Earth Orbit (LEO) missions, SCORPYOS combines hardware and software innovations to provide a robust, configurable, and user-friendly solution for space system management.

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Project Overview

SCORPYOS is a Supervisor Concept for Space Systems that operates independently or as a supporting unit. Its primary objective is to significantly improve the availability and reliability of commercial off-the-shelf (COTS) systems through a reference hardware design coupled with intuitive software and firmware tools. This integration allows users to tailor the system to their specific use cases with minimal complexity.

Key Features

Processing

Power: ARM Cortex M7 processor at 300 MHz with a floating-point unit.

Memory

Options include 2048Kb Flash, 384Kb SRAM, and additional expandable memory.

Interfaces

Multiple connectivity options, including:

- 4 RS-422 ports (one dedicated to configuration)
- 2 CAN interfaces
- 7 GPIO connections
- 4 Digital inputs (5V Logic Level)
- 4 Analog inputs (0V~5V)
- 1 SPI with 3 Slave Select lines

Power

Management: Highly efficient with overvoltage and overcurrent protections.

Compact

Design: Lightweight at 390g and compact dimensions (145x139x29.5 mm).

Radiation

Tolerance: SEL > 40MeV*cm²/mg and TID > 20krad.

Technical Specifications

Power Requirements

8V~12V input with LCL protection (UVP/OVP/OTP)

Power Consumption

Less than 1.2W

Physical Dimensions

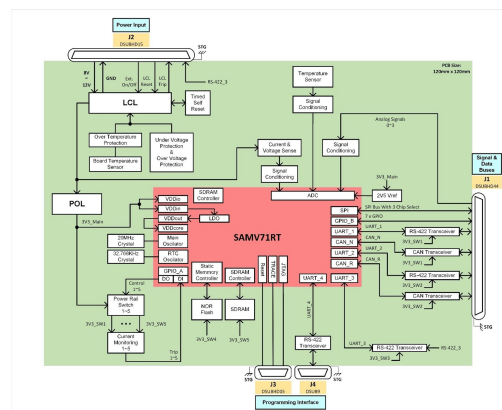
145x139x29.5mm

Weight

390g

Operating Temperature Range

-40°C to 100°C



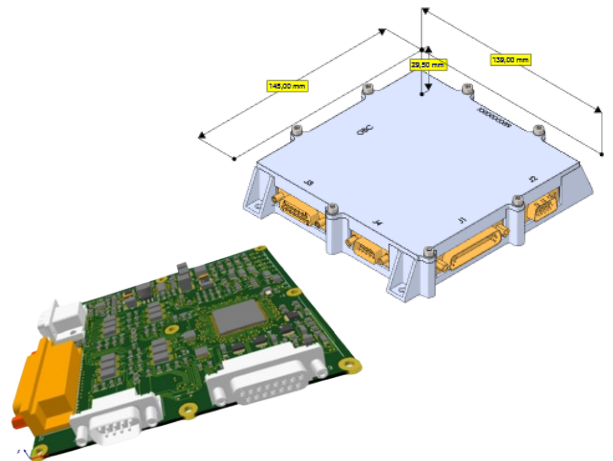
Mechanical and Electrical Innovations

The SCORPYOS design emphasizes simplicity and reliability.

Its mechanical architecture prioritizes lightweight construction and ease of integration, while its electrical design offers robust interfacing options for both flight and ground systems.

Connectors used for programming, reconfiguration of the system and live monitoring during Assembly, Integration, and Testing (AIT).

Overvoltage, overcurrent and overtemperature protections with respective signaling.



Advanced Firmware and Configuration Tools



SCORPYOS' firmware includes essential components such as watchdog timers, data validation checks, and real-time communication capabilities.

The configuration tool allows users to seamlessly set up and monitor the system, making it accessible for various operational scenarios.

Real-World Applications and Testing

SCORPYOS has been thoroughly tested through several use cases:

Digital Input Monitoring:

Utilizing expected value and watchdog timer checks to ensure system stability.

Analog Signal Analysis:

Employing limit and delta checks to detect deviations from predefined values.

Data Communication Monitoring:

Integrating message validation with content analysis to maintain data integrity.

Impact

SCORPYOS represents a significant contribution to space system supervision technology. Its combination of robust hardware design, comprehensive interface options, and sophisticated monitoring capabilities makes it an ideal solution for LEO missions requiring reliable system supervision.

Its focus on reliability, configurability, and user-friendliness ensures that it meets the evolving needs of the aerospace industry.

