

# Constellation On Board Computer

The Constellation On Board Computer product is a high quality On Board Computer based on COTS technology to offer a cost effective and highly performant product. The computer has a fully redundant architecture with robust failure handling and radiation mitigation to provide a highly reliable solution.



## KEY FEATURES

Fully cross-strapped dual redundant architecture with redundant reconfiguration functions allowing fully user defined reconfiguration sequences.

Highly performant processor and extensive I/O support that can be tailored according to customer needs.

Manufacturing highly automated and optimized for large quantities.

Optional integrated GNSS receiver, with support for GPS and Galileo, with an accuracy of 3.5m rms 3D.

TM/TC compliant to CCSDS format including AES256 encryption/decryption and authentication on both TM and TC links.

## RUAG SPACE HERITAGE

>3000 failure free equipment years in orbit  
>300 Launcher On-Board Computers  
>120 Satellite Data Handling Systems  
Latest OBCs in orbit: Hispasat 36W-1, Göktürk 1A, ExoMars Trace Gas Orbiter, Galileo FOC 9-14, Sentinel

## CORE INTERFACES

- 2 x 2 TM Encoder RS422
- 2 x 2 TC Decoder RS422
- 2 x 3 CAN buses
- 1 Internally cross-strapped SpaceWire link
- 2 x 2 SpaceWire links
- 2 x 7 RS422 / UART interfaces
- 2 x 2 RS485 / UART interfaces
- 2 x 10 GPIO
- 2 x 4 Sync Pulse output
- 2 x 1 Separation strap inputs
- 2 x 2 External alarm inputs
- 2 x 1 External Encryption Unit (optional)
- 2 x 51 General purpose pins (option)

## SWaP HYPERVISOR SOFTWARE AND OPER-SUPPORT

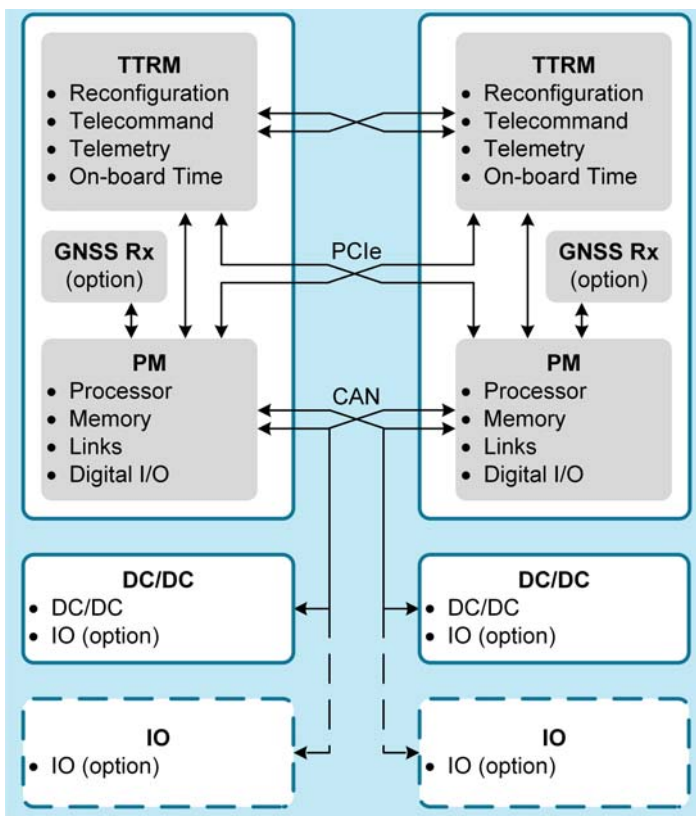
- Integrated software development environment
- Advanced software debug tool chain
- Fast Ethernet debug link
- Operating system independent boot and driver software
- Cross compiler suite
- Board support package for operating systems and hypervisors
- VxWorks
- PikeOS
- RTEMS

(Basic configuration)

Volume	292 x 85 x 256 mm <sup>3</sup> (excluding feet)
Power consumption	22 W
Mass	6.5 Kg

## ENVIRON-MENT

- Temperature -20 to +60°C
- Random vibration 15g<sub>RMS</sub>
- Shock 2000g @2000Hz



## SUPPORTED I/O OPTIONS

- Analogue TM
- Digital and Relay Status TM
- Temperature Acquisition TM
- Motor Control
- Magnetorquer Control
- Magnetometer Acquisition
- Sun Sensor Acquisition
- Digital Control Output
- Sync Pulses
- Secondary Power Supply
- Pressure Transducer Acquisition

## PROCESSING FUNCTION

- Power Architecture ©
  - 2 x e500Core @ 800 MHz
  - 3600 DMIPS
  - 1600 MFLOPS
  - 32 KB L1 instruction cache with parity
  - 32 KB L1 data cache with parity
- 512 KB L2 cache with ECC
- 1 GiB DDR3 processing memory with ECC
- 4 GB non-volatile storage with ECC

## INTEGRATED GNSS

(Optional)

- Tracks GPS L1 C/A or Galileo L1B / L1C signals and provides position, velocity and time
- Accuracy down to a maximum error of 3.5m RMS 3D with use of dynamic filtering
- Pulse Per Second (PPS) time error < 1µs RMS
- Operation with or without external LNA

## RADIATION TOLERANCE

- Total Ionising Dose (TID) allows 10 years in LEO
- All memories with ECC
- Latch-up protection

## OPTIONS

- Additional I/O
- Non-redundant unit

## RELIABILITY

- Reliability / half 800 FIT (FIDES std)
- No single-point failures
- Fully dual-redundant architecture