ICDE-NG

on board computer for multi-purpose applications

ICDE-NG (Integrated Control and Data Equipment - Next Generation) is a 32-bit based fully redundant On-Board Computer. It is composed of:

- Processor module with the ERC32 processor (up to 16 MIPS), high memory capability including in-flight programmable EEPROM,
- Telecommand/Telemetry module able to process ESA standard TC/TM packet up to 1Mbit uplink and 10Mbit downlink,
- Reconfiguration and surveillance module offering a Safeguard Memory and a Housekeeping Memory,
- I/O modules developed for sensor and actuator interfaces and communication data processing,
- Converter module offering independent power supply for all modules and up to 12 different voltages
- Optional GPS Receiver Module for LEO, MEO and GEO

The ICDE-NG provides full redundancy thanks to its internal cross strapped architecture allowing switching between individual functions or switch-over of complete computer function and offers electrical and mechanical separation of each function via its modular design.

Key Features

- Available interface designs of most European and worldwide AOCS equipment reducing design time and technical risks
- Modular box architecture enabling flexibility for I/Os and optional integration of the Airbus DS MosaicGNSS receiver into the same mechanical housing
- Long heritage in design, development, assembly, integration and verification of On Board Computers

Main application fields

- Platform or payload computer
- LEO, MEO and GEO satellite

Customers / Applications

- Galileo System Test Bed V2 (Giove-B), TerraSAR-X, Tandem-X, SEOSAR, LISA Pathfinder and ARSAT projects
- Operational in orbit on several satelittes since 2007

Budgets

- Mass   13.6 kg
- Volume   307 x 242 x 263 mm^3
- Power   35 W (with 2 redundant I/O modules)

Interfaces

- Output Data   max 48Mpix/s
- Input   PAN 1 line CCD
- Power bus   18 V - 50 V

Environments

- Thermal -25 to +50 ˚C (operational)

Performances

- Processor
- ERC32 running with 14MIPS@20Mhz
- Up to 8Mbytes of SRAM (+2Mbytes redundant)
- MIL-STD-1553B interface running at 1MHz
- Telecommand
- Receives and decodes telecommand packets in accordance to CCSDS and ESA Packet telecommand standard at up to 1Mbits
- Internal or external TC Decryption, Authentication, Pseudo-Randomizer

Telemetry
- Transmits telemetry data in accordance to CCSDS and ESA Packet Telemetry Standard up to 10Mbits
- Transfer Frame Second Header in accordance to ECSSE-50-03 Draft 1
- Direct telemetry generation
- Interface for external Encryption Unit
- Channel coding accordance to the CCSDS and ESA standard
- Reconfiguration
- Automatic reconfiguration, relay storage and alarm interface
- Housekeeping
- Up to 12.6Gbits of SDRAM EDAC and latch-up protected of telemetry memory (BOL)
- Up to 1Mbytes SRAM and 1Mbytes EEPROM EDAC protected Safeguard memory (BOL)

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ICDE architecture
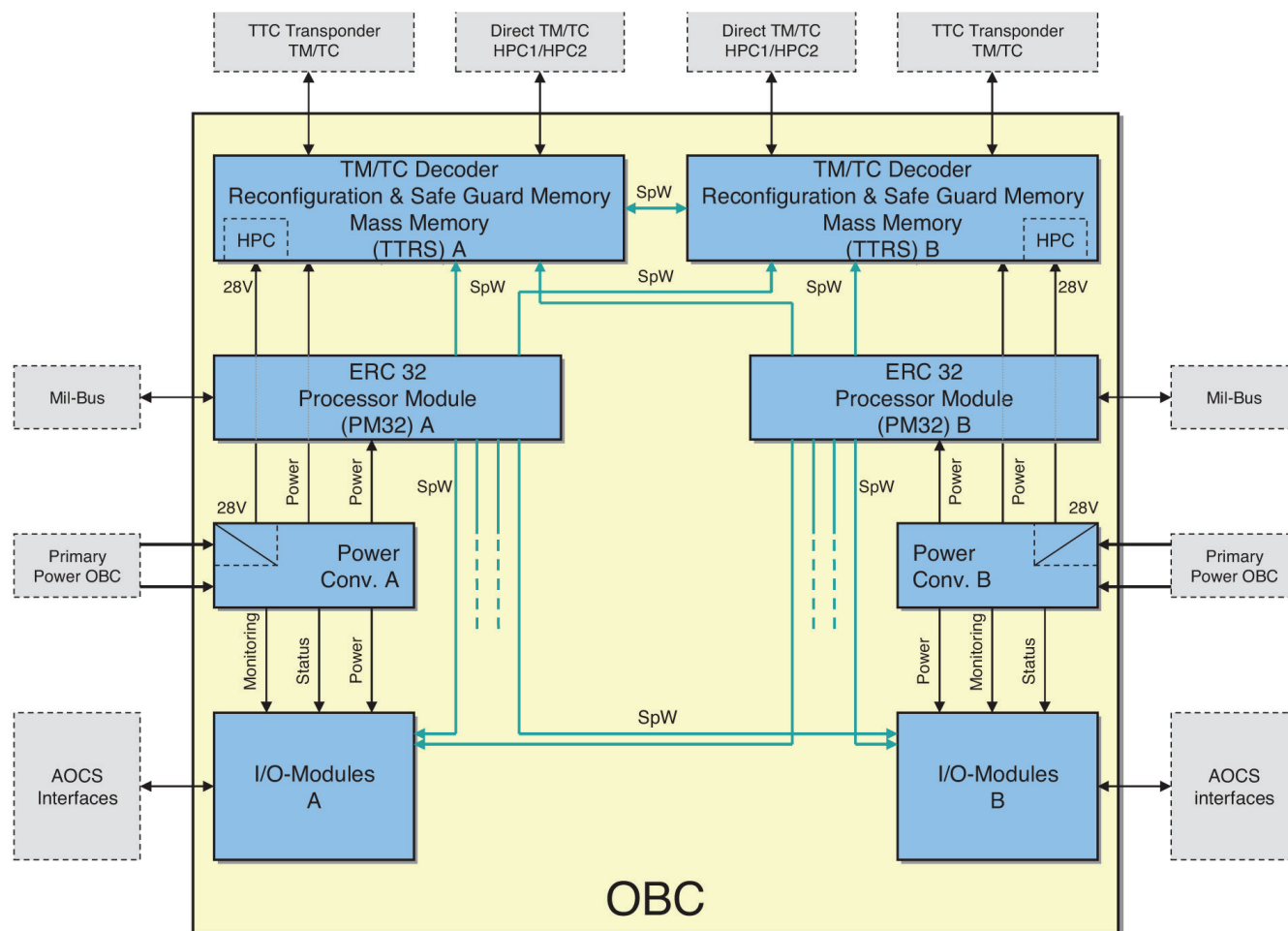
A Cross Coupling Network implementing IEEE1355/ SpaceWire links and a cross strapping network implementing general interface allow ICDE-NG internal communication between the main and redundant modules but such that the ICDE-NG control is hardware exclusive between two processor modules.

The configuration of the ICDE-NG box is such that a module is incorporated twice in order to allow full redundancy and such that the main and redundant parts of each module are separated. Hot redundant modules (such as the TTRS-NG module) are not located next to each other in order to avoid failure propagation from one critical module to another.

The ICDE-NG provides independent redundant IOM(s), which offer all interfaces between the ICDE-NG processors and the AOCS equipment. The IOM(s) provide(s) specific interfaces to the external equipment (mainly for propulsion, Solar Array Drive Mechanism and Magneto Torquer) and contain the analogue part and standard digital I/O-functions (data aquisition).