

F1 SINGLE - BOARD COMPUTER

The Voyager Versal Space Processing and Reconfigurable Computing (**F1**) card is an advanced, radiation-tolerant 3U SOSA-aligned single-board computer featuring the AMD Versal AI Core VC1902 as the main processor supported by a rad-hard monitor (RHM). The RHM provides boot and configuration support and acts as an external scrubber for the VC1902. This architecture allows F1 to robustly change configurations in-flight to support dynamic mission requirements.

RECONFIGURABLE IN FLIGHT

AI/ML + DSP

RAD-TOLERANT

APPLICATION

SOSA Aligned 3U VPX Boxes

Avionics and instrument boxes

Rapid, fast-turn space missions

SmallSat missions

Signal processing workloads for high-performance and parallel processing

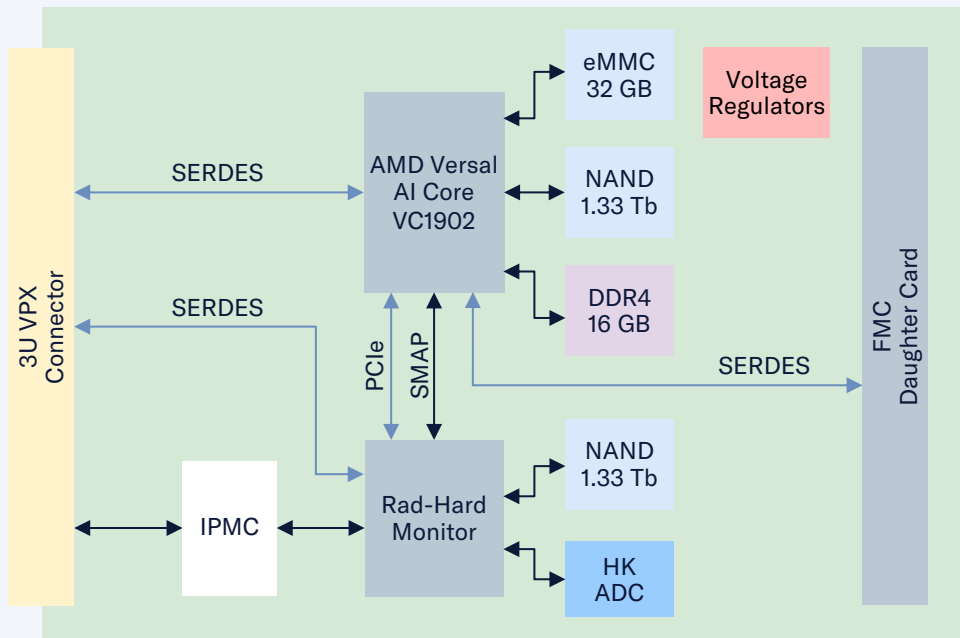


FIGURE 2 | F1 BLOCK DIAGRAM

KEY FEATURES

- SOSA Aligned:**
Single-board Computer with AMD Versal AI Core VC1902, Rad-Hard Monitor (RHM) and Intelligent Platform Management Controller (IPMC)
- High Performance :**
AI/ML and DSP processing with reconfigurable, fault-tolerant computing
- Versal AI Core Monitoring :**
With boot and configuration support via RHM
- On-board ADC :**
For voltage, temperature, and current monitoring
- Health Telemetry:**
IPMC reports health telemetry information to system manager
- Radiation-tolerant design**

PRODUCT SPECIFICATIONS

Specifications: SOSA Aligned Single Board Computer

Processors	- Dual-Core Arm-Cortex A72 Application Processing Unit at 1300 MHz - Dual-Core Arm-Cortex R5F Real-Time Processing Unit at 600 MHz
Programmable Logic	899,840 LUTs 1,799,680 Flip-Flops 191 Mb Total PL Memory
AI/ML and DSP	400 AI Engine Tiles with up to 133 INT8 TOPS or 8.3 FP32 TFLOPs 1,968 DSP Engines with up to 13.6 INT8 TOPS or 3.2 FP32 TFLOPs 100 Mb Total AI Engine Data Memory
Memory	16 GB DDR4 Memory
Non-Volatile Storage	32 GB eMMC for Versal AI Core 1.33 Tb NAND Flash for Versal AI Core 1.33 Tb NAND Flash for RHM
RHM	- Housekeeping ADC for monitoring voltage, current, and temperatures - Boot, configuration, and scrubbing support for Versal AI Core VC1902 via SelectMAP and PCIe - Power sequencing and control for Versal AI Core VC1902
IPMC	Tier 3 system-level capabilities defined under VITA 46.11
Interface Options	- FMC expansion cards available for functional expansion - Dedicated debug UART and JTAG for RHM and Versal AI Core - Data plane configurations ×10 10GBASE-KR or ×3 50GBASE-KR2 or ×2 100GBASE-KR4 and ×1 50GBASE-KR2 ×4 1000BASE-KX ×3 PCIe to backplane and ×1 PCIe to FMC ×3 SpaceWire ports ×4 GTY lanes to FMC
Form Factor	3U SOSA SpaceVPX
Estimated Max Power	0.5 W for IPMC 2.0 W for RHM 60.0 W for Versal AI Core 84.0 W total card power
Radiation Qualification	Designed to QML Class P