

G1

The Voyager G1 card is a configurable onboard radiation-tolerant edge accelerator. The 3U SOSA-aligned single-board computer features a Teledyne LS1046A processor and AMD Kintex UltraScale KU040 FPGA that are paired with an NVIDIA Jetson AGX Orin or an NVIDIA Jetson Orin Nano. Each processing element is supervised by a rad-hard monitor (RHM) which provides reliable boot and configuration scrubbing. This architecture enables designers to configure systems that ingest and process data efficiently regardless of the source or application.

SOSA-ALIGNED 3U VPX

ONBOARD AI ACCELERATION

RAD-TOLERANT

APPLICATION

SOSA Aligned 3U VPX Boxes

Space Datacenters

Rapid, fast-turn space missions

SmallSat missions

Signal processing workloads for high-performance and parallel processing

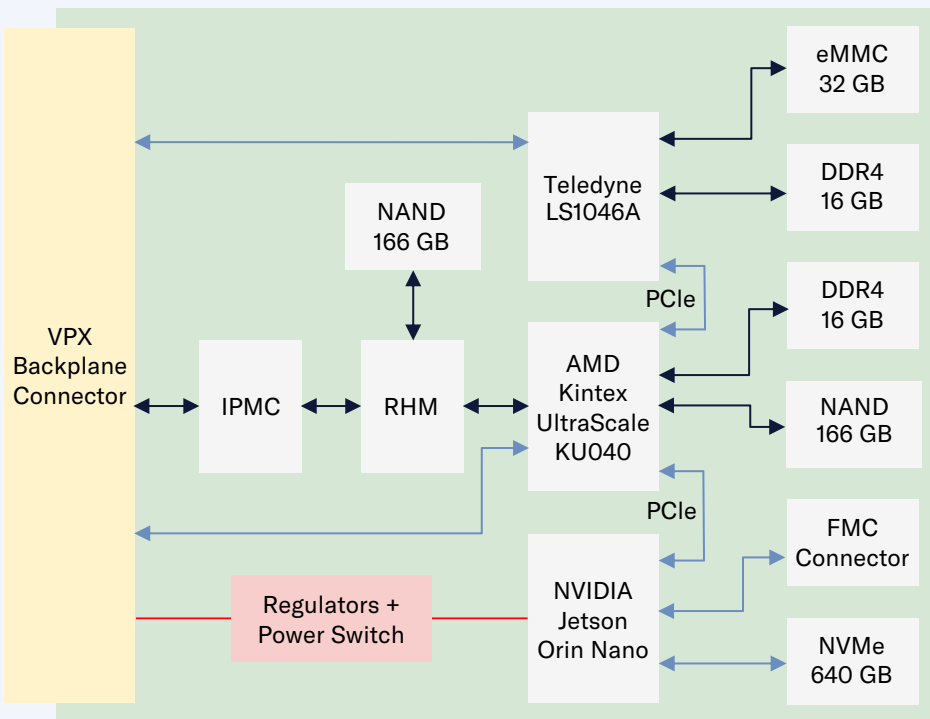


FIGURE 2 | G1 BLOCK DIAGRAM

KEY FEATURES

- SOSA Aligned:**
Single-board Computer with LS1046 CPU, KU040 FPGA, Rad-Hard Monitor (RHM), Intelligent Platform Management Controller (IPMC)
- Arm Processing:**
4x ARM A72 cores for traditional processing tasks
- Configurable AI Compute:**
Multiple configurations of GPU, tensor processors, and AI-accelerators with the same hardware
- Radiation Monitoring:**
Designed specifically for GPU
- FPGA Fabric:**
For hardware acceleration
- CPU and FGPA Monitoring:**
With boot and configuration support via RHM
- Radiation-tolerant design**
- Reusable Monitoring Architecture:**
To support other accelerators for rapid turn flight demonstrations

PRODUCT SPECIFICATIONS

Specifications: SOSA Aligned Single Board Computer

Processor	Teledyne LS1046A with Quad-Core A72 @ 1.8 GHz • 16 GB x64 DDR4 • 32 GB eMMC
FPGA	AMD Kintex UltraScale KU040 • 16 GB x64 DDR4 • 166 GB NAND Flash
GPU	NVIDIA Jetson Orin Nano or Jetson AGX Orin Industrial • 640 GB NVMe SSD
RHM	• Housekeeping ADC for monitoring voltage, current, and temperatures • Boot, configuration, and scrubbing support for CPU and FPGA via SelectMAP and PCIe • Board-level power sequencing and control
IPMC	• Tier 3 system-level capabilities defined under VITA 46.11
Interface Options	<u>Data Plane Configurations</u> • x2 10GBASE-KR (LS1046A) • x2 10GBASE-KR (KU040) <u>Control Plane Configurations</u> • x2 1GBASE-KX (LS1046A) • x2 1GBASE-KX (PolarFire SoC) • x1 SpaceWire Port (KU040) <u>Expansion Plane Configurations</u> • x2 PCIe x4 (KU040) • x2 SpaceWire Port (KU040) • FMC expansion cards available for front-panel connectors • Dedicated debug UART and JTAG for RHM, CPU, and FPGA
Form Factor	• 3U SOSA SpaceVPX • 220-mm Card Length • 1.8-inch Pitch
Estimated Max Power	• 0.5 W for IPMC • 2.0 W for RHM • 50 – 120W total card power, highly dependent on use case
Radiation Qualification	• Designed to QML Class P