



NIU3R Rugged COTS Systems

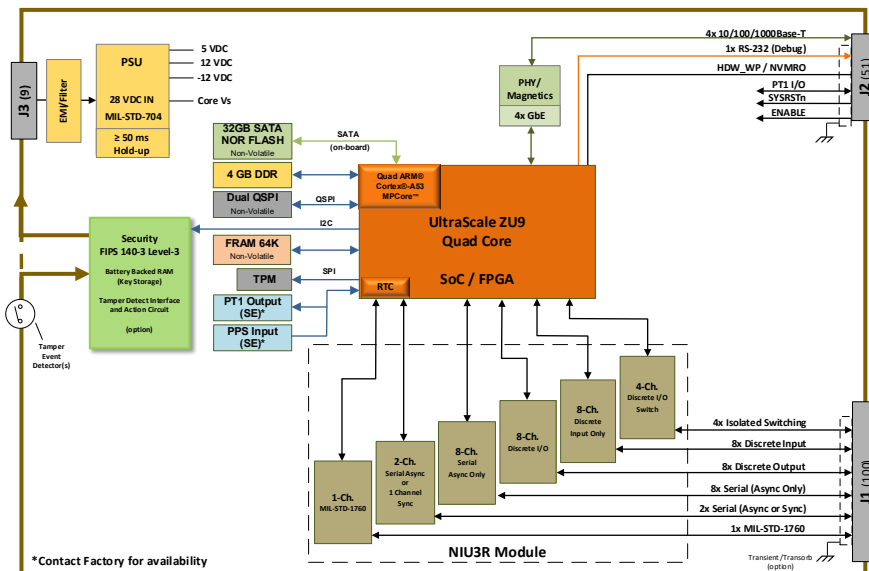
SWaP Optimized Processing, Multifunction I/O & Communications System

The NIU3R is a compact, rugged, low-power mission computer and integrated I/O system designed as a self-contained line-replaceable unit (LRU) for SWaP-constrained aerospace and defense platforms. The system integrates mission processing with a range of platform interfaces, including discrete I/O, serial communications, pulse timing resources, and Ethernet networking, within a single enclosure. Its compact, round form factor and flat interface surfaces enable efficient installation within cylindrical or space-limited vehicle structures, while eliminating the need for external expansion modules and providing an integrated deterministic control platform.

The NIU3R employs a fixed inboard I/O architecture derived from NAI's Configurable Open Systems Architecture™ (COSA®) technology, integrating proven smart-function capabilities directly onto the system electronics. This approach enables a compact and highly reliable implementation while allowing integrated functionality to be adapted for program-specific requirements where appropriate.

At the core of the system is a Xilinx Zynq® UltraScale+™ MPSoC, combining quad ARM® Cortex®-A53 processors with programmable logic resources to support deterministic interface control and real-time data processing. The device incorporates a Physically Unclonable Function (PUF) used to establish a silicon-unique hardware root-of-trust for secure system architectures.

The platform supports commercial and real-time operating environments including Wind River® VxWorks®, Wind River® Linux, Xilinx PetaLinux, and DDC-I Deos™, enabling applications such as mission computing, avionics subsystem control, embedded data acquisition, and system health monitoring.



Features

- **Integrated I/O Interfaces**
 - 16-Ch Discrete I/O (8 DI, 8 configurable DIO)
 - 4-Ch isolated discrete switching
 - 10-Ch Serial Interfaces (RS-232 / RS-422 / RS-485)
 - 8 async + 2 async (configurable as 1 sync)
 - 1-Ch MIL-STD-1760 interface
 - Pulse Timer input and output with timestamping* Differential Time Mark output*
- **Interface Connectors**
 - MIL-DTL-83513, high-density Micro-D
 - J1-Power: 9-pin
 - J2-Interface: 51-pin
 - J3-I/O: 100-pin
- **Processing & Connectivity**
 - Xilinx Zynq® UltraScale+™ ZU9 MPSoC Quad ARM® Cortex®-A53 MPCore™
 - 4 GB LPDDR4 RAM
 - 32 GB minimum SATA Flash
 - 4x 10/100/1000BASE-T Ethernet
 - 1x RS-232 debug port
- **Software OS**
 - Wind River® VxWorks® & Linux, PetaLinux, Deos (contact factory for availability)
- **Built-in Test***
 - Power-on (POST)
 - Continuous background (select functions)
- **System**
 - Self-contained rugged LRU
 - Fixed inboard I/O architecture
 - Designed for compact cylindrical packaging
- **SWaP**
 - 6 in. diameter class enclosure
 - Dimensions: 6.2" × 5.82" × 1.62"
 - Weight: ≤ 3.0 lb (1.36 kg)
 - 28 VDC input (nom); (18–36 VDC)
 - < 35 W max power
- **Compliance**
 - Designed to meet MIL-STD-704, -810, -461
 - Operating temp: -40°C to +71°C
 - Conduction-cooled
 - DO-178C / DO-254 DAL A capable*

*Designed to meet. Characterizations pending. EMI/EMC requires shielded cables and proper grounding practices. Specifications are subject to change without notice. All product and company names are trademarks or registered trademarks of their respective holders.

Architected for Versatility

NAI's Configurable Open Systems Architecture™ (COSA®) offers a choice of over 100 smart I/O, communications, or Ethernet switch functions, providing the highest packaging density and greatest flexibility of ruggedized embedded product solutions in the industry. Preexisting, fully-tested functions can be combined in an unlimited number of ways quickly and easily.

One-Source Efficiencies

Eliminate man-months of integration with a configured, field-proven system from NAI. Specification to deployment is a seamless experience as all design, state-of-the-art manufacturing, assembly and test are performed - by one trusted source. All facilities are located within the U.S. and optimized for high-mix/low volume production runs and extended lifecycle support.

Product Lifecycle Management

From design to production and beyond, NAI's product lifecycle management strategy ensures the long-term availability of COTS products through configuration management, technology refresh and obsolescence component purchase and storage.

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