

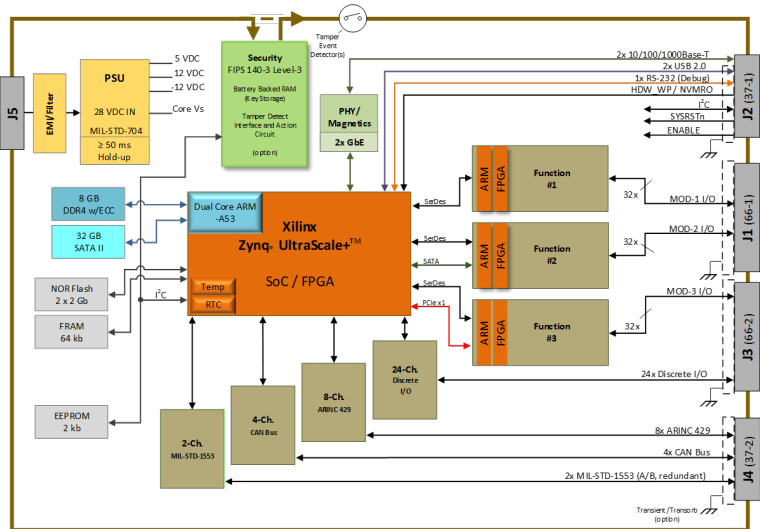


# NIU3A – Nano Interface Unit

## Rugged Embedded Multifunction I/O System with 3 Expansion COSA® Module Slots

The NIU3A is a small, rugged, low-power, self-contained multifunction I/O system preconfigured with 24-CH programmable Discrete I/O, 8-CH ARINC 429/575, 4-CH CANBus and 2-CH MIL-STD-1553 functions. The NIU3A can also be configured with up to three smart Configurable Open Systems Architecture™ (COSA®) function modules. The NIU3A boasts a Dual Core ARM A53 processor for customer application and I/O and communications management. The NIU3A is configured with two 10/100/1000Base-T (GbE) Ethernet ports and an RS-232 port for maintenance / diagnostic or configuration interface. Ideally suited for rugged Mil-Aero applications, the NIU3A delivers off-the-shelf solutions that accelerate deployment of SWaP-optimized systems in air, land and sea applications.

The NIU3A rugged multifunction I/O and communications platform provides scalable system level solutions enabling networks including on-board vehicle, marine and aircraft platforms, to field and expand digital network architectures for network-centric operations. Dual capability module slot allows for PCIe capable modules that offer support for single channel, Tri-Redundant TTE/AFDX/A664p7/Best Effort Ethernet, 2 x 10/100/1000 Base-T Ethernet or 2 Node 3 Port Firewire (IEEE 1394).



### Features

- **Preconfigured Onboard I/O Functions**
  - 24-CH Discrete I/O (Enhanced Mode Optional)
  - 8-CH ARINC 429/575
  - 4-CH CAN bus; CAN A/B 2.0, CAN-FD, ARINC-825
  - 2-CH MIL-STD-1553
- **Supports three NAI smart I/O function modules**
  - 70+ modules to choose from
  - Customer-configurable
  - COSA® architecture
- **Minimized SWaP Footprint**
  - 7.2" x 5.65" x 3.25" (est.) (incl. connectors)
  - ~5.4 lbs. (2.45 kg)
  - 28 VDC @ ~0.85 A (est.) + Module Power (5-25 W typ. operating, depending on configuration & application)
- **Xilinx Zynq UltraScale+ SoC with Dual Core ARM A53**
  - 8 GB DDR4 RAM
  - 32 GB SATA Flash
- **Connectivity**
  - 2x 10/100/1000Base-T (GbE)
  - 1x RS-232 debug port
  - 2x USB 2.0
- **Power Supply Hold-up (Optional)**
  - 50+ milliseconds of Holdup time
- **Certifiable**
  - DO-178C & DO-254 DAL A (Contact Factory)
- **Cybersecurity & Anti-Tamper**
  - FIPS-140-3 Level 3 (Contact Factory)
- **Continuous Background BIT**
- **Operating System Support**
  - Xilinx PetaLinux
  - Wind River VxWorks 7.x
  - DDC-I Deos
- **Rugged applications\***
  - MIL-STD-810
  - MIL-STD-461
  - MIL-STD-704
  - Operating temp: -40°C to +71°C
  - Conduction-cooled and Convection/Air-cooled options (contact factory)
- **Ideally suited for:**
  - Nodal Access Unit (NAU)
  - Data Concentrator Unit (DCU)
  - Remote Interface Unit (RIU)
  - Health & Usage Monitoring System (HUMS)

\*Designed to meet. Characterizations pending. EMI/EMC requires shielded cables and proper grounding practices.

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## Select up to 3 independent functions for your application

Analog & Digital I/O					
Function	Module	Description	Function	Module	Description
A/D Converter	AD1	12 Ch. $\pm 1.25$ to $\pm 10.0$ VDC FSR; 256 kHz (max), 24-bit Sigma-Delta	D/A Converter	DA1	12 Ch. $\pm 10$ VDC or $\pm 25$ mA / Ch.
	AD2	12 Ch. $\pm 12.5$ to $\pm 100.0$ VDC FSR; 256 kHz (max), 24-bit Sigma-Delta		DA2	16 Ch. $\pm 10$ VDC @ 10 mA max. / Ch.
	AD3	12 Ch. $\pm 25$ mA FSR; 24-bit 256 kHz (max), Sigma-Delta		DA3	4 Ch. $\pm 40$ VDC or $\pm 100$ mA / Ch.
	AD4	16 Ch. $\pm 1.25$ to $\pm 10.0$ VDC FSR or $\pm 25$ mA; 16-bit SAR, 8 Ch. x 2 A/D multiplexed, 400 kHz (aggregate per A/D)		DA4	4 Ch. $\pm 20$ to $\pm 80$ VDC @ $\pm 10$ mA max. / Ch.
	AD5	16 Ch. $\pm 6.25$ to $\pm 50.0$ VDC FSR; 16-bit SAR, 8 Ch. x 2 A/D multiplexed, 400 kHz (aggregate per A/D)		DA5	2 Ch. 65 VDC @ $\pm 2$ A max., external applied VCC source
	AD6	16 Ch. $\pm 12.5$ to $\pm 100.0$ VDC FSR; 16-bit SAR, 8 Ch. x 2 A/D multiplexed, 400 kHz (aggregate per A/D)	I/O Discrete	DT1	24 Ch. Discrete I/O, 0 - 60 VDC, 500 mA / Ch. max.
	ADE	16 Ch. $\pm 10$ VDC FSR; 200 kHz (max.), 16-bit SAR		DT2	16 Ch. Discrete switch, $\pm 80$ V, 625 mA / Ch. max., isolated
	ADF	16 Ch. $\pm 100$ VDC FSR; 200 kHz (max.), 16-bit SAR		DT3	4 Ch. Discrete-switch, 65 V, 2 A / Ch. as half-bridge configuration, ext. VCC or 2 Ch. $\pm 65$ V, 2 A / Ch. as full-bridge configuration, ext. VCC
	ADG	16 Ch. $\pm 25$ mA FSR; 200 kHz (max.), 16-bit SAR		DT4	24 Ch. Discrete I/O, 0 - 60 VDC, 500 mA / Ch. max., enhanced operation
	ADH	8 Ch. $\pm 100$ VDC FSR; Individual SAR (ADF-type) 8 Ch. high-current capable with external shunt		DT5	16 Ch. Discrete switch, $\pm 80$ V, 625 mA / Ch., enhanced operation
		DT6		4 Ch. Discrete-switch, 65 V, 2 A / Ch. as half-bridge configuration, ext. VCC or 2 Ch. $\pm 65$ V, 2 A / Ch. as full-bridge configuration, ext. VCC (DT3-type enhanced operation TBD/pending)	
I/O TTL/CMOS	TL1	24 Ch. 3.3V/5V tolerant, high-speed, programmable	I/O Relay	RY1	4 Ch. SPDT, 220 VDC / 250 VAC, 2 A, 60 W/62.5 VA max., non-latching
	TL2	24 Ch. 3.3V/5V tolerant, high-speed, programmable, enhanced		RY2	4 Ch. SPDT, 220 VDC / 250 VAC, 2 A, 60 W/62.5 VA max., latching
I/O Differential	DF1	16 Ch. RS-422/485 I/O transceiver			
	DF2	16 Ch. RS-422/485 I/O transceiver, enhanced			
Position, Timing, Measurement & Simulation					
Function	Module	Description	Function	Module	Description
AC Reference	AC1	1 Ch. 2-28 Vrms (LV) & 1 Ch. 28-115 Vrms (HV), programmable	SYN/RSL-to-Dig	SD1	4 Ch. 2-28 Vrms Input, 2-115 Vrms Exc, 47 Hz - 1 Hz Freq
	AC2	2 Ch. 2-28 Vrms (LV), 47 Hz -20 kHz (max. range).		SD2	4 Ch. 2-28 Vrms Input, 2-115 Vrms Exc, 1 kHz - 5 kHz Freq
	AC3	2 Ch. 28-115 Vrms (HV), 47 Hz - 2.5 kHz (max. range)		SD3	4 Ch. 2-28 Vrms Input, 2-115 Vrms Exc, 5 kHz - 10 kHz Freq
Thermocouple (Measure)	TC1	8 Ch. Thermocouple, J, K, T, E, N, B, R, S, and Low-voltage A/D		SD4	4 Ch. 2-28 Vrms Input, 2-115 Vrms Exc, 10 kHz - 20 kHz Freq
	TR1	8 Ch. RTD (RT1-type) or Thermocouple (TC1-type), programmable per Ch.		SD5	4 Ch. 28-90 Vrms Input, 2-115 Vrms Exc, 47 Hz - 1 kHz Freq
GPS	GP1	Multi-Ch. (satellite) GPS & IRIG Receiver or Source; 2x wide module, Javad TR2 high-performance GPS engine	L(R)VDT-to-Dig	LD1-5	4 Ch. 2-28 Vrms Input, 2-115 Vrms Exc (47 Hz - 20 kHz Freq. and 2-90 Vrms ranges, reference detailed specifications)
	GP2	Multi-Ch. (satellite) GPS & IRIG Receiver or Source; 1x wide module, uBlox Neo GPS engine		Dig-to-SYN/RSL Dig-to-L(R)VDT	DSx / DRx DLx
IRIG	RG1	1 Ch. IRIG Receiver or Source, digital & analog w/ master timer	Chip Detect	CD1	Six (6) chip detection and burn channels
Strain Gauge	SG1	4 Ch. Strain Gauge, full-bridge measurement	Variable Reluctance	VR1	8 Channels, Differential Input
Communication					
Function	Module	Description	Function	Module	Description
ARINC	AR1	12 Ch. ARINC 429/575, TX or RX	CANBus	CB1	8 Ch. CAN bus, CAN 2.0 A/B Protocol
	AR2	1 Ch. ARINC 568 (TX & RX) & 1 Ch. ARINC 579 (TX or RX)		CB2	8 Ch. CAN bus, J1939 Protocol
MIL-STD-1553	FT1, FT2, FT3	1, 2 & 4 Ch. MIL-STD-1553, Dual Redundant, XFMR-Coupled		CB3	8 Ch. CAN bus, CAN 2.0 A/B Protocol or J1939 Protocol, programmable
	FT4, FT5, FT6	1, 2 & 4 Ch. MIL-STD-1553, Dual Redundant, Direct-Coupled	Ethernet	EM1	2-Port 10/100/1000Base-T Ethernet NIC, Intel 82850, PCIe I/F to processor (local or off-board host)
	FTA, FTB, FTC	1, 2 & 4 Ch. MIL-STD-1553, Dual Redundant, XFMR-Coupled Assisted Mode Capable		ES2	16-Port 10/100/1000Base-T, managed switch, with L2/L3 Layer support 4x 10Gb Fiber Optic option, 2x wide module
	FTD, FTE, FTF	1, 2 & 4 Ch. MIL-STD-1553, Dual Redundant, Direct-Coupled Assisted Mode Capable	Serial	SC1	4 Ch. Serial Communications, multi-mode RS-232/422/485/423 capable, ASYNC/SYNC (S/HDL) non-isolated
	MIL-STD-1760	FTJ		1 Ch. MIL-STD-1553/1760, XFMR-Coupled	SC2
FTK		2 Ch. MIL-STD-1553/1760 XFMR-Coupled		SC3	8 Ch. Serial Communications RS-232/422/485 or GPIO, non-isolated
				SC7	4 Ch. Serial Communications, multi-mode, individual GNDs, non-isolated
Combination & Specialty					
Function	Module	Description	Function	Module	Description
Combination	CM5	2 Ch. MIL-STD-1553 & 8 Ch. ARINC 429/575	Flash	FM1	240 GB SSD, SATA II, MLC, -40° C to +85° C
	CM8	2 Ch. MIL-STD-1553 & 12 Ch. Discrete I/O		FM2	480 GB SSD, SATA II, MLC, -40° C to +85° C
				FM4	128 GB SSD, SATA II, SLC, -40° C to +85° C
				FM5	256 GB SSD, SATA II, SLC, -40° C to +85° C
				FM7	1 TB SSD, SATA II, TLC, 0° C to +70° C
		FM8		1 TB SSD, SATA II, TLC, -40° C to +85° C	
		FM9		2 TB SSD, SATA II, TLC, -40° C to +85° C	

### Architected for Versatility

NAI's Configurable Open Systems Architecture™ (COA<sup>®</sup>) offers a choice of over 70 smart I/O and communications options. Preexisting, fully-tested functions can be selected to quickly and easily meet system requirements. Individually dedicated I/O and communications processors allow mission computers to manage, monitor and control via single or dual Ethernet.

### Product Lifecycle Management

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

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