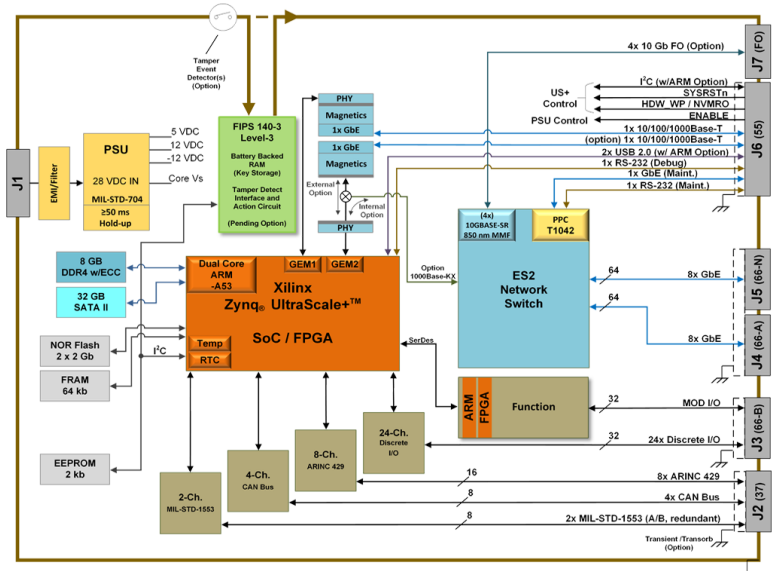


# NIU3E Rugged COTS Systems

## Rugged Embedded Multifunction I/O System with 10 GB Fiber Optic & 1 GB Copper Ethernet Switch

The NIU3E is a small, rugged, low-power, self-contained multifunction I/O processing system preconfigured with 24-CH programmable Discrete I/O, 8-CH ARINC 429/575, 4-CH CANBus and 2-CH MIL-STD-1553 functions and incorporates an Ethernet switch module that offers four (4) 10GBase-SR multimode fiber optic ports and sixteen (16) 10/100/1000Base-T Ethernet ports. The NIU3E can also be configured with one smart Configurable Open Systems Architecture™ (COSA®) function module. The NIU3E boasts a Dual or Quad Core ARM A53 processor for customer application and I/O and communications management. The NIU3E 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 NIU3E delivers off-the-shelf solutions that accelerate deployment of SWaP-optimized systems in air, land and sea applications.

The NIU3E rugged multifunction I/O and communications processing 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.



### 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 One NAI smart I/O function module**
  - 100+ modules to choose from Customer-configurable COSA® architecture
- **Minimized SWaP Footprint**
  - 7.2" x 6.6" x 3.0" (est.) (incl. connectors)
  - ~6 lbs. (2.72 kg)
  - 28 VDC @ ~0.85 A (est.)
  - + Module Power (5-25 W typ. operating, depending on configuration & application)
- **Xilinx Zynq UltraScale+ SoC with Dual/Quad Core ARM A53**
  - 8 GB DDR4 RAM
  - 32 GB SATA Flash
- **Supports ES2 Managed Switch Module**
  - 16x 10/100/1000Base-T (GbE)
  - 4x 10GBase-SR Fiber
  - 1x RS-232 debug port
- **Connectivity**
  - 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
  - Operating temp: -40°C to +71°C
  - Conduction-cooled and Convection/Air-cooled options (contact factory)

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

## Select up to 2 independent functions for your application

I/O Modules					
Function	Module	Description	Function	Module	Description
Analog-to-Digital	<u>AD1</u>	12 CH. A/D, $\pm 10$ V, Dedicated, 256 kHz (max), Sigma-Delta	Digital-to-Analog	<u>DA4</u>	4 CH. D/A, $\pm 20$ to $\pm 80$ , 10 mA, Voltage Control Only
	<u>AD2</u>	12 CH. A/D, $\pm 100$ V (max), Dedicated, 256 kHz (max), Sigma-Delta	Digital IO - Differential Transceiver	<u>DF1</u>	16 CH. Differential I/O, Input: -10 V to +10 V (422), -7 V to +12 V (485) Output: -.25 V to +5 V
	<u>AD3</u>	12 CH. A/D, $\pm 25$ mA, Dedicated, 256 kHz (max), Sigma-Delta		<u>DF2</u>	16 CH. 16 Channel Enhanced Differential I/O
	<u>AD4</u>	16 CH. A/D, $\pm 10$ V, Multiplexed, 500 KHz Agg / 8 Ch, SAR	Discrete IO - Multichannel, Programmable	<u>DT1</u>	24 CH. Discrete I/O, 0-60 VDC Input/Output, Max Iout 500 mA - 2 A, Source/Sink (out)
	<u>AD5</u>	16 CH. A/D, $\pm 50$ V, Multiplexed, 500 KHz Agg / 8 Ch, SAR		<u>DT2</u>	16 CH. Discrete I/O, $\pm 80$ V Input/Output, Max Iout 600 mA, Isolated/Ch Switch (out)
	<u>AD6</u>	16 CH. A/D, $\pm 100$ V, Multiplexed, 500 KHz Agg / 8 Ch, SAR		<u>DT3</u>	4 CH. Discrete I/O, $\pm 100$ V Input/Output, Max Iout 3A, Isolated/Ch Switch/Bridge
	<u>ADE</u>	16 CH. A/D, $\pm 10$ V, Individual 16-bit SAR, 200 kHz max., Simultaneous Sampling		<u>DT4</u>	24 CH. Enhanced DT1
	<u>ADE</u>	16 CH. A/D, $\pm 100$ V, Individual 16-bit SAR, 200 kHz max., Simultaneous Sampling		<u>DT5</u>	16 CH. Enhanced DT2
	Digital-to-Analog	<u>ADG</u>	16 CH. A/D, $\pm 25$ mA, Individual 16-bit SAR, 200 kHz max., Simultaneous Sampling	Relay	<u>RY1</u>
<u>DA1</u>		12 CH. D/A, $\pm 10$ V, 25 mA Per Channel, Current or Voltage Control	<u>RY2</u>		4 CH. Relay, 220V/2A @ 60W/62.5VA (Max), Latching
<u>DA2</u>		16 CH. D/A, $\pm 10$ V, 10 mA Per Channel, No Current Control	Digital IO - TTL, CMOS	<u>TL1</u>	24 CH. TTL I/O, Standard Functionality, Programmable
<u>DA3</u>	4 CH. D/A, $\pm 40$ V, $\pm 100$ mA, Voltage or Current Output	<u>TL2</u>		24 CH. TTL I/O, Enhanced Functionality, Programmable	
Measurement & Simulation Modules					
Function	Module	Description	Function	Module	Description
AC Reference	<u>AC2</u>	2 CH. AC Reference Source, 47 Hz - 20 KHz, $\pm 3\%$ Acc, 2 - 28 Vrms, 6 VA (Max/Ch) Power	LVDT RVDT Measurement and Simulation	<u>LD5</u>	4 CH. LVDT/RVDT to Digital, 28-90 Vrms Input, 2-115 Vrms Exc, 47 Hz - 1 KHz Freq
	<u>AC3</u>	2 CH. AC Reference Source, 47 Hz - 2.5 KHz, $\pm 3\%$ Acc, 28 - 115 Vrms, 6 VA (Max/Ch) Power		<u>RT1</u>	8 CH. Resistance Temperature Detectors (RTD), 2, 3, or 4 wire, 16 Bit Res, 16.7 Hz/Ch
Chip Detector and Fuzz Burn	<u>CD1</u>	6 CH. Chip Detector (CD) and Fuzz Burn (FB)	Thermocouple and RTD Measurement	<u>TC1</u>	8 CH. Thermocouple, 4.17 - 470 Hz, $\pm 100$ mV A/D
LVDT RVDT Measurement and Simulation	<u>LD1</u>	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 47 Hz - 1 KHz Freq		<u>TR1</u>	8 CH. Thermocouple (TCx) & Resistance Temperature Detectors (RTD), programmable per channel
	<u>LD2</u>	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 1 KHz - 5 KHz Freq	Strain Gauge Measurement	<u>SG1</u>	4 CH. Strain Gauge, 4.7 Hz - 4.8 KHz, Measurement, Conventional 4-Arm Bridge
	<u>LD3</u>	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 5 KHz - 10 KHz Freq	Variable Reluctance	<u>VR1</u>	8 CH. Variable Reluctance Signal Input and General-Purpose Pulse Counter, $\pm 100$ V, 100 kHz (max)
	<u>LD4</u>	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 10 KHz - 20 KHz Freq			

**Communication Modules**

Function	Module	Description	Function	Module	Description
ARINC Communications	<u>AR1</u>	12 CH. ARINC 429, 100 KHz or 12.5 KHz, RX/TX, 256 Word Tx/Rx Buffer	MIL-STD-1553B	<u>FTC</u>	4 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Transformer Coupled
	<u>AR2</u>	1 CH. ARINC 568 (CH-1, RX & TX) & 1 Channel ARINC 579 (CH-2, Programmable RX or TX), 1024-Word TX & RX Buffers per Ch.		<u>FTD</u>	1 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM, Direct Coupled
CANBus Communications	<u>CB1</u>	8 CH. CANBus, CAN 2.0 A/B, 16 K RX/TX Buffer, 1 Mb/s Max Data Rate		<u>FTE</u>	2 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Direct Coupled
	<u>CB2</u>	8 CH. CANBus, J1939, 16 K RX/TX Buffer, 500 kb/s Max Data Rate		<u>FTF</u>	4 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Direct Coupled
	<u>CB3</u>	8 CH. CANBus, CAN 2.0 A/B (CB1) or J1939 (CB2) protocol layer programmable per channel		MIL-STD-1760	<u>FTJ</u>
Ethernet NIC Interface	<u>EM1</u>	2 CH. Dual Ethernet I/F, Intel 82850, 10/100/1000			<u>FTK</u>
Ethernet Switch	<u>ES2</u>	16 CH. (Ports) Ethernet Switch, 10/100/1000Base-T (GbE), Layer 2+3 Managed	Serial Communications	<u>SC1</u>	4 CH. Serial, RS-232/422/423 (MIL-STD-188C)/485, Non Isolated
	<u>ES2</u>	16 CH. (Ports) Ethernet Switch, 10/100/1000Base-T (GbE), Layer 2+3 Managed		<u>SC2</u>	4 CH. Serial, RS-232/422/423 (MIL-STD-188C)/485, Isolated Per Channel and From Ground
MIL-STD-1553B	<u>FTA</u>	1 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM, Transformer Coupled		<u>SC3</u>	8 CH. (max) RS-232/422/485 Serial Comms or GPIO, Programmable, Non-isolated
	<u>FTB</u>	2 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Transformer Coupled		<u>SC7</u>	4 CH. Serial, RS-232/422/423 (MIL-STD-188C)/485, Non-Isolated w/ (4) SYS-GND pins provided

**Combination Modules**

Function	Module	Description	Function	Module	Description
Combo	<u>CM5</u>	1 CH. Combination, MIL-STD-1553 (2-Ch, redundant) & ARINC 429/575 (8-Ch), 100 KHz or 12.5 KHz, RX or TX, 256 Word Tx/Rx Buffer	Combo	<u>CM8</u>	1 CH. Combination, MIL-STD-1553 (AMC), 2-Ch. Dual-redundant & 12-Ch. Discrete I/O, 0-60 VDC Input/Output, Max Iout 500 mA - 2 A, Source/Sink (out)

**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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