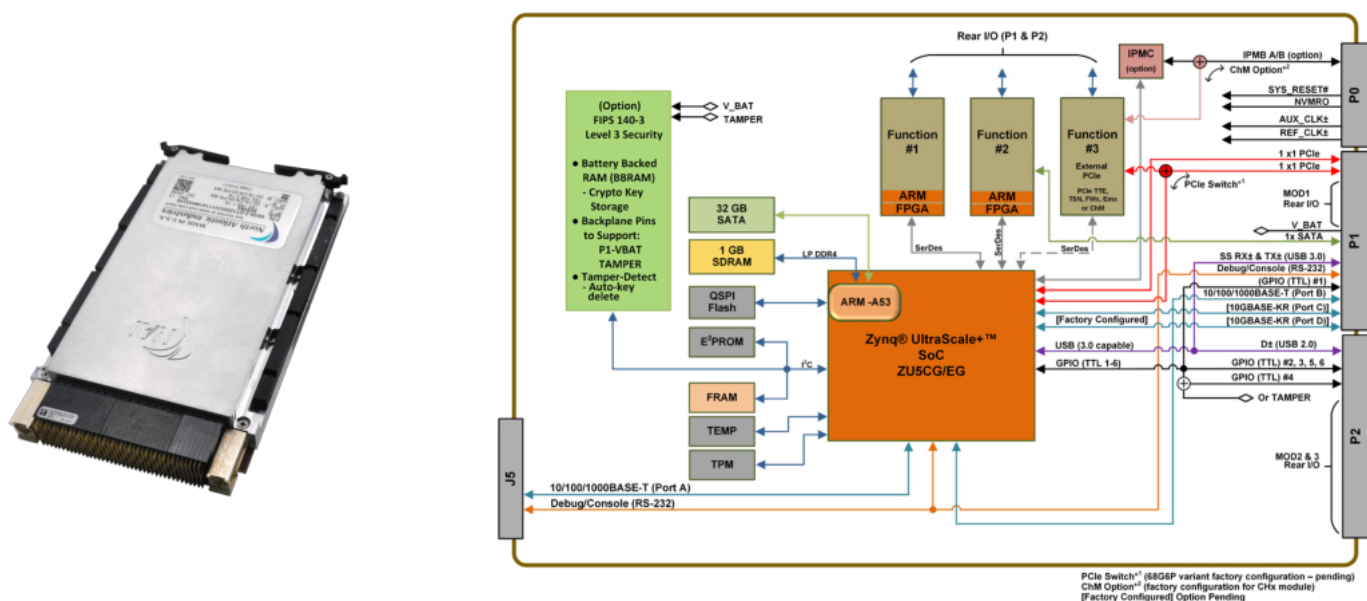




68G6 3U OpenVPX Multifunction I/O Boards

3U OpenVPX SOSA™-Aligned MFIO-Intensive Processing Board

The **68G6** is a **SOSA™-Aligned** 3U OpenVPX board that can be configured with up to three NAI smart I/O and communication function modules. In addition to the standard expansion plane (EP) PCIe and control plane (CP) Ethernet control interfaces, the 68G6 facilitates convenient external access to supported NAI PCIe function modules through its 1 x1 PCIe interface, enabling seamless expansion of host SBC functions for enhanced project solutions, while also offering external access to supported NAI FMx modules via a SATA II interface. The 68G6 is on NAI's certifiable product development roadmap supporting DO-178C and DO-254 design assurance guidelines for safety-critical applications. Ideally suited for rugged Mil-Aero applications, the 68G6 delivers off-the-shelf solutions that accelerate deployment of SWaP-optimized systems in air, land and sea applications.



Features

- **3U SOSA™-Aligned/VITA 65 OpenVPX Profile**
 - SLT3-PAY-2U2U-14.2.17
 - MODA3p-16.2.16-1-F2C-(P3U)(2E7)
- **Data and Control Interfaces**
 - Expansion Plane (P1):
 - 1 x1 PCIe Gen 3 (EPutp01, wafer 1) (for motherboard/modules)
 - Endpoint default, Root Complex optional
 - 1 x1 PCIe Gen 3 (EPutp02, wafer 2) (for module 3, direct external PCIe interface OR 2nd PCIe x1 motherboard control, pending)
 - Control Plane (P1) (TSN Planned):
 - 2x 10GBase-KR
- **IPMC Support (configured option)**
 - VITA 46.11 Tier-2 basic compatible
- **Advanced Security Options**
 - FIPS 140-3 Layer 3 Hardware Support, Secure Boot
- **Dual or Quad Core ARM -53 Endpoint w/Local Processing (Root Complex, Optional)**
 - 1.2 GHz (max)
 - 1 GB LPDDR4 & 32 GB SATA Flash
- **Supports Three NAI smart I/O function modules**
 - SerDes interface to function module slots 1, 2 or 3
 - Independent external 1 x1 PCIe interface to function module slot 3 - 68G6P variant board; for use with modules requiring high-speed routing including Ethernet and chassis management [CH1] functions (pending option with 2nd PCIe x1 control lane on EPutp02)
 - Independent external SATA interface to function module slot 2
- **Continuous background Built-In Test (BIT)**
 - As applicable for supported functions
- **Peripheral I/O (all I/O is rear accessed)**
 - USB 3.0, 6x TTL GPIO, RS-232 Debug/Console
- **Software Support Kit (SSK)**
 - API libraries, documentation, sample and source code
 - RTOS support for DDCI-Deos™, Wind River® VxWorks® HVP, Green Hills INTEGRITY-178 tuMP (contact factory)
- **Commercial or Rugged Applications Operating Temperatures**
 - Commercial: 0°C to 70°C
 - Rugged: -40°C to 85°C
 - Conduction and air-cooled options
- **Power**
 - +12V (VS1) and +3.3_AUX only
 - <11W (est. typical), not including module power
- **Mechanical (ANSI/VITA 48.1, 48.2)**
 - 3U, 5HP/1.0" pitch (air or conduction-cooled)

Select up to 3 independent functions for your application

I/O Modules					
Function	Module	Description	Function	Module	Description
Analog-to-Digital	<u>AD1</u>	12 CH. A/D, ± 10 V, Dedicated, 256 kHz (max), Sigma-Delta	Digital-to-Analog	<u>DA5</u>	4 CH. D/A, High-Voltage/High-Current Half-Bridge (2 Channels Full-Bridge) External VCC Sourced Outputs
	<u>AD2</u>	12 CH. A/D, ± 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>AD4</u>	16 CH. A/D, ± 10 V, Multiplexed, 500 KHz Agg / 8 Ch, SAR		<u>DF2</u>	16 CH. 16 Channel Enhanced Differential I/O
	<u>AD5</u>	16 CH. A/D, ± 50 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>AD6</u>	16 CH. A/D, ± 100 V, Multiplexed, 500 KHz Agg / 8 Ch, SAR		<u>DT2</u>	16 CH. Discrete I/O, ± 80 V Input/Output, Max Iout 600 mA, Isolated/Ch Switch (out)
	<u>AD6</u>	16 CH. A/D, ± 10 V, Individual 16-bit SAR, 200 kHz max., Simultaneous Sampling		<u>DT4</u>	24 CH. Enhanced DT1
	<u>ADF</u>	16 CH. A/D, ± 100 V, Individual 16-bit SAR, 200 kHz max., Simultaneous Sampling		<u>DT5</u>	16 CH. Enhanced DT2
Chip Detector and Fuzz Burn	<u>CD1</u>	6 CH. Chip Detector (CD) and Fuzz Burn (FB)	Relay	<u>RY1</u>	4 CH. Relay, 220V/2A @ 60W/62.5VA (Max), Non Latching
Digital-to-Analog	<u>DA1</u>	12 CH. D/A, ± 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, ± 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, ± 40 V, ± 100 mA, Voltage or Current Output		<u>TL2</u>	24 CH. TTL I/O, Enhanced Functionality, Programmable
	<u>DA4</u>	4 CH. D/A, ± 20 to ± 80 , 10 mA, Voltage Control Only	Variable Reluctance	<u>VR1</u>	8 CH. Variable Reluctance Signal Input and General-Purpose Pulse Counter, ± 100 V, 100 kHz (max)
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	Synchro Resolver Measurement and Simulation	<u>DSx (DRx)</u>	1 - 3 CH. Digital to Synchro/Resolver, 2 - 90 VLL, 2 - 115 Vrms Exc, 47 Hz - 20 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>SDx</u>	4 CH. Synchro/Resolver to Digital, 2 - 90 Vrms Input, 2 - 115 Vrms Exc, 47 Hz to 20 kHz Freq
LVDT RVDI Measurement and Simulation	<u>DLx</u>	1 - 3 CH. Digital to LVDT/RVDI, 2 - 90 Vrms Full Scale, 2 - 115 Vrms Exc, 47 Hz - 20 kHz Freq	Pulse Timer Receiver and Generator	<u>PT1</u>	2 CH. Pulse Timer 1-PPS &/or 10 MHz Input with Multiple Outputs and 2 Channels Isolated RS-422/485 Serial Communications
	<u>LD1</u>	4 CH. LVDT/RVDI to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 47 Hz - 1 KHz Freq	Thermocouple and RTD Measurement	<u>RT1</u>	8 CH. Resistance Temperature Detectors (RTD), 2, 3, or 4 wire, 16 Bit Res, 16.7 Hz/Ch
	<u>LD2</u>	4 CH. LVDT/RVDI to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 1 KHz - 5 KHz Freq		<u>TC1</u>	8 CH. Thermocouple, 4.17 - 470 Hz, ± 100 mV A/D
	<u>LD3</u>	4 CH. LVDT/RVDI to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 5 KHz - 10 KHz Freq		<u>TR1</u>	8 CH. Thermocouple (TCx) & Resistance Temperature Detectors (RTD), programmable per channel
	<u>LD4</u>	4 CH. LVDT/RVDI to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 10 KHz - 20 KHz Freq	Strain Gauge Measurement	<u>SG1</u>	4 CH. Strain Gauge, 4.7 Hz - 4.8 KHz, Measurement, Conventional 4-Arm Bridge
	<u>LD5</u>	4 CH. LVDT/RVDI to Digital, 28-90 Vrms Input, 2-115 Vrms Exc, 47 Hz - 1 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
CANBus Communications	<u>CB1</u>	8 CH. CANBus, CAN 2.0 A/B, 16 K RX/TX Buffer, 1 Mb/s Max Data Rate (G6-M1)	Serial Communications	<u>SC3</u>	8 CH. (max) RS-232/422/485 Serial Communications or GPIO, Programmable, Non-isolated
	<u>CB2</u>	8 CH. CANBus, J1939, 16 K RX/TX Buffer, 500 kb/s Max Data Rate (G6-M1)		<u>SC5</u>	4 CH. RS-232/422/485 communications, isolated per channel and from SYS GND
	<u>CB3</u>	8 CH. CANBus, CAN 2.0 A/B (CB1) or J1939 (CB2) protocol layer programmable per channel (G6-M1)		<u>SC6</u>	4 CH. RS-232/422/485 communications, individual SYS GND provided per channel (non-isolated)
MIL-STD-1553B	<u>FTA</u>	1 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM, Transformer Coupled	Time Sensitive Networking	<u>TN1</u>	1 CH. Single Channel, Tri-Redundant Ports, TSN, IEEE 802.1AS, End Point, DornierWorks IP
	<u>FTB</u>	2 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Transformer Coupled			
Storage					
Function	Module	Description	Function	Module	Description
SATA Solid State Drive (SSD)	<u>FM2</u>	1 CH. 480 GB MLC SATA Flash, extended temp -40°C to 85°C operation	SATA Solid State Drive (SSD)	<u>FM8</u>	1 CH. 1 TB SATA TLC NAND Flash, Extended Temperature Operation
	<u>FM7</u>	1 CH. 1 TB SATA Flash, 3D NAND MLC, 0-70 °C operation		<u>FM9</u>	1 CH. 1.92 TB SATA TLC NAND Flash, Extended Temperature Operation
Combination Modules					
Function	Module	Description	Function	Module	Description
Combo	<u>CM2</u>	8 CH. ARINC 429 (100 KHz or 12.5 KHz, RX/TX, 256 Word Tx/Rx Buffer) & 12 Ch. Discrete I/O	Combo	<u>CME</u>	8 CH. ±10V A/D (ADE-type) & 8 Channels ±10V D/A (DA2-type), Combination
	<u>CM4</u>	2 CH. 4 Ch. RS-422/485 ASYNC (TX±/RX±) & 12 Channel Discrete I/O, 0-60 VDC Input/Output, Max Iout 500 mA - 2 A, Source/Sink (out)		<u>CMF</u>	8 CH. ±100V A/D (ADF-type) & 8 Channels ±10V D/A (DA2-type), Combination
	<u>CM5</u>	2 CH. Dual-redundant MIL-STD-1553 & 8 Channel ARINC 429/575, 100 KHz or 12.5 KHz, RX or TX, 256 Word Tx/Rx Buffer		<u>CMH</u>	5 CH. Serial Comms: 1 Ch. RS-232 ASYNC w/flow (TX/RX/CTS/RTS), 4 Ch. RS-422/485 ASYNC (TX±/RX±) & 6 Ch. Differential RS-422/485 I/O (DF1-type)
	<u>CM8</u>	2 CH. Dual-redundant MIL-STD-1553 & 12 Channel Discrete I/O, 0-60 VDC Input/Output, Max Iout 500 mA - 2 A, Source/Sink (out)			
Chassis Management (ChM)					
Function	Module	Description	Function	Module	Description
Chassis Management	<u>CH1</u>	1 CH. Chassis Management Controller (ChMC), VITA 61 XMC, VITA 46.11, IPMB I/F, 1000BASE-T for System Management Communications			

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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