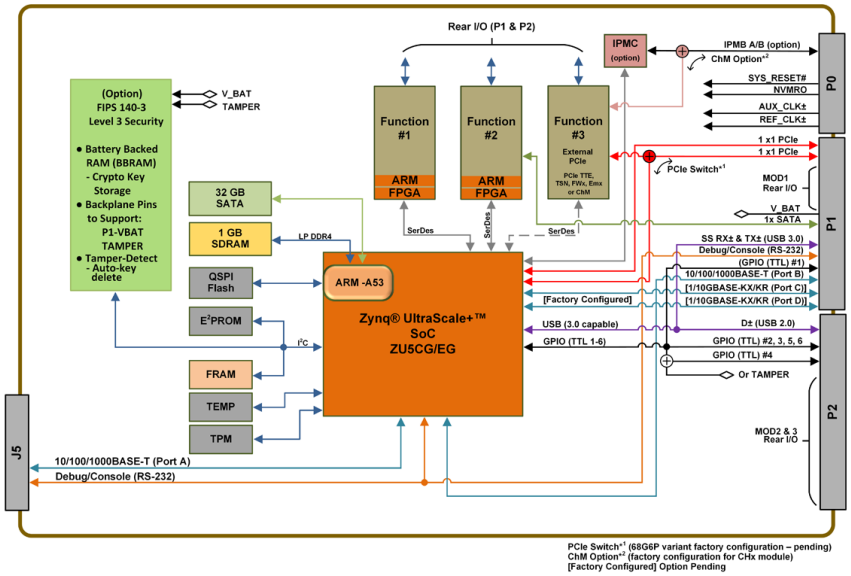
68G6 3U OpenVPX Multifunction I/O Boards

3U OpenVPX SOSA™ Aligned MFI/O-Intensive Processing Board

The **68G6** is a **SOSA™-Aligned** 3U OpenVPX SOSA-aligned 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)**
  - Up to 1.3 GHz
  - 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 Integrity-178 tuMP (contact factory)
- **Commercial or Rugged Applications Operating Temperatures**
  - Commercial: 0°C to 71°C
  - Rugged: -40°C to 85°C
  - Conduction and air-cooled options
- **Power**
  - +12V (VS1) and +3.3_AUX only
  - <20W (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
Analog-to-Digital	AD1	12 CH. A/D, ±10 V, Dedicated, 256 kHz (max), Sigma-Delta
	AD2	12 CH. A/D, ±100 V (max), Dedicated, 256 kHz (max), Sigma-Delta
	AD4	16 CH. A/D, ± 10 V, Multiplexed, 500 KHz Agg / 8 Ch, SAR
	AD5	16 CH. A/D, ± 50 V, Multiplexed, 500 KHz Agg / 8 Ch, SAR
	AD6	16 CH. A/D, ± 100 V, Multiplexed, 500 KHz Agg / 8 Ch, SAR
	ADE	16 CH. A/D, ±10 V, Individual 16-bit SAR, 200 kHz max., Simultaneous Sampling
	ADF	16 CH. A/D, ±100 V, Individual 16-bit SAR, 200 kHz max., Simultaneous Sampling
Chip Detector and Fuzz Burn	CD1	6 CH. Chip Detector (CD) and Fuzz Burn (FB)
Digital-to-Analog	DA1	12 CH. D/A, ± 10 V, 25 mA Per Channel, Current or Voltage Control
	DA2	16 CH. D/A, ± 10 V, 10 mA Per Channel, No Current Control
	DA3	4 CH. D/A, ±40 V, ±100 mA, Voltage or Current Output
	DA4	4 CH. D/A, ± 20 to ± 80, 10 mA, Voltage Control Only

Function	Module	Description
Digital-to-Analog	DA5	4 CH. D/A, High-Voltage/High-Current Half-Bridge (2 Channels Full-Bridge) External VCC Sourced Outputs
Digital IO - Differential Transceiver	DF1	16 CH. Differential I/O, Input: -10 V to +10 V (422), -7 V to +12 V (485) Output: -.25 V to +5 V
	DF2	16 CH. 16 Channel Enhanced Differential I/O
Discrete IO - Multichannel,Programmable	DT1	24 CH. Discrete I/O, 0-60 VDC Input/Output, Max Iout 500 mA - 2 A, Source/Sink (out)
	DT2	16 CH. Discrete I/O, ±80 V Input/Output, Max Iout 600 mA, Isolated/Ch Switch (out)
	DT4	24 CH. Enhanced DT1
	DT5	16 CH. Enhanced DT2
Relay	RY1	4 CH. Relay, 220V/2A @ 60W/62.5VA (Max), Non Latching
	RY2	4 CH. Relay, 220V/2A @ 60W/62.5VA (Max), Latching
Digital IO - TTL,CMOS	TL1	24 CH. TTL I/O, Standard Functionality, Programmable
	TL2	24 CH. TTL I/O, Enhanced Functionality, Programmable
Variable Reluctance	VR1	8 CH. Variable Reluctance Signal Input and General-Purpose Pulse Counter, ±100 V, 100 kHz (max)

Measurement & Simulation Modules

Function	Module	Description
AC Reference	AC2	2 CH. AC Reference Source, 47 Hz - 20 KHz, ± 3% Acc, 2 – 28 Vrms, 6 VA (Max/Ch) Power
	AC3	2 CH. AC Reference Source, 47 Hz - 2.5 KHz, ± 3% Acc, 28 – 115 Vrms, 6 VA (Max/Ch) Power
LVDT RVDT Measurement and Simulation	LD1	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 47 Hz -1 KHz Freq
	LD2	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 1 KHz - 5 KHz Freq
	LD3	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 5 KHz - 10 KHz Freq
	LD4	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 10 KHz - 20 KHz Freq

Function	Module	Description
LVDT RVDT Measurement and Simulation	LD5	4 CH. LVDT/RVDT to Digital, 28-90 Vrms Input, 2-115 Vrms Exc, 47 Hz - 1 KHz Freq
Thermocouple and RTD Measurement	RT1	8 CH. Resistance Temperature Detectors (RTD), 2, 3, or 4 wire, 16 Bit Res, 16.7 Hz/Ch
	TC1	8 CH. Thermocouple, 4.17 - 470 Hz, ±100 mV A/D
	TR1	8 CH. Thermocouple (TCx) & Resistance Temperature Detectors (RTD), programmable per channel
Strain Gauge Measurement	SG1	4 CH. Strain Gauge, 4.7 Hz - 4.8 KHz, Measurement, Conventional 4-Arm Bridge

Communication Modules

Function	Module	Description
ARINC Communications	AR1	12 CH. ARINC 429, 100 KHz or 12.5 KHz, RX/TX, 256 Word Tx/Rx Buffer
CANBus Communications	CB3	8 CH. CANBus, CAN 2.0 A/B (CB1) or J1939 (CB2) protocol layer programmable per channel
MIL-STD-1553B	FTA	1 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM, Transformer Coupled
	FTB	2 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Transformer Coupled

Function	Module	Description
MIL-STD-1553B	FTC	4 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Transformer Coupled
Serial Communications	SC3	8 CH. (max) RS-232/422/485 Serial Communications or GPIO, Programmable, Non-isolated
	SC5	4 CH. RS-232/422/485 communications, isolated per channel and from SYS GND
	SC6	4 CH. RS-232/422/485 communications, individual SYS GND provided per channel (non-isolated)

Storage					
Function	Module	Description	Function	Module	Description
SATA Solid State Drive (SSD)	FM2	1 CH. 480 GB MLC SATA Flash, extended temp -40°C to 85°C operation	SATA Solid State Drive (SSD)	FM9	1 CH. 1.92 TB SATA TLC NAND Flash, Extended Temperature Operation
	FM8	1 CH. 1 TB SATA TLC NAND Flash, Extended Temperature Operation			

Combination Modules					
Function	Module	Description	Function	Module	Description
Combo	CM5	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	Combo	CM8	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)

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.