# 68ARM1 3U OpenVPX Single Board Computers
3U OpenVPX ARM SBC with Three I/O Function Module Slots

NAI's 68ARM1 is a 3U OpenVPX ARM® Cortex®-A9 - based, Single Board Computer (SBC) that can be configured with up to three smart function modules. Ideally suited for rugged defense, commercial aerospace, and industrial applications, the 68ARM1 delivers off-the-shelf solutions that accelerate deployment of SWaP-optimized systems. The ARM® Cortex®-A9 processor is a low power, cost-sensitive, multi-core processor delivering exceptional levels of performance and power efficiency with all the functionality required in rugged, embedded SWaP-optimized programs for the Defense and Aerospace industries.

The 68ARM1 includes BSP and SSK support for Wind River®VxWorks® and for Xilinx® PetaLinux and DDC-I Deos. In addition, SSKs are supplied with source code and board-specific library I/O APIs to facilitate system integration.
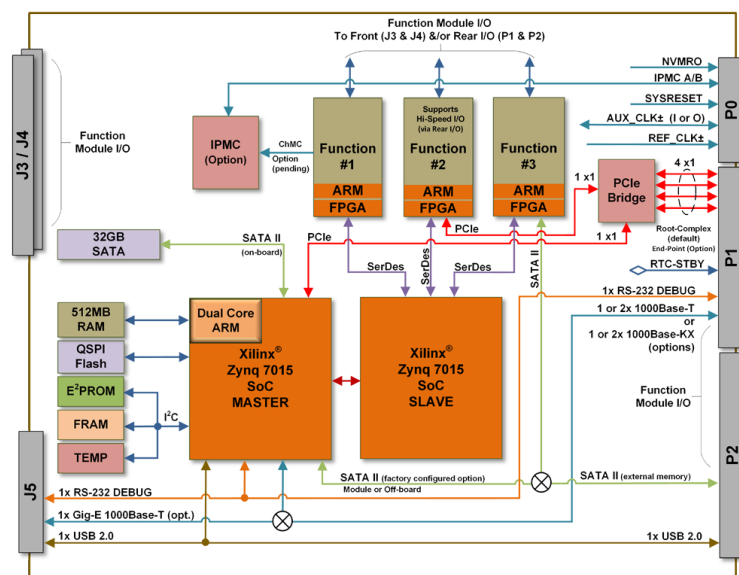
Features

- **OpenVPX™ Profile: SLT3-PAY-1F2U-14.2.12**
  - Data plane: 4x1 PCIe
  - Control plane: 2x 10/100/1000 Base-T or 2x 1000 Base-KX
- **ARM® Cortex®-A9 Dual Core 800MHz Processor**
  - 512 MB DDR3 SDRAM
  - 32 GB On-Board SATA II NAND Flash available
  - On-Board module 3 or External SATA II port access
- **< 10 W MB power dissipation**

- **Supports three NAI smart I/O function modules**
  - COSA® architecture
  - 100+ modules to choose from
  - Customer-configurable
  - Independent x1 SerDes interface to each function module slot
- **Front and/or rear I/O**
- **I²C bus to rear I/O**
- **Connectivity**
  - 2x 10/100/1000 Base-T Ethernet
    - 2 to rear or 1 to rear and 1 to front I/O; or 2x 1000Base-KX to rear I/O
  - 1x RS-232 to front or rear I/O
  - 1x USB 2.0 port to rear or front I/O

- **Operating System Support**
  - Wind River®
  - VxWorks®
  - Xilinx® PetaLinux OS
  - DDC-I Deos™
- **Commercial or rugged applications**
- **Operating temp:**
  - Commercial: 0°C to +70°C
  - Rugged: -40° C to +85° C
- **Continuous Background BIT**
- **Intelligent I/O library support included**
- **VICTORY Interface Services (Contact factory)**

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Select up to 3 independent functions for your application

I/O Modules					
Function	Module	Description	Function	Module	Description
Analog-to-Digital	AD1	12 CH. A/D, ±10 V, Dedicated, 256 kHz (max), Sigma-Delta	Digital-to-Analog	DA5	4 CH. D/A, High-Voltage/High-Current Half-Bridge (2 Channels Full-Bridge) External VCC Sourced Outputs
	AD2	12 CH. A/D, ±100 V (max), Dedicated, 256 kHz (max), Sigma-Delta	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
	AD3	12 CH. A/D, ±25 mA, Dedicated, 256 kHz (max), Sigma-Delta		DF2	16 CH. 16 Channel Enhanced Differential I/O
	AD4	16 CH. A/D, ± 10 V, Multiplexed, 500 KHz Agg / 8 Ch, SAR	Discrete IO - Multichannel,Programmable	DT1	24 CH. Discrete I/O, 0-60 VDC Input/Output, Max Iout 500 mA - 2 A, Source/Sink (out)
	AD5	16 CH. A/D, ± 50 V, Multiplexed, 500 KHz Agg / 8 Ch, SAR		DT2	16 CH. Discrete I/O, ±80 V Input/Output, Max Iout 600 mA, Isolated/Ch Switch (out)
	AD6	16 CH. A/D, ± 100 V, Multiplexed, 500 KHz Agg / 8 Ch, SAR		DT3	4 CH. Discrete Hi & Lo Side Switch Output @ 65V/2A (max), external individual supplied VCC & VSS per channel pair
	ADE	16 CH. A/D, ±10 V, Individual 16-bit SAR, 200 kHz max., Simultaneous Sampling		DT4	24 CH. Enhanced DT1
	ADF	16 CH. A/D, ±100 V, Individual 16-bit SAR, 200 kHz max., Simultaneous Sampling		DT5	16 CH. Enhanced DT2
Chip Detector and Fuzz Burn	CD1	6 CH. Chip Detector (CD) and Fuzz Burn (FB)	Relay	RY1	4 CH. Relay, 220V/2A @ 60W/62.5VA (Max), Non Latching
Digital-to-Analog	DA1	12 CH. D/A, ± 10 V, 25 mA Per Channel, Current or Voltage Control		RY2	4 CH. Relay, 220V/2A @ 60W/62.5VA (Max), Latching
	DA2	16 CH. D/A, ± 10 V, 10 mA Per Channel, No Current Control	Digital IO - TTL,CMOS	TL1	24 CH. TTL I/O, Standard Functionality, Programmable
	DA3	4 CH. D/A, ±40 V, ±100 mA, Voltage or Current Output		TL2	24 CH. TTL I/O, Enhanced Functionality, Programmable
	DA4	4 CH. D/A, ± 20 to ± 80, 10 mA, Voltage Control Only	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	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	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
	AC3	2 CH. AC Reference Source, 47 Hz - 2.5 KHz, ± 3% Acc, 28 – 115 Vrms, 6 VA (Max/Ch) Power	Synchro Resolver Measurement and Simulation	DSx (DRx)	1 - 3 CH. Digital to Synchro/Resolver, 2 - 90 VLL, 2 - 1115 Vrms Exc, 47 Hz - 20 kHz Freq
LVDT RVDT Measurement and Simulation	DLx	1 - 3 CH. Digital to LVDT/RVDT, 2 - 90 Vrms Full Scale, 2 - 115 Vrms Exc, 47 Hz - 20 kHz Freq		SDx	4 CH. Synchro/Resolver to Digital, 2 - 90 Vrms Input, 2 - 115 Vrms Exc, 47 Hz to 20 kHz Freq
	LD1	4 CH. LVDT/RVDT to Digital, 2-28 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
	LD2	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 1 KHz - 5 KHz Freq		TC1	8 CH. Thermocouple, 4.17 - 470 Hz, ±100 mV A/D
	LD3	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 5 KHz - 10 KHz Freq		TR1	8 CH. Thermocouple (TCx) & Resistance Temperature Detectors (RTD), programmable per channel
	LD4	4 CH. LVDT/RVDT to Digital, 2-28 Vrms Input, 2-115 Vrms Exc, 10 KHz - 20 KHz Freq	Strain Gauge Measurement	SG1	4 CH. Strain Gauge, 4.7 Hz - 4.8 KHz, Measurement, Conventional 4-Arm Bridge

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Communication Modules					
Function	Module	Description	Function	Module	Description
ARINC Communications	AR1	12 CH. ARINC 429, 100 KHz or 12.5 KHz, RX/TX, 256 Word Tx/Rx Buffer	MIL-STD-1553B	FTD	1 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM, Direct Coupled
	AR2	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.		FTE	2 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Direct Coupled
CANBus Communications	CB1	8 CH. CANBus, CAN 2.0 A/B, 16 K RX/TX Buffer, 1 Mb/s Max Data Rate		FTF	4 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Direct Coupled
	CB2	8 CH. CANBus, J1939, 16 K RX/TX Buffer, 500 kb/s Max Data Rate	MIL-STD-1760	FTJ	1 CH. MIL-STD-1760 (1553), BC, RT, BM, BM/RT, 128 KB RAM, Transformer Coupled
	CB3	8 CH. CANBus, CAN 2.0 A/B (CB1) or J1939 (CB2) protocol layer programmable per channel		FTK	2 CH. MIL-STD-1760 (1553), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Transformer Coupled
Ethernet NIC Interface	EM1	2 CH. Dual Ethernet I/F, Intel 82850, 10/100/1000	Serial Communications	SC1	4 CH. Serial, RS-232/422/423 (MIL-STD-188C)/485, Non Isolated
MIL-STD-1553B	FTA	1 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM, Transformer Coupled		SC3	8 CH. (max) RS-232/422/485 Serial Communications or GPIO, Programmable, Non-isolated
	FTB	2 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Transformer Coupled		SC5	4 CH. RS-232/422/485 communications, isolated per channel and from SYS GND
	FTC	4 CH. MIL-STD-1553 (AMC), BC, RT, BM, BM/RT, 128 KB RAM Per Channel, Transformer Coupled		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)	FM8	1 CH. 1 TB SATA TLC NAND Flash, Extended Temperature Operation
	FM7	1 CH. 1 TB SATA Flash, 3D NAND MLC, 0-70 °C operation		FM9	1 CH. 1.92 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.

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