Aries PC/104-Plus SBC

**PC/104-Plus SBC with Intel E3800 CPU & On-Board Data Acquisition
The Best PC/104 Bay Trail SBC in the World**

Top Side   Bottom Side (heat spreader removed to show components)
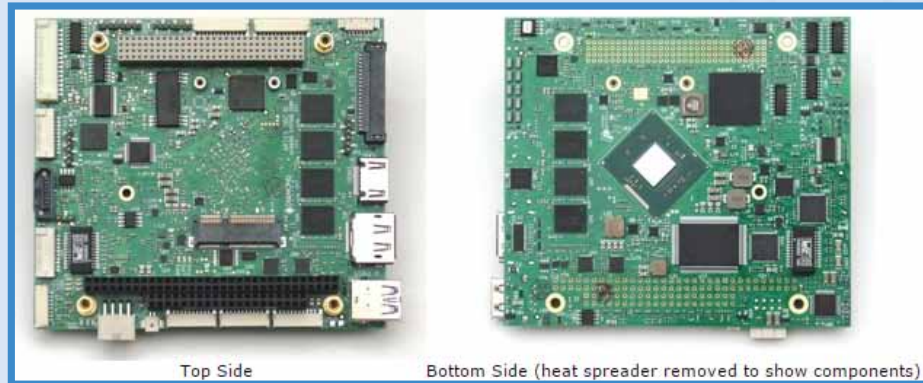
The Aries PC/104-Plus single board computer from Diamond Systems uses the Intel "Bay Trail" E3800 series processor to deliver an unmatched combination of performance, price and power consumption. Packed with real-world features, Aries provides a complete solution for most embedded applications in a single board, saving you space, time, and money.

Aries goes beyond the standard processor and I/O features found on other Bay Trail SBCs to provide rugged performance along with a professional-quality data acquisition circuit supported by industry-leading software. The full rectangular shape of Aries provides more PCB area and coastline to support the extreme level of I/O offered by the board.
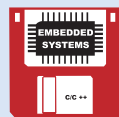
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Product Guide
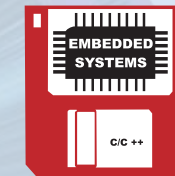
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Embedded Systems Solutions (ESS) is Diamond Systems' India partner.

ESS is proud to promote Diamond's extensive product line of compact, highly integrated single board computers (SBCs); an extensive line of expansion modules for analog and digital I/O, wired and wireless communications including multiprotocol serial ports and Ethernet switches, GPS, solid-state disk, and power supply functions; and complete, rugged, system-level solutions.

The Perfect Fit for Imperfect Environments

Aerospace & Defense

Diamond Systems is a trusted partner for aerospace/defense military customers worldwide, both government and OEMs. Diamond Systems's rugged single board computers and I/O expansion modules are deployed in numerous performance-critical aerospace and defense COTS applications around the world.

Applications include C3I, COMs on the move, data collection, precision targeting, environmental threat detection, and diagnostics. Our products can be found on the ground, in the air, and under the sea.

Wide variety of rugged, small form factor SBCs & I/O modules including industry-leading data acquisition

PCI/104-Express
PC/104-*Plus*
PC/104
COM Express
QSeven
EPIC
EBX
EMX™
ETX

Benefits for Aerospace/Defense Customers

- Designed in ruggedization, reliability, & state-of-the-art technology
- Rugged COTS boards and customized systems
- Long-term availability through extended lifecycle management
- Reduced time to market with off the shelf systems and products
- Reduced R&D costs through value added hardware and software services
- Perfect fit solutions designed to your specifications

Diamond is ISO 9000 certified and all of our products are managed with configuration control and change notification for our customers. We provide products with Class III manufacturing quality and long life for both COTS and semi-custom products, for example our COM-based SBCs ensure longevity through the use of interchangeable

Single Board Computer Product Selection Guide

Diamond Systems offers a wide variety of rugged, single board computers in a variety of small form factors, including PC/104, PC/104-*Plus*, PCI/104-Express, EMX, ETX, COM Express, EPIC, and EBX. Our products are notable for their combination of small size, ruggedness, and high degree of I/O. Virtually all of our SBCs operate over the extended temperature range of -40^0 C to +85^{0}C and either designed or qualified for MIL-STD-202 shock and vibration ratings, Diamonds invented the 2-in-1 concept of SBC + data acquisition on a single board. This 2-in-1 integration reduces the cost, size, and weight of your embedded system while increasing its ruggedness.

2-in-1 SBCs
Data acquisition and other I/O integrated on board to save space

Small Form Factor SBCs
Performance scalability, long lifecycle, and high feature density

Conduction Cooled SBCs
Higher reliability and wider operating temperature ranges

COM-Based SBCs
Performace scalability and longer product lifecycles

Product	Form Factor	Processor/ Speed	Power	Memory	Video	Audio	RS-232	RS-232/ 422/485	Ethernet	USB	DAQ	Expansion	Mass Storage	Input Voltage	Temp Range	Page No.
Altair	EMX Basic	Atom E680T / 1.6GHz	9.4W	Up to 2GB	LVDS, VGA	Yes	3	1	Gigabit	4 V2.0	No	EMX	1 SATA	5VDC	-40°C to +85°C	6
Atlas	PC/104-Express	Atom N2800 / 1.86GHz	6W	Up to 4GB	LVDS, VGA	HD	2	4	Gigabit	4 V2.0	No	PCI-104, PCIe/104	1 SATA	5VDC	-40°C to +80°C	7
Athena III	PC/104	Atom E680T / 1.6GHz Atom E640T / 1.0GHz	13W 9.4W	1GB	LVDS, VGA	HD		4	Gigabit	4 V2.0	Yes	PC/104	1 SATA	5VDC	-40°C to +80°C	5
Aurora	PC/104	Atom Z530P / 1.6GHz Atom Z510 / 1.1GHz	6W 5.4W	Up to 2GB	LVDS, VGA	Yes	2	2	Gigabit	4 V2.0	No	SUMIT-A and PC/104	1 SATA	5VDC	-40°C to +80°C	6
Helios	PC/104	Vortex86DX / 1GHz Vortex86DX / 800MHz	6W 5.4W	256MB	LVDS, VGA		2	2	10/100	4 V2.0	Yes	PC/104	1 IDE 100	5VDC	-40°C to +85°C	5
Hercules III	EBX	Atom E680T / 1.6GHz	14W	Up to 2GB	LVDS, VGA	Yes	4	2	Gigabit (2)	5 V2.0	Yes	PC/104-*Plus*	1 SATA	7-40VDC	-40°C to +85°C	5
Magellan	COM Express	Core2 Duo LV / 1.6GHz Atom Z510 / 1.1GHz	14.2W 10.3W	Up to 4GB	LVDS, VGA	Yes	2	2	Gigabit (2)	4 V2.0	No	PCI-104, SUMIT, FeaturePak	1 SATA	7-30VDC	-40°C to +85°C	8
Neptune	EPIC	Fusion G-T56N / 1.65GHz Fusion G-T40N / 1.0GHz	16.8W 12.3W	Up to 2GB	LVDS, VGA	Yes	2	4	10/100, Gigabit	4 V2.0	No	PC/104-*Plus*	2 IDE 100 1 SATA	5V, 7-28VDC	-40°C to +85°C	5
Pegasus	PC/104-*Plus*	Geode LX800 / 500MHz	5W	256MB	LVDS, VGA		1	1	10/100	4 V2.0	No	PC/104-*Plus*	1 IDE 33	5VDC	-40°C to +85°C	6
Pluto	ETX	Fusion G-T56N / 1.65GHz Fusion G-T40N / 1.0GHz	16.8W 12.3W	Up to 2GB	LVDS, VGA	Yes	3	1	10/100 (2)	4 V2.0	No	PC/104-*Plus*	1 IDE, 2 SATA	5VDC	-40°C to +85°C	8
Quantum	PCI/104-Express	i.MX6 single core / 1.0GHz i.MX6 quad core / 1.0GHz Fusion G-T40E / 1.0GHz G-Series eKabini SOC / 1.0GHz	7W 9W 10W 10W	Up to 2GB	LVDS, VGA, DDI	HD	1	2	Gigabit	5 V2.0	Yes	PCI-104, PCIe/104	1 SATA	5VDC, 6-32VDC	-20°C to +71°C	7
Rhodeus	PC/104	Geode LX800 / 500MHz	5W	Up to 1GB	LVDS, VGA		1	1	10/100	2 V2.0	No	PC/104	1 IDE 33	5VDC	-40°C to +85°C	6
Vega	EMX Basic	Intel Core i7-3517UE / 1.7GHz Intel Core i7-2610UE / 1.5GHz Intel Celeron 827E CPU / 1.4GtHz	32W 32W 28.5W	Up to 4GB	LVDS, VGA, DVI	Yes		4	Gigabit (2)	4 V2.0	Yes	EMX	1 SATA	5VDC, 7-40VDC	-40°C to +85°C	8

I/O Product Selection Guide

Diamond Systems offers an extensive line of industry-leading I/O modules in a variety of form factors. Our analog I/O boards offer unmatched flexibility due to their advanced architecture that supports the widest range of application needs. Our seriel modules offer cost-efficient solutions for extra serial ports. Our digital I/O modules include enhanced functionality including counter/timers, PWM generators, and counter-driven interrupts. All analog and digital I/O modules, as well as the data acquisition circuitry on our SBCs, is supported by our Universal Driver software for Windows and Linux that simplifies application development.

Available I/O Features
Analog I/O	CAN
Digital I/O	Relays
FPGA	Optoisolation
Serial Ports	WiFi
Ethernet	DC/DC

Form Factors
PC/104	Feature Pak
PC/104-*Plus*	EMX
PCIe/104	Sumit
PCIe MiniCard	

Data Acquisition Products

Product	Form Factor	Analog Inputs			Analog Outputs		DIO				Page No.
		Qty	Res	Sample Max	Qty	Res	Qty	Opto In	Relay Out	Counter/Timers	
DMM-32DX-AT	PC/104	32 SE, 16 DI	16-bit	250KHz	4	12-bit	24 I/O			2	11
DMM-32X-AT	PC/104	32 SE, 16 DI	16-bit	250KHz	4	12-bit	24 I/O			2	11
DMM-16-AT	PC/104	16SE, 8 DI	16-bit	100KHz	4	12-bit	8 I/O			2	11
DMM-AT	PC/104	16SE, 8 DI	12-bit	100KHz	2	12-bit	8 I/O			2	11
DMM-2000-AT	PC/104-*Plus*	32 SE, 16 DI	16-bit	Upto 2MHz	8 or 16	16-bit	19 I/O			8	10
P104-DAQ1616	EMX	16SE, 8DI	16-bit	2MHz	16	16-bit	56 I/O			2	15
FP-DAQ1616	FeaturePak	16SE, 8DI	16-bit	2MHz	16	16-bit	56 I/O			2	16
DS-MPE-DAQ0804	PCIe MiniCard	8 SE, 4 DI	16-bit	100KHz	4	16-bit	14 I/O				17
RMM-1616AP	PC/104-*Plus*				16	16-bit	48 I/O			4	14

Digital I/O Products

Product	Form Factor	DIO				Page No.
		Qty	Opto In	Relay Out	Counter/Timers	
GPIO-MM-XT	PC/104	100 I/O			10	12
Onyx-MM-XT	PC/104	48 I/O			2	12
OPMM-1616-XT	PC/104	8 I/O	16	16		12
Pearl-MM-P	PC/104	8 I/O		16		12
P104-GPIO96	PC/104-*Plus*	96 I/O			8	15
FP-GPIO96	FeaturePak	96 I/O			8	16
DS-MPE-GPIO	PCIe MiniCard	36 I/O				17

Serial I/O Products

Product	Form Factor	Serial	DIO	Page No.
		Qty	Qty	
EMM-8P-XT	PC/104	8	8 I/O	13
EMM-OPT4-XT	PC/104	4 opto	24 I/O	13
EMM-4M-XT	PC/104	4		13
EMM-8*PLUS*-XT	PC/104-*Plus*	8	8 I/O	15
EMM-8EL-XT	PCIe/104	4 or 8		13
DS-MPE-SER4M	PCIe-MiniCard	4		17
DS-MPE-SER4OPT	PCIe MiniCard	4 opto		17

Other I/O Products

Product	Form Factor	Features	Page No.
DS-MPE-CAN2L	PCIe MiniCard	Dual CAN 2.0 Ports	17
DS-MPE-GE1	PCIe MiniCard	Gigabit Ethernet Port	17
Epsilon-12G2	COM Express	Managed 14-port Gigabit Ethernet Switch	18
Epsilon-8000	PC/104	Managed 8-port Gigabit Ethernet Switch	18
EMX-ESG200	EMX	Dual Gigabit Ethernet module	16
EMX-ESG614	EMX	6 RS-232/422/485 & 14 DIO	16
MRC-424-XT	PC/104-*Plus*	Quad Ethernet and Digital I/O	15
JMM-512	PC/104	50W DC/DC Power Supply	14
JMM-LP	PC/104	25W DC/DC Power Supply	14
Janus-MM	PC/104	Dual CAN, GPS & Cellular Communications	18
Corona	PC/104	Dual Ethernet, Dual USB, Wireless	18

Ethernet Switches, WiFi, Modem and GPS

Epsilon-24000
Managed 26-Port Gigabit Ethernet Switch with wide voltage input and serial management port

Features

- 16 or 24 Gigabit Ethernet ports with non-blocking wire-speed performance
- 1 1G SFP socket; 1 2.5G SFP socket
- Built-in microcontroller for configuration and management
- RS-232 serial port provides out-of-band management interface
- Can operate autonomously or in conjunction with a host SBC
- 8K MAC addresses and 4K VLANs (IEEE 802.1Q), as well as 8K IPv4 and IPv6 multicast group support
- Jumbo frame support at all speeds
- Dual leaky bucket policers with remarking and statistics
- Flexible link aggregation support based on Layer-2 through Layer-4 information (IEEE 802.3ad)
- Multicast and broadcast storm control, as well as flooding control
- Rapid Spanning Tree protocol (RSTP) and MSTP
- 8 priorities and 8 QoS queues per port with scheduling
- Shaping/policing per queue and per port
- Multiple protocol support: IEEE 802.1d, IEEE 802.1w, IEEE 802.1s, and IEEE 802.1X
- Wide input voltage range: +5-34VDC
- Latching connectors for improved ruggedness
- PC/104 form factor module3.55" x 3.775" (90mm x 96mm)
- Extremely rugged -40ºC to +85ºC operating temperature

Epsilon-12G2
Managed 14-Port Gigabit Ethernet Switch with Dual Fibre Ports

Features

- 12 Gigabit Ethernet ports with non-blocking wire-speed performance
- 1 1G SFP socket; 1 2.5G SFP socket
- Built-in 416MHz MIPS 24KEC microcontroller for configuration and management
- RS-232 serial port provides out-of-band management interface
- Can operate autonomously or in conjunction with a host SBC
- 8K MAC addresses and 4K VLANs (IEEE 802.1Q), as well as 8K IPv4 and IPv6 multicast group support
- Jumbo frame support at all speeds
- Dual leaky bucket policers with remarking and statistics
- Flexible link aggregation support based on Layer-2 through Layer-4 information (IEEE 802.3ad)
- Multicast and broadcast storm control, as well as flooding control
- Rapid Spanning Tree protocol (RSTP) and MSTP
- 8 priorities and 8 QoS queues per port with scheduling
- Shaping/policing per queue and per port
- Multiple protocol support: IEEE 802.1d, IEEE 802.1w, IEEE 802.1s, and IEEE 802.1X
- Wide input voltage range: +5-40VDC
- Latching connectors for improved ruggedness
- COM Express form factor module(95 x 125mm)
- Extremely rugged -40ºC to +85ºC operating temperature

Janus-MM Wireless & Dual CAN Module
PC/104 I/O Module with Dual CAN Ports, GPS and Cellular Communications
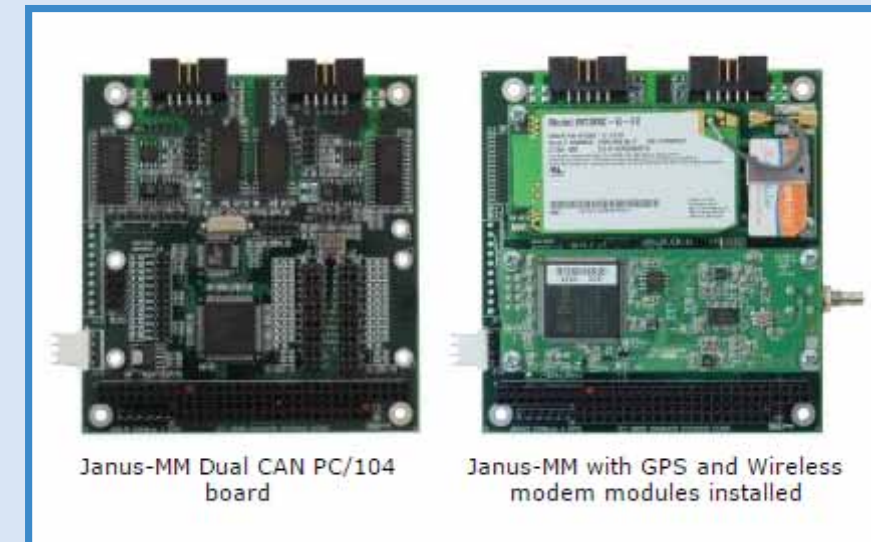
Janus-MM Dual CAN PC/104 board

Janus-MM with GPS and Wireless modem modules installed

Features

- 2-in-1 CAN + Wireless/GPS board
- Dual CAN 2.0B interface
- Philips SJA1000T controllers
- Channel-to-channel and channel-to-system isolation
- Socket for GPS receiver module
- 1 pulse per second precision output from GPS receiver
- Connector provided to supply backup power for the GPS almanac
- 0Ω jumper-bypass resistors for ruggedized applications
- PC/104 form factor
- -40ºC to +85ºC operation

Enclosures and Systems

Pandora Enclosure for Diamond SBCs
Cable-Free Enclosure For PC/104 Single Board Computers

Features

- 2-in-1 CAN + Wireless/GPS board
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Panel I/O Board

Our unique Panel I/O Board system is offered on most of our PC/104 single board computers and provides industry standard I/O connectors for the I/O, including CRT, Ethernet, USB, Serial, Parallel, PS/2, and data acquisition. Status LEDs and PC speaker are also included.

All panel I/O boards include extra built-in connectors which allows I/O from add-on PC/104 boards to be brought out to the front panel without having to customize the enclosure.

Pandora enclosures are available for these Diamond SBCs:

- Athena III PC/104 SBC
- Aurora SBC
- Helios SBC
- Rhodeus SBC

Diamond Systems in Aerospace and Defense Applications

Gunnery System for Military Vehicle Utilizes Custom Embedded SBC

A European military equipment manufacturer currently provides a weapons station control system for the U.S. Army's vehicle program. The weapons station is used to control a gunnery system from inside a moving military vehicle, which can often be traveling over rough terrain. Ease of use, high accuracy and precision, and operation in extremely harsh environments are critical performance factors of the control system.

Air-Launched Decoy Features Diamond's PC/104 and Custom Form-factor Boards

Diamond Systems provided design and manufacturing services for a total of 10 circuit boards used to control the launch and flight of the Northtrop Grumman Miniature Air-Launched Decoy (MALD), designed and built for the U.S. Air Force.

Product Ruggedization Services from DSC helps Customer Pass Harsh Environmental Requirements where Others Have Failed!

A leading Defense Contractor has developed a Weapons Station that utilizes Diamond's products and services and remotely controls light and medium caliber weapons that can be installed on any type of military vehicle.

Custom PC/104 SBC Facilitates Military Upgrade Program

A manufacturer of military vehicle sensor systems uses the Diamond Systems Prometheus PC/104 SBC board in an upgrade program that enhances the performance of the vehicle fleet.

The Prometheus CPUs are used in three separate systems within the vehicle: Navigation, stabilization, and fire control. The Prometheus includes a ZFx86 processor, Ethernet and serial ports for communications, and analog and digital I/O, all on a single board. The compact and rugged all-in-one design of Prometheus, along with its low power dissipation and extended temperature operating capability, enabled the customer to achieve their design goals in an environment with severely limited space and extreme environmental factors.

Space Shuttle Flight Demonstrates Ruggedness of PC/104 Modules

Space Shuttle Endeavor flight STS-77 contained three different experiments which utilized Diamond's Diamond-MM PC/104 analog I/O modules as part of the experiments' computer-based control systems. The extreme and harsh conditions of a rocket launch, ten days in orbit, re-entry and landing subjected the shuttle, its crew and contents to extreme ranges of temperature, shock and vibration, which required the utmost in reliability of the on-board equipment. Diamond Systems' products were up to the task.

PC/104 System Successfully Delivers in High Altitude Research Balloon Experiments

In May of 2008, a prestigious US University successfully conducted a series of research experiments as part of a NASA high altitude research balloon flight. Using a PC/104 based computer system, the University researchers conducted a series of engineering tasks over many hours and collect key science data. The NMSU PC/104 computer system was built around Diamond Systems' Athena II SBC, Emerald 8-port serial I/O module, Pearl opto-isolated relay module, and Jupiter power supply module.

Amphibious Vehicle Relies on Rugged Ethernet Switch for On-board Communications

A US prime contractor recently provided shipboard network infrastructure upgrades to the LCAC fleet of U. S. Navy amphibious vehicles for all of the networks aboard the LCAC, including navigation, control and communications. The upgraded network infrastructure had to support more distinct and redundant networks, offer increased overall data throughput, and support rigorous network security.