Aries PC/104-Plus SBC

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.

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.

Aerospace & Defense

Diamond Systems is a trusted partner for aerospace/defense military customers worldwide, both government and OEMs. Diamond System'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.

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 components.
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°C to +85°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

COM-Based SBCs
Performance scalability and longer product lifecycles

Conduction Cooled SBCs
Higher reliability and wider operating temperature ranges

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 serial 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, Optoisolation, FPGAs, Serial Ports, Ethernet, DC/DC

I/O Product Selection Guide

Form Factors
PC/104 Feature Pak
PC/104-Plus EMX Summit
PCI/104 bride MiniCard

Data Acquisition Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Form Factor</th>
<th>Analog Channels</th>
<th>Analog Output</th>
<th>DIO</th>
<th>Page No.</th>
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<tbody>
<tr>
<td>DMM-3224 AT</td>
<td>PC/104</td>
<td>32</td>
<td>1,250 µV</td>
<td>10-500 mA</td>
<td>10</td>
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<tr>
<td>DMM-3216 AT</td>
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<td>1,250 µV</td>
<td>10-500 mA</td>
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<tr>
<td>DMM-16 AT</td>
<td>PC/104</td>
<td>16</td>
<td>1,250 µV</td>
<td>10-500 mA</td>
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Digital I/O Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Form Factor</th>
<th>Serial</th>
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<tbody>
<tr>
<td>GPM-100 XT</td>
<td>PC/104</td>
<td>100 V</td>
<td>10</td>
</tr>
<tr>
<td>Opv-300 XT</td>
<td>PC/104</td>
<td>300 V</td>
<td>2</td>
</tr>
<tr>
<td>OPWM-1614 XT</td>
<td>PC/104</td>
<td>16 V</td>
<td>16</td>
</tr>
<tr>
<td>PoE-100-700</td>
<td>PC/104</td>
<td>100 V</td>
<td>16</td>
</tr>
<tr>
<td>F1X-P104-PCI</td>
<td>PC/104-PC</td>
<td>104 V</td>
<td>16</td>
</tr>
<tr>
<td>F1X-P106-PCI</td>
<td>PC/104-PCI</td>
<td>106 V</td>
<td>8</td>
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<tr>
<td>DS-MPS-104AM</td>
<td>PC/104-PCI</td>
<td>104 V</td>
<td>8</td>
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<tr>
<td>DS-MPS-204AM</td>
<td>PC/104-PCI</td>
<td>204 V</td>
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</table>

Other I/O Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Form Factor</th>
<th>Serial</th>
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</thead>
<tbody>
<tr>
<td>DS-MPS-CAN01</td>
<td>PC/104</td>
<td>Dual CAN 2.0</td>
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<tr>
<td>DS-MPS-G1</td>
<td>PC/104</td>
<td>Gigabit Ethernet Port</td>
<td>17</td>
</tr>
<tr>
<td>Equation-1202</td>
<td>PC/104</td>
<td>1202</td>
<td>18</td>
</tr>
<tr>
<td>Equation-G1</td>
<td>PC/104</td>
<td>Gigabit Ethernet Switch</td>
<td>18</td>
</tr>
<tr>
<td>Ethernet-EDX</td>
<td>PC/104</td>
<td>1000 V</td>
<td>15</td>
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<tr>
<td>EMX-ES200</td>
<td>PC/104</td>
<td>Dual Gigabit Ethernet Uplink</td>
<td>16</td>
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<td>JMM-112</td>
<td>PC/104</td>
<td>1:128</td>
<td>14</td>
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<tr>
<td>JMM-LT</td>
<td>PC/104</td>
<td>2x1600 Power Supply</td>
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</tr>
<tr>
<td>Junee-NM</td>
<td>PC/104</td>
<td>Dual CAN &amp; 485 Communications</td>
<td>18</td>
</tr>
<tr>
<td>JPA070</td>
<td>PC/104</td>
<td>Dual Ethernet &amp; USB</td>
<td>18</td>
</tr>
</tbody>
</table>
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 module: 3.55” 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
- PC/104 form factor module: 95 x 125mm
- -40ºC to +85ºC operation

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

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
- 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 support backup power for the GPS almanac
- 0Ω jumper-bypass resistors for ruggedized applications
- PC/104 form factor
- -40ºC to +85ºC operation

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
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 Northrop 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.