

I-BUS

Continuon™ Product Family

Beyond High Availability NEBS Blade Server



A Review of the Innovations by I-Bus

Designing application server blades – Industrial computing solutions for guaranteed availability - By John Chan

What is an ideal blade server system? Industry requirements

A high availability system should have the following characteristics:

- **Simplicity.** Open architecture and compliance with Federal and Telcordia generic requirements and design quality standards (Telcordia, ITU-T, UL/CSA, NEBS, etc.)
- **Density.** Highest density with smallest form factor
- **Performance.** Maximize the processor utilization and bus speed
- **Reliability.** Lowest MTBF without any single point of failure
- **Serviceability.** Lowest MTTR and ease of service and support
- **Maintainability.** Ease of use and hardware and software product upgrades
- **Scalability.** Support system growth and increasing volumes of traffic
- **Time-to-market.** Quicker
- **Total cost of ownership.** Lower

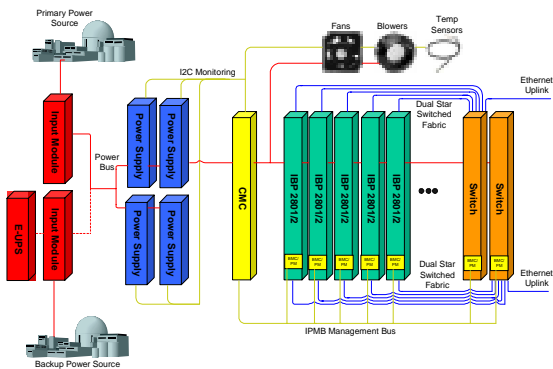


Figure 1 illustrates an ideal HA blade server system.

The I-Bus solutions

A comprehensive design of the overall application ready industrial computing platform through the use of a from-the-ground-up approach, from concept to commercialization, is a fundamentally important aspect of creating a robust high-performance and high-availability computing system capable of operating across a wide dynamic range of harsh and unforgiving environments.

The I-Bus Continuum™ family blade server product introduces a 16 blade system with dual 6U/4HP switch fabric slots. A dual star topology packet, switched backplane compliant to PICMG 2.16 and PICMG 2.9 standards with N+1 redundant – 48VDC, or 90-250VAC power subsystem together with a patented dual isolated hot-swap input modules provide a formidable HA solution. The I-Bus Continuum™ family product features a FailSafe Opticool thermal management using an I-Bus patented hot-swap redundant “push-mix-pull” cooling architecture. Continuum™ also has an optional PICMG 2.9 compliant system management module with SNMP agent support, which may be integrated in the rear to maximize the number of available I/O slots.

With 11 patent applications filed and 7 patents pending,

this new I-Bus Continuum™ product family is poised to overcome many of the industry’s toughest availability problems.

I-Bus Continuum™ family product 2801 System Master Blade

The IBC 2801 blade is fully cPSB PICMG 2.16 compatible to support Ethernet switched fabric backplane architectures. Figure 2 shows a block diagram of the IBC 2801. In addition to the compatibility of PICMG 2.1 full hot swap and PICMG 2.9 full IPMI system management, the IBC 2801 blade is a powerful, scalable, open architecture building block in a high-reliability and high-availability CompactPCI-based server blade system from I-Bus. The IBC 2801 supports dual low voltage Intel Pentium III processors, operating at 800 MHz / 933 MHz. Program and data storage needs are met with support for up to 2 Gbytes of DDR SDRAM as well as 256+ Mbytes of CompactFlash or 1 Gbyte IBM Microdrive, and a 20 Gbyte IDE hard drive on board, and/or on the IBC 2703 rear I/O transition module. Additional features include Ultra 160 SCSI with rear I/O, dual 10/100BaseTX Ethernet, 32bit / 33 MHz PMC expansion and on-board AGP Video. Also supported is the full set of standard PC peripherals including Ultra ATA/100, 1.44 Mbyte floppy, USB, RS-232 serial ports and parallel port, mouse and keyboard.

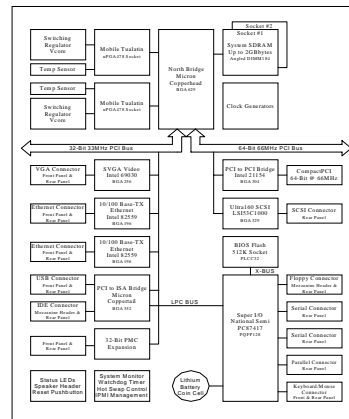


Figure 2. IBC 2801 Block Diagram

The IBC 2802 blade is identical to the IBC 2801 features set except for the additional dual Gigabit Ethernet support instead of SCSI (see block diagram in Figure 3). The 2802 blade server is fully cPSB PICMG 2.16 compatible to support Gigabit Ethernet switched fabric backplane architectures, PICMG 2.1 full hot-swap, and PICMG 2.9 full IPMI system management.

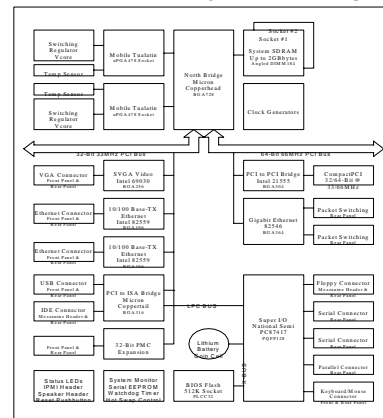


Figure 3. IBC 2802 Block Diagram

I-Bus Continuum™ 0818D Server Blade Platform

The I-Bus Continuum™ 0818D 8U rackmount network grade blade server application ready platform (see Figure 4) introduces dual star topology packet, switched backplane fully compliant to PICMG 2.16 to support Ethernet switched fabric architectures, PICMG 2.9 full IPMI system management, and PICMG 2.1 full hot-swap standards. The Continuum™ 0818D supports up to 16 blades with dual switch fabric slots and features a patented Failsafe Opticool™ with redundant “push-mix-pull” thermal management for a high density blade server in a small form factor.



Figure 4. I-Bus Continuum™ 0818D

The I-Bus Continuum™ 0818D features a patented dual isolated hot-swap 90-250VAC or –48VDC power input modules providing system independent over or under voltage protection. Continuum™ 0818D is also available with a patented optional non-disruptive field upgradeable embedded “Zero U” UPS backup for orderly shut-down or event ride-through, and a patented cable management for ease of use and management.

By combining CompactPCI technology, packet switch backplane, and IP switch routing into a single platform, the Continuum™ 0818D system platform allows OEMs and end users to reduce cabling, footprint, and power consumption in one common system management interface. Together with the IBC 2801 and IBC 2802 blade servers, the I-Bus Continuum™ 0818D server blades system allows ISP and enterprise customers to bring a new level of density and manageability to their data centers.

I-Bus CMC Chassis Management Controller and Redundant dual power input

The I-Bus Chassis Management Controller (CMC) is a rear accessible 6U x 4HP x 80mm CompactPCI rear I/O board which allows the chassis to be managed remotely with SNMP agent by system management software application (see Figure 5). The CMC monitors and/or manages the chassis power, temperature, fans, and blower speed. The I-Bus CMC features 6x I²C channels and dry contact relay outputs, it communicates with the I-Bus Baseboard Management Controller/Peripheral Management (BMC/PM) mezzanine module on each IBC 2801 or IBC 2802 server blade. The I-Bus CMC option can be mounted on the rear of Continuum™ 0818D platform to maximize the number of available I/O slots.

The I-Bus Orion Blade Server platform features a patented Redundant Isolated Power Input Architecture. It is available with redundant dual-48VDC input modules or redundant dual 90-250 VAC input modules. Continuum™ 0818D is also available with a patented optional non-disruptive field upgradeable embedded “Zero U” UPS backup for orderly shut-down or event ride-through, and a patented cable management for ease of use and management



Figure 5. I-Bus Continuum™ Enabling Technologies

I-Bus 2703 Rear I/O

The IBC 2703 is 6U CompactPCI Rear I/O transition module designed to support the rear panel I/O for the IBC 2801 and IBC 2802 CompactPCI server blades (see Figure 6 & 7). The IBC 2703 occupies a single 6U x 4HP x 80mm rear I/O slot and is designed to support the most common rear panel functions.

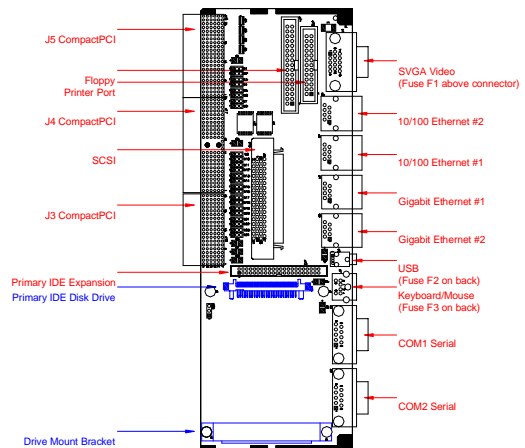


Figure 6. IBC 2703 Rear I/O Module

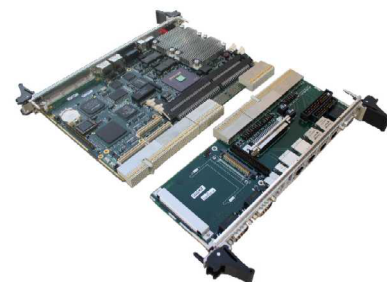


Figure 7. IBC 2703 Rear I/O w/ 2802

Continuon™ overcoming industry's most common problems

Performance

The IBC 2801 and IBC 2802 server blades feature dual 800/933 MHz Tualatin Pentium III processors, up to 2 Gbyte DDR memory, up to 40 Gbyte on-board disk storage, and a dual Gigabit Ethernet network connection. Performance data and independent benchmark test reports are available upon request.

Density

The I=Bus Continuon™ 0818D with the dual star topology packet switch backplane compliant to PICMG 2.16 and PICMG 2.9 standards can support up to 16 server blades plus dual fabric switches and a Chassis Management Controller (CMC) in an 8U network carrier grade CompactPCI chassis, including a 600W N+1 redundant power subsystem with patented dual redundant isolated power input modules and an optional "Zero U" embedded UPS.

Availability

The full hot-swap PICMG2.1 compliant Continuon™ 0818D with a dual redundant isolated power input is a stepping stone for the I-Bus next-generation Infini-Availability™ blade server platform. Continuon™ 0818D is designed to support the most common third party HA software, including but not limited to Windows 2000 Advanced Server Cluster option, GoAhead SelfReliant 7500, Continuous Computing UpSuite for Solaris and Linux, Sun Cluster, and Veritas Cluster Server, etc.

Maintainability

Both IBC 2801, IBC 2802 blade servers with BMC/PM mezzanine board are PICMG 2.9 compliant. With the I-Bus patented cable management option, the Continuon™ 0818D provide an additional manageability in term of ease of use and serviceability. The Continuon™ 0818D with a hot-swap Chassis Management Controller (CMC) which monitors all chassis functions including the health of each individual blade, backplane voltages, cooling system, power supplies, and power input modules, etc. All of the chassis management data can be reported to management utilities or to network managers such as HP open View, using SNMP.

Conclusion

The critical industry wide issues of density, performance, power, availability, maintainability, serviceability, scalability, and the total cost of ownership have been addressed in the I-Bus Continuon™ family products. As a result of advanced modular design techniques, simulation and analysis, the entire Orion product family successfully passed all rigorous tests and qualifications. The I-Bus Continuon™ product family will be officially released on February 14, 2003 with production quantities available in March 2003 to meet the industry toughest MARS requirements for use in the demanding business critical 24x7 operating environment.

There are 11 patent applications filed with seven patents pending in this new I-Bus Continuon™ product family. Not only providing the ease of management and service of a system consisting of heterogeneous types of blades, the I-Bus Continuon™ is the stepping stone to Infini-Availability™ blade server platform.

Johni Chan is President and CEO of I-Bus Corporation. Johni has more than 15 years of high-tech industry experience. He was previously President and CTO of AdStor Corporation, Vice President of Engineering at IBus/Phoenix, Director of Engineering at FORCE Computers Inc., and has held numerous senior management positions at IBM. Johni earned his B.S. from Ohio University and his M.S. and D.E. from Stanford University.



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About I-Bus:

Founded in 1982, I-Bus is a leading provider of innovative high availability embedded computing solutions, a global supplier of open-standard architecture boards and systems for communications, industrial, enterprise, and military applications.