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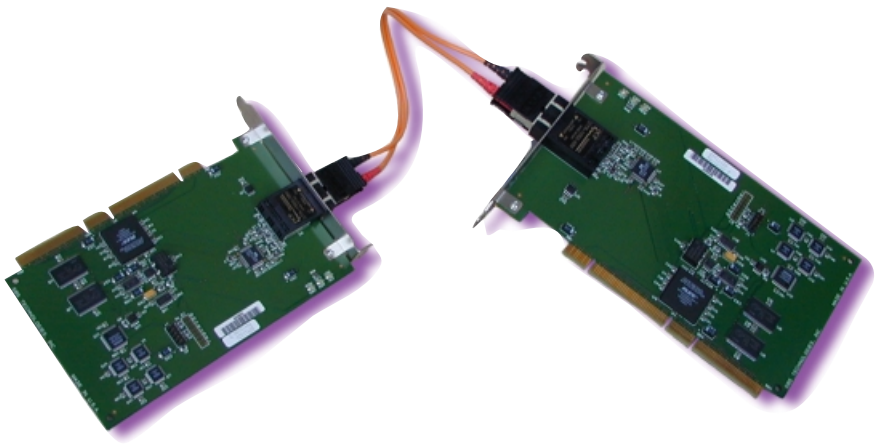
dataBLIZZARD™

Point-to-Point Systems Communication Interface

I/O & COMMUNICATIONS

Features

- 1.0625 Gb/s raw data rate
- 95 MB/s Controller Mode DMA transfer rate
- 2 µsec latency
- Drivers for most major operating systems
- PCI, CompactPCI, and PMC form factors
- Full-duplex and non-blocking link
- 64-bit / 66 MHz PCI/CompactPCI/PMC
- Universal signal voltage (5V, 3.3V)
- Supports concurrent peer-to-peer communication
- Flexible mapping of local bus address space to remote memory
- Two programmed interrupts
- Seven semaphores per card
- Data checking on the interface between cards
- 192K bytes 32-bit wide on-board memory available to user for mailbox or shared memory without accessing the remote bus
- Cable interface supports fiber-optic cable up to 500 meters



dataBLIZZARD ... Harness the power and speed of a driving blizzard to move your data fast ... when you want it moved ... to where you want it moved. Featuring a powerful integrated DMA (direct memory access) engine, SBS' dataBLIZZARD data pipe drives data between systems at exceptionally fast data transfer rates. It is the most processor efficient data mover available.

dataBLIZZARD couples software efficiency with hardware efficiency to provide you with the highest sustained transfer rates possible and it can be configured with only a few register accesses. No protocol is required. The entire data transaction can be completed without using even one remote processor cycle.

With dataBLIZZARD, the DMA transfer can be to or from any memory location in either system memory or PCI memory. The data can be contiguous or non-contiguous memory. Using dataBLIZZARD's unique mapping RAM feature, data scatter/gather of up to 16M bytes of data can be accomplished with a single DMA. No DMA chaining is required. The DMA address offset is done dynamically throughout the DMA transfer and can be unique for every 4K byte page of memory. After configuration, the DMA engine runs until the DMA is complete without requiring any further intervention from the processor. Upon completion, the processor may be notified via an interrupt.

A comprehensive suite of software drivers is provided to minimize integration time. In most cases, applications can be up and running in a few days. Drivers for Solaris™, IRIX™, Windows XP®/2000, VxWorks®, and Linux® are provided

What applications will benefit the most from dataBLIZZARD? Applications requiring large amounts of data to be transferred very quickly and efficiently and applications demanding low latency access to remote data or devices. Applications with two memories that must be closely synchronized and applications that require PCI, CompactPCI, and PMC to be integrated into one system will also benefit.

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Memory mapping

Transparent connectivity in which the address space of the destination bus appears as additional address space to the host bus is achieved via memory and I/O mapping. Mapping takes defined address ranges of unused memory on the host bus and transposes it to selected global memory address space and I/O on the destination bus. Once the mapping is created, there is no further software overhead; everything is handled by dataBLIZZARD and system hardware.

Bidirectional bus mastership in which address mapping is possible from both buses is provided by all dataBLIZZARDs. Memory mapping hardware allows discontiguous remote addresses to be mapped to contiguous local addresses.

Memory mapping uses simple C language pointers to access remote resources and any memory or I/O space address can be memory mapped.

DMA controller

DMA allows large blocks of data to be moved between the two systems at high speed with little processor overhead. The DMA engine reads data from one bus and writes data to the other bus. When the transfer is complete, dataBLIZZARD interrupts the processor.

All SBS dataBLIZZARD products have an integrated DMA engine. The DMA engine enables high-speed transfers from one system's processor or PCI memory directly into the other system's memory. Data transfer in either direction can be initiated by the local or remote processor.

dataBLIZZARD host cards incorporate scatter/gather hardware that allows contiguous data to be transferred into a discontiguous host buffer.

SBS Support Software, provided with the hardware, automatically engages the DMA engine for all reads or writes that are long enough to benefit from a DMA transfer.

Interrupts across the cable

Interrupts can be passed directly between two buses. SBS dataBLIZZARDs support two programmed interrupts that can be used to communicate between local and remote processes.

Error interrupts from invalid accesses, cable disconnects, or other service disruptions can be generated.

In addition, a DMA operation can initiate an interrupt that can be sent to the initiating side of the dataBLIZZARD when the DMA is done.

Concurrent operations

SBS dataBLIZZARDs allow either side to initiate a remote read or write without being concerned with activity occurring on the remote system. In fact, both processors can initiate a read or write to the other system at the same time. The link is full-duplex and non-blocking. This means that both transactions will complete in the fastest time possible. A DMA can also be running in the background while allowing the PIOs to complete simultaneously. DMA engine resources can be arbitrated for using the hardware semaphore included on the dataBLIZZARD card. The software driver automatically handles this arbitration.

Processor efficiency

Because dataBLIZZARDs do not require protocol stacks, they transfer data very efficiently. Remote data can be acessed directly by the processor as if it were stored in local PCI hardware memory or it can be transferred to local memory using the DMA engine. Either way, dataBLIZZARDs are designed to transfer data with minimum processor loading. Up to 16M bytes can be transferred with only eight register write commands from the processor.

Programmed Input/Output (PIO)

A region of local memory can be transparently mapped by dataBLIZZARD to memory space on the remote system. This is done transparently without any message or protocol stack required. The processor reads or writes the remote memory as if it were its own memory. The transaction takes only 2 µsec, making dataBLIZZARD ideal for deterministic, real-time applications.

Semaphores

SBS dataBLIZZARD products include semaphores to allow processes to synchronize communication between the two systems or to protect resources shared between the two systems.

Software drivers

Operating System Supported	Software Model Number
Solaris	946
IRIX	965
Windows NT/2000	983
VxWorks	993
Linux	1003

SBS has made it easy to get the software up and running; dataBLIZZARD can be integrated within a few days. Instead of providing a low level driver, we give the software engineer a simple-to-use application interface, the Mirror API. Mirror API lets applications share and access data with remote sources using simple, straightforward instructions such as *open*, *close*, *bind*, *read*, and *write*. There are about 40 Mirror API commands.

Software drivers and manuals are downloadable from the SBS web site www.sbs.com by accessing the product's web page:

1. From the SBS homepage either use the *Product Search* function -- enter the product name into the dialog box -- or use the *Quick Links* function to find a catagory of products, then select the specific product from the list displayed.
2. After accessing the correct product page, click the *Get Software* button.

Software drivers are included with SBS dataBLIZZARDs. The software provides all the tools required to access and control dataBLIZZARD hardware.

SBS drivers can be installed in both systems allowing peer-to-peer communications.

Software drivers for dataBLIZZARD allow access to system memory or PCI addresses assigned to hardware.

Software components include:

- A device driver for the operating system
- Example programs demonstrating:
  - How to map remote bus addresses into an application's memory space
  - Read and write functions
  - Requirements for sending, receiving and handling inter rupts, including programmed and error interrupts
- Tools needed for device driver installation
- Documentation

dataBLIZZARD

Specifications

Power Requirements
- Cards draw 1.5A at 5V

PCI Adapter Card
- Conforms to PCI Local Bus Specification 2.2

CompactPCI Adapter Card
- Meets PICMG 2.0 R3.0

PMC Adapter Card
- Meets IEEE 1386.1 draft 2.0

Temperature
- Operating: 0° to +60° C
- Storage: -40° to +85° C

Humidity
- 5% to 90%, non-condensing

Ordering Information

Model Number	Description
DBC0-PCI	1 PCI dataBLIZZARD card
DBC0-CPCI	1 CompactPCI dataBLIZZARD card
DBC0-PMC	1 PMC dataBLIZZARD card
DB0-CPCI-CPCI	Set of 2 CompactPCI dataBLIZZARD cards
DB0-CPCI-PMC	1 CompactPCI and 1 PMC dataBLIZZARD card
DB0-PCI-PCI	Set of 2 PCI dataBLIZZARD cards
DB0-PCI-PMC	1 PCI and 1 PMC dataBLIZZARD card
DB0-PMC-PMC	Set of 2 PMC dataBLIZZARDs
DB0-PCI-CPCI	1 PCI and 1 CompactPCI dataBLIZZARD card
Fiber-Optic Cable (one required)	
15-103	5 meter
15-101	10 meter
15-102	25 meter
15-104	50 meter
15-105	100 meter
Custom cable lengths up to 500 meters	

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