PCI-RMS Software

FEATURES

- PCI-RMS Daemon or Windows Service
- Access Library for PIO, DMA, and Memory Mapping
- Standard and Spinlock Reflective Memory
- High Performance Memory Channel
- Health Monitoring and Diagnostics
- Software Support Service

BENEFITS

- No Driver to Write
- Easy to Install and Maintain
- Flexible Programming Model
- Supports Windows XP, NT4, Linux, Solaris, and Tru64 UNIX

Overview

PCI-RMS software is available for Windows XP, Windows NT, Linux, Solaris, and Tru64 UNIX. It includes a compatible driver, Access Library, Daemon/Service for Windows, online Health Monitoring facility, and online Diagnostic.

Reflective Memory Space

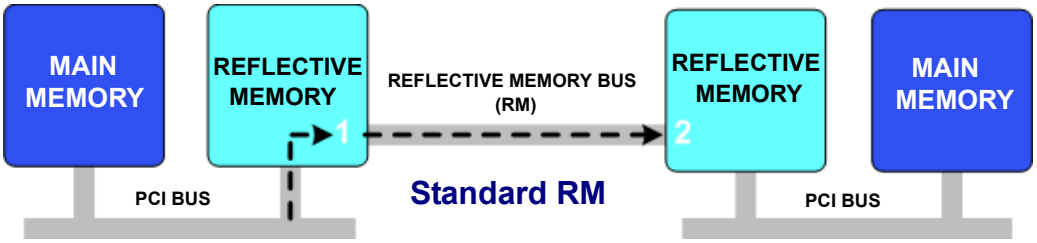
PCI-RMS supports up to 256 MB of physical memory space. This space is divided into three segments:

- Standard Reflective Memory
- Spinlock Reflective Memory
- Memory Channel

Each memory type has particular strengths and they can be used simultaneously to match the programming model desired. In each mode, block move data transfers are supported.

Standard Reflective Memory

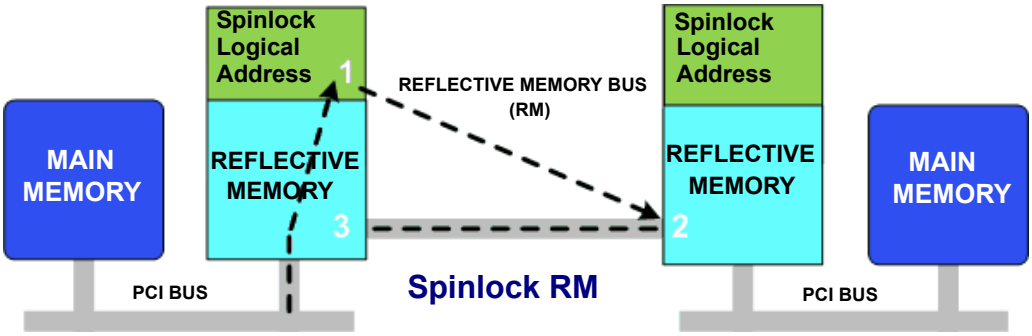
Standard Reflective Memory is an SRAM buffer located on the physical PCI-RMS circuit card. Data written into this buffer is also reflected to the Standard Reflective Memory address space on remote nodes. Standard Reflective Memory is very flexible and easy to use.



Writes into the Reflected Area are Transmitted to Other Nodes/Reflected Area.

Spinlock Reflective Memory

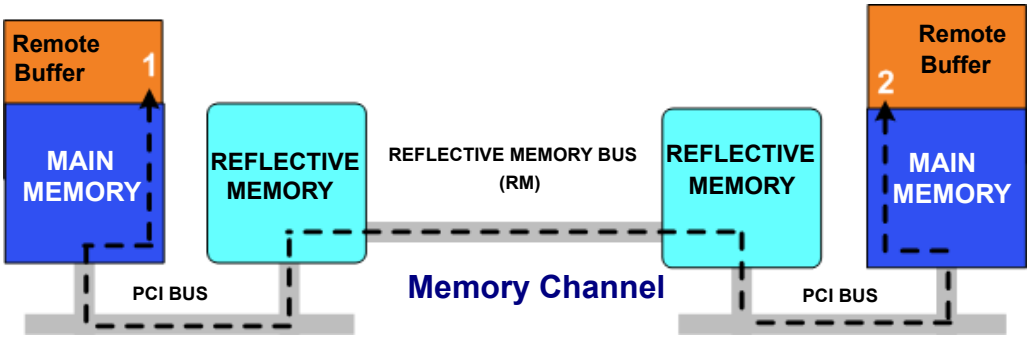
Spinlock Reflective Memory actually overlays the Standard Reflective Memory. The only difference is that the local buffer is not updated until each node in the ring receives the write request. By testing that the Spinlock write completed, the application program is assured that the message has been passed to all nodes in the ring.



Writes to Spinlock Address. Updates the Remote Reflective Address. Updates the Local Reflective Address when All Remote Node Updates are Completed.

Memory Channel

Memory Channel uses the local processor's memory instead of a buffer on the PCI-RMS circuit card. Memory Channel writes reflect through each PCI-RMS board on the ring into local processor memory on the other nodes. Memory Channel reads are fulfilled from local processor memory. Thus, reads do not require access to the PCI bus and are fully cached.



Writes to Memory Mapped Region or to Local Main Memory. Block DMA from Local Main Memory Buffer (addressable range) to Remote Main Memory (addressable range) using On-Board DMA Engine.

PCI-RMS Daemon/Windows' Service and Library

Typically, a native system device driver is required when controlling PCI devices, and writing the driver is a time intensive task. This Compro product provides a driver, an Access Library and a Daemon/Windows' service to ease the programmer's use of PCI Reflective Memory, eliminating the need to write a custom device driver.

The PCI-RMS Daemon/Windows' service initializes the Reflective Memory System (RMS) hardware. It also manages the RMS memory space by allowing static definition of named partitions.

With the Access Library, the mechanics of accessing PCI-RMS are simplified by providing high and low level RMS access functions. The high level functions use the Daemon's/Windows' named partitions while the low level routines use raw PCI addresses.

The RMS Daemon/Windows' service has two tasks:

- It configures the Reflective Memory hardware and sets up the necessary system resources. In this phase, the Daemon or Windows' service reads a file that specifies the board and partition setup parameters. It also allocates a memory buffer and programs the PCI-RMS board to reflect data into that buffer.
- It manages application access to the pre-configured Reflective Memory partitions. The Daemon or Windows' service remains active to act as an information server to user applications. A user program can query the Daemon/Windows' service for information, including the offset and size of a partition and a list of existing partitions. With this information the user application can invoke library calls to access Reflective Memory space.

The Access Library supports Programmed I/O (PIO), Memory Mapped, and Direct Memory Access (DMA) modes. All three modes can be used concurrently by the user applications.

PIO mode uses routines to read and write individual data words.

Memory Mapped mode lets an application map PCI-RMS memory into its virtual address space. Since kernel calls are not required to access memory, latency is very low. DMA mode moves blocks of data without consuming valuable CPU cycles.

DMA functions are provided to transfer data from the local processor's memory to the PCI-RMS or from PCI-RMS to a local processor's memory. This mode provides the highest throughput for moving blocks of data from one memory space to another.

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Diagnostic

The RMS Diagnostic is an online program that exercises the functionality of the driver, the Access Library, the PCI-RMS board, and the Fiber Channel ring. The diagnostic enables the operator to verify individual node and multiple node functionality. This assists the engineer in installing and verifying proper PCI-RMS operation without the need for application programs.

This feature provides an extra level of confidence for programmers that the Access Library has been installed correctly and the RMS Daemon/ Windows' service is functioning normally before attempting to execute any user developed applications.

Diagnostic Health Monitor

Compro also provides Health Monitoring software for the Linux/UNIX/ Solaris environment. The Health Daemon lets any node provide instantaneous status on its health to the PCI-RMS ring, permitting events to be logged by a Historian.

The Health Monitor provides a color representation of each node's general status and the general status of the PCI-RMS ring. The Historian keeps a running log of events detected by the Monitor and displays them for the operator to observe. The Monitor requires a Graphical User Interface (GUI) to display and operate the RMS Status and Historian. This requirement can be satisfied with either an X-Terminal or an X11 capable PC.

Summary

The PCI-RMS software support is extensive and focused on the needs of the user's operation. Compro provides performance options for the user and tools that make installation and integration a snap!

Compro also makes available for purchase several levels of hardware and software support to meet your long term logistics needs.

This set of tools combined with the PCI-RMS hardware make Real-Time clustering a reality!

Prerequisites

- Windows XP (SP2), Windows NT4, Tru64 UNIX V4.0D or later Alpha-based system, Solaris, or Linux
- Compro's PCI-RMS Board
- 8 MB Free System Memory
- Minimum 10 MB Free Disk Space