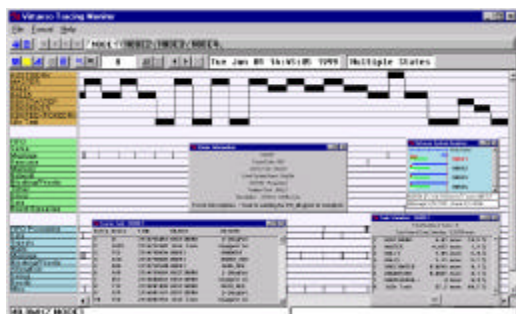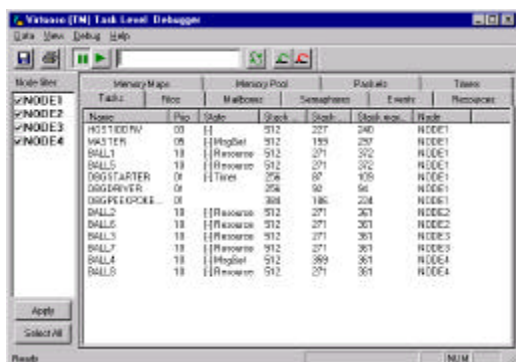# *Virtuoso v.4.1 Product Data Sheet*
Real-Time Software Development Tools for Embedded Systems

*Programming a DSP requires a deep know-how of the processor, its architecture and its instruction set.
Virtuoso™ solves most of the low level complexity by offering a solid programming framework without
compromising on the performance.*

Main Product features :

- Open four layer architecture
- Transparent parallel processing thanks to the Virtuoso's Virtual Single Processor model
- Application specific runtime generation through the use of Eonic's SoftStealth™ technology
- Advanced GUI based development and graphical debugging environment.

Architecture :

- Up to 5 levels on context on the SHARC®
- Fully scalable Application Kernel for distributed pre-emptive scheduling
- Ultra-small, ultra-fast System Kernel for low latency and small overhead
- Open support for NMI and nested interrupt handling

Application specific runtime generation

- System generation automatically removes any unused code
- Allows for a fully distributed system Overhead of < 3 K
- Typical kernel codesize < 10 K for a full system
- Allows for a better use of the fast internal memory

Transparent Parallel Processing

- Distributed semantics guarantee side-effect free programming across a parallel SHARC® DSP system
- Intelligent routing exploits parallel prioritized packet-switching for better throughput and guaranteed hard real-time behavior across large DSP networks
- User maps kernel objects at the application level, independent of the hardware topology
- Routing tables generated from topology description
- No changes to source code when remapping objects onto a different architecture

Application level microkernel services

- Most services exist in blocking, non-blocking and timed-out versions
- Group operations for Tasks and Semaphores
- Extensive task operations for easy program control
- Binary Event handling with optional Event handler function
- Counting Semaphores with select option
- FIFO's for buffered fixed-size communication
- Mailboxes for synchronous and asynchronous Rendez-Vous type of communication. Supports any datasize with cancel options
- Memory maps for fixed size protected memory
- Memory Pools for variable size protected memory

Additional runtime support

- Distributed stdio from any task in the system
- Distributed PC graphics
- Workload monitor
- Integrated netloader
- Netlink drivers for use by the VSP routing system
- Rawlink drivers for point-to-point connections
- Support for SPORT links
- High and low resolution timer support

Board Support Packages

- Virtuoso supports most commercial SHARC® boards
- Easy porting to customer specific hardware

System level nanokernel services

- Services are optimized for system level operation
- Prioritized round-robin small overhead processes
- Processes communicate with ISR or tasks through various types of channels : FIFO, Stack, Semaphore, LIFO
- Codesize < 400 instructions
- Context switch times around 500 nanoseconds (50 MHz ADSP-21060)
- Ideal for low overhead drivers and system functions

Development Support Tools

- Virtuoso brings the DSP developer a High level, but open development environment that until now was only available for general purpose processors.
- Virtuoso's Project Manager brings all Application specification together in a single access point
- Automatic code generation
- Built-in editor
- Edit-compile and run from a single window
- GUI based task level distributed debugger
- GUI based graphical distributed tracing monitor with built-in analysis features.
- Graphical distributed workload monitor
- Integration with Third Party emulator/debuggers like Visual DSP

Host System integration

- Extensive support for porting to other platforms
- Modular architecture for user specific extensions or application integration
- Development host communicates with Deployment host through proxy services

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