

HIL Simulator*

Modular Multiprocessor Real Time (RT) System

Characteristics:

- High Performance Real Time System
- Multithreaded Linux Operating System
- 2-32 Xeon Multi-Processor Architecture
- Multi-Processor Task (Hyper Threading)
- RT Optimised Encapsulated S/W Kernel
- Load and Task Balanced RT Process
- Hard Determinism I/O Allocation
- Unique System Time (RCIM, IRIG or GPS)
- High Resolution Scheduler
- Expandable I/O Process (Chassis)
- Stand-Alone Test Management System
- Main Real Time Database
- Automatic Test Process
- Integrated Real Time Test Language
- Long Term RAID System
- Integrated Online Visualisation (Labview)
- Integrated Offline Visualisation (DIAdem)
- Integrated Model Environment
- Time Partitioning Testing Platform
- High Speed Ethernet Network

* Hardware in the Loop



Figure: 19" RT Environment

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Multiprocessor architecture

The multiprocessing Real Time system concept is based on a Concurrent™ high-performance computer platform that is typically used for Real Time data acquisition, simulation, and industrial control system application. The basis for the hardware design concept is a selectable backplane form factor (VME, PCI, cPCI, PXI, VXI, etc.) or any type of bus (remote) communications protocol (CAN, MIL STD-1553, ARINC 429, AFDX, Ethernet, etc.) for required I/Os. This allows to use a wide range of different commercial off-the-shelf I/O cards which are available for the various backplane form factors. The form factors can even be mixed, e.g. VME and PCI I/O cards or attached to the same Real Time system. Thereby the Concurrent™ iHawk Real Time computer with its internal PCI-X and/or PCI-Express bus system is attached to the backplane via "bridges". That allows a flexible expansion of the system and the insertion of multiple I/O cards into the backplane.

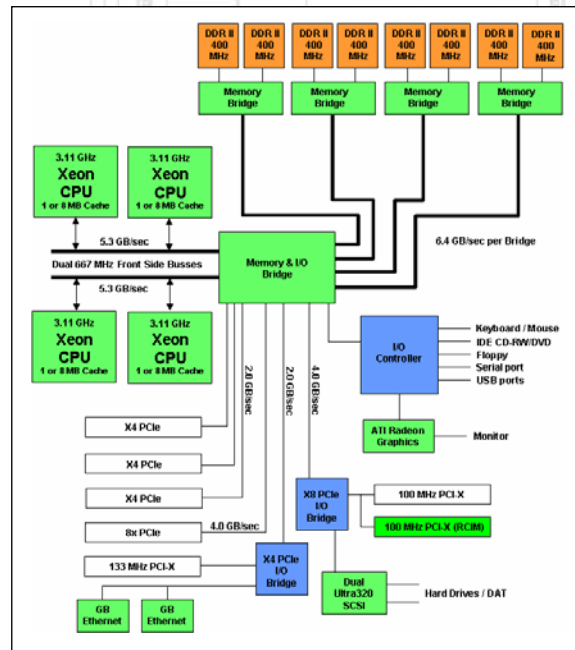


Figure: H/W Architecture of the multiprocessing Real Time System iHawk

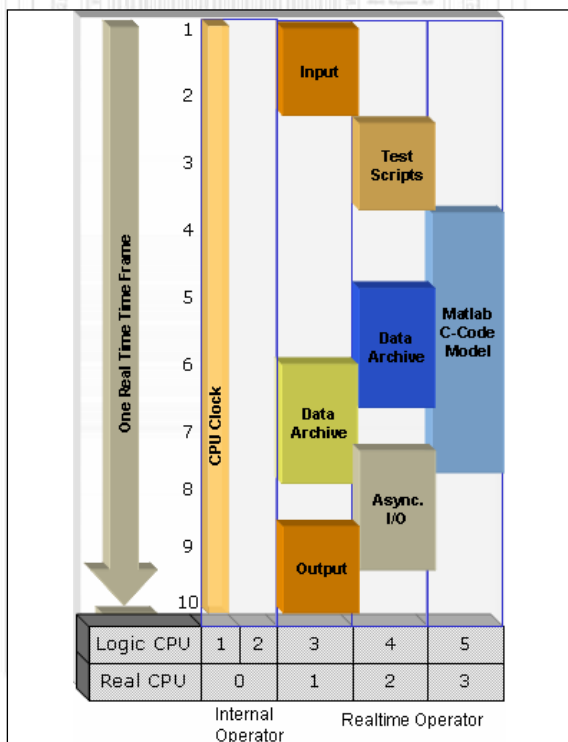


Figure: Multi-Processor Hyper-Threading

The basis for the software concept is the layer architecture with an open interface structure. Open source software like Linux with specific standard interfaces offer an effective combination of functionality and extensibility.

The main feature is a Real Time signal database, acting as the central communications platform for all relevant tasks. The database reduces the cross data transfer via special communication media and also reduces latencies in the overall system. Main emphasis is given to an uninterrupted information flow in the system. The system concept offers a great amount of configurability concerning input/output devices and internal and external cross communication.

Graphical display, control and protection software acquire data from archive files and use the test run management system information for test data evaluation. An engineering tool set comprises further applications like alarm and event generation, simulation/modelling support with (Matlab/Simulink), Real Time test definition language, adjustable frame rate scheduler, monitoring system, control logic and protection features.