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iHawk PLATFORMS

Your real-time applications demand the best.



Features

- Single, dual and quad-CPU x86 systems
- Up to 22 cores per CPU
- Up to 55 MB of cache per CPU
- Up to 768 GB of memory per system
- Rackmount, tower or desktop chassis
- Optional ruggedized packaging
- 1 Gbit and 10 Gbit Ethernet
- SATA and SAS disks and SSD drives
- Real-Time Clock & Interrupt Module
- A complete range of standard I/O cards
- High-performance PCIe x16 graphics
- Optional signal conditioning
- GPU platforms with up to 8 CUDA cards
- RedHawk™ Linux® real-time operating system
- C/C++, Fortran and Ada compilers
- NightStar™ real-time debugging and analysis tools
  - NightView source-level debugger
  - NightTrace analyzer
  - NightSim periodic scheduler
  - NightProbe data monitor
  - NightTune system and application tuner
- SIMulation Workbench™ real-time modeling environment

The iHawk™ is Concurrent's high-performance, real-time Linux-based computer platform for time-critical simulation, data acquisition and process control applications. iHawk symmetric multiprocessors feature from one to four Intel or AMD x86 processors and up to 768 GB of memory in a single rackmount or tower enclosure.

iHawk systems offer the latest processor, chipset and packaging technology. iHawk multiprocessing platforms run a single copy of Concurrent's RedHawk Linux real-time operating system. iHawk solutions are delivered fully-integrated and tested with I/O cards, peripherals, RedHawk Linux and device drivers designed to meet exact customer requirements.

Real-Time Linux Performance and Determinism

At the heart of every iHawk solution is Concurrent's RedHawk Linux real-time operating system. Compatible with the popular Red Hat® and CentOS Linux distributions, RedHawk features high I/O throughput, fast response to external events, interprocess communication and optimized NUMA memory enhancements. iHawk is the ideal Linux environment for complex real-time applications.

RedHawk Linux is based upon a multi-threaded, fully pre-emptible Linux kernel with low-latency enhancements. RedHawk's true symmetric multiprocessing support includes load-balancing and CPU shielding to maximize determinism and real-time performance in mission-critical solutions. A user-level application can be guaranteed to respond to an external event in less than 5 microseconds on certified platforms.

NightStar Debugging and Analysis Tools

Concurrent's NightStar is a powerful, integrated tool set for debugging and analyzing time-critical Linux applications. NightStar tools run with minimal intrusion, thus preserving application execution behavior and determinism. Users can quickly and easily debug, monitor, schedule, analyze and tune applications in real-time. NightStar GUI-based tools reduce test time, increase productivity and lower development costs.

Time-critical applications require debugging tools that can handle the complexities of multiple processors and cores, multi-task interaction and multi-threading. NightStar's advanced features enable system builders to solve difficult problems quickly. NightStar tools include the Night View source-level debugger, NightTrace graphical analyzer, NightProbe data monitor, NightSim cyclic scheduler and NightTune performance tuner.

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The NightTrace tool allows a user to graphically view the interaction between the Linux kernel and multiple application threads in real-time.

Real-Time Clock & Interrupt Module

The iHawk's Real-Time Clock & Interrupt Module (RCIM) is a multifunction PCIe or PCI card designed for time-critical applications that require rapid response to external events. The RCIM includes a synchronized clock readable by multiple iHawk systems, eight programmable timers, and twelve input and twelve output external interrupt lines. The RCIM is fully supported by Concurrent RedHawk Linux.

An optional, on-board GPS module is available to align the RCIM's synchronized clock to GPS standard time. One GPS-equipped RCIM can synchronize all iHawks in an RCIM chain, or multiple iHawks equipped with the GPS module can operate from a common time base without any cable connections between the systems. POSIX timers based on absolute GPS time can be used to simultaneously start the execution of programs on systems which are not physically connected.

Flexible Packaging

iHawk systems come in standard rackmount, tower and desktop enclosures with up to 18 integral PCIe slots and optional PCIe and PCI expansion chassis. For applications that require a VME I/O subsystem, PCIe-to-VME bridges and chassis are available. iHawk systems can contain up to 72 disk drives with optional RAID capability. iHawks are available with ruggedized packaging and conformal coating. iHawk systems can be interconnected using Ethernet, reflective memory or high-speed fabrics such as Infiniband.

GPU CUDA Solutions

Concurrent offers customized real-time CUDA platforms that can contain from 1 to 8 of the latest NVIDIA Tesla and graphics cards. RedHawk Linux, which includes the latest version of the CUDA SDK, features real-time CUDA optimization. RedHawk reduces the process dispatch latency of real-time processes in CUDA applications from hundreds of microseconds to under 20 microseconds. RedHawk provides better overall performance by optimizing the allocation of memory shared between the CPU and the GPUs.

SIMulation Workbench

iHawk systems support Concurrent's SIMulation Workbench (SimWB), a comprehensive framework for developing and executing real-time hardware-in-the-loop test stands and training system simulations. The SimWB real-time core is organized around a very fast memory resident database. Simulation models and I/O processes have direct access to data with very low latency. Models and I/O processes run sequentially during the real-time loop with their execution dispatched by the SimWB scheduler. This modular design allows for complete I/O independence from the various models with a point-and-click GUI.

Custom Engineering From Concurrent

Concurrent's Special Systems group is available to design and deliver iHawk systems for customers who require complete competitive solutions for demanding real-time applications. Concurrent engineers can provide special packaging including peripherals and enclosures, integrate third-party I/O cards, develop and integrate RedHawk Linux drivers, and perform application re-hosting. Hardware and software is designed and developed to exact customer specifications.

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Specifications

Processors
- 1 to 4 Intel® Xeon, Intel Core or AMD® Opteron sockets
- Up to 22 cores per processor
- Up to 768 GB of main memory

I/O Busses
- Up to 18 PCIe slots
- Up to 10 PCI slots
- 7/16-slot PCIe expansion chassis
- 6/13-slot PCI expansion chassis
- VME64 via PCIe-to-VME bridge

Integral I/O
- 1 Gbit and 10 Gbit Ethernet
- RS-232 serial ports and headers
- USB ports
- SAS and SATA controllers
- On-board graphics

Real-time Clock & Interrupt Module
- One 64-bit synchronization clock
- Eight 32-bit real-time clocks
- Twelve external input interrupt lines
- Twelve external output interrupt lines
- GPS Option

Standard Peripherals
- Up to 8 TB SATA and SAS disks
- Up to 1 TB SSDs
- DVD-ROM/DVD-RW/Blu-Ray
- Keyboard/mouse

PCIe and PCI I/O Controllers
- Analog input and output
- Digital input and output
- AFDX / ARINC 664
- ARINC 429
- CANbus
- FlexRay
- EtherCAT
- MIL-STD-1553
- RVDT / LVDT
- Resolver
- Relay
- IRIG-B
- Counter/Timers
- Reflective memory
- Resistor simulator
- Serial
- Pulse generator
- Pulse width modulation I/O
- Network I/O

Enclosures
- Mini-tower and full-tower chassis
- 1U, 2U, 3U and 4U rackmount chassis
- Desktop enclosures
- 2 to 72 peripheral bays
- Rackmount cabinets (14U, 25U, 34U, 38U and 43U)

Environmental
- Operating Temp: 10° to 35° C (50° to 95°F)
- Non-operating Temp: -40° to 70° C (-40° to 158°F)
- Operating Humidity: 8% to 90% (non-condensing)
- Non-Operating Humidity: 5 to 95% (non-condensing)

Regulatory
- USA – UL listed, FCC
- Canada - CUL listed
- China - CCC Mark
- Europe - CE Mark
- Germany - TUV Certified
- RoHS Compliant
- EN/IEC 60950-compliant

Service and Support
- On-site or Return-to-Factory (RTF) warranty
- Extended warranty
- Software support
  - Telephone advisory support
  - Product improvements
  - New releases
  - Patches to reported problems

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