

## Features

- PCI-Express graphics busses
- Wide selection of COTS graphics cards
- Advanced imaging hardware features
  - Genlock
  - Framelock
  - Multi-system combining
  - Distributed Rendering
- Easily upgradable to the latest graphics technology
- Multi-monitor capable
- Symmetric multiprocessing (SMP)
- Latest Intel® Xeon™ and AMD Opteron™ CPUs
- Up to 16 GB of memory per server
- Tower or 3U rackmount chassis with disk and DVD/CD-RW
- Gigabit Ethernet
- Ultra320 SCSI or SATA drives
- Keyboard, mouse, and USB/serial ports
- A wide range of I/O interface and PCI controller options
  - Optional PCI and VME I/O expansion subsystems
  - Optional RAID
- Packaging Options
  - 14U and 43U 19" racks
  - Gigabit Ethernet switches
  - KVM switches
  - Power distribution

## RedHawk™ Linux® Software

- RedHawk Linux real-time operating system
- C, C++, Fortran and Ada compilers
- NightStar Real-time development tools
- Graphics Software
  - Vega Prime
  - OpenSceneGraph
  - GL Studio
  - OpenGL



# ImaGen

## Visual Servers



### Overview

Concurrent Computer Corporation's ImaGen visual servers provide multiple channels of state-of-the-art visualization and graphics performance. High-end image generation, once achievable only on large, costly, dedicated visual systems, is now available on Concurrent ImaGen Linux-based servers employing COTS graphics technology. ImaGen servers can be connected to Concurrent iHawk™ host multiprocessors to provide a complete training system platform with the highest levels of computer-generated image quality and fidelity. Concurrent ImaGen always offers the latest in industry-standard components from leading graphics suppliers, thus ensuring application developers will have access to the best possible COTS IG solutions.

ImaGen is the ideal imaging platform for today's simulation and modeling applications that require enhanced realism and the ability to process very large amounts of input data. Typical ImaGen imaging applications include civil and military simulation, mission planning, homeland security, scientific and medical visualization, architectural design, energy exploration and entertainment.

### High-Performance Graphics

ImaGen is a high-performance platform for true real-time imaging and

host applications. ImaGen features leading-edge component and packaging technology including multiple Intel® Xeon™ or AMD Opteron™ processors with PCI-Express graphics slots in flexible tower or rackmount enclosures. ImaGen can be configured with your choice of multi-monitor PCI-Express graphics controllers such as those offered by NVIDIA, ATI and 3DLabs. Loaded with popular 3D visualization software like MultiGen-Paradigm's Vega Prime™, DiSTI's GL Studio™, OpenGL, Open Performer and OpenSceneGraph, ImaGen is the most flexible, upgradable high-performance Linux-based graphics platform available today.

### Concurrent Combiner Technology

Any number of ImaGen image generation servers can be linked together to produce a single unified output image to any desired level of photorealism. For example, the power of individual ImaGen servers can be assigned to render specific subsets of an image in parallel. Subset images can be automatically assembled by compositor hardware to produce a total image in unprecedented speed equal to the aggregate of the nominal fill rate and polygon performance of the selected graphics cards. ImaGen servers support a variety of image combining modes such as sample

*Integrated Solutions... Real Benefits*

division for anti-aliasing, time division, image division, eye division and volume division for large rendering applications.

## Framelock and Genlock

ImaGen servers offer a full range of video synchronization capabilities. Commercial and military flight, maritime and driving simulators often require multiple displays to provide photo realistic views of an environment as seen from a cockpit, window or control panel. ImaGen framelock features can provide for a seamless viewing experience in multiple display applications. ImaGen genlock functionality enables synchronization with standard video signal formats or house-sync signals providing a powerful solution for display, video debrief and compositing.

## RedHawk Linux Performance and Determinism

At the heart of each ImaGen server is Concurrent's RedHawk Linux real-time operating system. RedHawk Linux, compatible with the popular Red Hat® Linux distribution, provides high I/O throughput, guaranteed fast response to external events, and optimized interprocess communication. RedHawk, also featured on Concurrent iHawk systems, is the leading Linux environment for deterministic, real-time applications. RedHawk is based upon a multithreaded, fully preemptible Linux kernel with low-latency enhancements. RedHawk's true symmetric multiprocessing support includes load-balancing and CPU shielding to maximize image display determinism and real-time performance in mission-critical solutions.

## Flexible Packaging

ImaGen servers come in standard tower and rackmount packaging with multiple PCI-Express slots, up to five integral 32/64-bit PCI slots and optional PCI-to-PCI expansion chassis. ImaGen can be configured with multiple SCSI or SATA disk drives with optional RAID capability.

## Custom Engineering From Concurrent

Concurrent's Professional Services Group is available to design and deliver ImaGen servers for customers who require complete competitive solutions for demanding image generation requirements. Concurrent engineers can provide special packaging including ruggedized peripherals and enclosures, integrate third-party I/O cards, develop and integrate RedHawk Linux drivers, and perform application rehosting. Hardware and software is designed and developed to exact customer specifications.



# Specifications

### Processors

- 1 or 2 Intel® Xeon™ or AMD Opteron™ Processors
- 512 KB, 1 MB or 2MB L2 cache

### Memory

- 1 GB to 16 GB ECC SDRAM

### I/O Busses

- Graphics
  - Dual PCIe x16 with SLI
- 3 to 5 PCI slots
  - 64-bit PCI-X
  - 32-bit 33 MHz
- 7/13-slot PCI expansion chassis
- VME64 (via PCI-to-VME bridge)

### Integral I/O

- 10/100/1000BaseT Ethernet
- RS-232 serial ports
- USB ports
- Dual channel Ultra SCSI
- Dual Video port

### Standard Peripherals

- 74 to 250 GB SATA disks
- 36 to 146 GB SCSI disks
- CD-ROM, CD-RW and DVD/CD-RW
- 3.5" 1.44 GB floppy
- Keyboard/Mouse
- 8-port and 16-port KVM switch

### Optional PCI I/O Controllers

- Multiport 10/100/1000 BaseT Ethernet
- Reflective memory
- Concurrent Real-Time Clock & Interrupt Module (RCIM)

### Environmental

- Operating Temperature: 10° C to 35° C (50° F to 95° F)
- Storage Temperature: -40° C to 65° C (-40° F to 149° F)

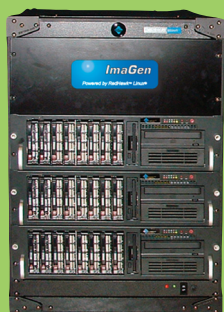
### Regulatory

- FCC Class B (U.S.)
- CE

Board Features	Quadro FX 3400	Quadro FX 4500	Quadro FX 4500G
Memory Size	256MB GDDR3	512MB GDDR3	512MB GDDR3
Memory Interface	256-bit	256-bit	256-bit
Memory Bandwidth	27.2 GB/sec.	35.2 GB/sec.	35.2 GB/sec.
Display Connectors	DVI-I+DVI-I+Stereo	DVI-I+DVI-I+Stereo	DVI-I+DVI-I+Stereo
Dual-Link DVI	Yes (1)	Yes (2)	Yes (2)
SLI Support	Yes	Yes	Yes
Genlock/Framelock	-	-	Yes

### 3D Primitive Performance

Triangles per Second	117 Million	135 Million	135 Million
Texels per Second/ Fill Rate	4.2 Billion	6.4 Billion	6.4 Billion



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