



SiliconGraphics
Computer Systems

Indy™ Product Guide

INDY



The Silicon Graphics Advantage

Imagine being able to incorporate sound, video and high-quality 3D graphics into your work without the cost and complexity of adding option cards, software, device drivers, or cables to some loosely integrated personal computer or workstation. Now you can. Indy™, a powerful desktop workstation from Silicon Graphics®, brings you all the digital media tools you need to collaborate interactively with your workgroup.

Designed for the Most Demanding Applications

Indy™ gives you a digital color video camera (IndyCam™), an engaging user environment, and a host of digital media tools — all at a remarkably low price. Indy is based upon the MIPS® RISC R4000® family of processors with an extremely fast system architecture, so it achieves the incredible application performance you've come to expect from a Silicon Graphics system.

Over 1,800 applications make Indy ideal for markets such as MCAD, color publishing, film and video, software development, education, and media authoring. Whether you are a creative or technical professional, Indy has the application performance you require and the interactive media you want at the price you've been asking for.

CAD, Color Publishing, Film and Video

All major CAD applications fly on the full-range of 8-bit to 24-bit hardware accelerated graphics options. Previous color publishing barriers are exploded by Indy's unparalleled RIP speed and applications such as Adobe Photoshop™ and high-end color pre-press packages. Indy has everything you need for video or film production from sophisticated 3D animation tools to breakthrough paint, special effects, compositing, audio and editing applications.



Indy XL (8-bit and 24-bit)

High-performance, high-resolution (1280x1024) graphics subsystem supports the Graphics Library™ as well as 32-bit Z-buffering in software. Because XL graphics performance is directly proportional to CPU speed, upgrades to faster CPUs automatically increase graphics performance



Indy XZ Hardware

Accelerated Graphics
Geometry Engine® graphics accelerators manipulate 3D models with 180Mflops of dedicated graphics compute performance



Indy Presenter

Indy shown with Indy Presenter™ 1024x768 flat-panel display, the first flat-panel display that can be used with an overhead projector

CHALLENGE™ S Server

For additional RIP or render serving, and ease in file sharing with Indy or hybrid environments

High-Performance System Architecture

Designed for the world's most demanding applications, this 64-bit system crunches large data sets — fast. Indy can be configured and upgraded to meet your requirements, so your investment is protected. The Indy advanced system architecture gives you a choice of MIPS RISC R4000 CPU modules and graphics subsystems. You can add up to 256MB of memory, seven Fast SCSI-2 devices and 2GB of internal disk storage as your needs grow. Of course, digital audio and video and integrated digital networking capabilities are standard for Indy. A new world of capturing, creating, and communicating ideas in the most natural and intuitive ways is now open to you.

1 IndyCam

This fully digital camera with adjustable focus and a CCD array delivers a full resolution 640x480 digital video signal to the built-in video subsystem

2 High-Bandwidth System Architecture

The 64-bit system bus enables industry-leading 267MB/sec sustained throughput. This high-speed bus combined with high-performance custom ASICs and the 64-bit MIPS RISC R4000 family of CPUs give Indy unsurpassed application performance



3 High-Capacity Memory Subsystem

Two-way interleaved memory system accommodates up to 256MB and is powered by a 400MB/sec memory bus enabling very fast memory access and I/O throughput for data sets

4 Upgradable CPU Module

Modular CPU implementation provides for easy upgrades to more processing power today and in the future

5 Built-In Video Subsystem

Dedicated video-in ASIC incorporates full-resolution, full-color, and full-frame rate video directly into the high-speed system architecture

6 Built-In Digital Audio Subsystem

Like the video-in subsystem, the audio subsystem is fully integrated on the 64-bit system bus and provides four independent channels of CD-quality audio output, as well as two audio input channels

7 Expandability

Two drive bays allow you to expand your disk space to 2GB internally or add a floptical drive that reads and writes Macintosh® and PC floppies as well as 21MB floptical media

Performance Chart

	R4600™PC @100 MHz	R4600SC @133 MHz	R4400™SC @150 MHz
Cache (primary)	16kd/16ki	16kd/16ki	16kd/16ki
Cache (secondary)	—	.5MB	1MB
SPECint92	62.8	93.7	91.7
SPECfp92	49.9	72.9	97.5
AIM	63.7	104.0	113.3
MIPS	119	163.5	136
MFLOPS	11	19	25

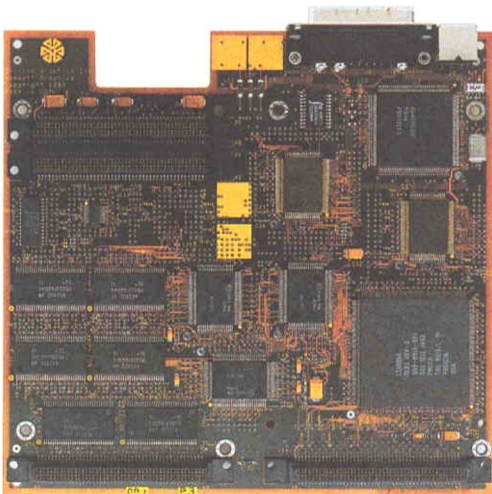
Graphics Choices from the Leader in Visual Computing

Both technical and creative professionals will appreciate the high-resolution 8-bit (virtual 24-bit) Indy graphics subsystem. These subsystems provide tremendous imaging, 2D, and 3D performance.

Indy works with amazing speed: up to 1.6 million X11 lines per second and 51 million pixels per second—all with 1280x1024 screen resolution and up to 76Hz refresh rate. With Indy XL graphics you can manipulate images at up to 1.6M 2D and 800K 3D vectors per second. Indy achieves higher performance with line and triangle drawings than any other comparably priced system.

Advanced Features

- Alpha blending
 - Accumulation buffer
 - Anti-aliased RGB lines
 - Texture mapping
 - Fog
 - Depth cueing
 - Spot lighting
 - 8 light sources
- 2-sided lighting
 - Ambient, diffused, and specular
 - Arbitrary clipping planes
 - Sub-pixel positioning
 - Stereo graphics
 - Pan and zoom
 - Sphere rendering
 - X11 pixel operations

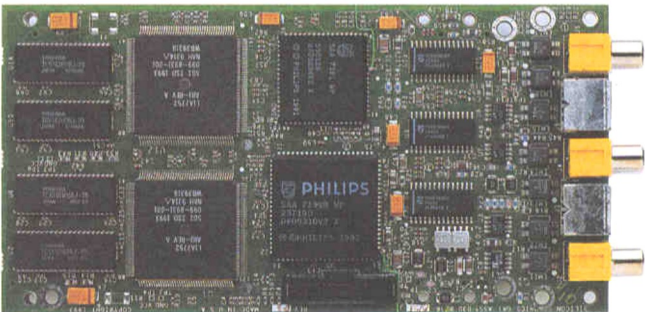


Industry-Leading Power
Indy graphics draws 1.6 million X-lines/sec and fills 51Mpixels/sec, providing unsurpassed performance for demanding imaging and line drawing applications

Enhanced Performance
Anti-aliasing through area-sampling, 256 sub-pixel positions, and endpoint filtering enhance performance for wireframe applications such as mechanical CAD and molecular modeling

REX3
The Raster Engine (REX3) ASIC converts geometric data processed by the CPU into pixel and line data in the frame buffer. The REX3 supports peak fill rates of 437M pixels/sec for block fills and 62 Mpixels/sec for shaded spans

For those who need even greater 3D performance, there's the Indy XZ™ which dedicates 180Mflops of power to 3D work. Indy XZ brings interactive 3D performance to your desk without destroying your budget.



High-Quality Video Output

The Indy Video™ option card adds additional high-quality video communication power to your desktop workstation.

Now you can print-to-tape to share high-resolution images. You can quickly create video presentations and scan-convert full-screen graphics in real time to videotape. (Imagine sending your 3D model to videotape for viewing at a customer presentation!) Frame animation of compute-intensive models or simulations can also be output to videotape for real-time playback.

Indy Video delivers high-quality special effects. Now all the real-time effects you want, like overlays, dissolves, fades, wipes, chroma keying, and luma keying, can be easily coordinated and performed in real time.

Full-Resolution, Full-Motion Video on Disk

The Cosmo Compress™ motion JPEG video compression option card gives Indy real-time video compression and decompression. Cosmo Compress works with Indy Video and powerful software applications to let you explore new horizons in video production, digital video distribution, motion video analysis, and video-based training.

Its powerful video capabilities include nonlinear editing and full-resolution, full-frame rate real-time playback of special effects, composites, and animations from disk.

Indy Video GIO

With a combination of CCIR 601 video I/O and compression, video professionals can work in digital component video and perform the highest quality Motion JPEG compression all with one option.

Stereo Interface
StereoView Ready
Connect StereoView™ hardware for virtual reality and advanced graphics applications

Monitor Connector
High-resolution (1280x1024) and low-resolution color monitors up to 76Hz

GIO Expansion
Allows maximum expandability for professional video options, video compression, additional networking interfaces, and a variety of third-party add-in cards

AUI & 10BaseT Ethernet Connections
One Ethernet™ controller with both AUI and 10BaseT interfaces for convenient and flexible standard networking—both interfaces support 10Mbit/sec transmission rates

Two Serial Connections
Macintosh-compatible RS-422 and RS-232 as well as MIDI timing at transfer rates up to 38.4Kbits/sec through these two 8-pin mini-din connectors for easy integration with modems, printers, and other serial devices

Parallel Connection
A bi-directional, programmable 8-bit parallel port with up to 10MB/sec transfer rate gives easy access to a variety of printers, scanners, and other devices

Audio Interfaces
Line-in and line-out jacks, microphone-in and headphone-out jacks, as well as a digital I/O jack for CD-quality audio applications

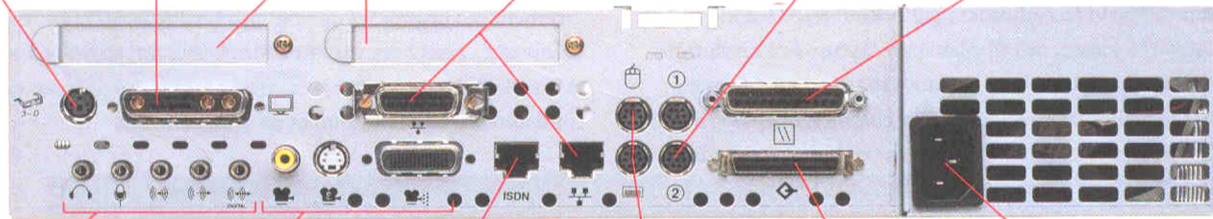
Video Input Connections
Built-in video accepts a variety of standard video inputs with a Silicon Graphics digital port, S-video port, and a composite analog port supporting NTSC/PAL formats

ISDN Built-In
Standard wide-area networking interface suitable for video conferencing, telephone, and emerging media applications—ISDN provides two channels of 64Kbits/sec transmission rate over ordinary telephone lines

Keyboard & Mouse Connections
Standard PS/2™ interfaces, provides full user interface support of 3-button mouse

SCSI-2 Connection
In addition to the two internal peripheral bays, the integrated SCSI controller also supports up to five additional external devices such as disks, CD-ROMs, and scanners, and provides fast, single-ended, 8-bit transfers up to 10MB/sec

Power Supply
170 watt autoswitching power supply permits system operation anywhere in the world



GIO Expansion

A wide variety of expansion cards that enhance the video, networking, and input/output capabilities of the Indy system are available directly from Silicon Graphics. Many others are available from third parties.

High-Speed Networking with FDDI

Silicon Graphics has developed the industry's highest-performing FDDI solution, the GIO-FDDI expansion card. This card, which is capable of full-bandwidth performance, gives the Indy workstation ten times the network throughput available from traditional Ethernet.

Dual SCSI Channels for Optimum Performance

To augment the internal SCSI channel, add up to two more SCSI-2 channels on the GIO expansion slots. Combining multiple SCSI-2 controllers with the disk striping available in the IRIX™ Operating System significantly increases the available I/O throughput by providing an extra 10MB/second channel on each controller.

Additional Ethernet Ports

Run separate networks on each port. Let the Indy workstation route between the subnetworks. Add one or two E++ GIO Ethernet adapters, and the Indy workstation will connect to one or two more subnets.

Token Ring

Indy workstations let you opt for token ring networks instead of Ethernet. The GIO Token Ring adapter delivers high-performance connectivity to IP and SNA running on shielded or unshielded twisted-pair token ring networks.

The GIOSync Synchronous Serial Adapter

For mainframe connections or links to Wide Area X.25 networks, the GIOSync adapter supports SDLC and HDLC on either of two independent 64K ports. You can even run SDLC on one port while running HDLC on the other.

Unrivalled Digital Media

Indy has plenty of media tools to enhance communication. Now you can incorporate 3D graphics, photorealistic images, video, CD/DAT-quality audio, and text into your work, in real time and all in digital format. Best of all, IndyCam, digital and analog video-in, microphone, CD-quality audio, support for Kodak Photo-CD™ format, and software media tools are standard with every Indy workstation.

IndyCam is an ideal tool for collaborative workgroup communications. The video subsystem performs filtered scaling to 1/2, 1/3, and 1/4 screen, or IndyCam can capture full-resolution, full-frame video directly to memory in true digital format. CD/DAT-quality audio includes four channels of analog audio and two channels of digital audio. Inexpensive third-party software supports full-motion MPEG1 and video CD playback.

Indigo Magic User Environment

Indigo Magic™ is a new generation desktop user environment that combines an intuitive desktop management system with

powerful digital media tools in a single user interface. We call it a "Media User Interface" because Indigo Magic simplifies system and network access and facilitates collaborative computing with unique digital media tools that let you capture, create, and communicate your ideas in ways that are more vivid and compelling than you ever imagined.

With the Indigo Magic Desk Manager, create multiple iconic desktops with all the applications, files and tools you'll need to work on specific projects. System administration and management is a breeze. Set up your printer and user accounts and connect to a network with just the click of an icon. The Indigo Magic User Environment is "network aware," so you can easily find and use all the resources on your network.

InPerson Multi-Point Teleconferencing

The optional InPerson™ software gives your team the tools to share technical and creative information without ever leaving the office. High-quality audio and video, text, and images are interactively sharable, in real time, over standard network connections.

InPerson features:

Multi-Point Desktop Teleconferencing Option

InPerson software turns your workstation into a powerful communications center allowing you to "call" people and interact with live video and audio

Audio and Video

Call participants are automatically assigned unique cursors

Whiteboard

Participants in a conference call can work on a project together using the Whiteboard; the group can mark-up a selected file, a captured image, or a text document collectively and in real time; you can add pages to the Whiteboard so you never run out of room

Shared shelf

Files can be quickly distributed to every participant in a conference call by dragging and dropping

Moviemaker

Cut and paste motion video clips and audio clips to create your own movies for multimedia presentations

Desks

As many desks as you have hats can be set aside and instantly recalled

IndyCam

Bundled digital color video camera for InPerson Teleconferencing, making movies, or snapshotting real-world objects

Movieplayer

Soundeditor

Capture

Record 320x240 movies to disk at 15 frames per second and software compress, or use the Cosmo Compress option and record full-resolution full-motion video

Soundfiler

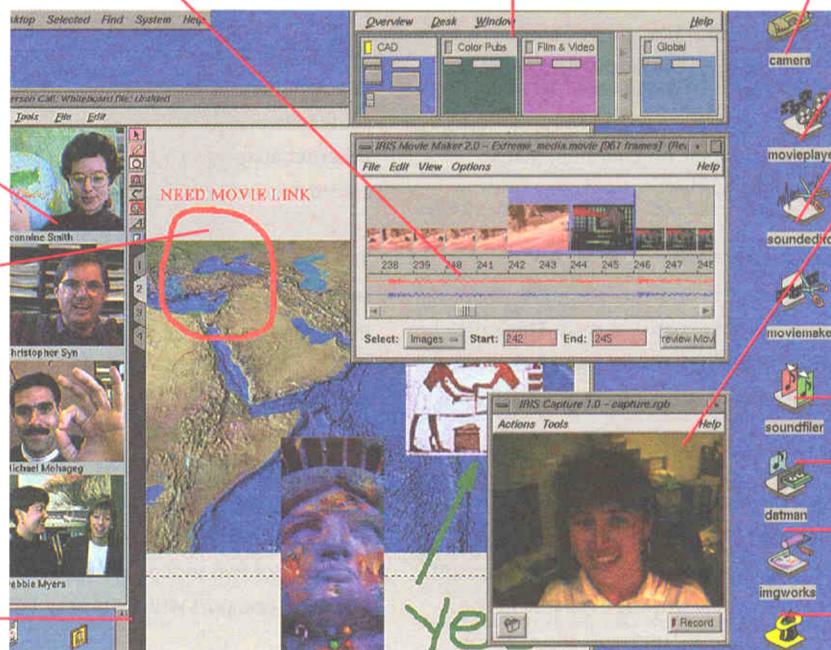
Datman

Imageworks

Image editor

Showcase

Author multi-media presentations using 3D models, images, text, movies, and sounds



Network File Sharing

Drag and drop files from any system on the network onto your desktop

Icon Catalog

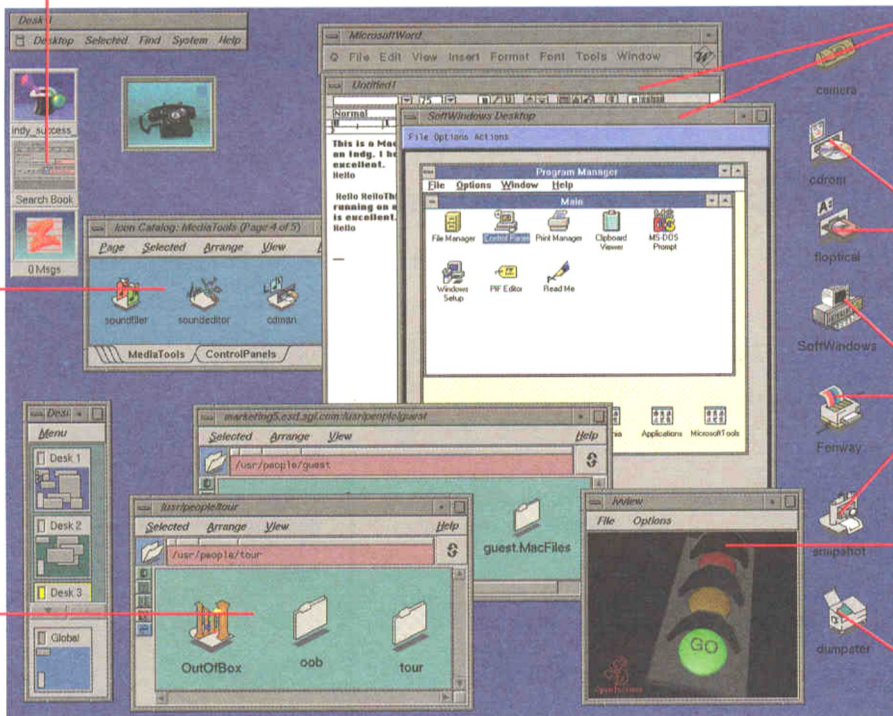
System software utilities like media tools and control panels can be placed on the desktop

Search Book

Easily search the entire network for any resource: files, system, peripheral, and more

Indy Works Well With Others

Indy excels in a multi-vendor environment with PCs, Macintoshes, and other UNIX® systems. Indy can also act as a server and client on a network simultaneously. Its multitasking power is a tremendous solution for rip-and-render serving. Indy supports PC and Macintosh client software for Netware™ and AppleTalk® networks, as well as third-party PC and Macintosh emulation packages such as Quorum Equal™ and Insignia SoftWindows™. Indy reads and writes PC and Macintosh floppies and supports Photo-CD and Quicktime™.

**PC and Macintosh®**

Simultaneously run Macintosh, PC, and Motif™ windows, Soft Windows™ emulation and Equal application adapters for Macintosh Word and Excel

CD and Floptical

First video CD compatible workstation; icon changes to reference last media loaded in CD

Network Aware

Printers, scanners and other users on the network are available as icons

Multi-Tasking

Indy doesn't stop just because you did—rendering and RIPing become background tasks

Dumpster

Drag and drop to discard files

For Client/Server: CHALLENGE S

CHALLENGE™ S enables heterogeneous workgroups to share files, images, and output devices simply and inexpensively. Multiple Ethernet support, or higher bandwidth networking options including FDDI and ATM, ensure optimum network performance. The CHALLENGE™ S server is ready to support PC Network and Macintosh client workstations with software that enables clients to interact with CHALLENGE S through familiar, native client interfaces. Binary compatibility with all Silicon Graphics systems makes CHALLENGE S well suited for software development or CASE.

The Out-of-Box Experience

From the moment you open the box, Indy brings your ideas to life. Play any of the 30 bundled interactive IndiZone Games and explore the many useful tools. Open the box... and enter the world of Indy.

Indy CPU Performance Chart

	R4600™PC @100 MHz	R4600SC @133 MHz	R4400™SC @150 MHz
Cache (primary)	16kd/16ki	16kd/16ki	16kd/16ki
Cache (secondary)	—	.5MB	1MB
SPECint92	62.8	93.7	91.7
SPECfp92	49.9	72.9	97.5
AIM	63.7	104.0	113.3

Indy XL Graphics Performance

	R4600PC @100 MHz	R4600SC @133 MHz	R4400SC @150 MHz
XLines/sec	1.4M	1.5M	1.6M
3D Vectors/sec	333K	443K	800K
Tmesh/sec (z)	33K	51K	64K
Screen Clear	3msec	3msec	3msec
DMA Pixel Xfer			
8-bit	45M	N/A	51M
24-bit	19M	N/A	40M

Indy XZ Graphics Performance

3D lines/sec	920k
3D lines GouraudZ, Depth Cued/sec	446k
Tmesh, Flat NO-Z/sec	402k
Tmesh, GouraudZ, Lit/sec	180k
Quads, FlatZ/sec	127k
Quads, GouraudZ, Lit/sec	91k
Characters	240k
Screen Clear	9msec
Rectangle Fill Rate/sec (500x500)	40M pix

Serious Hardware Features

CPU module	R4600™PC@ 100MHz R4600™SC@ 133MHz R4400™SC@ 150MHz
Graphics	8-bit XL 1280x1024/1024x768 up to 76Hz refresh rate (upgradable to 24) 24-bit XL 1280x1024/1024x768 up to 76Hz refresh rate XZ 24-bit HW Accelerated Z 1280x1024 1024x768 (Presenter Only)
Monitor	Color 20-inch 1280x1024 resolution 50 & 76Hz refresh rates Color 17-inch 1280x1024 resolution 50 & 76Hz refresh rates Color 15-inch 1024x768 resolution 70Hz refresh rate Flat panel 12-inch Active matrix LCD 1024x768, 15-bits/pixel
Input/Output	2 serial, 1 parallel Ethernet™, (10-baseT or AUI) Fast SCSI-2, ISDN, Stereo vision (17" & 20" monitor only)
Memory	16MB to 256MB
Mass Storage	Two internal devices: (3.5" x 1" form factor) 21MB Floptical Drive 535MB Hard Disk 1.0GB Hard Disk
GIO Expansion	Two GIO-32 slots
Input Devices	PS/2™ keyboard & mouse Analog microphone IndyCam™: full color CCD 640x480 resolution
Warranty	One year hardware

Graphics Features

Color Maps	4 (256 color) 1 (4096 color) 24-bit only
Display Modes	RGB double buffer RGB single buffer Color index double buffer Color index single buffer
Pop-up/Overlay Planes	8-bit XL: 2-bits/none 24-bit XL: 2-bits/8-bits XZ: 4-bits/4-bits

Video

Input	Independent input video bus 2 analog video-in ports (S-Video and Composite) NTSC and PAL support 1 digital video-in port 320x240x20fps to disk 640x480x30fps to memory
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Audio

Input	Mono/Stereo microphone (mono microphone incl.) Line-level stereo analog AES/EBU digital stereo
Output	External volume controls Stereo headphone Mono internal speaker Line-level stereo analog AES/EBU digital stereo
Sampling Rates	48, 44.1, 32KHz, etc.
Connectors	Five 1/8 inch (3.5 mm) stereo jacks

Serious Software Features

IRIX™ 5.2	IEEE POSIX 1003.1, FIPS 151-1, UNIX® System V.4, 4.3 BSD enhancements, SVID Issue 3, X11R5 Window System™, OSF/Motif™ Toolkit 1.2, Display PostScript®, IRIS GL™, OpenGL™
Indigo Magic	Media User Interface, IRIS Showcase™ 3.2, Media Tools, MediaMail™ Photo-CD™ support
PC & Macintosh	Trial copies of PC & Macintosh® emulators

SGI Accessories Supported

Indy carrying case	Indybag
GIO Options (single wide)	Indy Video™, Cosmo Compress™ (full-motion JPEG) Indy Video 601 (2 single-wide) Ethernet, Fast SCSI-2 X.25, TokenRing
GIO Options (double wide)	FDDI single attach (fiber only) (GIO options not avail- able with XZ graphics)
Tablet	Hitachi 1111C
External Drives	SyQuest™
External Tapes	1.0GB QIC 2.0GB DAT

Input Devices

Dials, Dials and buttons, Optical mouse	
Other External Devices	CD-ROM, MIDI Interface 1GB/2GB External Disks

Physical Environment

System	3"H x 16"W x 14"D 16 lbs.
20-inch Monitor	18.5"H x 18.5"W x 19.7"D 81.4 lbs.
17-inch Monitor	16.1"H x 15.7"W x 17.7"D 55 lbs.
15-inch Monitor	14.2"H x 13.4"W x 16.5"D 52.8 lbs.
Flat Panel 12-inch	18.5"H x 12.5"W x 1.1"D 7 lbs.
Power Requirements	100-132 VAC, 2.4-1.8A 200-264 VAC, 1.2-0.9A 47-63 Hz
Heat Dissipation	900 BTU/hour
Ambient Temperature	+ 13 to + 35 degrees C (operating) - 40 to + 65 degrees C (non-operating)
Relative Humidity	10% to 80% operating no condensation 5% to 95% non-operating no condensation
Altitude	10,000' operating 40,000' non-operating
Vibration	0.02 inches, 5-19Hz 0.25 G, 5-500Hz
Noise	36 dB (A) in typical operating position

Regulatory Agency Approvals

Electromagnetic Emission	FCC Class B Canada DOC. Class B CISPR 22 Class B Germany VDE Class B VCCI Class 2
Product Safety	CSA 22.2 No. 950, UL 1950, IEC 950, EN 60950, Class 1 SELV
Ergonomic/Health	Germany ZH1/618, ISO 9241

Serious Fun Features

Interactive Games	
Out-of-Box Experience	
Sound Scheme	
Screen Savers	
Custom Backgrounds	
Juggling Balls	

For more information please call

U.S. 1(800) 800-7441

Europe (41) 22-798.75.25

North Pacific (81) 3-5420.71.10

South Pacific (61) 2-879.95.00

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