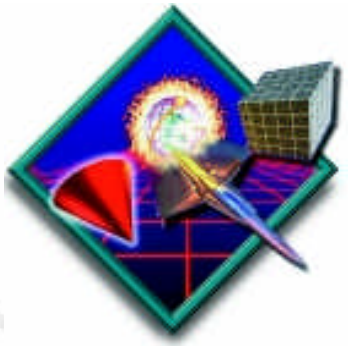
FIREGL
BE THE CREATOR

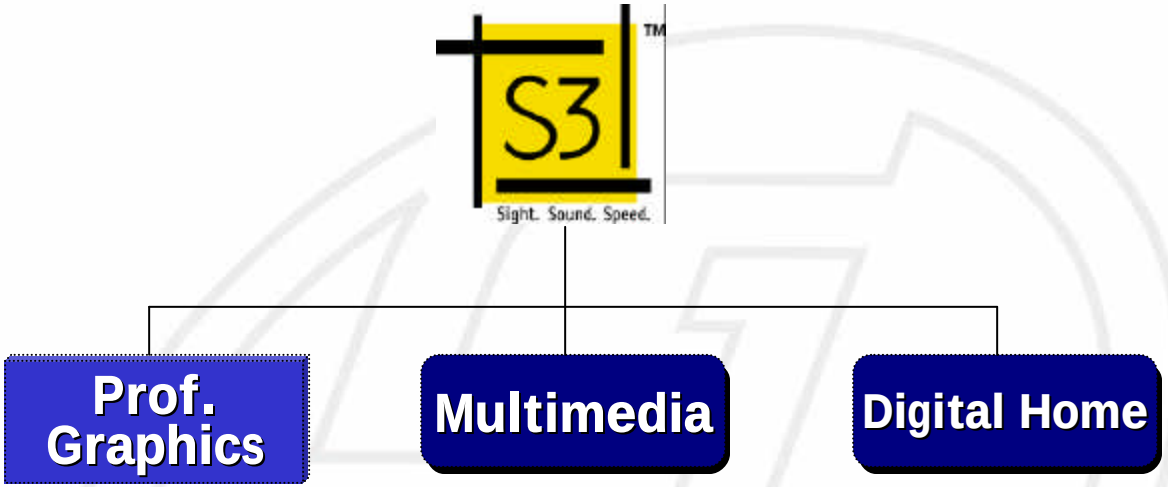
Pure Power,
Pure Performance

"Agenda"



- ***S3/Professional Graphics***
  - "Fire GL", the Brand
  - S3/PGD & IBM Austin Graphics Group
- ***Market and Trends***
  - Create It & Deliver It
  - Growth & Opportunities
  - Requirements
- ***Fire GL2 & Fire GL3***
  - MCAD vs Digital Content Creation
  - Performance
  - Competition

“S3/PG Division”



“Fire GL is Alive & Well !”

- Not included in S3/VIA Joint Venture
- Separate Division, Separate P&L
- Continue w/ IBM Austin Graphics
- Committed to delivering High-Performance OpenGL accelerators

"Fire GL", the Brand

A Leading Brand...

- Founded in 1986 as SPEA, in Starnberg, GmbH
- Since 1987, "Fire GL" is synonymous with high-end workstation graphics
- Diamond acquired SPEA in 1995
- Six Generations of Fire GL since 1995
- Established in major OEMs and ISVs
- Worldwide recognition

COMPAQ

DELL PRECISION™ WORKSTATIONS

IBM IntelliStation

FUJITSU COMPUTERS SIEMENS

FIREGL BE THE CREATOR

“Award Winning”

Ausgabe 4/99
Diamond Fire GL1

“...if you have a Pentium III workstation, [the Fire GL1] is a great performer and worth its price.”

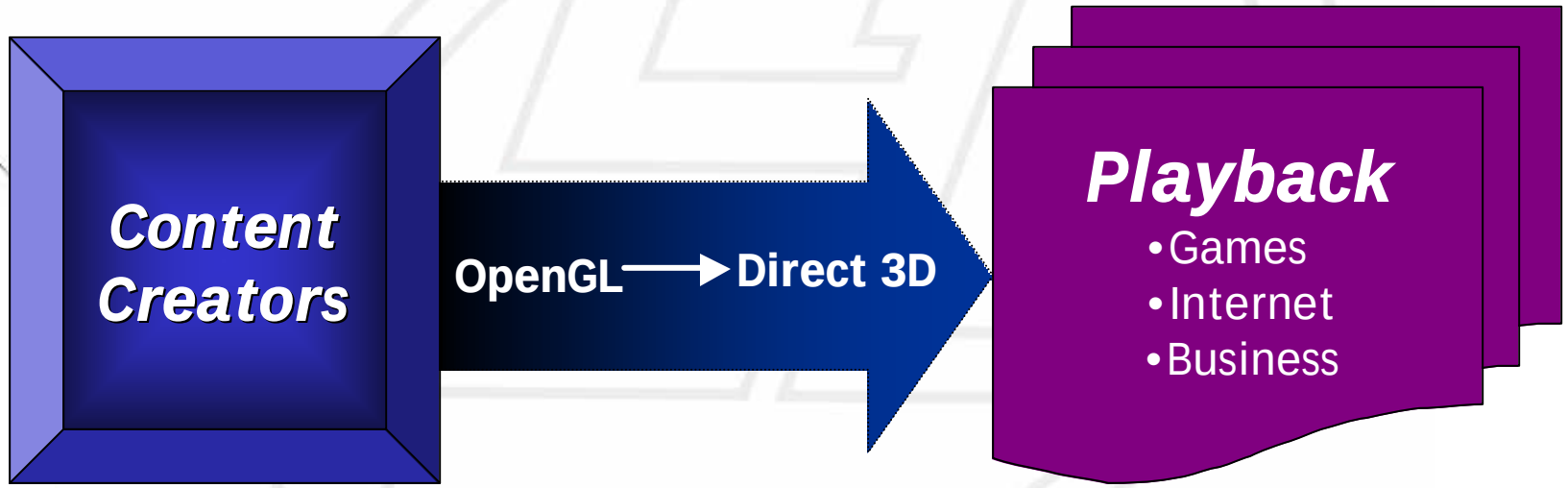
"S3/PG Division"

S3/PGD & IBM RS/6000

- 5 year exclusive marketing and co-development
- S3/PGD is responsible for sales & marketing of the IBM silicon & boards
- Hardware & software development
- IBM sells chips exclusively to S3/PGD
- S3/PGD sells and market boards
- Co-development on drivers, OGL ICD & DX7
- S3/PGD agreement of future roadmaps

"PG Market & Trends"

"Customers vs Endusers"



Professional Graphics

Mainstream Graphics

"PG Market & Trends"

"Customers vs Endusers"

- *PG Customers focus on Vertical Markets*
- *Game Endusers rate quality subjectively,*
  - A game doesn't have to be accurate architecturally, or have precision engineered objects or images
  - Game boards would not pass the professional graphics benchmarks because of quality
- *PG Customers rate quality on the basis of precision and accuracy of images*
  - Require sub-pixel precision, stencil support, and OpenGL conformance.
  - Reliability & Productivity matters to PG users
  - Benchmarks are different, (Winbench vs Viewperf)

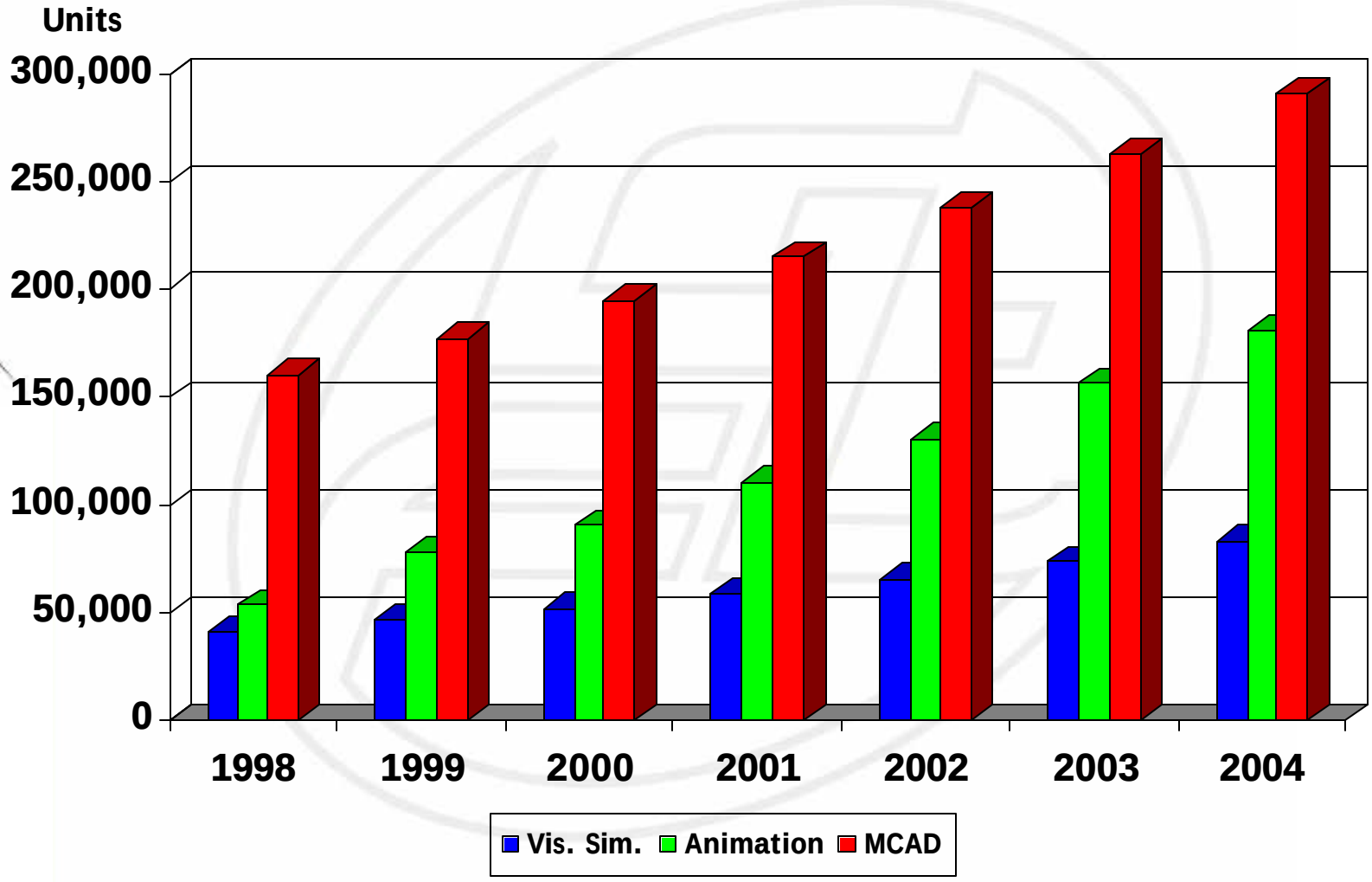
"PG Market & Trends"

PG Market is Growing

- ***Collaborative Computing***
  - Windows 2000 Adoption
    - Workstations feed the Corporate Desktop
  - Sharing of 3D designs is seen as an essential tool for Internet-savvy companies.
- ***Demand for 3D Content***
  - From Playstation 2 & Microsoft's X-Box
  - Film, Games, and Internet Demand for PG 3D Tools
- ***OpenGL is the key***
  - Windows 2000 and Linux and other 3D Tools
- ***Convergence of 3D with Traditional Media***
  - Establishment of OpenML
  - People like to see sophisticated 3D in their films, television, advertising, in the media

Khronos group

“PG Market & Trends”



Source: M2 Research

“PG Market & Trends”

PG Market is Application Specific

65%, CAD/CAM

design tools used by architects, town planners, engineers...

30%, Animation

tools used in film, game development, Web design...

5%, Visualization and Simulation

scientific analysis, data mining, aerospace, automotive engineering...

PG Applications Certifies Hardware

ISVs tests, certifies and recommend graphics and systems

"PG Market & Trends"

Balanced 2D and 3D Acceleration

- ***Productivity with 3D Acceleration***
  - **Over 50%** of a design is spent in wireframe & high-quality anti-aliased lines
  - **Next 20-25%,** shaded mode is used to first visualize the 3D object or scene
  - **Finally, 15-20%,** is used to apply textures
  - **Last 5-10%** is real-time playback; here speed and the size of the playback are not crucial
- ***2D Acceleration is a MUST***

  "A Workstation Graphics Adapter has to accelerate 3D OpenGL applications and 2D applications like Photoshop, Premiere and Office 2000."

PG ISV Relationships…

Quarterly Technical Meetings

- Optimize & Customize Drivers for ISVs
- Certification and Compatibility Testing
- Collaborate on additional 3D hardware and software features
- Develop & implement joint Marketing Programs
- Develop additional OpenGL extensions
- International ISV Support

FIREGL
BE THE CREATOR

Pure Power, Pure Performance

- Dual Screen, Single Slot
- IBM's GT1000, 30+ GFLOP Geometry Engine
- IBM's RC1000, 256-bit, Graphics Rasterizer & DDR Memory Interface
- 128Mb Unified Frame Buffer
- Under US$2000, Fall 2000

The Next Generation…

- Single Screen, Single Slot
- IBM's GT1000, 30+ GFLOP Geometry Engine
- IBM's RC1000, 256-bit, Graphics Rasterizer & DDR Memory Interface
- 64Mb Unified Frame Buffer
- Under US$1200, Fall 2000

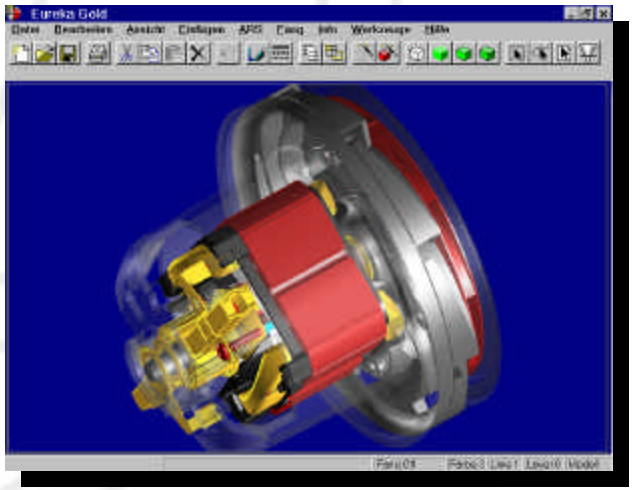
An Evolution in Workstation Graphics

- Multi-Screen, Multi-Cards
- Optimized for Intel's *SSE & AMD's 3DNow!*
- IBM's 256-bit Rasterizer & Memory Interface
- 32Mb Unified Frame Buffer
- Under US$700

“Fire GL2 & Fire GL3”

Professional CAD & MCAD

- **Geometry**
  - 16 Simultaneous Lights (Directional, Positional or Spot)
  - Fog Factor Generation
  - Full Immediate Mode
- **Image Qualities**
  - Gamma Corrected AA Lines
  - Hardware Alpha Cursors
  - RAMDAC, 10-bit triple DAC
  - Dual DVI-I Panel Link Support
- **Productivity**
  - Back Face Culling
  - Occlusion Culling
  - Linked Queues



“Fire GL2 & Fire GL3”

3D Animators & Game Developers

- **Realistic Renderings**
  - Bump-Mapping Single Pass, Multi-Texture
  - Anisotropic Filtering via Rectangular MipMaps
- **D3D Support**
  - S3TC, Texture Decompression
  - D3D, Texture Enviroments
- **Professional GUIs**
  - 8-bit Double Buffered Overlays
  - Quad-Buffered Support
- **Broadcast Video Support**
  - Bilinear Scaling, (Up/Down)
  - YUV-RGB Converter for Video & Textures
  - Supports 422 YUV & RGB Pixels
  - 2, Triple Buffered, Video Overlays

"Fire GL2 & Fire GL3"

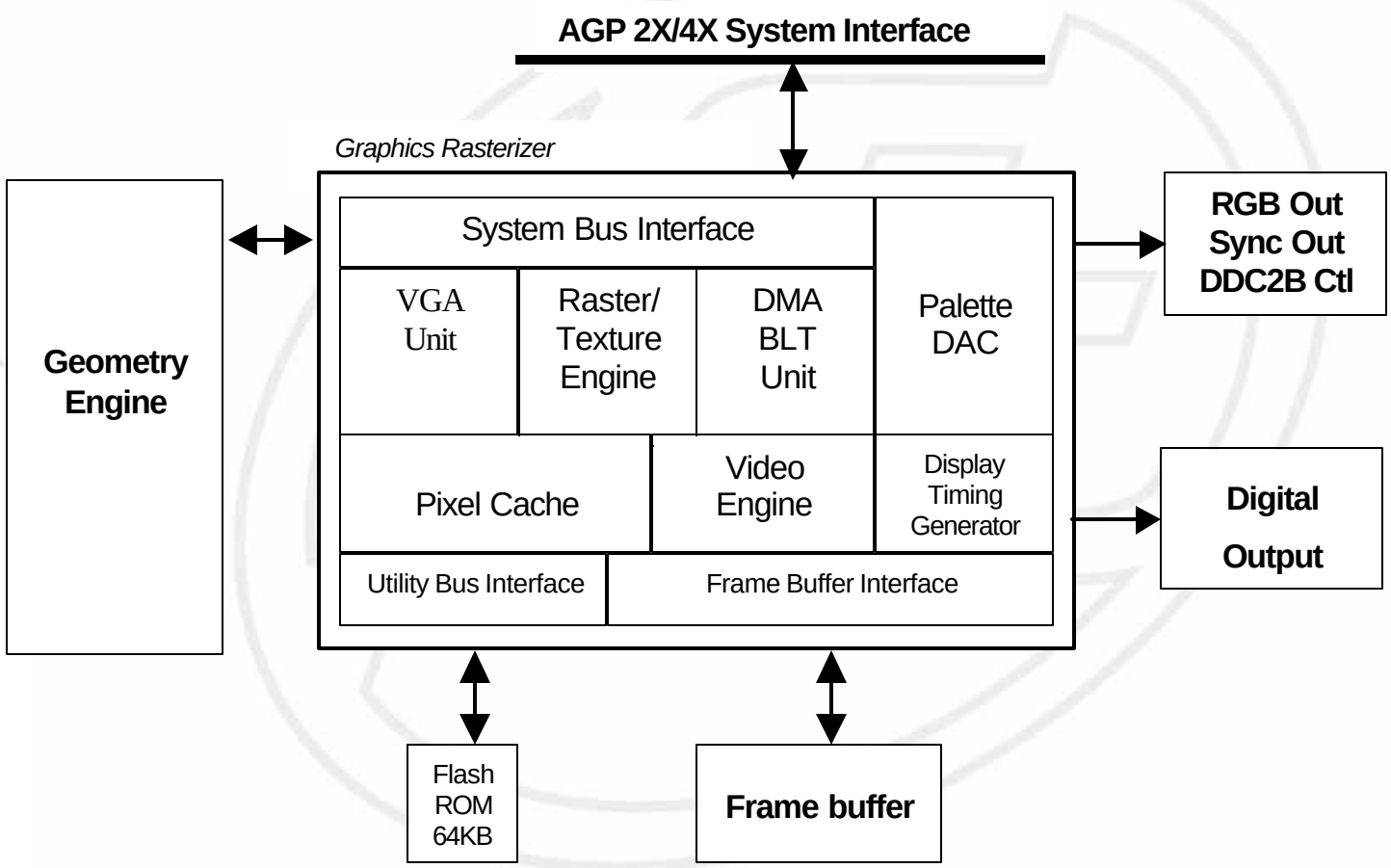
Fire GL2

- **Ideal for MCAD**
  - **Single Screen, Single Slot (15 Pin VGA or DVI-D)**
  - **30+ GFLOP Geometry Engine**
  - **64Mb Unified Frame Buffer**
  - **AGP 2X/4X**
  - 27M Triangles/Sec
  - 31M Vertices/Sec Anti-Aliased Lines
  - 410M Pixel/Sec G-Shaded, Z-Buffered, Non-Textured
  - 200M Pixel/Sec Tri-linear Texture

Fire GL3

- **Ideal for DCC**
  - **Dual Screen, Single Slot (Dual DVI-I w/ VGA Dongle)**
  - **30+ GFLOP Geometry Engine**
  - **128Mb Unified Frame Buffer**
  - **AGP Pro50**
  - 27M Triangles/Sec
  - 31M Vertices/Sec Anti-Aliased Lines/Sec
  - 410 M Pixel/Sec G-Shaded Z-Buffered, Non-Textured
  - 200 M Pixel/Sec Tri-linear Texture
  - Full Scene Anti-Aliasing

“Fire GL2 & Fire GL3”



“Fire GL3” & D4D Monitor

Professional Visualization

- Flat auto stereoscopic 3D display for Fire GL3
- For true 3D visualization of 3D video or synthetic 3D data or other three-dimensional information
- No Eye Glasses Needed
- Available from S3/PGD
- Target Markets
  - MCAD
  - Industrial Design
  - Simulation
  - Medical Applications

"Fire GL Line"

	Fire GL1	"Fire GL2"	"Fire GL3"
Price	<US$700	<US$1200	<US$2000
Hardware Features	AGP 2X Single Monitor	AGP 2X/4X Single Monitor	AGP Pro50 Dual Monitor
Geometry Acceleration	SSE and Mutli Threaded	Hardware	Hardware
Interface	256-bit Graphic Engine 256-bit Interface	256-bit Graphic Engine 256-bit DDR Interface	256-bit Graphic Engine 256-bit DDR Interface
Memory	32 MB Unified Frame Buffer	64 MB Unified Frame Buffer	128 MB Unified Frame Buffer
Performance Triangle Set-Up Rate AA Vertices Set-Up Rate Lit Triangles w/ 16 Lights G-Shaded, Non-Texture Trilinear pixels/second	 4.5M 15M n/a 200M 45M	 27M 31M 27M 410M 200M	 27M 31M 27M 410M 200M
Benchmarks* WinBench 99 HE Viewperf ProCDRS -	 414 28+	 tbd 70+	 tbd 70+
OS Support	NT 4.0, Win2K, Linux & Win64	NT 4.0, Win2K, Linux & Win64	NT 4.0, Win2K, Linux & Win64

*Preliminary benchmark data – subject to change

"Performance"

"SPEC/OPC"

	Awavds	DRV	DX	Light	ProCDRS
	======	====	====	====	=======
Diamond Fire GL2	111.6*	35.4*	79.9*	5.9*	61.12**
WildCat 4210 Pro	112.89	36.46	70.71	5.9	61.51

"SPEC/APC"

	Proe2000i APC	Solidworks 99 APC	3DS MAX Low/High
	==========	==============	==============
Diamond Fire GL2	10.7*	4.81*	45.5 / 30.8*
WildCat 4210 Pro	9.03	4.64	Not avaiable

-Test System: Intel , 933 MHz single PIII, 512 MB RAMBUS memory.
-WildCat 4210 Pro numbers are copied from OPC page
* All numbers are measured with early, non optimized driver
** This number will go ~ 70 soon !!!

"The Commitment"

PG Players are going through shakeout:

- **S3/PGD**:
  - Complete line, top to bottom OpenGL Offering
  - Solutions from "Creation to Playback"
  - Financial & Operations of a Company approaching $1 Billion
- **nVidia/ELSA**:
  - Focused on Playback
  - Must Deliver Graphics for Microsoft X-Box !
  - ELSA, NO IP, dependent on nVidia
- **3Dlabs**:
  - Acquired Intense 3D to offer complete line of graphics, must execute.

FIREGL
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“Questions & Answers”