Sun GX Series
Graphics Workstations
The standard for graphics performance from the desktop to powerful desktop systems

Sun GX Series Graphics Workstations

Key Concepts

- **INNOVATION** — Unique architecture designed with RISC concepts applied to graphics (80/20 rule). 3 commands externally - massively parallel state machine internally ("SuperCISC").

- **INTEGRATION** — Uses the most advanced ASIC technology, tightly coupled to the CPU
  the FBC - 43K gates, 170K transistors 223 pin PGA for high speed rasterization
  the TEC - 25K gates, 212K transistors 95 pin PGA for transformations - 51 Mflops maximum

- **SCALABLE PERFORMANCE** — Designed assuming infinitely fast CPU - no longer is graphics the bottleneck.

- **VISION** — Accelerates more than vectors and polygons - useful to many markets

- **AFFORDABLE** — Designed to be the standard level of performance in the industry

- **FLEXIBLE** — The CPU acts as intelligent DMA controller enabling it to traverse multiple software display lists. Allows high level graphics functions to be controlled by the CPU.

- **OPENNESS** — Accelerates Open Standards like Phigs, GKS, X.11/News, Open Look, etc

- **APPLICATIONS** — Accelerates existing applications (including the window system) as well as standard high performance interfaces

Sun Microsystems Inc.
Graphics Products Division
GX Series Graphics Workstations

June 1989
GX Subsystem – SPECIFICATION OVERVIEW

* Hardware accelerator architecture, no processor on board
* P4/S Bus interface
* Size smaller than standard PC AT card
* 8-bit index color
* Supports 1152X900, 1024X1024, and 1024X768 resolutions
* Low power CMOS implementation
* Design based on two complex CMOS ASICs
  FBC is 43K gates + rams (2X Sunrise IU density) 223 pins
  TEC is 25K gates + rams (1X Sunrise IU density) 95 pins
* Performance platform dependent
* Meets Sun’s corporate Environmental Spec
* Meets FCC and other safety agency requirements
* MTBF is 35,000 hours
Sun GX Series Graphics Workstations

CG6 Board Layout

13W3

TEC

Dumb Frame Buffer Interface

DAC

Clock

FBC

VRAM

BUS Interface Logic

Memory Control Logic

P4/SBus

Sun GX Series Graphics Workstations

FBC FEATURES

* CPU Interface
  Common to SPARC, 680X0, 80X86

* Context Switchable

* Addressing
  XY Addressable bitmap
  Barrel Shifter

* Clipping
  One rectangular window
  Gross clip checking

* Point/Vector/Triangle/Quadrilateral Command
  Up to four vertices
  Degenerate Polygons
  Self-Intersecting Polygons
  Supports chained and relative addressing

* BitBit Command
  With RasterOps
  Any Direction

* Text Command
  Foreground/background Colors
  Font width mask
  1 plane to 8 plane conversion

* Picking Support
  Draw detect at pixel level
  Rectangular Windows
  Without rendering

* RasterOps
  16 Ops with 2 color and mask
  16-pixel datapath
  Linear ROPs

* Antialiasing
  Subpixel addressing
  4x4 filtering
  325 dpi equivalent

* Patterns
  Alignable 16X16 repeating

* Plane and Pixel Mask

* Resolutions
  1024x1024
  1152x900
  1024x768
  1280x1024
  1600x1280

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Sun GX Series Graphics Workstations

TEC FEATURES

* CPU Interface
  Common to SPARC, 680X0, 80X86

* Context Switchable

* 3D Transforms
  Floating Point Math Unit with 51 MFlops SP
  Scaling, Rotation, Translation, etc.
  Integer, signed fixed point, binary and IEEE SP FP
  Independent input and output formats
  Can automatically load results to FBC

* Character Generation Support
  Matrix Concatenation
  Implicitization and subdivision

* Hardware Cursor
  32X32 Cursor
  3 Colors
  Multiple resolutions

* Video Control
  Programmable Timing
  SYNC Generation
  Multiple Resolutions

Sun GX Series Graphics Workstations

The Software Story

* Pixrects/Pixwin – accelerates existing applications

* Standards:
  * SunPHIGS 1.1 (70%+ efficient)
  * SunGKS 3.0 (70%+ efficient)

SunWindows
Sunview 1.X

X.11/NeWS
XView

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What Is the Sun GX Series?

- The GX series is a full line of 68030 and SPARC-based 2D/3D color graphics workstations.

Introducing:
The SPARCstation 1GX:
$14,995

- 175K 3D v/s with Sun PHIGS 1.1
- 400K 2D v/s with Sun GKS 3.0
- 12.5 MIPS SPARC Processor
- 1.4 MFlop DP Floating Point
- 8–16 MB RAM
- 100–208 MB SCSI internal disks
- Expands up to 1.1 GB external disks

The most powerful desktop graphics workstation available.
Introducing: The SPARCstation 330GX:
$37,900

- 200K 3D v/s with Sun PHIGS 1.1
- 450K 2D v/s with Sun GKS 3.0
- 16 MIPS SPARC Processor
- 2.6 MFlop DP Floating Point
- 8–40 MB Parity RAM
- 327–654 MB SCSI internal disks
- Expands up to 1.3 GB external disks

Highest performance 8 bit 2D/3D color graphics workstation

Introducing: The SPARCstation 370GX:
$48,900

- 200K 3D v/s with Sun PHIGS 1.1
- 450K 2D v/s with Sun GKS 3.0
- 16 MIPS SPARC Processor
- 2.6 MFlop DP Floating Point
- 8–56 MB ECC RAM
- 327MB – 1.3GB SCSI internal disks
- Expands up to 5.5 GB fast SMD disks

Most powerful, expandable uniprocessor workstation available
Highest graphics, I/O and memory performance.
Introducing:
The Sun 3/80GX:
$13,995

- 100K 3D v/s with Sun PHIGS 1.1
- 325K 2D v/s with Sun GKS 3.0
- 3 MIPS 68030 Processor
- 68882 standard (0.16 MFlops)
- 4-16 MB RAM
- 104-208 MB SCSI internal disks
- Expands up to 1.1 GB external disks

High performance, low-cost desktop Sun-3 compatible with integrated graphics

Introducing:
The Sun 3/470GX:
$48,900

- 150K 3D v/s through Sun PHIGS 1.1
- 425K 2D v/s with Sun GKS 3.0
- 7 MIPS 68030 PROCESSOR
- 68882 Std
- Optional 0.6 MFlop DP Floating Point
- 8-128 MB ECC RAM
- 327MB – 1.3 GB SCSI internal disks
- Expands up to 5.5 GB fast SMD disks

Most powerful 68030 8 bit 2D/3D workstation available. Outstanding graphics, I/O and memory performance.