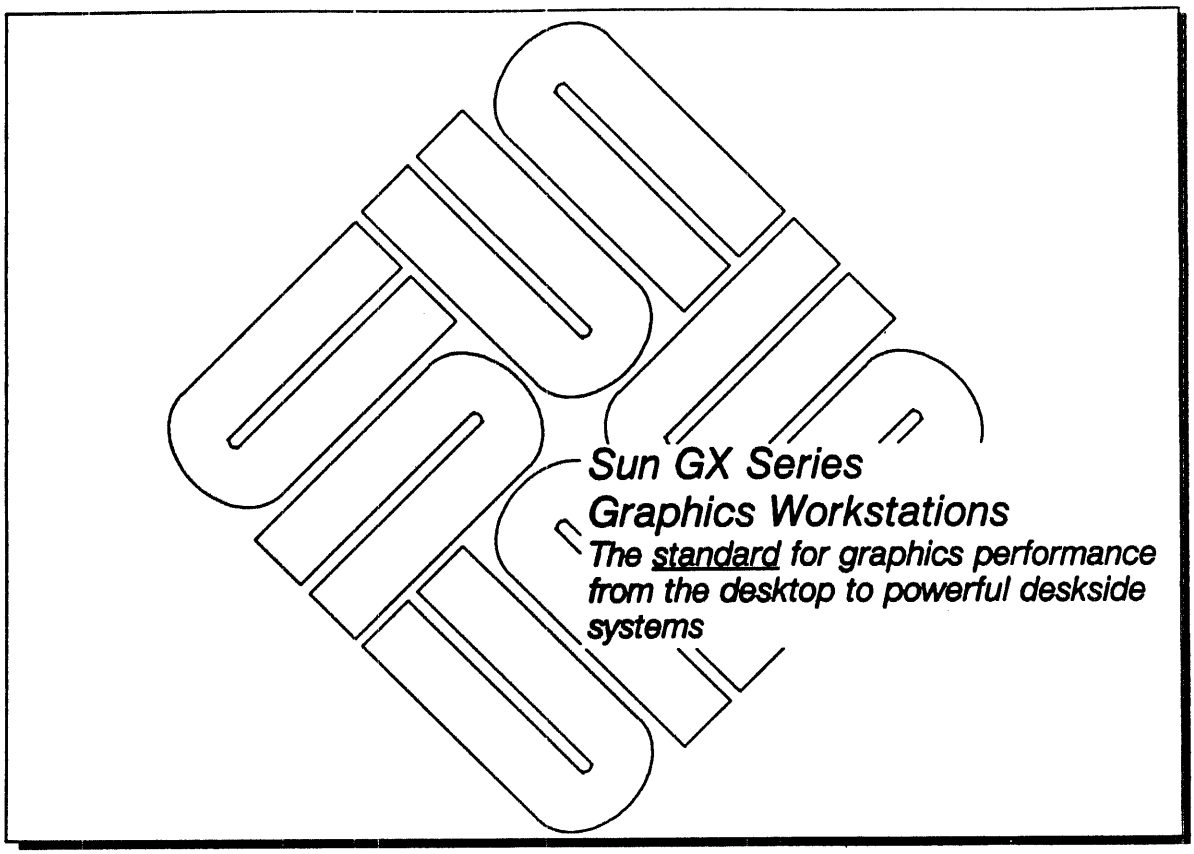


Sun *GX* Series Graphics Workstations

Key Concepts

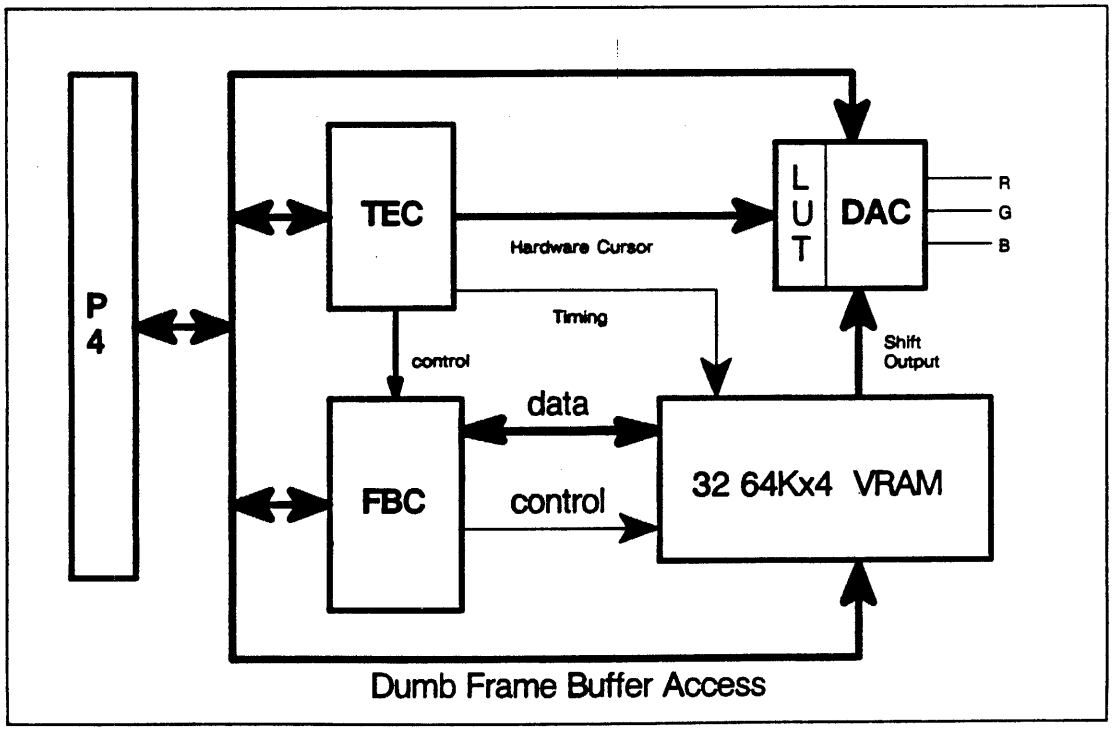
- ***INNOVATION*** – Unique architecture designed with RISC concepts applied to graphics (80/20 rule). 3 commands externally – massively parallel state machine internally ("SuperCISC").
- ***INTEGRATION*** – Uses the most advanced ASIC technology, tightly coupled to the CPU
  the FBC – 43K gates, 170K 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 tranverse multiple software displaylists. Allows high level graphics functions to be controlled by the CPU.
- ***OPENess*** – 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

GX Subsystem – SPECIFICATION OVERVIEW

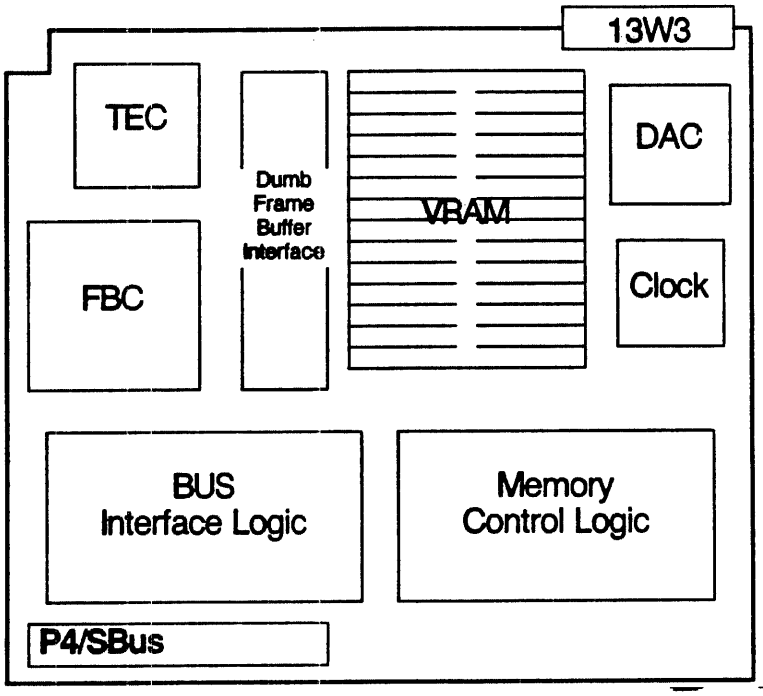
* Hardware accelerator architecture, no processor on board
* P4/S Bus interface
* Size smaller than standard PC AT card
* 8–bit index color
* Supports 1152X900,1024X1024, and 1024X768 resolutions
* Low power CMOS implementation
* Design based on two complex CMOS ASICs
  FBC is 43K gates + rams (2X Sunrise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

Sun *GX* Series Graphics Workstations

CG6 ARCHITECTURE



CG6 Board Layout



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 vectices
  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 datpath
  Linear ROPs
* Antialiasing
  Subpixel addressing
  4x4 filtering
  325 dpi equivalent
* Patterns
  Alignable 16X16 repeating
* Plane and Pixel Mask
* Resolutions
  1152x900x8
  1024x1024x8
  1024x768x8
  1280x1024x8
  1600x1280x8

Sun *GX* Series Graphics Workstations

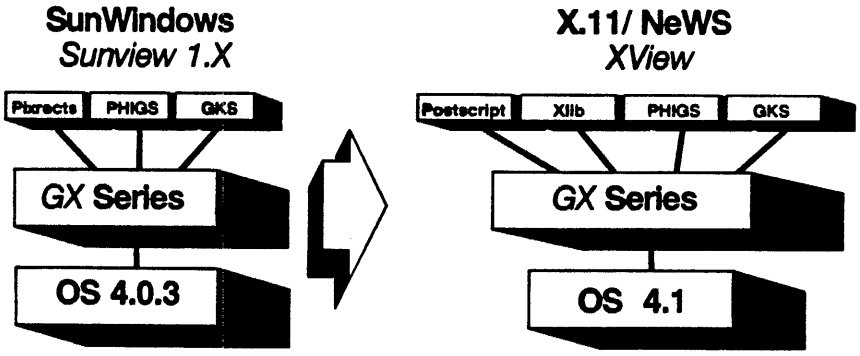
TEC FEATURES

* **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 subdivison**
* **Hardware Cursor**
  - **32X32 Cursor**
  - **3 Colors**
  - **Multiple resolutions**
* **Video Control**
  - **Programmable Timing**
  - **SYNC Generation**
  - **Multiple Resolutions**

Sun *GX* Series Graphics Workstations

The Software Story

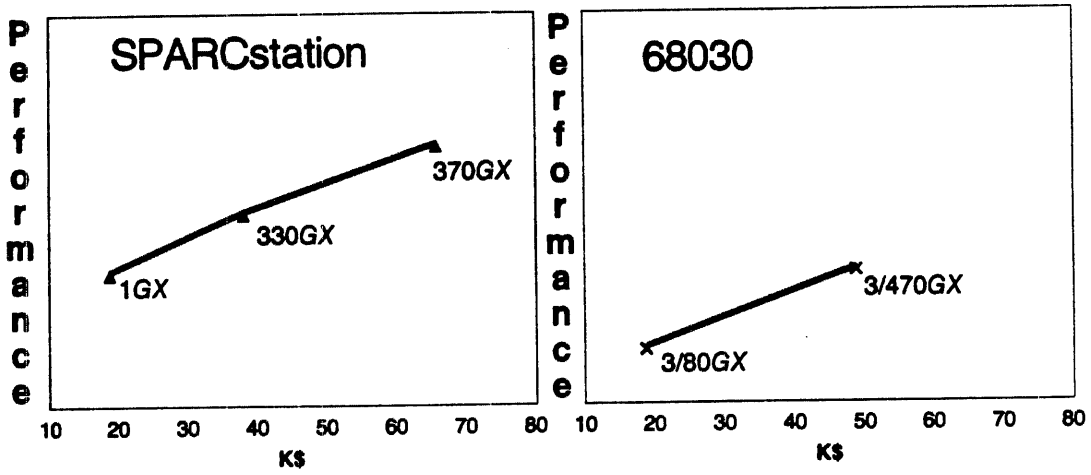
- Pixrects/ Pixwin – accelerates existing applications
- Standards: * SunPHIGS 1.1 (70%+ efficient)
  * SunGKS 3.0 (70%+ efficient)



Sun *GX* Series Graphics Workstations

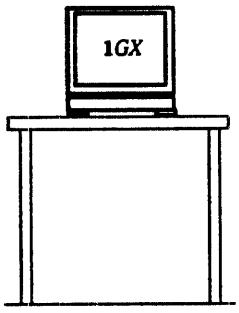
What Is the Sun *GX* Series?

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



Sun *GX* Series Graphics Workstations

Introducing:
The SPARCstation 1*GX*:
$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**

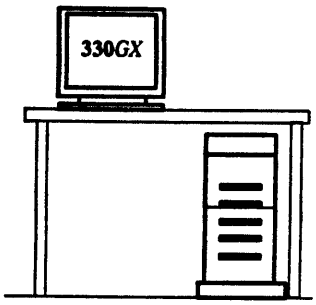
The most powerful desktop graphics workstation available.

Sun Microsystems Inc.
Graphics Products Division
GX Series Graphics Workstations

June 1989

Sun *GX* Series Graphics Workstations

Introducing:
The SPARCstation 330*GX*:
$37,900

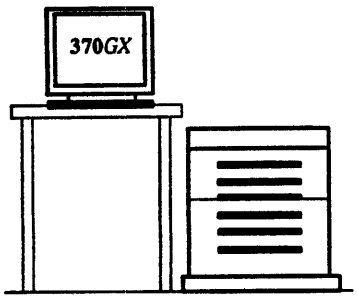


- **200K 3D v/s with Sun PHIGS 1.1**
- **450K 2D v/s with Sun GKS 3.0**
- **16 MIPS SPARC Processor**
- **2.6 MFlop DP Floating Point**
- **8–40 MB Parity RAM**
- **327–654 MB SCSI internal disks**
- **Expands up to 1.3 GB external disks**

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

Sun *GX* Series Graphics Workstations

Introducing:
The SPARCstation 370*GX*:
$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**

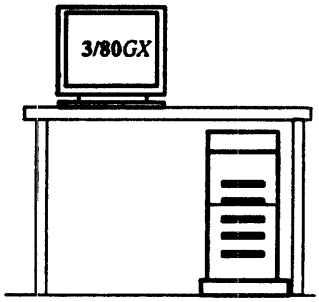
Most powerful, expandable uniprocessor workstation available
Highest graphics, I/O and memory performance.

Sun Microsystems Inc.
Graphics Products Division

June 1989

Sun *GX* Series Graphics Workstations

Introducing:
The Sun 3/80*GX*:
$13,995

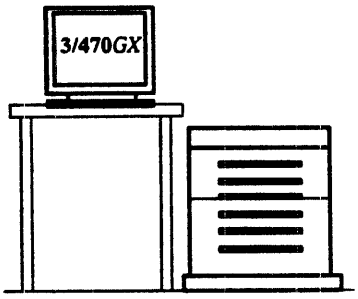


- **100K 3D v/s with Sun PHIGS 1.1**
- **325K 2D v/s with Sun GKS 3.0**
- **3 MIPS 68030 Processor**
- **68882 standard (0.16 MFlops)**
- **4–16 MB RAM**
- **104–208 MB SCSI internal disks**
- **Expands up to 1.1 GB external disks**

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

Sun *GX* Series Graphics Workstations

Introducing:
The Sun 3/470*GX*:
$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.

Sun Microsystems Inc.
Graphics Products Division

June 1989