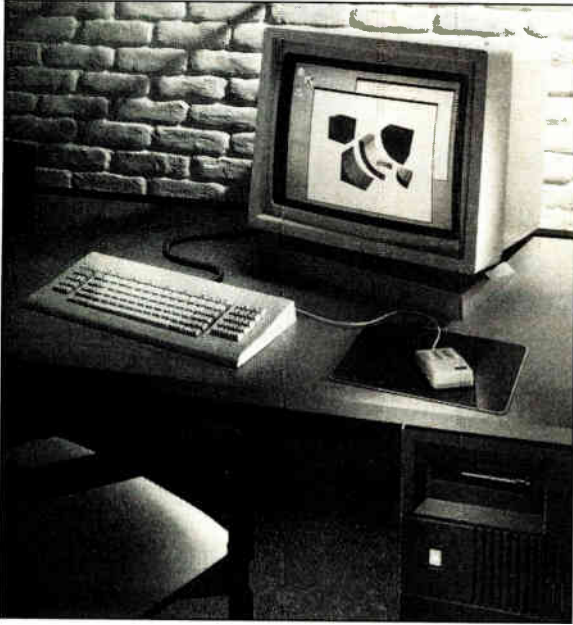


GRAPHICS BOARDS MAKE SUN STATIONS 80% FASTER

THE GRAPHICS PROCESSOR AND GRAPHICS BUFFER PROVIDE QUICKER RESPONSE FOR CAE AND SOLIDS MODELING



FASTER STILL. Sun's two graphics boards will work in the Sun 3/160 and a new work station based on the 20-MHz 68020.

Users of Sun Microsystems Inc.'s work stations can now add options that will speed up their graphics processing capability by 80%. Called Graphics Acceleration Options, the two-board set comprises the GP+ graphics processor and the GB graphics buffer.

The two boards afford faster response for two-dimensional applications, such as computer-aided engineering, and for 3-d applications, such as mechanical computer-aided design and solids modeling. The options can boost the graphics performance of the Sun 3/160 work station family and that of a family the company will unveil next month at the Siggraph show in Dallas. The new work stations will be built around the new 20-MHz version of Motorola's 68020 32-bit microprocessor.

QUICK DRAW. The drawing speed of the GP+ graphics processor is 20% faster than the previous-generation board. It has a vector drawing rate of 1.75 million pixels/s, as compared with 1.5 million pixel/s. It can transform, clip, and scale a 3-d image at a rate of 45,000 vectors/s as compared with the older board's 25,000 vectors/s.

The GP+ graphics processor architecture is based on two pipeline stages, the viewing processor and the painting processor. Each is implemented with a

high-speed 29116 bipolar bit-slice processor from Advanced Micro Devices Inc. of Sunnyvale, Calif. The viewing processor also uses the 1232 and 1233 floating-point data-path chip set from Weitek Corp., Sunnyvale, to perform all transformation and clipping operations in floating-point coordinates, with no loss of performance. The chips are CMOS versions of previous-generation bipolar chips, the 1032 and 1033. They give the viewing process a speed 2½ times that of the previous version of the processor.

Sun expects even more performance once it adds Weitek's next generation of the data-path chips, called the 3132. On one chip, the multiply and add operations will work in parallel so that a multiply-and-accumulate operation can occur in 50 ns, half the time now required. In addition, the same chip also contains a divide capability and a lookup table. The chip is said to be the first to combine all three functions.

In performing a transformation, the GP+ viewing processor converts the im-

age stored as a display list in the modeling-coordinate system into the device-coordinate system of the work-station CRT. The clipping operation removes any part of the image that is outside the viewing area of the CRT screen after the designer has zoomed in. The viewing processor passes its transformed image to the painting processor.

DOT TO DOT. At this point, the drawing consists of a set of end points that resembles a connect-the-dots drawing. The painting processor not only connects the dots but colors in the spaces between. In addition, it performs hidden-surface removal at the same time.

The painting processor also performs Gouraud shading, the minimum shading required for solids modeling. Also known as smooth shading, Gouraud shading is a computationally intense technique used to render 3-d objects by interpolating the color and intensity of each pixel based on the end points of the polygons that make up an image being displayed on the work station's screen. The result is a smooth transition of color change over the surface of the object.

The GB memory speeds hidden-surface removal in 3-d images. It functions as a 16-bit-per-pixel memory array for Z-buffer depth-sorting algorithms in 3-d applications. This helps boost the Gouraud shading rate, says Sun, because the hardware algorithm allows Z-buffer read operations to overlap with other functions.

The GP+ sells for \$6,900, and the GB sells for \$4,000. Both graphics boards can be delivered 60 days after receipt of order.

—Jonah McLeod

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SILICON GRAPHICS ADDS NETWORK SUPPORT

New support for one popular engineering network and enhanced support for another will help Silicon Graphics Inc.'s work stations communicate with the variety of mainframes, minicomputers, and work stations its customers use. Now the Iris 3000 [*Electronics*, Feb. 10, 1986, p. 57] and Iris 2400 color graphics work stations can use the Network File System (NFS) from Sun Microsystems Inc. They also will be able to make wider use of the Defense Department's Transmission Control Protocol/Internet Protocol.

NFS, which operates independently of machine type or operating system, enables a work station to access a file on a

remote work station as if it were a local file. The sharing of data in a heterogeneous network facilitates teamwork among engineers and cuts the amount of system administration by eliminating the need to keep redundant copies of files.

THREE-WAY TRANSFERS. TCP/IP makes it possible to transfer files among the Mountain View, Calif., company's work stations operating under AT&T Co.'s Unix operating system and Digital Equipment Corp. VAX and MicroVAX computers running under the VMS operating system, or IBM Corp. mainframe computers operating under the MVS environment. The new TCP/IP implemen-