IBM 6090 Graphics System

Productive by design

The IBM 6090 Graphics System—a vision of the future... today

The challenges facing today's business have never been more complex, and effective solutions to those challenges have never been more critical. Decisions that you make today require that you carefully examine the effect of those decisions across your enterprise, and ensure that they meet both the needs of today and the vision that your enterprise has for tomorrow.

Given these considerations, many enterprises have come to rely on sophisticated graphics systems to solve the problems of designing, engineering and manufacturing products, in order to stay competitive in a global marketplace.

The adoption of Computer-Aided Design, Computer-Aided Manufacturing, Computer-Aided Engineering (CAD/CAM/CAE) and Computer-Integrated Manufacturing (CIM) solutions have enabled these enterprises to address a rapidly changing and challenging marketplace. From areas as diverse as aerodynamic modeling to the design of an electric hair dryer, companies have implemented these CAD/CAM strategies to increase the quality of their products and reduce the time and expense of development.

And as the complexity of these advanced graphics solutions has increased, enterprises have recognized the need to implement a total system solution to meet their growing requirements—a system that has the capacity to respond effectively to both today's necessities and the vision of tomorrow's opportunities.

A growing number of companies, both large and small, have found that their needs are best met by incorporating advanced graphics capabilities at every stage—from design, through testing, to production. And as their graphic requirements have grown, their reliance on these solutions has increased.

More than ever, these enterprises need a total system solution that satisfies the need for advanced graphics functions, improved processing performance and high-speed channel communications at every step of the design and development process. Across the enterprise—at both local and remote locations.

They recognize a need for a graphics system that combines state-of-the-art hardware, systems software that increases both function and performance while fully accessing the capabilities of the hardware, and applications that fully exploit the substantial functional and performance power of the hardware system. They want a system that provides a complete and comprehensive solution for a wide range of graphics applications.

These are precisely the needs that are met by the IBM 6090 Graphics System—our most powerful solution for sophisticated graphics environments.


IBM

The IBM 6090 Graphics System—a total system solution

IBM is the recognized leader as a systems integrator in the development and implementation of host-based CAD/CAM solutions. The 6090 continues IBM's tradition of providing a clear growth path for CAD/CAM/CAE and other advanced graphics users, and the 6090 Graphics System also protects the investment you have made in IBM 5080 Graphics System applications, because the 6090 allows you to continue to run existing 5080 Graphics System applications.

It provides users with real-time three-dimensional (3D) functions, advanced graphics primitives, advanced shading capabilities, and significant performance improvements. It is an extension of the IBM commitment to provide the enhanced functions and performance levels needed for computationally intensive applications requiring advanced visualization in a broad range of graphics environments.

Powerful tools for producing advanced graphics

The components of the IBM 6090 Graphics System that supply higher performance and functions are the 6095 Graphics Processor, the 6098 Channel Control Unit, the 6098-01R Remote Control Unit and a full complement of displays and peripheral devices.

The cornerstone of the 6090 Graphics System, the 6095 Graphics Processor—with its 32-bit floating point architecture and hardware specifically designed to enhance the performance of applications written to the graPHIGS™ Programming Interface Version 2—can provide significant price/performance advantages over previously available graphics systems.

Interact with realistic graphics

The IBM 6090 Graphics System enables visualization and manipulation of highly realistic engineering drawings, technical illustrations or other complex graphics—and permits use of an available palette of over 16 million colors.

The 6095 lets users employ real-time 3D shading capabilities using advanced graphics primitives, automatic curve and surface generation, increased resolution (1280 x 1024 pixels), and more—giving designers and engineers powerful productivity tools to employ in their work.

The 6090 Graphics System also contains shading functions that let users explore a variety of lighting effects during product design and development—providing a selection of multiple light sources that include ambient, diffused or specular light points, to heighten the realism of the image on the display. And, with the highly interactive performance of the 6090, these images can be visualized, manipulated and modified in real-time, speeding the process and increasing user productivity.

Transmit large and complex models

The increased performance of the 6090 Graphics System enables users to efficiently transmit large and complex models to local and remote configurations. And, since the files reside on the host, the 6090 gives you increased control over valuable information and provides necessary data integrity for users anywhere in the enterprise.

The 6090 works with designers and engineers to increase productivity potential, cut design and production costs, and improve product quality by providing a high level of graphics communication support.

Maximizing function and protecting your investment

The 6090 Graphics System is a powerful, highly interactive graphics solution that offers extensive three-dimensional visualization functions, increased processing capabilities and advanced graphics primitives. It is enhanced to provide light sources and shading capabilities, the ability to visualize designs in over 16 million concurrent colors, and includes significant price/performance improvements.

The 6090 Graphics System has been designed to offer these enhanced functions and performance while providing both a clear growth path for your advanced graphics needs, and giving you a graphics system that is complementary to what you are presently using.

New users can immediately realize the benefits of the 6090 Graphics System, while current 5080 users can take advantage of the increased performance and function, provided that applications conform to the 5080 Principles of Operation. In fact, applications currently running on 5080 Graphics Systems will operate on the 6090 Graphics System—protecting and maximizing the investment made in IBM 5080 Graphics System applications.

Building a complete graphics solution

The 6090 Graphics System is designed to address a wide variety of advanced graphics requirements, supplying your users with additional functions and higher performance—and by providing advanced graphics workstations at a competitive price.

Increased graphics processing capability
The first building block of the IBM 6090 Graphics System is the 6095 Graphics Processor, a high performance, real-time 3D graphics processor that is fully compatible with IBM 5085 or IBM 5086 Graphics Processors.

The 6095, with its 32-bit Floating Point Graphics Protocol (FPGP) architecture, provides significantly increased performance over the 5086 Graphics Processor. In addition, to give users and application developers the ability to realize the most efficient graphics processing performance, the 6095 has been designed to work with the graPHIGS Programming Interface Version 2.

Through the FPGP, the 6095 provides increased speed and precision while making fewer demands on the host. Thus, with the shading functions, faster transformations, pixel times and vector draws available through the 6095, users can realize increased performance and productivity.

The 6095 Graphics Processor provides more process memory—up to a maximum of 32Mb—as well as a variety of advanced graphics functions.

The 6095's Shading Processor Option provides users with the ability to work with multiple light sources, hidden line/surface removal, and depth cueing, to more completely visualize and evaluate surface characteristics.

The 6095 also enables users to generate curves and surfaces exactly using Non-Uniform Rational B-Splines (NURBS)—faster, more precisely and with less required storage. The capacity to execute transformations at high speed, coupled with the use of NURBS curves and surfaces, enables application programmers to create images with mathematical descriptions based on a few control points, instead of through a large number of polygon coordinates.

In addition, features such as high-speed bit-block transfers (BIT-BLT), high-performance Transformation and Clipping, the availability of a 3270 windowing capability, increased pixel resolution and 5080 compatibility make the 6095 a truly efficient graphics processor.

With the 6095's advanced function, improved ergonomics and price/performance enhancements, you have the optimum combination of mainframe computational power and the power of an advanced graphics workstation—anywhere in your enterprise.

High-performance communications
The 6098 Channel Control Unit provides high-performance, multi-interface, broadband communications support in the 6090 Graphics System. The high-speed transfer of data improves system performance—at up to 4.5Mb per second—almost twice the speed previously available.

The increased capacity of the 6098 Channel Control Unit enables you to connect more than four times as many devices as the 5088 Channel Controller.

Connecting graphics workstations throughout the enterprise
The 6098-01R Remote Control Unit links graphics workstations at remote sites with the host graphics installation over either V.35 or T1 links, and can attach up to 16 graphics processors—either the 6095 Graphics Processor or 5086 Graphics Processor—while providing significant price/performance advantages.

A wide range of peripherals for advanced graphics needs
The 6090 Graphics System provides an extensive array of peripheral devices to work with the system hardware.

The 6090 Graphics System works with the 6091 display family, Models 019 and 023, as well as the 5081 display, Model 016. The 6091 displays are high-resolution raster color displays that provide enhanced resolution to heighten the realism of images on the screen (up to 1280 x 1024 pixels), and enable the user to change screen resolution with a switch on the front of the console.

A variety of input devices are also available—and are compatible with previous 5080 Graphics Systems, which helps to protect and maximize the investment you have already made. Such tools as the Graphics Keyboard, Lighted Program Function Keys (LPFK), Dials and Tablets provide you with convenient methods to input graphics information for a variety of still or animated visual effects on either 5081 or 6091 displays.

The visualizations that your users are working with on screen can be viewed through such devices as Plotters and Screen Projectors.

What's more, the enhanced 6097 Screen Printers—that provide up to 274,000-color capability, precise 300 dots-per-inch (dpi) registration and 1280 x 1024 resolution—give you hard copy that uses a thermal transfer process to faithfully duplicate the display image.

System software to enhance graphics

The related system software used with the 6090 Graphics System allows applications to deliver enhanced function and performance to end users.

IBM Graphics Access Method/ System Product (GAM/SP), Release 3.0, is enhanced to support the 6090 Graphics System, and is required for access to advanced graphics functions.

The graPHIGS Programming Interface Version 2 utilizes the 6090 Graphics System to provide programmers and application designers tools to create realistic models. The graPHIGS API V2 provides access to such functions as lighting, shading, depth cueing, and advanced graphics primitives, and takes advantage of the high-performance rendering capabilities of the 6090 Graphics System.

Advanced functions using the graPHIGS Programming Interface

The graPHIGS API V2 is an enhanced, interactive programming tool that efficiently utilizes the 6095 Graphics Processor. Available in MVS™ and VM environments, graPHIGS API V2 gives your graphics application programmers, who are working in a number of high-level languages, the ability to increase programmer productivity.

Much of the graPHIGS API V2 power lies in the special capabilities of the Floating Point Graphics Protocol. These advanced capabilities give users access to all the graphics functions that reside in the hardware, provide increased speed and precision, and decrease demands on host capabilities and storage. Thus, if your applications utilize the graPHIGS API V2 to run on the 6095 Graphics Processor, they perform more efficiently.

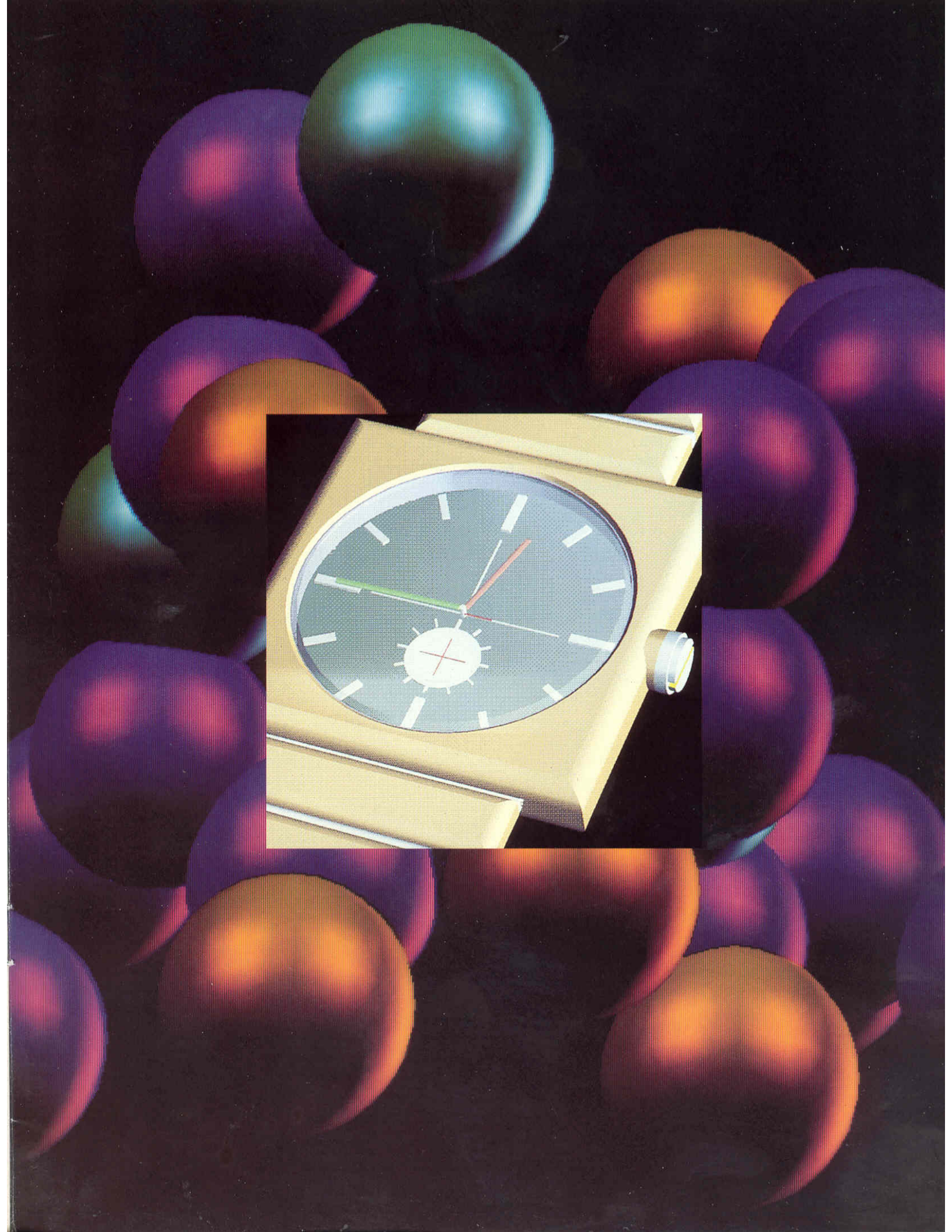
If you write your own graphics software, the graPHIGS API V2 can help reduce the cost you incur in developing and maintaining this software by enabling you to increase programmer productivity and develop applications which run on a broad range of devices. As a result, your application programmers will be able to create device-independent applications more readily and maintain programs more easily.

Increased function for design and engineering applications

The graPHIGS API V2 provides advanced graphics primitives for the creation of curves and surfaces that are commonly used in engineering applications. A wide variety of new attributes and other geometric information add to the increase in function.

Using graPHIGS API V2 with the Shading Processor Option installed in the 6095 Graphics Processor provides several sophisticated functions that, depending on your data's complexity, operate in near real-time. This performance, combined with the advanced rendering of the Shading Processor Option, can significantly enhance the visual realism of a model or technical illustration. For example, functions such as hidden line/surface removal can now be done locally using the 6095 Graphics Processor.

The light source simulation capability of the Shading Processor Option enables users to illuminate objects using various light sources—and then view the model under these lighting conditions. In addition, depth cueing allows a user to create an illusion of depth in a displayed model, adjusting colors so that the graphics primitives further away from the viewer have lower intensities.



The IBM 6090 Graphics System—a complete graphics solution

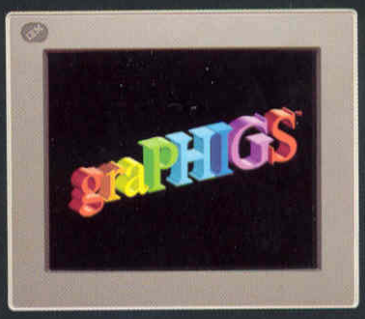
The IBM 6090 Graphics System provides CAD/CAM and other advanced graphics users with significantly higher performance and a broad range of additional functions to satisfy the needs that your enterprise has—now and in the future.

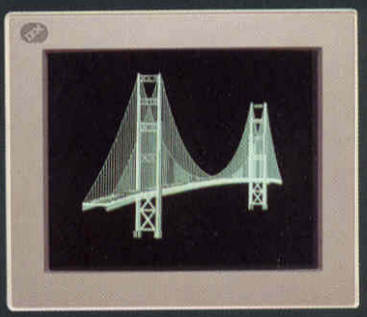
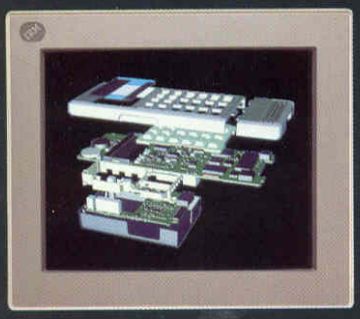
The 6090 is a complete family of products that works together with the system software, and applications that use the system software capabilities, to form a powerful, advanced graphics product family. The 6090 can enable your designers and engineers to more completely address the requirements necessary in your industry.

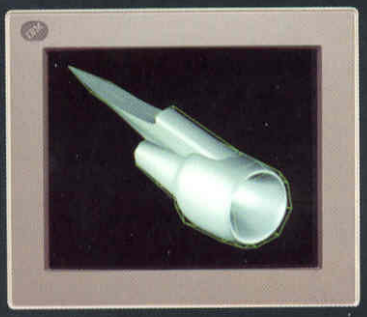
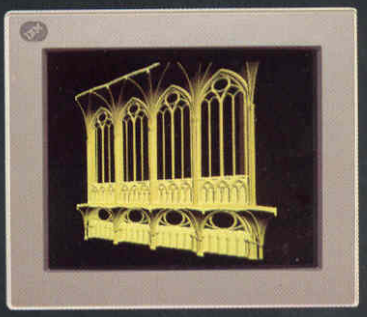
The *hardware* provides advanced graphics functions, high-speed processing and communications capacity, increased data transfer capability, and an improved remote communications facility. The latest levels of *system software* give additional graphics function and performance, as well as full access to the capabilities of the hardware. The *applications* that use this software can fully exploit the substantial functional and performance power of the hardware/software system.

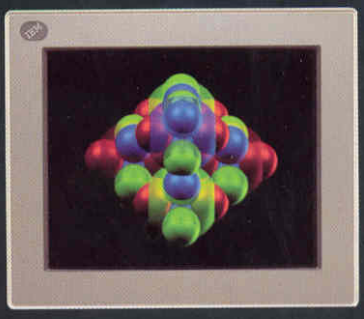
The 6090 Graphics System, with its increased power, capacity and function, provides a total system solution in hardware, systems software and applications—enabling your users to become more productive, more accurate and more cost-efficient. It is a system that provides the sophisticated graphics tools necessary to compete in an expanding and highly competitive arena—and a system that can serve the visions you have for the future.

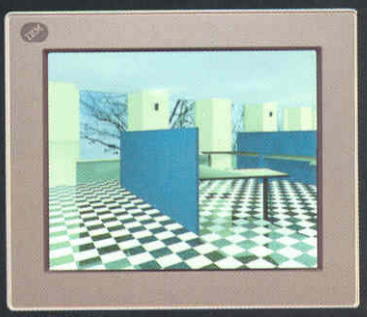
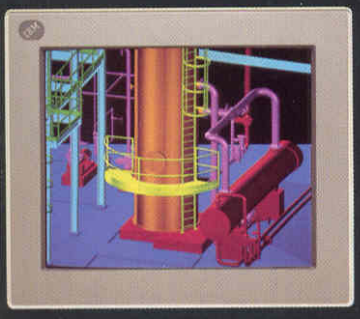
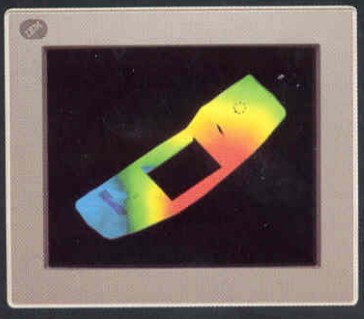
To learn more about the IBM 6090 Graphics System, contact your IBM marketing representative, and be introduced to the most state-of-the-art graphics system available from IBM.



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1133 Westchester Avenue
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Printed in the United States of America
10-89

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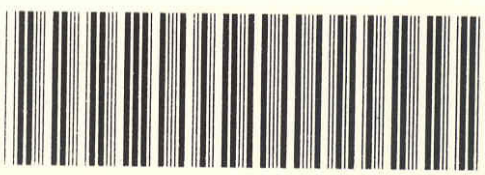

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