LEX 90/35 SOLIDVIEW-M

SOLIDVIEW-M is a medium resolution (640x512) version of Lexidata's patented SOLIDVIEW™ solid modeling technology. Available as an option on selected LEX 90/35 raster graphics display processors, SOLIDVIEW-M allows the user to combine standard LEX 90™ functionality with the patented solid modeling capability of SOLIDVIEW. Because LEX 90/35 is field upgradeable, SOLIDVIEW-M can be purchased either with the system initially, or added later as applications and requirements change. SOLIDVIEW-M features fast, flicker-free 60Hz operation, two complete eight-bit image buffers, and a 16-bit depth buffer.

FEATURES	BENEFITS
LEX 90/35-Based Option	Can Be Added to Selected LEX 90/35 Display Systems At Any Time
Two Complete 8-Bit Image Buffers	Allows Drawing of One Image While Another is Being Viewed
60Hz Non-Interlaced System	Displays Bright, Flicker-Free Color Graphics
16-Bit Z-Buffer	Provides Fast, High-Quality 3-D Solid Models
Full LEX 90 EGOS Instruction Set	Same System Can Be Used For 2-D And 3-D Display
Local Hidden Surface Removal and Local Visible Surface Shading	Offloads the Host Computer

SOLIDVIEW vs. Conventional Approaches Other systems must not only transform and clip an object into a viewing volume and remove hidden surfaces, but also calculate intensities for every pixel on each visible surface before pixel data can be sent to the display processor. The result of this host-only computation is a slow line-at-a-time "painting" of the image.

In contrast, the powerful combination of SOLIDVIEW-M and a host computer increases efficiency by concurrently performing the two fundamental processes involved in generating a shaded 3-D image. While the host transforms and clips the object into a viewing volume, SOLIDVIEW-M removes hidden surfaces and shades visible surfaces. SOLIDVIEW-M displays solid images *in seconds* instead of several minutes when created by conventional means.

Firmware The SOLIDVIEW technology provides display functions for 3-D shaded image generation. The host sends transformed and clipped convex planar polygons to the display processor in screen coordinate format. The host also determines the proper shades for the polygons and loads the Lookup Table. SOLIDVIEW-M relieves the host of the repetitive, time-consuming work of displaying 3-D solid objects. The SOLIDVIEW-M library also contains the standard Image Display Operating System and Extended Graphics Operating System (IDOS/EGOS) function set supplied with all LEX 90/35 systems.
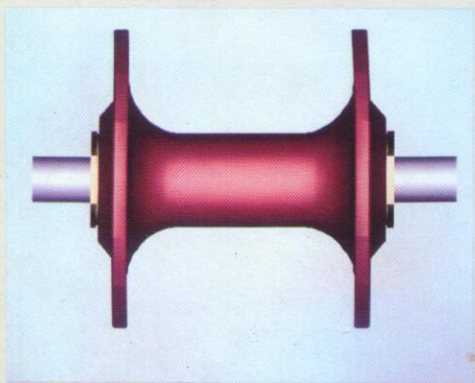
A 2-D front view of a bicycle hub highlighting SOLIDVIEW-M's shading capabilities.
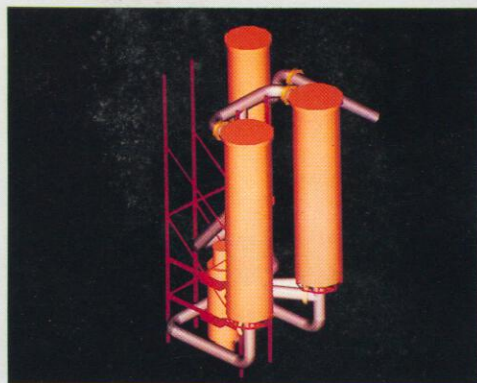
As demonstrated by this model of an integrated piping design, any 3-D object (including 3-D data or mathematical functions) may be modeled using SOLIDVIEW-M.
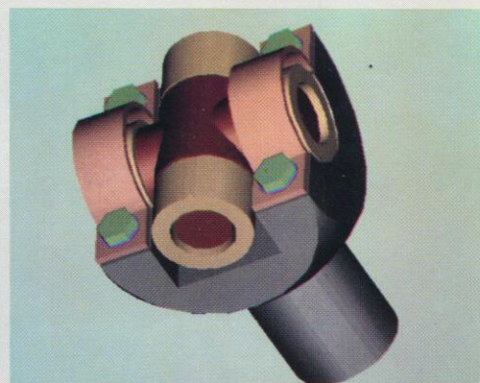
This completed 3-D display of a common universal joint, consisting of approximately 3,000 polygons, was incrementally constructed by SOLIDVIEW-M in only a few seconds.

Translucency As each polygon is sent to SOLIDVIEW-M, visible surfaces of the new polygon hide any surfaces behind them. At the user's option, however, SOLIDVIEW-M can use a translucent pattern rather than an opaque shade. Since the translucent pattern only writes selected pixels, some of the information behind the added polygon remains visible. Using this "screen door effect," important details inside the solid model are visible even as other parts are added to the view. Once a picture is drawn with SOLIDVIEW-M (which typically takes 10 to 20 seconds), a new translucent version can be drawn in the same amount of time with no additional host calculations.

Incremental Construction SOLIDVIEW-M works with a series of 3-D graphics primitives to enable the user to generate a solid image easily and quickly. Unlike other solid modeling systems that draw the entire screen one line at a time, SOLIDVIEW-M displays the construction of solid objects *incrementally*. Because of the unique use of a local Z-buffer, vectors or polygons can be sent to SOLIDVIEW-M in any order. As a result, objects can be constructed on the screen as they would be constructed in real life — one piece at a time instead of one line at a time.

Surface Rendering Techniques SOLIDVIEW-M provides both intensity variation and spatial variation as two shading techniques. Intensity variation is performed using either Polyhedron (constant) or Gouraud (intensity interpolation) shading. Spatial variation include opaque and translucent modes.

Summary SOLIDVIEW, Lexidata's exclusive, patented technology for the display of solid models, is available as an option on selected LEX 90/35 high-performance raster graphics display systems. The SOLIDVIEW-M option displays high-speed solid images and performs local hidden surface removal and local visible surface shading. In addition to its patented features and capabilities, SOLIDVIEW-M also enables the user to take full advantage of all standard LEX 90 functionality.

LEX 90/35 SOLIDVIEW-M Specifications*

Performance Average polygon write during shading and hidden surface removal: Up to 2,000 polygons/second	**Refresh Rate** 60Hz non-interlaced 16-Bit Z-buffer
Resolution 640x512x8x2 Images 256 Colors from a palette of 16.7 million	**Input Device** 3-D Joystick

*Note: Consult other LEX 90/35 data sheets for additional hardware specifications.

LEX 90/35 SOLIDVIEW-M Ordering Guide

Order No.	Description
FW-02	SV-M Functionality
FW-02-UK1	SV-M Upgrade Kit

⊡LEXIDATA®

Lexidata Corporation
755 Middlesex Turnpike
Billerica, MA 01865
(617) 663-8550 TWX: 710-347-1574

UNITED KINGDOM: Lexidata Ltd., Hook (025672) 3411
FRANCE: Lexidata SARL, Rungis (1) 686-56-71
JAPAN: Lexidata Technical Center, Tokyo 486-0670