Digital Engineering. A Product Perspective.

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Redefining the World of Computer Graphics.

The Retro-Graphics™ Terminal Enhancement. The Idea That Became a Company.

It began in 1978, with a complicated engineering challenge we solved with a simple idea — to take an existing alphanumerics terminal and add single-board circuitry and additional memory to convert that terminal into a full-featured, bit-map graphics terminal. It was an idea we called Retro-Graphics. A successful idea that has helped us forge a strong, resourceful company called Digital Engineering.

The Retro-Graphics enhancement of an alphanumerics terminal is easy. By plugging a printed circuit board into your alphanumerics display, the terminal is transformed into a device capable of creating complicated graphics — point plots, vector and polygon drawings, pie and bar charts, complex mappings, and more. All without affecting the alphanumerics capabilities of the terminal.

You get the best of state-of-the-art raster scan graphics technology, with standard to medium resolution and flicker-free imagery. You also get complete compatibility with Tektronix® graphics terminals and industry-standard graphics software, like ISSCO's® DISSPLA® and TELLAGRAF®, Tektronix' PLOT 10™, Megatek's Template™, Precision Visuals' DI-3000™, and Signal Technology's Interactive Laboratory System (ILS®).

The Retro-Graphics enhancement is available either as a field-installable add-on to an existing terminal or as a new fully upgraded graphics terminal. And, in many cases, Retro-Graphics will cost you less than half of what you paid for a comparable graphics terminal.

DE™ has grown rapidly, and now offers products and services ranging from Retro-Graphics enhancements, firmware, software, and input/output devices to a complete program of technical documentation, customer services, sales support, and graphics R&D.

Digital Engineering not only stands as the pioneer in add-on graphics, it continues as the leader in the field. We've achieved leadership by building depth into our company, and by developing a full range of products and services. And in the future, DE will continue to bring to the industry the products and services it will need. Digital Engineering. The Retro-Graphics terminal enhancement. Important names to know if you need affordable computer graphics.

Retro-Graphics Enhanced Display Terminals. Popular Becomes Versatile.

Digital Engineering offers a series of graphics-upgraded display terminals, including some of the most popular on the market today — the DEC™ VT100™, VT101™, VT102™, VT103™, VT131™, and VT132™ terminals, the TeleVideo® 900 Series of terminals, the Lear Siegler ADM 3A, 3A+, and 5 Dumb Terminal® displays, the standard ADDS VIEWPOINT terminal, TI's OPTI 900™ Model 940 Electronic Video Terminal, and the Datamedia™ ColorScan™ 10, 30, 60, and 70 color terminals. With the features added by Retro-Graphics (and Color Retro-Graphics™ for the ColorScan) these terminals have become versatile graphics wonderworkers in more than 20,000 business, scientific, and engineering applications worldwide. Digital Engineering. Going places in graphics.

With the Retro-Graphics enhancement, you get complete emulation of the Tektronix 4010 Series of graphics terminals — and, with the introduction of our new GEN.II™ Retro-Graphics products, you can add Tek® 4027 color graphics terminal simulation as well. Additionally, our DQ650M enhancements for the DEC terminals include Tek 4014 simulation along with GEN.II's 4010/4027 features.

Our enhancement boards, which contain an 8- or 16-bit microprocessor and a dynamic RAM memory in one, two, or three planes, provide monochromatic, gray scale, or color display. Retro-Graphics enhancements can be supplied in non-interlaced or interlaced video formats. And in some cases, our boards contain an on-board power supply — which means you won't load down the terminal's power supply.

In the future, DE will continue to add to its list of enhanced terminals. We have developed the revolutionary GEN.II-based RG1000 terminal enhancement board, which can be custom-designed to fit most terminals on the market now — or coming in the near future.

Retro-Graphics enhanced display terminals from Digital Engineering. They'll give you graphics possibilities without diminishing alphanumerics capabilities. And they'll give your business the advantage of better communications at less cost.

Firmware and Software. Expanding Graphics Horizons.

Since the Digital Engineering Retro-Graphics enhancements are Tektronix-based, compatibility with most popular utility and applications programs, both present and future, is assured. This compatibility also means that programs written for monochromatic Retro-Graphics products will also work with gray-scale or Color Retro-Graphics enhancements that you install now or later.

Basically, the Retro-Graphics feature sets are defined by our Tek-compatible firmware, giving the user the choice of text, vector, point, crosshair cursor, and other modes needed to achieve smart-looking graphics easily and quickly.

Through simple, English-like commands, the user can plot points, draw arcs, circles, and polygons, and automatically fill closed shapes. Use independent line formats for solid, dotted, or dashed vectors. Selectively erase on a mode-independent basis. And display all these graphics functions — and more — in a choice of screen formats.

Graphics text can also be manipulated to suit the plot. Both dot-matrix and vector-character sets can be generated, including ASCII, APL, and user-defined sets. Characters can be defined by height and width, and they can be italicized, rotated, and proportionally spaced.

DE also offers firmware options for compatibility with non-Tektronix software provided by mainframe and minicomputer manufacturers; for example, our optional ReGIS-compatible firmware will be available for DEC environments in 1983.

For maximum flexibility, Retro-Graphics system architecture is designed with easy-to-use software "hooks" that give the sophisticated user the ability to program custom software in a high-level language — "C," for example. This allows the Retro-Graphics enhanced terminal to be tailored to the user's specific applications.

Digital Engineering firmware products are packed with graphics features that put little demand on important software/host computer resources. In essence Retro-Graphics enables you to spend more time creating high-quality graphics and less time waiting for terminal/host computer data transmissions.

To make it even easier to enter the world of graphics, and to explore that world at affordable prices, Digital Engineering has also developed PLOTPAK — our entry into the graphics software market.

Developed for our standard Retro-Graphics enhancements (models VT640, VT640S, and RG512 with Tek 4010 emulation), PLOTPAK is a set of graphics routines that can help the user to get bar charts, pie charts, and other images on the screen fast. It features "windowing" and "clipping" of the virtual plotting surface — the user can zoom and pan through the virtual image rapidly by selecting a portion of the virtual plotting surface and mapping it into a viewport on the terminal screen. And PLOTPAK helps you do all this without modifying the virtual image data. PLOTPAK also features error-checking, telling you immediately if input data is correct and facilitating rapid debugging of applications programs. PLOTPAK software supports the drivers needed for all our standard Retro-Graphics enhanced terminals.

Now the MIS manager and programmer who is exploring graphics has an instant software package available from the same team that developed the Retro-Graphics terminal enhancement.

Graphics Input and Output. For System Flexibility.

Digital Engineering supports its Retro-Graphics enhanced terminals with an impressive range of devices that allow you to easily interact with the graphics system or preserve graphics images in hardcopy form.

Our standard crosshair cursor feature allows you to interact directly with the host computer; you can position a crosshair on the terminal screen with four keyboard arrow keys and transmit the X-Y coordinates to the computer — a useful tool in CAD applications, for instance.

Our light pen option allows the operator to simply touch a raster screen with the light pen to transmit coordinates to the host computer. Or an optional interface for Summagraphics™ Bit Pad One™ and Bit Pad 10™ digitizers is also available for even more versatility. These digitizing devices are typically used to trace continuous and complex graphics lines in applications that depend heavily on charts, maps, or other ordered but complicated forms.

When hardcopy of the screen image is needed, DE offers optional interfaces and connectors for a variety of thermal and impact printers and photographic hardcopy devices. Each is designed specifically for the user-chosen output device to achieve the utmost in flexibility.

Documentation Support. Complete Information That's Easy to Use.

In order to keep Digital Engineering users fully informed about our products we've established a comprehensive documentation service. Each Digital Engineering manual is skillfully written — in easy-to-use terms — and fully illustrated. As a result little time is spent installing Retro-Graphics products or getting the enhancements on-line and into operation.

Our manuals include:

- Operation Manuals — complete tutorial manuals, including operation and installation instructions. These manuals are packaged with each Digital Engineering product.
- Maintenance Manuals — comprehensive electronic information about our products with schematics, block diagrams, and other details (not included in product packaging).

Additional copies of these manuals are available for a small fee. Contact us for a list of applicable DE manuals and their prices.

Digital Engineering is committed to supporting its customers — end users and OEMs — with the best available information on the products we offer to the industry.

Customer Service. Fast, Accurate Response When You Need It.

The Digital Engineering customer service system is based on our factory support and a worldwide distribution network. Each Retro-Graphics distributor stands as a front-line installation, field service, and repair unit, fully supported by DE-supplied and -specified repair and test equipment. We also continually track repair statistics, spare parts use and stocking by computer in order to keep distributors supplied with what they need to get the job done.

Warranty and maintenance programs — as well as factory installation — are also offered by DE. Our Retro-Graphics warranty provides parts, labor, and one-way shipping costs. Plus our response times are fast — 72-hour turnaround on repairs and 24-hour parts shipping.

For additional maintenance options, users of Retro-Graphics upgraded DEC VT100 and VT132 terminals may also choose from a variety of service programs now offered by Digital Equipment Corporation.

Manufacturing Strength. R&D Capability. Making It Better Now and in the Future.

At present, Digital Engineering manufacturing facilities can turn out thousands of Retro-Graphics enhancements each month. This means customers have access to more than enough products to meet their requirements — and we're willing to sit down and discuss special customer needs at any time.

Exacting procurement standards ensure that only reliable components are incorporated into DE products. QC engineers monitor every stage of production, and each product is tested by advanced computer-controlled automatic test equipment. Once assembled, each product is "burned-in" over a range of temperatures to make sure it works when it's used in the field.

Digital Engineering products are the result of thousands of hours of research and development in all aspects of engineering design. And for the future, we're constantly at work exploring new product developments that will meet new and changing business requirements.

Finally, Digital Engineering quality is what counts. Present products and future ones bearing the Digital Engineering name are the best examples of our concern for quality and our achievement of reliability.

Distribution and Delivery. Products When and Where You Need Them.

The Digital Engineering distribution system is comprehensive, with outlets for our products worldwide. Local and regional distributors work closely with us to keep our customers supplied with the products they need, where they need them — fast.

Not only have we chosen the best group of distributors for our products, we go all out to support them with equipment, documentation, and training.

Retro-Graphics enhancements, firmware, software, and input/output devices — Digital Engineering products that put you into the graphics picture easily and affordably. Digital Engineering documentation, service, quality control, and distribution — to keep your graphics systems up and running, and up to date.

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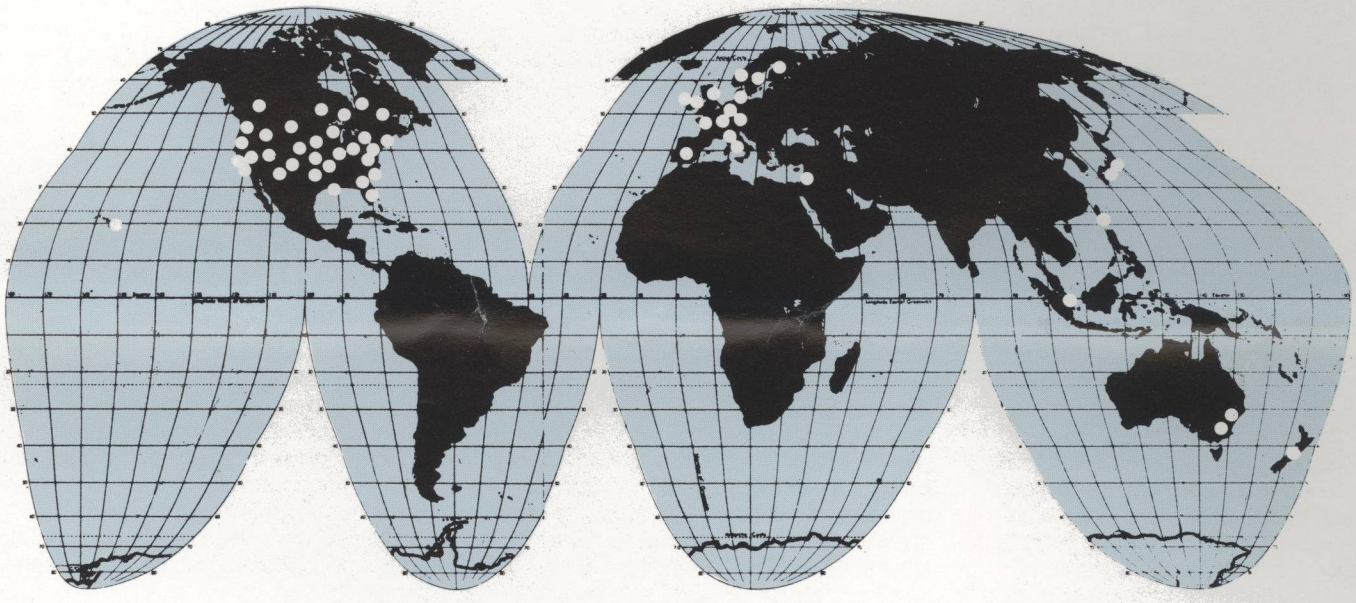
Worldwide Distributor Network



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DE-031 10/82 Printed in U.S.A.