IDD: A leader in computer graphics

Jon Reed, General Manager
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Tektronix had been around for about 22 years before the first Information Display product appeared on the market. Today, the Information Display Division accounts for about a quarter of Tek's total business.

The growth of IDD illustrates the Division's success in serving and growing with its markets. In fact, since Tektronix first entered the computer graphics market, the company has maintained a leading position in the industry.

The development of the direct view bistable storage tube by Tektronix engineers in 1962 triggered Tek's entry into the computer graphics industry. To understand the significance of this development, you should know something about other available display technologies.

Before development of the DVST, the only effective way to generate a graphic display had been the raster or refresh technique, which requires the computer to continuously transmit a block of data to the display, scanning electron beam at a rate fast enough to limit flicker.

A raster display is very much like a home television screen. You may have noticed that the scanning action creates discernable lines on the screen and that images are displayed by brighter or darker spots along the scan line. This can create a problem when you try to display a smooth diagonal line.

The raster scan display is naturally dynamic, however, and color and grey-scale images are available. While the "jaggies" create unacceptable images for some applications, the advantages of raster scan have made the technology appropriate for others.

The DVST requires only a single transmission of data to store an image directly on a color coating of the CRT faceplate—sort of like an etch-a-sketch. This allows lines to be drawn from end-to-end virtually anywhere on the screen. The result is a high-quality, totally flicker-free display—without need for the high-contrast memory usually associated with refreshed displays.

The low cost and high image quality of DVST displays revolutionized the graphics industry. The DVST opened the door for applications in design and engineering, in scientific and statistical analysis, and mapping and management graphics. However, for some applications the low interactivity and lack of color have been disadvantages which Tektronix DVST engineers have worked to address.

I've mentioned that the computer graphics industry has grown at a very fast rate since Tektronix entered the market, but I really haven't told you why people use graphics. In a word, it's productivity. Computer-generated graphics are fast and precise. Computer graphics can virtually eliminate some repetitive, time-consuming tasks.

You can think of computer graphics as the interface between humans and the huge processing power of the computer. Humans don't really relate well to numbers—but numbers are the basis of computations. When those numbers can be presented in a graphic format, many things can be seen clearly and easily.

Computer graphics are currently used in a number of ways—to design the car you drive, in mapping, in architecture, in medicine, education and analysis.

To answer the needs of a growing market and to remain on the leading edge of new technologies, Tektronix provides a broad range of graphics products, among them the 4010 Series DVST scanner terminals including the model 4014—an industry standard—as well as models 4006, 4010, 4012, 4013, 4016.

The 4020 Series raster scan terminals, including the models 4024, 4025, and 4027 color graphics terminal; the 4050 Series of desktop computers—standalone graphic systems which utilize high-resolution DVST displays; copiers, plotters and imaging systems, and applications software.

The Information Display Division, like the rest of

JON REED
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Tektronix, focuses on markets in scientific and engineering environments. These are the markets which we have traditionally addressed well, and we feel we will continue to be successful in these areas.

As new applications emerge, and as new user needs develop, Tektronix must strive to provide useful tools to address these needs for years to come.

Some of our newest products, like the 4110 Series Intelligent Graphics Terminals, were developed for present applications, but with an eye to the past as well as the future.

We've designed in capabilities, like enhanced communications, that most people can't fully utilize now. But we think the kind of speed that the 4110 Series is capable of will be important in the years to come.

We've included features that our customers have indicated that they really need—like expandable memory, local mass storage, and local intelligence to make them even more productive.

And we're concerned that our current customers can use our new products, so we've made the 4110 Series compatible with existing products lines.

The 4110 Series includes, at introduction, both a raster scan and a DVST terminal. We've made significant improvements in implementing each technology to more effectively answer the needs of users. For example, the 4112 features the same addressability as the 4114 storage tube.

Although the displayable resolution is not the same, the high addressability helps to maintain a level of detail when you zoom in on one section of the image. The 4112 additionally features optional grey scale, multiple viewports and optional multiple bit planes.

Tek engineers have worked hard to overcome some of the early drawbacks of the DVST—including interactivity and lack of color. To increase user interactivity with the DVST terminal, the 4114 displays 3000 vectors of refreshed or non-stored information. Refreshed objects can be modified and changed before storing the image. And when 3000 vectors aren't enough, the 4114's fast repaint capability can redraw a 26,000 vector display in about one-half second.

We've also introduced a major technological breakthrough—color refresh. The addition of color makes it easy to discern refreshed from stored information. In complex displays like this, that's an important benefit.

We think that the 4110 Series will go a long way to maintain Tek's position in the computer graphics industry. The new products, as well as some other products introduced during the last year at Wilsonville, including the 4612 electrostatic hard copy units, Plot 50 graphics software, and the 4662 Eight Pen Plotter, can serve as an indication of the direction that IDD will go during the coming year. We're part of a growing, exciting industry and we intend to provide the necessary products to remain a leader in computer graphics.

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Given the trend of IID customers expecting personalization and differentiated capabilities in their graphics peripherals, do you see a need for the IID orientation to software/firmware development to become more like that used in mainframe computer systems?

Both yes and no. Understand the surface, software and firmware developments for IID products must be viewed as one computer. Because the underlying technology is the same and because the rapid pace of change in the electronics industry is so fast, we will design software and firmware in a similar manner. But designers for mainframe computers are addressing a sophisticated group of users, and we will need to target the interfaces that IID customers need. Most of our users are not experienced computer users, so we will continue to design products to make them easy to use and learn.

What future is there for the Direct-View Storage Tube (DVST) when "cost per bit" expense of memory devices has built up so rapidly the last few years? Doesn't this above condition obsolete the DVST in today's market?

Raster scan and Direct-View Storage Tube (DVST) display technologies will each serve in certain areas of our applications. Each technology will have optimum application niches for many years to come.

Along with this growth, we have seen an increasing demand for capabilities that expand the use of personal computing systems. These demands include graphics; networks which allow users to share data and information; and more memory for each user. With these opportunities comes a challenge to do the things we have done well better. There is a demanding expectation for value—not only price/performance, but also quality, service and support. We must develop products quickly and intelligently to meet these opportunities.

What directions do you see desktop graphic computing systems going in the next three to five years? Where would you like Tek desktop systems to be in three to five years? I see less distinction between what we now describe as desktop graphic computing systems and what we view as graphic terminals. I envision a wide range of functionality available to our customers—from a graphic port connected to a central computing facility to a semi-independent intelligent workstation—built from interconnected modules.

Since Tek has incorporated deivializationalization, it appears we are working for a different several technologies to coexist, including raster, DVST and storage with refresh. Different applications require different features from a product.

What is the section of IID building the terminals for the 8500 System?

The 8500 terminal is a sophisticated graphics capabilities—capabilities that most users don't need and don't want to pay for. When the 8500 Series was designed, IID terminals were considered a separate entity. The most cost-effective way to secure an appropriate terminal was to buy from an outside supplier.

What impacts (if any) do you perceive that the expanding quality/priority performance ratio of personal computing products will have on current and future IID products?

The improving price and performance characteristics of personal computing products present both an opportunity and a challenge to the Information Display Division. Although IID products to not compete directly with personal computing products, we have growing awareness of the functionality and benefits found in these products. Suggesting the most cost-effective way to secure an appropriate terminal was to buy from an outside supplier.

Will factory service for IID products move to Wilsonville as part of the divestiture program? If not, why not? Service is part of the corporate service organization which is located at the corporate headquarters. Several of our customers have products with factories and service in other parts of the country. When the products are modified, we assure that the service is consistent to those customers, and for the economics that a centralized function can provide, Factory Service will be centralized.

What would you do with the 637 Building and what would you do with the 633 and 635 if they were available?

When building construction will start on the next building at Wilsonville, and what and where will it be?

When analyzing any new construction, it's important that we determine that we're going to be able to use it in the future. In addition, there are several other factors which we need to examine. For instance, will there be anywhere to locate the equipment from overseas manufacturing, which would affect new construction at IID. If a decision is made to house all of the new equipment at one of the three possible sites for the new building: 637 Building, 633 Building, 635 Building, 606 Building or 635, or north behind Building 633.

What amount of company profit is generated by IID, broken down into dollar amounts and as a percentage of total profit?

For individual divi-
sions are company confidential and not available outside the corporation. The percentage of sales and as of March 7, week 40 results are approximately 300,000 or 29 percent of Tektrol's sales.

Why isn't paging allowed in Building 637?

Building 637 is laid out as an open office environment. There are conference rooms for meetings, but they are in the open area. The type of work, engineering, marketing and administration that goes on in Building 637 requires a lot of concentration. The environmental characteristics of the open office area are conducive to concentration. At the same time that we are determining to eliminate paging and reduce the background noise so we could have a quieter work environment.

It was felt that the majority of people would benefit from this move and that using the features of the phone system such as R-Recall, T-Transfer, T-Interrupt, and & 1 i H, Hold, no undue hardships would be created.
ONE APPLICATION OF graphic computers is design work. Here, the suspension system of a Ford Fiesta is shown on a graphic screen.

TEKTRONIX' NEW 4110 series is designed to serve as a logical, compatible evolution from the popular 4010 series. The 4112 Computer Display Terminal is a monochrome raster display device that combines graphics with powerful local intelligence.

the time it takes to get a product from the conception stage to the marketplace?
how the factors can help to shorten product development time, activities which may occur at several points along the cycle. At the beginning, it is important that the project is well defined. This includes identifying the product features at the outset—don’t allow non-essential features to delay the project. Second, focus on the project, allocate the resources and the right people to the project. Add design aids to improve and speed up design time. Finally, establish good project management system to track the plan to actual performance.

Questions from the floor for Jon Reed on IDD

Some of the slides you were showing were three dimensional. Is 3-D a problem in terms of technology?

Yes. As far as I know, no one has really figured out how to get a good three-dimensional display without going to very sophisticated technology, such as a movement called 3-D Modeling.

Are there any plans to do away with paging in Buildings 60 and 61?

No.

Why is IDD considering going overseas with production?

Our primary motivation is to be able to participate more fully in those marketplaces. Most foreign countries tend to buy from companies that manufacture in their country, as opposed to companies who manufacture in the U.S. and ship the products overseas.

Another motivation is one of capacity. Tek has production facilities already set up abroad that could be used instead of building something new here.

Are the Graphic Computing Systems and Terminals and Displays Business Units going to be combined?

There are discussions going on about merging the product families but the actual business units would not be combined. Some of the products we’re building in both of those areas look very much the same, and rather than build two sets of something we could combine and only build one.

Most of our software and firmware is for the scientific environment. Do we have some for business applications?

We do favor the scientific and engineering user; however, we also make software that is very generic and can be used for lots of different things, including business applications.

Have IDD sales been as affected by the recession as the rest of Tektronix?

No. Sales haven’t been affected until recently, but the order rate has been affected, both in the U.S. and internationally.

Will Reagan’s defense budget put IDD into overtime?

A lot of our equipment does go to the government. I expect they will be buying more from us in light of the bigger budget, but also remember that at the present time Mr. Reagan has put a freeze on the purchase of all computer equipment to the government until they get some of the procurement problems cleared up.

Does IDD have a representative on the Commerce Department Committee?

No.