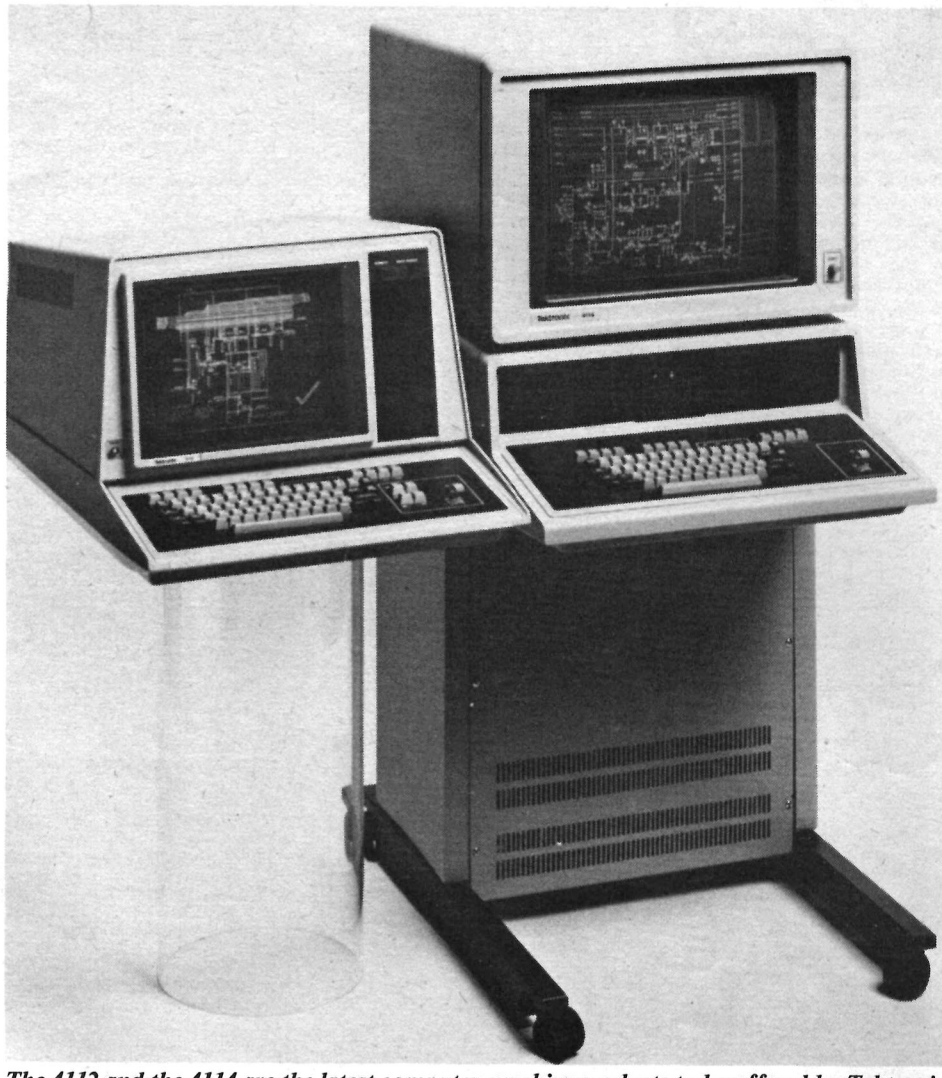
ON THE COVER: It takes a lot of people to get a new product ready for introduction. These are just part of the engineering, manufacturing and marketing people behind the introduction this week of two new Information Display Division products—the 4112 and 4114 graphics terminals. These people gathered recently for a preview of training information prepared for IDD sales engineers.



The 4112 and the 4114 are the latest computer graphics products to be offered by Tektronix and the first members of the new 4110 Series graphics terminals. The 4114 is a 19" high-resolution direct view storage tube (DVST) terminal with refresh and local redraw capabilities, priced at $17,500. The 4112, priced at $9,600 is a moderate resolution 15" raster scan product featuring the high addressability of the storage tube. Both products feature unique local intelligence and enhanced communications capabilities.

Tektronix introduces new computer graphics series

4112 features raster technology

To many computer graphics customers, the ability to quickly interact with and manipulate a display is more important than screen capacity. For those users, Tektronix has introduced the 4112 Computer Display Terminal.

The 4112 is a monochrome raster device that combines moderate-resolution graphics with powerful local intelligence to provide users with new standards of high interactivity and low host overhead.

The 4112 is one of two instruments just introduced by Tek as part of its new 4110 Series of intelligent graphics terminals. The other, the 4114, incorporates the exclusive Tektronix bistable storage tube (DVST) to bring new interactivity, communications economies, and speed enhancements to graphics applications requiring the large screen, high density, and fine line quality that the DVST provides.

Base price for the 4112 is $9,600.

"The 4112 has been engineered to be as compatible as possible with our 4010 Series of DVST terminals," says Mike Kondrat (Terminals Marketing manager). "The 4010 Series has long set the standards of the industry. Current users can move to the 4112 or incorporate it into multi-terminal environments without sacrificing existing programs."

Users of the 4112 will be able to command the vast processing power of host-based computing while exploiting a number of enhanced throughput features to substantially reduce the costs and delays associated with host communications. Most notable is the 4112's capacity for locally retained picture segments, whereby a group of MOVE and DRAW commands can be defined, then stored, recalled and manipulated locally, significantly enhancing interactivity while reducing dependence on the host.

This capability will allow an architect, for example, to define and store on RAM or disk commonly used graphic symbols for doors, windows, electrical fixtures, plumbing and landscaping.

In addition, the designer or analyst is able to address much more detail than that normally associated with raster graphics. Behind the 4112's 640 X 480 viewable point matrix is an addressable matrix of 4096 X 4096 points—the same as the 19-inch high resolution Tektronix 4014. A local zoom and pan function lets the user scan the internal display space and magnify any selected portion up to full 15" screen size for detailed study and manipulation.

The user can define the size and position of a separately scrollable dialog area anywhere on-screen, so transactions between terminal and host never interfere with the graphics work area.

To further facilitate analysis, the 4112 permits up to 16 viewports to coexist on the screen. Designers, for example, can simultaneously display multiple graphs for comparison of results, with independent zoom and pan for each defined viewport.

The 4112 can be optionally configured to literally open up new dimensions of both line drawing and graphic shading. Two additional memory planes can be added to the terminal's single, standard plane to enable three separately addressable display surfaces or overlays. Alternately, the surfaces can be addressed jointly to create up to eight shades of gray.

The local multiple bit plane capability will let users work with separate layers of circuit boards, piping or wiring diagrams—or define separate graphics and text planes—then superimpose one over the other. The gray scale effect can be used in conjunction with an easy panel flooding function by which any closed figure can be drawn and its interior shaded by varying intesity levels, or by user-defined patterns.

Supporting these local capabilities is RAM memory expandable up to 640K bytes total, plus optional integral flexible disk storage offering 512K byte capacity per disk.

On-line, too, 4112 users can look forward to increased productivity and interactivity, thanks to selectable data communications rates as high as 19,200 baud, and sustained transmission of alphanumerics and simple graphics at 9600 baud. Some users may exploit this state-of-the-art communications speed immediately; to most, however, it is a future standard ensuring the terminal's long life expectancy.

4114 meets high density needs

Tektronix has introduced the 4114 Computer Display Terminal to meet the increasing high-density graphics need of the engineering and scientific fields. The 4114, an evolution from the popular Tektronix 4010 Series, meets user needs for greater interactivity and reduced host overhead.

The 4114 and its high-contrast counterpart, the 4114 Option 31, are part of the new 4110 series of intelligent graphics terminals. Base price for the 4114 is $17,500. The 4114 Option 31 Color Enhanced Refresh is priced at $19,500.

"Some of our current graphics customers have reached the point at which the time and cost of communicating with the host computer are the greatest obstacles to productivity," says Mike Kondrat (Terminals Marketing manager). "Barely ten years ago, the market hardly knew what to do with computer graphics. Today, they can't get it fast enough. That's both a success story and a challenge that we've met with the 4114."

Users of the 4114 will benefit from the readability and high information content associated with the 19-inch Tektronix DVST (direct view storage tube) display. They can take advantage of the vast processing power of host-based computing, while exploiting a number of enhanced throughput capabilities. Most notable is the 4114's capacity for locally retained picture segments, whereby a group of MOVE and DRAW commands can be defined, then stored, recalled and manipulated locally, significantly reducing dependency on the host.

This capability allows an engineer, for example, to define and store on RAM (random access memory) or disk commonly used graphic elements such as symbols, background graphics, piping, valves and symbol codes.

Supporting the picture segments feature and further decreasing host dependency are two-dimensional transforms—the ability to locally translate, rotate and scale picture segments. To facilitate such transforms without erasure or repainting the storage tube, the 4114 has been augmented with up to 3000 short vectors of flicker-free refresh capability.

In addition, users can quickly update the screen by utilizing the 4114's new fast repaint feature. For example, an integrated circuit mask containing some 26,000 short vectors stored in RAM, can be erased and redrawn on the screen in less than one-half second.

A particularly convenient 4114 capability, a by-product of the 4114's refresh capability, is a definable refreshed dialog area. The size and position of this text area can be defined by the user anywhere on-screen at any time. Scrollable by thumbwheel control, it ensures that transactions between the terminal and the host remain clear of the graphics workspace.

To improve the readability of refreshed information, Tektronix has introduced a Color Enhanced Refresh version of the 4114. Instead of displaying the refreshed vectors in the usual green of the DVST display, the 4114 Option 31 highlights the refresh in orange-red. Picture elements subject to transformation remain clearly visible in high-density mapping, CAD/CAM (computer-aided design/manufacturing) and other applications subject to a high degree of interactivity.

On-line, too, 4114 users can look forward to increased productivity and interactivity, thanks to selectable data communications rates as high as 19,200 baud. Tektronix expects state-of-the-art users to immediately exploit the maximum rate to move large amounts of data at highest possible speed; to other customers, it will offer a long-term standard.

To support the expanded local capability of the 4114, memory capacity has been increased considerably: RAM is expandable up to 800K bytes total. Optional single or dual flexible disk mass storage is available, with 512K byte capacity per disk.

Compatibility gets attention

Tektronix engineers were particularly attentive in the design of the 4114 to ensure its compatibility with the Tektronix 4014-1 which, since its introduction in 1975, has become the world standard in graphics terminals. Virtually all existing 4014-1 applications software will function similarly on the 4114, with modifications required only to gain access to the 4114's advanced features.

There is also commonality between the 4114 and the new 4112 raster terminal. Peripherals, memory, bus structure, keyboard and data communications interfaces are all identical, so users can transfer their skills and programs from one terminal to another with a minimum of readjustment.

Users will also find complete operations support for the 4114 and the 4112 already in place in the Tektronix PLOT 10 Interactive Grahpics Library (IGL). Existing 4010 Series applications programs based on the PLOT 10 Terminal Control System (TCS) will run on the 4114 in 4010 Series emulation mode. Appropriate device drivers, special character fonts and segments support can be added as IGL modules.

To ensure a long future for the 4114 in any applications, Tektronix engineers packaged the new terminal into a pedestal configuration to provide for maximum expandability via plug-in circuit cards.