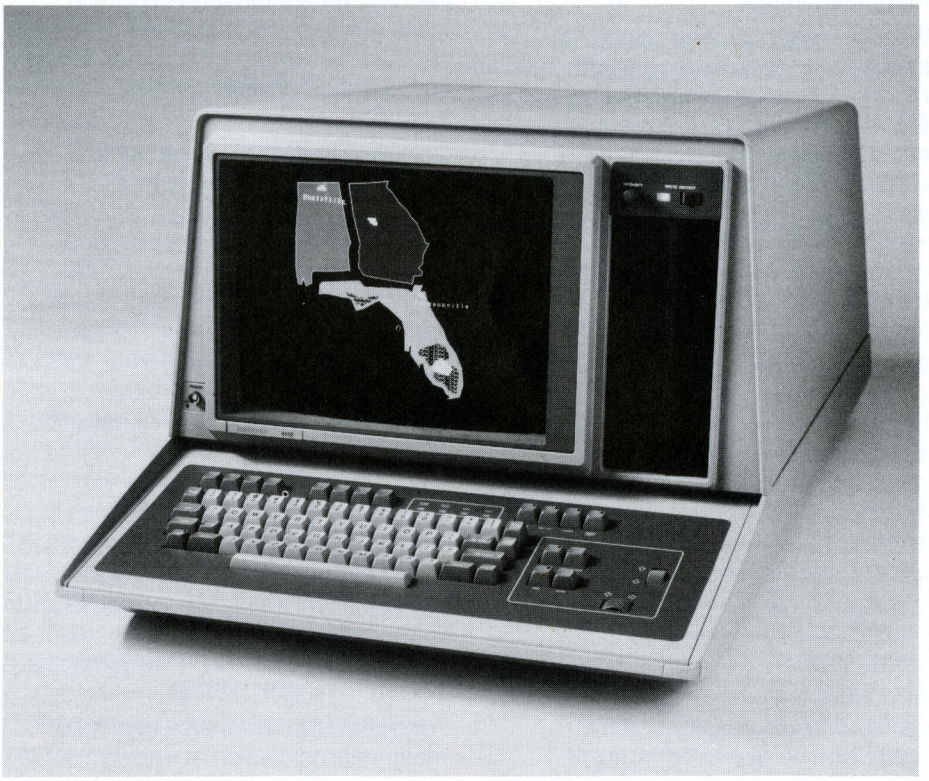
Raster scan monochrome display with local picture segments, 2-D transforms, true zoom and pan and up to three memory planes. Compatible with Tektronix 4010 Series.

COMPUTER DISPLAY TERMINAL



New economies of communications traffic and CPU time. The 4112 capitalizes on many conveniences and special capabilities of a raster scan display. Designed to satisfy a broad range of evolving needs, from basic line graphs to high density design, the 4112 provides access to an unusually wide assortment of graphics capabilities. Its powerful local intelligence keeps user interactivity high and host dependency low.

The 4112 is designed to be compatible with the popular Tektronix 4010 Series of computer display terminals. Programs developed for the 4012 or 4014, for example, may require only minor software revisions —mostly to account for new expanded capabilities—in order to run on the 4112. By using the modular device drivers and advanced feature support of the Tektronix PLOT 10 Interactive Graphics Library (IGL), updating existing programs for the new 4112 features is a simple process.

In addition, there is great commonality among all members of the new 4110 Series. The selection allows you to specify the best terminal for each need, without significant investment in increased operator training or software.

The 4112 offers a bright, flicker-free 381mm (15-inch) raster scan display with a viewable resolution of 640 × 480 points, augmented by 4096 × 4096 point addressability and by zoom and pan.

In addition, the user can specify as many as 64 viewports for simultaneous display of multiple design perspective, or for any other consolidated presentation of related information. Each viewport can be zoomed into and out of individually.

The 4112 incorporates several valuable local features that enhance user interactivity and graphics capacity, while radically reducing the load on the host and the volume of communications traffic. These features include:

Local picture segments. A local picture segment is a group of graphic primitives that describes a portion or segment of a picture. These primitives are retained in the terminal's memory to be redrawn and manipulated at any time by using the 4112's local "segments" capability. Eight programmable function keys are provided for user-definable functions that may be used locally.

Schematic components, symbols, titles and text can be defined as segments, for example, then stored in local memory and redrawn when needed, with minimal computer time and communications traffic required.

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2-D Transforms. Local segments may also be rotated, scaled or translated (moved around the screen), by a simple short command from the host processor.

Zoom and pan. An addressable display space of 4096 × 4096 points is accessible locally by simple, key-actuated zoom and pan or via the host. The thumbwheel controls are used to pan the display with a rectangular cursor and to set the viewport dimensions of the magnified image.

With this magnification capability, the user can view and work with plots of the same complexity as those developed on the highest resolution Tektronix storage tube displays. It permits addition or examination of extremely fine detail, while simultaneously reducing communications traffic and the time that the user would spend waiting for data transmitted from a host.

Multiple display memory planes. Optionally, two additional bit map buffers, or memory planes, may be added to the 4112, providing as many as three display surfaces. This capability enables a number of effects, including overlays of text and/or graphic information, particularly useful in the preparation of multi-layer schematics such as circuit boards.

Secondly, the memory planes can be used to create gray scale effects, with up to eight shades of gray/displayable at once. A panel flooding feature enables easy fill-in of closed figures with gray scale or with patterns.

Multiple bit planes are also useful in developing limited animation and in double buffering to reduce overlap viewing and repaint time.

Definable dialog area. At any time, the user can specify the size and position of the region where communications between terminal and host are displayed. This dialog area is scrollable by the thumbwheels, allowing for easy recall of previous communications. The amount of buffer memory reserved for the dialog area is defined by the user and may include virtually all of the terminal's memory, if desired.

Memory. The standard 4112 memory consists of 32K bytes of RAM and 72K bytes of ROM. It is expandable incrementally up to a total of 672K bytes RAM, so capacity can continually expand with the application need. Extensive use of segments capability will require RAM expansion.

For convenient, local storage of fonts, macros and other elements, an optional, integral flexible disk drive can be specified to add a total 494K bytes per diskette of off-line mass storage with disk drive. You can also perform background spooling and off-line plotting functions.

Communications: an array of tools for keeping traffic to a minimum. The compact host commands enabled by the 4112's local intelligence provide dramatic new communications efficiencies in any application. Several other throughput advantages may also be utilized, including a sustained transmission speed of 9600 bits per second. Receiving and transmitting rates may be specified independently. Communications interface is standard RS-232-C.

A flagging feature allows both the terminal and the host computer to signal each other when to start and stop transmission, to prevent overflowing the input queues.

For better error detection and automatic retransmission of data blocks, a block mode option is available.

The following is a complete list of 4112 options currently available. All are field installable, enabling an easy updating of capabilities to meet evolving applications.

Option 1. Extended Communications. Includes half-duplex and block mode.

Option 2. Current-Loop Interface. Converts RS-232 signal levels to 20-milliampere current-loop signals.

Option 4. Special Keyboards. These provide the keyboard and firmware for specific language requirements, including United Kingdom (option 4A), Swedish (option 4C), APL (option 4E), and Danish-Norwegian (option 4F).

Option 10. Three-Port Peripheral Interface. A single interface with three RS-232 connectors and associated firmware that permit the terminal to be used with a plotter printer or other RS-232-C device, without that device being placed between the terminal and the host computer. Enables background spooling from host to port or port to port.

Option 11. External Video Output. Converts 60 Hz, non-interlaced video to 30 Hz interlaced video (or with the 50 Hz version, converts 50 Hz non-interlaced video to 25 Hz interlaced video). Also allows the 4112 to be synchronized with an external source. Used with hard copy units and with external monitors.

Option 13. 11″ × 11″ Graphic Tablet with pen.

Option 14. 30″ × 40″ Graphic Tablet with pen.
Both include controller, tablet and interface. They allow easy, accurate digitizing of virtually any graph or drawing with pen point, one-button or four-button cursor. These tablets represent two-fold increase in accuracy over previous tablets. Note that these tablet options are compatible with 4110 Series terminals only, adding greater accuracy and increased resolution up to 200 points/inch. Other graphic tablets are not compatible with the 4110 terminals.

Option 20. Display Memory Planes. Two additional bit map buffers that make possible overlays, 8-level gray scale, double buffering and limited animation effects.

Option 24. Additional 32K bytes of RAM.

Option 25. Additional 64K bytes of RAM.

Option 26. Additional 96K bytes of RAM.

Option 27. Additional 128K bytes of RAM.

Option 28. Additional 256K bytes of RAM.

Option 29. Additional 512K bytes of RAM.

Option 42. Single Flexible Disk. Single flexible disk unit and controller provide the convenience and security of local removable mass storage media with up to 494K bytes of user file storage per diskette. The diskette may be formatted to optimize the directory size to maintain from 368 to 1872 user files. Each file is referenced by name which may be from one to nine characters long.

Option 52. Specify Voltage and Hz.

Option A1—220V/16A 50Hz operation. Universal Euro Plug

Option A2—240V/13A 50Hz operation. United Kingdom Plug.

Option A3—240V/10A 50Hz operation. Australian Plug.

Option A4—240V/15A 60Hz operation. North American Plug.

All options and displays will be set for 50 Hz operation when these options specify 50Hz.

Specifications

Display

Medium: Raster-scan CRT

Display Area:
220 × 254mm (8.6 × 11.5 in)

Phosphor Type:
White P4

Scan Type:
60 Hz non-interlaced or 50 Hz non-interlaced (optional)

Keyboard

Normal Keyboard:
72 typewriter paired upper and lower case, programmable and auto repeating (seven lighted);

8 user-definable programmable function keys, 4 terminal control keys, and 4 special keys for zoom and pan functions

Other controls:
Thumbwheels control graphic cursor, zoom-pan function, and scrolling

Audible bell alarm

Alphanumeric Mode

Standard Character Set:
Full ASCII set of 94 displayable characters, or 128 displayable characters in "snoopy mode"

Optional Character sets:
United Kingdom (option 4A)
Swedish (option 4C)
APL (option 4E)
Danish/Norwegian (option 4F)

Character Format:
80 columns, 34 rows
7 × 9 dot matrix in an 8 by 14 area.

Graphics Mode

Resolution:
640 horizontal by 480 vertical pixels

Addressability:
4096 × 4096 points

Graphic Command Syntax:
PLOT 10 compatible

Line Types:
Solid, dashed, erase

Graphic primitives:
Vectors, polygons, and text

Gray Scale:
Eight levels of grey scale are provided if two optional (three total) memory planes are included.

Interactive graphics:
Thumbwheels in the keyboard control a graphic cursor. The graphic cursor may have its shape defined by the user (with hardware crosshairs as default). The user can also control zooming, scrolling, and the alpha cursor position by keyboard keys.

Computer Interfaces

Basic data communications interface, EIA RS-232C compatible, full or half-duplex.

AC Power

90 to 132 Vac, 6.25A maximum 48 to 62 Hz or 180 to 250 Vac, 3A maximum, 48 to 62 Hz

Physical Characteristics

Dimensions:
Height: 546.1 mm (21.5 in)
Width: 404.1 mm (15.9 in)
Depth: 812.2 mm (32.0 in)

Weight:
46.27 kg (102 lbs)

Companion Products

4612 Hard Copy Unit (Requires Opt. 11 on 4112)
4632 Hard Copy Unit (Requires Opt. 10—60 Hz scanning rate or Opt. 11 pick up—50 Hz scanning rate on 4632; or Opt. 11 on 4112)
4634 Hard Copy Unit
4662 Interactive Digital Plotter
4663 Interactive Digital Plotter

Software

PLOT 10 Software provides access to proven graphics software. Existing 4010/4012 applications programs that use Terminal Control System (TCS) will run on the 4112 in emulation mode. New application programs that take advantage of the advanced features of the 4112 use PLOT 10 Interactive Graphics Library (IGL).

Graphic Tablet Characteristics

(Options 13 and 14)

Proximity Distance:
Data will be stable if pen stylus or cursor is held stable within 3.97 mm (0.156 in) of tablet surface.

Proximity Area:
Option 13: 280 by 280 mm (11 by 11 in)
Option 14: 760 by 1020 mm (30 by 40 in)

Resolution:
0.127 mm (0.005 in).

Accuracy:
±0.0254 mm (±0.010 in).

Repeatability:
±0.127 mm (±0.005 in).

Dimensions of Option 13 Tablet: active surface is 279 mm wide by 279 mm high (11 by 11 in)

Option 14 Tablet: Active surface is 1.016 m wide by 762 mm high (30 by 40 in)

A separate structural plastic box is used to house the Graphic Tablet pulsars.

Flexible Disk Characteristics

(Option 42)

8 inch single-sided double-density diskette.

IBM compatible soft-sectored recording format.

Cyclic redundancy checking and automatic data recovery retry for reliability.

Direct memory access.

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