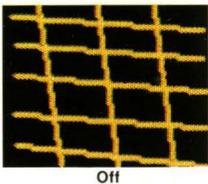
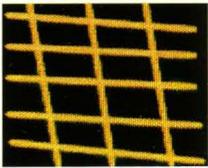




**Raster graphics have a sharp new look.**

# Built-in anti-aliasing—and a whole lot more—makes the AED 767 the most advanced color graphics terminal in its price range.

AED 767's unique anti-aliasing feature



The AED767 desktop terminal now brings a sharp new look to full-color raster graphics—plus a number of advanced features making it ideal for CAD/CAM...graphic arts...image processing...cartography...business graphics... process display...simulation...and animation.

No more jaggies! The built-in anti-aliasing is incorporated into the AED terminal itself, and virtually eliminates the jagged or stepped lines common to computer-generated

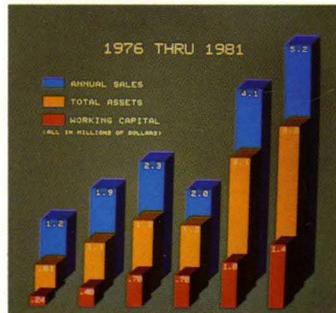
drawings—**without** host processing.

To activate 'jag-free' vectors you simply press a function key on the AED767 keyboard, or send a single command from the host computer. Thereafter, every vector on the AED767 display will appear anti-aliased...**automatically**.

It means that for the first time, a full-color graphics terminal will draw lines as smooth as those produced on a stroke generator, but with all the additional advantages of raster technology. And all at an affordable price!

# Versatile features to satisfy all

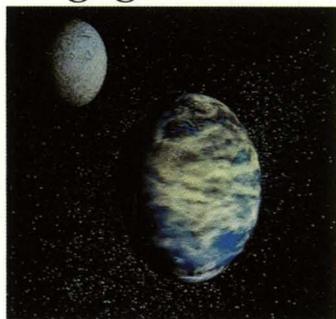
## Business



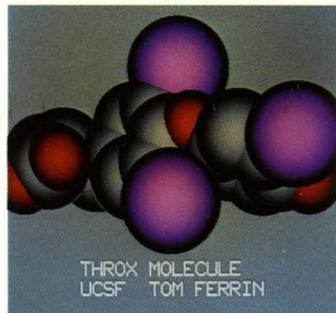
## Cartography



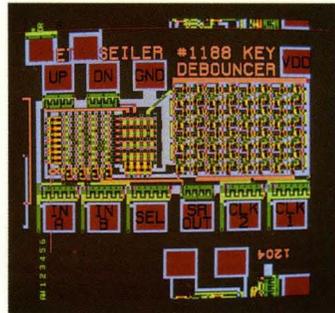
## Imaging



## Simulation

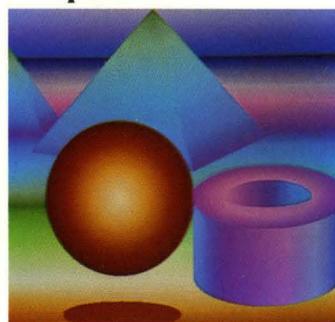


## CAD/CAM



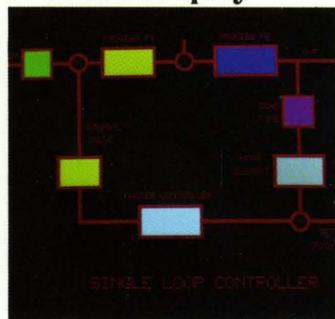
Left. Business Graphics image provided by Ken Wilkerson, AED. Right. CAD image of a VLSI chip generated by Julian Gomez, Cal Tech/JPL.

## Graphic Arts



Left. Mapping image provided by Geo Based Systems, Inc., Raleigh, N.C. Right. The program for this graphic was developed by Yoichiro Kawaguchi at NTI and provided by ASR, International.

## Process Display



Left. Image of planets generated by Paul Xander, Jr., of Computer Graphics Lab., NYIT. Right. Process Display image generated by Roy Smith, AED.

## TV Production



Left. Molecule image generated by Tom Ferrin of Computer Graphics Lab., Univ. Calif. at San Francisco. Right. The program for this TV image was developed by Dick Lundin and Lance Williams of Computer Graphics Lab., NYIT.

**Optically superior resolution.** The AED767 has the highest resolution of any desktop color graphics terminal—with a 1K x 1K x 8 virtual address space and a 768 x 575-pixel viewing window. The result? Your color drawings will be smoother than ever before.

There is another advantage to high resolution: almost infinite precision. The 767 can visually accommodate even your most complex drawings. With no "jaggies" whatsoever—when you activate built-in anti-aliasing.

**More viewable information.** You have a large 768 x 575-pixel viewing window, so you can see more of your image at any given time. The remaining portion of your image resides in memory, and is easily viewable at any time through panning.

**256-color display.** You can display 256 colors simultaneously—from a full palette of 16.8 million! Every shade, hue, and subtlety of color is at your command, making the 767 just right for CAD/CAM, graphic arts, image processing, and business graphics.

**Unique blue-line grid.** A feature unique to the 767 is a blue drafting grid that will appear on the display screen whenever you want—at any intensity level you choose. The grid can be turned on and off without affecting the image on the screen.

It is particularly useful as a reference guide whenever maximum orthogonality is desired, such as in IC or PCB design, or in schematic development. And, because it is generated in the internal firmware of the 767, it doesn't occupy valuable video memory.

**Conics generation.** Constructing conics from individual vectors can be a time-consuming process. The 767 speeds up your drawing by letting you generate circles, ellipses, stipple-filled rectangles, color-filled rectangles, and closed-curve-filled polygons with simple commands from either the keyboard or your computer.

**Selectable refresh rates.** You can select from three refresh rates—for full compatibility with either U.S. or European television, or at a faster rate for flicker-free operation.

This unique capability lets you create your drawing, for example, at a refresh rate fast enough to banish annoying flicker, then decrease the rate for full compatibility with standard broadcast video. No other raster graphics terminal on the market offers you this flexibility!

**640 x 483 operation.** The 767 normally operates at 640 pixels by 483 lines. This eliminates clipping of image edges in TV applications. Alternative display sizes are 512 x 512, and 768 x 575.

# your graphics & imaging needs.

**Tektronix emulation.** The 767 emulates the Tektronix 4010 family of storage terminals, so you can take advantage of the large body of software already available for them.

At the same time, the 767's built-in anti-aliasing eliminates the primary objection to raster graphics voiced by "stroker" advocates: "jaggies." Plus, the 767 offers features that stroke generators cannot, such as lots of color, layering, and graphics processing capabilities.

**Two-second image transfers.** In addition to drawing vectors quickly with minimal host information, the 767 operates in a bit-map mode which enables you to transfer images from host memory to terminal with parallel DMA efficiency. This means it takes only about 2 seconds to transfer 1,098,304 bytes of information to or from the terminal.

An alternative operating mode, run length encoding, permits efficient image transfers over the serial line—a capability that is essential when the host is at a remote location and complicated images, such as shaded three-dimensional models, must be transferred to or from the 767.

**User-definable symbols.** You can pre-define the symbols of your choice, and store them locally in the terminal. Then, when you want to use the symbols in your work, you simply evoke them from the terminal's memory and place them anywhere on the display screen with simple keyboard or program commands.

Plus, by writing your symbols in a separate memory plane, you can move them anywhere on the screen without disturbing existing drawings or data.

**Selectable cursors.** You can have any one of three cursors on screen upon command: standard X; gunsite; or a full-screen cursor. The full-screen cursor acts, in effect, as an "electronic T-square," allowing you to align your graphic elements perfectly—vertically as well as horizontally.

All three cursor styles can blink between two colors of your choice—a valuable feature that prevents the cursor from disappearing over certain colored areas.

What is more, you can program the cursor to index to various points on the 767's unique blue-line grid. **Automatically.**

**Zoom to 16x.** You can zoom in on any portion of a drawing—magnifying it to full-screen size. You will appreciate this useful feature, particularly when working with complex designs.

Programmable zoom levels of 1X, 2X, 3X...16X with independent multipliers on the vertical and horizontal sizes are standard features.

**Color blink.** When producing complex designs, it is often useful to distinguish the last vector drawn from all others until you decide to make it a permanent part of your design. With the 767, you can blink the vector at any rate to a second color, then return it to its fixed color at any time.

Plus, eight colors can simultaneously blink at different rates to any other eight colors—a capability that is extremely useful for C<sup>3</sup>, process, control, and similar displays.

**Powerful command set.** The terminal can carry out a wide variety of functions with minimal information from the host computer. The result is much greater transmission efficiency, and increased convenience for you.

In the "local" mode, you can test your command sequence without tying up the computer by entering either single or three-letter mnemonic commands.

**Eight memory planes.** This feature enables you to create layered designs of virtually any type or complexity—from multi-layered VLSI circuits and PC boards to architectural schematics and detailed images.

You can selectively mask one or more of the memory planes at any time to minimize visual "clutter," and even switch back and forth between masked and unmasked images.

The maskable memory planes let you produce animation effects through dynamically changing displays. Combining this feature with zooming and panning permits generation of animated mini-movies at flicker-free rates, because all "frames" can be pre-loaded for subsequence viewing.

A good application for masking in CAD is the design of multiple-layered ICs. The eight memory planes can be used to mask and view different levels of your circuit design as you wish (256 combinations possible).

**Unique stipple fill.** You can fill rectangles with the colored patterns of your choice to emphasize areas of your drawing in ways not possible with color alone—a capability highly useful in VLSI, CAD, and other applications.

**Vertex-fill polygon generation.** This saves you time by letting you fill polygons without precalculating an interior (seed) point. It is true even of complex filled polygons with dozens of arbitrary corners. All you do is state the number of vertices and the polygon's coordinates. The 767 does the rest!

**Scroll.** You can scroll both horizontally and vertically throughout your drawing or image. Plus, a special Scroll Disable key lets you temporarily start or stop program text scrolling as you desire.

**Pan.** For quick access to the undisplayed portions of your drawing, you have continuous joystick panning capability—at any level of zoom. Both position (standard and vernier sensitivities) and rate pan may be selected by function switches or program command.

**Video memory access.** You can access video memory and write on the display screen with maximum ease and efficiency. This applies to vector generation, as well as to the more complex processes of run-length encoding and pixel-by-pixel read/write.

You simply enter text, vectors, circles, ellipses, rectangles, and pixels on the screen with single or triple commands, and arguments (or as specified by host program). A choice of five arguments is possible: decimal, seven or eight bit binary, and hexadecimal or modified hex.

Rectangles may be filled with solid colors or colored patterns (stipple fill). In addition, polygons of extremely complex shapes and multiple islands can be completely filled or overlaid with color.

You can also write or read an individual pixel of any color—or a one-color string of pixels—upon command. This process facilitates run length encoding, which permits data compression and hastens the transmission, to or from the host, of complex images or designs having many identical colors. Plus, a picture drawn with conics and complex polygons can be read back run-length encoded.

Run-length transmissions can occur over a serial or parallel cable. The 767's parallel channel supports DMA (direct memory access) transfers, and drivers are available for several host computer operating systems.

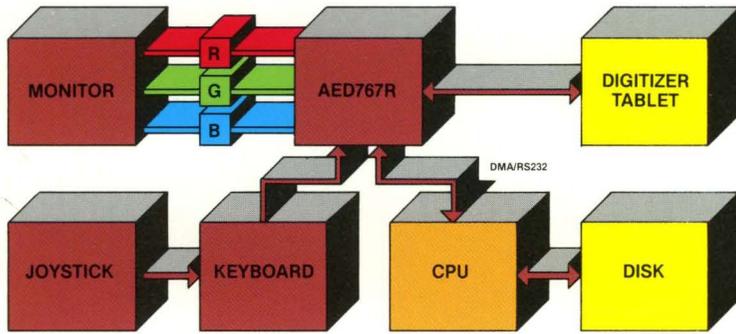
What is more, the 767 lets you write or read on a pixel-by-pixel basis, anywhere on the screen. Or, if you prefer, you can write or read pixels in rectangular "areas of interest"—defined by you or program. This allows you to transfer all or part of your image to the screen, and make desired changes with maximum efficiency.

**Microcode downloading.** For added functions, you can download microcode instructions from the host into the 767's microprocessor RAM to supplement the terminal's already extensive firmware command set. The terminal lets you alternate between your own command set and the 767 firmware commands.

**User group.** Membership in the AED graphics user group is free to all purchasers of an AED graphics system. Members receive a free subscription to the group's newsletter, access to a library of user-submitted computer programs and software for support of the graphics system, and information about applications for the system from other group members.



# System Configuration



## Technical Specifications

**Intelligence.** An on-board 500 nanosecond 6502A microprocessor controls the terminal and I/O functions, and performs character, vector, circle, and filled-area generation. Terminal has up to 42k bytes of RAM/ROM. Upward compatible instruction set from AED512.

**Keyboard.** Full ASCII standard communications format, with upper and lower case characters, 10-key numeric pad, 10 terminal control keys, and 8 user-definable function keys. Solid state key switch design, and typewriter "feel."

**Joystick.** For selecting data features and objects, colors, panning, and image editing. Absolute position (coarse or fine) or rate mode are key selectable.

**Communications.** Either RS232-C or 20 ma. current loop; rates to 19.2 kilobaud. Terminal includes an auxiliary RS232-C serial interface for driving printer, plotter, or graphics digitizer. The terminal may also be used with all hard copy devices having a standard RS170 interface. Direct Memory Access (DMA) port permits I/O at 500k bytes/second.

**External sync.** The AED767 can gen-lock to external video equipment, offering state-of-the-art computer graphics capability to television-based systems. By including video mixers, NTSC encoders/decoders, and/or special effects generators, the user can overlay or switch video from tape, disk or camera with graphics images from the AED767.

**Modular configuration.** The base unit, including electronics, I/O ports, keyboards and joystick, may be purchased without the display monitor. The monitor can be placed on top of the base unit or separated from the controller. An alternate configuration includes a remote keyboard, rack-mountable controller, and a separate display monitor.

## Warranty

The AED767 and its options are guaranteed to be free from defects in workmanship, materials, or design for 90 days from the date of invoice.

**Display monitors.** Optional 14", 19" long-persistence phosphor, and standard phosphor monitors are available from AED.

**RS232C ports and parallel interface.** The 767 can be used with any computer through our RS232C interface. It can also drive printer or plotter with additional microcode. One host port and one auxiliary RS232C port are standard in the AED767. Rates from 300 to 19,200 Baud are switch-selectable and also programmable. An external clock mode allows higher rates for special applications.

The 767 also has a 16-bit parallel interface using a 50 wire cable. This allows you to communicate with the 767 at maximum speed. The parallel port may be used to transmit graphics commands as well as images via direct memory access.

**Power requirements.** 47-63 Hz: Terminal 100 VAC  $\pm 10\%$  @ 2A, or 115 VAC  $\pm 10\%$  @ 2A, or 230 VAC  $\pm 10\%$  @ 2A, excluding monitor.

**External connections.** Serial Interface—25 pin "D"; Parallel Direct Video Memory Access—50 pin Scotchflex; Aux. Serial—25 pin "D"; Red, Green, Blue composite video—BNC connectors; Monochrome/2-level Hard Copy—UHF connector; External Sync/Mix—UHF connector.

## Dimensions

	Weight	Height	Width	Depth
<b>AED767</b> With 13" color monitor:	60 lbs. 27 kg	16" 41 cm	22.8" 58 cm	30" 76 cm
<b>AED767</b> Without monitor:	25 lbs. 11 kg	3.5" 9 cm	22.8" 58 cm	30" 76 cm
<b>AED767R</b> (rackmount) Without monitor:	25 lbs. 11 kg	3.5" 9 cm	19" 48 cm	26.5" 67 cm
<b>AED767KB</b> Remote keyboard:	10 lbs. 4.5 kg	3.0" 7.6 cm	20.1" 51 cm	9.8" 25 cm

## Mnemonic Graphics Command Summary

AAV*	Anti-Aliased Vector
BFL	Boundary Fill
BLG*	Blue-Line Grid On/Off
BSO	Set Both Origins (V&H)
COP	Make Hard Copy
DAI	Define Area of Interest
DCA	Draw Cursor Absolute
DCL	Draw Circle
DFC	Draw Fat Circle
DFF*	Draw Filled Polygon
DFR	Draw Filled Rectangle
DJC	Disable Joystick Cursor
DMV	Draw Multiple Vectors
DPA	Disable Panning
DPK	Define Programmable Key
DRL	Define LED Display
DSF	Define Special Font
DSK	Define Soft Key
DSP	Define Stipple Pattern
DTM	Define Tablet Mapping
DVA	Draw Vector Absolute
DVR	Draw Vector Relative
ECU	Erase Cursor Unconditionally
EJC	Enable Joystick Cursor
ELP*	Draw Ellipse
EPA	Enable Panning
ERS	Erase Entire Memory
ESC	Escape to Interpreter
ESF	Erase Special Font
ETC	Enable Tablet Cursor
FFD	Form Feed
FRF	Draw Filled Rectangle Relative
GFL	Generalized Overlay Fill
GS	Enter TEK Emulation Mode
HOM	Home, Cursor Return
HSR	Horizontal Scroll Relative
IFL	Interior Fill
JUS	Jump to User Subroutine
LAT*	Load Anti-Aliased Vector-Color Table
LMR	Load Microprocessor RAM
MOV	Move Absolute
MVR	Move Relative
OFL	Overlay Fill
OPT	Set Programmable Option Number
RCP	Read CAP**
RCT*	Read Color Table
RDA	Read Direct from AOI
RHO	Read Horizontal Origin
RHR	Read Horizontal Runs
RHS	Read Horizontal Scan
RJP	Read Joystick Position
RPX	Read Pixel
RRD	Read Raster Direct
RST	Reset Terminal
RVO	Read Vertical Origin
SAC	Set Alpha Cursor Color
SAP	Select Alpha Parameters
SBC	Set Background Color
SBL	Set Blink
SBR	Set Baud Rate
SCC	Set Cursor Colors
SCD	Start Command DMA
SCP	Set Cursor Parameters
SCR	Send Carriage Return
SCS	Set Console Status
SCT	Set Color Table
SDA	Stop Direct Access, Read or Write
SEC	Set Color
SEN	Set Encoding Scheme
SHO	Set Horizontal Origin
SIF	Select Interface
SKS	Send Keystroke
SLS	Set Line Style
SPF	Select Pattern Fill
SRM	Set Read Mask
SSE	Set Stack End Address
STD	Set Turnaround Delay
SUB	Enter TEK Compat. Input Mode
SUC	Set Up Counters for DVMA
SVO	Set Vertical Origin
SWM	Set Write Mask
SZR	Set Zoom Register
VSR	Vertical Scroll Relative
WDA	Write Direct Into AOI
WHC	Write Horizontal Scan if no AOI
WHR	Write Horizontal Runs if AOI
WHS	Write Horizontal Scan if AOI
WHU	Write Horizontal Runs if no AOI
WIP	Write Incremental Plot
WMP	Write Multiple Pixels
WPX	Write Pixel
WRD	Write Raster Direct
WSF	Write Special Font
XCD	Exit Command DMA
XTD*	Enter Extended Command Set

Instruction compatible with AED512 subset.

\* Available only on AED767.

\*\* CAP-Current Access Postion.



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