

Ramtek

RM-9460: RAMTEK'S NEWEST, MOST POWERFUL DISPLAY SYSTEM COSTS LESS THAN YOU THINK.

RM-9460





Ramtek's newest, most powerful display systems costs less than you think.

Ramtek's RM-9460 has multiple processors and a new memory design which combine to give you imaging, graphics and alphanumeric capabilities that rival more expensive display systems.

Multiple processor architecture gives the RM-9460 extra speed. While the 16-bit MC68000-based display processor is controlling all processing elements, storing subpictures and fonts, and performing coordinate transformations, up to three graphics processors are available to draw primitives into refresh memory and perform clipping, entity detection (identify objects selected by the cursor), pan and zoom. This enables the execution of interactive tasks at multiple independent workstations with minimal host support.

More speed; bigger RAM.

Fast instruction execution time allows vectors to be drawn at refresh memory rates. High density 64K dynamic RAMs and improved circuit design increase performance while reducing the board count, saving space and money.

Color and detail.

Resolution of 1280 x 1024 and a palette of up to 16 million colors or 256 levels of gray differentiate the most subtle variations in imaging or graphics data. And, unlike most other systems, you can have this resolution and color selection at the same time.

The perfect display system for system builders and sophisticated end-users.

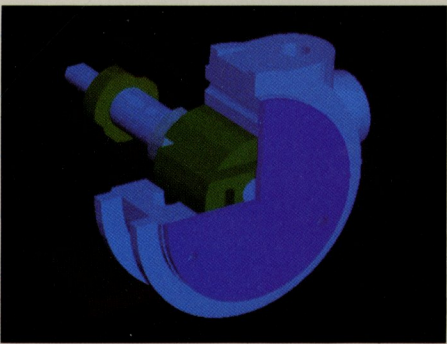
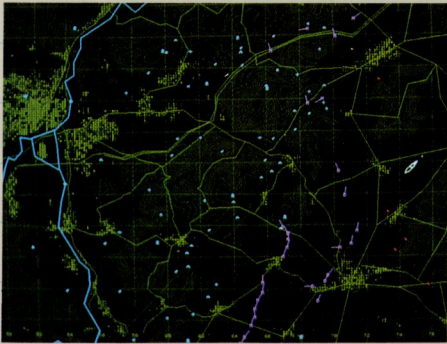
If you build systems for CAD/CAM, sophisticated process control, command and control, simulation, or imaging, the RM-9460 is the perfect display sub-system (interfaces to most host computers are off-the-shelf). It gives your system more capability, demands little from the host, and enables fast and easy integration.

With the RM-9460, the sophisticated end-user can display digitally generated images with meaningful color and detail. They can manipulate images and graphics with greater flexibility; and perform these functions at multiple independent workstations.

One RM-9460 serves multiple workstations.

With the MC 68000 based display processor managing all of the RM-9460's system resources, the operator at each workstation can concentrate on the graphics application. Each user workstation has a dedicated graphics processor utilizing bit-slice technology which performs all of the graphics functions including pan and zoom.

The RM-9460 packs these display capabilities in a compact package. It can be configured as an output peripheral or an on-line interactive display system.

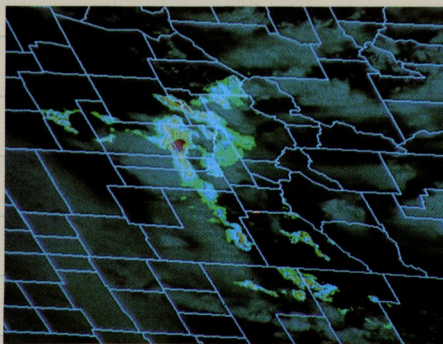


Multiple processors deliver more throughput for more users.

- Fast Vector Throughput
- Fast Display of New Pictures
- Fast Interactive Video Functions
- Fast Generation of Alphanumerics
- One System Serves Multiple Workstations

What you can do with a RM-9460.

- Download subpictures and special symbol fonts for execution via keyboard function keys.
- Independently scale and window alphanumeric font data.
- Define your picture in a high resolution (32K by 32K) virtual address space.
- Translate, rotate, scale, clip and draw graphics in a broad range of colors and line textures.
- Add detail as the picture is enlarged; subtract detail (declutter) as the picture is reduced.
- Use entity detect to identify locally stored graphic subroutines and instructions that draw selected objects.
- Generate plots and bar graphs.
- Flood polygons.



- Display image and bit-per-element raster data.
- Transmit packed image data (multiple pixels in one 16 bit word) from the host and display it as sequential pixels on the screen.
- Perform logical and arithmetic operations on multiple images.
- Use the modulated vector feature to write image data along a specified vector.
- Manipulate stored pictures by video lookup tables.

Software.

The RM-9460 is supported by many popular CAD/CAM, general graphics, and imaging application software packages. Ramtek's Software Affiliation Program ensures compatibility with widely used graphics software packages such as PATRAN, ANVIL-4000, DISSPLA, and DI-3000, through close cooperation with major software vendors.

RM-9460

Service and support.

Ramtek offers domestic and international on-site field service and a customer support network to assure user satisfaction. No matter how remote, every service center has the committed support of the home office.

Only a phone call away, Ramtek's support specialists are always ready with the technical know-how needed to help customers get the most out of their color graphics systems.

Our sales support people serve as an on-call consulting organization that forms an essential part of the sales/support/service team.

Training.

A variety of courses give Ramtek customers training in all aspects of our equipment. Software and hardware courses provide an extensive overview of the systems and teach basic diagnostics and troubleshooting techniques.

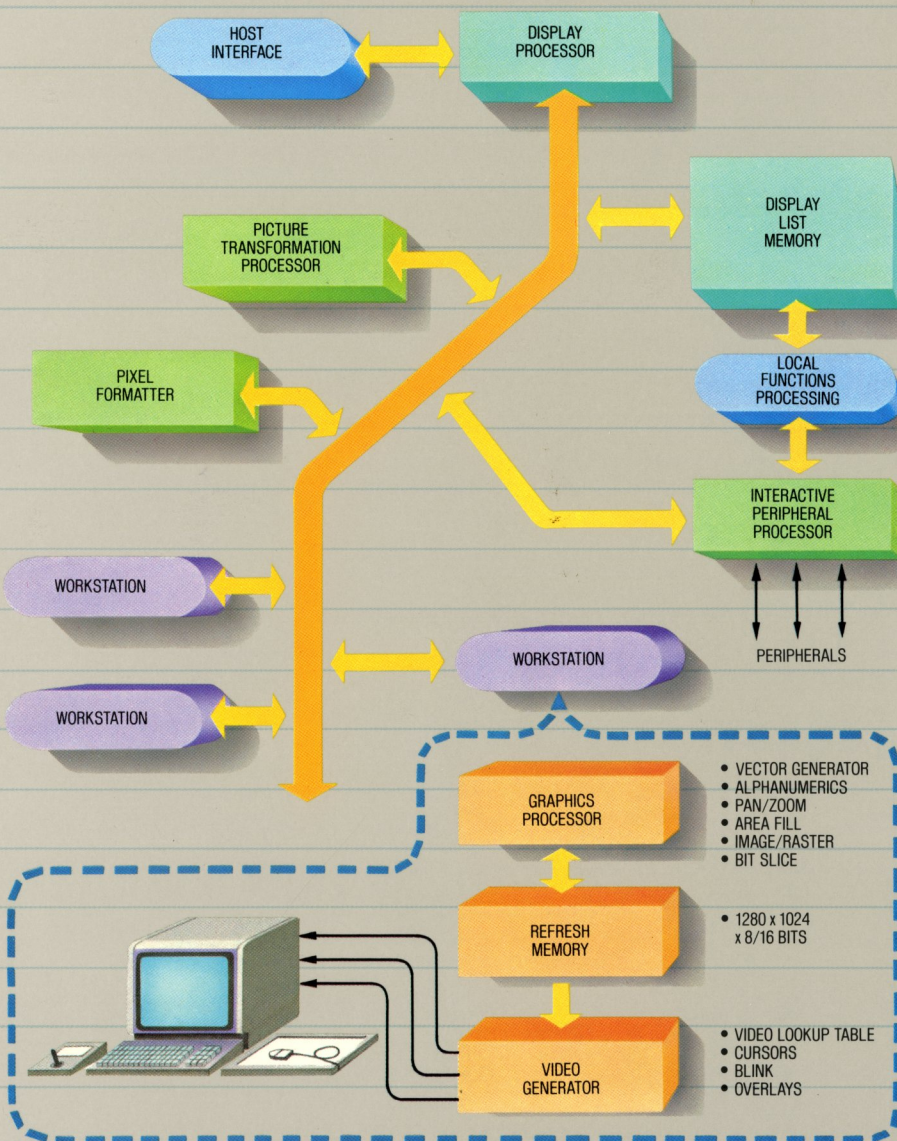
Also from Ramtek.

In addition to the RM-9460, Ramtek offers a complete line of general purpose colorgraphic terminals, monitors (resolution to 1280 x 1024 and CRT image sizes to 25 inches diagonal), color hard copy systems and accessories.

It costs less than you think.

The RM-9460 offers more imaging, graphics, and alphanumeric manipulation power for less money. For detailed specifications, write or call your nearest Ramtek office.

The RM-9460—Powerful Multi-Processor Architecture



Ramtek

Our Experience Shows

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RM-9460

The Ramtek Model RM-9460 is an off-the-shelf, commercial-grade raster scan display generator that drives industry compatible monochrome and color CRT monitors and large screen projectors. The system employs state-of-the-art microprocessor technology to solve a diverse range of graphics and image processing problems. The RM-9460 is capable of single or multi-channel operation and may be configured as an output peripheral or as an on-line interactive display system.

Display Processor

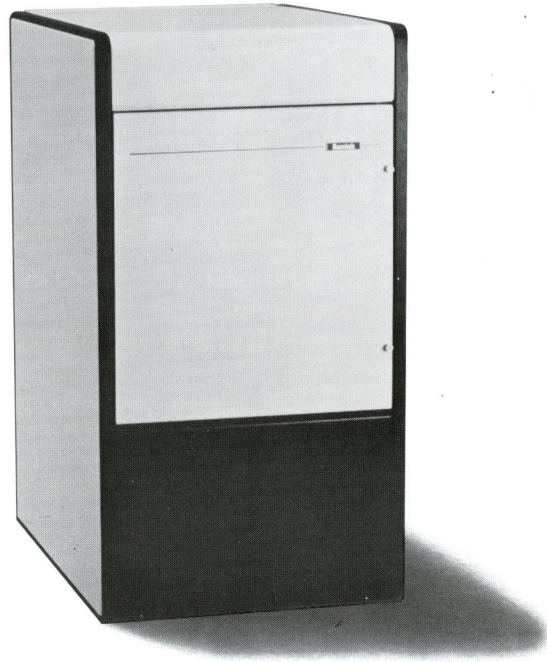
The display processor directly or indirectly controls each element of the display system. It decodes received instructions, stores subpictures (display lists) and fonts, performs coordinate transformations, and drives the bit-slice graphics processors. The user can choose between the Z-80^{T.M.} or MC68000^{T.M.} microprocessor. This unique versatility, along with the RM-9460's flexible architecture, enables the OEM user to easily customize the display system for his specific application.

Graphic Processor

For multi-workstation applications the RM-9460 provides additional bit-slice graphics processors. Multiple graphics processors can be employed in a single RM-9460 to give the user independent graphics operation on up to three CRT screens. This includes completely independent PAN and ZOOM functions on each display. Each graphics processor draws primitives (alphanumerics, graphics, etc.) into the refresh memory and performs clipping, entity detection, pan and zoom.

Refresh Memory

The RM-9460 uses solid state 64K byte dynamic RAM memories to store pictures in raster scan dot-matrix format with a resolution of 1280 elements by 1024 lines both addressable and viewable. Different combinations of refresh memory and graphics processors can be employed in an RM-9460 to provide a wide number of configurations. For instance, the system could be configured to support three CRT's with three independent 8-bit refresh memories or two CRT's, each with 16-bit refresh memories.



Video Generators

Ramtek provides a wide variety of video generators for numerous applications. The video generator transforms the stored picture into industry compatible video signals that drive Ramtek or other commercially available high resolution CRT monitors.

Display List

The RM-9460 allows the user to off-load the host computer by providing the capability to download subpictures and graphics subroutines into user program-mable memory. In its MC68000^{T.M.} configuration 240K bytes of display list memory is provided for this purpose. The Z-80^{T.M.} configuration allows the user to add display list memory in 128K byte segments to a total of 384K bytes.

Peripheral Processing

The RM-9460 can support multiple keyboards and graphics input devices such as tablets, light pens, joysticks, digital mice and trackballs. In addition, up to eight cursor generators can be supplied in a single display generator.

Primitives

Reset, erase, flash screen fill, point, solid rectangle, vector, conic, polygon flood, text, raster, plot, trend, barchart, image mode.

Attributes

Foreground and background color and/or intensity, line texture, character size and spacing, character or image orientation, clipping window, format window, reverse background, blink, mirror image.

Fonts

Standard 7 x 9 character font set. Up to sixteen additional fonts may be down loaded, maximum font resolution is 16 x 20 elements; however, symbols may be enlarged by pixel replication.

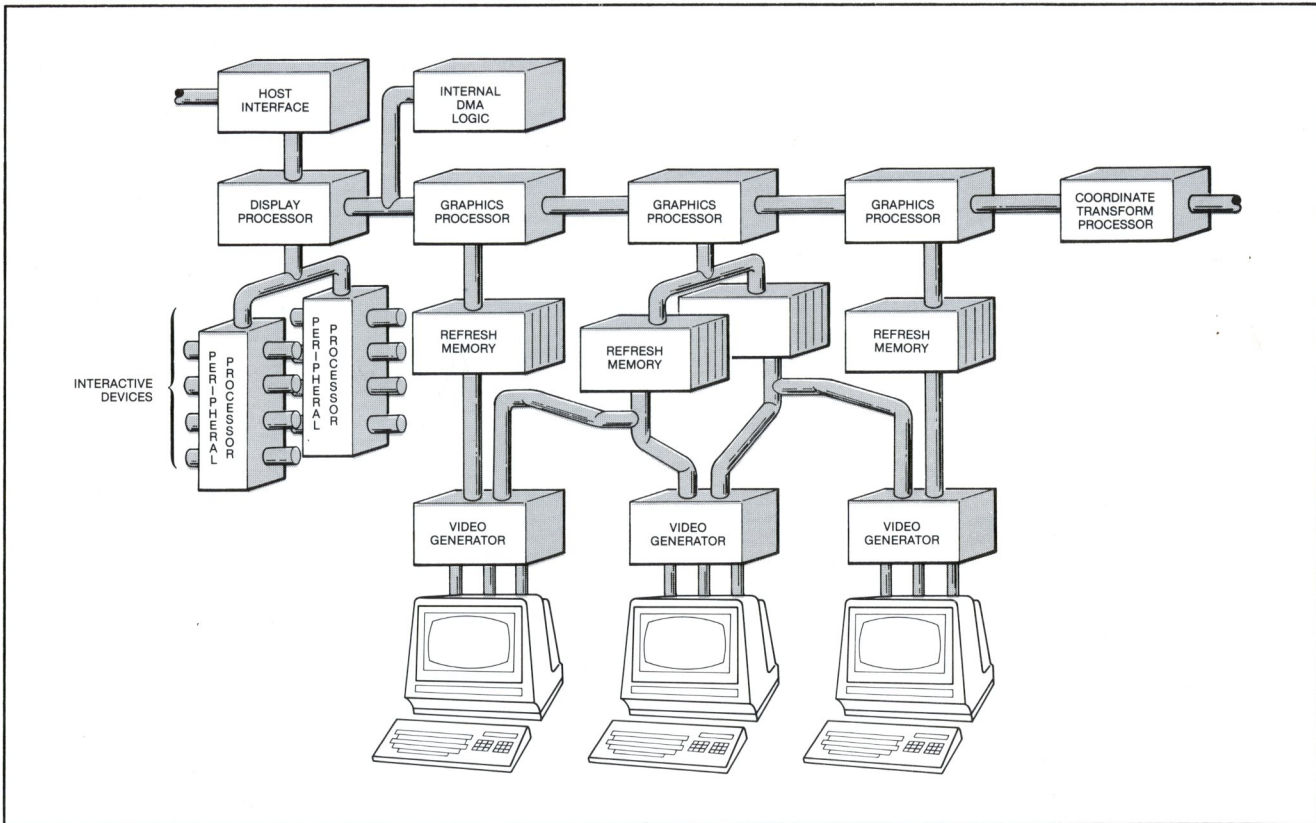
Coordinate Transformations

Translation within 32K by 32K virtual picture space, scale from .004:1 to 127.99:1, 2D rotation in 1 degree increments.

Addressing Modes

Absolute, relative, indexed.

RM-9460 Functional Architecture



Screen Resolution

1280 elements by 1024 lines.

Video Functions

Pan, zoom (in integer steps from 1:1 to 16:1 independent in X and Y). Up to three workstations with independent pan, zoom, blink and color/intensity 'translation' can be supported by one RM-9460.

Display List

The RM-9460 can contain up to 384K bytes of user programmable memory. Subpictures are stored locally as graphics subroutines in 4K to 16K byte display list segments. General programming capabilities include general purpose registers, 32 levels of subroutine nesting, conditional branching, display list register, arithmetic and logical operations.

Local Functions

Execution of locally-stored graphics subroutines is triggered by peripheral activity such as cursor movement or keystroke.

Declutter

Instructions contained in locally-stored graphics subroutines may be classified and either executed or not depending on a user-defined display class table. The user may modify this table on a basis of picture

size, adding detail as the picture is enlarged and subtracting detail as the picture is reduced.

Entity Detect

Identifies instructions contained in locally-stored graphics subpictures that modify pixels within a user-defined target window on the screen.

Clip Window

Constrains pictures to arbitrary viewports on the display surface.

Format Window

Defines a rectangular region on the screen in which text or image data will be contained.

Scroll

Up, down, left and right within user defined rectangular window.

Readback

Image data, video lookup table values, cursor coordinates, keystroke input, display list data and status information may be read back to host.

Interrupts

Peripheral activity, illegal instruction and data transfer complete.

Image Pixel Formatting

Image data consisting of 2 bits/pixel through 5 bits/pixel may be transmitted from the host in a packed format (multiple pixels per 16 bit word) and unpacked by the pixel formatting option and displayed as sequential pixels.

Modulated Vectors

Writes image data (Z-axis) along a specified vector. Applications include raster scan presentation of radar data.

Extended Imaging

Local arithmetic and logical operations between memories or memory groups. Local image copy and combinational functions.

Context Switching

In any RM-9460 system, each task has certain resources and variables involved in its display process. The context switching feature of the RM-9460 allows the system to switch from one display environment to another. This allows the RM-9460 to perform multiple tasks independently. Each task operates in its unique display environment with the RM-9460 performing the environment management.

SPECIFICATIONS

Display Processor

RM-9460/8X Series

Z-80 based display processor

RM-9460/6X Series

MC68000 based display processor

Graphics Processor

AMD 2901 bit-slice processor

Peripheral Processor

Z-80 CPU plus Z-80-SIO support

Performance

Pixel Access 1.49 μ sec/pixel
Vector Write 16K vectors/sec
(.5 inch/vector)
2D Transform 25 μ sec/endpoint

Physical

Mechanical (cabinet)

41.6 inches high

21.5 inches wide

30 inches deep

Mechanical (chassis)

17 vertical card slots

24.5 inches high

19 inches wide

27 inches deep

Electrical

100-130 VAC

190-250 VAC

47-66 Hz

1650 Watts

Environmental

0-40° Centigrade operating

10-95% relative humidity, non-condensing

Video

Rise/fall time 7 nsec
Pixel time 18.44 nsec

Video Options

RM-9460-VI

Drives 2-bit (4-level) video outputs to 12 Mono-chrome or four RGB color displays. Color, intensity, overlay and blink assignment are accomplished by PROM coding.

RM-9460-V7A

Drives three 4-bit (16-level) video outputs to an RGB display. Provides up to 2048 colors from a palette of 4096.

RM-9460-V7B

Drives three 8-bit (256-level) video outputs to an RGB display. Provides up to 1024 colors from a palette of 16 million.

RM-9460-V8

Drives eight 2-bit (4-level) video outputs to eight monochrome or two RGB color displays. Two separate video look-up tables provide the ability to display 64 different colors simultaneously from a menu of 64. In addition, the ability to blink graphics or cursors between user-selected colors is provided.

RM-9460-V12A

Provides one RGB and hardcopy output plus a high speed character generator (as an alphanumeric overlay); provides up to 64 colors from a menu of 256 via a video lookup table. Character generator features include: 128 characters (upper and

lower case), reverse video, blink, underscore, and 4-level intensity. Provides 24 lines x 80 characters.

RM-9460-V12B

Provides one 256-level output plus a high speed character generator as described for V12A video generator.

Refresh Memory

Resolution 1280 elements by 1024 lines
Bit planes 8-plane increments to 32 planes maximum.

Customer Service and Training

A worldwide network of customer service depot and repair stations is available to our customers. Field engineers and technical support personnel provide 24-hour response to customer calls. In addition, Ramtek offers a unique software support department staffed with highly qualified analysts to assist the user in accomplishing his application.

Regularly scheduled hardware and software training classes are conducted by Ramtek's Educational Department at its headquarters in Santa Clara, California.

Also from Ramtek

In addition to the RM 9460, Ramtek offers a full line of compatible peripherals, general purpose graphics terminals, monitors and color hardcopy devices.

Specifications subject to change without notice.

Option Summary

Video Boards	RGB Outputs	—or—	Mono Outputs	VLT Length	VLT Width
V1	4		12	256	6
V7A	1		3	2048	13
V7B	1		3	1024	25
V8	2		8	256	8
V12A	1		4	256	8
V12B	0		1	256	8

Select the RM-9460 Model Best Suited for Your Specific Application:

RM-9460/8X	A	B	C	D	RM-9460/6X
/80					N/A
/81				x	/61
/82	x				N/A
/83	x			x	/63
/84		x		x	/64
/85	x	x		x	/65
/86			x	x	/66
/87	x		x	x	/67
/88		x	x	x	/68
/89	x	x	x	x	/69

- A** Serial peripheral processor support up to 4 keyboards and 4 cursor control devices such as joysticks, trackballs, tablets, digital mice and light pens (optionally expandable to 8).
- B** High speed coordinate transformation option allows 2D translate, scale and rotate without degrading throughput.
- C** Pixel formatting function allows pixel data formatted as 2 bits/pixel up to 5 bits/pixel to be transmitted as packed data, unpacked by the RM-9460 and displayed sequentially.
- D** Display List Memory; 240K bytes standard for RM-9460/6X series. For RM-9460/8X Series, display list memory is available in 128K byte increments to a total of 384K bytes.

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