VG 8250
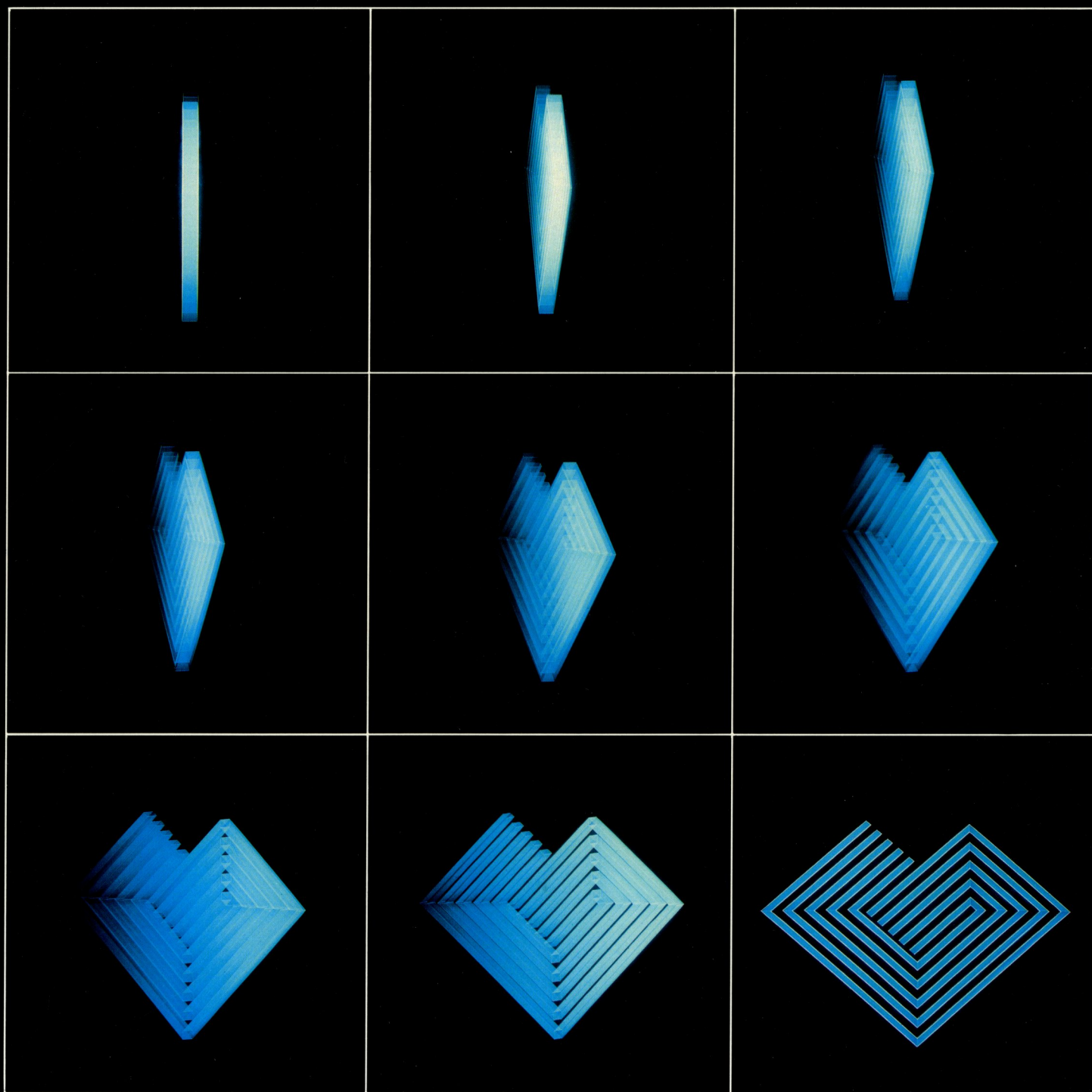
Vector General

The mind's eye

THE SYSTEM

The Vector General 8250 Graphics Display System is a plug-compatible replacement for the IBM 3250 display system used with the IBM 370, 3000, and 4300 class of computers. This emulation enables users to upgrade their systems while still preserving large libraries of CAD CAM, simulation, command and control, and data acquisition programs written explicitly for the 2250 and 3250 class of displays.

While emulating these earlier models, however, the VG 8250 extends capability far beyond systems bound by these first and second generation machines. Since the VG 8250 is priced significantly below the 3250, these extended capabilities result in substantial improvements in price/performance ratios.

Consider just a few of the VG 8250's unique capabilities:
- Cost effective configurations of only a few display stations for first time users.
- Modular growth to large 32 display systems distributed among as many as 12 different sites over a radius of up to 3 miles.
- High-speed (3-megabit) communication to ensure fast response on even the largest configurations.
- State-of-the-art components combined with built in diagnostics and other maintainability features combined to produce availabilities approaching 98%.
- Modern ergometric design to increase operator productivity by simplifying operation and reducing fatigue.

In designing the VG 8250, Vector General drew upon its 12 years of experience in designing high performance graphics display systems in general, and 7 years of experience in developing CADAM® and other CAD CAM systems in particular. The first of a new generation of display systems, the VG 8250 pays off not just in equipment cost savings, but more significantly in increased productivity.

THE BUILDING BLOCKS CONCEPT

The VG 8250 Graphics Display System design architecture incorporates a building block concept. As shown opposite, it consists of a number of major components which enable the potential user to begin with a limited configuration and add on until he expands to the maximum.

The Channel Data Communications Unit (CDCU 8211) is the channel control unit that links to the selector, block multiplexer, or byte multiplexer channel on one end and up to 12 communication lines on the other. The CDCU processes commands and data and transmits them serially down a low-cost, user-supplied, 3-megabits-per-second coaxial cable, to up to twelve remote sites that can be as far as 15,000 feet away. The CDCU 8211 can support up to 32 display stations without degradation in VG 8250 response.

The Remote Display Controllers Unit (RDCU 823X) is the basic remote site hardware that supports the 3 megabit line at the site and issues commands and data to two display controllers plugged into the RDCU chassis. The RDCU constantly polls the display controllers for status and transmits that information back to the CDCU. Two models of the RDCU are available: the RDCU 8231, which supports one controller; and the RDCU 8232, which supports two display controllers.

The Display Controller Unit (DCU 824X) takes the commands and data, processes them, and outputs pictures to up to four display stations. It includes all the necessary controller hardware to support the standard display station configuration. There are two types of display controllers: the high speed DCU 8241, with a high speed display generator, that supports four high speed display stations; and the medium speed DCU 8242 that supports two medium speed display stations.

The Display Station (DST 825X) is the operator display station that includes the monitor and devices; function switch box, keyboard, and light pen. The display station has two models, the high speed DST 8251 and the medium speed DST 8252. The only differences between them are monitor speed and line quality; both display stations are suitable for CAD CAM applications.

The new user can start with a small configuration of just one CDCU 8211, one RDCU 8232, one DCU 8241, and two to four DST 8251s. As his workload increases, he can modularly build onto the system by adding more DCU/DSTs and other RDCU 8232 sites.

Normally, starter systems should be flexible enough to support the larger site configurations for ease of expansion. RDCU 8231 sites are confined to areas that get less usage by a group of users or are limited by space constraints to four display stations at the site. Furthermore, the medium speed controller/display station requirements are limited to two stations, but are useful in areas where usage may even be less. If there is a question about expansion, the user is always advised to build in the potential growth.

Consideration should also be given to items such as buffer size per display station and the number of and speed of display monitors needed by the particular types of user application programs. As more sites are added, the user begins to fill the CDCU 8211 with more remote sites until he has reached his maximum. Similarly, the user fills out his remote sites until he has reached the thirty-two display station requirement. The number of sites and display stations on a CDCU 8211 is completely flexible as long as the thirty-two station requirement is not exceeded.

CADAM® is a registered trademark of the Lockheed Corporation.

THE ENHANCEMENTS

The VG 8250 Graphics Display System has many extra optional enhancements that can be acquired to suit wide and varied needs of users.

Supervisor is a card that is plugged into the CDCU that collects system data and acts as the "watchdog" of the VG 8250. Accessed by up to four standard RS-232C terminals, this data management system provides the necessary data to the CAD CAM Scheduler, Maintenance Manager, Computer Operations, and System Manager.

Refresh Memory expands the DCU refresh buffer from 32 Kbytes to 64 Kbytes with no limitation on amount of memory allocation per station. It is extremely useful with four stations per controller or applications where more buffer is a requirement.

Character Rotation/Scale are additional display instruction commands for continuous rotation and/or scaling of the four basic character sizes.

Clip/Zoom permits the picture to be panned and zoomed locally from the actual display data without regenerating the list from the computer. Zoom is 8 to 1 and does not affect the character blast function.
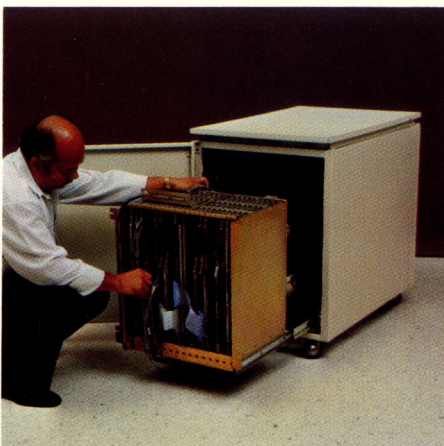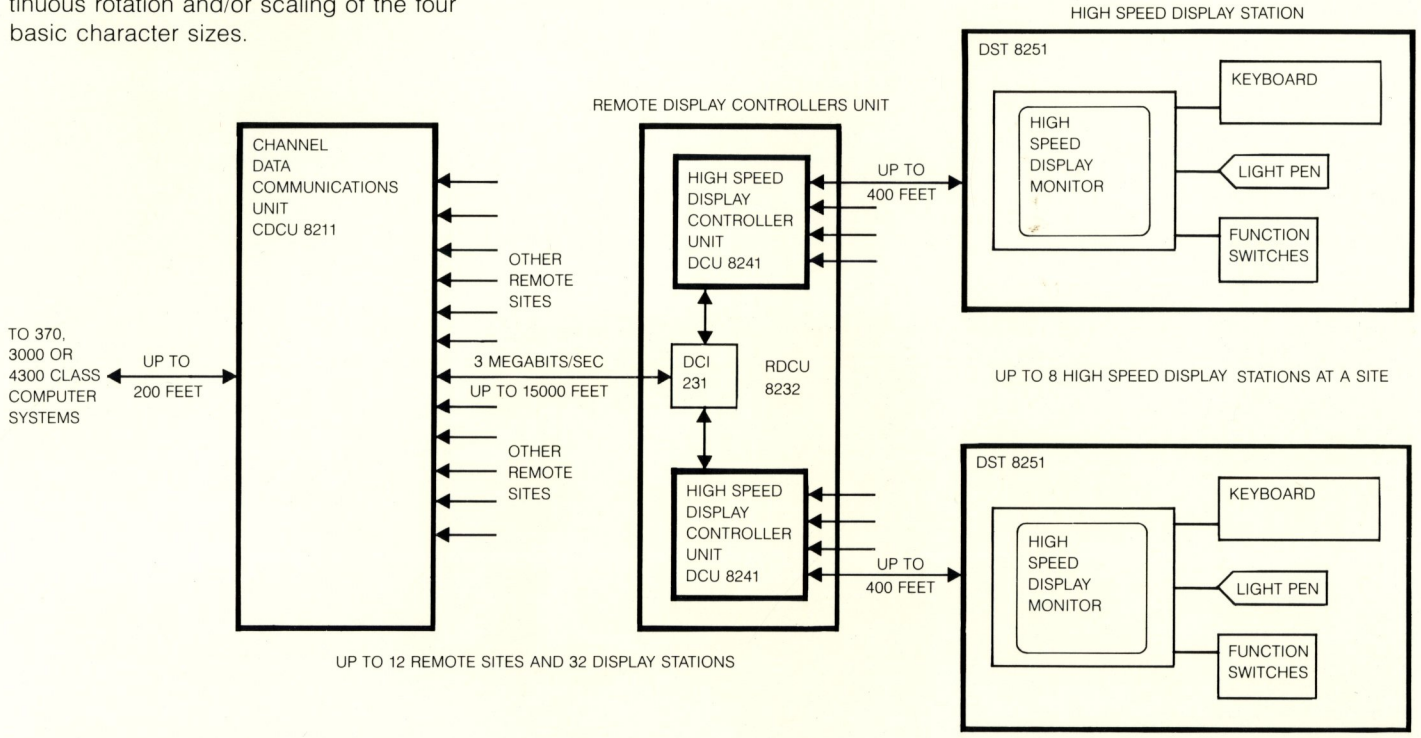
Tablet/Digitizers are available in sizes from 11" x 11" to 44" x 60" work surfaces. The work surface is mapped into the screen space. Modes of operation are either "Light Pen Emulate" or "Digitize." The tablet is a useful substitute for the light pen and is provided with a stylus. The digitizers are provided in standard and back-lighted versions with a four button cursor.

Hardcopy, which can be shared among up to eight display stations at a site, is produced by a V-80 Versatec plotter that is interfaced to the RDCU. A frame is "grabbed," then converted to raster data, and drawn on the plotter (typically in 20 seconds) without causing the displays to flicker.

Work Station Furniture is ergometrically designed with tilt/up-down keyboard, wings with sliding shelves, and lazy susans. A 36" x 40" table can become a complete customized work station system to accommodate a wide variety of devices, drawings, and computer program printouts by adding these options. For those who need a large drawing surface, there is a tilt drafting table on casters.

DDS Communications consist of a Digital Data Service link available in either 56 Kbaud or 1.544 Mbaud in accordance with Bell specifications. The DDS link allows the CDCU to communicate over telephone lines to the remote site.

Fiber Optic Communications allow the CDCU to interface to a fiber optic cable and communicate to the remote site. Distances and speed are the same as the coaxial cable, but useful for severe environments and secured areas.

HIGH SPEED DISPLAY STATION

CHANNEL DATA COMMUNICATIONS UNIT CDCU 8211

TO 370, 3000 OR 4300 CLASS COMPUTER SYSTEMS

UP TO 200 FEET

OTHER REMOTE SITES

3 MEGABITS/SEC
UP TO 15000 FEET

OTHER REMOTE SITES

REMOTE DISPLAY CONTROLLERS UNIT

HIGH SPEED DISPLAY CONTROLLER UNIT DCU 8241

DCI 231   RDCU 8232

HIGH SPEED DISPLAY CONTROLLER UNIT DCU 8241

UP TO 400 FEET

DST 8251
HIGH SPEED DISPLAY MONITOR
KEYBOARD
LIGHT PEN
FUNCTION SWITCHES

UP TO 8 HIGH SPEED DISPLAY STATIONS AT A SITE

DST 8251
HIGH SPEED DISPLAY MONITOR
KEYBOARD
LIGHT PEN
FUNCTION SWITCHES

UP TO 400 FEET

UP TO 12 REMOTE SITES AND 32 DISPLAY STATIONS

RELIABILITY AND MAINTAINABILITY

Vector General has traditionally been known for the maintainability as well as the reliability of its equipment. Vector General users have recorded a ninety-seven percent availability or better over the past seven years. Vector General's reliability, in particular, has been maximized by such practices as:

Printed Circuit Cards — In keeping with Vector General manufacturing practices, the VG 8250 is all PC; there are no wire wrap boards shipped in production systems.

System Testing — Extensive final system testing, including normal operation under severe environmental conditions, helps eliminate potential IC chip problems. Final testing also includes operation on Vector General's own IBM 4331 computer running extensive diagnostic programs to verify correct channel and system operation.

Now, Vector General has extended this capability still further with the VG 8250, which also incorporates:

Modularity — The VG 8250 is designed with fewer functions per printed circuit card and includes LED indicators to display correct functional operation. The CDCU is composed of three basic boards, two of which are repeated 12 and 6 times respectively. This enables easier system level and board level debugging, and minimizes spares requirements.

Micro Programmed Diagnostics — Each line in the CDCU and each RDCU uses a micro-processor that has diagnostic routines programmed into it to verify correct operation of the CDCU and combination RDCU/DCU/DST respectively. First level diagnostics are run using test switches and indicators on the edge of the circuit card while second level diagnostics allow an RS-232C terminal to plug into the card and display critical registers. These tests can be run without bringing the entire system off-line. The optional supervisor can monitor channel and communication errors.

Mainframe Diagnostic Programs — Written under the operating system and over GAM, IBM Graphics Access Method, these diagnostics verify system operation and can emulate specific system problems that may occur at the user's site.

Test Equipment — The VG 8250 has its own tester, the optional Multi Purpose Analyzer, which can emulate the variety of IBM channels to verify CDCU and VG 8250 operation, without operating off the mainframe, and extensive capabilities for testing DCU operation to the board level.

HUMAN FACTORS

The VG 8250 has been designed in conjunction with many users of this type of equipment who analyzed their human factors needs to make the display station easier to use. Here are only a few of the features:

Display Monitor
- Anti-reflecting coating.
- Bezel that shields light from screen.
- Left and right hand light pen holders.
- Built-in keyed connectors for devices including tablet.

Keyboard
- Left and right handed key pads with special symbols for annotation and lettering.
- IBM standard keyboard layout.
- Caps Lock Key.
- Sixteen extra special keys for access to special controller features: Light Pen Emulate, Digitize, Cursor Size, Highlight Enable, Highlight Disable, Scale Factor Enter, Keyboard Normal Mode and others for future expansion.

32 Key Function Switch Box
- 2250 layout and registration.
- Switch fits finger tips.
- Spring loaded switch when making contact.
- Back lighted LEDs.

Light Pen
- Short stroke tip switch.
- Highly selective and sensitive.
- Touch or tip switch with touch switch disable.
- Nonslip hand grip.
- Very light.
- Small coiled cable with strain relief.

Tablet
- Compact and light in weight (6.4 lb).
- Excellent for lap use or on desk.
- Self-contained with no extra power supply.
- Left and right handed stylus holders.
- High resolution (.0025″) and accuracy (.005″).
- Electrical switch on stylus.
- Optional four button cursor.

Operator Messages
- Symbolic messages appear as picture overlays in the lower right hand corner of monitor to notify operator of system malfunctions.

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