THE SYSTEM
The 8510/a GRAPHICS COMPUTER SYSTEM consists of the Model 8510 DATA PROCESSOR, with FIS/EIS (Hardware floating point option) a 56K Byte memory/video controller unit and the Model 8532 Keyboard/Display. This special configuration provides the user with a flexible disc based digital computer system, programmable through a variety of standard languages, with the added capabilities of producing medium resolution raster scan graphics. User programs can display both characters and graphics, independently or simultaneously in any combination of three zones in the display area. The character dot pattern is alterable through program control of a writeable character generator (192 character set capability) facilitating any special character representation desired including foreign language character sets.

FEATURES:
- LSI - Processor (16-bit word)
- Power Monitor - power fail/restart
- Auto Bootstrap Program Loader
- Flexible Disk Mass Storage (IBM 3740 format)
- Single Serial Interface
- 28K 16-bit dynamic MOS memory
- 12"CRT display
- Full ASCII keyboard
- 320 dot wide x 240 dot high graphics display
- Alterable character generator
- 2-port memory structure
- Simultaneous character/graphics displays
- Full disk operating system support
- Supports BASIC, FORTRAN IV, APL, PASCAL

THE 8510 DATA PROCESSOR
The TERAK 8510 is a completely self-contained disk based computer system incorporating a powerful LSI technology processor, a single flexible disk drive, a disk controller which handles up to four drives, single serial interface circuitry, power supplies and 4K words (16-bit) of MOS read/write memory.

The system is further enhanced by the unique TERAK universal serial interface panel allowing use of any peripheral requiring 20mA or RS-232-C signal levels and any of 14 switch selectable baud rates.

The 8510 features a 16-bit CPU, word and byte processing, eight general purpose registers, hardware and software interrupts, real time clock, parallel I/O data bus, power failure/auto-restart logic and hardware multiply, divide and floating point arithmetic.

The 8510 is supported by a complete disk operating-system including a single job and a foreground/background (F/B) monitor. The operating system supports a MACRO Assembler, Editor, Linker, Librarian, file transfer software and utilities for converting, dumping, comparing and verifying. The operating system also supports three high level languages; BASIC (single and multiple user) FORTRAN IV, and APL. The 8510 also supports a version of the PASCAL language. (Software is separately priced.)

The 8510 is housed in an attractively painted sheet metal cabinet measuring approximately 7.5"H x 12"W x 18"D. The entire unit weighs less than forty pounds (40 lbs.) and consumes about 150 watts.

THE VIDEO DISPLAY CONTROLLER AND 24K MEMORY SYSTEM
The display and memory system provides the 8510/a with main memory and with an extensive display capability. This system is contained on a single 8-1/2" x 10" PWB. Output from the display drives the 8532 keyboard/display using a raster scan dot matrix. Programs can display both graphics and characters, from independent buffers. In addition, the dot pattern displayed for any valid character code may be changed by program control of the alterable character generator. Features of this system include:

- 24K memory. Combined with the 4K word memory on the 8510/a processor, a total of 28K 16-bit words is provided.
- 320 dot wide by 240 dot high graphics display. An aspect ratio of .75 maintains a "comfortable" viewing area.
- Square dot matrix graphic display. Horizontal and vertical dot spacing are equal, eliminating any need for scaling correction.
- Main memory graphic display buffer. The graphic display is refreshed from the main memory. The buffer start address is under program control, accommodating variable boundaries between programs and buffers, simplifying addressing, and allowing rapid switch between dual buffers.
- Zone blanking of the graphic and character display.
- 2-port memory structure. Graphic display refresh does not use the 8510/a central data bus.
- 24 x 80 character display. Characters can be displayed simultaneously with graphics.
the LSI processor board providing the 8510/a with 28K words
independent of the video controller. (4K words are resident on
speed when the graphics display is blanked, and is functionally
dynamic Read-Write memory. The memory cycles at full bus
The memory display system provides 24K words of 16-bit
the selective blanking feature.

simultaneous reduction of the area of the monitor displayed, by
4800 words for this buffer. This can be reduced, with
buffer in the memory. Maximum memory requirements are
illuminates or blanks each dot according to the contents of a
placement of graphics. When active, the graphic display
minimizes the computation requirements for accurate
between any two adjacent dot positions. This "square array"
matrix of dots, 320 wide by 240 high. This area is presented
The graphic display is presented on the video monitor as a
are being refreshed. The character display is refreshed
simultaneously with the graphic display. Otherwise, the graphic
display and character display are independent.
The graphic display is presented on the video monitor as a
matrix of dots, 320 wide by 240 high. This area is presented
with an aspect ratio of .75 such that there is equal spacing
between any two adjacent dot positions. This "square array"
iminizes the computation requirements for accurate
placement of graphics. When active, the graphic display
illuminates or blanks each dot according to the contents of a
buffer in the memory. Maximum memory requirements are
4800 words for this buffer. This can be reduced, with
simultaneous reduction of the area of the monitor displayed, by
the selective blanking feature.

MEMORY
The memory display system provides 24K words of 16-bit
dynamic Read-Write memory. The memory cycles at full bus
speed when the graphics display is blanked, and is functionally
independent of the video controller. (4K words are resident on
the LSI processor board providing the 8510/a with 28K words
total.)

VIDEO CONTROLLER
The video controller is designed to provide medium resolution
graphics and random-addressed character displays on the 8532
Keyboard/Display. Both displays are refreshed at 60 frames per
second. The 24K memory is structured in a two-port design,
allowing access by both the processor and video controller.
This allows essentially full processor speed while the displays
are being refreshed. The character display is refreshed
simultaneously with the graphic display. Otherwise, the graphic
display and character display are independent.
The graphic display is presented on the video monitor as a
matrix of dots, 320 wide by 240 high. This area is presented
with an aspect ratio of .75 such that there is equal spacing
between any two adjacent dot positions. This "square array"
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placement of graphics. When active, the graphic display
illuminates or blanks each dot according to the contents of a
buffer in the memory. Maximum memory requirements are
4800 words for this buffer. This can be reduced, with
simultaneous reduction of the area of the monitor displayed, by
the selective blanking feature.

PROCESSOR SPECIFICATIONS

DEC LSI-11 Microcomputer
Mass Memory
Single Integral flexible disk drive. IBM 3740 compatible for
mat, ceramic read/write head
320 ms average access time.
256, 256 bytes per diskette.
Reliability: Read error rate—
less than 1 in 10^12 bits
Unrecoverable read error rate
—less than 1 in 10^12 bits
Head Life—15,000 Contact
Hours
Media Life—Greater than
10 x 10^6 passes per track on
approved media.

Environmental
Operating Temperature—
+40°F to +90°F
Operating Humidity—
20% to 80% R.H
(non-condensing)

Physical Height
7.5 in. (19.0 cm)
Width
12.2 in. (31.0 cm)
Depth
18.0 in. (46.0 cm)
Weight
40 lbs. (18.2 kg)

Standard Options Available
Additional single serial
interface
Line printer controller
16-bit parallel interface

A.C. Power Requirements
120 VAC @ 60 Hz
150 watts typical

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THE 8532 KEYBOARD / DISPLAY

The TERAK 8532 incorporates a video display (CRT) with a 12" (diagonal) screen, and a free-standing keyboard providing a full 128-character ASCII set and function keys for Cursor Control (right, left, up, down), Space, Carriage Return, Escape and Delete. Automatic time delay repeat of all keys is standard.

The 8532 utilizes a P4 phosphor at a refresh rate of 60 times per second.

The video display unit houses an audio alarm (2" speaker) which can be operated in two modes—standard 700 Hz continuous tone or, under software control, variable tones employing pulse width or pulse position techniques.

The Keyboard and Display units are individually cable connected to the Processor unit permitting maximum flexibility in positioning of units for operator convenience. The Processor is equipped with a standard BNC connector providing composite video output for remote monitor viewing.

The keyboard and display unit are housed in separate cabinets, the display unit cabinet containing all associated power supplies. The video display unit cabinet measures approximately 10.5"H x 13.0"W x 12.0"D and the keyboard housing measures approximately 3.5"H x 16.0"W x 6.5"D. The combined units weigh approximately forty (40) pounds.

GENERAL

The 8510/a GRAPHICS COMPUTER SYSTEM operates on American National Standard single-phase, 120 volt 60Hz line power per ANSI C84.1-1970. The complete system has been designed in a totally modular fashion to facilitate any required maintenance. TERAK warrants the 8510/a system to be free from defects in material and workmanship for one year from date of installation in accordance with its published warranty policies.

The 8510/a system runs under RT-11/85A. This operating system is the DIGITAL EQUIPMENT CORPORATION (DEC) RT-11 Operating System with a modified boot handler and loader. TERAK is authorized to license third party users to acquire software binaries for use on a single CPU (8510). A version of the PASCAL language is also available for the 8510/a. All software is separately priced.