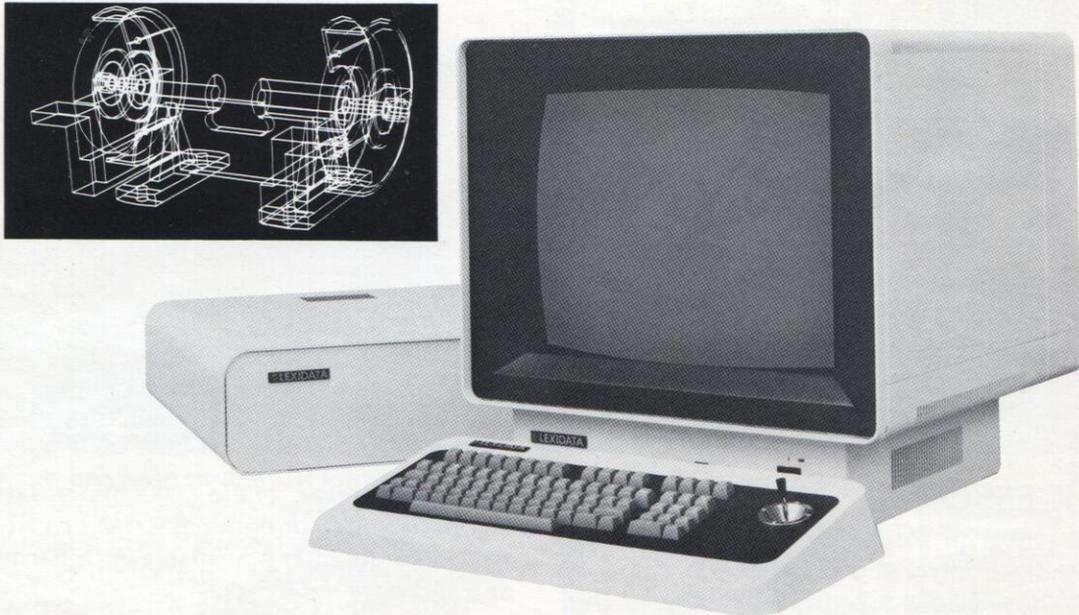


**NOW AVAILABLE
WITH VT-100™
EMULATION AND
NEW ERGONOMIC
DESIGN**

2400 & 2410

INTELLIGENT 1280 x 1024 GRAPHICS TERMINALS

The Lexidata™ 2400 and 2410 are intelligent, high-resolution graphics terminals featuring 1280 x 1024 resolution, user-definable workspaces, Tektronix 4014/PLOT 10™ compatibility, and Lexidata's Multi-Tasking Monitor. These and many more versatile features make the 2400 (monochrome) and 2410 (up to 16 colors) well-suited to satisfy a wide range of graphics applications.



Benchgrinder wireframe (above) as displayed on the 2400 high-resolution graphics terminal.

FEATURES

- Tektronix 4014/PLOT 10 Compatibility
- Affordable, High-Resolution Raster Display
- Supported By a Variety of Third Party Software Packages
- 68000 Microprocessor
- Multi-Tasking Monitor
- Programmable Keyboard with Joystick

BENEFITS

- Allows Use of Existing Application Software
- Lowers OEM System Cost/Provides High-Quality Graphics
- Satisfies Multiple Application Needs
- Allows Rapid Development of User-Defined Application Tasks
- Offloads Host Computer/Accepts Downloadable Application Tasks
- Offers Convenient User/System Interface

SYSTEM ARCHITECTURE

Both the 2400 and 2410 consist of three separate components: a 19-inch monitor; an ASCII keyboard with joystick; and a module containing system electronics and interfaces.

Multi-Tasking, Run-Time Monitor

The Lexidata Multi-Tasking Monitor resides in 64KB of PROM. User-defined application tasks, cross-compiled into 68000 code, can be easily linked to the Multi-

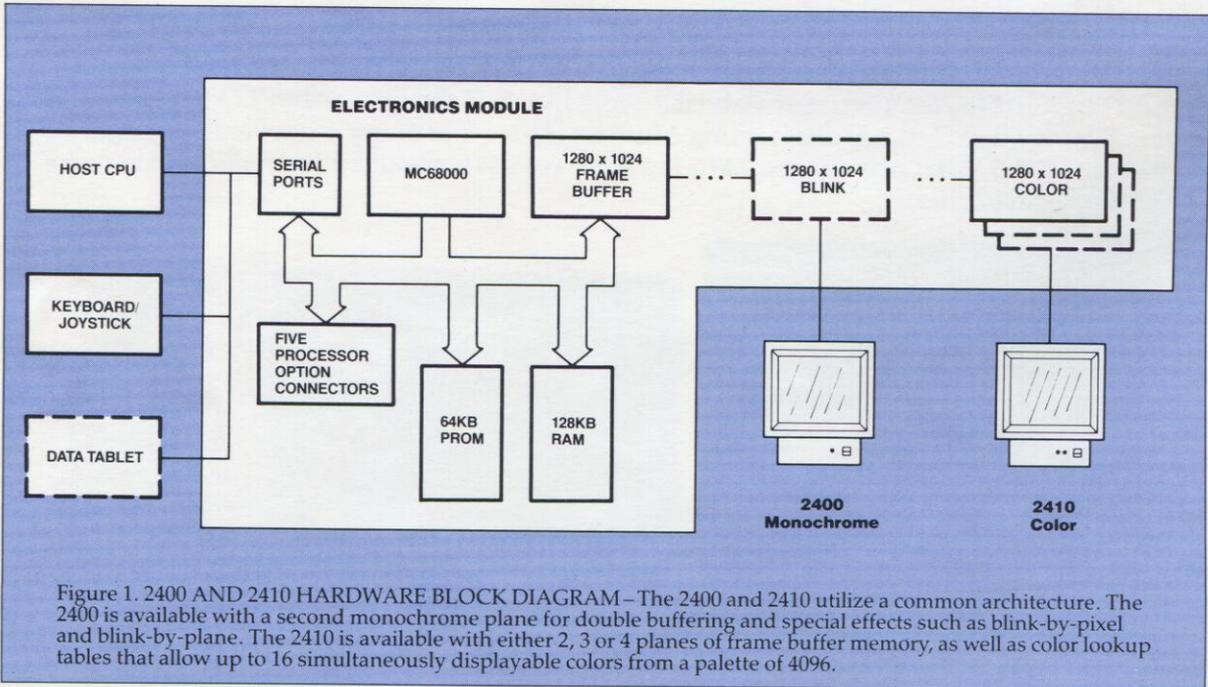


Figure 1. 2400 AND 2410 HARDWARE BLOCK DIAGRAM—The 2400 and 2410 utilize a common architecture. The 2400 is available with a second monochrome plane for double buffering and special effects such as blink-by-pixel and blink-by-plane. The 2410 is available with either 2, 3 or 4 planes of frame buffer memory, as well as color lookup tables that allow up to 16 simultaneously displayable colors from a palette of 4096.

PROCESSOR

The powerful 16/32-bit 68000 microprocessor handles control and graphics operations. The 2400 and 2410 take full advantage of the 68000's large memory address capabilities for optimizing the overall terminal operation. The 2400 and 2410 also contain 128KB of RAM which is used for buffering system software, as well as user application code. The 2400 and 2410 graphics language command set provides easy access to the exciting capabilities of monochrome and color raster graphics. A full complement of graphics commands afford the user the ability to increase overall system throughput significantly.

Tasking Monitor. These tasks may reside in standard RAM, or optional RAM or PROM. An option module is available with hardware and software debug tools.

TEKTRONIX 4014/PLOT 10 COMPATIBILITY

The 2400 and 2410 are Tektronix 4014/PLOT 10 compatible, providing execution of application software using PLOT 10. Lexidata graphics language set-up commands allow the 2400 and 2410 to emulate the most commonly used 4014 "strap options." When the 2400 and 2410 are set to Full Screen

Mode (FSM), 10-bit PLOT 10 data is displayed using the full 1280 x 1024 screen resolution. For color graphics and special effects, PLOT 10 data can be easily augmented with the 2400 and 2410 graphics language command set.

Processor Option Bus

Up to five Option Modules can be attached to the Processor Option Bus for upgrading system functionality. Multiple serial ports and additional PROM and RAM are among the currently available modules. Also available are Prototyping and Extender Boards.

HIGH RESOLUTION GRAPHICS

Using the latest in display design technology, the 2400 and 2410 both possess ultra-high 1280 x 1024 resolution displays, offering 100 pixels per inch (39 pixels/mm). The ultra-high bandwidth of the 2400's 50/60 Hz non-interlaced display produces exceptionally-stable monochrome graphics, and has been designed with an effective anti-glare and contrast enhancing optical filter to reduce operator fatigue.

The 2410, which operates at 25/30 Hz interlaced, uses special long-persistence phosphors and precision in-line CRT technology to produce vivid color images. Like the 2400, the 2410 also uses a bonded optical filter to reduce operator fatigue. The 2410 is available with either 2, 3 or 4 planes of frame buffer memory, as well as color lookup tables that allow up to 16 simultaneously displayable colors from a palette of 4096.

USER-DEFINABLE WORKSPACES

To increase operator efficiency and reduce system costs, the display is configured to allow user definition for as many as four variable-sized workspaces. Each workspace can be defined for a specific activity. Workspace 1 supports pan and zoom and is ideal for handling interactive graphics. Workspace 2 is a static workspace with shape and space

attributes which readily accommodate system-select menus. Workspace 3 is capable of scrolling text vertically (with wraparound) and is well-suited for text processing. Workspace 4 is a static workspace which can be used for logging messages or annotating the keyboard's programmable function keys.

Each workspace is provided with its own independently-controlled text and graphics cursors. A graphics cursor can also be defined independent of the workspaces. All graphics cursors are variable in size.

All four workspaces can be optimally configured to allow the system to simultaneously perform interactive graphics, conduct system dialogue, maintain a system-select menu, and log additional messages. The availability of these workspaces enables a reduction in the total system cost by eliminating the need for a separate alphanumeric display, as well as menu space on the digitizer work surface.

The position of each workspace and its associated attributes appear below.

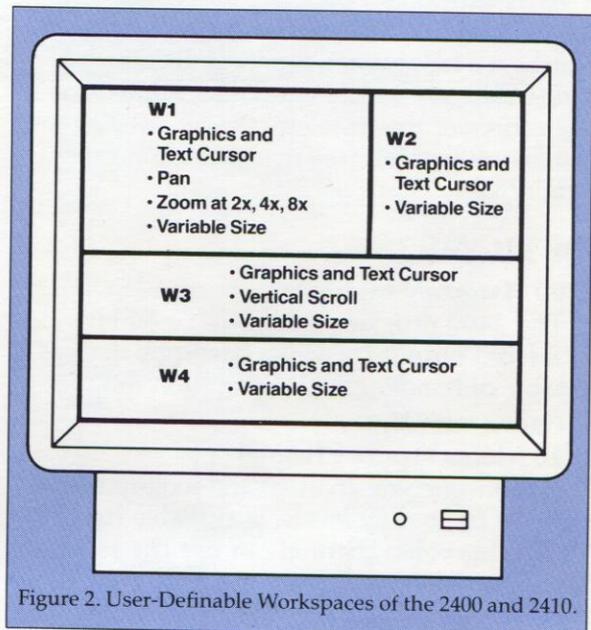


Figure 2. User-Definable Workspaces of the 2400 and 2410.

COMMUNICATIONS

Keyboard with Joystick

Both systems come standard with a detachable ergonomically-designed keyboard that includes an integral joystick for cursor control. All 85 keys, including 12 function keys, can be programmed to any of 128 ASCII characters or user-defined nested macros. Each macro can be nested to a depth of 16 levels and contain up to 512 bytes of commands or ASCII characters. By use of the "function shift key" the 12 function keys can be programmed to 24 different functions. Also included is a 12-position numeric keypad for ease of data entry.

RS-232 Ports

Two RS-232 ports are provided. The "Host Port" communicates at up to 19.2K baud. The "Data Tablet Port" accepts the optional Lexidata data tablet which can be used for cursor control or digitizing.

Power-Up Diagnostics

After power-up, a set of PROM-resident diagnostics exercise all major components. Hardware failures are reported via a set of four LEDs on the keyboard which indicate the source of the problem. Power-up diagnostics insure trouble-free operation and rapid field repair.

OPTIONS

2400 Hardcopy Interface

The 2400 provides a compatible 30 Hz interlaced output for video hardcopy devices capable of handling high-resolution monochrome raster formats.

2410 Monochrome Channel

A monochrome channel and lookup table, with up to 16 grey levels, is available for the 2410. This video channel can use the same hardcopy devices as the 2400.

Program Memory Expansion

The 2400 and 2410 allow flexible system memory expansion. Up to a total of 1.28 megabytes in 128KB or 256KB increments can be easily installed.

Input Devices

An 11" x 11" data tablet with stylus or four-button puck is available. The data tablet is completely supported under PLOT 10 control.

Font Expansion Module

An available Font Expansion Module allows the 2400 and 2410 to display up to eight user-defined, variable-sized text fonts. In addition, the module comes pre-programmed with Tektronix 4014 and APL compatible fonts. The Font Expansion Module also contains the capability of fast polygon fills.

Dual Serial/Debug Module

The Dual Serial/Debug Module contains two additional RS-232c serial ports, as well as software and hardware to aid in debugging user-written application tasks.

2400 AND 2410 CONFIGURATION SUMMARY

Model	2400 (monochrome)	2410 (color)
Display resolution	1280x1024	1280x1024
Display refresh rate	50/60 Hz non-interlaced	25/30 Hz interlaced
Display memory	1 plane	2, 3 or 4 planes
Video output	video, horizontal and vertical sync	RGB composite (optional mono- chrome channel)
Color lookup table	N/A	4x4 red; green; blue 4x4 optional monochrome
Color palette	N/A	4096
Maximum number of simultaneously displayable colors	N/A	16
Host interface	RS-232c Up to 19.2K baud	RS-232c Up to 19.2K baud
Hardcopy refresh rate (optional)	30 Hz interlaced	30 Hz interlaced

2400 AND 2410 GRAPHICS LANGUAGE COMMAND SUMMARY

The Lexidata 2400 and 2410 graphics language command set is intended to take advantage of the full monochrome and color capabilities of the 2400 and 2410, respectively.

INITIALIZATION

CLE	Clear key definitions
COM	Modify command prefix
DIR	Direct data flow to workspace
EAR	Store parameters from power-down
FSM	Set full-screen mode for PLOT 10
HOS	Define host transmission characters
IDE	Send user-defined ID code to host
STA	Display status
STE	Set terminal communications parameters
TRA	Append trailing characters
VID	Set video parameters
WOR	Define workspace sizes
WPR	Set workspace priority-W2/W3

2D GRAPHICS FUNCTION

ARC	Draw circle/arc
COP	Copy pixel block
INT	Assign intensity values
MOV	Absolute move graphics position
RMO	Relative move graphics position
RVE	Relative vector draw
VEC	Absolute vector draw

TEXT FUNCTIONS

CHA	Set character size and attributes
ERR	Specify error message workspace
STR	Write text string

PAN/ZOOM

PAN	Pan workspace 1
ZOO	Zoom workspace 1

CURSOR CONTROL

BLI	Turn off/on cursor, set blink frequency
GCU	Enable graphics cursor
	Enable/Disable keyboard to report position of graphics cursor
GPO	Report graphics position
PAD	Select keypad numeric/cursor
POS	Move cursor position
RCP	Report cursor position
TCU	Enable/Disable text cursor blinking

PERIPHERAL CONTROL

LOC	Define data tablet workspaces
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LOOKUP TABLE

LUT Read/write lookup table color values

SPECIAL GRAPHIC FUNCTIONS

BLI	Blink-by-color, blink-by-plane
ERA	Erase specified workspace
FIL	Select fill pattern
FLO	Execute flood algorithm
LIN	Select line pattern
PAT	Set user-defined line and fill patterns
PLA	Set frame buffer read/write mask
	Display specified planes
WMO	Select replace or complement write modes

MULTI-TASKING MONITOR FUNCTIONS

ECM	Echo commands for debug
EXP	Expand and execute nested macro
FUN	Set function key shift mode
JSR	Jump to user-defined subroutine
LEA	Learn nested macro definition
LNK	Link a user-defined task
LOA	Download "S-Records"

2400 AND 2410 SYSTEM SPECIFICATIONS

DISPLAY

19-inch (48cm) diagonal measure

Phosphor Type

2400: P4 white phosphor

2410: Long persistence color phosphors

TEXT

Standard Text Format

Size	Characters/line	Lines/page
1	160	85
2	80	42
3	53	28
4	40	21

Standard Character Size

Size	Matrix	Cell
1	7x9	8x12
2	14x18	16x24
3	21x27	24x36
4	28x36	32x48

Character set

96 displayable ASCII characters (upper and lower case)

(Continued on page 5)

CURSOR

Blinking (variable frequency) block character in text mode and variable sized cross-hair in graphics mode.

Cursor control via host, joystick, keypad, or optional data tablet.

KEYBOARD

Detached, 85-key with 2-axis joystick
6 ft. (1.8m) coiled cable

N-Key rollover

Audible "beep" using CNTRL G

11-key cursor/numeric keypad with cursor arrows, numbers and decimal point

Function Keys

12 programmable function keys (used with function shift key, each may be assigned two distinct functions)

Reserved Keys (with LED indicators)

Function Shift: Selects functions 1-12 or 13-24

Learn Mode: Enables reprogramming of keys

Cursor/Numeric Select: Selects keypad for cursor control or numeric

On Line/Local Select

GRAPHICS FEATURES

Command Protocols

PLOT 10 Modes:

Alpha, Graphics, Point Plot, Incremental Point Plot, Gin, By-Pass and Extended Graphics

Lexidata Graphics Language Commands:

Entered via Alpha mode, used for raster and color operations

Pan and Zoom (Workspace 1)

Pixel replication: 2x and 4x

Horizontal pan: 80 pixel steps

Vertical pan: 16 pixel steps

Dimensions and Weights

	Height	Width	Depth	Weight
2400 Monitor	20" (50.8cm)	20" (50.8cm)	17.5" (44.5cm)	90 lb. (42kg)
2410 Monitor	20" (50.8cm)	20" (50.8cm)	21.5" (54.5cm)	75 lb. (35kg)
Electronics Module	6.5" (17.8cm)	20.8" (48.3cm)	24.3" (61cm)	35 lb. (12kg) max.
Keyboard	4" (10.2cm)	21" (53.3cm)	11" (28cm)	5 lb. (2.3kg)

Text Scrolling

Automatic vertical scrolling in Workspace 3

Blink

2410: Blink-by-color, blink-by-plane

Masking

Read/write plane enable and plane display masks.

Pixel Write Speeds

(Replace write-mode)

2.5 μ sec/pixel horizontal lines

3.5 μ sec/pixel vertical lines

6.5 μ sec/pixel diagonal lines

Set-up less than 100 μ sec/vector

Capable of continuous vector input at 19.2K baud

HOST INTERFACE

Serial via RS-232c up to 19.2K baud

Set-up Attributes

Stored in 128 byte Electrically

Alterable ROM during power down.

Includes common 4014 "strap options"

POWER REQUIREMENTS

110/220 VAC \pm 10%, 50/60Hz \pm 5%

2400: 150W average

2410: 300W average

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature

10 to 40 degrees C

4 inch (10cm) minimum clearance front and rear of electronics module for air flow

Storage Temperature

-35 to 70 degrees C

Operating & Storage Relative Humidity

10% to 90% (non-condensing)

Regulatory Compliance

Complies with the conducted and radiated EMI emissions levels defined in FCC docket #20780 for class A equipment.

U/L Listed, File #E79464.

APPLICATION SOFTWARE SUPPORT

The Series 2000 is compatible with a variety of the world's leading application software packages. The following is a representative list of available third party software packages which support the 2400 and/or the 2410:

VENDOR

Advanced Technology Center
European Software Contractors A/S
GE CAE International Inc.
Interchart Inc.
Manufacturing and Consulting Services Inc.
Matra Datavision
PAFEC Ltd.
PDA Engineering
Precision Visuals Inc.
Shipping Research Services A/S
Swanson Analysis
Zycor Inc.

APPLICATION SOFTWARE PACKAGE

GRAFFPAK-CORE™, P-CUBED™
UNIRAS®
SDRC I-DEAS™
InterDraw™
ANVIL-4000™
EUCLID™
DOGS™
PATRAN-G™
DI-3000™
AUTOKON™, AUTOFIT™
ANSYS®
Z-MAP™, B-MAP™, Z-EDIT™



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