NEW 4330/4230 FAMILY

3D/2D Graphics Workstations and Terminals

- **Integrated Workstation or Host/Network-Connected Terminal Configurations**
- **20 MHz 68020/68881 Workstation CPU, with Optional Floating Point Accelerator**
- **16.7 MHz 68020/68881 Graphics Engine**
- **UNIX-based UTek™ Operating System with System Administration Interface, On-Line Tutorials and On-Line Help**
- **Pipelined Architecture and Custom Gate Arrays for Maximum Graphics Performance**
- **True Color Capability with up to 24 Bit Planes**
- **3D Wireframe, Shaded Surface and Stereoscopic Representations**
- **Supports High-Performance 2D Graphics**
- **Support for X Windows, Ethernet, TCP/IP and Sun NFS**
- **System Software Includes IBM PC/XT Emulation and C, with Optional FORTRAN, Pascal and UNIFY Data Base Manager**
- **4M Bytes System Memory, Expandable to 12M Bytes**
- **86M Bytes Hard Disk, 156M Bytes and 234M Bytes Optional**

UTek is a trademark of Tektronix, Inc.

The Tektronix 4330 Graphics Workstations and 4230 Terminals deliver the 3D and 2D graphics features set that Tek pioneered in the 4120 Series, now enhanced to provide even higher performance.

High-Performance Processing
The 4330/4230 Family offers excellent graphics price/performance. Motorola's 68020 16.7 MHz processor manages the display list, ASCII command processing, and input/output. Three microcoded engines, including a bit-sliced engine, accelerate graphics data manipulation. 4M bytes of graphics memory (3M bytes available to the user as display list memory) are standard with an additional 48M bytes optional.

The 4330 Series Workstations operate with two 68020 processors, working together to boost total applications performance. The applications processor operates at 20 MHz and is augmented by the 68881 floating point processor—and an optional floating point accelerator.

Tektronix' UTek Operating System is a powerful implementation of Berkeley 4.2 UNIX. With a number of extensions from System V, UTek facilitates system administration and maintenance.

The Right Features for 3D Graphics
Displayed objects can be shaded via constant, cosine or Gouraud shading methods. Users can select from 16 predefined translucency patterns and specify ambient light intensity and direction for up to 16 sources of white light for each of 64 possible views. Objects can be viewed in parallel or perspective projection, sectioned, clipped, rolled and rotated.

Graphics segments and a 32-bit virtual graphics coordinate space (24 bits for 3D graphics) support true zoom and pan. Segment editing and subrouting, and the powerful DRAW FACETS command, provide high-level programming entities. Tek has expanded its patented implementation of matching segment classes so they can be "picked" for graphics input.

The 4330/4230 Family offers high-performance 2D graphics capability, with 2D speeds five times faster than available in the 4320/4220 Family.

Easy Handling of Graphics Data
For entering and manipulating graphics data, 4330/4230 systems include a VT220-compatible modular keyboard with a cursor pad and optional thumbwheels. A mouse is standard with the workstations and optional with the terminals. An optional Valuator Dial Box provides 8 fully-programmable graphics input controls for the greatest productivity in manipulating 3D graphics.

To support the dense graphics used in scientific and engineering applications, all systems come with 4M bytes of display memory, with 3M bytes available to the user. Additional memory is available in 16M byte increments, with a total of 52M bytes (51M bytes available to the user).

Superior Display Quality
The 4330/4230 systems offer a choice of 16 or 19-inch color displays with 1280×1024 addressable points for an exceptionally crisp image. For flicker-free viewing, displays operate at 60 Hz, noninterlaced. True stereoscopic viewing (available as an option) provides alternate left-eye, right-eye views at a rate of 115 Hz.

Plenty of Mass Storage
The 4330 Workstations include an 86M byte hard disk and a 1.2M byte flexible disk for mass storage. Optional additions are 156M byte or 234M byte hard disks, a 60M byte cartridge tape, and a 360K byte flexible disk. For storing even more data, the Tektronix 4944 Mass Storage Unit supports a variety of streamer tape, hard disk and flexible disk options.

Extensive Compatibility with Software Applications
Compatibility with Tek's 4120 Series and new 4320/4220 Family allows hundreds of previously-developed applications to run with few or no changes, providing the flexibility to select the most useful combination of software and hardware. To simplify software porting, the workstations support industry standards like UNIX, X Windows, and FORTRAN.

TABLE 1. 4330/4230 FAMILY PERFORMANCE CHARACTERISTICS

	4335 Workstation	4336 Workstation	4337 Workstation	4235 Terminal	4236 Terminal	4237 Terminal
System Processors	68020 @ 20 MHz 68881 coprocessor	68020 @ 20 MHz 68881 coprocessor	68020 @ 20 MHz 68881 coprocessor			
Optional Accelerator	Floating pt. accel.	Floating pt. accel.	Floating pt. accel.			
Graphics Processor	68020 @ 16.7 MHz	68020 @ 16.7 MHz	68020 @ 16.7 MHz	68020 @ 16.7 MHz	68020 @ 16.7 MHz	68020 @ 16.7 MHz
Bit Planes Maximum	4 8 + 8	8 8	12 24	4 8 + 8	8 8	12 24
Display Modes	2D, 3D wireframe	2D, 3D wireframe, hidden line, shaded surface, double buffered	2D, 3D wireframe, hidden line, shaded surface, double buffered, true color	2D, 3D wireframe	2D, 3D wireframe, hidden line, shaded surface, double buffered	2D, 3D wireframe, hidden line, shaded surface, double buffered, true color
Optional Display	Stereoscopic	Stereoscopic	Stereoscopic	Stereoscopic	Stereoscopic	Stereoscopic
Displayable Colors Maximum	16 256	256 256	4,096 16.7M	16 256	256 256	4,096 16.7M
Display Size	406 mm (16 in.)	406 mm (16 in.)	406 mm (16 in.)	406 mm (16 in)	406 mm (16 in.)	406 mm (16 in.)
Optional Display Size	483 mm (19 in.)	483 mm (19 in.)	483 mm (19 in.)	483 mm (19 in.)	483 mm (19 in.)	483 mm (19 in.)
Addressability	1280 × 1024	1280 × 1024	1280 × 1024	1280 × 1024	1280 × 1024	1280 × 1024
System Memory (bytes) Maximum (bytes)	4M 8 or 12M	4M 8 or 12M	4M 8 or 12M			
Display Memory (bytes) Maximum (bytes)	4M 20, 36, or 52M	4M 20, 36, or 52M	4M 20, 36, or 52M	4M 20, 36, or 52M	4M 20, 36, or 52M	4M 20, 36, or 52M
Mass Storage (bytes)	86M hard disk, 1.2M flexible disk	86M hard disk, 1.2M flexible disk	86M hard disk, 1.2M flexible disk			
Optional Mass Storage (bytes)	156 or 234M hard disk, 60M cartridge tape, 360K flexible disk	156 or 234M hard disk, 60M cartridge tape, 360K flexible disk	156 or 234M hard disk, 60M cartridge tape, 360K flexible disk			
Interfaces	Dual RS-232C, LAN, Second RGB output, SCSI, Color printer	Dual RS-232C, LAN, Second RGB output, SCSI, Color printer	Dual RS-232C, LAN, Second RGB output, SCSI, Color printer	Host RS-232C, Dual RS-232C, LAN, Second RGB output, Color printer	Host RS-232C, Dual RS-232C, LAN, Second RGB output, Color printer	Host RS-232C, Dual RS-232C, LAN, Second RGB output, Color printer
Optional Interfaces	Additional RS-232C, Dual Centronics I/FS	Additional RS-232C, Dual Centronics I/FS	Additional RS-232C, Dual Centronics I/FS	Interactive DMA	Interactive DMA	Interactive DMA
System Software	UTek, C, X Windows 10.4, PC software support	UTek, C, X Windows 10.4, PC software support	UTek, C, X Windows 10.4, PC software support			
Optional Software	Pascal, UNIFY, ACCELL	Pascal, UNIFY, ACCELL	Pascal, UNIFY, ACCELL			
Supported GIN Devices	Thumbwheels, tablets, mouse, valuator dials, cursor pad	Thumbwheels, tablets, mouse, valuator dials, cursor pad	Thumbwheels, tablets, mouse, valuator dials, cursor pad	Thumbwheels, tablets, mouse, valuator dials, cursor pad	Thumbwheels, tablets, mouse, valuator dials, cursor pad	Thumbwheels, tablets, mouse, valuator dials, cursor pad
Supported Tek Color Printers	4692, 4696, 4693D	4692, 4696, 4693D	4692, 4696, 4693D	4692, 4696, 4693D	4692, 4696, 4693D	4692, 4696, 4693D

Tektronix PLOT 10® TekniCAD™ and TekniCAP™ are supported, and PLOT 10 Standard Tektronix Interface (STI) and Terminal Control System (TCS) have been enhanced to provide fast access to the 4330/4230 Family.

Software emulation of the IBM PC/XT is also standard, allowing the workstations to run a variety of PC/XT-based applications.

The 4330 Workstations and 4230 Terminals include a local area network port (IEEE 802.3) as well as dual RS-232C, Centronics-style, and Small Computer System Interface (SCSI) ports. Multiple RS-232C DMA ports and additional Centronics-compatible interfaces can be installed.

Tektronix and Industry Standards

The 4330 Workstations include industry-standard implementations of C, with FORTRAN 77 and ISO Pascal available as options.

In addition to the Tektronix PLOT 10 graphics standards, the 4330 Workstations implement UTek, Tektronix' powerful UNIX-based operating system. UTek's menu-based **sysadmin** interface simplifies the most complex system tasks, including network and system administration.

Networking is supported by an IEEE 802.3 Ethernet interface and the standard TCP/IP protocol. For file management across the network, the 4330 Series uses Sun Microsystems' Network File System (NFS)*.

Output Support

The 4330 Workstations and 4230 Terminals support Tek's new 4693D Color Image Printer which prints up to 16 million shades at 300 dots-per-inch addressability. Built-in color interfaces provide driver connection and hardware support for the Tektronix 4696 and 4692 Color Ink-Jet Printers. 4330/4230 Workstations and Terminals are free for other use while files are printing.

Sun Microsystems' NFS will be available in Spring 1988.

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