PICS 2000
Specifications

PICS 2000

System Description

The PICS 2000 is a high performance, multidimensional image processing and viewing system. The independent, stand alone, system accepts input from a variety of scanners through a magnetic tape reader Once the image data is processed, the PICS 2000 displays images on a 19" color monitor After review, the images created by the PICS 2000 are transferred to standard VHS tape.

The console is an attractive and compact unit equipped with both a color image monitor and a color monitor for user interaction. The intuitive user interface allows queueing of studies for unattended processing of multiple studies. A VHS tape recorder with audio input allows the radiologist to record information about the study. Interactively, the radiologist can control image rotation, changing speed and direction, and highlighting important areas of interest with a graphic arrow. Ultimately, the referring physician is provided with a clearly narrated video with the important features of the study fully explained. This VCR is also used to playback prerecorded video tapes for review.

The image computer and the tape reader are contained in the computer rack. The compact 42" high rack allows the tape reader to be placed within easy reach of the console, for convenient operator access. The entire system requires an area of less than 6 feet $\times$ 4 feet.

Hardware Description

Viewing Console

- 19 inch landscape, color image monitor Capable of displaying 640 × 512 interlaced 30 Hertz images with speaker
- 16 inch landscape, color bit mapped text monitor 1152(h) × 900(v) 81 pixels/inch, 66Hz N 93 MHz
- Keyboard (Floating on Tabletop)
- Mouse
- VHS Video Tape Recorder (VTR) with microphone jack
- Philips CX/TX Style desk
- NTSC Encoder for converting RGB to NTSC for VTR

Host Workstation

- Sun 3/110 Host Computer
  - CPU Board (MC68020, MC6881 4 MB RAM, Ethernet 10 Mbits/sec local area network interface, 2 RS-423 serial ports with modem control)
  - SCSI Disc/Tape Controller (capable of handling 4 disc drives and 1 tape drive)
  - DUMI—VME bus SYSBUS interface card
- 1 @ 320 Megabyte (unformatted) SCSI 5¼" hard disc (includes a chassis which supports the addition of 2 more discs)
- 1 @ ½" SCSI front load tape drive (1600 and 3200 bpi)
- 1 @ Modem

Image Computer

- **PIXAR II Image Computer**
  - 1 @ CHAP (Channel Processor) board operating at 40 Mips
  - 1 @ FSP (Frame Store Processor) board containing 12 Megabytes of image memory capable of 1280 × 1024, Non-interlaced, 60 Hertz, RGB output
  - 1 @ FSM (Frame Store Memory) board containing 12 Megabytes of image memory

Planning

- Max Distance from console to rack. 15 feet (SCSI Limit) connector to connector
- **Cooling**
  Rack _____ 2559 BTU/Hour
  Console _____ 1621 BTU/Hour
- **Dimensions**
  Rack _____ 21.3" (W) × 41.8" (H) × 52" (D)
  (w/door open)
  Console _____ 42.5" (W) × 37.5" (H) × 38.5" (D)
  (w/o monitors)
- **Power Requirements**
  Rack _____ Dedicated 220VAC, 20AMP
  Console _____ Dedicated 110VAC, 15AMP

3D Rendering Performance

(Generation of Precomputed Views)

User Selectable Parameters

- Rendering Methods _____ Volume, Surface, + Shaded Surface
- Bone Transparency _____ 100%, 75%, 50%, 25%, 0%
- Tissue Transparency _____ 100%, 75%, 50%, 25%, 0%
- Rotation Type _____ Spin, Tumble
- Number of Views _____ 4, 8, 16, 32, 64
- Matrix of Final Volume _____ 128, 256, 320, 512
- Volume of Interest _____ Any rectangular volume

Animation of Pre-Computed Views

- Real Time User interactive by mouse control
- Graphics Arrow
- Stop Frame and/or spin/tumble
- Animation stored digitally
- Animation available for recording on VHS

MSP Enhancement Package

This MSP enhancement is available as an upgrade for all PICS 2000s shipped without this package.
- Annotation of Images
- Interactive Multiplanar Reformatting (MPR)
- Disarticulation and Tumor Highlighting—Irregular Regions of Interest
- Linear measurement

User Interface

User Friendly Window Environment

- Tapetool Window _____ Acquisition of images from Magnetic Tape
- Orderform Window _____ Processing Protocol Selection
- Clipboard _____ Display of Patient Information
- Queue Window _____ Instant Display of rendering status
- Animation Window _____ Animation of precomputed Views
- Videotape Window _____ Recording of animated sequence on video tape

Scanner Compatibility

Currently Available

Philips 310/350
Philips TX/CX/LX
Siemens SOMATOM DR1 2, 3, DRH
GE 9000, 9800
Additional tape readers are currently being developed

PICS 2000 UP

(Option)

The PICS 2000 UP provides the user the full functionality of the clinically proven turnkey MSP software and also the ability to program the Pixar Image Computer directly as an "open system"

Hardware
- PICS 2000
- Additional 320 mB disc

Software
- MSP software
- Chaptools (A set of powerful programs, utilities, libraries, and resources that provide the user a comprehensive, development environment for programming the PIXAR I)
  - C Compiler
  - Assembler
  - Debugger
  - Link Editor
  - Loader
  - Program Archiver
- Chaplibraries (A set of utilities and run time libraries for many of the basic tasks of graphics manipulation and image processing)
  - Image Processing Utilities
    —Merging, Convolution, Rotation, Warping, Scaling, Copying, Histogram, Filtering, Linear Algebra, Boolean Algebra, Arithmetic Operations
  - Display Utilities
    —Sequencing of Animation Frames, nteractively Examining Frame Buffer Memory, Generating Color Bars, Modifying the Monitor Color Map, Zoom, Scroll, Gamma Correction, Channel Selection
  - Input/Output Utilities
    —Loading, Unloading, Encoding, Decoding
- Chapvolumes (A flexible set of tools for generating images (views) of three dimensional volumes in space)

MPDI™ Examination

(Option)

A Standardized, cross referenced reformatting program designed for surgeons. All images are windowed once for bone and once for tissue.
- Axial
- Sagittal
- Standard Coronal
- Curved Coronal