S3 Single Chip MPEG-1
Audio/Video Decoder

MPEG Momentum & The Personal Computer

- 30% of all households now have PC’s
- There are now more PC’s being sold every year than TV’s
- Most major PC OEM manufacturers will have MPEG-1 decode capable product offerings by 1996
- Many of those will have MPEG on the motherboard
MPEG Momentum & the Personal Computer

- There are currently 250 (and growing) MPEG titles in circulation
- MPEG-1 encoder systems are now available and are reasonably priced
- MPEG-1 compression houses are abundant
- "Compressionism" is showing up in the marketplace

MPEG Implementation
Extremes
Brute Force Hardware MPEG Implementation

- Advantages
  - Appropriate for non-intelligent consumer-type devices

- Disadvantages
  - Expensive
  - Inflexible
  - Ignore the presence of a CPU in the PC

Software MPEG Implementation

- Advantages
  - Base level performance on Pentium class CPU's
  - Appropriate for single task linear content display

- Disadvantages
  - Limited performance
  - Audio degradation
  - DOS playback not supported
Shared MPEG Implementation

- Uniquely partition the MPEG responsibilities between the CPU and peripheral devices
In the future...

Should the MPEG-1 algorithm be completely relegated to the microprocessor?

- Indeo vs MPEG
- Computational vs I/O intensive tasks
- Principle of locality

Scenic/MX1

- Audio/video decoding
- Data mastering
- Video scaling
- Stream parsing
- AIC solution
- GUI variant
Scenic/MX2

- Audio/video decoding
- Data mastering
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PCI Bus

A Scenic View

Video In/Out
Host I/F
DMA
40 MIP DSP
Memory I/F
Reference Data
DMA
Timer
V L I D Z I
DMA
I2S
Audio Out
Scenic Details

- 128-pin PQFP
- 5-Volt .6u 3LM
- Single Chip MPEG-1 Audio/Video Decoder
- MPEG-1 level 1 or 2 audio decompression at 32, 44.1 or 48 KHz, single channel, dual channel, stereo or joint stereo
- 40MHz

Scenic Details

- Requires 1/2 MBytes FP mode DRAM
- Hardware audio/video synchronization means
- White book, green book, OM-1 & MCI compliant
- Error detection & correction
- Designed from scratch
Design & Verification Methodology

- Hardware
  - IKOS NSIM
  - Quickturn Emulation

- Software
  - IKOS Voyager
  - IKOS FS
  - Synopsis

Milestones

- Concept in June 1994
- Functioning silicon in March 1995
- Volume shipment in June 1995
Bad News

- Four outstanding patents on related issues
  - Audio decode mechanism
  - Synchronization means
  - Video decode implementation
  - Partitioning

Good News

- MPEG is prolific
- PC's are becoming entertainment centric
- Accelerator companies are providing complementary (read advanced) functions above & beyond current microprocessor capabilities