DVI™ TECHNOLOGY & i750 VIDEO PROCESSORS
Sanjay Vinekar
Intel Corporation
Video Processing Requirements in PCs

Digital, CD-ROM based storage
- Interactivity
- High Storage Density
- Low data rate (1.2Mbit/sec)

30 Frames/second
256 X 240 minimum pixel resolution
8 bits/color component

Above requirements mean:
- Data is compressed before storage
  (1.2Mbits to describe 256x240x30 pixels or .65bit/pixel)
- Data is decompressed before display
  (for 12.5Mhz instruction rate, <7 instructions/pixel)

DVI™ Technology is a framework which makes Video Processing possible.

i750 Design Objectives

- Full Screen, 30fps Motion Video
- High Resolution Stills (512x400 VGA, 768x512 NTSC)
- Graphics (2-D and 3-D drawing and animation)
- Texture Mapping
- Special Effects
- Low System Cost
  (<10 components for a multimedia subsystem)

Solution
- 82750PA
  - Microcode Programmable Pixel Processor
- 82750DA
  - Highly Programmable Display Processor
- VRAM
**82750PA Key Features**

**Microcode Programmable**
- Wide Instruction Word (48 bits)
- On-chip Instruction RAM (256 x 48)
- Zero-Delay Branching

**Powerful Execution Unit**
- Dual 16 Bus Architecture
- General Purpose ALU
- On-chip Data RAM (256x16)
- Register Files (8x16)
- Loop Counters (2)

**I/O**
- 2 Input FIFOs
- 2 Output FIFOs

**Special Purpose Hardware**
- Pixel Interpolator
- Variable Length Sequence Decoder

---

**82750DA Block Diagram**

- Data (32)
- Scik
- Vbus
- Sync
- Pixel
- Sync Port Control
- CLUT
- Buffers
- VU Interpolator
- G/Y(8), R/V(8), B/U(8), Alpha(8)
82750DA Key Features

Highly Programmable Sync & Timing
- All Sync Parameters Are Register Programmable
- Virtually Any Sync Format Can Be Programmed
  VGA, NTSC, PAL, SECAM
- Many Pixel Resolutions Can Be Programmed
  768x512, 512x400, 256x240

Interpolation Support for Subsampled Bitmaps
- On-chip Buffers For V,U Samples (2 x 256 pixels each)
- Real Time Interpolators For 2x and 4x

On-chip Color Lookup Table

Programmable Functional Modes
- 8, 16, 32-bit Graphics Modes
- 9-bit Video Mode
- Mixed Graphics & Video Mode

Special Functions
- Digitizing Support
- Keying And Overlay Support
- Alpha Channel Support

i750 Summary

<table>
<thead>
<tr>
<th></th>
<th>82750PA</th>
<th>82750DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clock</td>
<td>12.5Mhz</td>
<td>20.0Mhz</td>
</tr>
<tr>
<td>Process</td>
<td>CMOS, 1.5micron</td>
<td>CMOS, 1.5micron</td>
</tr>
<tr>
<td>Design</td>
<td>Si Compilation</td>
<td>Si Compilation</td>
</tr>
<tr>
<td>Package</td>
<td>132-pin CPGA</td>
<td>117-pin CPGA</td>
</tr>
</tbody>
</table>
i750B Chipset

- Full Custom
- CHMOS, 1 Micron Process
- Plastic Packaging

82750PB
- 2X Clock Speed
- 2X On-chip Memory
- 2X I/O Bandwidth

82750DB
- 2x Clock Speed
- Full 3 x 256 x 8 Color Look-up Table
- YUV-RGB conversion
- On-chip Video D/A

Summary

i750 Chipset brings Multimedia capability to PCs.

- Full Screen 30fps Motion Video
- CD-ROM Data rate
- Real-time Capture and Compression
- High Resolution Stills
- Graphics and Animation
- Texture Mapping
- Special Effects

- Highly Programmable

- Low System Cost

i750B Video Processors Will Have 2X Performance And Lower Cost