Intel/Lockheed-Martin chipset

- Called Real3D
  - LM also did Sega standup arcade games
- Compatibility
- Most of pipeline in silicon
  - Exception: geometry calculations
- Uses Accelerated Graphics Port interface

Compatibility: OpenGL, WindowsNT. DirectX.

Pipeline:

Off chip:

  Geometry Calculation (transformation 3D->2D)

    no MMX speedup

On chip:

  Scanline generation

  lighting/fog/z-buffer

    shade-last

  texture mapping

Intel also doing graphics chip effort in Folsom

Accelerated Graphics Port (AGP)

- *Purpose*
- *Speed*
- *Unified memory architecture?*

Purpose: reduce cost of framebuffers. Pentium Pro systems, early 1997

Creates high speed path between card and DRAM controller ->

fast path to system memory

On card: z-buffer, alpha blending. Floating point adder, float->fixed cvtr

Off card: texture maps

Speed: dedicated point-to-point, no bus. 66 MHz, data xferred at both edges of clock -> 528 MB/sec (not to exceed)

Problem: AGP deals with physical addr, OS with virtual addr

Intel publically opposes a unified memory architecture, but is contributing toward UMA by presenting this fast path into memory. Nothing to stop card vendors from putting whole framebuffer into local memory.