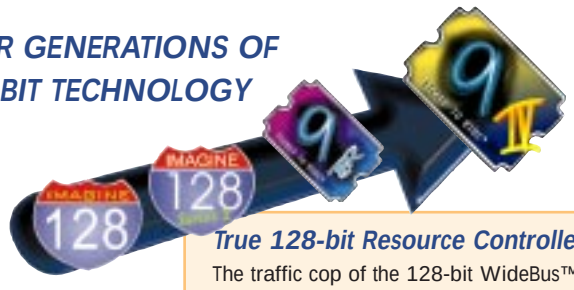
Ticket to Ride™ IV

Ticket to Ride IV is Number Nine's fourth generation, true 128-bit graphics processor. It offers more than triple the performance of the original Ticket to Ride chip, the multiple award-winner on which it is based. An advanced blending unit, display list processing power, and true-color 3D in super high resolutions earned Ticket to Ride the honor of being selected by Microsoft to display their GDI-2K™ software at WinHec (Windows Developer Hardware Conference.) Ticket to Ride IV improves upon all these features, positioning itself as technology well beyond the millennium.

KEY FEATURES

- High performance 128-bit Visual Processor for 3D, 2D, and Video desktop applications
- Number Nine's exclusive 128-bit *WideBus*™ technology
- 2X AGP and PCI 2.1 compliant
- Tightly coupled 128-bit 3D/Video and 2D Engines
- Full 430 MFLOPs Floating Point 3D Rendering Pipeline
- True Color / High Color 3D Rendering
- 32-bit Precision Z-buffer
- Integrated 128-bit, 250 MHz Palette DAC
- Optimized SDRAM / SGRAM / WRAM Interface
- Memory Configuration up to 32MB
- 128-bit WRAM support (256-bit Interleaved)
- Support for external DAC
- Shared Frame Buffer Support
- 3.3 Volt IO and core, 5 volt tolerant
- 388 Pin BGA Package

FOUR GENERATIONS OF 128-BIT TECHNOLOGY



Full 2X AGP Support

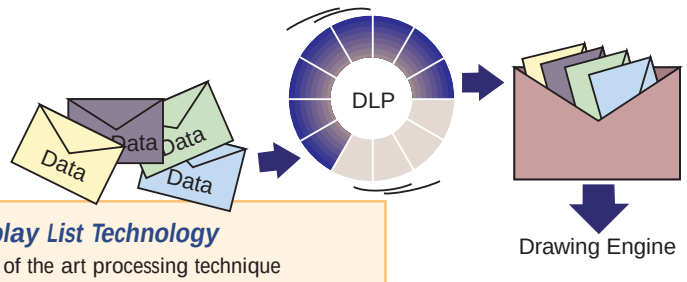
- AGP 2X data transfer rates, allowing data throughput up to 533 MB/sec from system memory
- Pipelined memory reads and writes, fully hiding memory access latency
- Sideband Addressing
  - increases data transfer
  - dedicated data bus
- High speed access to system memory
  - more memory bandwidth
  - smaller memory footprint

True 128-bit Resource Controller

The traffic cop of the 128-bit WideBus™ superhighway, Number Nine's fourth generation resource controller efficiently utilizes 128-bit memory bandwidth to optimize speed and overall chip performance.

Microsoft® 4D (GDI-2K) Ready

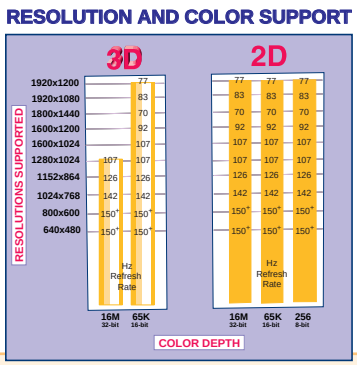
2D/3D/4D display technology of the future makes use of Ticket to Ride IV's unique ability to process both 2D and 3D commands simultaneously without having to arbitrate between resources.



Display List Technology

State of the art processing technique to maximize performance and provide faster text throughput with specialized commands.

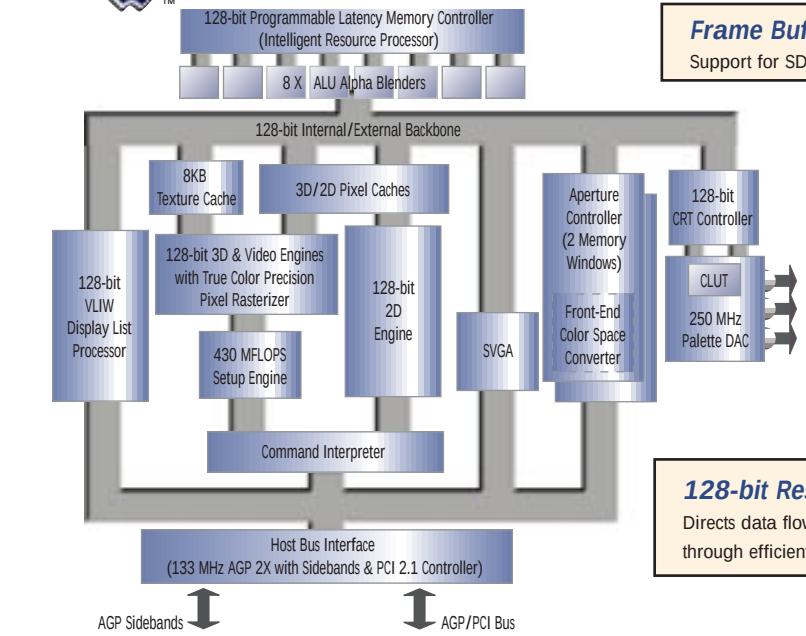
RESOLUTION AND COLOR SUPPORT



High Resolution, Full Color Capability

Ticket to Ride IV is the highest resolution true color graphics chip on the market today, with the ability to provide true color imaging up to 1920x1200 @77Hz.

Ticket to Ride™ IV



Frame Buffer

Support for SDRAM, SGRAM, WRAM, Interleaved WRAM

Advanced Blending Unit

- Uses destination alpha channels for optimal blending capability
- Direct line to 128-bit memory for ultra-fast performance
- First chip to support Microsoft's GDI 2K (4D) graphics interface of the future
- Contains 8 ALUs for maximum processing efficiency

2D/3D Graphics Controller

- Windowed 3D capabilities
- No loss of performance with bilinear functions turned on

128-bit Resource Controller

Directs data flow and optimizes chip performance through efficient use of resources.

Simultaneous Multi-Pixel Processing

- Block Write Support
- Pre-clipped BLTs, Fills, Area Patterns
- Display List Processing for text and graphics

30 Frames/Second Full Screen MPEG-II Playback

- Front-End Color Space Conversion
- Real Time Single Pass Video Scaling in X & Y

Integrated Palette DAC

- New 250 MHz triple 8-bit Palette DAC
- 128-bit interface from memory
- Integrated clock synthesizers
- Support for external DACs
- True Hardware Zoom

24-Bit RGB Digital Data Output

- Supports high resolution flat panel display

Flexible Memory Configuration

- Support for up to 32MB of SDRAM or SGRAM
- Support for up to 32MB of WRAM with 256-bit memory interface (interleaved)
- Support for 8- and 16-Mbit memory devices
- Programmable Latency Memory Controller
- Support for low latency SGRAMs

2X AGP Transfers at up to 533MB/s

- System memory texture cache
- Accelerates system BLTs

Combined 2D/3D Drawing Engine

- 2.0 Gigabyte / Second Onboard bandwidth
- 3D setup and rendering using floating precision
- Full 32-bit or 16-bit 3D pipeline
- 430 MFLOPs Floating Point Setup Engine
  - Full IEEE 754 Floating Point Inputs
  - Hardware Vertex Sorting

3D Display Buffers

- Double and Triple Display Buffering
- 24-bit true color professional 3D rendering with 8-bit Alpha Blending
- 16-bit high color 3D rendering for games
- 32- /24- /16-bit precision Z-buffering
- 10 LOD MIP Mapping in hardware
- Full-Scene Anti-aliasing

3D Texture Processing

- Perspective Correction texture mapping
- Tri-linear and Bi-linear Filtering
- 8KB on chip Texture Cache
- Palletized Textures: 8, 4, 2, 1 bpt
- Non palletized: 32, 16, 8 bpt
- Decal, Modulate, Replace, Blend Texture modes

3D Atmospheric Effects

- Per Pixel Specular Lighting effects
- Per Pixel Interpolated Fogging
- Per Pixel Alpha Blending and Compare
- Source and Destination
- Table Fogging
- Gouraud Shading for 3D triangles and lines

One Chip Architecture Satisfies Multiple 3D APIs

- Chip & drivers optimized for Direct3D v5.0/6.0 and OpenGL®
- Direct3D Transformed & Lit vertices accepted without modification
- OpenGL specific support including:
  - ICD & MCD OpenGL Drivers
  - Advanced 3D chip features exposed
  - Texture Filter modes
  - Alpha Blending modes

Extensive Software Support

- WHQL Support
- Leadership Drivers and Firmware
  - Leading Win95, Win98, and WinNT Performance Driver
- Integrated VGA Core
  - Performance-tuned VESA 2.0 Compliant Video BIOS
- Windows Plug & Play compliant
  - DDC 2B support
  - Display Power Manager Support
- Multi-monitor Display Drivers

OEM Support Services

- Chip documentation and support
  - Board reference designs
  - Hardware Integration notes
  - Software Developer Kit
- GUI, BIOS, Driver software sources available
- International Software - Global Market Support

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