Gamecube Architecture

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Topics

- Development History
- System Overview
- Architecture Overview
- The Gecko Processor
- Conclusion

Development History

- Development began following the launch of the Nintendo 64
- Codenamed “Dolphin”
- IBM developed the CPU
- ArtX developed the GPU
- Motion controls were developed but never released to consumers

System Overview

- 485 MHz CPU
- 162 MHz GPU
- 24 MB GPU RAM
- 16 MB Audio RAM
- MiniDVD optical discs store up to 1.5 GB
- Resolution max at 480p
- Stereoscopic 3D and Motion control development

Architecture Overview

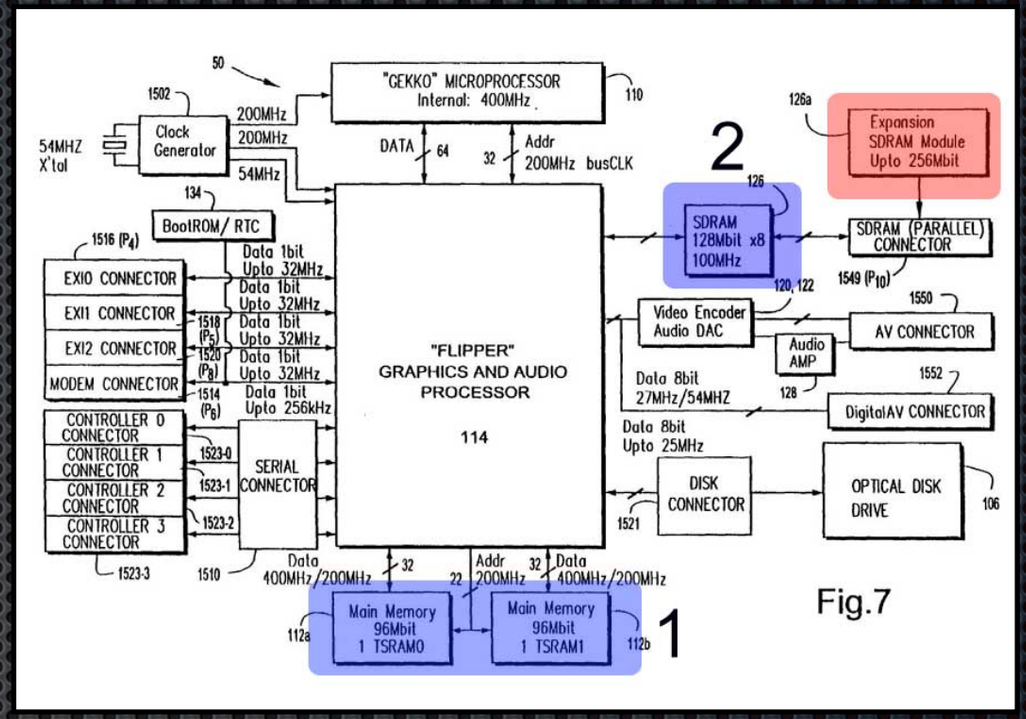
- RISC based instruction set
  - Instruction decode is one clock cycle
- 32 General purpose and 64-bit floating point registers
- 2 32-bit ALUs, 1 64-bit ALU
  - 4 stage and 7 stage pipeline, respectively
  - Load-store and branch prediction

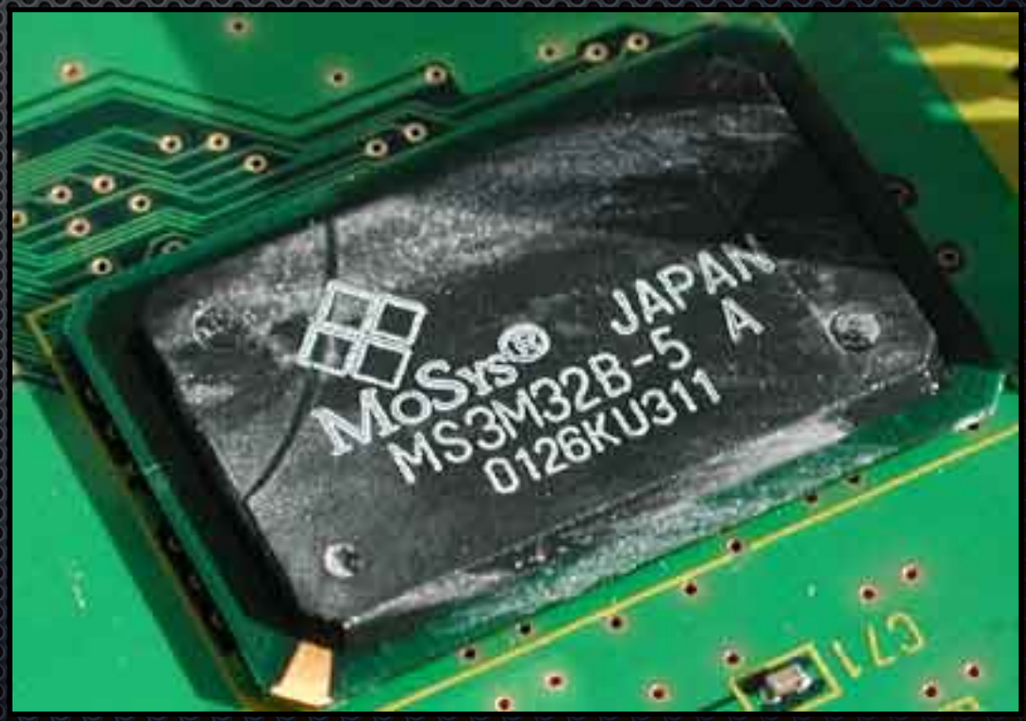
Gecko

- Codename for the CPU
- IBM based design on PowerPC 750CXe processor
- Built on a 0.18 micron process
- 2 separate pipelines
  - 4-stage integer pipeline
  - 7-stage floating point pipeline
- FPU capable of 1.9 GFLOPS

Flipper

- Codename for the GPU
- Made use of 1T-SRAM
- 2 MB Z-buffer
  - 4 1T devices
  - 96-bit wide interface per for 7.8 GB/s bandwidth
- 1 MB texture cache
  - 32 1T devices
  - 16-bit wide bus per for 10.4 GB/s bandwidth





Audio

- Used Macronix DSP
- Ran at 81 MHz
- Connected to 16 MB RAM through 8-bit bus
  - 81 MB/s bandwidth
  - Doubled as storage memory
- Stereo
  - Can play 5.1-channel surround via Dolby Pro Logic II

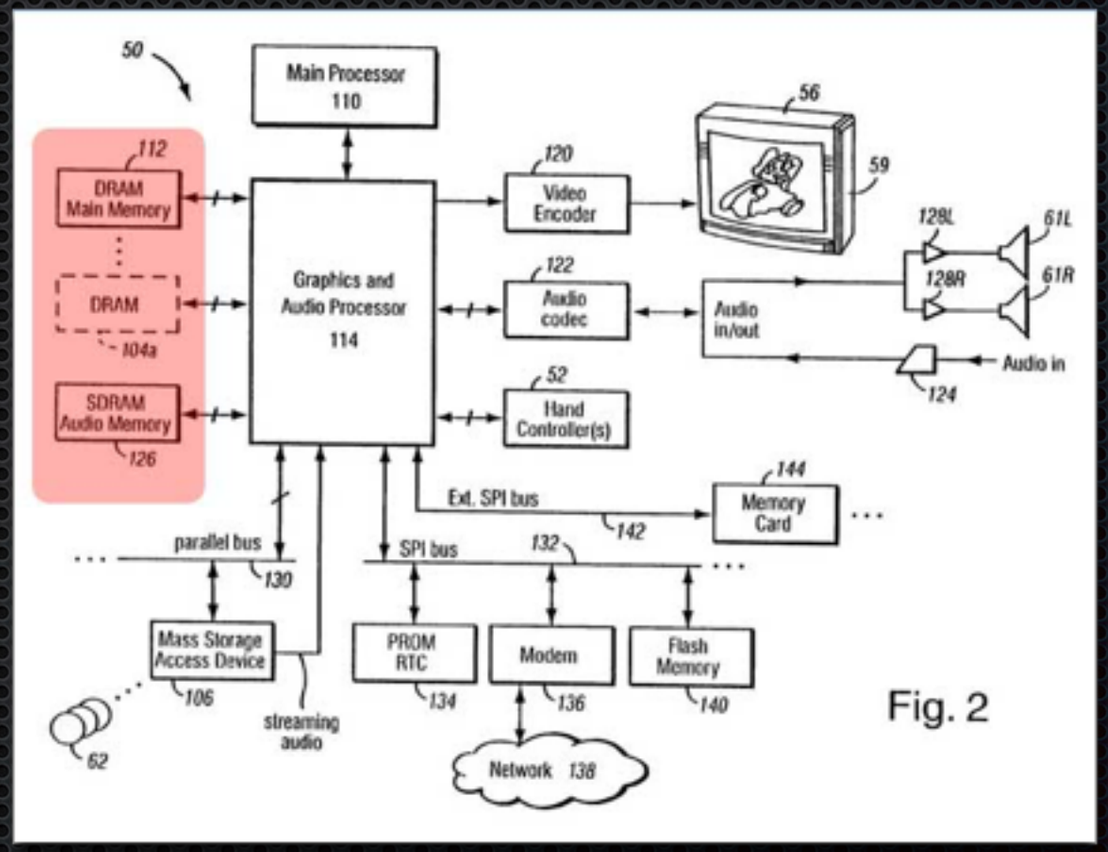


Fig. 2

Conclusion

- System designed to be a game console from start to finish
- Excels at producing good graphics in a short time
- Began development on motion controls eventually leading to the Wii

Questions?