Ricoh 5A22 Processor

- 65816 ISA instruction set
  - 256 instructions (8-bit opcode)
- 16-bit registers
- ~2.86 MHz Clock Speed
- 2 DMAs
  - General Purpose DMA
  - Horizontal DMA
- 2 Address busses
  - 24-bit address “A bus”
  - 8-bit data “B bus”
Hardware Layout

- 5A22 CPU
  - 128KB Work RAM
- 2 Picture Processing Units
  - 2 32KB Video RAM
- SPC700 CPU
  - Sound DSP
  - 2 32KB PSRAM
- Checking Integrated Circuit
  - “Lock” and “Key”

Datapath

Game Cartridge
- Mask ROM
- Mapper
- SRAM

Connects to:
- CIC
- 128 KB WRAM
- Picture Processing Unit 1
- Picture Processing Unit 2
- 64 KB VRAM

Expansion Port connects to:
- Ricoh 5A22 CPU
- Sony SPC700 CPU
- Sound DSP
- 64 KB PSRAM

Connected to TV and Sound Icon.
Graphics

Graphics – CRT Screens

- 60 Frame/Sec
  16.6ms each frame

- Drawing to Display
  14.2ms

- V-Blank
  2.4ms

- 224 Scanlines
  63.5 μs each line

- Sweep
  47.8 μs

- H-Blank
  15.7 μs
Graphics

Graphics - Background Modes
Graphics – MODE 7

• Single 8bpp background layer
• Linear Algebra Magic
Bibliography

- Overall Architecture: [https://copetti.org/projects/console/super-nintendo/](https://copetti.org/projects/console/super-nintendo/)
- Super NES Features Playlist: [https://www.youtube.com/playlist?list=PLH0DvlQyFw5KCC33jliHEx4_kVgwht6G0](https://www.youtube.com/playlist?list=PLH0DvlQyFw5KCC33jliHEx4_kVgwht6G0)
- ???: [https://youtu.be/DJKY1lNJQ8Q](https://youtu.be/DJKY1lNJQ8Q)