Nintendo Gameboy Architecture

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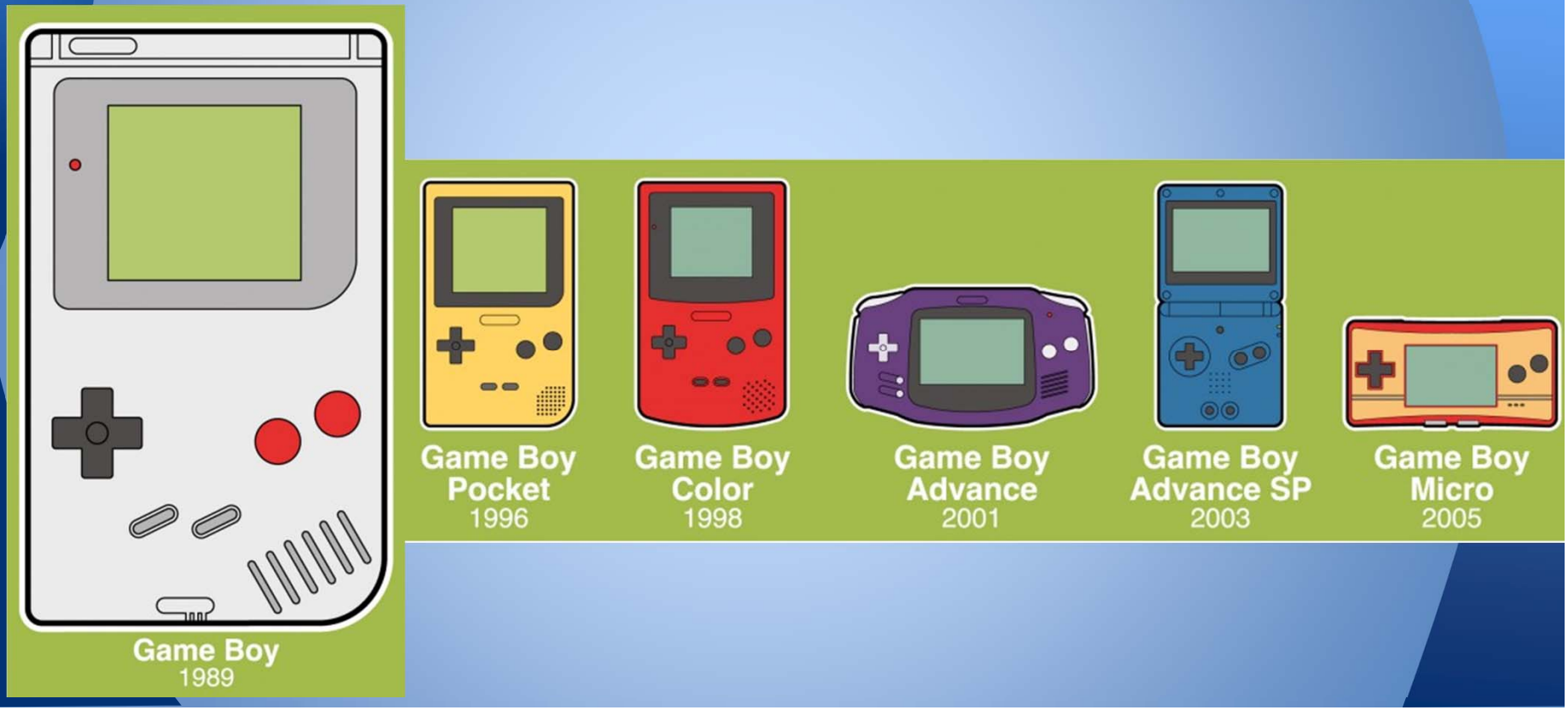
Overview

- Game Boy History
- Game Boy to Game Boy Color
- Game Boy Advance to Game Boy Micro

Nintendo's History

- Founded in 1889.
- Entered the arcade game industry in 1975.
- Began producing their own hardware in 1977.
- First handheld game in 1980.
- Game Boy released in 1989.

Game Boy History

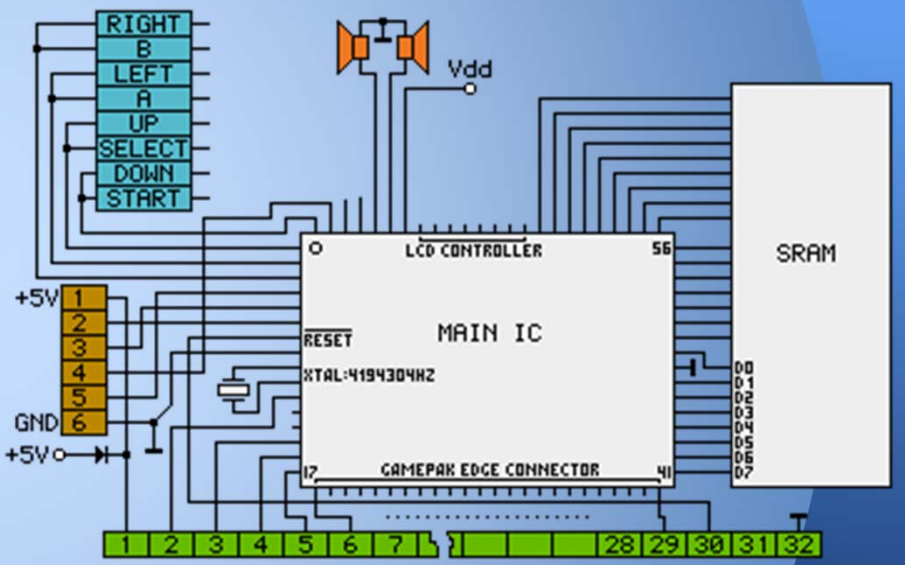


Game Boy Line: Success

- Released in 1989 and GB Advance discontinued in 2005
- Sold 64.42 million Game Boy Originals before Game Boy Color was released
- 118.69 million Game Boy and Game Boy Colors sold
- Over 81.51 million Game Boy Advances sold worldwide
- Tetris sold 30.26 million copies
- Pokemon Red and Blue sold 23.64 million copies combined
- Pokemon Gold and Silver sold 23 million copies combined
- Pokemon Ruby and Sapphire sold 13 million copies combined

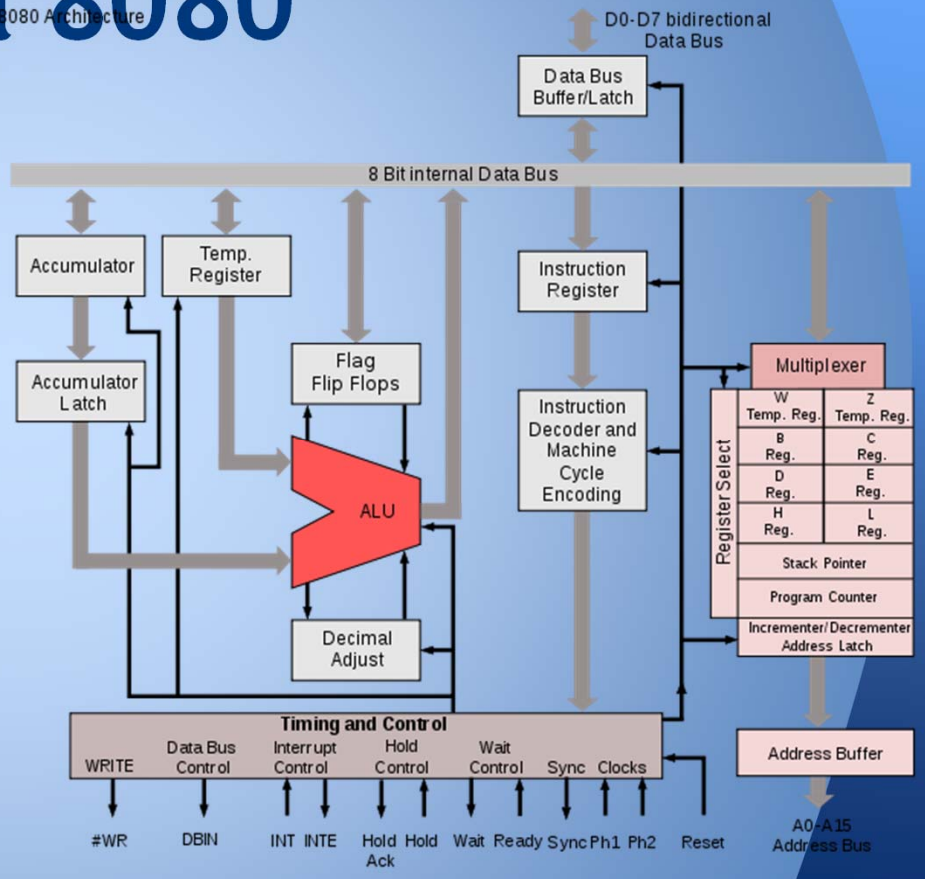
Game Boy Line: Hardware Specs

	Original, Pocket, and Light	Color
CPU	8-bit SHARP LR35902 (Hybrid of Intel 8080 and Zilog Z80)	
Clock Speed	4.194304 MHz	8.4 MHz
Work RAM	8 KB	32 KB
Video RAM	8 KB	16 KB
Power	DC 6V, 0.7W	DC 3V, 0.6W
Colors	4 grayshades	32,768 colors
Sound	4 Channels with Stereo Sound	



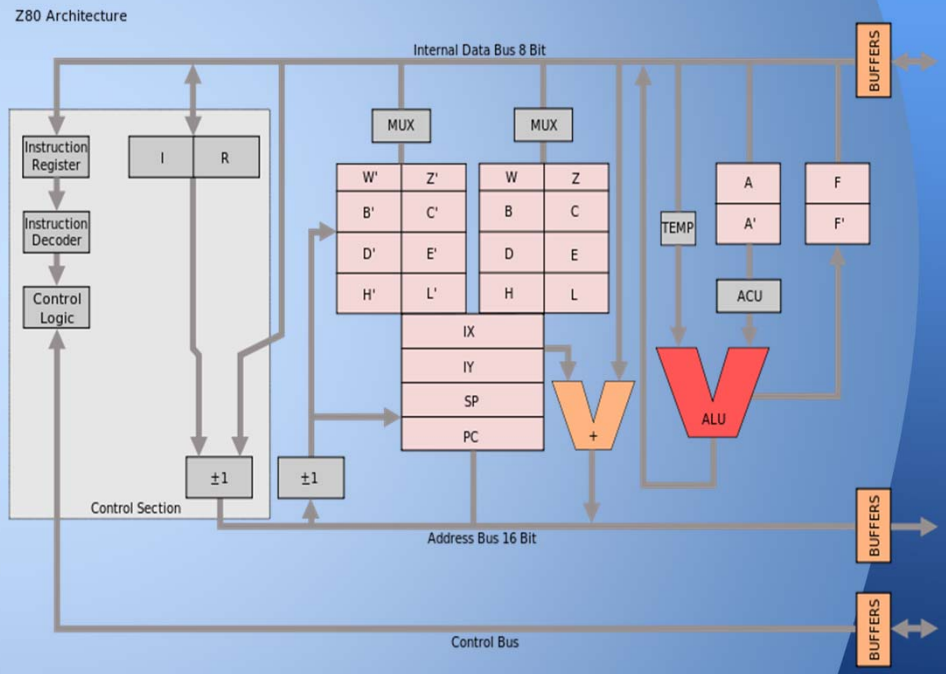
Intel 8080

- 16-bit address bus.
- 8-bit data bus.
- 64K of byte-addressable memory.
- 8 8-bit registers.
- 16 bit stack pointer.
- 16 bit program counter.
- 256 I/O ports.



Zilog Z80

- Binary Compatible with 8080.
- Addition of Index Registers.
- Addition of a second register file.
- Improved Interrupt System.
- Enhanced Instruction Set.

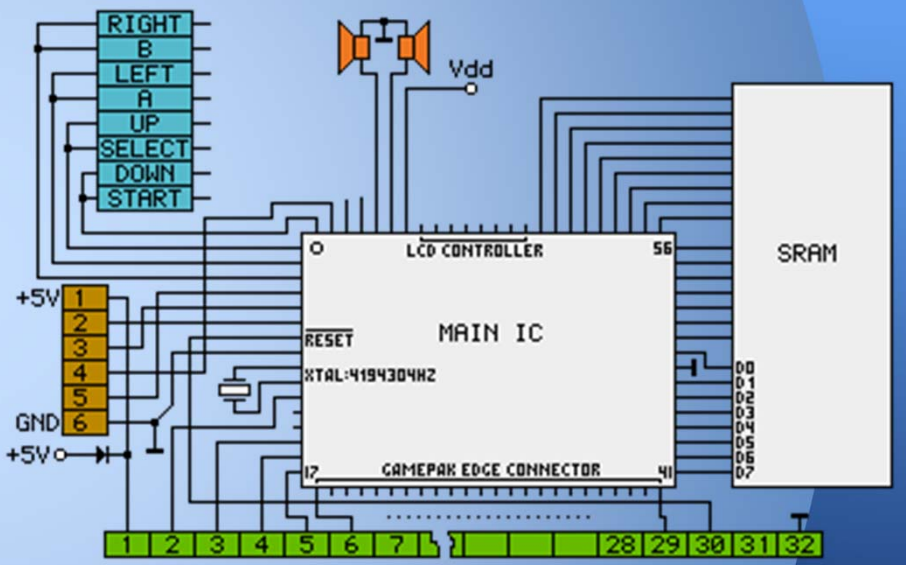


Sharp LR35902

- Hybrid of Intel 8080 and Zilog Z80
- 8080 Characteristics
  - Single Register file
- Z80 Characteristics
  - Coding syntax
  - Instruction Extender (0xCB)
- New Characteristics
  - I/O Scheme
  - Flag Register

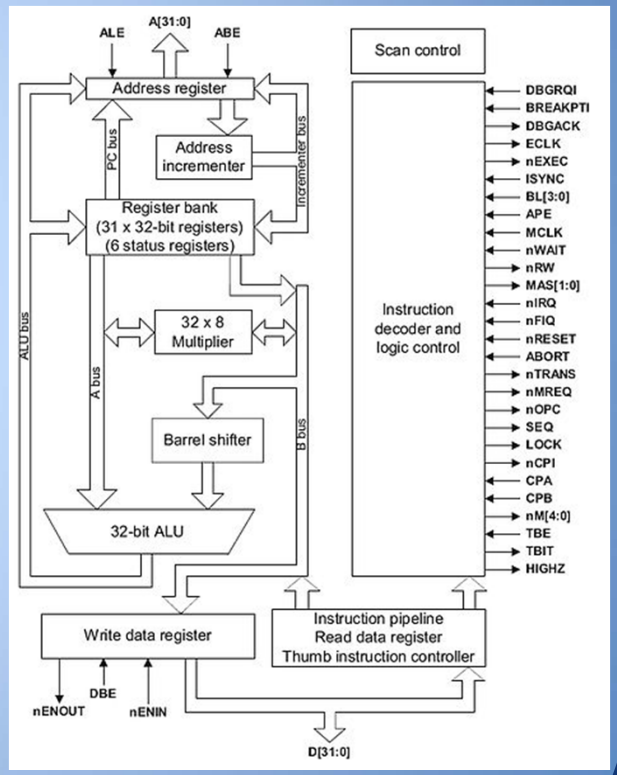
Game Boy Advance: Hardware

	Advance
CPU	32-bit ARM7TDMI +Sharp LR35902
Clock Speed	16.8 MHz + 8 MHz
Work RAM	256 KB
Video RAM	96 KB
Power	DC 6V, 0.7W
Colors	4 grayshades 32,768 colors
Sound	6 Channels with Stereo Sound



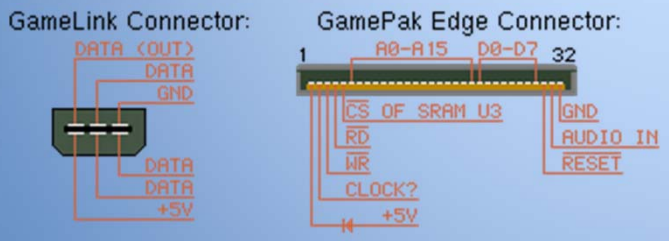
ARM7TDMI

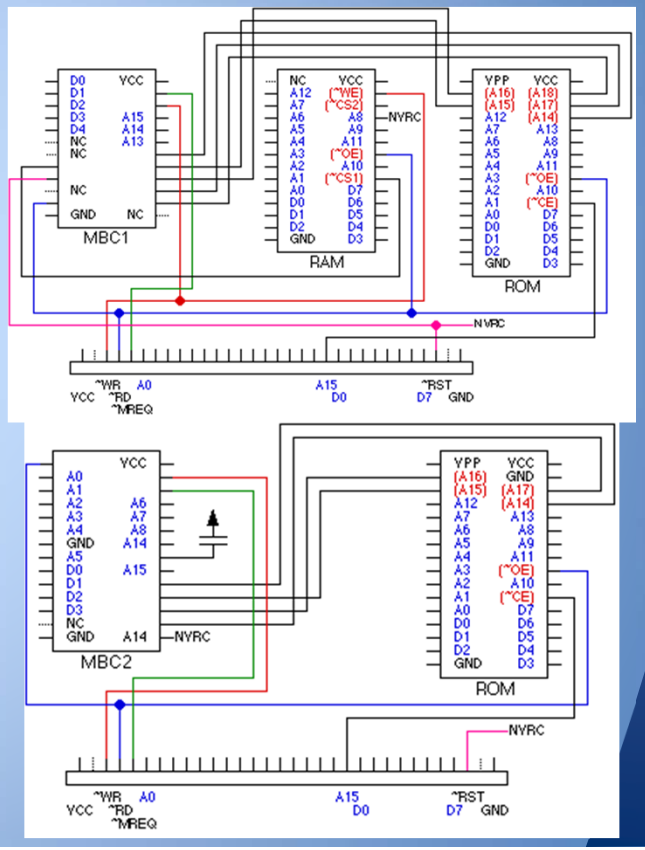
- Based on Reduced Instruction Set Computer (RISC) principles.
- Three-stage pipeline
- 32-bit data bus
- 2 instruction sets
  - 32-bit ARM
  - 16-bit Thumb



Game Boy Cartridges

- 32kB - 1MB for GB Original
- 2MB - 32MB for GB Advance
- 32 pin
- 8 kB of RAM
- ROM split into 16kB blocks





Questions????

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