A Scourge is Born

The History of the Microcomputer -- Invention and Evolution

Intel

- 1968 - Intel is born out of Fairchild Semi.
- Is an early leader in DRAMs
- 1971 - Introduce 4004
- 1972 - Introduces 8008
- 1974 - Introduces 8080
- 1978 - Introduces 8086
- DRAMs become commoditized
- 1983 - They shift to processors because there's more money in it.

Intel

- World's largest semi-conductor manufacturer
  - Technology leader
  - Really a manufacturing company
  - With a tiny piece of architecture on top

The 0404

- Born out of necessity.
  - A customer wanted a calculator
  - Intel couldn’t design a bunch of controllers
  - But they could supply custom memories (i.e., they could store programs!)

0404 Features

- A call stack -- because code lived in a ROM
  - Previous calling conventions overwrote parts of program memory
- Intelligent memory chips.
  - Snooped a bus looking for commands
- 16 pin packaging.
  - This was a real constraint

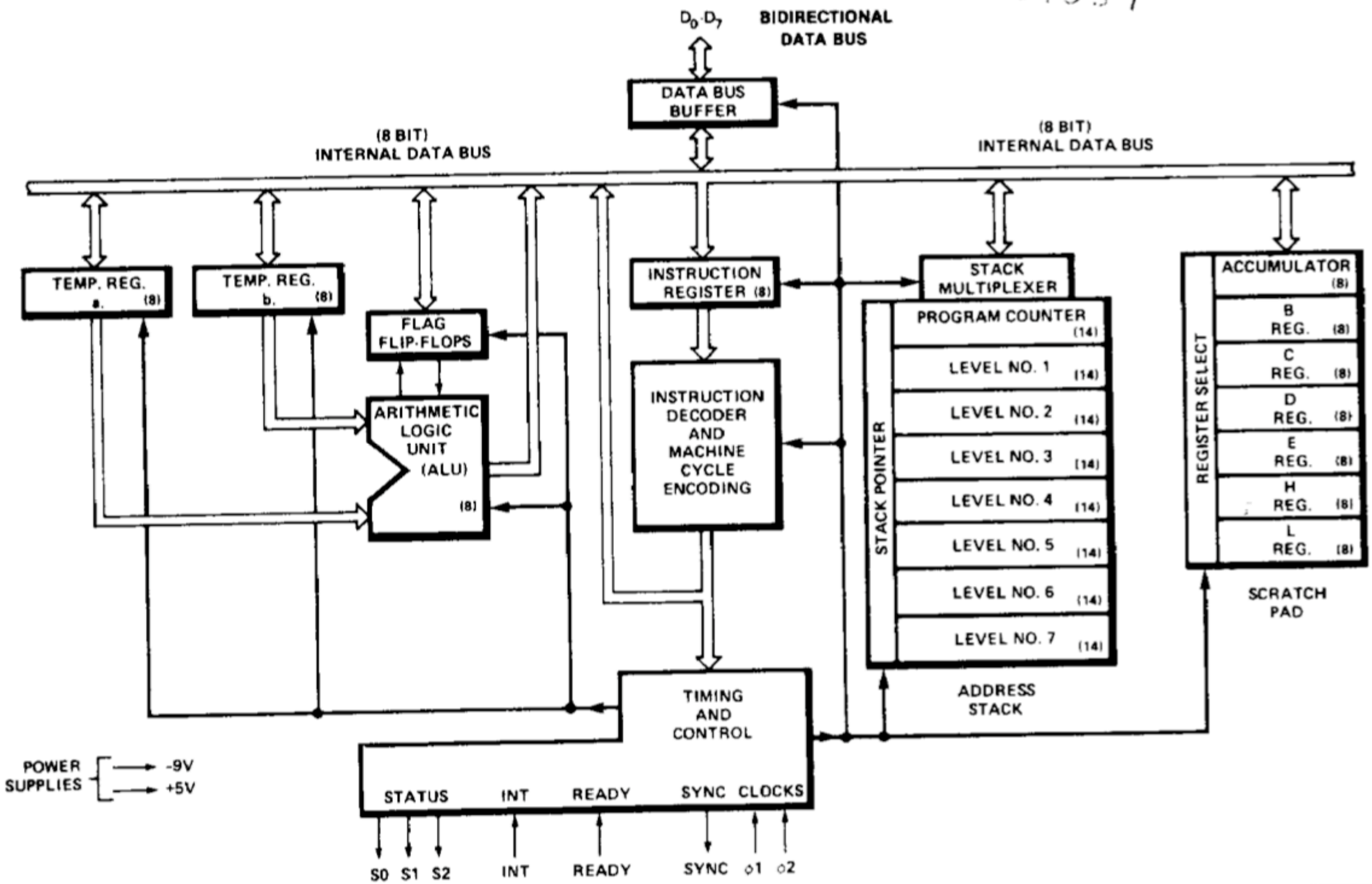
0404 Legacy

- The first single-chip processor
- An important exercise in reductionist computing
- Follow on products are everywhere.
  - 8048 integrated ROM and RAM into one chip
  - Found use in > 1 Billion keyboards

The 8008

- This is a real computer
  - Programs in RAM
    - 16KB of memory
- Vastly more expensive
  - 40 auxiliary chips
- 2 more pins!!! huzzah!

BLOCK DIAGRAM



And so it began...

- Even at the beginning x86 was legacy.
- Other horrors
  - Little-endianness
  - Complicated register rules
  - Segments
- M. Shima perhaps deserves “credit” for x86

Technology

- DRAM in the CPU
- SSI vs. MSI vs. LSI
  - Interesting gap in capability between SSI and MSI
  - TTL was scalable but expensive
  - MSI was cheaper but not scalable
  - Leads to a huge gap in capabilities/$

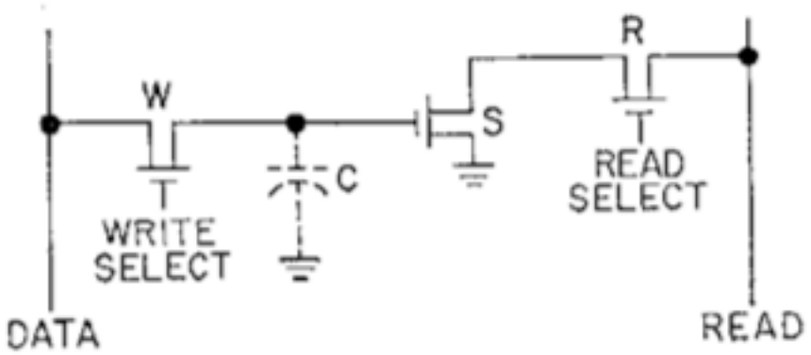
Closing the Gap

- Systems with more components
  - "Minis" "super minis" "main frames"
- Systems with fewer components
  - "micro" "personal" etc.
- There's a clear migration of architectural features from "big iron" to "the desktop"

In context

- This was the start of the industry that architects study.
- We don't pay much attention to mainframe (for better or worse).

Intel's 3T memory cell



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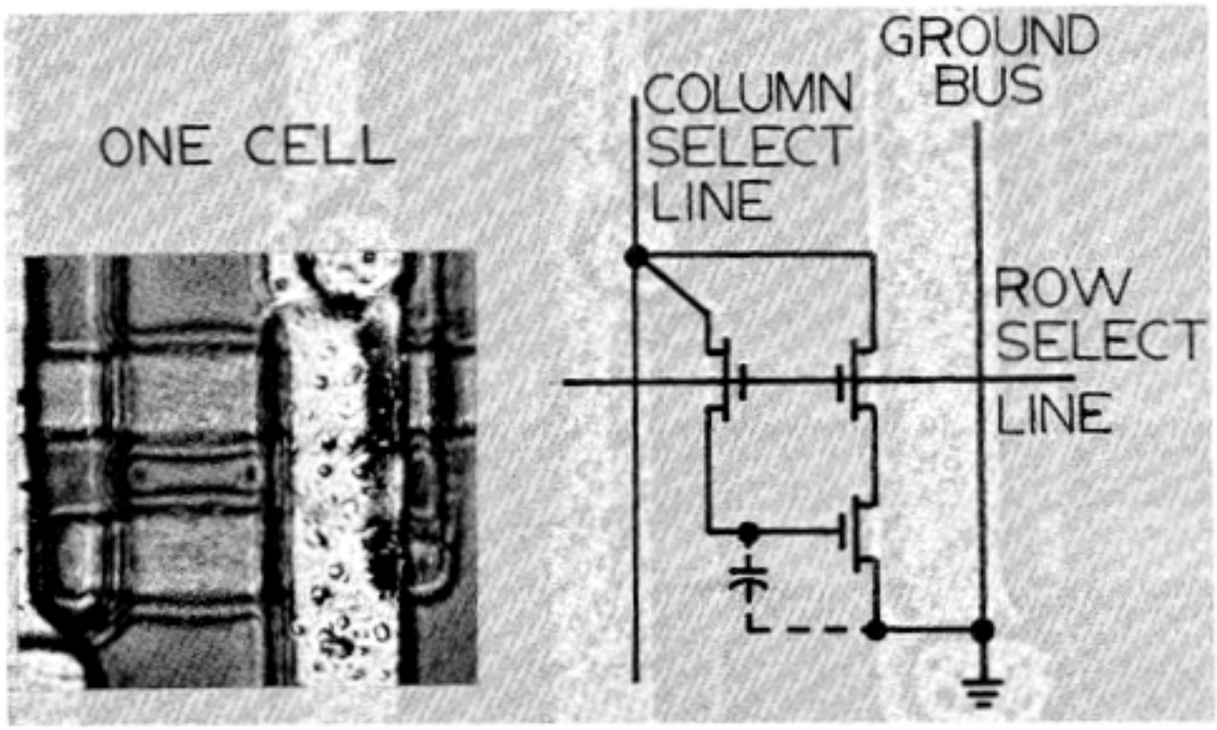

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