RAM Memory - Types

- SRAM – Static RAM. Retains data without refreshed. Most expensive. Used sparingly.
- DRAM – Dynamic RAM. Must be refreshed from duplicate data. Lease expensive. Used extensively.
- SDRAM – Synchronous DRAM. What is used today.
- RAMBUS – Old. Not used anymore.

RAM comes in “sticks” that are either:

- SIMM – Single In-Line Memory Module
- DIMM – Dual In-line Memory Module. Common.
- SO-DIMM – Small Outline. Used in laptops.

RAM Memory Speeds

RAM transfers data based on a multiple of FSB clock speed. It can transfer data once, or multiple times per clock cycle:

- SDR – Single Data Rate. Transfer once per clock cycle. 168 pins.
- DDR – Double Data Rate. Twice as fast as SDR (twice per clock cycle). 184 pins.
- DDR2 – Twice as fast as DDR. 240 pins.
- DDR3 – Twice as fast as DDR2. 240 pins.

The speed of ram supported is determined by the motherboard. Systems are not usually backwards compatible.

Motherboard RAM Architectures

Modern motherboards support different RAM configurations:

- <u>Dual Channel:</u>
  - Pairs of identical modules installed in color coded banks. Usually two banks so can expand.
  - Modules must be identical in capacity, speed, # sides, # chips
  - Modules can be DDR, DDR2, or DDR3
  - If only one module installed, will run in single channel mode.

Motherboard RAM Architectures – Cont.

- <u>Triple Channel:</u>
- Modules are installed in “triplets” in color coded banks.
- Modules must be same speed and capacity
- Only works with DDR3 modules
- If less than 3 installed, most mobos will revert to dual or single channel mode.