

## Exploring RAM

RAM is a primary memory device that stores data temporarily in the form of instructions required by the processor to execute the tasks of a user. RAM stores active data on a computer, which means the data on which work is being done. For example, if you are working on an MS-Word file, then information about the MS-Word file will be stored in RAM. Whenever you want to perform any action regarding the file, such as opening the file or adding or modifying its content, the action is performed by the processor after retrieving the required information from the RAM. However, the data in RAM stays as long as your computer is running. If you turn off the computer, then RAM loses its stored data. RAM is available in different memory sizes, such as 512 MB, 1 GB, 2 GB, 4 GB, and 8 GB depending on the usage. Now, let's discuss different types of physical memory in the next section.

## Discussing Types of Physical Memory

Physical memory is of two types, namely RAM and Read Only Memory (ROM). A brief description of these two types can be given as follows:

- **RAM:** Refers to a semiconductor-based memory where the CPU or the other hardware devices can read and write data. In this memory, the data is temporarily stored since it is a volatile memory. Once the system turns off, it loses the data. As a result, RAM is used as a temporary data storage area. Further, the RAM memory has numerous types, which are as follows:
  - **Dynamic RAM (DRAM):** Refers to the memory that stores every bit of information in a single capacitor. A capacitor is an electrical element that stores electrical charge. This electrical charge allows DRAM to store data. When there is no electrical charge, RAM loses the stored data. A capacitor has a tendency to neutralize electric charges in it; therefore, to retain the electric charges, the capacitor has to be recharged or refreshed periodically, which in turn helps retain the stored data. This need to frequently recharge the capacitor tends to make DRAM slow.
  - **Static RAM (SRAM):** Refers to a memory that stores data in a semiconductor. SRAM needs a continuous supply of electric current to retain data. Unlike DRAM, SRAM does not store data in a capacitor; therefore, it does not require refreshing, which makes it faster than DRAM. Due to this reason, SRAM is more expensive than DRAM.
  - **Synchronous DRAM (SDRAM):** Refers to a type of DRAM that is synchronized with the clock speed of a processor to execute more data in less time. The clock speed of SDRAM is 133 MHz.

- **Double Data Rate SDRAM (DDR SDRAM):** Refers to the memory that transfers data at high speed. The clock speed of DDR SDRAM ranges from 133 MHz to 2133 MHz.
- **RDRAM:** Stands for Rambus Dynamic Random Access Memory or RDRAM. It is the fastest among all the random memory types with the data transfer speed of 1 GHz. Generally, RDRAM is used for the purpose of video memory on graphics accelerator cards. Dynamic RDRAM is the improvement to existing RDRAM. The RDRAM chip provides high bandwidth and therefore used by workstations and the servers. This memory chip places under the RIMM (Rambus Inline Memory Module) module. In addition, the number of chips placed under the module completely relies on the bus width of the RAM. RDRAM (RAM Bus DRAM) of 160 or 184 Pins operates at 300-400 MHz.
- **Asynchronous DRAM:** Most basic form of DRAM consisting of four active-low control signals that are /RAS, /CAS, /WE, and /OE.
- **Video RAM (VRAM):** Lets you save the frame buffer present in the graphics adaptors. It is a dual ported variant of DRAM.
- **Window RAM (WRAM):** Refers to a video RAM with high-performance capability and is used with video cards, such as the Matrox Millennium.
- **Fast page mode DRAM (FPM DRAM):** Refers to the DRAM in which one row of the DRAM is kept open with /RAS with simultaneous multiple reads or writes operation with separate pulses of /CAS.
- **Extended data out DRAM (EDO DRAM):** Also known as Hyper Page Mode enabled DRAM, that lets you start a new access cycle while keeping the data output of the previous cycle in an active state.
- **Burst EDO DRAM (BEDO DRAM):** Refers to the type of DRAM that can said to be an evolution of existing EDO RAM. The BEDO RAM can process four memory addresses in one burst. Also, the page-access cycle can be divided into two components using the BEDO RAM.
- **Multibank DRAM (MDRAM):** Provides a cheap and quick way by applying interleaving technique for main memory to second-level cache memory.
- **Synchronous dynamic RAM (SDRAM):** Refers to the revised version interface of asynchronous memory that can be used to add a clock line.
- **Synchronous graphics RAM (SGRAM):** Refers to a type of SDRAM which contains a single port and is used by graphics adaptors to synchronize data with the CPU bus.