SNS COLLEGE OF ENGINEERING
Kurumbapalayam (Po), Coimbatore – 641 107
AN AUTONOMOUS INSTITUTION
Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

UNIT-IV
MEMORY SYSTEM
Basic concepts of Semiconductor RAMS

1) A digital processing system required the facility of storing digital information. This information is basically in the form of binary code and data the data or informa-tion is stored in memory. Initially the information was stored using magnetic storage until the Semiconductor technologies were discovered. Semiconductor memories are available in various types and capacities. These memories have the advantages of small size, low, cost, high speed, and high realability over magnetic memories. Semiconductor memory is a sort of semiconductor device employed for

storing data. There are two types or electronic data storage mediums that we can practise namely magnetic or optical.

There are two main types or classes that can be employed for semi conductor technology Random Access memory and Read-only memory. These memory categories differentiate the memory from how it operates. With this article on RAM, we will start our discussion regarding semi-conductor memories, starting with RAM (Random access memory). Its various types, features and more. It appears in a variety of shapes, speeds, capacities and designs.

Semiconductor RAM Memory: Random Access memory is a form of semi conductor memory technology that is applied for regarding and writing data in any order. It is used for such purposes as the computer or processor memory where variables and others are stored and are needed on a random basis. Data can be stored and read many times to and from this type of any memory location requires equal time for reading and writing.

Random Access memory is (volatile memories are those memories that store the data tentatively.) memory alternatively referred to as main memory, primary, or system

SNS COLLEGE OF ENGINEERING
Kurumbapalayam (Po), Coimbatore – 641 107
AN AUTONOMOUS INSTITUTION
Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

Random access memory can be easily programmed, erased and reprogrammed by the user. therefore is used in immense quantities in computer application as current-day computing and processing technology demands large amount of memory to empower them to handle the memory Requirements. various types of RAM including SRAM, DRAM, SDRAM. with its its DDR3, DDR4, and DDR5 variants are used in huge quantities.

Types OF RAM:

RAM is majorly categorised into two categories:

SRM (Static Random Access memory)

DRAM (Dynamic Random Access memory)

Static RAM (SRAM):
SRAM full form is Static Random Access memory. It possesses an array of flip-flops that are used to save the data. The memory cells consist

of flip flops that hold the information till the power supply is on. The word static implies that the memory holds its contents as long as the electricity is being supplied and the data is dumped when the power gets down because of its volatile nature.

In static RAM, data is stored in FFs like structure and is implemented by BJT or MOSFET. A Flip-Flop for a memory cell uses four or six transistors. along with some wiring which does not require refreshments. This makes static RAM significantly faster as compared to dynamic RAM.

Dynamic RAM (DRAM): DRAM (Dynamic Random Access memory) stores the data in the form of charges in the capacitor and transistor pair available in the memory cell. DRAM is implemented using MOSFETS. The Dynamic Random Access memory needs to be regularly refreshed so that the data should be maintained. This is achieved by installing the memory on a refresh circuit that rewrites the content several hundred times every second. It dissipates less power as compared to SRAM and operates at a slower rate than as well

Dynamic Random Access memory is installed for most system memory as it is relatively cheap and small. It consists of memory cells which consti- tute a single capacitor and a single transistor few other types of RAM are:

Synchronous Dynamic RAM (SDRAM):

SDRAM is type of DRAM and works in sync with the CPU clock, which implies it waits for the clock signal before acknowledging the data input. It simply works in contrast to Dynamic Random Access memory. mostly applied in compute memory, video game consoles etc.

Single Data Rate synchronous Dynamic (SDR SDRAM): The single data rate symbolises how the memory processess. It can process one read and one write instruction per clock cycle. popularly used in computer memory, video game console etc.

Double Data Rate Synchronous Dynamic RAM (DDR SDRAM):

DDR SDRAM works similar to SDR SDRAM just twice faster than it. DDR SDRAM can process two reads and two write instructions per clock cycle. Popularly used in computer memory. The other upgraded versions of DDR SDRAM are DDR3, DDR3 and DDR4.

Graphices Double Data Rate Synchronous Dynamic RAM (GDDR SDRAM):

GDDR SDRAM is a variety of DDR SDRAM and is specifically designed for video graphics cards The other upgraded. version of GDDR SDRAM is GDDR2 SDRAM, GDDR3 SDRAM, GDDR4 SDRAM and GDDR 5 SDRAM.