

SNS COLLEGE OF TECHNOLOGY

Coimbatore-35 An Autonomous Institution

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DEPARTMENT OF MECHATRONICS ENGINEERING

19MCT201 - DESIGN OF DIGITAL CIRCUITS II YEAR - III SEM

UNIT 5 – DIGITAL LOGIC FAMILIES AND PLD

TOPIC 2– ROM, PROM, EPROM & EEPROM







ROM: Read Only Memory

Read only memory devices are a special case of memory where, in normal system operation, the memory is read but not changed. Read only memories are non-volatile, that is, stored information is retained when the power is removed.

It is programmed never. The data is hard-coded into the chip itself. Once the chip wafer is manufactured, that is it, it can never be changed, only tested before it goes out. The ones and zeros are hard-coded connections to +V and ground."







Programmable ROM (PROM)

- after • Written only once manufacturing
- Can be read, but cannot be written later
- Is nonvolatile, non-erasable
- Attractive for small production runs

Advantages:

- flexible and convenient
- less expensive







PROM

One step up from the masked ROM is the PROM (programmable ROM), which is purchased in an unprogrammed state.

- ✓ If you were to look at the contents of an unprogrammed PROM, the data is made up entirely of 1's.
- ✓ The process of writing your data to the PROM involves a special piece of equipment called a device programmer. The device programmer writes data to the device one word at a time by applying an electrical charge to the input pins of the chip.
- Once a PROM has been programmed in this way, its contents can never be changed. If the code or data stored in the PROM must be changed, the current device must be discarded. As a result, PROMs are also known as one-time programmable (OTP) devices.





Erasable PROM (EPROM)

- Can be written many times
- Erased by ultraviolet radiation before each write operation at chip level
- Erasure (20 mins) can be performed repeatedly
- ► Is nonvolatile
- Pros & cons:
 - Capable of multiple update
 - More expensive than PROM





Erasable PROM (EPROM)



- EPROM (erasable-and-programmable ROM) An programmed in exactly the same manner as a PROM.
- V However, EPROMs can be erased and reprogrammed repeatedly.
- ✓ To erase an EPROM, you simply expose the device to a strong source of ultraviolet light. (A window in the top of the device allows the light to reach the silicon.).
- Though more expensive than PROMs, their ability to be
 descriptions of the second reprogrammed makes EPROMs an essential part of the software development and testing process.



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is

Example of EPROM chip with glass window admitting UV light





Electrically EPROM (EEPROM)

- Erased and updated at the byte level
- Takes much longer to write than read
- ► Is nonvolatile
- More expensive and less dense than EPROM



- **EEPROMS** are electrically-erasable-and-programmable.
- □ Internally, they are similar to EPROMs, but the erase operation is accomplished electrically, rather than by exposure to ultraviolet light.
- □ Any byte within an EEPROM may be erased and rewritten. Once written, the new data will remain in the device forever-or at least until it is electrically erased.





EEPROM Chip

EEPROM Programmer



Comparision

PROM

A Read Only Memory (ROM) that can be modified only once by a users

Stands for Programmable Read Only Memory

Developed by Wen Tsing Chow in 1956

Reprogrammable only once

EPROM

A programmable ROM that can be erased and reused

Stands for Erasable

Programmable Read Only Memory

Developed by Dov Frohman in 1971

Can be reprogramed using ultraviolet light

EFPROM

A user-modifiable ROM that can be erased and reprogrammed repeatedly through a normal electrical voltage

Stands for Electrically Erasable Programmable Read-Only Memory

Developed by George Perlegos in 1978

Can be reprogramed using electrical charge





Types of Memories





Introduction to Memory







Types of Memories





ASSESSMENT - 1

Mux relates with us....

Question 1 Which combinational circuit is renowned for selecting a single Which is the major functioning responsibility of the input from multiple inputs & directing the binary information multiplexing combinational circuit? to output line? ▶ a) Data Selector a) Decoding the binary information ▶ b) Data distributor **b**) Generation of all minterms in an output function with OR-gate **c**) Both data selector and data distributor **c**) Generation of selected path between multiple sources and a single destination ▶ d) DeMultiplexer d) Encoding of binary information MULTIPLEXER/DESIGN OF DIGITAL CIRCUITS/R.YASODHARAN/MCT/SNSCT 6/16/2020



Question 2



References

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