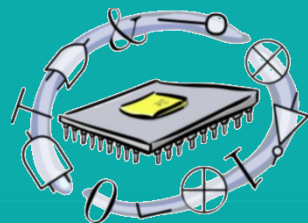


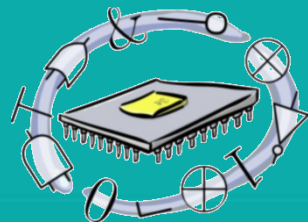
Programmable Logic Devices (PLAS)

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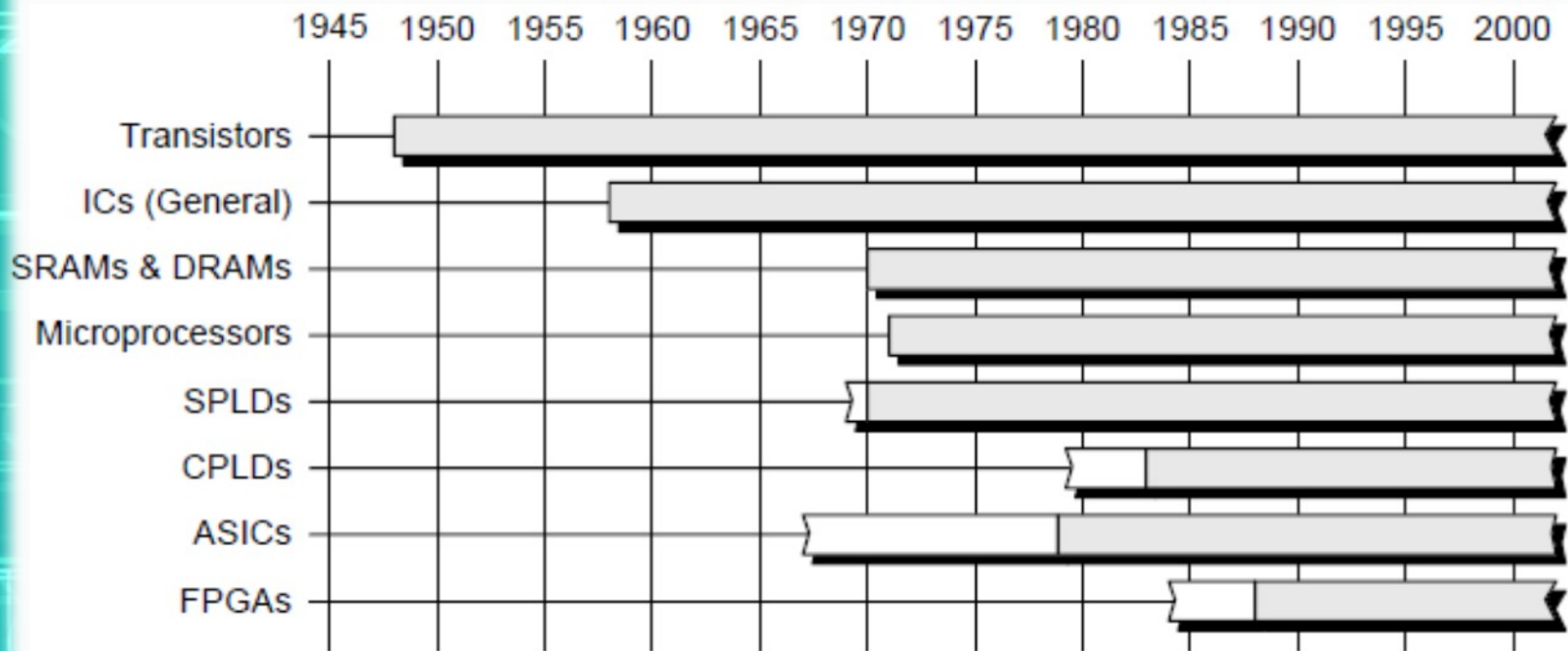


Road Map

- Definitions
- Programmable Logic Devices
 - Purpose
 - Advantages
 - Types
- Configuration
- Conclusion

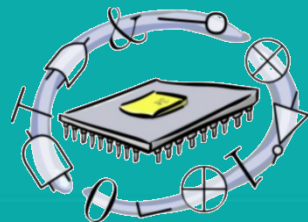


Time line of Programmable devices



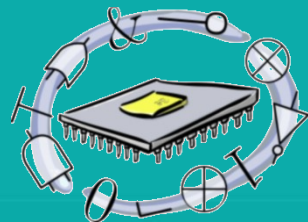
Definitions

- Programmable Logic Device (PLD):
 - Also known as “Field Programmable Logic Device (FPLD)”
 - An integrated circuit chip that can be configured by the user to implement different digital hardware.

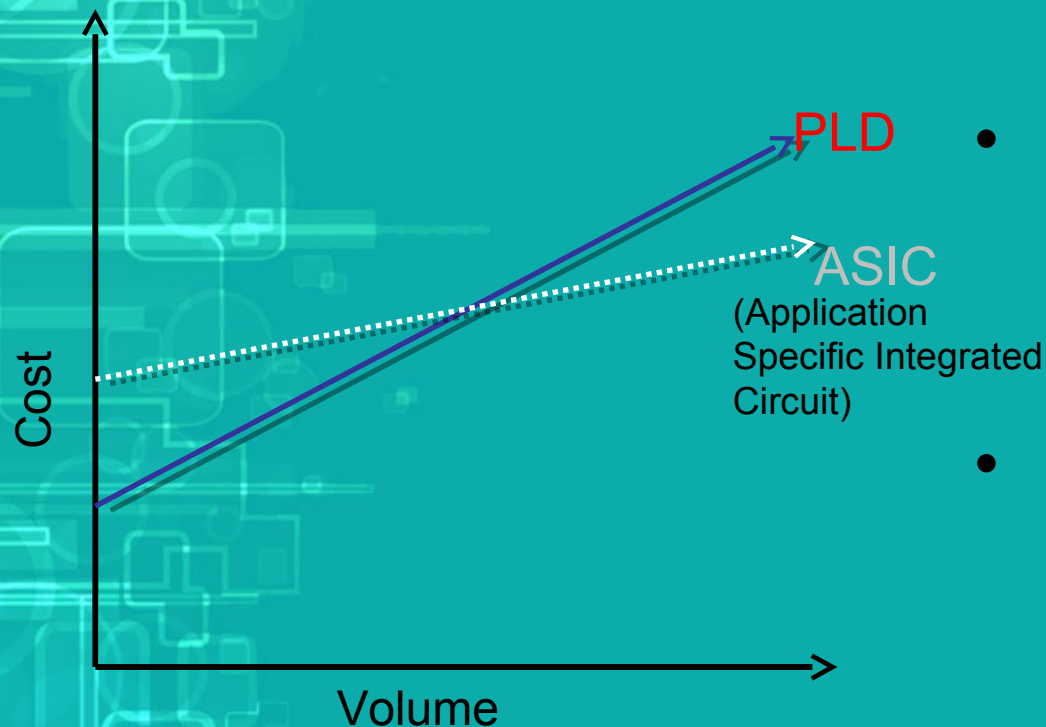


Purpose of PLDs

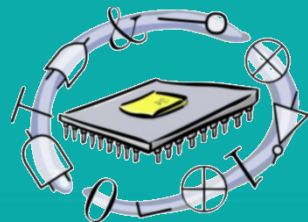
- Permits elaborate digital logic designs to be implemented by the user on a single device.
- Is capable of being erased and reprogrammed with a new design.



Advantages of PLDs

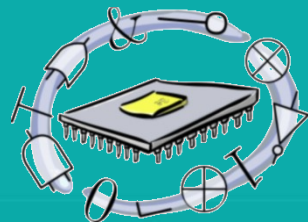


- Cost effective in lower volumes
- Short design time
- Well suited for academics and prototyping



Advantages of PLDs

- Programmability
- Re-programmability
 - PLDs can be reprogrammed without being removed from the circuit board.
- Low cost of design
- Immediate hardware implementation

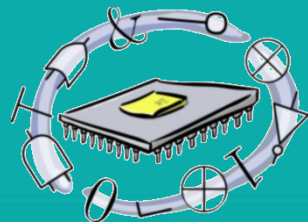


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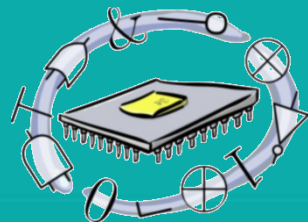
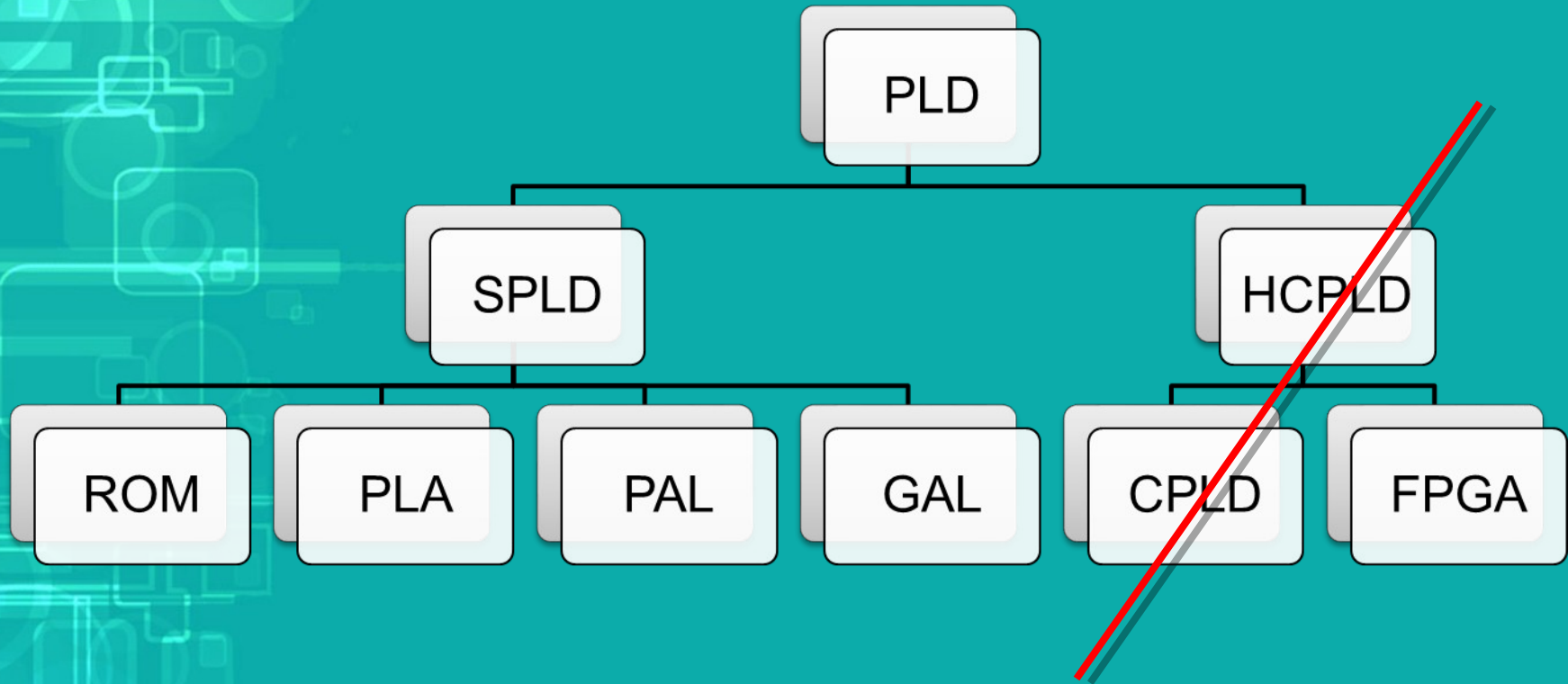
- PLDs are often used for address decoding, where they have several clear advantages over the 7400-series TTL parts that they replaced: One chip requires less board area, power, and wiring than several do. The design inside the chip is flexible, so a change in the logic does not require any rewiring of the board. Rather, simply replacing one PLD with another part that has been programmed with the new design can alter the decoding logic.

Types of PLDs

- SPLDs (Simple Programmable Logic Devices)
 - ROM (Read-Only Memory)
 - PLA (Programmable Logic Array)
 - PAL (Programmable Array Logic)
 - GAL (Generic Array Logic)

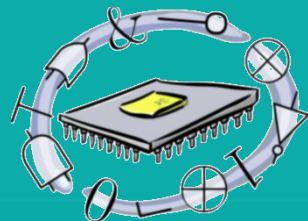


Types of PLDs (Cont.)



Simple Programmable Logic Devices (SPLDs)

- Simple programmable logic devices (SPLD) are the simplest, smallest and least-expensive forms of programmable logic devices. SPLDs can be used in boards to replace 7400-series TTL components (AND, OR, and NOT gates).
- Most SPLDs use either fuses or non-volatile memory cells (EPROM, EEPROM, FLASH, and others) to define the functionality.



Programmable Logic Arrays (PLAS)

- A **programmable logic array (PLA)** is a kind of **programmable logic** device used to implement combinational **logic** circuits.
- The PLA has a set of **programmable** AND gate planes, which link to a set of **programmable** OR gate planes, which can then be conditionally complemented to produce an output.
- Programmable Logic Array or PLA is used to implement logic functions in digital circuits. The structure has programmable AND-matrix, programmable OR-matrix, input and output buffers. Block diagram of a **PLA** device is as shown below;

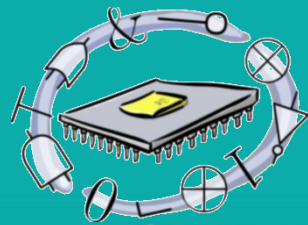


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- Note that the use of the word "Programmable" does not indicate that all PLAs are field-programmable.
- This is particularly true of PLAs that are embedded in more complex and numerous integrated circuits such as microprocessors.

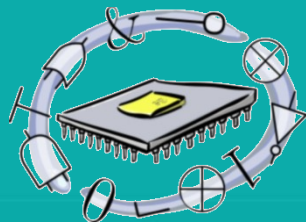
PLD Configuration

- Combination of a logic device and memory
- Memory stores the pattern the PLD was programmed with
 - EPROM
 - Non-volatile and reprogrammable
 - EEPROM
 - Non-volatile and reprogrammable
 - Static RAM (SRAM)
 - Volatile memory
 - Flash memory
 - Non-volatile memory



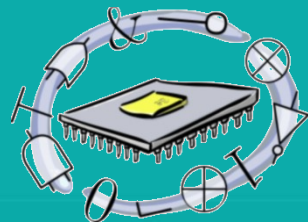
Configuration (cont.)

Name	Re-Programmable	Volatile
SRAM	Yes	Yes
FLASH	Yes	No
EPROM	Yes (out of the circuit)	No
EEPROM	Yes (in the circuit)	No



Conclusion

- History
- Definitions
- Programmable Logic Devices
 - Purpose
 - Advantages
 - Types
- Configuration



References

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