

Definitions and Reference

pp. 5-20 thru 5-21, pp. 5-28 thru 5-29

TTL - Transistor Transistor Logic, a family of integrated circuits introduced in the late 1960's to early 1970's that implemented a set of useful logic functions.

CMOS - Complementary Metal Oxide Semiconductor, a family of integrated circuits introduced in 1973 similar to TTL but which consumed way less power at the expense of being slow. CMOS circuitry has shrunk in size, gotten much faster and has largely replaced TTL.

AND - A logic function that is true (high) if and only if both inputs are true (high), and false (low) otherwise.

NAND - A logic function that is true (high) if either or both inputs are false (low), and false (low) otherwise.

OR - A logic function that is true (high) if either or both inputs are true (high), and false (low) otherwise

NOR - A logic function that is true (high) if and only if both inputs are false (low), and false (low) otherwise.

Questions

E6C01 - What is the recommended power supply voltage for TTL series integrated circuits?

5 volts

E6C02 - What logic state do the inputs of a TTL device assume if they are left open?

A logic-high state

E6C03 – What level of input voltage is a logic “high” in a TTL device operating with a positive 5-volt power supply?

2.0 to 5.5 volts

NB – There is a “no-mans land” between 0.8 volts and 2.0 volts that signals are allowed to make a very fast transition through but must not linger there.

E6C04 – What level of input voltage is a logic “low” in a TTL device operating with a positive 5-volt power supply?

0.0 to 0.8 volts

E6C05 – Which of the following is an advantage of CMOS logic devices over TTL devices?

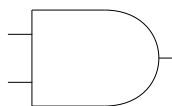
Lower power consumption

E6C06 – Why do CMOS digital integrated circuits have high immunity to noise on the input signal or power supply.

The input switching threshold is about one-half the power supply voltage

E6C07 – In Figure E6–5, what is the schematic symbol for an AND gate?

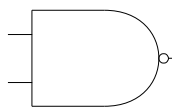
1



AND Gate

E6C08 – In Figure E6–5, what is the schematic symbol for a NAND gate?

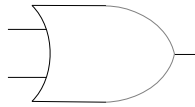
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NAND Gate

E6C09 - In Figure E6-5, what is the schematic symbol for an OR gate?

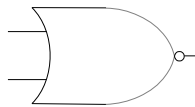
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OR Gate

E6C10 - In Figure E6-5, what is the schematic symbol for a NOR gate?

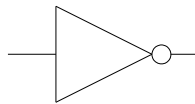
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NOR Gate

E6C11 - In figure E6-5, what is the schematic symbol for the NOT operation (inverter)?

5



NOT Gate (Inverter)