

Laboratory 1: Introduction to Logic Gates

Part I: Gate basics

1. Using a 74LS00 quad NAND gate, verify the NAND gate truth table.
2. Using a 74LS02 quad NOR gate, verify the NOR gate truth table.

Part II: Gate properties

3. Measure the input and output characteristics for this gate. What voltage is the input transition from high to low? Is there a difference in the transition levels for going from low to high? Are they within specifications?
4. What happens if you forget to tie an input to its appropriate level?
5. Use a gate and look at the delay between the input transition and the output transition. Is it within spec? Take a screen shot on your scope and print it out to show your measurement.
6. What are the input and output impedances?

Part III: Combinatorial logic

7. Use only NAND gates to construct a circuit that operates as a three-input NAND gate.
8. Use only NAND gates to construct a two input XNOR (exclusive NOR) gate. The XNOR truth table is shown below.

XNOR Truth Table

A	B	$\overline{A \oplus B}$
0	0	1
1	0	0
0	1	0
1	1	1