

THE UNIVERSITY OF AZAD JAMMU & KASHMIR, MUZAFFARABAD



COURSE TITLE

CALD

COURSE CODE

CS-1205

LAB TITLE

BASIC LOGIC GATES

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CALD

Lab 1

Objective:

To study and understand the basic functioning and truth tables of various logic gates including AND, OR, NOT, NAND, NOR, and XOR

7400 NAND Gate IC Implementation

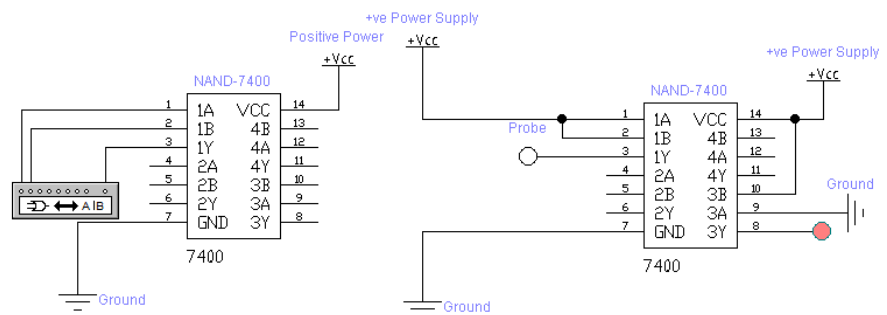
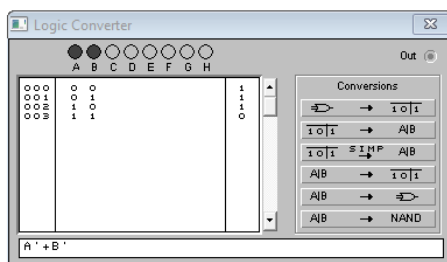


Figure 1: Showing the implementation of IC 7400 NAND Gate

Key Points

- VCC (positive power) is connected to pin 14, and Ground (GND) is connected to pin 7, providing the necessary power for the IC to operate.
- The circuit is implemented and stimulated using Electronic Workbench.
- The software stimulates all possible input combinations to generate the corresponding output states.
- The generated truth table demonstrates the functional behavior of 7400 NAND Gate.
- I've also tested two combinations using a probe as shown in the picture.

7402 NOR Gate IC Implementation

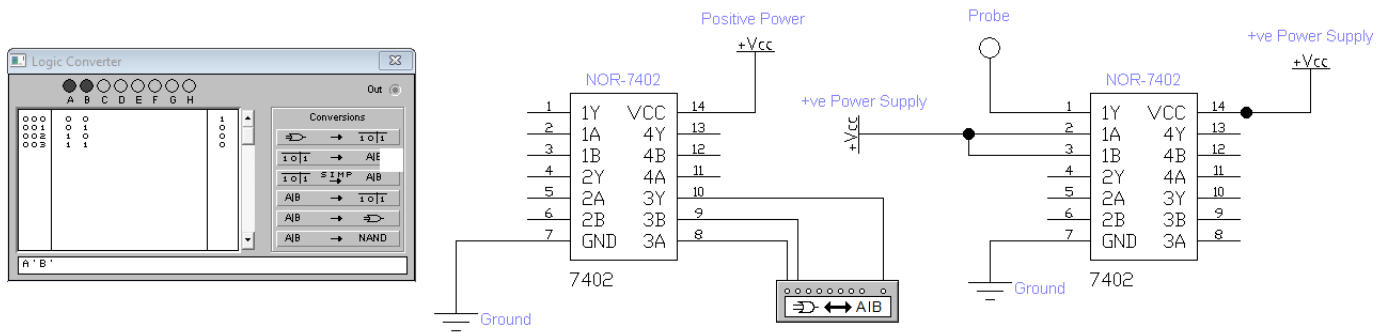


Figure 2: Showing the implementation of IC 7402 NOR Gate

Key Points

- The generated truth table demonstrates the functional behavior of 7402 NOR Gate.
- As we can see, the probe is not glowing with both the inputs as 1.
- Here I've used the third NOR Gate with **Input A** = Pin 8, **Input B** = Pin 9.

7404 NOT Gate IC Implementation

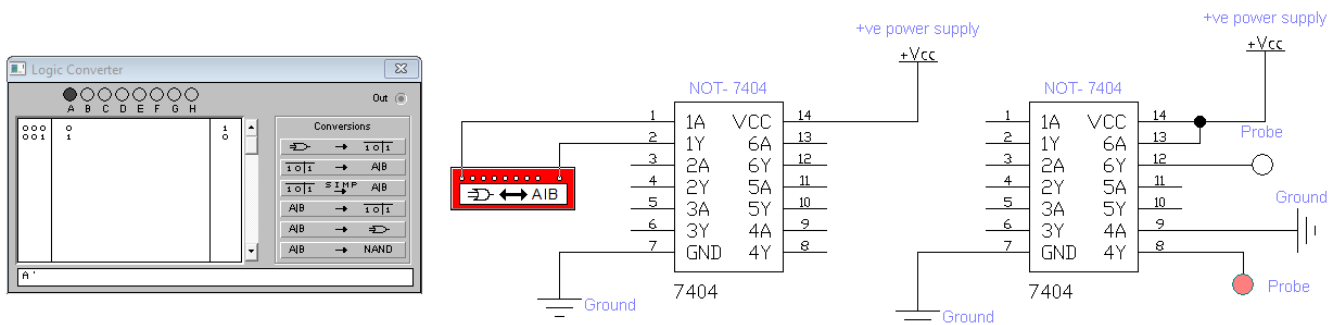


Figure 3: Showing the implementation of IC 7404 NOT Gate

Key Points

- VCC (positive power) is connected to pin 14, and Ground (GND) is connected to pin 7, providing the necessary power for the IC to operate.
- We can see that the probe is glowing when the output is 0.
- The generated truth table demonstrates the functional behavior of 7404 NOT Gate.

7408 AND Gate IC Implementation

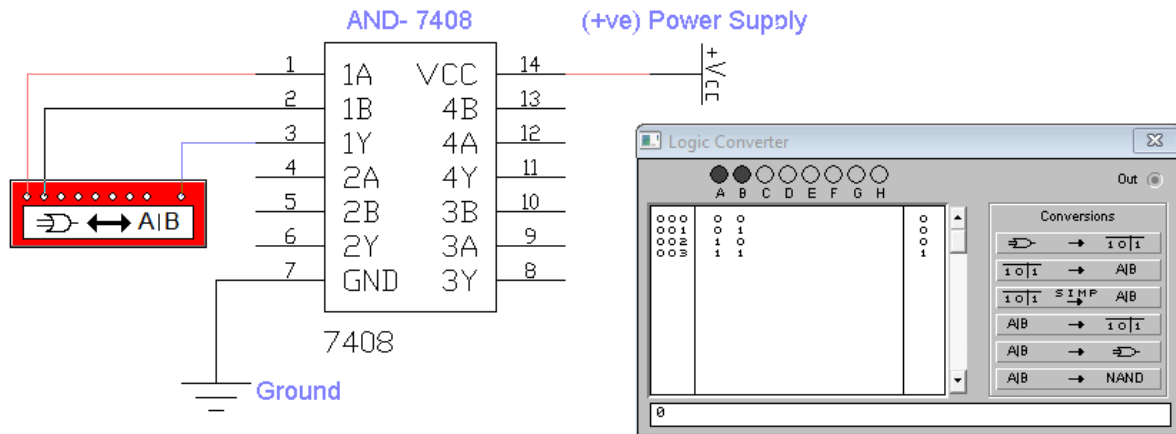


Figure 4: Showing the working of IC 7408 AND Gate

- The generated truth table demonstrates the functional behavior of 7408 AND Gate.

Procedure

First of all, I made sure my IC was placed in the virtual workspace and had its power and ground pins (VCC and GND) correctly connected to the virtual power supply. Then, I looked for the "Logic Converter" tool within the Electronic Workbench software. Once I found it, I told this tool which pins I wanted it to consider as inputs and which as outputs for all the ICs. For example, in the case of IC 7402 NOR Gate I've considered **Input A** = Pin 8, **Input B** = Pin 9 and the Pin 10 for the **output**.

After setting up these input and output pin assignments for the gates, I then clicked the button that said "convert". The Logic Converter tool then automatically did all the work of trying out every possible combination of 0s and 1s on my designated input pins. For each of these combinations, it simulated how the different gates behave.

The tool then neatly displayed all these input combinations and their corresponding output values in a table format – that's the truth table I've included in the above pictures.

Additionally, I have also tested the working of Gates using Probes and checking with different combinations.