

(DE3 -12) OR Gate

Aim of experiment

Examination of the operation of the OR logic gate and compare the expected outputs to the truth tables for this device.

Apparatus

Prototyping board– DC power supply 5V or 9V Battery – Light Emitting Diode (LEDs) – Digital ICs: 7432 OR Gate – wires.

Theory of experiment

All logic gates have two or more inputs and one output. These logic gates accept digital logic levels on their inputs and will provide a digital logic level output which is dependent on the type of logic gate and the inputs applied to the gate. For the TTL logic family, any gate input that is not connected will be treated as if logic 1 is present on that input. The number of different possible combinations of inputs is 2^n where n is the number of inputs. Therefore, four unique combinations of inputs are possible for a two input gate.

The OR function is similar to the mathematical function of addition and the output for the OR gate may be analyzed using the laws of addition. The logic operator for the OR function is a + sign. The output will be logic 0 only if all the inputs are logic 0, and the output will be logic 1 anytime any input is at logic 1.

The logic symbols and the truth table for the OR gate may be found in *Figure 1* and the Boolean Equation for this function is:

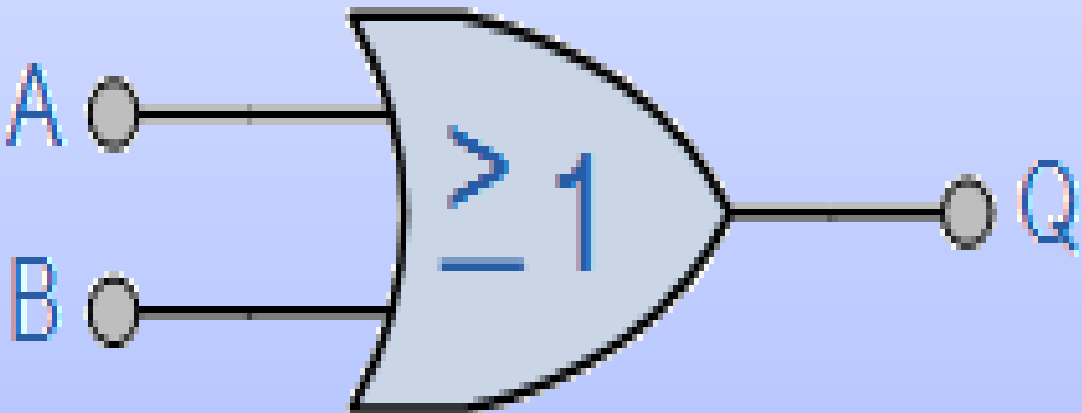
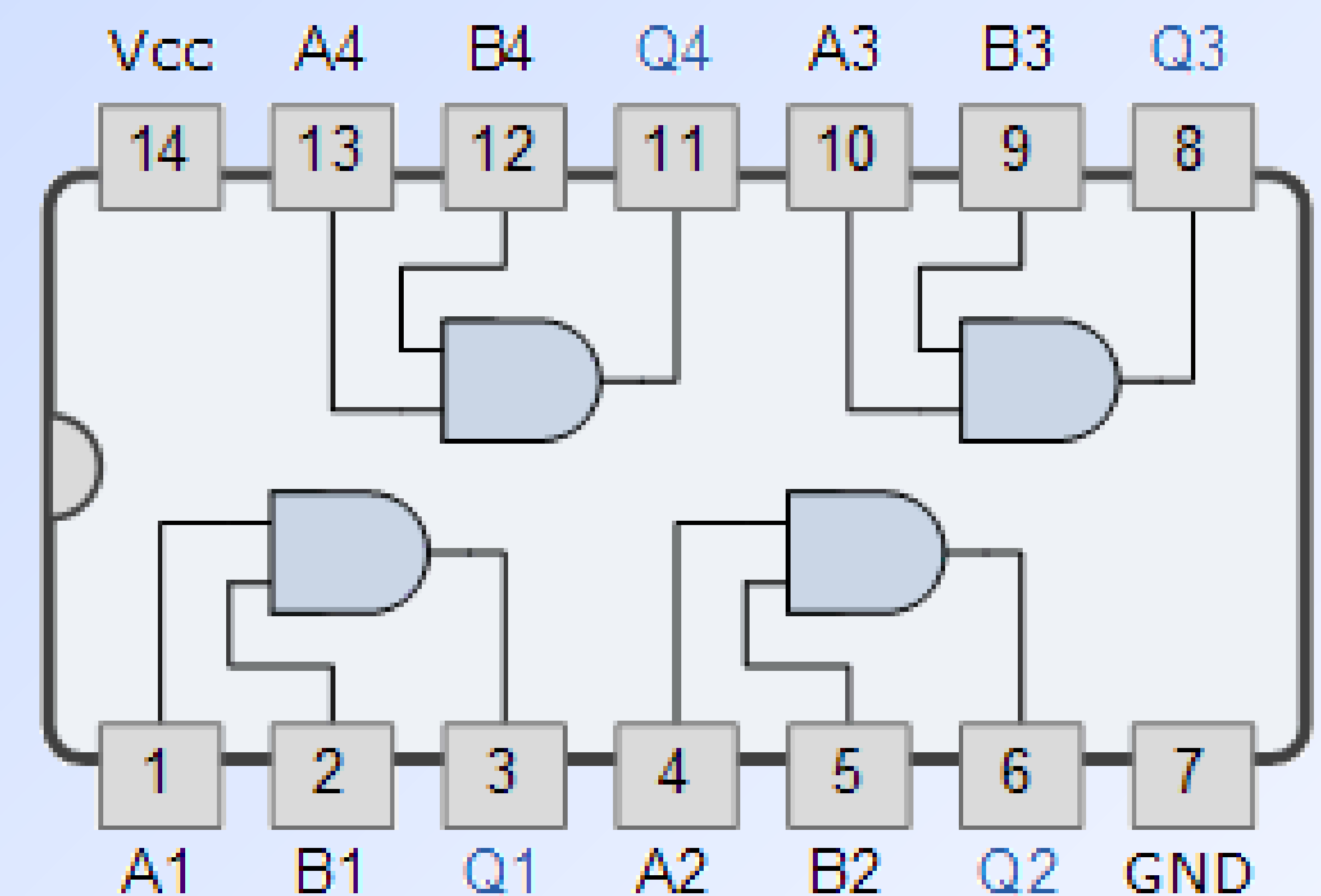
Symbol	Truth Table		
 2-input OR Gate	B	A	Q
	0	0	0
	0	1	1
	1	0	1
	1	1	1
Boolean Expression $Q = A+B$	Read as A OR B gives Q		

Figure 1. Logic symbols and truth table for the OR function

Procedures

1. Put the 7432 OR Gate shown in the Prototyping board.
2. Connect the pin 14 to 5 V and pin 7 to ground.
3. Connect pin 1 and 2 to input switches in Prototyping board, and connect pin 3 to output LED.
4. Change switches 1 and 2 on and off and show the output of LEDS.
5. Record the results in the following table.



Results

Switch 1	Switch 2	LED output
0	0	
1	0	
0	1	
1	1	