

Lab Report 8

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Experiment 8 - Bus based ALU-Register Data Transaction

Objective:

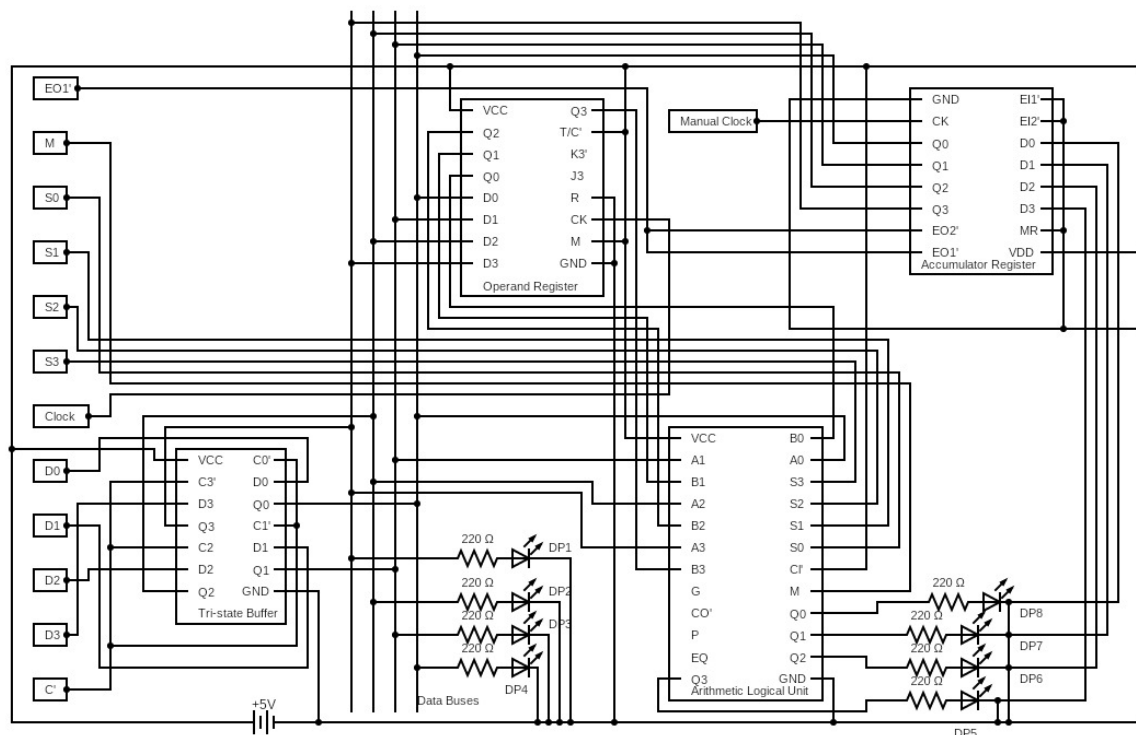
To implement and study a 4 bit-bus based Arithmetic and Logic Unit - Register Data Transaction.

Electronic Components Required:

1. Digital Test Kit
2. CD4035 IC Register
3. CD4076 IC Register
4. 74LS181 IC ALU
5. 74LS125 IC Tri-State Buffer
6. Voltage Supply
7. Normal Wires

Reference Circuit:

Circuit Diagram



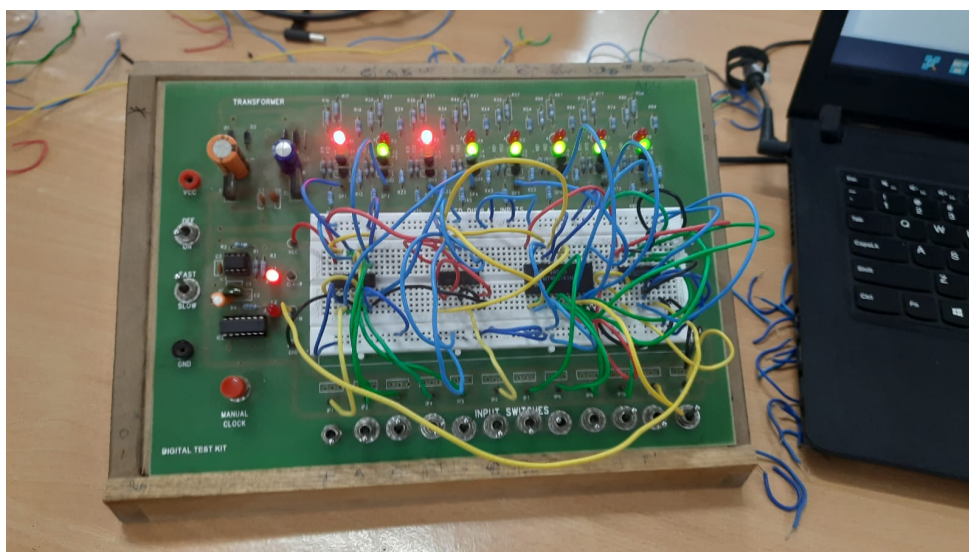
Procedure:

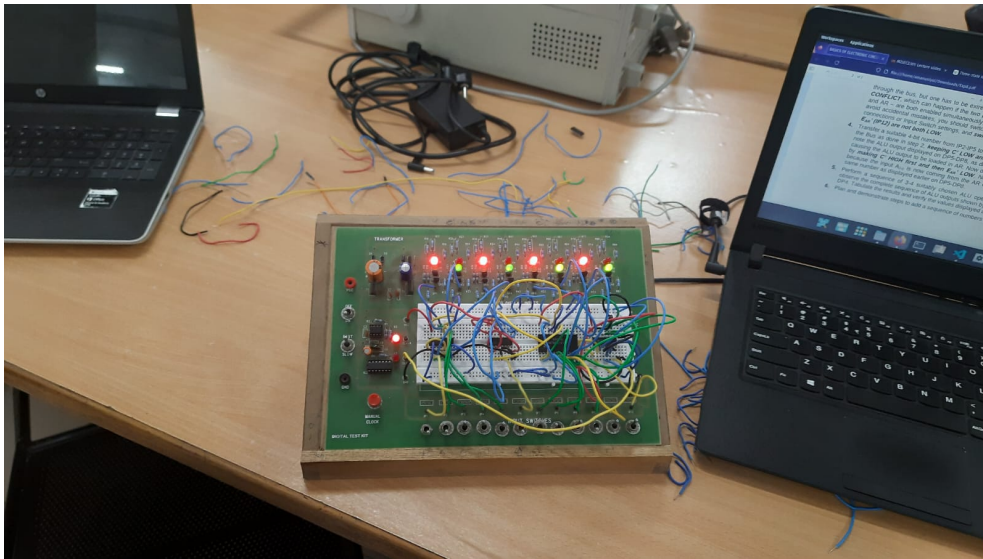
1. Connect the Tri State Buffer circuit to the vertical Data Bus on the left side.
2. Set C'(IP-1) to 1 and observe that all of the LEDs in DP1-DP4 are turned off, indicating that the bus is "floating," that is, not "driven" to a proper logic level by a digital output.
3. Enable the TSB output by setting C' to 0 and applying different data inputs through IP2-IP5 to ensure that DP1-DP4 displays the applied input correctly.
4. Finish the connections to the OR and the ALU.
5. Enable TSB output (C' = 0) and send a Clock pulse to OR via IP6 to transfer a suitable 4-bit number from IP2-IP5.
6. Connect another 4-bit number from IP2-IP5 to the Bus and choose an ALU function by connecting

the appropriate ALU control inputs S3-0 and M through IP7-IP11 while keeping C' LOW.

7. Confirm that the 4-bit number displayed on DP5-DP8 corresponds to the correct ALU output for inputs A3-0 from the Bus and B3-0 from the OR.
8. Complete the interconnections to the AR.
9. Apply a suitable 4-bit number from IP2-IP5 to OR and another 4-bit number from IP2-IP5 to the Bus as in step 5, while keeping C' LOW and EAR' HIGH.
 - a. As in step 6, select an appropriate ALU function and take note of the ALU output displayed on DP5-DP8
 - b. Send a Manual Clock pulse to AR, which loads the ALU output into AR.
 - c. Disable the TSB output and enable the AR output by first setting C' HIGH and then EAR' LOW

Observations:





On performing a sequence of 3-4 suitably chosen ALU operations (from the function table of ALU) with the same number in OR, we observe that the complete sequence of the ALU outputs shown by DP5-DP8 is same as the AR outputs shown by DP1- DP4.

Conclusion:

In this experiment, we learnt how to perform arithmetic operations via the bus and how the data is stored in an accumulator, which can be reused via the bus. Thus, the Bus-Based ALU is ready.