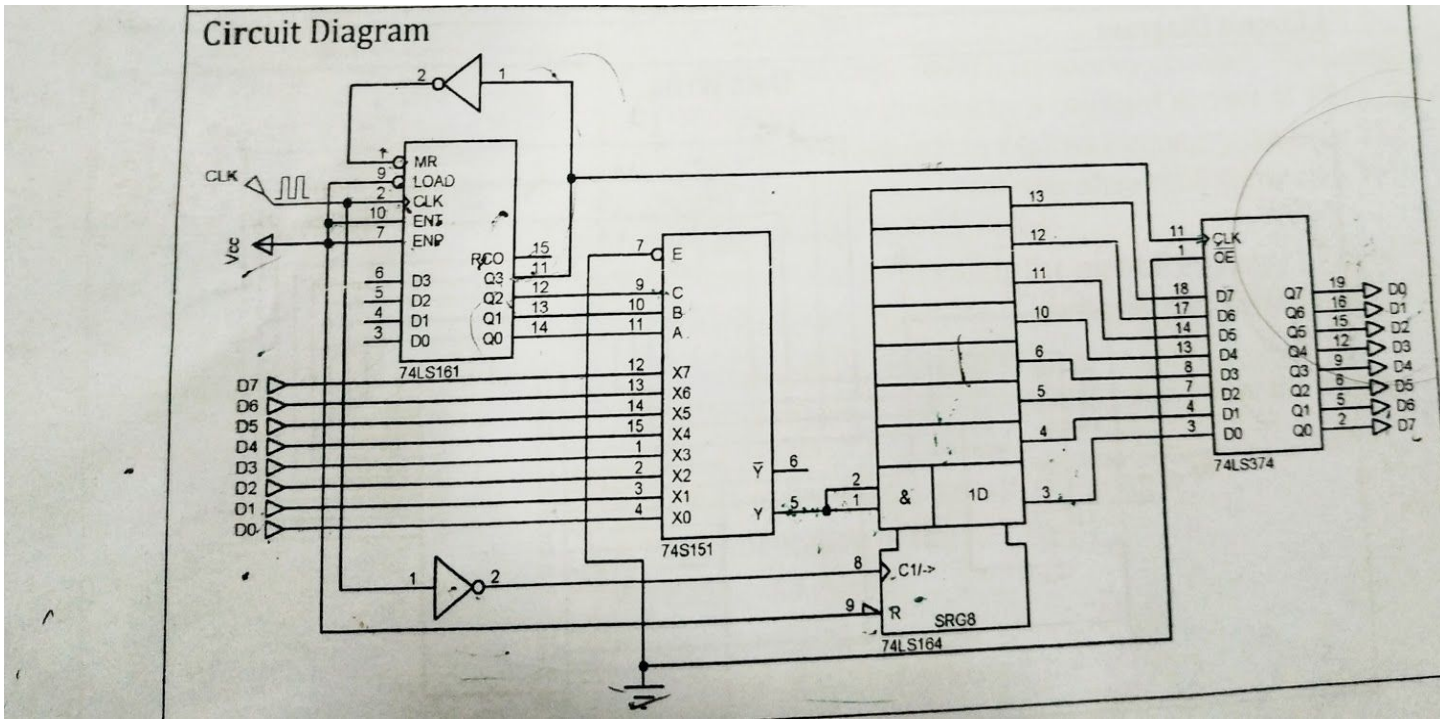
Architecture Lab

Experiment 1: Synchronous Data Transfer.



Overview of the Experiment:

In this experiment we have to implement a data transfer system where both sender and receiver circuits should be synchronized using single clock.and at the sender point , we will have parallel data from the binary counter and sender will convert it to serial data using the mux and then the receiver will print the data again in a parallel form by using the SIPO shift register and the d flip-flop.

What We need to know:

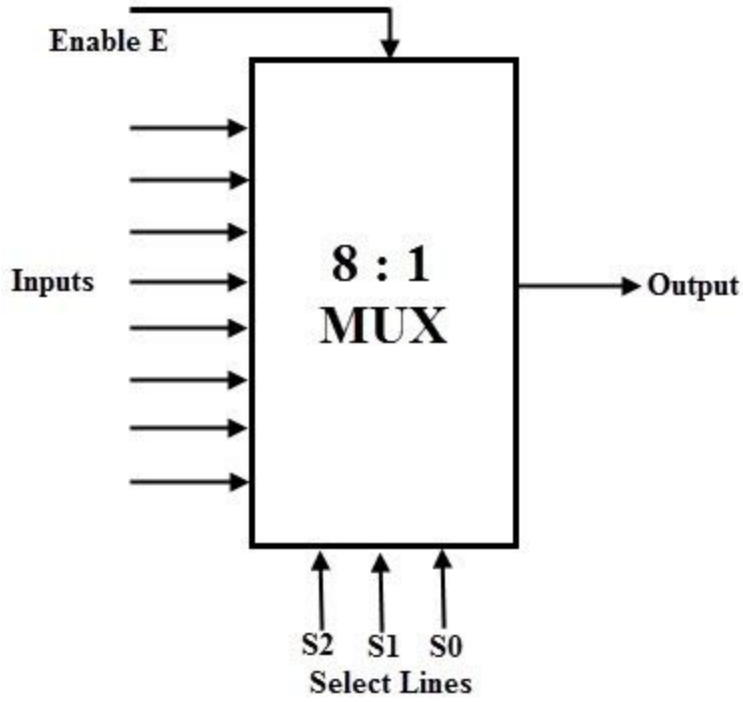
1.What is Synchronous Data Transfer?

-Synchronous transmission is a data transfer method which is characterized by a continuous stream of data in the form of signals which are accompanied by regular timing signals which are generated by some external clocking mechanism meant to ensure that both the sender and receiver are synchronized with each other.

In a word “Both sender and receiver circuits should be synchronized using a single clock.”

2. 8-to-1 Multiplexer

An 8-to-1 multiplexer consists of eight data inputs D0 through D7, three input select lines S2 through S0 and a single output line Y. Depending on the select lines combinations, multiplexer decodes the inputs.



3. SIPO Shift Register

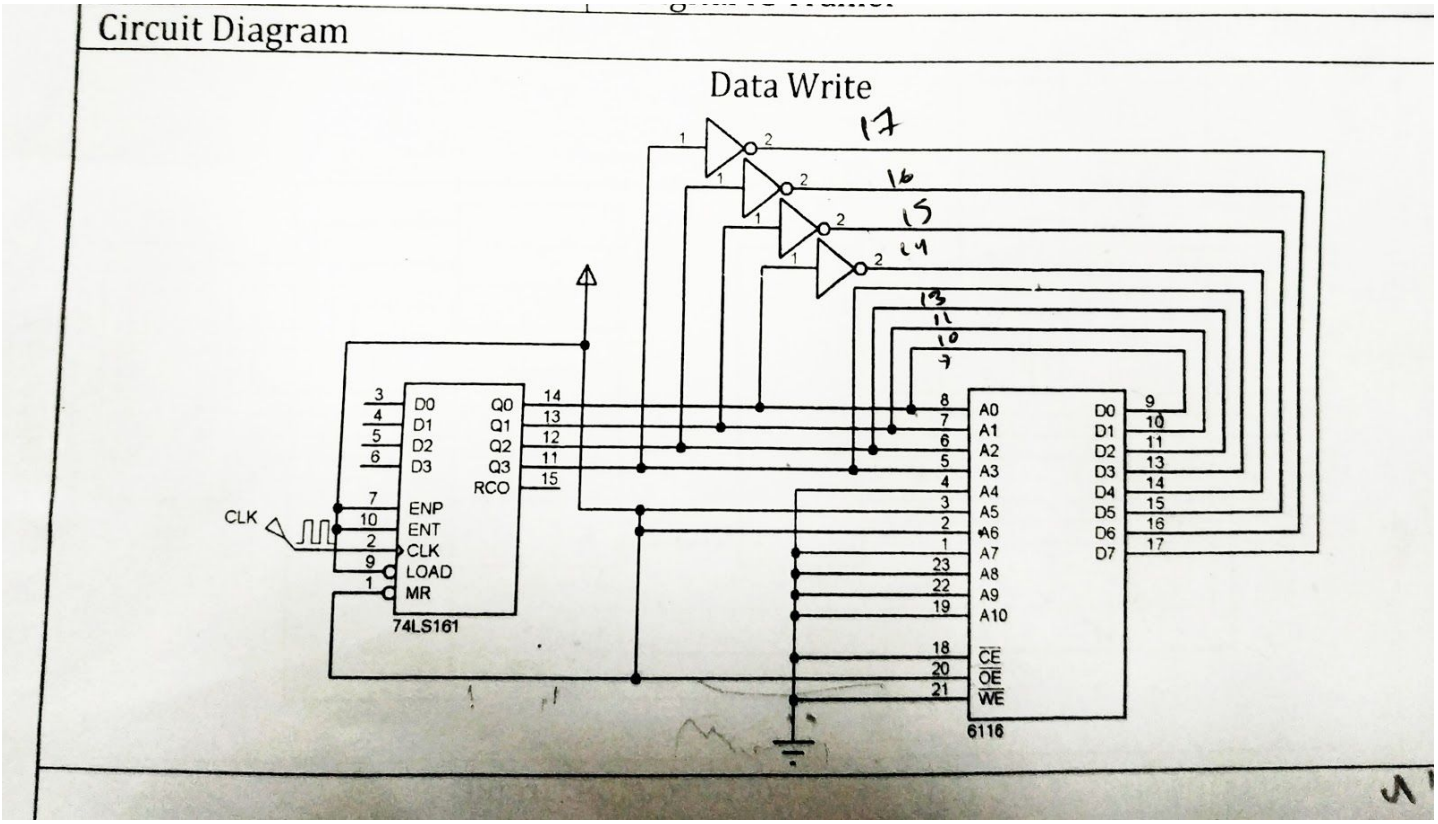
Shift Register is a group of flip flops used to store multiple bits of data. The bits stored in such registers can be made to move within the registers and in/out of the registers by applying clock pulses.

The shift register, which allows serial input (one bit after the other through a single data line) and produces a parallel output is known as **Serial-In Parallel-Out** shift register.

4. A question arises why we use the flip-flop??

To store the single bit output from SIPO until it becomes an 8 bit number which is our expected output, as we are transferring an 8 bit data.

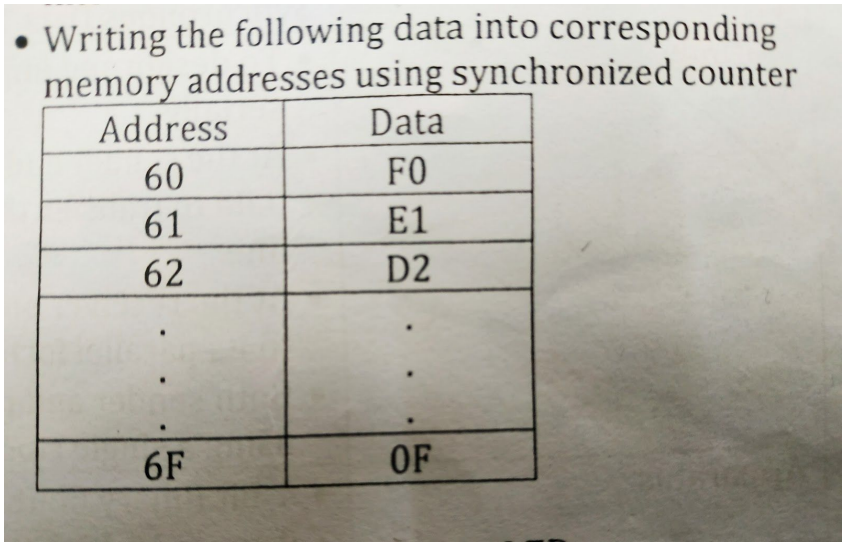
Experiment 2: Memory operations.



Overview of the Experiment:

We have design a memory subsystem to store data in memory and then display the stored data into LED.

We are given address and data:



- Writing the following data into corresponding memory addresses using synchronized counter

Address	Data
60	F0
61	E1
62	D2
.	.
.	.
.	.
6F	0F

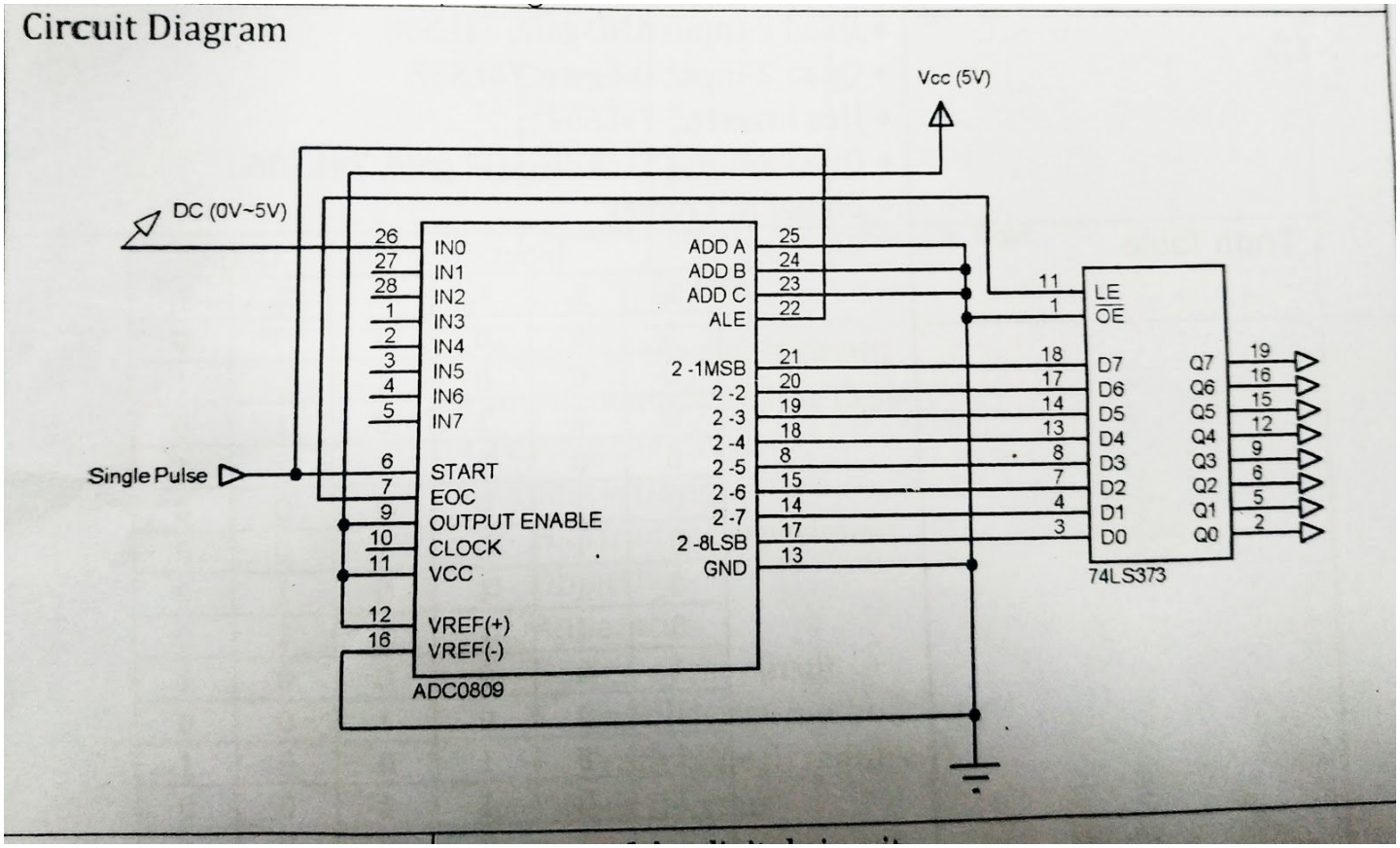
We will use the binary counter to indicate the addresses and also for the input.
While storing data in the memory,we will connect the write enable pin(21) with ground as it is negative edge enable and output enable pin (20) with vcc for the same reason.
And for showing the output ,after storing the data we will do the reverse work.

What We need to know:

STATIC RAM:

SRAM (static RAM) is random access memory (RAM) that retains data bits in its memory as long as power is being supplied.

Experiment 4: Analog to Digital conversion.



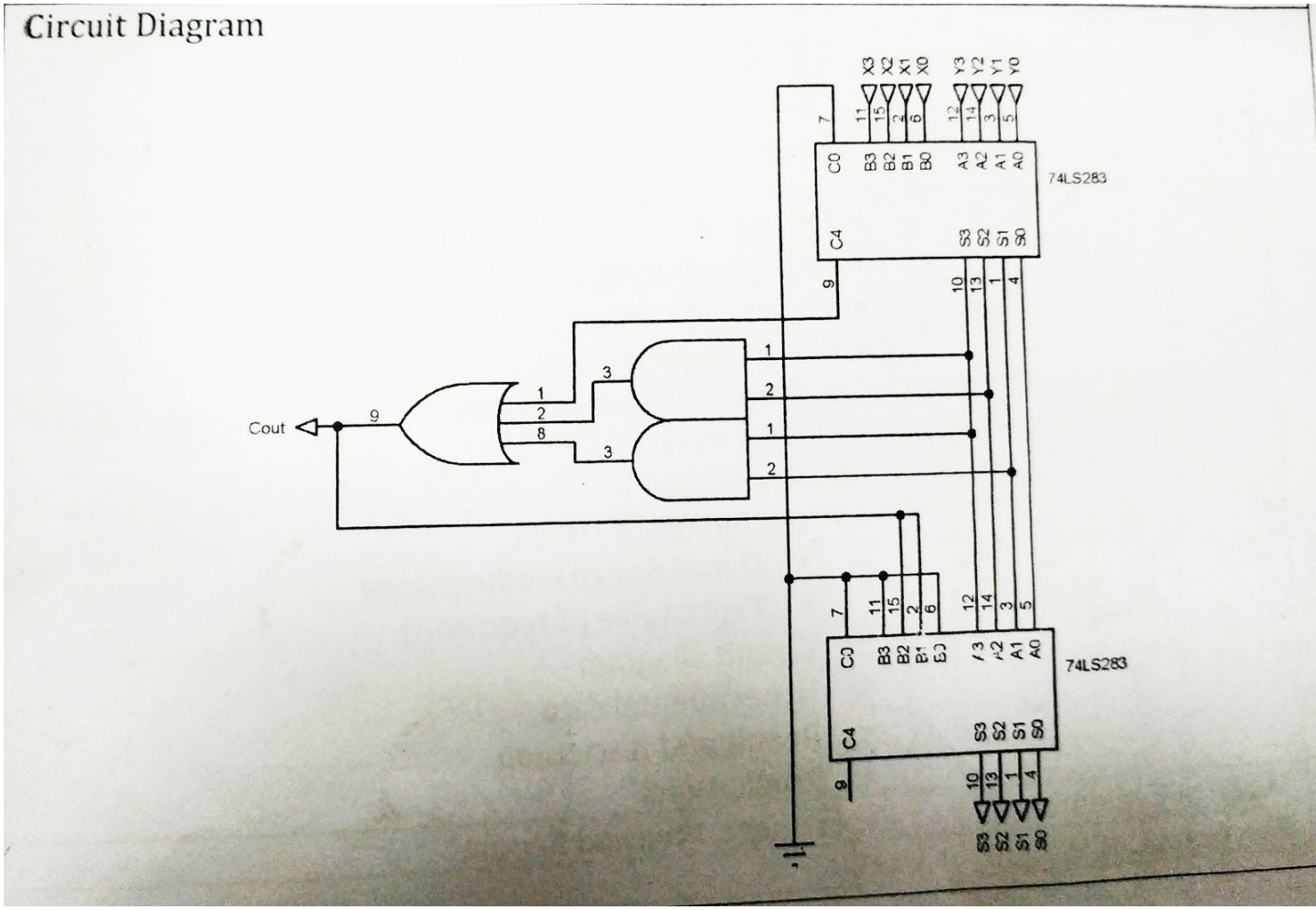
Overview of the Experiment:

In this experiment we have to implement or show the conversion of analog signal to digital signal.
We used an ADC and we use the voltage as our signal and when the EOC{7} pin was 1 then we showed it on LED how the voltage changes.

What We need to know:

ADC:An analog to digital converter is a circuit that converts a continuous voltage value (analog) to a binary value (digital) that can be understood by a digital device which could then be used for digital computation.

Experiment 7: ALU design.[Design a BCD Adder Circuit]



Overview of the Experiment:

https://www.youtube.com/watch?v=9O7OJi7RCLQ

Follow this link to understand this experiment completely.