

Experiment # 6

Serial adder

1- Introduction:

The aim of this experiment is to realize a 4-bit serial adder. This will show us one of the adding methods of adding that is used inside some computer systems. It is obvious that serial adder is slower than parallel adder. This is because serial adder adds one bit of the two numbers at a time. The following table shows the difference between Parallel adder and Serial adder.

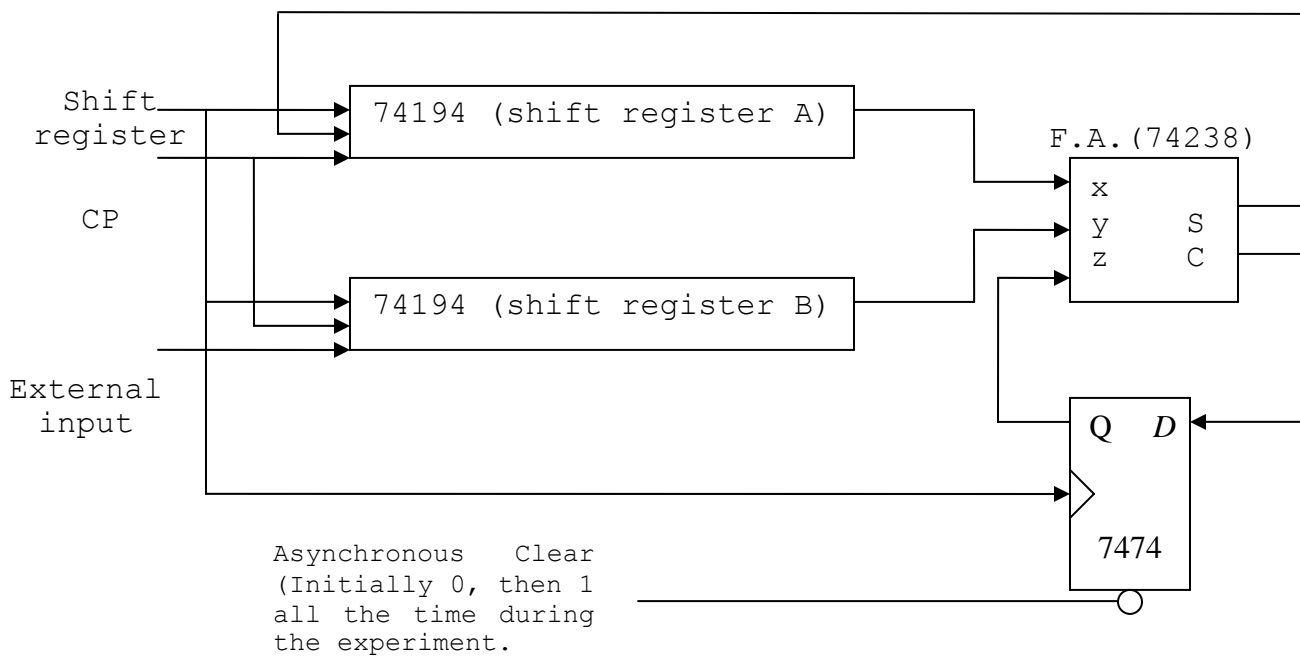
	Parallel adder	Serial adder
circuit	Pure combinational circuit.	Synchronous sequential circuit.
Number of Full Adders	F.A. # = # of bits in each binary number to be added.	Only one F.A.
Register type	Register with parallel load.	Two shift registers.

2- Equipment:

<i>IC Type</i>	<i>IC number</i>	<i>IC function</i>	<i>Number of pieces</i>
Shift register with parallel load D-flip-flop	74194 7474	Loading the augend and the addend and shift them one bit to right with each clock pulse. Store of binary information. Here we store the carry. Initially the D-f-f is reset to zero.	2 pieces to store the augend and the addend. 1 flip-flop.
Full-Adder	7483	Used to perform arithmetic addition operation.	Only one.

3- Procedure:

- The function diagram is:



- Note that the shift register works as the following:

S_1	S_0	Function
0	0	No change
0	1	Shift right
1	0	Shift left
1	1	Parallel Load

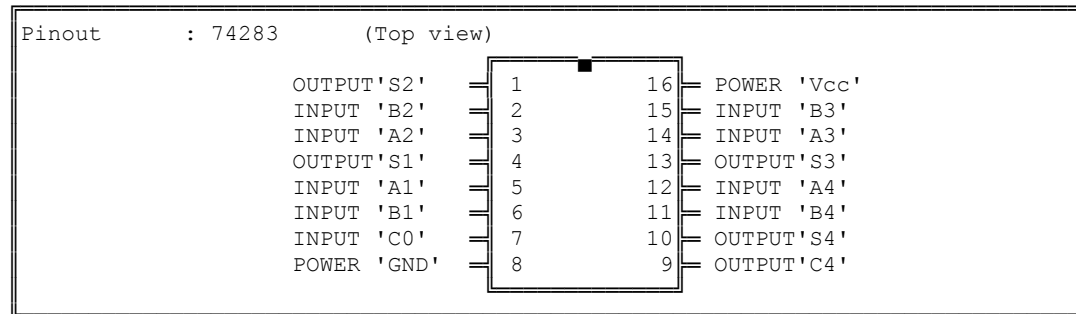
- Derive the wiring diagram.
- Connect the circuit given by the function diagram according to the derived wiring diagram.
- Check if the circuit works properly.

4- Conclusions and Exercises :

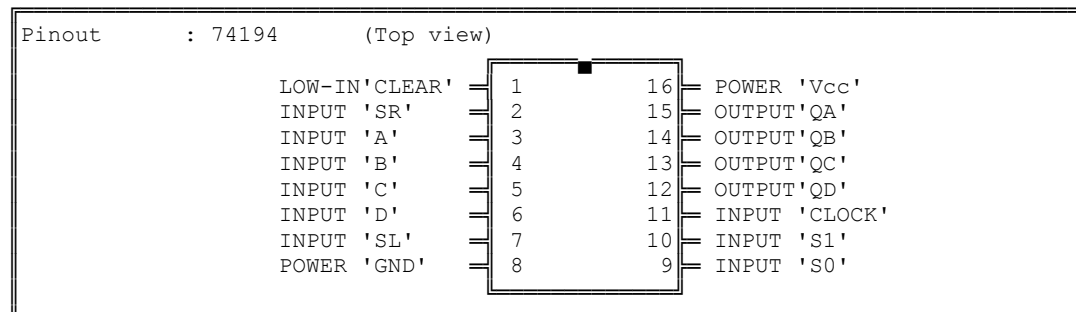
- 1- Design a serial adder with JK flip-flop ?
- 2- Write your conclusions about the experiment.

5- Pin-out for ICs:

Function : 4-Bit BINARY FULL ADDERS



Function : 4 Bit universal bidirectional shift register



Function : D-FLIPFLOP

