

EXPERIMENT No. 5

COUNTERS AND SHIFT REGISTERS

NAME: _____ **; ID:** _____;

GROUP NO.: _____ **;DATE** _____.

Objectives:

- To verify function table of IC 74194.
- To Design and implement :
 1. A Sequence detector 1001 using D FF by considering overlapping condition.
 2. A Ring counter using IC 74194

Components Required: Switch panel, LED panel , Multimeter, CRO, CRO Probes (2Nos.),Breadboard, following ICs:

7474 – Dual D flip-flop 7486 – Quad 2-input XOR

7400 – Quad 2-input NAND 74194 – 4 bit shift register

Experiment:

Verify proper functioning of all the instruments to be used for the experiment before implementation.

Run #01: Shift registers

Do the following operations on the register using IC 74194: a 4 bit shift register.

1. Asynchronously clear the register.
2. Load the word 1010 into the register.
3. Shift left the loaded word.
4. Shift right the loaded word.

Prepare a function table below to note down your observations.

Run #02: Shift register counters

A shift register counter is basically a shift register with the serial output connected back to the serial input to produce special sequences. Two of the most common shift register counters are the Ring counter and the Johnson counter which are described in your textbook.

Set up a 4-bit ring counter circuit using IC 74194. Apply clock inputs and note down the diagram and observations below.

Run #03: Sequence detector

The aim of this run is to design and implement a sequence detector using D flip-flops. The circuit to be designed is to detect a sequence of 1001 from an input string of data, which is serial in nature. An output of 1 is generated when the sequence is detected. Work out the state diagram for the detector (overlapping sequences also to be taken into account) and draw the diagram below.

Draw the corresponding state table that specifies the relationship between present state, inputs and next state and outputs

Derive the expression for the D flip-flop inputs and outputs. Write down the expressions below.

Draw the circuit diagram using required ICs of the sequence detector.

Hook up the circuit using the required ICs. Feed serial inputs that are appropriately synchronized with clock. Observe the flip-flop states and output. Note your observations in the table below.

Table 11.1: Observation table for 1001 sequence detector

Input	Present State	Next State	Output
0			
1			
0			
0			
1			
0			
0			
1			
1			