Assignment 10

Class - SE IV

Batch - F4

Title -: Realization of MOD-N counter using (Decade counter IC 7490)

Objectives -

i) To verify IC 7490.

ii) To design and implement MOD-20.

iii) To design and implement MOD-96.

Apparatus -: Digital trainer kit, IC 7490, Patch cords, +5V power supply.

Theory -:

IC 7490 is a TTL MSI decade counter that counts ten digits. and it resets for every new clock inputs. As it can go through 10 unique combination of output if is also called as Decade Counter. A BCD counter can count 0000, 0001, 0010, 1000, 1001, 1010, 1011, 1110, 1111, 000 and 0001 and so on. There are some available ICs for decade counters. which can readily use in our circuits like IC 7490. It is an asynchronous decade counter.
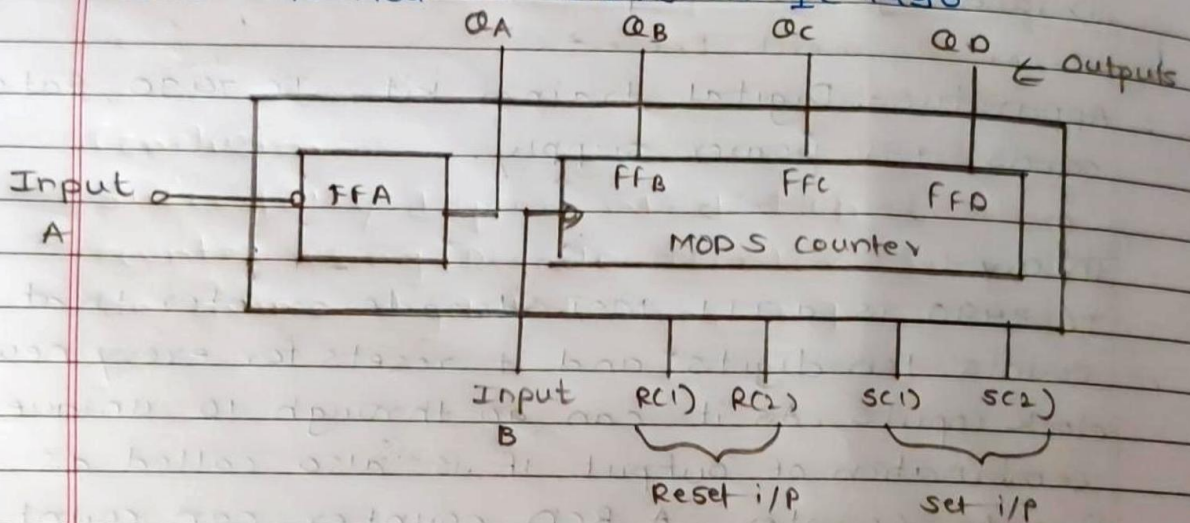
Procedure -:

1. Make the connections as per the logic circuit of 3 bit Asynchronous up/DOWN counter ckt using IC - 74LS90 and verify its truth table
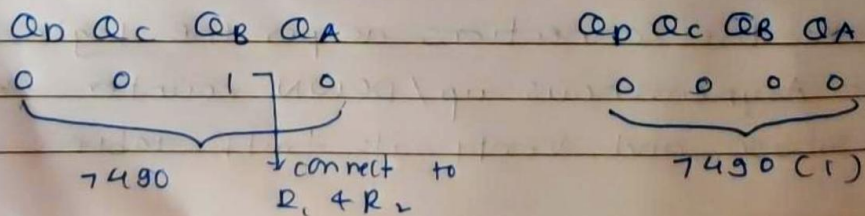
# * PIN Diagram of IC-7490.

| | | | |
|---|---|---|---|
| CLKB | 1 | 14 | CLKA |
| Rs | 2 | 13 | NC |
| R₁ | 3 | 12 | Q_A |
| Nc | 4 | 11 | Q_D |
| Vcc | 5 | 10 | GND |
| S₁ | 6 | 9 | Q_B |
| S₂ | 7 | 8 | Q_C |

(IC 7490)

## Basic internal Structure of IC 7490



$Q_A$    $Q_B$    $Q_C$    $Q_D$ ← outputs

Input A → FFA   FFB   FFC   FFD   MOD 5 counter

Input B   R(1), R(2)    S(1)  S(2)
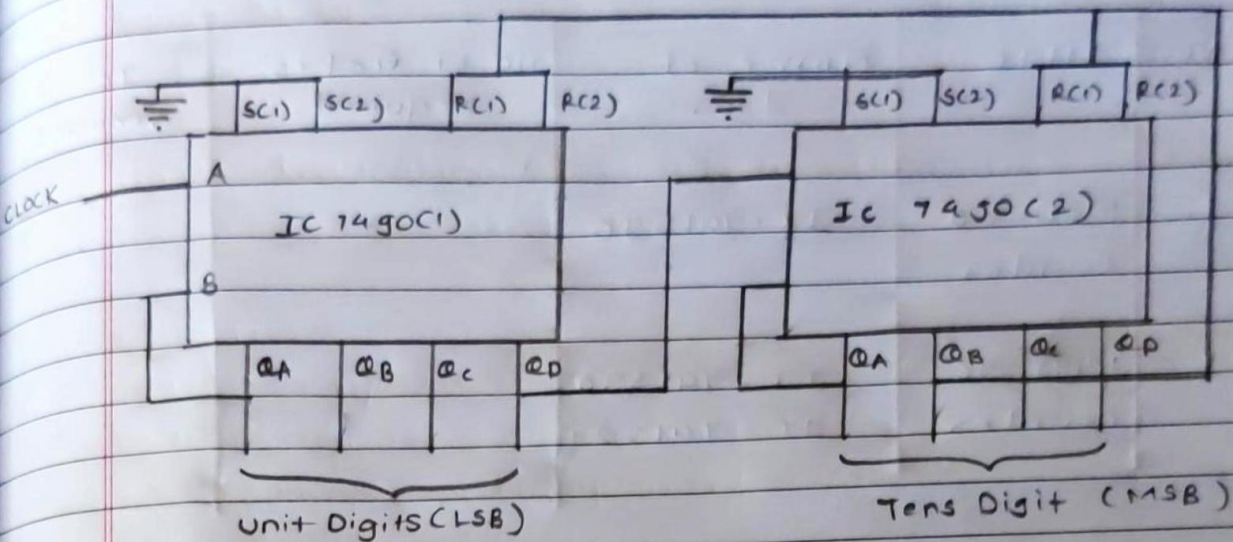
Reset i/p      Set i/p

## I) Design a MOD-20 counter using IC 7490

We known that one IC can work as MOD-10 (BCD) counter. Therefore we need two ICs. The counter will go through states 0-19 and should be reset on state 20 i.e.
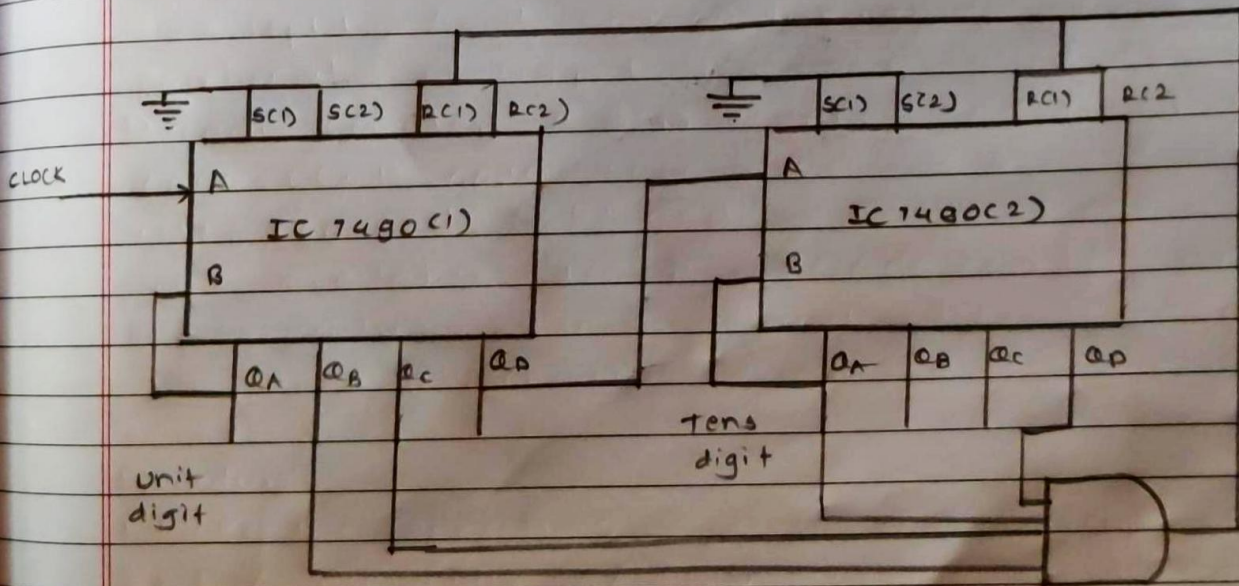
$Q_D$ $Q_C$ $Q_B$ $Q_A$          $Q_D$ $Q_C$ $Q_B$ $Q_A$

0    0    1    0                 0    0    0    0

7490  ↓ connect to               7490 (1)
      R₁ & R₂

## Circuit Diagram :



Unit Digits (LSB)                    Tens Digit (MSB)

II) Design MOD-96 counter using IC 7490.
IC 7490 is a Decade counter. When two such IC's
are cascade, it becomes a divide by 100 counter
To get divide by 96 counter, the counter is as
soon as it becomes 1001 0110



Unit digit                    Tens digit

\* Logic gates/MSI required for implementation :

| No. | Title | Name of IC | No. of Gates required. | IC required |
|-----|-------|------------|-----------------------|-------------|
| 1. | MOD-20 counter | IC-74LS90 | — | 2 |
| 2. | MOD-96 counter | IC-74LS90 IC-74LS21 | — 1 | 2 1 |

Conclusion :-

Successfully Implemented MOD-20 & MOD-96 counter using Decade counter. IC-74LS90 on an online digital trainer kit.