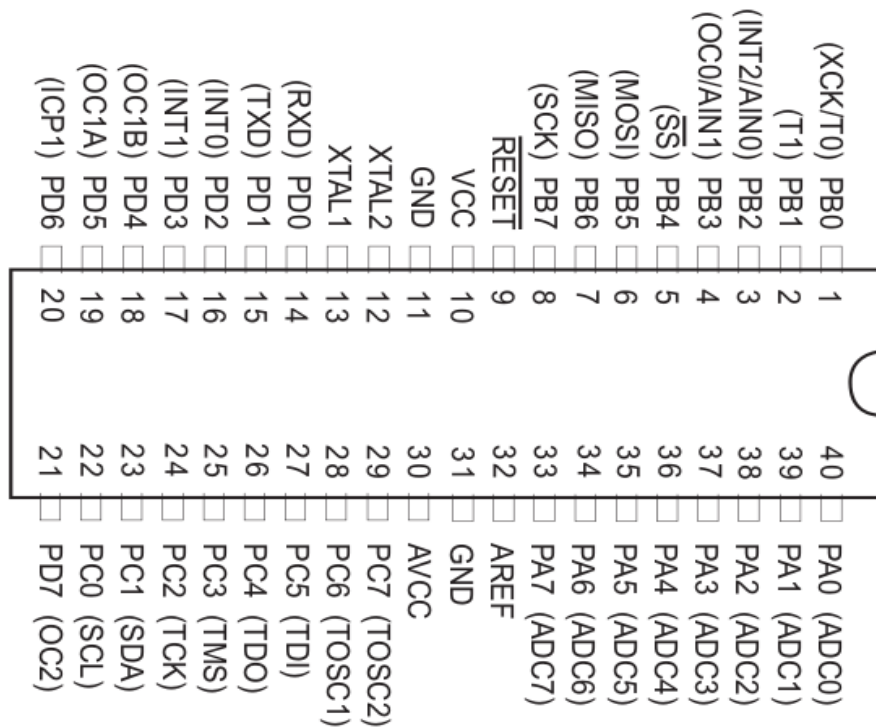


Embedded Hardware Design

Bootloader Lab -1

Part-3

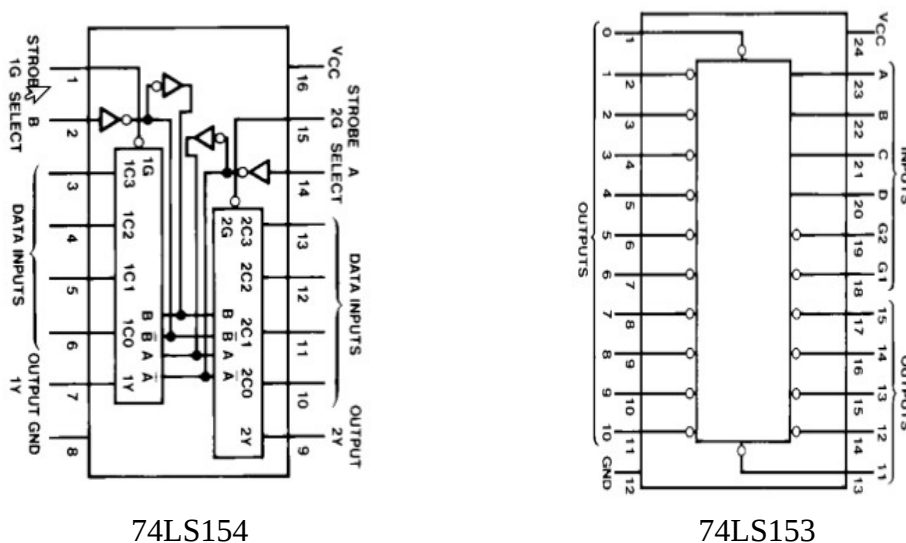
PIN CONFIGURATION AT-MEGA 16



Connections:

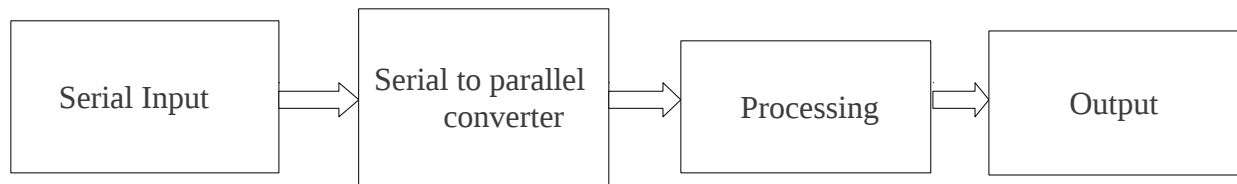
- 1>Connect the 8 wire cable to port A (PA0-7) and a three pin connector to bootloader.
- 2>Place the 74LS154 (4x16 decoder) on bread and connect PA3-6 to input of 154.
- 2>Connect the LEDs (+) leg to the o/p pins of 154 and terminate other end to ground with a resistor.
- 3>Now place 74LS153 (dual 4x1 mux) on the breadboard and connect address to PA0-1.
- 4>Connect output of 153 to PA2.
- 5>Do all other required connection for the 153 and 154 as per datasheets.

PIN CONFIGURATION



Directions:

- 1>Program At-Mega 16 for PORTA with (PA0-1),(PA3-6) as output and PA2 as input.
- 2>The task of experiment is to impliment following system.



- 3>Serial input is achieved by scanning the mux input and creating a 4 bit frame (S2P), I0=LSB.
- 4>Once you have a frame of 4 bit take its reversed bit order's compliment and give output.
- 5>Output goes to a decoder and you get a particular array of lit LED from it.
- 6>Note down the output of decoder and check your programming.

Note :

- 1>Reversed bit order implies mapping in following manner: 3->6,7->7 and 2->2.
- 2>Read datasheet of 74LS153,154 and be ready with the circuit before the lab.
- 3>Write code for this segment before hand and bring it written in your lab notes.

Hints:

- 1>First check your serial 2 parallel outputs.
- 2>Then the complimented part.
- 3>Connections of 153 and 154 are very simple.Look for truth tables for pin connections.
- 4>>Psuedo code:

```
start
int serial2parallel=0;
loop i=0 to 3
    PORTA=i;
    serial2parallel (or operator) = PINA2<<i;
end loop

int output=0;
output=~serial2parallel;
PORTA (or operator)=(output<<3);
end
```

What you have learned in this lab:

- 1>Efficiently utilizing the input/output pins of a micro controllers.
- 2>We have seen the inputs/outputs of u-C can be expanded with the help of some chips.
- 3>Converting a model of a system into a programe.