Project Report
Crossroads Traffic light

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Section: 1

B.NO: 12

Introduction

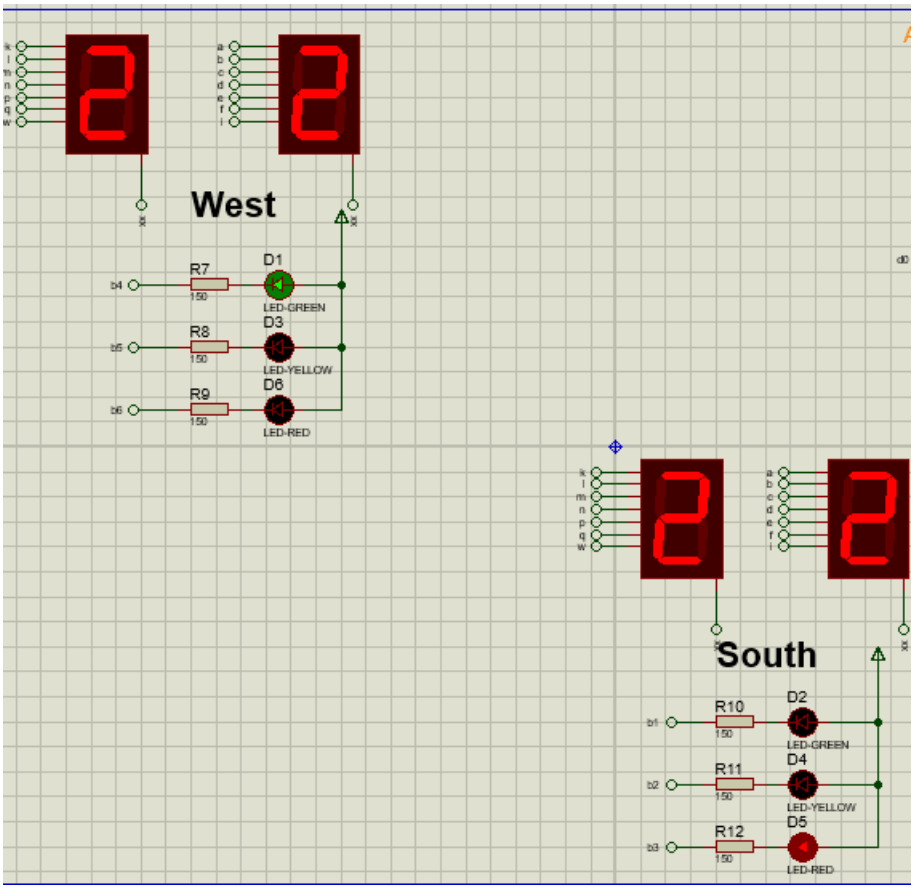
The project is about making two traffic lights for two roads (the west road and the south road). Each road has its own traffic light with its own counter that counts from a specific number given from the project brief. The project has two modes. The automatic mode in which the counter counts automatically and the light of the traffic light changes without any outer contribution. The second mode is the manual mode in which the counter is always set to zero unless the user presses a button which changes the roads from south to west or vice versa. Upon changing from green light to yellow light there must be a delay of 3 seconds during the manual or the automatic mode and the light changes immediately when it is from red to green.

Project implementation

Proteus part:

The project first started with laying the basics which is the PIC16F877A, wiring the oscillation ports and the master clear port. After that, it was asked that the least number of ports must be used so, only port B is used to display the numbers on the 7 segments display. Port B is connected to two decoders. The first decoder takes the ports from 0 to 3 and is responsible for showing the units in the number. Ports from 4 to 7 are connected to another decoder which is responsible for the tenth part of the number (the two 7 segments on the left as in fig 1).

Note that instead of wiring with wires the inputs and outputs are used.



The 7 segments were connected in the cathode form, so the decoders are of type 7448.

Each 7 segments is connected to a PNP transistor which is connected to port A from 0 to 3, these transistors help in closing or opening the 7 segments when needed.

The LEDs which is the traffic light part is connected as sink in order to decrease the current dissipated by the circuit (as shown in fig 2).

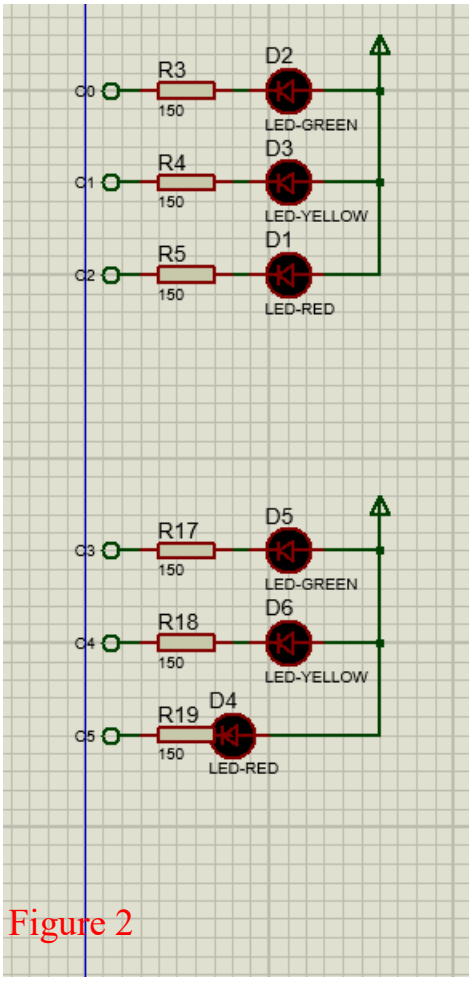


Figure 2

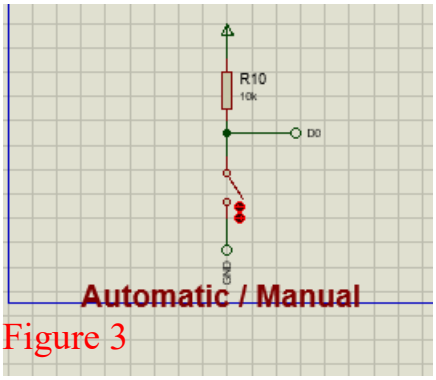


Figure 3

A switch and a button were added. The switch is for changing between the automatic mode and the manual mode (shown in fig 3). The button is for changing between the streets in the manual mode (shown in fig 4).

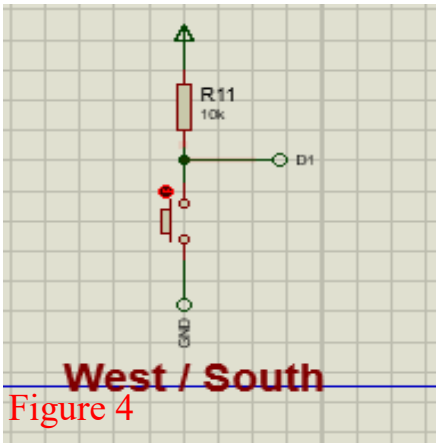


Figure 4

MikroC part:

To correctly use the decoders an array of the numbers in their correct form must be used,

and to do so the 8-bit binary number must be changed to its decimal equivalent (changes from binary to decimal are shown in table 1).

Binary	Decimal
00000000	0
00000001	1
00000010	2
00000011	3
00000100	4
00000101	5
00000110	6
00000111	7
00001000	8
00001001	9
00010000	16
00010001	17
00010010	18
00010011	19
00010100	20
00010101	21
00010110	22
00010111	23
00011000	24
00011001	25
00100000	32
00100001	33
00010010	34
00010011	35

Table 1

The values of the decimal from table 1 were put in the array and later will be used to display the counter.

A function called counter was made which is responsible for looping through the array displaying the numbers on the 7 segments and changing the light of the traffic in the automatic mode.

The main function has the initializers for all the used ports and a condition that checks if the port controlling the automatic to manual switch is closed or open. If it is open, then the counter function is called displaying the numbers automatically. If it is closed, then the code will enter the manual part in which all the 7 segments display zero and are waiting for the user to press the button that switches the streets.