

## TRAFFIC LIGHT CONTROLLER

Traffic light controller interface module is designed to simulate the function of four way traffic light controller. Combinations of red, amber and green LEDs are provided to indicate Halt, Wait and Go signals for vehicles. Combination of red and green LEDs are provided for pedestrian crossing. 36 LEDs are arranged in the form of an intersection.

A typical junction

is represented in the Figure 3.9.1. At the left corner of each road, a group of five LEDs (red, amber and 3 green) are arranged in the form of a T-section to control the traffic of that road. Each road is named North (N), South (S), East (E) and West (W).

- LED's L1, L10, L19 & L28 (Red) are for the stop signal for the vehicles on the road N, S, W, & E respectively.
- L2, L11, L20 & L29 (Amber) indicates wait state for vehicles on the Road N, S, W, & E respectively.
- L3, L4 & L5 (Green) are for left, strait and right turn for the vehicles on road S. Similarly, L12-L13-L14, L23-L22-L21 & L32-L31-L30 simulates same function for the roads E, N, W respectively.
- A total of 16 LED's (2 Red & 2 Green at each road) are provided for pedestrian crossing. L7-L9, L16-L18, L25-L27 & L34-L36 (Green) when ON allows pedestrians to cross and L6- L8, L15-L17, L24-L26 & L33-L35 (Red) when ON alarms the pedestrians to wait.
- To minimize the hardware pedestrian's indicator LEDs (both red and green are connected to same port lines (PC4 to PC7) with red inverted.

- Red LEDs L10 & L 28 are connected to port lines PC2 & PC3 while L1 & L19 are connected to lines PC0 & PC1 after inversion. All other LED's (amber and green) are connected to port A & B.

## WORKING:

8255 is interfaced with 8086 in I/O mapped I/O and all ports are output ports. The basic operation of the interface is explained with the help of the enclosed program. The enclosed program assumes no entry of vehicles from North to West, from road East to South.

At the beginning of the program all red LEDs are switched ON, and all other LEDs are switched OFF. Amber LED is switched ON before switching over to proceed state from Halt state.

The sequence of traffic followed is given below.

- From road north to East, from road east to north, from road south to west from road west to south, from road west to north.
- From road north to East, from road south to west, from road south to north, from road south to east, from road north to south, from road south to north.
- Pedestrian crossing at roads west & east.
- From road east to west, From road west to east, Pedestrian crossing at roads north & south.

# TRAFFIC LIGHT CONTROLLER

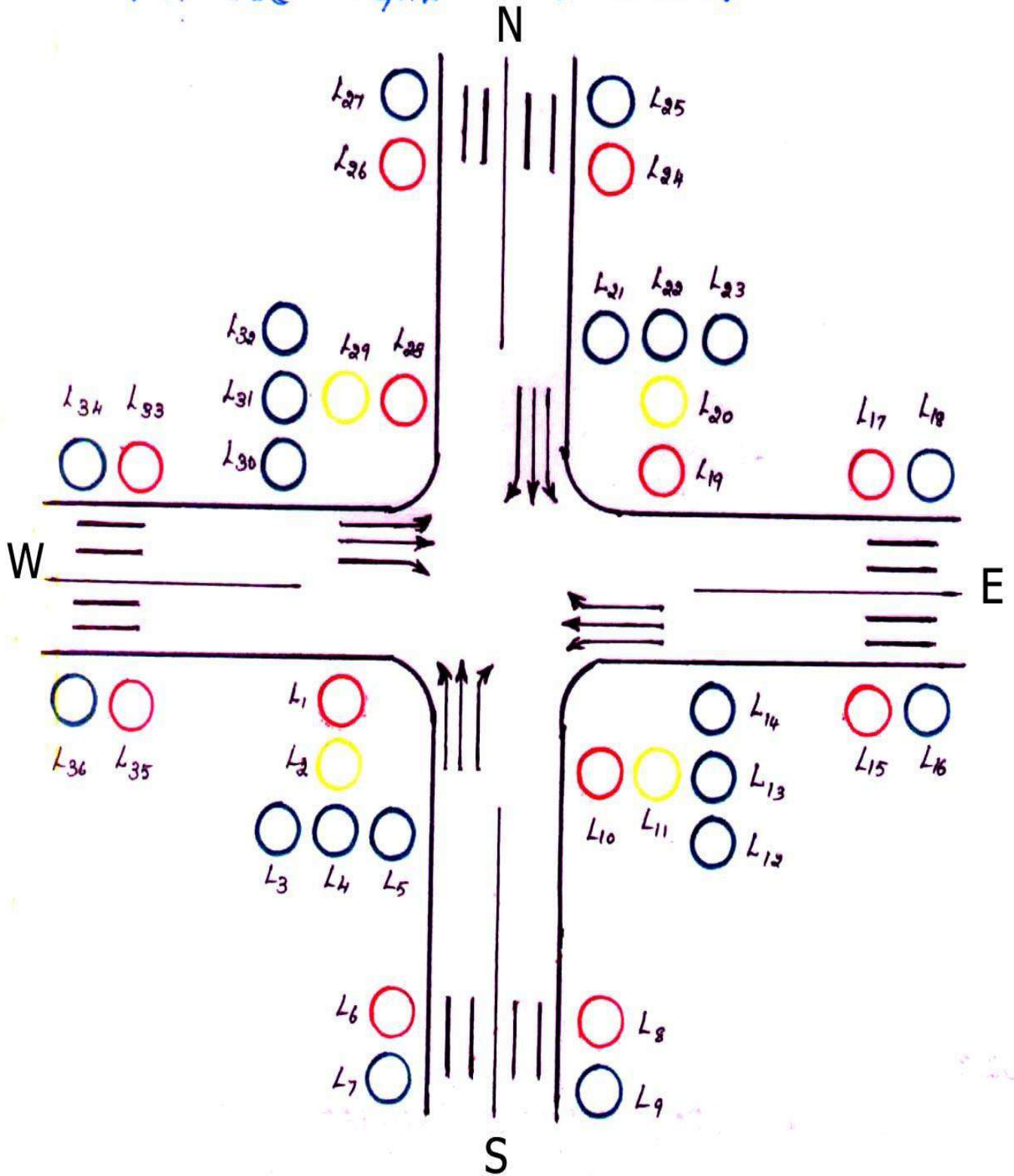


Figure 3.9.1 Traffic Light Junction with arrangement of LEDs

**PROGRAM:**

| ADDRESS | OPCODE   | LABEL  | MNEMONICS      |
|---------|----------|--------|----------------|
| 1000    | B0 80    | Start  | Mov AL,80H     |
| 1002    | E6 26    |        | OUT CNTRL,AL   |
| 1004    | BB 6B 10 | REPEAT | MOV BX,LOOK UP |
| 1007    | BE 77 10 |        | MOV SI,LABEL   |
| 100A    | E8 32 00 |        | CALL OUT       |
| 100D    | 8A 04    |        | MOV AL,[SI]    |
| 100F    | E6 20    |        | OUT 20,AL      |
| 1011    | E8 4A 00 |        | CALL DELAY1    |
| 1014    | 46       |        | INC SI         |
| 1015    | 43       |        | INC BX         |
| 1016    | E8 26 00 |        | CALL OUT       |
| 1019    | 8A 04    |        | MOV AL,[SI]    |
| 101B    | E6 22    |        | OUT 22,AL      |
| 101D    | E8 3E 00 |        | CALL DELAY1    |
| 1020    | 46       |        | INC SI         |
| 1021    | 43       |        | INC BX         |
| 1022    | E8 1A 00 |        | CALL OUT       |
| 1025    | 8A 04    |        | MOV AL,[SI]    |
| 1027    | E6 24    |        | OUT 24,AL      |
| 1029    | E8 32 00 |        | CALL DELAY1    |
| 102C    | 46       |        | INC SI         |
| 102D    | 43       |        | INC BX         |
| 102E    | E8 0E 00 |        | CALL OUT       |
| 1031    | 8A 04    |        | MOV AL,[SI]    |
| 1033    | E6 24    |        | OUT 24,AL      |
| 1035    | 46       |        | INC SI         |
| 1036    | 8A 04    |        | MOV AL,[SI]    |
| 1038    | E6 20    |        | OUT 22,AL      |
| 103A    | E8 21 00 |        | CALL DELAY1    |
| 103D    | EB C5    |        | JMP REPEAT     |
| 103F    | 8A 07    | OUT    | MOV AL,[BX]    |
| 1041    | E6 24    |        | OUT 24,AL      |
| 1043    | 43       |        | INC BX         |
| 1044    | 8A 07    |        | MOV AL,[BX]    |
| 1046    | E6 22    |        | OUT 22,AL      |
| 1048    | 43       |        | INC BX         |
| 1049    | 8A 07    |        | MOV AL,[BX]    |
| 104B    | E6 20    |        | OUT 20,AL      |
| 104D    | E8 01 00 |        | CALL DELAY     |

|      |          |         |               |
|------|----------|---------|---------------|
|      |          |         | RET           |
| 1050 | C3       |         | RET           |
| 1051 | BF 40 00 | DELAY   | MOV DI,00040H |
| 1054 | BA FF FF | A       | MOV DX,0FFFFH |
| 1057 | 4A       | A1:     | DEC DX        |
| 1058 | 75 F6    |         | JNZ A1        |
| 105A | 4F       |         | DEC DI        |
| 105B | 75 F6    |         | JNZ A         |
| 105D | C3       |         | RET           |
| 105E | BF 15 00 | DELAY1: | MOV DI,00015H |
| 1061 | BA FF FF |         | MOV DX,0FFFFH |
| 1064 | 4A       |         | DEC DX        |
| 1065 | 75 FD    |         | JNZ B1        |
| 1067 | 4F       |         | DEC DI        |
| 1068 | 75 F6    |         | JNZ B         |
| 106A | C3       |         | RET           |

LOOK UP TABLE 1:

| ADDRESS | OPCODE      |         | DATA               |
|---------|-------------|---------|--------------------|
| 106B    | 12 27 44 10 | LOOK UP | DB 12H,27H,44H,10H |
| 106F    | 2B 92 10 9D |         | 2BH,92H,10H,9DH    |
| 1073    | 84 48 2E 84 |         | 84H,48H,2EH,84H    |

LOOK UP TABLE 2:

|      | OPCODE      | LABEL: | DATA                      |
|------|-------------|--------|---------------------------|
| 1077 |             |        |                           |
| 107B | 48 4B 20 49 |        | DB 48H<br>4BH,20H,49H,04H |
| 107C | 04          |        | END                       |