User's Manual

FOR

ET-TLC
TRAFFIC LIGHT CONTROLLER

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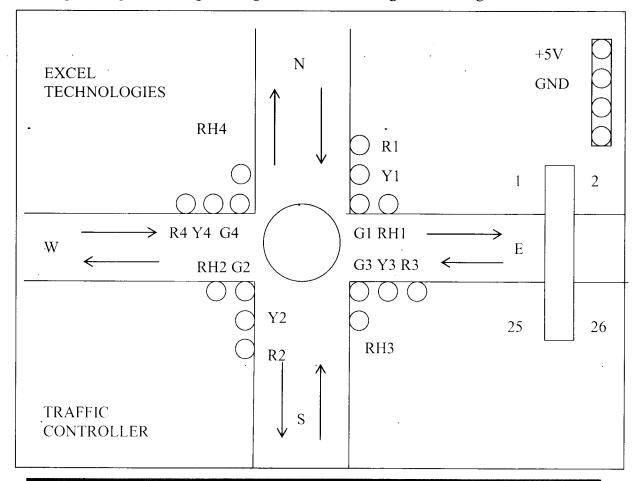
TRAFFIC LIGHT CONTROLLER INTERFACING MODULE (ET-TLC)

This module will demonstrate to the student as to how the traffic light signal can be controlled and simulated using Microprocessor and I/O lines. This in a way gives them the feel of microprocessor application.

GENERAL

The traffic light controller simulates the operation of traffic light in a busy crossing. The Red, Yellow and Green colour LED's are used for indication stop, Get Ready and Go signal. The card has been designed in such a way that students can write different programs to simulate different patterns of traffic control followed in different cities. The duration of the traffic movement is controlled by delay routines which are called by the main program.

CIRCUIT DESCRIPTION:

The hardware design for this module is very simple as only the Buffers are used to drive an LED's through the I/O lines of 8255. The LED to be ON is to be fed with logic 1 through 8255 port. The light arrangement in the crossing are used as given below:

The Port A and Port B of 8255 are used as given below:

PA0	PA1	PA2	PA3	PA4	PA5	PA6	PA7
For R1	For G2	For Y1	For Y2	For G1	For R2	For RH1	For RH2

PB0	PB1	PB2	PB3	PB4	PB5	PB6	PB7
For R3	For R4	For Y3	For Y4	For G3	For G4	For RH3	For RH4

EXERCISES:

1. Write a program to control the traffic using following scheme of traffic movement as per the priority given in a, b, c, etc.

a) North to South and South to North Traffic
b) South to North and South to East Traffic
c) North to South and North to West Traffic
d) East to West and West to East Traffic
e) East to North and East to West Traffic
f) West to South and West to East Traffic
g) Repeat from (a)

2. Writ a program to control the traffic using following scheme of traffic movement as per the priority given in a, b, c, etc.

a) North to South and North to West Traffic
b) South to North and South to East Traffic
c) North to South and South to North Traffic
d) East to West and West to East Traffic
e) East to West and East to North Traffic
f) West to East and West to South Traffic
g) Repeat from (a)

3. Write a program to control the traffic using following scheme of traffic movement as per the priority given in a, b, c, etc.

a) South to North and South to East Traffic
b) Flashing Warning on RH1 for South to East Traffic before Stopping South to East Traffic
c) North to South and South to North Traffic
d) North to South and North to West Traffic
e) East to West and East to North Traffic
f) Flash Warning on RH3 for East to North Traffic before stopping

g) East to West and West to East Traffic

h) West to East and West to South Traffic

i) Repeat from (a)

NOTE; The delay for duration of the ;movement and stop of traffic as well as the duration of flash etc. or duration of Yellow between Red and Green can be selected suitably by changing the value of counters used in delay routines.

The user can imagine new ways of controlling Traffic and give the students such exercise to perform.

EXERCISE:-1

The exercise number one is solved here for the students to understand the way the program can be written.

SETUP FOR THE EXPERIMENT

This explanation as well as the explanation of the Program under the heading " Description of the Program" is for 8085 LED Kit. However if you are interfacing the Traffic Light Controller Module to other Kits, then also refer to the specific instruction before the program listing for that particular Kit also

1) Connect the ET-TLC interfacing module to the 8255-1 port connector of the kit using 26-pin flat FRC cable. The pin No.1 of the connector on the module as well as the kit is marked. Please ensure that the pin no. 1 of the connector is connected to pin no. 1 of the module.

2) Connect the +5V, GND to the Module either through the Kit or Externally.

3) Enter the program given below from the memory location mentioned in the program.

4) Execute the program.

SEQUENCE OF SWITCHING:-

The sequence of switching i.e. outputting of data for example-1 is given here. The students once understands this, can then write programs for other exercises.

Sl. No.	LED's to be Switched ON	Binary Data to be outputted	Word /Data to be outputted
1	PortA-R2, R1	0 0 1 0 0 0 0 1	21
	Port B- G4, G3	0 0 1 1 0 0 0 0	30
2	PortA-R2, R1	0 0 1 0 0 0 0 1	21 ·
	Port B-Y4, Y3	0 0 0 0 1 1 0 0	0C
3	Port A-R2, R1	0 0 1 0 0 0 0 1	21

	Port B- RH4, RH3, R4, R3	1 1 0 0 0 0 1 1	C3
4	Port A- Y2, Y1	0 0 0 0 1 1 0 0	0C
	Port B-Y4, Y3	0 0 0 0 1 1 0 0	0C
5	Port A-G1, G2	0 0 0 1 0 0 1 0	12
	Port B-R4, R3	0 0 0 0 0 0 1 1	03
6	Port A- Y2, Y1	0 0 0 0 1 1 0 0	0C
	Port B- R4, R3	0 0 0 0 0 0 1 1	03
7	Port A-RH2, RH1, R2, R1	1 1 1 0 0 0 0 1	E1
	Port B- R4, R3	0 0 0 0 0 0 1 1	03
8	Port A- Y2, Y1	0 0 0 0 1 1 0 0	0C
		0 0 0 0 1 1 0 0	0C

DESCRIPTION OF THE PROGRAM:-

The 8255 is first initialized as all the ports as output port. After this the sequence of data as per the scheme to be implemented is outputted one by one. The delay between the sequence can be selected by changing the counter value loaded in the A register in the delay routine. After the sequence is over, the program is looped back.

NOTE: - Listing of program for various models of Microprocessor and Micro controller kits is given below. Please select the model of kit being used before entering the program into the kit.

LISTING OF THE PROGRAM FOR TRAFFIC LIGHT CONTROLLERMODULE (ET-TLC) TO INTERFACE **WITH 8085 KIT HAVING LED DISPLAY**

Connect the J1 of the Kit to the Module through 26 Pin FRC Cable. Ensure that the pin-1 of the J1 at the Kit end is connected to the pin-1 of the Module connector. Enter the program from address 2000. Execute the program from address 2000

ADDRESS	OPCODE	LABEL	MNEMONICS	REMARKS
2000	3E 80		MVIA, 80	Initialize All Port A, B & C as output port.
2002	D3 03	START	OUT 03	
2004	3E 70		MVI A, 70	Out data 70 at port A.
2006	D3 00		OUT 00	
2008	3E 03		MVI A,03	Out data 03 at port B
200A	D3 01		OUT 01.	
200C	CD 60 20		CALL DELAY1	Call delay
200F	3E 24		MVI A,24	Out data 24 at port A.
2011	D3 00		OUT 00	
2013	3E 03		MVI A,03	Out data 03 at port B.
2015	D3 01		OUT 01	

2017	CD 70 20		CALL DELAY2	Call delay
201A	3E 21		MVI A, 21	Out data 21 at port A.
201C	D3 00		OUT 00	
201E	3E 52		MVI A, 52	Out data 52 at port B.
2020	D3 01		OUT 01	
2022	CD 60 20		CALL DELAY1	Call Delay
2025	3E 21		MVI A, 21	Out data 21 at port A
2027	D3 00		OUT 00	
2029	3E 06		MVI A, 06	Out data 06 at port B.
202B	D3 01		OUT 01	
202D	CD 70 20		CALL DELAY 2	Call delay.
2030	3E 83		MVI A,83	Out data 83 at port A.
2032	D3 00		OUT 00	
2034	3E 03		MVI A,03	Out data 03 at port B.
2036	D3 01		OUT 01	
2038	CD 60 20		CALL DELAY1	Call delay.
203B	3E 09		MVI A, 09	Out data 09 at port A.
203D	D3 00		OUT 00	
203F	3E 03		MVI A, 03	
2041	D3 01		OUT 01	Out data 03 at port B
2043	CD 70 20		CALL DELAY-2	Call delay.
2046	3E 21		MVI A,21	. Out data 21 at port A
2048	D3 00		OUT 00	
204A	3E A1		MVI A, A1	Out data A1 at port B.
204C	D3 01		OUT 01	
204E	CD 60 20		CALL DELAY 1	Call delay.
2051	3E 21		MVI 21	Out data21 at port A.
2053	D3 00		OUT 00	
2055	3E 09		MVI A,09	Out data 09 at port B.
2057	D3 01		OUT 01	
2059	CD 70 20		CALL DELAY 2	Call delay.
205C	C3 04 20		JMP START	Repeat the process.
205F	00		NOP	

DELAY SUBROUTINE-1				
2060	06 0C	KNT1	MVI B,0C	Generate Delay multiple of 0.5 sec.
2062	11 00 00		LXI B, 0000	
2065	CD BC 03		CALL DELAY	
2068	05 78		DCR B	
206A	C2 62 20		JNZ KNT-1	
206D	C9		RET	Return to main program.

DELAY SUBROUTINE –2				
2070	06 03	KNT2	MVI B,03	Generate Delay multiple of

2072	11 00 00		LXI B,0000	0.5 sec.
2075	CD BC 03		CALL DELAY	
2078	05 78		DCR B	
207A	C2 72 20		JNZ KNT-2	
207D	C9		RET	

LISTING OF THE PROGRAM FOR TRAFFIC LIGHT CONTROLLER MODULE (ET-TLC) TO INTERFACE **WITH 8085 KITS HAVING LCD DISPLAY**

Connect the J1 of the Kit to the Module through 26 Pin FRC Cable. Ensure that the pin-1 of the J1 at the Kit end is connected to the pin-1 of the Module connector. Enter the program from address 2000. Execute the program from address 2000.

ADDRESS	OPCODE	LABEL	MNEMONICS	REMARKS
2000	3E 80		MVIA, 80	Initialize All Port A, B & C as output port.
2002	D3 03	START	OUT 03	
2004	3E 70		MVI A, 70	Out data 70 at port A.
2006	D3 00		OUT 00	
2008	3E 03		MVI A,03	Out data 03 at port B
200A	D3 01		OUT 01	
200C	CD 60 20		CALL DELAY1	Call delay
200F	3E 24		MVI A,24	Out data 24 at port A.
2011	D3 00		OUT 00	
2013	3E 03		MVI A,03	Out data 03 at port B.
2015	D3 01		OUT 01	
2017	CD 70 20		CALL DELAY2	Call delay
201A	3E 21		MVI A, 21	Out data 21 at port A.
201C	D3 00		OUT 00	
201E	3E 52		MVI A, 52	Out data 52 at port B.
2020	D3 01		OUT 01	
2022	CD 60 20		CALL DELAY1	Call Delay
2025	3E 21		MVI A, 21	Out data 21 at port A
2027	D3 00		OUT 00	
2029	3E 06		MVI A, 06	Out data 06 at port B.
202B	D3 01		OUT 01	
202D	CD 70 20		CALL DELAY 2	Call delay.
2030	3E 83		MVI A,83	Out data 83 at port A.
2032	D3 00		OUT 00	
2034	3E 03		MVI A,03	Out data 03 at port B.
2036	D3 01		OUT 01	
2038	CD 60 20		CALL DELAY1	Call delay.

203B	3E 09		MVI A, 09	
203D	D3 00		OUT 00	Out data 09 at port A.
203F	3E 03		MVI A, 03	
2041	D3 01		OUT 01	Out data 03 at port B
2043	CD 70 20		CALL DELAY-2	Call delay.
2046	3E 21		MVI A,21	. Out data 21 at port A
2048	D3 00		OUT 00	
204A	3E A1		MVI A, A1	Out data A1 at port B.
204C	D3 01		OUT 01	
204E	CD 60 20		CALL DELAY 1	Call delay.
2051	3E 21		MVI 21	Out data21 at port A.
2053	D3 00		OUT 00	
2055	3E 09		MVI A,09	Out data 09 at port B.
2057	D3 01		OUT 01	
2059	CD 70 20		CALL DELAY 2	Call delay.
205C	C3 04 20		JMP START	Repeat the process.
205F	00		NOP	

DELAY SUBROUTINE-1				
2060	06 0C	KNT1	MVI B,0C	Generate Delay multiple of 0.5 sec.
2062	11 00 00		LXI B, 0000	
2065	CD A6 03		CALL DELAY	
2068	05 78		DCR B	
206A	C2 62 20		JNZ KNT-1	
206D	C9		RET	Return to main program.

DELAY SUBROUTINE –2				
2070	06 03	KNT2	MVI B,03	Generate Delay multiple of 0.5 sec.
2072	11 00 00		LXI B,0000	
2075	CD A6 03		CALL DELAY	
2078	05 78		DCR B	
207A	C2 72 20		JNZ KNT-2	
207D	C9		RET	

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