LED MATRIX INTERFACING MODULE (ET-MAT)

The LED matrix interfacing module will demonstrate to the student as to how a bunch of LED's can be connected in a matrix to display a relevant message and how this matrix can be connected to a microprocessor based system through I/O line.

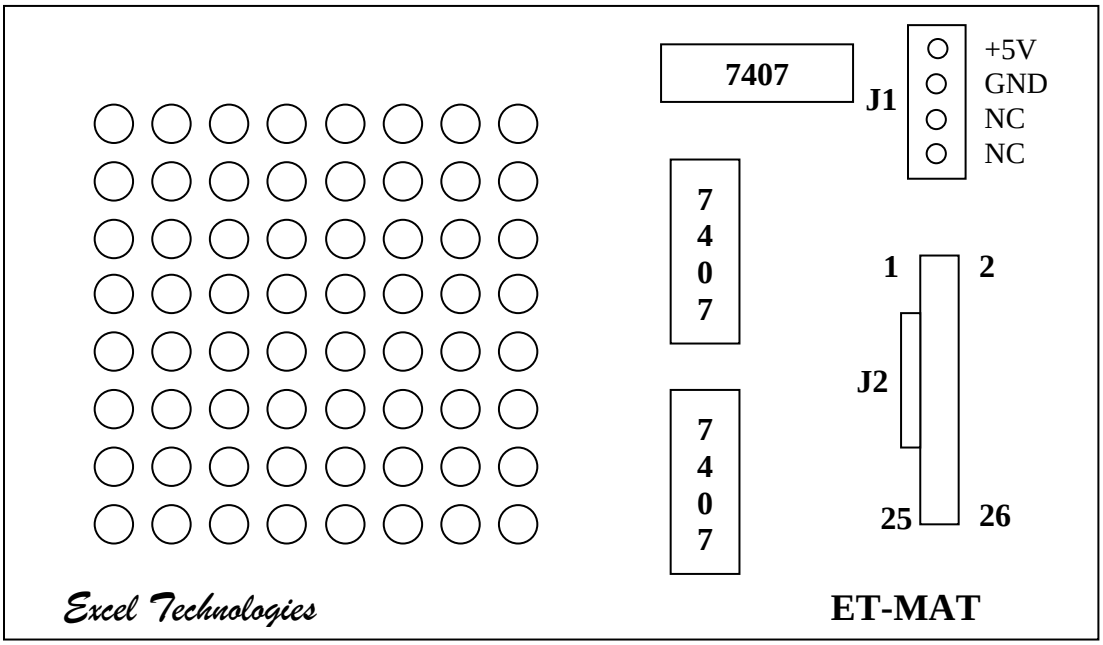
GENERAL

In most of the Microprocessor based systems, certain Input and Output devices are required for the man and machine communication. The various output devices used are displays, printer, plotters etc. LED Matrix displays are used quite oftenly to display the information processed by Microprocessor. In today's era a lot of information in the Data form or in graphics is displayed on the matrix type of displays.

MULTIPLEXING TECHNIQUE

Multiplexing can be done in two ways. Software multiplexing and hardware multiplexing. A multiplexing technique brings the advantage of hardware reduction.

In this module 64 LED's are connected in a matrix of 8*8 i.e. 8 rows and 8 columns. The exact matrix is shown in the circuit diagram given at the end of the manual. An LED is connected between each row and each column. The Anodes of the LED are connected to the Row and the cathodes are connected to the column.



Layout of LED MATRIX Interfacing Module

The port A of the 8255-1 drives the rows when connected to the Kit, i.e. PA0 to PA7

The Port B of the 8255-1 drives the columns when connected to the Kit i.e. PB0 to PB7.

An LED will glow when the row corresponding to it has Logic 1 and the column corresponding to it has Logic 0. So for displaying any message, we have to out logic 1 and Logic 0 on the rows and column depending upon the message to be displayed. The switching is done so fast that to a normal eye it appears to be a continuo message.

EXPERIMENT EXERCISES

The student can perform following experiments using this module:

1. Display a message 1 2 and 3 one by one and then stop the program

2. Display a message " GOOD" in the moving form. Keep the program in a loop.

3. Display a message "A", "B" and "C " one by one. Keep the program in a loop.

LED MATRIX MODULE EXERCISE-1

The third of the three exercises listed above is solved here.

Set up for the Experiment

1. Connect the LED Matrix interfacing Module to the 8255-1 port connector of the kit Using 26 Pin flat cable. The Pin No. 1 of the connectors on the Module as well as the kit is marked. Please ensure that the Pin. No. 1 of the kit connector is connected to Pin No.1 of the Module.
2. Enter the program given below from the memory location mentioned in the program.
3. Executed the program form the starting address. The matrix will display "A", "B" and "C" one by one.

Description of the Program

The first step to display any message is to find the code to be outputted on the rows. So we make the codes for displaying "A", "B" and "C" one by one. These codes are given at the end of the program.

The codes for a character are outputted on the port A one by one with the rotating zeros on the columns, i.e., on Port B.

Eight codes will be required to be outputted on the Port A one by one for every character to be displayed with the rotating zeros on Port B.
Once a character has been displayed, we again repeat the process with the next code.

ADDRESS	OP-CODE	MNEMONICS	COMMENT
6000	75 81 68	MOV SP,#68	Initialize Stack Pointer
6003	74 80	MOVA,#80	Initialize all ports as outputs
6005	90 28 0B	MOV DPTR,#280B	
6008	F0	MOVX@DPTR,A	
6009	75 40 80	MOV 40,#80	Display the character “A”
600C	90 60 60	MOV DPTR,#6060	
600F	12 60 30	LCALL 6030	
6012	D5 40 F7	DJNZ 40, F7	
6015	75 40 80	MOV 40,#80	Display the character “B”
6018	90 60 68	MOV DPTR,#6068	
601B	12 60 30	LCALL 6030	
601E	D5 40 F7	DJNZ 40, F7	
6021	75 40 80	MOV 40,#80	Display the character “C”
6024	90 60 70	MOV DPTR,#6070	
6027	12 60 30	LCALL 6030	
602A	D5 40 F7	DJNZ 40, F7	
602D	02 60 09	LJMP 6009	Loop Back to repeat the sequence
6030	75 41 FE	MOV 41,#FE	Bit pattern to drive first column
6033	75 42 08	MOV 42,#08	Counter for 8 columns
6036	E0	MOVA,@DPTR	Read code
6037	C0 83	PUSH 83	Save Data pointer
6039	C0 82	PUSH 82	
603B	90 28 08	MOV DPTR,#2808	Send code for display
603E	F0	MOV@DPTR,A	
603F	E5 41	MOV A, 41	Enable coloumn to display code
6041	90 28 09	MOV DPTR,#2809	
6044	F0	MOVX@DPTR,A	
6045	23	RLA	Shift Bit pattern to left
6046	F5 41	MOV 41,A	
6048	12 60 54	LCALL 6054	A small delay
604B	D0 82	POP 82	Restore Data pointer
604D	D0 83	POP 83	
604F	A3	INC DPTR	Point ot next code
6050	D5 42 E3	DJNZ 42,E3	Display the entire character
6053	22	RET	
6054	75 31 F0	MOV 31,#F0	A small delay
6057	D5 31 FD	DJNZ 31,FD	
605A	22	RET	
6060	F8 14 12 11 11 12 14 F8		
6068	00 81 FF 89 89 89 76 00		
6070	00 3C 42 81 81 81 42 00		