

User's Manual

FOR

ET – MAT
LED MATRIX INTERFACE MODULE

Excel Technologies

C-92, Sector - 63, Noida, U.P. 201309, India

Ph : 0120 - 4318572, 08860106750

www.exceltechnologiesonline.in

Email : exceltechnologies.piplani@gmail.com

LED MATRIX INTERFACE MODULE

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.

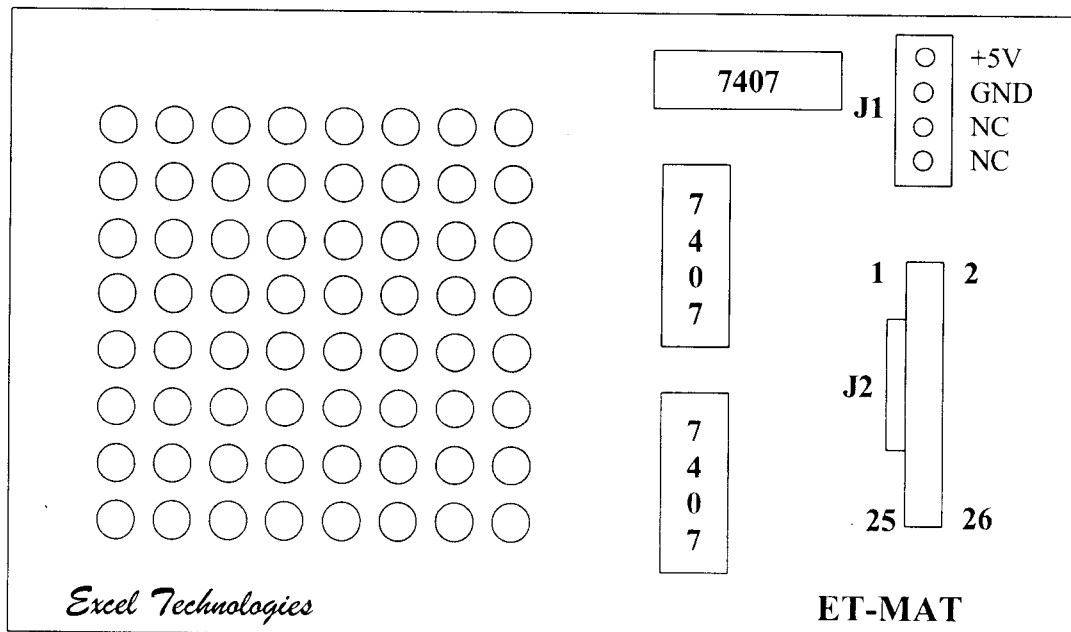
GENERAL

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.



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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.

This is shown in the diagram given at the end of the manual.

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 output 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 continuous 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 from 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.

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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.

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 OF 8X8 LED MATRIX MODULE (ET-MAT) TO INTERFACE WITH 8085 KIT (BOTH WITH LED AND LCD DISPLAY)

Address	OP-CODE	LABEL	MNEMONICS	REMARKS
2000	3E 80	Start	MVI A, 80	Define all ports of 8255-1 as output ports
2002	D3 03		OUT 03	
2004	16 03	LOOP4	MVI D, 03	Load the counter value for the number of characters to be displayed
2006	21 50 20		LXI H, 2050	Point to the first data
2009	E5	LOOP3	PUSH H	Save the data pointer
200A	1E FF		MVI E, FF	Load the counter for deciding the delay for which a character will be displayed
200C	E1	LOOP2	POP H	Store the data counter for 8 values to be outputted for each character
200D	E5		PUSH H	
200E	0E 08		MVI C, 08	
2010	06 FE		MVI B, FE	Out data for the Rows
2012	7E	LOOP1	MOV A, M	
2013	D3 00		OUT 00	
2015	2C		INR L	Out rotating zero on columns
2016	78		MOV A, B	
2017	D3 01		OUT 01	
2019	07		RLC	Give Delay
201A	47		MOV B, A	
201B	3E 40		MVI A, 40	

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201D	3D	LOOP5	DCR A	
201E	C2 1D 20		JNZ LOOP5	
2021	0D		DCR C	
2022	C2 12 20		JNZ LOOP1	
2025	1D		DCR E	
2026	C2 0C 20		JNZ LOOP2	
2029	E1		POP H	
202A	7D		MOV A, L	
202B	C6 08		ADI 08	
202D	6F		MOV L, A	
202E	15		DCR D	
202F	C2 09 20		JNZ LOOP3	Go To Display Next Character
2032	C3 04 20		JMP LOOP4	Loop Back

Enter the following data at the address location 2050

2050	F8 14 12 11 11 12 14 F8	Data to display "A"
2058	00 81 FF 89 89 89 76 00	Data to display "B"
2060	18 24 42 81 81 81 42 00	Data to display "C"

Note: On executing the program a character "A", "B" and "C" will be displayed one by one (in loop) on the LED Matrix of the interfacing module.