INTRODUCTION

The "STS 8086LCD" trainer is a MICROPROCESSOR trainer, which can work on 8086 CPU.This kit can be used as a developer kit for 8086 based programs and interfaces. This trainer kit contain strong monitoring program which is user friendly and can be easily handled by a beginner in the field of microprocessors. STS 8086LCD trainer a trainer mainly used for academic studies and so fulfills most of the lab requirements. Key features of STS8086LCD trainer are

- User friendly monitoring program
- Built in Inline assembler for entering programs as mnemonics
- Disassembler to examine the programs
- Single stepping and Break point feature to debug program
- PS/2 Keyboard interface
- Contain most of the interface modules such as 8255, 8253, 8251 etc.
- Simple menu operated commands, easy to use
- User friendly text editor to enter text for assembler (Insert, Delete, Backspace, Home, End □! and '! keys to edit the text)
- Proper error messages to identify assembling errors ("Mnemonic Error", "Operand Mismatch", "Few many Parameters", "More than expected" etc.)
- Commands to enable, disable and edit break points

- Remembers starting and ending addresses of move and fil commands when repeat the command
- View/Modify command to edit contents of RAM location
- Fill command to fill RAM locations with a particular data
- Move command Move a block of data from a location to another location.

SYSTEM SPECIFICATIONS

CPU	:	8086/88 (16bit processor)
Clock Frequency	:	6.144 MHz
KEYBOARD	:	PS/2, IBM Compatible
Display	:	16 * 2 LCD Module
RAM	:	64 KB (62256 *2)
EPROM	:	64 KB (27256 *2)
IO Lines	:	48 lines (8255 *2)
Timer/Counter	:	8253
Interrupt Controller	:	8259
Interface	:	UART (8251)
BUS	:	Address, data and control lines (TTL compatible)
Power	:	5V 800mA
Operating Temp	:	0- 50 °C

MEMORY MAPPING

Program memory

ROM: 8000:0000 - 8000:FFFF H

RAM : 0000:0000 H – 0000:FFFF H

NOTE : User can enter their program from location 0400H to FFFFH

Peripherals

IO MAPPING

8255-1 : PORTA : **40 H**, PORTB: 42H, PORTC: **44H** CONTROL WORD : **46H**

8255-2 : PORTA : **60 H**, PORTB: 62H, PORTC: **64H** CONTROL WORD : **66H**

8251 : DATA: A0H, CONTROL WORD A2H

8253 : TIMER0:**C0H** TIMER1:C2H
TIMER2 : **C4H** CONTROL WORD : **C6H**

8259 : DATA WORD: **E0H** CONTROL WORD: E2H

MENU COMMANDS

Command: A, B, D, E , F , G , M, R , S , T

A :- Assemble (In line assembler Generates Code corresponding to 8086 code set)

B :- Block Move

D :- Disassemble

F :- Fill data

G :- Go and Execute

M :- Modify/View Memory

E :- Edit/View Memory (8 bytes same time)

R :- Register view/Edit (Values of Last Break of Single Step

S :- Single Step

T :- View/ Edit Break point (Press enter to enable break point and Backspace for Disable break point)

Note :-

'Enter' key to continue/accept the data for each command

MENU 'A': ASSEMBLE

User can enter the assembly language directly in to the kit, assembler will assemble the 8086 instruction in machine code.

When assembler option is chosen by pressing letter 'A', on IBM key board, display will show like

```
ASSEMBLER
ENTER START ADDR:____
```

Now, the user can enter the starting address from where the assembling is required

E.g.:400

After entering desired starting address press 'ENTER' key on the key board. The system will show a text address screen. Enter a valid assembly instruction in this window. After entry press 'ENTER' again.

Features of Editor are:

Home key for making cursor home

□! key to move cursor back.

Note: Break Point will effect when '**GO**' command is selected from Main menu.

Program will break at the address which break point is set. Then user can continue just like single step.

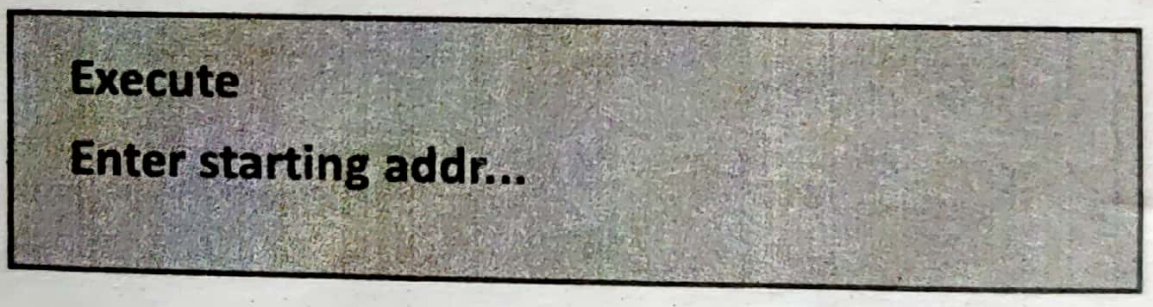
If break is occurred in program, it will show '**Break: 0408**' and press '**ENTER**' to view the current code of break point and press '**ENTER**' again to continue running the program.

G: GO/EXECUTE

This command is used to perform execution of program

Select '**G**' for execution

The display will show



Now enter the starting address of the program and press '**ENTER**' again.

The display will show:

MENU 'M' MODIFY/VIEW MEMORY

In this mode, user can view the memory contents directly. Select this option by pressing '**M**' key ,then the screen will ask for starting address ;the display will how

Modify Memory
Enter Starting Addr:___

Then Enter Starting Address and hit '**ENTER**' then the screen will be:

Modify Memory
400:00

Enter the new HEX value using 0-9 keys(of the cash register keys only of key board) for number and A-F keys for data keys.

User need to enter only lower digit of the data for one digit/00

For 01 entry one needs to enter only '1'.and not '01'.

Press **ENTER** to increment/accept the data and '**Back Space**' to decrement /accept the data.

User can view the contents by pressing '**ENTER**' up memory address and '**Back space**' for down memory address.

Press '**Esc**' to exit from this mode