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Expt. No. 1 Page No. 1 Dated 1/2/24

Experiment - 1

Introduction to MP8085

- The Intel 8085 is an 8-bit microprocessor produced by Intel and introduced in march 1976
- The 8085 MP is an 8-bit processor available as a 40 pin IC package & uses +5V for power.
- It can run at a maximum frequency of 3MHz
- It's data bus width is 8 bit and address bus with is 16 bit.
- It can address maximum 64 KB of memory

∴

→ MP8085 Trainer Kit

- Based on Intel 8085A processor
- operates at 3.072 MHz
- operates on single 5V power supply
- peripheral controllers 8251, 8279, 8253, 8255
- standalone user interface is 7-segment display & on board keypad.
- Built-in oneline Assembler / Desassembler in serial Mode.
- provision to work with interfaces.

Teacher's Signature : _____

Introduction to 8085 Microprocessor kit

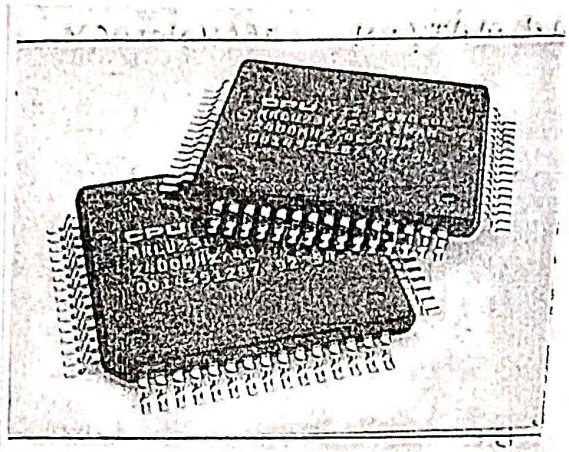

fig - 1.1

MP 8085

Expt. No. 01 Page No. 2 Dated 2/2/24

- onboard battery backup for RAM.
- Built in Text editor, Assembler and Disassembler facilities in serial mode.
- It has four on board ribbon cable connectors for easy expansion and two user defined function keys.

Specifications:

(1) CPU: 8085 operated at 3.072MHz

(2) Memory: There 28 pin JEDEC sockets offers 64K Bytes of memory as in the following configuration.

(3) ROM: 16K Bytes of monitor program in 27128 EP ROM.

(4) ROM/RAM: 16K Bytes user expansion using any EPROM/SRAM.

(5) RAM: 32K Bytes supplied using 62256 CMOS static RAM with battery backup.

Peripherals: (1) 8255 - (Two Nos) one 8255 is supplied to give 24 programmable I/O lines. User can have 48 I/O lines by populating an additional 8255 in expansion socket.

Teacher's Signature :

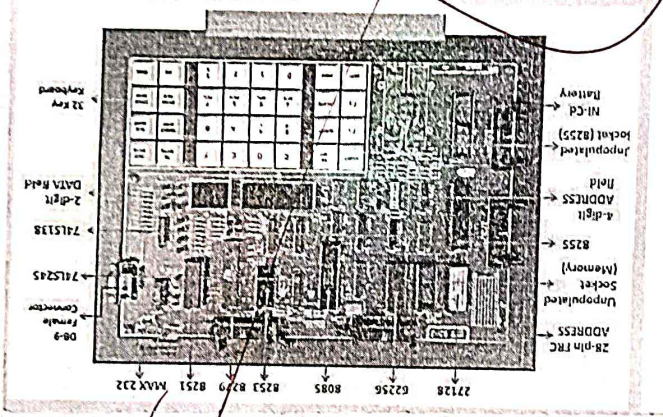

Fig P-2 - UP Kit 8085

(2) 8253 – 3 programmable interval times – Timer 0 is used for implementing single step fecility. Timer 1 is used for generating band clock and Timer 2 is availeble to the user.

(3) 8251 – for serial communication supports all standard bauds from 110 to 19200.

(4) 8279 : To control 32 keys keyboard and 6-digit, half – inch size, screen segment LED display.

- Bus expansion : fully de-multiplexed and buffered TTL compatible bus singal bought out through two 26 pin ribbon cable connect for expansion.

- Interface signales :-

→ parallel I/O : 48 TTL compatible lines (2×8255) brought out through two 26 Pin ribbon cable connector.

→ Serial I/O : RS-232-C serial interface signals through onboard 9 pin D type Female connector.

Teacher's Signature :

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- Interrupts : All interrupts except TRAP are available to user. If single step function is not required, TRAP can also be used by the user.

Power supply Requirements : +5V DC @ 900mA approx

Dimensions :
L x B x H : 365 x 275 x 55 mm Approx.
weight : 1300 gms Approx.

15/2/24

Teacher's Signature :

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Experiment No - 2

Write a program to perform Addition operation for 2 - 8 bit No. sum is 8-bit.

Apparatus : Battery, 8085 kit, power supply 5V

Instructions used :

1. The instruction MVI A, 8 bit data transfer the 8-bit number to the accumulator.
2. The instruction MVI B, 8 bit data transfers the 8 bit number to the register.
3. The instruction ADD B adds the number in B to number in A.
4. This instruction i.e. STA 8050 it stores the result in the memory location.
5. HLT instruction needs the program.

Step to perform addition operation for two 8 bit Numbers.

i. Reset the microprocessor kit.

Teacher's Signature : _____

write a program to perform addition operation for two 8 bit numbers, sum is 8-bit.

Memory address	MNEMONICS	MACHINE CODE	COMMENTS
8000	MVI A, 30H	3E	Loads the number in accumulator
8001	A ← 30	30	Assign value 30 in A
8002	MVI B, 20H	06	Loads the number in register B
8003	8 ← 20	20	Assign value 20 in B.
8004	ADD B	80	Adds the contents stored in B to A
8005	STA, 8503	32	Stores the result at 8503 H
8006	03 ← L	03	03 specified register pair L
8007	B5 ← 4	B5	85 specified register Pair H
8008	HLT	76	STOP

Expt. No. 2 Page No. 6 Dated

(2) press Ex Mem.

(3) put initial address of program to start and press Next.

(4) program :-

Line	instruction	opCode
Line 1	MVI A 01	3E
Line 2	MVI B 02	06
Line 3	ADD	80
Line 4	STA	32
Line 5	HLT	76

(5) Execute program : Press RESET, ----- and put initial address of program and press EXEC.

(6) If E comes then your program has been successfully completed, if ERR comes then there is an error.

(7) RESET the system.

RESET :-

Press RESET, then Ex Mem and put result address and press NEXT.

RESULT :

IP1 8001 - 20H

IP2 8003 - 30H

O/P 8030 - output - 50H

15/3/24

Teacher's Signature :

write a program to perform subtraction 8 bit no, 8 is 8 bit no

Memory Address	Mnemonic code	Machine Code	comments
8000	MVI A, 30H	3E	Loads the no to Acc
8001	A ← 30	30	Assign value 3 to A
8002	MVI B, 20H	06	Loads the no in register B
8003	B ← 20	20	Assign value 20 to B
8004	SUB B	90	subtraction content start in B from acc content
8005	03 ← L	03	03 is at register pair L
8006	05 ← H	85	85 is stores at pair H
8007	85 ← H	85	85 is stores at pair H
8008	HLT	36	STOP

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Experiment No-3

Aim: Write a program to perform subtraction of 8 bit nos is 8 bit number.

Apparatus: Battery, 8085 kit, power supply 220V

Instruction used:

1. The instruction MVIA, 8 bit data transfer the 8bit no to the accumulator.
2. The instruction MVIB, 8 bit data transfer the 8 bit no to the register.
3. The instruction SUB B subtracts the no in B from no in A.
4. This instruction ie STA 8503H stores the result in the mem location.
5. HLT instruction ends the program.

Steps to perform subtraction of 2 - 8bit no's

1. Press next
2. Press the mp kit
3. Press the 'go'
4. Put initial address of program where we started to put data.
5. program.

Lines	instruction	opcode
Line1	MVIA, 30H	3E
Line2	MVIB, 20H	06

Teacher's Signature : _____

Expt. No. _____ Page No. _____ Dated _____

Line 3	SUBB	90
Line 4	STA 9000	32
Line 5	HLT	76

(vi) Executes the program

(vii) If comes then your program has been successfully completed if ERR comes then is error.

(viii) Reset the system.

Result 8001 – 30H
8003 – 20H
8503 – o/p – 50H

Teacher's Signature : 15/3/84

Write a program to perform add operation for two 8 bit no's where sum is 16 bit

Memory Address	Mnemonic	Machine code	Comments
8000 8001	MVI A 90H	3E 90	loads the no to the Accumulator
8002 8003	MVI B 90H	06 90	loads the no to register
8004 8005	MVI C 00H	0E 00	Load the carry generated to register
8006	ADD B	80	Add the no in register B to reg A.
8007 8008 8009	INC JMP AHEAD	D2 0B 80	Jump to next step if no carry is generated
800A	INR C	0C	Increment the carry
800B 800C 800D	AHEAD STA	32 03 85	stores the result at 8503H
800E	MOV Ac	79	Move carry to Ac load the result in Ac.
800F 8010 8011	STA	32 04 85	stores the carry generated in 8504 H.
8012	HLT	76	STOP.

Expt. No. _____ Page No. _____ Dated _____

Experiment 4

Aim: write a program to perform addition operation for the 2 8bit number sum is 16 bits.

Apparatus :- Battery, 8085 kit, power supply 230V

Instruction used:

1. The instruction MVIA, 8bit data transfer the 8 bit no to ACC.
2. The instruction MVIB, 8bit data transfer the 8 bit no to Acc.
3. The instruction affign value of add of A and B to B
4. The instruction i.e. STA 8503H stores result in mem loc;
5. HLT instruction end the program.

Step to perform add operation for 2, 8bit numbers with carry

1. press reset
2. Press the MP
3. press GO

Teacher's Signature : _____

Expt. No. _____ Page No. _____ Dated _____

④ put the initial address of program when we started the program.

⑤ Execute the program.

⑥ If E comes then your program has been successfully completed if ERR comes then there is an error.

⑦ Reset program / the system.

⑧ put the address of memory where you want to store the result.

Result → 8001 → 90 no 1
8003 → 90 no 2
8005 → 00 carry
8003 → 20H

Teacher's Signature : _____ 15/3/24

Experiment no :- 5

Aim :- Find 1's Compliment of 8 bit number

Apparatus : Battery, 8085 µp, power supply, 200V

Memory address	Mnemonics	machine code	comments
800 0	MVI, A	3E	Move the data to the AC
8001	18H	18	load the data to the Acc
8002	CMA	2F	complement of A
8003	STA	32	store the result
8004		02	lower bit address of register
8005		85	Heigher bit address of register
800 6	HLT	76	Stop the program execution

Result : Input 8001 - 18 0001 1000

output 8502 - E7 1 1 1 0 0 1 1 1

E 7

Expt. No. _____ Page No. _____ Dated _____

Experiment no : 5

Instruction : The instruction MVI A, 8 bit data transfer the 8 bit number to the Accumulator

→ The instruction CMP, complement the value of A.

→ The instruction STA 8500 stores the result in the memory location.

→ HLT instruction is used to end the program.

procedure : Reset the microprocessor
press examine memory key.
put initial address of program to start and program :

Instruction	mnemonic codes
MVI A, 18H	3E
CMP	2F
STA	32
HLT	76

Execute the program
Reset
Press Go and put initial address of program press execute key.
if E displays up then the program is successfully executed.
If ERR displays then there must be an error.
Reset the system again

Teacher's Signature : _____

Expt. No. ______ Page No. ______ Dated ______

Result : Input 1 : 8001 → 18 0001 1000

output 8502 → E7

1110 0111

↓ ↓

E 7

Teacher's Signature : ______

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Experiment ÷ 6

Aim : Find 2's complement of 8 bit number

Apparatus : Battery, 8085 µP, power supply, 220 V

Memory Address	Mnemonic	machine code	Comments
8000	MVI, A	3E	move the data to AC
8001	18H	18	load the value to AC
8002	CMA	2f	complement the A
8003	STA	32	Store the result of 1's complement at 8502
8004	02H	02	lower bit address
8005	85-H	85	higher bit address
8006	ADI	C6	Add immediately
8007	01H	01	ADD 1 to the value of 1's Complement.
8008	STA	32	Store the result of 2's Complement at 8503
8009	03-H	03	lower bit address
800A	85-H	85	Higher bit address
800B	HLT	76	To stop the program

Result : input → 8001 18H 0001 1000
1's complement → E7 1C 1110 0111
2's complement → E8 1110 1000
E 8

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Experiment : 6

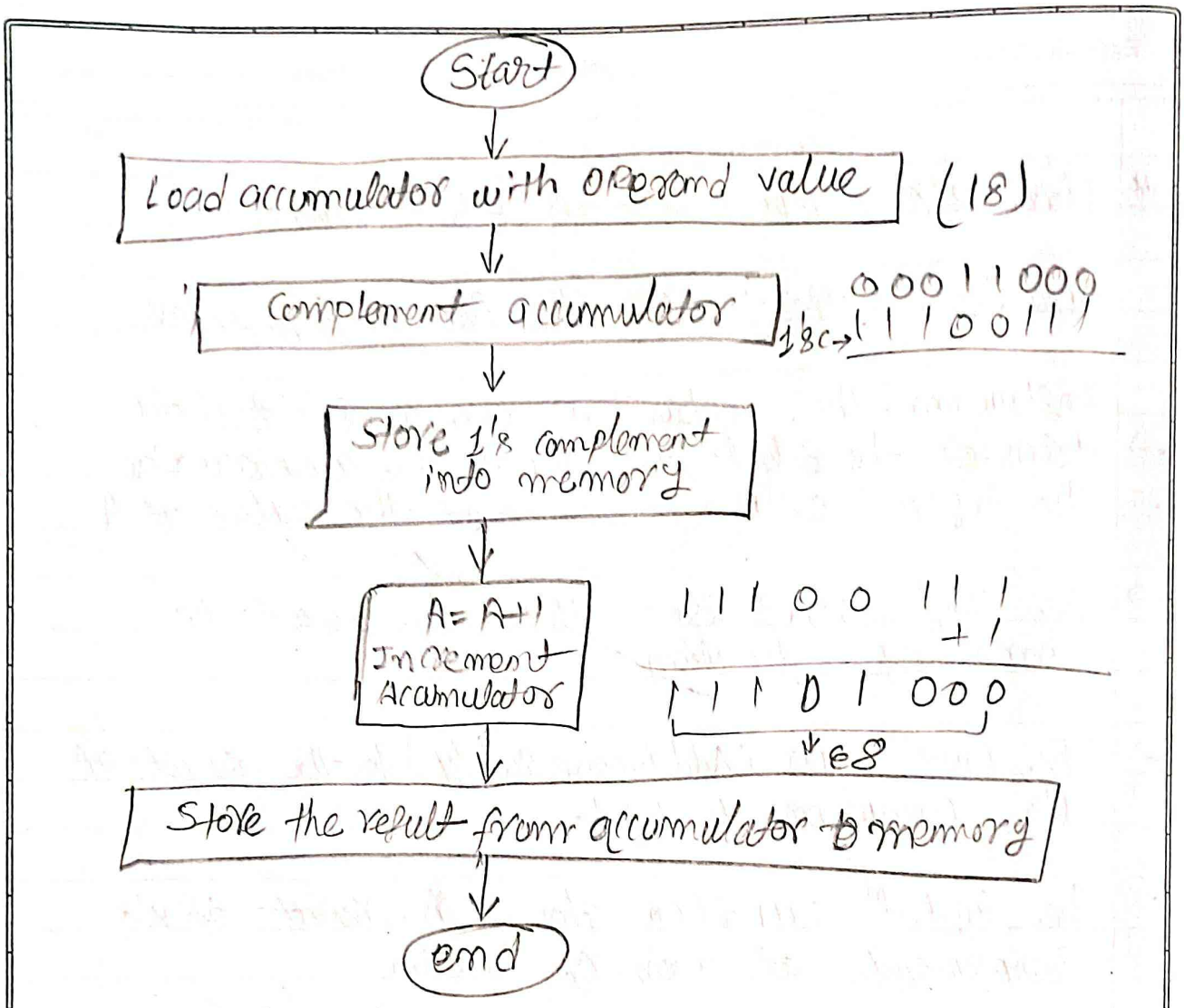
* find 2's Complement of 8 bit number

Apparatus : Battery, 8085 Up, Power supply, 220V

Instruction : The instruction MVIA, 8 bit data
→ transfer the 8 bit number to the accumulator
→ The instr.ⁿ CMP → Complement the value of A
→ The Instⁿ STA → 8500 stores the result in memory location
→ The instⁿ ADI (Add immediately) to the result of 1's Complement by 1.
→ The instrⁿ STA 8600 stores the result of 2's Complement at memory location
→ HLT is used to end the program execution
procedure :
→ Press reset key
→ Press examine memory key.
→ Next, put the initial address of program
→ Next, instruction will go. like this :

instruction	Mnemonic code
~~CMP~~ MVI	3E

Teacher's Signature : _____



Impl → at loc → 8001 → 18

1's comple^{m} result at loc^{n} → 8502 → 11100111

2's com^{m} result at loc^{n} → 8503 → 11101000 → E8

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STA	32
ADI	C6
STA	32
HLT	76

→ Press Reset key
→ then go
→ put initial address of program and press execute key if E occurs then the program is Correct and if ERR occurs that mean there is an error in program
→ Reset

Result : Input :- 8001 − 18H → 0001 1000

1's Complement at 8502 is 8E7 ⟶ 1110 0111

+1

2's Complement at 8503 is E8

1110 1000

6E 8

output → E8

Teacher's Signature : _____ 28/3/24

Experiment – 7

Aim: To perform addition of 16-bit numbers.

Mnemonics	Memory address	Machine code	Description
LHLD	8000	2A	load HL pair Direct
	8001	50	Address to store first 16 bit
	8002	80	Number
XCHG	8003	EB	exchange H-L pair with DE
LHLD	8004	2A	load HL pair Direct
	8005	52	Memory Address to store end
	8006	80	16 bit No.
MVI, C	8007	0E	for carry generate
	8008	00	initialise reg C with 0
DAD, D	8009	19	Double-Addition
INC	800A	D2..	if no carry, jump ahead
	800B	0E	LSB
	800C	80	MSB
INRC	800D	0C	increment carry by 1
SHLD	800E	22	store H-L pair Direct
	800F	54	Memory location to store the
	8010	80	result
MOV A, C	8011	79	Move the carry to Accumulator
STA	8012	32	store the content of Accumulator
	8013	56	Memory Address to store
	8014	80	carry of Accumulator
HLT	8015	76	End of the program.

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To Perform addition of 16-bit number

Apparatus: Battery, 8085 Up, power supply, 220 V

Instruction: The instruction LHLD, load the HL pair Direct
→ The instruction XCHG, change the H-L pair with DE
→ The Instruction DAD Double Addition used
→ The Instruction MVI, C load the carry generate to the register C.

→ The inst[n] STA stores the result in memory location
→ HLT inst[n] ~~END~~ End the program.

~~Set~~ steps to perform addition of 16 bit no.
→ Press Reset
→ Examine memory
→ Starting address
→ ~~Prem~~ program
→ Reset
→ GTO
→ Starting address
→ execute
→ Examine memory
if C comes then ~~Program~~ may be successfully Completed
if error Comes then program is wrong
Result location
Next

Teacher's Signature : _____

Input 1, at location 8050 - A645

→ 1010 0110 0100 0101

Input 2, at location 8052 - 9B23

→ 1001 1011 0010 0011

Addition →

1010	0110	0100	0101
1001	1011	0010	0011
0100	0001	0110	1000
4	1	6	8

1 ← carry generate

Sum at location → 8054 → 4168

Carry, at location → 8056 → 01

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Result :-

Input I → A6[redacted] at 8050 (
" 45 at 8051
Input II → 9B[redacted] at location 8052 (
" 23 at location 8053
Sum at 8054 → 68 (268)
Sum at 8055 → 41
Carry at 8056 → 01

Teacher's Signature : _____ 19/4/24

Aim : To perform & learn 1's complement of a 16 bit.

Memory address	Mnemonics	Opcode	comments
8000	LHLD, 8050H	2A	Load HL pair directly at memory location 8050H
8001	———		
8002	———		
8003	MOV A, L	7D	Loads contents of L to A
8004	CMA	2f	complement the content of ACC
8005	MOV L, A	6F	Loads the contents A to L
8006	MOV A, H	7c	Loads the content of H to A
8007	CMA	2f	complement the content of Acc
8008	MOV H, A	67	Loads the contents of A to H
8009	SHLD 8052H	22	Stores the 1's complement
800A	———	52	at Memory Location
800B	———	80	8052H
800C	HLT	76	Stops the program exe

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Experiment: 08

1's complement of 16 bit No.

Aim: To perform & learn 1's complement of a 16 bit number.

Apparatus: Battery soft kit, Power supply 220V

Instruction used:

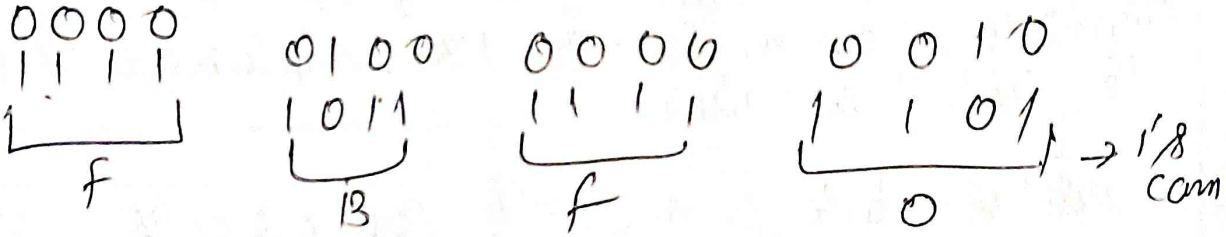
1. The instruction LHLD load the HL pair using direct Addressing from memory location.
2. The instruction 'MOV A, R' moved the data of specified reg to Acc.
3. The instruction 'MOV reg A' move the data of Acc to specified Reg.
4. The instruction 'SHLD' stores the contents of HL register pair at specified memory location.
5. The instruction HLT stops the program
6. The instruction 'CMA' Complements the contents of Acc.

* Steps to perform 1's complement of a 16 bit no
  1. Press Reset
  2. Press Exam Mem
  3. Enter the start address where you want

Teacher's Signature: _____

→ Calculation

04 02H



Result → Hexadecimal

Hexadecimal		Decimal	
02H	—	$(0000\ 0010)_2$	I/p
04H	—	$(0000\ 0100)_2$	
F0H	—	$(1111\ 1101)_2$	o/p
FBH	—	$(1111\ 1011)_2$	

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then write the program & press Next

4. Write the program in opcode form.
5. Reset the 8085 kit
6. Press GO
7. Enter the start address of the program
8. Press Execute
9. Reset the kit
10. Press Exam mem Enter the address where result is stored.
11. Press Next to see the result

Result: 8050H - 02H] I/P
8051H - 04H]
8052H - FDH] 2's complement
8053H - FDH]

Teacher's Signature : _____

Experiment - 9

Aim :- To Perform & Learn 2's Complement of an 16 bit number.

Memory Address	Mnemonic code	Opcode	Comments
8000	LHLD 8050H	2A	Loads HL pair direct
8001	———	50	at memory location
8002	———	80	8050H
8003	MOV A,L	7D	Loads contents of L to A.
8004	CMA	2f	complement the ACC
8005	MOV L,A	6E	Loads the contents of A to L
8006	MOV A,H	7C	Loads the contents of H to A
8007	CMA	2f	complements the ACC
8008	MOV H,A	67	Loads the contents of A to H
8009	SHLD 8052H	22	stores the 1's complement
800A	———	52	at location 8052 H
800B	———	80	
800C	INX H	23	Increment HL by 1
800D	SHLD 8054H	22	Stores the 2's complement
800E	———	54	result mem location
800f	———	80	8054H
8010	HLT	76	Stops the Programme

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Experiment :- 09

2's Complement of 16 bit number

Aim: To perform & learn 2's Complement of an 16 bit numbers.

Apparatus: Battery, 8085 Kit, power supply 220V

Instⁿ used:

1. The instruction 'LHLD' loads the HL pair using direct addressing from memory loc.
2. The instruction 'MOVA' moves the data of specified to Acc.
3. The instruction ~~MOVA~~, 'CMA' Complements the contents of Acc.
4. The instⁿ 'Mov Reg A' moves the data of Acc to specified register.
5. The instruction SHLD stores the contents of HL reg pair at specified memory address.
6. The instruction INXH : Increments the contents of HL Register pair by 1.

Teacher's Signature : _____

Calculations.

04

00000100

1111 1011

F B

02.

00000010

1101

F D → 1's Com

1111 1011 1111 · 1101

+1

1111 1011 1111 1110 → 2's Com

F B F E

Result:

Hexadecimal	Decimal	
02H	$(0000\ 0010)_2$	
04H	$(0000\ 0100)_2$	1's C
FBH	$(1111\ 1011)_2$	
FDH	$(1111\ 1101)_2$	
FBH	$(1111\ 1011)_2$	2's C
FE	$(1111\ 1110)_2$	

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7. The instruction HLT stops the program

Steps to perform 2's Complement of a 16 bit no.

1. Press Reset
2. Press exam memory
3. Store address
4. write the program in opcode form
5. Reset the 8085 kit
6. Press GO
7. Enter the start address of the program
8. Press execute
9. Reset the kit
10. Press Exam Memory enter the address where result is stored.
11. Press Next to see the result.

Result:

8050H	02H	I/P
8051H	04H	
8052H	FBH	1's complement
8053H	FDH	
8054H	FEH	2's complement
8055H	FBH	

Teacher's Signature : _____