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SIMULATOR PROGRAM FOR THE MCS-80 8080 CPU

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1.0 INTRODUCTION

The Intel 8080 CPU simulator program is now available on the LLL Octopus CDC-7600 computer system. The program (MCS80SIM) provides a software simulation together with simulator execution commands to aid in program development for the MCS-80.

Besides accepting 8080 machine code the simulator allows: manipulation of the simulated memory and 8080 registers, breakpoint insertion, program tracing, symbolic and numeric dumps, single stepping, and other operations during the simulation.

This report details how the simulator (MCS80SIM) is accessed and how it is run on the Octopus network. The Intel manual "8080 Simulator Software Package" describes the simulator, the simulator commands, and error messages. (The program is called MCS80SIM at LLL rather than INTERP/8 as in the Intel Manual.)

2.0 READING THE MCS80SIM PROGRAM FROM PHOTOSTORE

MCS80SIM is stored in the elephant photostore under the "take" directory: .558850:NEWINTEL and can be read from the photostore as follows:

Note: In the following examples, lines prefixed with a right arrow (→) are those typed by the user. All others are typed by the program.

→ELF/.5.1

→.RDS.558850:NEWINTEL:MCS80SIM

→.END

RDS

ALL DONE

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3.0 INPUT TO MCS80SIM

When the simulator program is executed, the program types a request for information:

TYPE INPUT FILE, OUTPUT FILE, CODE FILE

The proper responses are:

INPUT FILE: TTY or Disk File where the code file in simulator execution command format is stored. If TTY is typed the program expects commands to be input from the teletype.

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OUTPUT FILE: TTY or Disk File name where all simulator output is to go. The disk file will be created by the program. If TTY is typed output will be to the teletype.

CODE FILE: Disk File name which contains 8080 machine code in "BNPF" format produced by the 8080 assembler and the symbol table file also in a form produced by the MCS8080 assembler.

All Disk File names must be seven or fewer characters in length.

The load command of the simulator causes the symbol tables and code to be loaded into the simulated MCS80 memory. The proper unit numbers when running MCS80SIM are:

LOAD 1. If input is from teletype.

LOAD 5. If running from disk file in simulator execution command format.

LOAD 6. If running from disk file in code (BNPF) format.

LOAD 6. If running from disk code.

4.0 EXAMPLE SIMULATOR RUNS

To better show how the simulator is used at LLL two figures have been prepared. Figure 1 illustrates; #1. The operations needed to transfer the MCS-80 assembler and simulator to Disk File. #2. The creating of a sample assembly language 8080 program (using Trix). #3. The assembly of a program.

Figure 2 shows the use of the simulator with input and output on a teletype.

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ELF / .5 .1
• RDS .558850:NEWINTEL:MCS80SIM
• RDS .558850:NEWINTEL:MCS80
• RDS
RDS
• END

ALL DONE

TRIX AC / .5 .1
• C(TEST2)
• BL1
& LXI SP, 1000
& SAMPLE PROGRAM FOR 8080 PROCESSOR
&START: MVI L, 200
& MVI H, 0
&LOOP: MOV A,M
& CPI 46
& JZ FOUND
& CALL INCR
& MOV A,L
& CPI 220
& JNZ LOOP
&FOUND: HLT
&INCR: INR L
& RNZ
& INR H
& RET
& END
• END

ALL DONE
MCS80 / 1 .7
TYPE INPUT FILE AND OUTPUT TAPE
TEST2
8080 MACRO ASSEMBLER, VER 1.1

NO PROGRAM ERRORS

ALL DONE

Figure 1. Transferring the assembler and simulator to Disk File.

MCS80SIM / 1.6
 TYPE INPUT FILE, OUTPUT FILE, CODE FILE
 TTY TTY MCSBIN
 INTERP/80 VERS 1.0

LOAD 6 6.
 27 LOAD OK

DISPLAY SYMBOLS.

00000000	00000	0000H	BLOCK01
00000070	00007	0007H	A
00000000	00000	0000H	B
00000010	00001	0001H	C
00000020	00002	0002H	D
00000030	00003	0003H	E
00000260	00022	0016H	FOUND
00000040	00004	0004H	H
00000210	00023	0017H	INCR
00000050	00005	0005H	L
00000070	00007	0007H	LOOP
00000060	00006	0006H	M
00000060	00006	0006H	PSW
00000060	00006	0006H	SP
00000300	00003	0003H	START

DI MEM 0 TO 50 HEX, MEM 0 TO 50 CODE.

00000	31H	40H	00H	2EH	C8H	26H	00H	7EH	FEH	2EH	CAH	16H	00H	CDH	17H	00H
00016	7DH	FEH	DCH	C2H	07H	00H	76H	2CH	C0H	24H	C9H	00H	00H	00H	00H	00H
00032	00H	00H	00H	00H												
00048	00H	00H	00H													
00008	LXI	SP	064		000		MVI	L	200		MVI	H	000			
00007	MOV	AM	CPI		046		JZ		022		000		CALL			
00014	023			000		MOV	AL	CPI	220		JNZ		007			
00021	000		HLT			INR	L	RNZ		INR	H	RET		NOP		
00028	NOP		NOP		NOP											
00049	NOP		NOP													

SET MEM 200 TO 210 = 43 46 48 20H 1111000B.

SET OK

GO.
 HLT CYCLE 134

DI CPU.

C	Y	Z	S	A	B	C	D	E	H	L	HL	SP	PC														
*	0	1	0	1	*	0	4	6	*	0	0	*	0	0	2	0	1	*	0	0	6	4	*	0	0	2	3

TIME.
 TIME=134 (67 USEC)

END.
 SEOF

ALL DONE

Figure 2. Creating a sample assembly-language program.

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