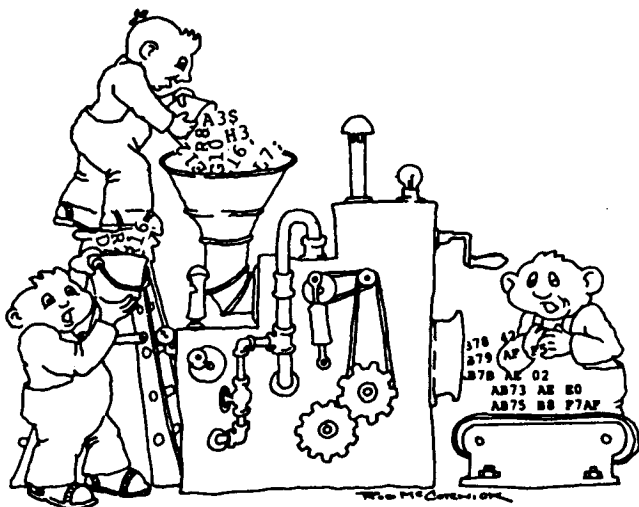


# My MC-10 Speaks ML!

*Machine language on the MC-10?  
What won't this little machine do?*



4K MC-10

*by Tim McFadden and Doug Kelley*



**I**N OUR LAST ARTICLE on the MC-10 we described its features and performance; this time we want to show you how to program in machine language, using a simple Basic monitor program (Program Listing 1). To run the program, type it into the MC-10, save it to tape, then Run it.

When the program is Run, a main menu will appear at the top of the screen. To select any one of the options, press the number corresponding to your choice. When you want to finish the program, press number six to return to the Basic command mode.

If you press number one you will enter the Memory Examine and Modify section. The computer will respond with the prompt START ADDRESS?, to which you respond by entering the number, either in

hex or decimal, you wish to start examining. (For a decimal number, simply enter that number, for a hex number, use the prefix \$.)

If at any time during the program you wish to return to the main menu, press M followed by pressing Enter. After you have entered your start address the computer will respond with the hex address; the contents of the location in hex; the ASCII symbol for the number in memory (if there is one); and will then prompt you for a response. You may either press Enter to indicate no change, or the number to which you wish to change the contents. As always, entering an M will return you to the menu, and a P will toggle the printer on/off switch.

Pressing number two, while in the main menu, will put the program into a

Memory Block Display mode. The computer will ask you what memory location you want to examine, and you may respond with the decimal or the hex value. Again, as always, you may press M or P. The screen will immediately fill, starting with your location on the top left of the screen. The display will continue to update until the letter M is pressed.

To advance to the next page of memory, press the Z key, and to go to the previous page of memory, press W. Notice the Up and Down Arrows on the W and Z keys, to help you remember which key pages in which direction.

## Memory Blocks

Since the MC-10 has no built-in CSAVEM command, the monitor lets you save a block of memory to cassette tape. To enter this mode, press the numeral three key, and the computer will ask you the start address of your data. Respond with the hex or decimal location, or the P or M keys. Do the same for the END ADDRESS? prompt. The computer will next tell you to ready the cassette recorder and press Enter. If you wish to name your file, do so before you press the Enter key. The computer will save the block of memory, then return you to the main menu.

Loading a block of memory is done by pressing the numeral four key. The computer will respond with: LOAD ADDRESS?; you should answer as you did for the START ADDRESS? prompt in the Save mode. The computer will then ask for the ending address of the data. If you hit the Enter key, the computer will load the entire block of memory from cassette, but if you Enter an address, the computer will load only to that address. The Load address does not have to correspond to the Save address, creating an additional block move feature. The computer will once again ask you to set up the tape recorder and press Enter. If you do not specify a file name, the computer will load the next section of data on the cassette.

Executing a program in memory is done by pressing the numeral five key. The computer will present a prompt: EXECUTION ADDRESS?, to which you should respond with the address of the memory location to which you wish to transfer control.

To aid in your programming efforts, here are some useful undocumented ROM routines found in the Micro Color Basic Interpreter. Also included in Table 1 are some memory locations you may find useful. ■ ■ ■

♦ Programs

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Table 1. Memory Locations and ROM Routines

\$F83F	FLSCUR	Flash the cursor at the current cursor position.
\$F883	POLCAT	Pole the keyboard and return the key being pressed to the A accumulator.
\$F9C6	CHROUT	Output a character from the A accumulator to the device pointed to by DEVNUM.
\$F9D0	LPTOUT	Output the A accumulator to the printer.
\$FA1B	SCNOUT	Output the A accumulator to the screen.
\$FAAF	INPLIN	Input a line of text from the keyboard.
\$FBD4	CLS	Clear the text screen.
\$FB06	CLSB	Clear the screen with the contents of the B accumulator.
\$0003		Bit 0 is serial out, bit 2 is serial in.
\$00E8	DEVNUM	Device number.
\$4224	BAUD	Baud:
		\$F0 = 300 bps
		\$76 = 600 bps
		\$3C = 1200 bps
		\$19 = 2400 bps
		\$0A = 4800 bps
\$0093-\$0094		Points to start of Basic.
\$0095-\$0096		Points to start of variables.
\$009B-\$009C		Points to top of stack.
\$00A1-\$00A2		Points to top of user RAM.
\$00AD-\$00AE		Points to next line of Basic program.
\$00EA		Reset flag.
\$421F-\$4220		Jump for EXEC.
\$4280-\$4281		Position of cursor.
\$4229		Printer width.
\$4231-\$4236		Keyboard look-up table.
\$4282		Cursor character.

Program Listing 1. MC-10 Basic Monitor

```

10 REM 1983 BY DOUG KELLEY
12 'GOSUB1000
15 H$="0123456789ABCDEF"
17 DIMA(30)
20 CLS:PRINT@7,"MICRO MONITOR 1.
0";
30 PRINT@131,"1) EXAMINE/CHANGE
MEMORY";
40 PRINT@163,"2) DISPLAY A MEMO
RY BLOCK";
50 PRINT@195,"3) SAVE A BLOCK O
F MEMORY";
60 PRINT@227,"4) LOAD A BLOCK O
F MEMORY";
70 PRINT@259,"5) EXECUTE A PROG
RAM";
80 PRINT@291,"6) END PROGRAM";
90 PRINT@360,"ENTER SELECTION";
100 A$=INKEY$:IF A$=""THEN100
110 IF A$<"1"OR A$>"6"THEN SOUND
1,1:GOSUB100
115 CLS
120 ON VAL(A$)GOSUB300,200,400,5
00,600,700
    
```

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```

130 GOTO 20
200 PRINT"START ADDRESS OF BLOCK
";:GOSUB800
205 IFM=1THENRETURN
210 POKE20450,INT(A/256)
220 POKE20451,A-INT(A/256)*256
230 EXEC 20443
240 A$=INKEY$:IFA$=""THEN240
250 IFA$="W"THENA=A-512
260 IFA$="Z"THENA=A+512
270 IFA$="M"THENRETURN
280 GOTO210
300 PRINT"START ADDRESS";:GOSUB8
00:IFM=1THENRETURN
310 CC=A
320 A=CC:GOSUB900:A=PEEK(CC):GOS
UB900:PRINTCHR$(PEEK(CC));" ";:G
OSUB800
325 IFPP=1THENLPRINTCHR$(PEEK(CC
))
330 IFM=1THENRETURN
340 IFA$=""THEN360
350 POKECC,A
360 CC=CC+1:GOTO320
400 PRINT"START ADDRESS";:GOSUB8
00:SA=A
405 IFM=1THENRETURN
410 PRINT"END ADDRESS";:GOSUB800
:EA=A
415 IFM=1THENRETURN
420 PRINT"READY TAPE RECORDER AN
D PRESS <ENTER>"
430 INPUT A$
435 IFA$="M"THENRETURN
440 FOR C=SA TO EA STEP 30
445 FOR P=0 TO 29
450 A(P)=PEEK(C+P)
455 NEXT P
460 CSAVE*A,A$
470 NEXT C
475 A(0)=1000
476 CSAVE*A,A$
480 RETURN
500 PRINT"LOAD ADDRESS";:GOSUB80
0:LA=A
505 IFM=1THENRETURN
510 PRINT"END ADDRESS";:GOSUB800

515 IFA$=""THENA=65535
520 IFM=1THENRETURN
530 PRINT"READY TAPE RECORDER AN
D PRESS <ENTER>"
540 INPUTA$
545 IFA$="M"THENRETURN
  
```

♦ to page 87

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Color Computer/85

```

550 FOR C=LA TO A STEP 30
560 CLOAD*A,A$
565 FOR P=0 TO 29
566 IFA(P)=1000THEN590
570 POKE C+P,A(P)
575 NEXT P
580 NEXT C
590 RETURN
600 PRINT"EXECUTION ADDRESS";:GO
SUB800
605 IFM=1THENRETURN
610 EXEC A
620 RETURN
700 END
800 M=0:INPUTA$
805 IFA$="P"THENPP=1-PP:GOTO800
810 IFA$="M"THENM=1
820 IFA$=""THENA=0:RETURN
830 IFLEFT$(A$,1)<>"$"THENA=VAL(
A$):RETURN
840 A$=MID$(A$,2)
850 A=0:B=1
860 IFRIGHT$(A$,1)>="A"THENV=ASC
(RIGHT$(A$,1))-55:GOTO870
865 V=VAL(RIGHT$(A$,1))
870 A=A+V*B:B=B*16
880 A$=LEFT$(A$,LEN(A$)-1)
890 IFA$=""THENA$="$":RETURN
895 GOTO860
900 B=4096:C=A/B:D=INT(C)
910 E=D*B:F=A-E:G=256:H=F/G:I=IN
T(H)
920 J=I*G:K=F-J:L=16:M=K/L:N=INT
(M)
930 O=N*L:P=K-O:Q=INT(P)
940 PRINTMID$(H$,D+1,1);MID$(H$,
I+1,1);MID$(H$,N+1,1);MID$(H$,Q+
1,1);" ";
945 IFPP=1THENLPRINTMID$(H$,D+1,
1);MID$(H$,I+1,1);MID$(H$,N+1,1)
;MID$(H$,Q+1,1);" ";
950 RETURN
1000 CLEAR200,20430
1010 FORC=20443TO20478
1020 READA$:GOSUB850
1030 POKEC,A
1040 ENDC NEXT C
1050 GOTO15
1060 DATA CE,40,00,FF,4F,D7,CE,0
0,00,FF,4F,D9,FE,4F,D9,A6,00,08,
FF,4F,D9,FE,4F,D7,A7,00,08,FF,4F
,D7,8C,42,00,26,E9,39
    
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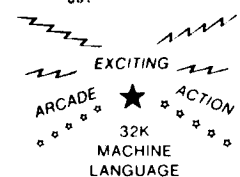
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