

# HUG SOFTWARE TAPE I

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NOTE: Adjust volume to 1/3 to 1/2 for good 'LOAD'.  
The titles in this index may not exactly match the titles on the tape.

Part Number 885-1009

## HUG SOFTWARE TAPE I

## INDEX

## SIDE 2

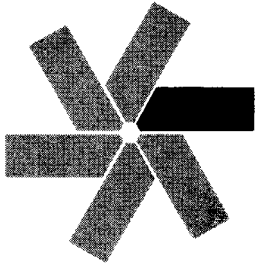
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OBJECT CODE PROGRAMS

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 Hidden Pea  
 H8 Memory Test  
 Mastermind  
 H8 Demo  
 ASR Driver (2 cuts)  
 Clock  
 Chess Timer  
 Othello

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# Heath User's Group

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Since a few of the object code programs have no means of documenting themselves, the authors' description is included here for your convenience. Also, we felt the information on the H8 music package might be helpful - :JB:

NOTE: A source listing of the 'ASR DRIVER' is available upon request.

## SYSTEM DESCRIPTION

### MUSIC-8 (\*)

TWO MUSIC-8 PROGRAMS ENABLE THE H8 TO PLAY A CODED MUSICAL SCORE THROUGH THE FRONT-PANEL SPEAKER TWO UTILITIES ARE ALSO INCLUDED FOR THE CONVENIENCE OF THE USER.

THE SYSTEM IS BASED UPON CONCEPTS DESCRIBED IN AN ARTICLE IN THE OCTOBER, 1977, . ISSUE OF ROM MAGAZINE BY DOROTHY SIEGEL. A FOLLOW UP ARTICLE APPEARED IN THE NOVEMBER ISSUE. BOTH ARTICLES ARE RECOMMENDED FOR THEIR MORE COMPREHENSIVE DESCRIPTION OF THE THEORY BEHIND THE SYSTEM

AN EXTENDED BENTON HARBOR BASIC PROGRAM TITLED "SCORE" TRANSLATES A MUSICAL SCORE CODED IN DATA STATEMENTS INTO PITCH AND DURATION PARAMETERS FOR THE "PLAY" PROGRAM. THE HASL PROGRAM TITLED "PLAY" UTILIZES THE RESULTING PARAMETERS TO PRODUCE THE PREVIOUSLY SCORED MUSICAL TONE THROUGH THE H8 SPEAKER

SINCE "PLAY" MUST BE LOADED ABOVE BASIC IN MEMORY, AND SINCE THE PITCH AND DURATION PARAMETERS MUST BE TRANSLATED INTO MEMORY ABOVE "PLAY", A BASIC UTILITY IS PROVIDED FOR USE WITH A CONFIGURED VERSION OF BASIC ALREADY LOADED INTO MEMORY, TO RECONFIGURE THE HIGH MEMORY ADDRESS, AND TO ENABLE THE USR FUNCTION. ANOTHER BASIC UTILITY IS PROVIDED TO LOAD "PLAY", WHICH HAS BEEN CODED INTO DATA STATEMENTS, INTO ANY SPECIFIED SECTION OF MEMORY, AND TO RELOCATE ITS ADDRESS CONSTANTS AS NECESSARY.

(\*) MUSI CATE -- TO SET TO MUSI C" (OXFORD ENGLISH DICTIONARY)

APPENDIX B

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EQUIPMENT MODIFICATION

THE FRONT-PANEL SPEAKER IS DRIVEN BY A 1024KHZ SIGNAL FROM PIN 15 OF IC103. IF NO MODIFICATION TO THE SPEAKER CIRCUIT IS MADE, THE SOUND PRODUCED BY MUSIC-8 WILL BE HEAVILY COLORED BY THAT SIGNAL. HOWEVER, IF A SHARP TOOL SUCH AS A SCREWDRIVER TIP IS USED TO BREAK THE FOIL LEADING FROM PIN 15 OF IC103 TO PIN 3 OF IC104 ON THE BACK OF THE FRONT-PANEL CIRCUIT BOARD, AND A JUMPER WIRE CONNECTED FROM THE POINT THE GRAY D7 WIRE IS SOLDERED TO THE BOARD AND PIN 3 OF IC104, MUSIC-8 CAN PRODUCE PURE TONES. THE H8 WILL OPERATE NORMALLY AFTER MAKING THE MODIFICATION, EXCEPT THAT THE SPEAKER WILL SOUND MUTED WHEN IT IS USED IN THE USUAL MANNER. IF MUTING IS OBJECTIONABLE, A SPDT SWITCH CAN BE INSERTED AS FOLLOWS:

- A. PREPARE 3 WIRES (POSSIBLY 3 WIRES FROM A LEFT-OVER LENGTH OF 8-STRAND WIRE) LONG ENOUGH TO REACH THE SPDT SWITCH WHEREVER IT IS TO BE MOUNTED (POSSIBLY THROUGH ONE OF THE REAR HOLES IN THE H8 CABINET).
- B. SOLDER A WIRE FROM THE CENTER LUG OF THE SWITCH TO THE FOIL CLOSEST TO PIN 3 OF IC104 NEAR THE BREAK IN THE FOIL.
- C. SOLDER A WIRE FROM ONE OF THE END LUGS OF THE SWITCH TO THE FOIL CLOSEST TO PIN 15 OF IC103 AT THE OTHER SIDE OF THE BREAK. THIS COMPLETES THE NORMAL SWITCH POSITION WIRING.
- D. SOLDER A WIRE FROM THE REMAINING END LUG OF THE SWITCH TO THE POINT THE GRAY WIRE IS SOLDERED TO "D7" ON THE CIRCUIT BOARD. THIS COMPLETES THE MUSIC-8 SWITCH POSITION WIRING.

IF THE SWITCH IS REMOVED AT SOME FUTURE TIME, A BARE JUMPER WIRE CAN BE SOLDERED ACROSS THE BREAK MADE IN THE FOIL, RESTORING THE H8 TO ITS ORIGINAL STATUS.

EXTENDED BENTON HARBOR BASIC #10.01.02.

\*LOAD

SURE?YFOUND RECONFIGURE EXTENDED BENTON HARBOR BASIC 18.81.82.

\*RUN

RESET EXT. B. H. BASIC 10.01.02. HIGH MEMORY LIMIT

HOW MANY 'K' BYTES DO YOU WISH TO ALLOCATE TO BASIC? 14

DO YOU WISH TO ENABLE THE USR FUNCTION? N

USR FUNCTION DISABLED

THIS ROUTINE SCRATCHES ITSELF AFTER EXECUTION.

END AT LINE 65535

\*LOAD " "

SURE?YFOUND LOAD/RELOCATE 10.01.02. MUSIC-8 PLAY

\*RUN

RELOCATE AND LOAD ASSEMBLER LANGUAGE PROGRAM

MEMORY AVAILABLE IS 10240 BYTES.

USR FUNCTION ENTRY POINT NOW SET TO LOCATION 0 OCTAL (0  
DECIMAL).

DO YOU WISH TO CHANGE THE ENTRY POINT? Y

WILL YOU ENTER THE ENTRY ADDRESS IN OCTAL OR DECIMAL? D

ENTER ENTRY ADDRESS - (8+14)\*1024

PROGRAM BEING LOADED IS: PLAY

ASSEMBLED ORIGIN IS: 160000

RELOCATED ORIGIN IS: 130000

ENTRY POINT SET TO: 28888

LAST ADDRESS LOADED: 130134

END AT LINE 65535

\*LOAD " "

SURE?YFOUND MUSIC-8 SCORE - 'THE ENTERTAINER' BY S. JOPLIN

\*RUN

|    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |

|     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 31  | 32  | 33  | 34  | 35  | 36  | 37  | 38  | 39  | 40  |
| 41  | 42  | 43  | 44  | 45  | 46  | 47  | 48  | 49  | 50  |
| 51  | 52  | 53  | 54  | 55  | 56  | 57  | 58  | 59  | 60  |
| 61  | 62  | 63  | 64i | 65  | 66  | 67  | 68  | 69  | 70  |
| 71  | 72  | 73  | 74  | 75  | 76  | 77  | 78  | 79  | 80  |
| 81  | 82  | 83  | 84  | 85  | 86  | 87  | 88  | 89  | 90  |
| 91  | 92  | 93  | 94  | 95  | 96  | 97  | 98  | 99  | 100 |
| 101 | 102 | 103 | 184 | 105 | 106 | 107 | 188 | 189 | 110 |
| 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 |

SCORE COMPILATION COMPLETE!

CTL KEYS ARE INOPERATIVE DURING PLAYING OF PIECE  
SET SPEAKER SWITCH FOR MUSIC - TYPE SPACE TO PLAY

RESET SPEAKER SWITCH IF FINISHED, OR TYPE CONTINUE TO REPLAY  
MORE NOTES (ADDITIONAL DATA STATEMENTS) MAY BE ADDED BEFORE  
TYPING CONTINUE, AND THE TRANSLATING PROCESS WILL CONTINUE  
WITH THE NOTE FOLLOWING THE LAST NOTE PREVIOUSLY TRANSLATED.

STOP AT LINE 758

\*

A MINIMUM CONFIGURATION H-8 "HIDDEN PEA" GAME  
written by  
J. W. PEHOUSHEK

This program will run in a minimum configuration H-8, having only 4K RAM. No other accessories are required.

"Hidden Pea" is an H-8 version of the carnival sideshow sleight of hand game - guess which shell has the pea hidden under it. The H-8 version, however, uses the front panel LED display, and moves a horizontal "bar" randomly, from one "0" digit to another. This motion is displayed for a short, random time duration. The display blanks, and a ? appears. The player must enter a number between 1 and 9, indicating his guess of the digit "0" within which the bar was last displayed.

A correct answer produces a string of high pitched "beeps". An incorrect answer produces a single low "buzz". The H-8 then produces the moving bar display again. Faster if a correct answer has been given. Slower if incorrect.

This procedure continues until a net 29 correct answers have been given. At this point the bar is moving quite rapidly, requiring good visual skills.

The H-8 then computes your score, and displays it;

SCORE = 89

A perfect score of 99 is possible. While displaying the score, a series of beeps and buzzes are produced. The program then repeats.



## H8 ALARM CLOCK

### USING THE PROGRAM

After the program has been loaded, the PC should be set to 040 100 Press GO. The prompting message, SET Hr will appear. Key in the hour value you wish to set. You will then be asked to SET Min, and then SET SEC. When this is done, the display will show the set time. To start the clock running, simply press the "/" key. An accurate time "hack" such as WWV can be used. The clock is now running. Each new second should be displayed as the clock counts up.

To set the alarm time, press the "+" key. Again the SET Hr prompting messages will appear. Respond with the desired time values for the alarm time. Upon completion, the display will return to the display it had before setting the alarm. Because the clock is running under interrupt, and was in fact updating itself while you were setting the alarm, it did not lose track of the correct time. The alarm can be reset at any time, even if already set, by following the above procedure.

To cancel the alarm, or to turn off a sounding alarm, simply press the "-" key.

To change display modes, press the "\*" key once. This will cause the time for which the alarm is set, to be displayed. Pressing the "\*" key again will restore the display to the clock time.

### PROGRAM "MODIFICATION";

Many additions to this program have been tried. A few of them are;

- Round a "chime" at each hour.
- Allow setting month, day, year.
- Play a tune at midnight.
- Display <sup>0</sup> character messages at a given time.
- Using another interrupt input, count the revolutions of your watt-hour meter (photocell and light source), and once every 5 minutes save the count in a different memory location. After one day, recall the data, and plot your power usage versus time of day.

No doubt many other worthwhile applications can be found.

## PROGRAM DESCRIPTION

This program implements a four-position, six-color version of the game of MASTERMIND using the H8.

MASTERMIND is played by two players, a Coder and a Decoder. A Coder selects a secret code which is "guessed" by the Decoder. The Coder gives the Decoder feedback on the correctness of each trial guess so that new guesses can be determined.

In this implementation, the H8 plays the Decoder participant. The H8 "guesses" a secret code word (a four digit code, using digits 1 to 6) selected by the Coder. H8 code word "guesses" are displayed in the H8 front panel LEDs and Coder responses indicating the number of correct code positions and values are entered through the H8 front panel keypad.

The H8 (Decoder) usually "guesses" the code word in three to five guesses and never requires more than six guesses. It uses information on the correctness of past "guesses" to determine new "guesses". The game time is mainly determined by the Coder response time. The H8 (Decoder) usually appears to display each new "guess" immediately; a maximum delay between guesses of about 2 seconds can occur.

A minimal H-8 system is required (H-8 with 4k RAM board). The program (written in HASL-8) illustrates the use of FPLEDS and KEYPAD, via calls to PAM-8.

## OPERATING INSTRUCTIONS

### 1. PLAYERS:

Decoder - H8  
Coder - operator

### 2. CODE WORD:

The code word is of the form:

|   |   |   |   |
|---|---|---|---|
| d | d | d | d |
|---|---|---|---|

where:

d is digit from 1 to 6.

### 3. TO PLAY:

- a. Coder selects a code word and starts the game by indicating ready to H8 by pressing GO on H8 Keypad (any key will do).
- b. Decoder displays first guess in H8 front panel LEDs (see #4. below).
- c. Coder enters response of the form "ab" through H8 keypad where:
  - a - number of correct digit values in the correct positions ( $0 \leq a \leq 4$ )
  - b - number of correct digit values in the wrong positions ( $0 \leq b \leq 4$ )(note:  $a+b < 4$ )

Note: Decoder rejects "a" if not in bounds; it will continue to accept values of "a" until in-bounds value is given. Same is true for "b" input. Also, if  $a + b > 4$  then decoder expects "a and b" to be entered again. Decoder displays "a" and "b" in front panel LEDs.
- d. Decoder displays next guess in H8 front panel LEDs (and "a" and "b" which were entered in previous step).

- e. Repeat steps c. and d. until secret code is guessed correctly. The correct guess is indicated by a Coder response of "40" (i.e., all 4 digit values are correct and in the correct positions). Correct code will flash in the H8 front panel LEDs. If an error is made by the Coder (inconsistent responses), the Decoder will flash zeros and allow Coder to restart at step a.

To play another game begin at Step a.

#### 4. DISPLAY FORMAT:

Game turns including both Decoder trial guesses (dddd) and Coder feedback (ab) will be displayed on the H8 front panel LEDs in the following format:

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| - | - | d | d | d | d |
|---|---|---|---|---|---|

|   |   |   |
|---|---|---|
| - | a | b |
|---|---|---|

## CHESS TIMER

Tracks the time of two players in chess or other games. The elapsed time of the white player is shown in the left 3 LED's and of the black player in the right 3. The move number is shown in the middle 3 LED's. A decimal point on his side indicates it is a player's turn. A blinking decimal point indicates that the player's clock is running.

## H8 MEMORY TEST

The test program resides in the first 4K of the memory card originated at 040.000A. Exercise of this area or the first 4K of memory card originated at location 0 (PAM-8 ROM area) is not allowed. A message declaring this 'forbidden' will appear if attempted. After an initial sign on message, the H8 will display a prompt message asking for the number of the board to *be tested*. *The user response is the number of the board to be tested* in accordance with the following table:

| H8-1 Board | User Input |
|------------|------------|
| 0K         | 0          |
| 8K         | 1          |
| 16K        | 2          |
| 24K        | 3          |
| 32K        | 4          |
| 40K        | 5          |
| 48K        | 6          |
| 56K        | 7          |

Each user Input (in this case, the board number) must be followed by entering the 'ALTER/RSTO' key which functions as the CR (carriage return) would if using a terminal. If an improper Input is specified, the H8 will flash an error message and ask for re-entry of the required data. If the user accidentally inputs incorrect data in any of the H8 prompted parameters; the '\*' (cancel) key will allow re-entry of all test parameters. If an incorrect key is hit prior to entry of the 'ALTER/RSTO' key, the user may simply re-enter the correct key. No data is taken until the 'ALTER/RSTO' key is pressed.

After the board number is entered, a prompt message for the desired board size will be displayed (4 or 8th), asking if a 4 or 8 thousand byte segment is to be exercised.

If the board size entered is 4K, the H8 will ask if the lower or upper 4K segment is to be tested (L-U 0-1). Enter 0 for the lower 4K, enter 1 for the upper 4K. As stated above, test of board 0 or 1 lower 4K will be rejected.

After entry of the above parameters, the H8 will ask if a continuous test or single pass through all patterns should be executed (C-S 0-1). Enter 0 for continuous mode, 1 for single pass. The continuous mode is good for isolating intermittent failures.

After entry of the C-S parameter, the test execution begins. During test execution, the H8 will display the address bit number currently being tested. In the continuous mode, this will continue until a return to the monitor is requested. In the single pass mode, execution of the test with no detected failures will result in display of the message 'END OF TST'. In either the continuous or the single pass mode, the detection of failure will sound the alarm and display the message 'BRD M IC NNN'. NNN represents the memory IC position number from the H8-1 schematic and M represents the user input board number.

After the display of either the 'END OF TST' message or the 'BOARD FAIL' message followed by five 'BEEPS', the test program may be restarted by pressing the H8 'GO' (4) key. New test parameters may then be entered to test the next H8-1 board.

Failures are normally due to memory chip problems, but the board should, of course, be suspect if it is a first time operation check. Solder splashes or other board or TTL failures will be translated by this program into memory chip locations. Address lead 'STUCK' conditions may also lead to erroneous memory chip readouts. Careful board inspection will usually locate these types of failures.

If the program runs successfully to 'END OF TST', a thorough exercise has been performed which verifies all memory cells, address decode and chip select functions. Some pattern sensitivity failures may not be detected by this exercise, however, the address and address bit complement patterns used represent an efficient trade-off between simpler exercise patterns and the more time consuming pattern sensitivity tests.