

HAM-1

The cassette included with this documentation contains four key programs of interest to amateur radio operators. They are:

1. CW Receive
2. CW Keyboard
3. RTTY Receive
4. RTTY Send

The 8080 microprocessor is programmed to utilize about 6.5K of its memory for these four programs. Many desirable features have been included such as speed selectors and buffers to enhance operations. Future versions of this "HAM" cassette will, hopefully, have even more features.

GENERAL:

The "HAM" Cassette is loaded into a Digital Group, Inc. 8080 10K system; either from a cold start initialize or by selecting the "READ Cassette" option of the 8080 Op. System. After the cassette loads in, a special HAM option select list will be shown.

The programs represent the present programming level of the four programs. However, several individuals, and hopefully you, will be adding features and refinements to achieve even better HAM systems.

CW Send:

This program allows you to use your Digital Group, Inc. 10K 8080 system as an extended CW Keyboard. A 256 character "software "FIFO" buffer permits typing as many as 256 characters ahead of the CW character being sent.

Eight 100 character max buffers are also included which may be previously built and put on line as required.

Special speed increase/decrease characters are available which allow trimming to the precise speed desired.

CW Send Operation

1. Press Option 5
2. Select Desired Speed 1-3 (5, 13, or 20 WPM)
3. Enter characters to be sent (256 max including buffer's contents).

...OR...

Build 1 to 8 buffers:

- a. While holding down the "Control" key on your keyboard, type i (or I).
- b. Select buffer A, B, C, D, E, F, G, or H by entering the desired character (either a-h or A-H) while holding down the "Control" key. Either upper or lower case alpha may be entered with identical results.
- c. Enter up to 100 characters into the selected buffer.
- d. End the buffer by hitting "Return".

4. Play the desired buffers by typing the buffer's title while holding down the "Control" key.
5. Characters may be entered between buffers.

Example: (Buffer A...say has CQ) W0xxx (Buffer B...has "de W0LMD")
589 (Buffer C..."RST. QTH is...).

6. Speed Change:

Slower - Enter V's while holding down "Control" key.

Faster - Enter W's while holding down "Control" key.

CW Send Ports - The program will produce its output on Port 2, LSB. This assignment to Port 2 is controlled by software at addresses 6172, 6204, and 6212.

The FIFO fullness register is available by monitoring Port 3 with an 8-bit D/A to a meter, if desired. (See May 1976 BYTE Magazine for typical D/A circuits). Port 3 is selected by address 6073.

CW Receive:

The CW Receive software permits receiving CW and displaying the alphanumeric characters on the TV screen.

At the offset, be aware that poor copy typically results from hand-keying due to sloppy CW habits of even "good" operators. The program automatically adjusts to whatever speed CW is currently being received. All timing is measured in terms of the last dot's length. All dashes, spaces between elements, spaces between letters and spaces between words should be rather close to the ideal timings as given in CW textbooks. Greater than 50% departure from the ideal timing relationships will result in erroneous translation.

CW Receive Port:

The software uses the Digital Group, Inc. Cassette interface as a temporary CW Audio to mark/space converter.

The most critical component of a CW to ASCII converter is the "Tone to Keyer" section. A number of designs have been proposed, but none appear completely satisfactory. November 1975 QST, pages 14-15, shows a typical circuit. A recent redesign of this circuit is available through Bert Kelley, K4EEU. This circuit appears much better though several areas could be improved upon.

If an external interface circuit is utilized, a different input Port, LSB, may be selected by modifying the code at addresses 31102 and 31177 to the octal number of the input Port LSB to be used.

Should data inversion be a problem, you may logically invert the software by changing addresses 31110 and 31204 from a "312" to a "302".

RTTY Receive:

You can retire your "old 15" after getting this program running! The program allows receiving 60, 66, and 100 WPM Baudot on your TV set. Great XYL pleaser!

Input for this one is via the cassette interface which works very well for 850 Hz shift and adequately for 170 shift using straddle tuning. A preferred system is an external RTTY TU tuned to the exact shift being received. A modified version of the Digital Group, Inc. Cassette interface on a 3½" x 6" PC card will be available in July 1976. The changes necessary to make this \$30.00 kit function as a RTTY TU and AFSK is to be published in July '76 BYTE Magazine.

The present input port is Port 1, LSB. To change to another port, modify addresses 11025 and 11043 to the desired octal number of the desired input port, LSB.

Example: You have an ST6, etc., with a TTL compatible output (0 to +5 out). You wish to couple this to Input port 3, LSB. Modify 11025 and 11043 to an "003" and write out your modified system cassette. End.

RTTY Send:

Baudot out via the cassette interface is possible by simply using the VCO as your AFSK unit. The speed sent will be the same speed that you selected when receiving (60, 66, or 100 WPM).

Again, an external AFSK unit may be desirable (see above). You may modify the output port, LSB, utilized by changing addresses 11250 and 11270 to the octal equivalent of the desired port, LSB.

CONCLUSION:

We hope you enjoy this HAM-1 software. The bulk of the programming was done by Ted Holdahl, WØPMY, adapted from earlier programming by Dr. Robert Suding, WØLMD.

Several enhancements have been suggested:

1. The present programming is based on timing loops. Interrupt controlled software would permit considerably enhanced operation.
2. Buffers presently are being added to the RTTY send software. Even better would be the ability to build the transmit buffer while in either send or receive mode.
3. Video display of the buffer fullness condition and a character being transmitted pointer would be nice.
4. The software FIFO should be larger.

5. The CW keyboard speed selection should be done digitally; e.g., if you want 14 WPM, enter 14.
6. Detection of a space approximately 5 characters before the end of a line with blanks. This would result in fewer split words.
7. Scrolling the page would look nicer than simply overwriting. Similarly, the line ahead of the one being received could be pre-cleared. The scrolling system in the KINGDOM game would work nicely here.
8. For the truly gigantic, a software system which tracks and corrects for operator CW styles would be exciting.

As you can see, a software approach to HAM station peripherals can result as a drastic station enhancement as simple as a \$5.00 cassette software system. Software giants are invited to correspond with WØPMY or WØLMD with a cassette of their HAM software system. The Digital Group Software Systems, Inc. (DGSS) will be happy to aid in the distribution of significant system enhancements.

73,

Robert, WØLMD