BINARY PUNCH PROGRAM

The Nicolet Binary Punch program is designed to punch out regions of memory onto tape in a format that can be read by the Binary Loader. These regions of memory may contain either programs or spectral data. In this way accumulated data or programs which have been modified since they were loaded may be dumped onto tape for loading at some later date into any 1080 data system.

There are two existing versions of the Binary Punch program, a Low version occupying locations 0 - 252_8 and a High version occupying 5000 - 5252_8. They are otherwise identical. The version which is selected depends on the region of memory to be dumped onto tape.

Loading and Use

The Binary Punch program tape is loaded using the standard Binary Loader, as described under Loading Programs. The program is started as follows:

1. To start the Low version at location $\emptyset$

    Depress the Stored Program Start button on the 1080 console

2. To start the High version at location 5000

    a) Set the Switch Register to 5000_8
    b) Depress Load PC and press Execute
    c) Depress Continue and press Execute

The program will start by typing a carriage return-line feed and typing the letter P. This questions means "which punch are you using?"

In answer to the question P, type L to use the low speed punch mechanism of the Teletype and H to use the high speed punch. If H is typed and no high speed punch is available, nothing will seem to happen since the computer is looking for a high speed punch ready signal.

The program then types SA, asking for the Starting Address of the block to be punched. Enter this address in octal, followed by a carriage return. If a mistake is made in typing, type Rubout or any other illegal character. The program will respond with a question mark and a carriage return and allow the SA to be re-entered.

The program next types TA, asking for the Terminating Address of the block. It is assumed that the terminating address is greater than the starting address.

After entering the terminating address, but before typing a carriage return, turn on the punch. When the Return is typed, the program will begin punching the

leader and the specified block of data. The Return is not echoed on the Teletype as this would produce a spurious punch in the tape if the low speed punch is in use.

When the block has been punched, the program will wait for one of two instructions: T to terminate the tape, and type trailer tape or M to enter another memory block for punching. Do not remove the tape from the punch unless some trailer tape has been punched, as several rows of holes may still be inside the punch mechanism.

To punch out a second block, turn off the punch, and type M. Turning off the punch first assures that the M will not be punched on the tape. The program will then return to the beginning and type SA. Answer the questions as before.

When all blocks have been punched, type T to indicate that trailer is to be punched. The trailer section is exactly like the leader except that a Rubout is punched midway through it. This Rubout is a signal to the Binary Loader program, causing it to halt when this character is encountered.

OCTAL PRINT PROGRAM

The octal print program is used to produce an octal memory dump of any specified region of memory. The data is listed in five columns, where the first column is the octal address and the second column the contents of that address. The remaining three columns contain the contents of the next three addresses.

This program occupies locations 0 - 176 and can be loaded using the standard Binary Loader. The program starts at location ∅ and can thus be started by pressing the Stored Program Start button on the 1080 console.

The program first asks for the starting address of the block by typing SA. Enter the octal address and terminate it by typing a Return. If any character other than an octal number is entered, the program will type a ? followed by a carriage return and line feed and allow the entire number to be re-entered. Thus, if any error is made, type some illegal character, such as a Rubout, and re-enter the number.

The program next asks for the terminating address of the data block by typing TA. Again, answer by entering this octal address followed by a Return. The program will type several line feeds and begin listing the block of data as shown below.

To dump additional data blocks onto the Teletype, type M when the listing is done. This will restart the program at the beginning. In the example below, the Octal Print program has been commanded to dump itself onto the Teletype:

```
SA 0
TA 176
```

0	44453	2000120	2000120	2000120
4	110323	2000055	110301	2000055
10	2000173	2000062	2404126	2000120
14	110324	2000055	110301	2000055
20	2000173	2000062	2424127	2000120
24	2000120	110004	2224131	2000120
30	2110126	2000132	2000173	2000173
34	3110126	2000132	2134126	2462127
40	162000	45	2126131	32
44	25	2000120	2000113	462315
50	162000	3	462324	45
54	5220	176	6444	56
60	4443	1000055	22	2174130
64	2000113	462215	162000	105
70	2000055	470260	5144	107
74	2404120	470010	5104	107
100	2110130	5003	2510120	2404130
104	64	2110130	1000062	110277
110	2000055	2000120	63	65
114	6454	114	44453	1000113
120	30	110215	2000055	110212
124	2000055	1000120	126	177
130	176	3777775	36	5210
134	5042	2404172	110005	2404171
140	2110172	1003	2000160	2110172
144	5043	2404172	1007	2000160
150	2706171	143	2110172	5043
154	1007	510260	2000055	1000132
160	150	510260	462260	5204
164	5141	162000	110240	2000055
170	1000160	0	0	34
174	110240	2000055	1000173	
```

## Introduction

SWAP is a very simple program allowing users having only low speed equipment to utilize their 1080 systems more effectively. It swaps the contents of the lowest 4K, excluding the loaders (locations 0 - 7577) with the 2nd 4K of data memory (locations 110000 - 117577).

The main advantage of SWAP is in saving a copy of the rather lengthy FFT program, while still having the program memory and 4K of data memory available for other programs, such as the Assembler. Since the Assembler utilizes only the first 4K of data memory (locations 100000 - 107777) for text storage, it can be used without destroying the copied FFT. When the user is done with the Assembler, he can simply run SWAP again to restore the FFT. As long as data is not acquired in the 2nd 4K of data memory, the Assembler also remains intact and can be recalled by running SWAP. However, since the Assembler is much shorter than the FFT program, it is not nearly as inconvenient to reload it as to reload the FFT.

## Storage

SWAP is stored in unused locations reserved for the Binary Loaders, and occupies locations 7600 - 7625. Since no other NIC-supplied program utilizes this area, SWAP should be permanently resident once loaded, unless wiped out by experimental software. The minimum hardware required is a NIC 1083 computer and low speed reader.

## Loading and Use

SWAP is loaded using the standard Binary Loader. The exchange of the contents of locations 0 - 7577 and 110000 - 117777 occurs each time it is run.

SWAP is run by starting the computer at 7600. Briefly, this is accomplished as follows:

a)  Press STOP
b)  Depress LOAD PC
c)  Set the switch register to 0007600
d)  Press Execute
e)  Depress CONTINUE
f)  Press Execute

The entire execution of SWAP requires approximately 0.19 seconds. The computer will halt with the PC set to 7620 when SWAP is finished. Then proceed to operate the just-swapped program as usual.