NIBBLEWRITER

Key in your own quick and easy-to-use word processor

ibbleWriter is a forty column word processor with many of the major functions of the high-powered commercial word processors. It is screen oriented and features a full function word wrap, insert and delete functions, a clear to end of line function, and it even allows you to highlight carriage returns as inverse asterisks. The cursor character changes to indicate either insert or replace mode.

It is menu driven and allows you to start a new document, load an existing document, save the current document, rename the current document, continue with the current document, and print the current document. The print routine even allows you to set the margins for your printer.

The program shows the name of the current file on the top line and also indicates the line and column numbers of the current cursor position on the bottom line. It also has a help screen that you can access from the main menu. The program has a maximum capacity of 240 lines, which will provide approximately three to four pages of printed text, depending on margin settings.

USING THE PROGRAM

When you RUN NIBBLEWRITER, the main menu (Figure 1) appears on the screen. By selecting either START NEW DOCUMENT or LOAD DOCUMENT, a filename input routine will allow you to enter the filename that you want to assign to a new document or the filename of the document you want to load, depending on the selection you made from the main menu. The filename input routine does not allow you to enter illegal filenames. You can use the Escape key to exit from the routine if you desire. Entering ''?'' catalogs your disk so you can select the file you want.

After entering the filename, NibbleWriter automatically loads in the existing document or creates a new one. The top
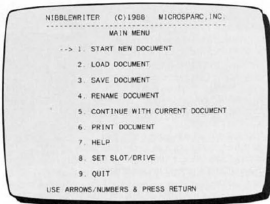

Figure 1: NibbleWriter Main Menu

line shows the name of the file, and the bottom line shows the line and column of the current cursor position. The top line also indicates that the Escape key will bring you back to the main menu. From the main menu, you can reenter the document by selecting CONTINUE WITH CURRENT DOCUMENT. After typing in a new document or editing the existing one, you can save it by returning to the main menu and selecting SAVE DOCUMENT. If the current filename already exists on your disk, you will be asked if you want to replace the existing file with the current one or rename the current document so that it will be saved under a different filename. You can also rename the current document at any time by selecting RENAME DOCUMENT from the main menu. The SET SLOT/DRIVE option lets you choose which disk drive to use for loading and storing your files. When you first run NibbleWriter, the default values are slot 6, drive 1.

If you want to print a document on your printer, select PRINT DOCUMENT from the main menu. You can then
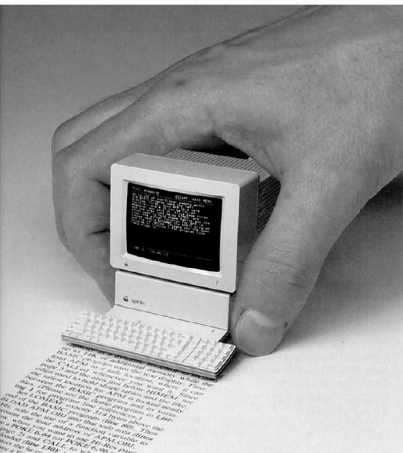
The commands and their functions that are available while typing in a document are summarized on the help screen, which can be selected from the main menu. The arrow keys allow you to move the cursor anywhere on the screen. The Escape key returns you to the main menu. The Delete key deletes the character to the left of the cursor and automatically moves the rest of the document up. Control-D deletes the character that is under the cursor and moves

> **N**ibbleWriter is screen oriented and features a full-function word wrap, insert and delete functions, and a clear to end of line function.

text up. Control-E toggles between the insert mode and replace mode. In replace mode the cursor is the regular checkerboard square. In insert mode the cursor changes to the underline character. Control-Y clears from the current cursor position to the end of the line and moves the rest of the document up.

select the margins you want on the printed document. Be sure the default settings on your printer are set for 10 characters per inch (CPI) and 6 lines per inch (LPI) or the margin routine will not work properly. The current margin settings are shown on the screen and you are prompted to change them. If you do, you will be asked to enter each margin setting. You cannot enter illegal values, and you may accept the default value of one inch. Margin value entries must be in increments of tenths of an inch; and for values of less than an inch, you must enter the leading zero (i.e., 0.5). After completing the margin entries, the new values are shown on the screen and you are again asked if you want to change them. If you accept the margins as shown, you will be prompted to be sure your printer is ready. You are then prompted to press the Space bar to start printing. After each page is printed, this same prompt appears to allow you to load a new sheet of paper. You can press the Escape key at any time to cancel the printing. When printing is complete, the main menu appears again.

Control-Z toggles between hiding carriage returns and showing them as inverse asterisks. Tab, or Control-I if you don't have a Tab key, moves the cursor to the next Tab position, i.e., column 6, 11, 16, 21, and so on. Control-F moves to the first line of the document. Control-C moves to the middle of the document. Control-L moves to the last line of the document. While typing in either the insert or replace modes, the program automatically wraps a word to the beginning of the next line if it extends past the end of the line. For a list of all commands and their functions, see Table 1.

Finally, you can exit the program by selecting QUIT from the main menu.

ENTERING THE PROGRAM

To enter the programs, first type in the Applesoft program in **Listing 1**, and save it with

SAVE NIBBLEWRITER

Table 1: Word Processor Commands

Command	Function
Arrow Keys	Move the cursor in the indicated direction anywhere on the screen.
Escape Key	Returns to the main menu.
Delete Key	Deletes the character to the left of the cursor. Moves characters from the cursor to the end of the line one position to the left, and moves up the rest of the document.
Control-D	Deletes the character under the cursor. Moves characters to the right of the cursor one position to the left, and moves text up.
Control-E	Toggles between insert and replace modes. In insert mode, cursor changes to underline character.
Control-Y	Clears from the current cursor position to the end of the current line, and moves up the rest of the document.
Control-Z	Toggles between hiding carriage returns or showing them as inverse asterisks.
Tab Key or Control-I	Moves cursor to next tab position (column 6, 11, 16, 21, etc.).
Control-F	Moves to first line of document.
Control-C	Moves to center (middle) of document.
Control-L	Moves to last line of document.

If you have an assembler, type in the source code from Listing 2 and assemble it. If you type in the source code with the comments, the file may be too long to assemble unless you split it into two files and chain them. Without comments, it should fit in one file. Otherwise, enter the Monitor with CALL –151 and type in the hex codes from Listing 3. Save it with

```
BSAVE NW.BIN,A$6600,L$9FE
```

The commands and their functions are summarized on the help screen, which can be selected from the main menu.

HOW THE PROGRAM WORKS

NibbleWriter (Listing 1) is mainly a driver for the machine language program (Listing 2) and an interface with the user. NW.BIN (Listing 2) is well commented, so I won't cover it line by line. The general idea is to generate a blank line when a word wrap is required, move the word to the beginning of the blank line, and then adjust the rest of the document. This is handled in subroutines DELETE, NORMAL, and INSERT

(lines 318-573). The rest of the program initializes the program, checks the input for control characters, and performs various support functions for the DELETE, NORMAL, and INSERT routines. Since the IIe does not allow the cursor character to be replaced, I had to write a KEYIN routine, lines 577-610, which allows the cursor character to be changed. Lines 1223-1354 handle the printing of the document to the printer, which requires its own word wrap routine.

I would like to discuss briefly how the documents are stored in memory. Figure 2 shows the structure of a couple of lines of a sample document in memory. The hex numbers in the memory locations are the ASCII codes for the corresponding characters. As you can see, it is basically the same as a normal text file, except for the zeros at the end of each line. If you want to use a file created with this program in another word processor, you can just read it in as a text file, because the zeros are ignored. However,

```
There are 40 memory locations per line.

First line starts at memory location $7000

| | | T | h | i | s | | | i | s | | | | | t | e | s | t | | |
|20|20|20|20|20|54|68|69|73|20|69|73|20|...|74|65|73|74|0 |0 |

Second line starts at memory location $7028

| I | d | o | c | I u | m | e | n | t | | | | C | R | | | | |
|64|6F|63|75|6D|65|6E|74|...|0 |0 |0 |0 |0 |0 |
```

Figure 2: Memory Structure

you must first change the file from a binary file to a text file. With ProDOS this can be done with the following sequence of commands:

```
BLOAD FILENAME
CREATE NEWFILENAME,T,TXT
BSAVE NEWFILENAME,A$7000,Lnum,T,TXT
```

where *num* is the length of the file obtained from the listing generated from a CATALOG command.

LISTING 1: NIBBLEWRITER

```
37   10  REM
C0   20  REM       NIBBLEWRITER
89   30  REM       BY ROBERT T. VUILLE
AE   40  REM       COPYRIGHT (C) 1988
C2   50  REM       BY MICROSPARC, INC.
24   60  REM       CONCORD, MA  01742
A7   70  REM
A0   80  HOME : PRINT CHR$ (21)
41   90  REM  SET HIMEM
38  100  PRODOS = PEEK (48896) = 76:  IF NOT PRODOS
          THEN HIMEM: 24832: GOTO 170
D7  110  REM  FOR PRODOS
38  120  POKE 768,32: POKE 769,248: POKE 770,190
B4  130  POKE 771,169: POKE 772,53: POKE 773,32
A3  140  POKE 774,245: POKE 775,190: POKE 776,96
A8  150  CALL 768
CA  160  REM  INITIALIZATION
FA  170  LM$ = "1.0":RM$ = "1.0":TM$ = "1.0":BM$ = "
          1.0"
A4  180  LM = 8:RM = 66:TM = 6:BM = 60
91  190  POKE 30,0: POKE 233,0: REM NEWF & PRNTF
0A  200  DS = CHR$ (4):B$ = CHR$ (7):E$ = CHR$ (2
          7):R$ = CHR$ (13): IF NOT PRODOS THEN DS
           = CHR$ (13) + CHR$ (4)
21  210  M1$ = "MARGIN VALUE EXCEEDS MAXIMUM"
42  220  M2$ = "MARGIN VALUE IS LESS THAN MINIMUM"
33  230  M3$ = "CHAR CANNOT BE USED IN THIS INPUT"
6D  240  FL$ = "WP.#00"
2D  250  RADAR = 26124: REM  FILENAME ($660C)
92  260  ST = 6:DR = 1: REM  DEFAULT SLOT AND DRIVE
98  270  PRINT PR#0"
28  280  :
92  290  REM  LOAD WP OBJECT FILE
E3  300  :
90  310  LK = 1: ONERR GOTO 3130
82  320  PRINT D$"BLOAD WP.BIN"
9F  340  POKE 216,0: REM  RESET ERROR FLAG
```

```
AE  350  REM     INITIALIZE & READ MENU DATA
36  360  :
6B  370  READ NITEMS: DIM MENUS(9): FOR J = 0 TO NI
          TEMS: READ MENUS(J) : NEXT
18  380  DIM X$(1):X$(0) = "  ":X$(1) = '-->'
49  390  :
01  400  REM     MAIN MENU
3B  410  :
3B  420  VTAB 1: HOME : GOSUB 2660: POKE 216,0: ONER
          R  GOTO 3130
B1  430  PX = 38:SX = 4:SE = SE + (SE = 0):MX = MITE
          MS: GOSUB 2960: IF Z = 20 THEN PRINT B$:
           GOTO 420
54  440  ON SE GOTO 480,560,670,830,940,990,1480,21
          50,1740
78  450  :
9A  460  REM     START NEW DOCUMENT
9A  470  :
18  480  IF PEEK (30) = 3 THEN GOSUB 2660: IF ESC
          F = 1 THEN 420
49  490  GOSUB 1830:  IF ESCF = 1 THEN 420
82  500  POKE 30,0
A1  510  CALL 26112: REM  ENTRY ($6600)
F5  520  :
52  530  REM     LOAD NEW DOCUMENT
F5  540  :
18  560  IF PEEK (30) = 3 THEN GOSUB 2660: IF ESC
          F = 1 THEN 420
04  570  GOSUB 1830:  IF ESCF = 1 THEN 420
39  580  HTAB 1: VTAB 20: PRINT "LOADING "FL$
59  590  LK = 3: ONERR  GOTO 3130
82  600  PRINT D$"BLOAD "FL$",S"ST",D"DR
61  610  POKE 216,0
82  620  POKE 30,1: REM  SET NEWF FOR LOADED FILE
51  630  GOTO 510
66  640  :
B0  650  REM     SAVE CURRENT DOCUMENT
06  660  :
7F  680  IF PEEK (30) < > 2 THEN VTAB 5:
          PRINT "THERE IS NO CURRENT DOCUMENT": VTAB
          10: PRINT "PRESS RETURN FOR MAIN MENU": ;
          GET A$: GOTO 420
7F  680  EF = PEEK (252) + 256 * PEEK (253): REM
          EFL($FC) & EFH($FD)
E1  700  ONERR  GOTO 3130
98  710  PRINT D$"VERIFY "FL$",S"ST",D"DR
A7  720  HOME : VTAB 5: PRINT "FILE: "FL$" ALREAD
          Y EXISTS"
```

LISTING 1: NIBBLEWRITER

```
05  730  VTAB 10: PRINT "PRESS 'Y' TO REPLACE EXIST
         ING FILE": PRINT : PRINT "PRESS 'N' TO RENA
         ME FILE": VTAB 10: PRINT "DO YOU WANT TO RE
         PLACE THE EXISTING FILE? (Y/N) ";
3A  740  GET A$
C2  750  IF A$ = "N" OR A$ = "n" THEN  POKE 216,0:
         GOTO 840
9F  760  IF A$ < > "Y" AND A$ < > "y" THEN
         GOTO 730
C6  770  PRINT : PRINT "DELETING "FL$
B4  780  LK = 2: ONERR  GOTO 3130
84  790  PRINT D$"DELETE "FL$",S"ST",D"DR
7F  800  HTAB 1: VTAB 24: PRINT "SAVING "FL$
81  810  LK = 2: ONERR  GOTO 3130
79  820  PRINT D$"BSAVE "FL$",A$7000,L"LN",S"ST",D"
         DR
E5  830  POKE 216,0: GOTO 1280
0E  840  GOSUB 1830: IF ESCF = 1 THEN 420
C2  850  GOTO 670
33  860  :
68  870  REM   RENAME CURRENT DOCUMENT
41  880  :
BB  890  GOSUB 1830: IF ESCF = 1 THEN 420
30  900  GOTO 840
32  910  :
CD  920  REM   CONTINUE WITH CURRENT DOCUMENT
04  930  :
F1  940  MSG$ = M2$: GOSUB 2250
F5  950  GOTO 510
56  960  :
ED  970  REM   PRINT ROUTINE
CA  980  :
E9  990  IF  PRGE (30) < > 2 THEN 670
E1 1000  MSG$ = 2: PRINT "MARGIN VALUES ARE A
         S FOLLOWS:": PRINT : PRINT "LM= "LM$" RM=
         "RM$" TM= "TM$" BM= "BM$
A3 1010  VTAB 4: PRINT "DO YOU WANT TO CHANGE MAR
         GINS (Y/N)? ";
   1020  GET A$
46 1030  IF A$ = "Y" OR A$ = "y" THEN 1060
B6 1040  IF A$ < > "N" AND A$ < > "n" THEN 1020
A7 1050  GOTO 1370
E8 1060  MS = "LM":MA$ = "7.0":MI$ = "0.5"
FB 1070  GOSUB 2330: IF ESCF = 1 THEN 420
08 1080  N =  VAL (N$)
65 1090  IF N < .5 THEN MSG$ = M1$: GOSUB 2250: GOT
         O 1060
3B 1100  IF N < .5 THEN MSG$ = M2$: GOSUB 2250
   1110  LM = N + ..
9F 1120  LM$ = N$
5F 1130  MS = "RM":MA$ = "7.0":MI$ = "0.5"
8B 1140  GOSUB 2330: IF ESCF = 1 THEN 420
56 1150  N =  VAL (N$)
86 1160  IF N < .5 THEN MSG$ = M1$: GOSUB 2250: GOT
         O 1130
   1170  IF N < .5 THEN MSG$ = M2$: GOSUB 2250
7A 1180  RM = MA$ - (N + 10 - 4) - LM
C1 1190  IF RM < = 0 THEN MSG$ = "LEFT MARGIN EXC
         EEDS RIGHT MARGIN": GOSUB 2250:RM = 66: GOT
         O 1130
38 1200  RM$ = N$
0B 1210  MS = "TM":MA$ = "8.0":MI$ = "0.2"
D7 1220  GOSUB 2330: IF ESCF = 1 THEN 420
   1230  N =  VAL (N$)
   1240  IF N < .2 THEN MSG$ = M1$: GOSUB 2250: GOT
         O 1210
BB 1250  ...
96 1260  TM =  INT (6 + N + .5)
3A 1270  TM$ = N$
F4 1280  MS = "BM":MA$ = "8.0":MI$ = "0.2"
16 1290  GOSUB 2330: IF ESCF = 1 THEN 420
13 1300  N =  VAL (N$)
3E 1310  IF N < .2 THEN MSG$ = M1$: GOSUB 2250: GOT
         O 1280
90 1320  IF N < .2 THEN MSG$ = M2$: GOSUB 2250
DE 1330  BM = 66 -  INT (6 + N + .5)
   1340  IF TM < = 0 THEN MSG$ = "TOP MARGIN EXC
         EEDS BOTTOM MARGIN": GOSUB 2250: GOTO 1210
D6 1350  BM$ = N$

A4 1360  GOTO 990
7C 1370  POKE 26,TM: POKE 27,BM: POKE 28,LM: POKE
         29,RM
B3 1380  HOME : VTAB 10: PRINT "BE SURE YOUR PRINTE
         R IS READY": VTAB 10: PRINT "PRESS RETURN T
         O CONTINUE: ": GET A$
A2 1390  HOME : VTAB 15: PRINT "PRESS ESCAPE TO CA
         NCEL PRINTING."
12 1400  VTAB 12: PRINT "PRESS SPACE BAR TO CONTIN
         UE: "
38 1410  PRINT "PRINT"
71 1420  PRINT  CHR$ (9)"80N": POKE 233,1: CALL 26
         112: POKE 233,0
FD 1430  PRINT D$"PR#0"
45 1440  GOTO 420
2C 1450  :
04 1460  REM   HELP SCREEN
33 1470  :
6B 1480  TEXT : HOME
41 1490  NORMAL : PRINT "              HELP SCREEN":
         REM   13 SPACES
41 1500  PRINT : PRINT
B8 1510  PRINT "<ARROWS> - MOVE CURSOR"
43 1530  PRINT "<ESCAPE> - RETURN TO MAIN MENU"
F0 1540  PRINT : PRINT
CD 1550  PRINT "<DELETE> - DELETE CHAR LEFT OF CUR
         SOR"
42 1560  PRINT : PRINT
E5 1570  PRINT "<CTRL>-D - DELETE CHAR UNDER CURSO
         R"
58 1580  PRINT : PRINT
A3 1590  PRINT "<CTRL>-E - CHANGE INSERT/REPLACE C
         URSOR"
F0 1600  PRINT : PRINT
F9 1610  PRINT "<CTRL>-Y - CLEAR FROM CURSOR TO EO
         L"
1D 1620  PRINT : PRINT
C0 1630  PRINT "<CTRL>-Z - SHOW CR'S AS INV ASTERI
         SK"
71 1640  PRINT : PRINT
E8 1650  PRINT "<TAB> -  MOVE CURSOR TO NEXT TAB
         POS"
94 1660  PRINT : PRINT
AE 1670  PRINT "<CTRL>-R - MOVE TO FIRST LINE"
DF 1680  PRINT "<CTRL>-C - MOVE TO CENTER LINE"
DF 1690  PRINT "<CTRL>-L - MOVE TO LAST LINE"
C8 1700  HTAB 1: VTAB 24: PRINT "PRESS RETURN TO C
         ONTINUE: ": GET A$: GOTO 420
CC 1710  :
6F 1720  REM   QUIT
EE 1730  :
69 1740  HOME : VTAB 10: PRINT "DO YOU REALLY WANT
         TO QUIT (Y/N)? ";
56 1750  GET A$
7D 1760  IF A$ = "Y" OR A$ = "y" THEN 1790
2B 1770  IF A$ = "N" OR A$ = "n" THEN 420
7A 1780  GOTO 1750
C1 1790  HOME : END
00 1800  :
6A 1810  REM   FILENAME INPUT ROUTINE
2C 1820  :
9B 1830  HOME :N$ = "":ESCF = 0
04 1840  VTAB 2: PRINT "ENTER FILENAME FOR DOCUMEN
         T": PRINT : PRINT
C4 1850  PRINT "PRESS '?' TO CATALOG DISK": PRINT
         : PRINT
C2 1860  PRINT "ESCAPE ON 1ST CHAR RETURNS TO MAIN
         MENU": PRINT
7D 1870  PRINT "ESCAPE ON ANY OTHER CHARACTER":
         PRINT "CANCELS INPUT AND STARTS OVER":
         PRINT
4D 1880  PRINT "RETURN ACCEPTS INPUT"
FB 1890  HTAB 1: VTAB 15: PRINT "FILENAME: ";
0B 1900  GET C$
1F 1910  IF C$ = E$ THEN ESCF = 1: RETURN
92 1920  IF C$ = "?" THEN  PRINT D$ LEFT$ ("CATALO
         G",7 - 4 + PRODOS)",S"ST",D"DR: HTAB 1: VTA
         B 24: PRINT "PRESS RETURN TO CONTINUE: ";:
         GET A$: GOTO 1830
F0 1930  AN =  ASC (C$)
1C 1940  IF AN > 96 AND AN < 123 THEN AN = AN - 32
CE 1950  IF AN < 65 OR AN > 90 THEN MSG$ = "FIRST
```

```
72      POSITION MUST BE A LETTER": GOSUB 2250: GOTO 1830
        1960 PRINT CHR$ (8)
29      1970 N$ = CHR$ (8)
70      1980 FOR K = 1 TO 15
17      1990 HTAB 1: VTAB 18: CALL - 958
17      2000 VTAB 15: HTAB (11 + K)
00      2010 GET C$
27      2020 IF C$ = E$ THEN K = 15: NEXT : GOTO 1830
23      2030 IF C$ = CHR$ (8) AND K = 1 THEN K = 15: NEXT : GOTO 1830
DB      2040 IF C$ = CHR$ (8) THEN K = K - 1: HTAB (
        1 1 + K): PRINT " ":N$ = LEFT$ (N$,K): GOTO
        2000
88      2050 IF C$ < R$ THEN LC = K:K = 15: GOTO 2110
53      2060 AN = ASC (C$)
99      2070 IF AN > 96 AND AN < 123 THEN AN = AN - 32
EE      2080 IF (AN < 65 OR AN > 90) AND (AN < 48 OR
        A N > 57) AND < > 46 THEN MSG$ = "CHARACT
        ER CANNOT BE USED IN FILENAME": GOSUB 2250:
        GOTO 1990
D9      2090 PRINT CHR$ (8)
81      2100 N$ = N$ + C$
96      2110 NEXT
27      2120 IF C$ < > R$ THEN MSG$ = "FILENAME TOO L
        ONG, LIMIT - 15 CHARACTERS": GOSUB 2250:
        GOTO 1830
94      2130 FLS = N$
72      2140 FOR I = 0 TO 15
DF      2150 POKE FADDR + I,0
A6      2160 NEXT
71      2170 FOR K = 1 TO LEN (N$)
81      2180 POKE FADDR - 1 + K, ASC ( MID$ (N$,K,1))
        + 128
54      2190 NEXT
38      2200 POKE FADDR + LC,0
27      2210 RETURN
72      2220 :
73      2230 REM   ERROR MESSAGES
56      2240 :

3B      2250 PRINT B$
02      2260 HTAB 1: VTAB 18
3E      2270 PRINT MSG$: PRINT : PRINT
A1      2280 PRINT "PRESS RETURN AND TRY AGAIN: ";:
        POKE - 16368,0: GET A$
62      2290 RETURN
D4      2300 :
A7      2310 REM   PRINTER MARGIN ROUTINE
F6      2320 :
A8      2330 HOME :N$ = "":ESCF = 0
4A      2340 VTAB 2: PRINT "ENTER VALUE FOR "N$: PRINT
        "MAXIMUM 'MAAS' - MINIMUM 'MIN$: PRINT
41      2350 PRINT "ESCAPE ON 1ST CHAR RETURNS TO MAIN
        MENU": PRINT
E7      2360 PRINT "ESCAPE ON ANY OTHER CHARACTER":
        PRINT "CANCELS INPUT AND STARTS OVER":
        PRINT
DA      2370 PRINT "RETURN ACCEPTS INPUT"
D8      2380 PRINT : PRINT "RETURN ON 1ST CHAR ACCEPTS
        DEFAULT (1.0)"
BC      2390 HTAB 15: VTAB 15: PRINT M$:   1.0"
C3      2400 HTAB 5: VTAB 15
A7      2410 GET C$
C2      2420 IF C$ = E$ THEN ESCF = 1: RETURN
B6      2430 IF C$ = R$ THEN N$ = '1.0": RETURN
3F      2440 AN = ASC (C$)
3F      2450 IF AN < 48 OR AN > 57 THEN MSG$ = M3$:
        GOSUB 2250: GOTO 2330
46      2460 PRINT C$;: CALL - 868
47      2470 N$ = C$
58      2480 HTAB 1: VTAB 15
3D      2490 VTAB 15: HTAB (5 + K): CALL - 958
C2      2500 GET C$
54      2510 IF C$ = E$ THEN K = 3: NEXT : GOTO 2330
C7      2520 IF C$ = CHR$ (8) AND K = 1 THEN K = 3:
        NEXT : GOTO 2330
A4      2540 IF C$ = CHR$ (8) THEN K = K - 1: HTAB (5
        + K): PRINT " ":N$ = LEFT$ (N$,K): GOTO 2
        500
3A      2550 IF C$ = R$ THEN K = 3: GOTO 2600
FE      2560 AN = ASC (C$)
```

LISTING 1: NIBBLEWRITER

```
EC  2570 IF (AN < 48 OR AN > 57) AND AN < > 46
         THEN AN$ = M3$: GOSUB 2250: GOTO 2490
55  2580 PRINT C$
27  2590 NS = NS + C$
D4  2600 IF C$ < > R$ THEN MSG$ = "INPUT TOO LONG
         LIMIT - 3 CHARACTERS": GOSUB 2250: GOTO
         330
C0  2620 RETURN
33  2630 :
8D  2640 REM ERASE CURRENT DOCUMENT?
8D  2650 :
D2  2660 HOME: ESCF = 0: VTAB 8: PRINT "YOU ARE AB
         OUT TO ERASE": PRINT "THE CURRENT DOCUMENT
         ."
C5  2670 VTAB 12: PRINT "DO YOU REALLY WANT TO DO
         THIS? (Y/N)"
4A  2680 GET A$
8D  2690 IF A$ = "N" OR A$ = "n" THEN ESCF = 1:
         RETURN
09  2700 :
D4  2710 IF A$ < > "Y" AND A$ < > "y" THEN 2680
09  2720 :
B4  2730 REM SELECT SLOT AND DRIVE
8D  2740 :
C5  2750 HOME: VTAB 1: PRINT "WHICH SLOT DO YOU WA
         NT TO USE? (1-7)"
D8  2760 GET A$
C5  2770 IF A$ > "2" AND A$ < = CHR$ (54 + PR
         ODDS) THEN PRINT A$:ST = VAL (A$): GOTO
         2790
4C  2780 GOTO 2760
F2  2790 VTAB 5: PRINT "WHICH DISK DRIVE": PRINT "
         DO YOU WANT TO USE? (1-2)"
52  2800 GET A$
F4  2810 IF A$ = "1" OR A$ = "2" THEN PRINT A$:DR
          = VAL (A$): GOTO 2830
58  2820 GOTO 2800
01  2830 POKE 216,0: ONERR GOTO 2870: IF PRODOS
         THEN D$ "PREFIX.$/";ST;",D";DR
42  2840 IF PRODOS THEN GOTO 420
01  2850 PRINT D$ "VERIFY JUNK.S";ST;",D";DR
01  2860 GOTO 420
6A  2880 POKE 216,0: EL = PEEK (222) EL = PEEK (2
         18) * 256 - PEEK (219): IF EL = 2850 AND
          E = 6 THEN 420
    2880 PRINT "DISK ERROR": PRINT "PRESS
         RETURN TO CONTINUE": POKE - 16368,0: GE
         T AA$: GOTO 420
F2  2890 :
C5  2900 REM DATA FOR MAIN MENU
8D  2910 :
D0  2920 MSG$ (0) = "MAIN MENU, START NEW DOCUMENT,LOAD
         DOCUMENT, SAVE DOCUMENT,RENAME DOCUMENT,CON
         TINUE WITH CURRENT DOCUMENT,PRINT DOCUMENT,
         HELP,SET SLOT/DRIVE,QUIT
F5  2930 :
61  2940 REM MENU HANDLER
5B  2950 :
D4  2960 SL = SE
8D  2970 N = SLOS = SL: GOSUB 3000: Z = 0: VTAB 24:
         HTAB 24: PRINT CALL - 868: - 868, POKE - 16384,0
D3  2980 VTAB 24: HTAB 3W: PRINT SL; - HTAB 1638
         4,128:Z = PEEK ( - 16384) - 1287: IF Z >
          = 49 AND Z < = 48 + MX THEN Z - 48:N =
         Z < NOT Z = 0: GOTO 2970
39  2990 Z = (Z = 21 OR Z = 10) - (Z = 8 OR Z = 21)
          + 10 - (Z = 13) - (Z = 2) * (Z = 27) ON NOT
         Z GOTO 2980:N = SL + Z - (Z < 10):N = SL -
         MX - (SL > MX) + MX * (SL < 1): N = OS:
         GOSUB 3000 :N = 2 + Z: GOTO 2970:SE = SL
71  3000 VTAB 3 + 2 + N: HTAB XA: PRINT X$(SL = OS
         9) ;: RETURN
24  3010 :
CC  3020 REM PRINT A MENU
58  3030 :
88  3040 HOME: MSG$(0): VTAB 1: PRINT "NIBB
         LEWRITER" (C)1988 MICROSPARC, INC: VTAB
         2: FOR I = 1 TO 40: PRINT "-": NEXT
6F  3050 VTAB 3: HTAB INT ((40 - LEN (TL$)) / 2)
2E  3060 PRINT TL$
```

```
56  3070 FOR I = 1 TO MITEMS: VTAB 3 + 2 + I: HTAB
         8: PRINT I;". ";MENU$(I): NEXT
26  3080 VTAB 24: HTAB 1: PRINT "USE ARROWS/NUMBER
         S & PRESS RETURN;
B1  3090 RETURN
33  3100 :
D2  3110 REM DISK ERRORS
33  3120 :
88  3130 HOME: VTAB 10
92  3140 POKE 216,0
B1  3150 IF PEEK (222) = 6 OR PEEK (222) = 7 THE
         N MSG$ = "FILE (" + FL$ + ") " + CHR$ (13)
          + "IS NOT ON THIS DISK.": ON (( PEEK (218)
          * 256 - PEEK (219) = 320) + 1) GOTO 3210.
         3230
F7  3160 IF PEEK (222) = 13 THEN MSG$ = "FILE ("
          + FL$ + ") " + CHR$ (13) + "IS NOT A BINAR
         Y FILE.": GOTO 3210
B1  3170 IF PEEK (222) = 9 OR PEEK (222) = 17
         THEN MSG$ = "DISK OR DIRECTORY IS FULL.":
         GOTO 3210
B1  3180 IF PEEK (222) = 10 THEN MSG$ = "EXISTING
          FILE (" + FL$ + ") " + CHR$ (13) + "IS LOC
         KED.": GOTO 3210
    3190 MSG$ = "SYSTEM ERROR: " PEEK (222);" HAS
         OCCURRED"
C7  3200 PRINT "AT LINE #"; PEEK (218) + PEEK (21
         9) - 256: MSG$ = "
E3  3210 GOSUB 2250
09  3220 GOTO 420
    3230 VTAB 24: PRINT "BINARY FILE NOT FOUND":
         END
```

TOTAL: E08B

END OF LISTING 1

LISTING 2: NW.BIN Source Code

```
 1  *
 2  * NW.BIN SOURCE CODE
 3  * BY ROBERT T. YUILLE
 4  * COPYRIGHT (C) 1992
 5  * BY MICROSPARC, INC.
 6  * CONCORD, NH  01742
 7  *
 8  * THE ASSEMBLER V3.1
 9  *
10  *
11  TM      EQU $20      ; TOP MARGIN
12  BM      EQU $21      ; BOTTOM MARGIN
13  LM      EQU $22      ; LEFT MARGIN
14  NFF     EQU $2A      ; NEW FILE FLAG
15  NEWP    EQU $1B      ; NEW PAGE FLAG
16  PRNTF   EQU $42      ; PRINTER FLAG
17  MBS     EQU $3C      ; MEM MOVE START ADDR
18  MBE     EQU $3E      ; MEM MOVE END ADDR
19  MWD     EQU $42      ; MEM MOVE DESTINATION ADDR
20  CH      EQU $24      ; CURSOR HORIZONTAL
21  CURSOR  EQU $28      ; CURSOR CHARACTER
22  NXTCHR  EQU $FC      ; NEXT CUSTOM CHAR
23  PFOS    EQU $FF      ; PRINTER POSITION
24  VLO     EQU $06      ; 
25  VHI     EQU $07      ; WORD MOVES
26  EFL     EQU $08      ; EFL - LOW
27  EFH     EQU $09      ; & HIGH BYTES
28  TMP1    EQU $1A      ; TEMPORARY
29  TMP2    EQU $1B      ; BUFFERS
31  WINDX   EQU $20      ; WINDOW BOTTOM
32  WINDB   EQU $21      ; WINDOW POSITION
33  CV      EQU $25      ; CURSOR VERT POSITION
34  CS      EQU $25      ; CURSOR VERT POSITION
35  BASL    EQU $28      ; SCREEN LINE ADDRESS
36  KBD     EQU $C000    ; KEYBOARD KEY
37  STROBE  EQU $C010    ; KEYBOARD STROBE
38  OUTNUM  EQU $ED24    ; PRINT OUT NUMBER
39  RLF     EQU $FC1A    ; REVERSE LINE FEED
40  LF      EQU $FC66    ; 
41  CLEOF   EQU $FC42    ; CLEAR TO END OF FILE
42  CLEOL   EQU $FC9C    ; CLEAR TO END OF LINE
43  COUT    EQU $FDED    ; OUTPUT CHARACTER
44  BELL    EQU $FBDD    ; RING BELL
45  *
46  *
47  *
48  *
49          ORG $6600
50  *
51  *
52  * START PROGRAM
53  *
```

LISTING 2: NW.BIN Source Code

```
54              CLD
55              JMP ENTRY
56 FILENAME ASC 0.0
57              ASC 'FILE:'
58              DFS 16
59 ENTRY    JSR PRNTF      ; CHECK PRINT FLAG
60              BEQ ENT1
61              JMP PRINT
62 ENT1     JSR PREP       ; PREP SCREEN
63              JSR HOME
64              JSR SETCH      ; SET WINDOW POINTER
65              LDA NEWF       ; CHECK FOR TYPE
66              BNE ENT2       ; OF ENTRY
67 NEWDOC    LDA NEWLN      ; MAKE A NEW LINE
68              LDY #2
69              STY NEWF
70              DEY
71              STY LLN
72              STY FLN
73              JMP ENT3
74 ENT2     CLD
75              BEQ CURRDOC
76 LOADOC    LDA #2
77              STA NEWF
78              JSR FENDOC     ; FIND END OF DOCUMENT
79              JSR SAVALL
80              LDA #2
81              INY
82              STY FLN        ; SET FIRST LINE TO 1
83              LDA LN
84              STY FLN        ; SET LAST LINE
85              JSR PRNTDOC1   ; PUT DOCUMENT ON SCREEN
86              LDY #0
87              STY CRSF
88 CURRDOC   JSR CSR1       ; SET CURSOR
89              JMP CSR1
90 ;***********************
91 ; GET NEXT KEY PRESS
92 ;***********************
93 NXTKEY   JSR PRNTDOC    ; PRINT DOCUMENT
94 NXTKEY1  JSR PRNTLC     ; PRINT LINE & COL #'S
95              LDA #0
96              STA GRF        ; 0-FLAGS
97              STA FCMDF      ; --
98              JSR KEYIN      ; GET KEYPRESS
99 CMDLP    LDY #0
100             LDY CMDCODE    ; CHECK FOR
101             BEQ CMD        ; COMMANDS
102             DEY
103             CMP #$40       ; SCREEN REST OF
104             BPL CMDLP      ; CONTROL CHARACTERS
105             BCS NXI1
106             JMP BAD
107 NXI1     JMP NORMAL     ; CHARACTER FROM DOCUMENT
108 CMD      MOV A          ; FOUND COMMAND
109             TAY            ; IN TABLE
110             ASL
111             TAY
112             LDA CMDADR,Y
113             STA TMP
114             LDA CMDADR+1,Y
115             STA TMP1
116             JMP (TMP)      ; GO TO COMMAND
117 ;***********************
118 ; CHANGE CURSOR
119 ; INSERT/REPLACE
120 ;***********************
121 CHGCSR   LDA IMODE      ; TOGGLE
122             EOR #$80       ; IMODE
123             STA IMODE      ; FLAG
124 CSR1     LDA IMODE
125             BNE CSR3       ; SET
126 CSR2     LDA #$FF       ; CURSOR
127             STA CURSOR     ; CHARACTER
128 CSR3     STA #$0F
129             STA CURSOR     ; --
130             JMP NXTKEY1    ; --
131 ;***********************
132 ; ESCAPE KEY
133 ;***********************
134 ESC      JSR SAVALL
135             JSR FENDOC     ; SET END OF
136             JSR NETLN      ; DOCUMENT
137             LDA CML        ; POINTER
138             STA EFL
139             LDA CMH        ; --
140             STA EFH        ; --
141             RTS
142 ;***********************
143 ; RIGHT ARROW
144 ;***********************
145 RARR     JSR CCELN      ; END OF LINE?
146             BEQ RA1        ; YES
147             INC CH
148             JMP NXTKEY1
149 RA1      JSR CKLWF      ; LAST LINE OF DOC?
150             BEQ BAD        ; YES
151             JSR CKLLB      ; BOTTOM OF WINDOW?
152             BEQ BAD        ; YES
153             STA CH
154 RA2      JSR CKWINB     ; BOTTOM OF WINDOW?
155             BEQ RA3        ; YES
156             JSR SETNXTLN   ; GO TO NEXT LINE
157             JMP NXTKEY1
158 RA3      INC FLN        ; SCROLL UP
159             JSR NXTLN
```

```
163             JMP NXTKEY     ; --
164 ;***********************
165 ; LEFT ARROW
166 ;***********************
167 LARR     LDY CH         ; BEGINNING OF LINE?
168             BEQ LA1        ; YES
169             DEC CH
170             JMP NXTKEY1
171 LA1      JSR CKLNI      ; FIRST LINE OF DOC?
172             BEQ BAD        ; YES
173             LDA #39
174             STA CH
175 LA2      JSR CKWINT     ; TOP OF WINDOW?
176             BEQ LA3        ; YES
177             JSR SETPRELN   ; GO TO PREVIOUS LINE
178             JMP NXTKEY1
179 LA3      JSR FLN        ; --
180             JSR PRELN      ; SCROLL DOWN
181             JMP NXTKEY     ; --
182 ; BAD ENTRY
183 BAD      JSR BELL
184             JMP NXTKEY1
185 ;***********************
186 ; DOWN ARROW
187 ;***********************
188 DNARR    JSR CKLWT      ; --
189             BEQ BAD
190             JSR CKLLB
191             BEQ BAD        ; --
192             JMP RA2
193 ;***********************
194 ; UP ARROW
195 ;***********************
196 UPARR    JSR CKLNI
197             BEQ BAD
198             JMP LA2
199 ;***********************
200 CKLLB    LDY #40
201             LDA (CML),Y
202             RTS
203 ; TAB
204 TAB      LDA CH
205             CMP #35        ; 35 OR MORE?
206             BCS BAD        ; YES
207             CMP #5         ; LESS THAN 5?
208             BCC RA9        ; NO
209             LDA #5
210             JMP TB4        ; SET TO 5
211 TB2      LDA #35        ; --
212             STA TMP        ; --
213 TBLP1    LDA CH         ; FIND
214             SEC            ; POSITION
215             SBC TMP        ; OF CURSOR
216             BCS TB2        ; --
217             DEC TB3        ; --
218             BCS TB4        ; --
219 TB3      LDA TMP        ; AND SET TO
220             SEC            ; NEXT TAB
221             SBC #5         ; POSITION
222             JMP TBLP1      ; --
223 TB3      CLC            ; --
224             LDA TMP        ; --
225             ADC #5         ; --
226             JMP NXTKEY1    ; --
227 ;***********************
228 ; MOVE TO FIRST LINE OF DOC. <CTRL>-F
229 ;***********************
230 FRSTLN   LDA #1
231             STA FLN
232 FST1     JSR SETPLN     ; SET MEM PTR TO FIRST LINE
233             JSR HOME
234             JMP NXTKEY
235 ;***********************
236 ; MOVE TO CENTER OF DOC. <CTRL>-C
237 ;***********************
238 CNTRLN   LDA LLN
239             LSR
240             STA FLN
241             JMP FST1
242 ;***********************
243 ; MOVE TO END OF DOC. <CTRL>-L
244 ;***********************
245 LASTLN   LDY LLN
246             DEY
247             STY FLN
248             JMP FST1
249 ;***********************
250 ; <CTRL>-Y
251 ; CLEAR TO EOL
252 ;***********************
253 CLEAREOL LDY CH         ; --
254 CLLP     STA (CML),Y    ; FILL REST
255             INY            ; OF MEMORY
256             CPY #40        ; FOR LINE
257             BNE CLLP       ; WITH ZEROS
258             JSR SAVALL
259             LDA CH
260             BNE CLR1
261             JMP BLANKLN    ; DELETE BLANK LINE
262 CLR1     JMP MRAP1      ; WRAP UP
263 ;***********************
264 ; <CTRL>-S - TOGGLE
265 ; DISPLAY OF CR'S
266 ;***********************
267 SHOWCR   LDA CRSF       ; TOGGLE
268             EOR #$80       ; CR SHOW
269             STA CRSF       ; FLAG
270             STA CRSF       ; --
271             JMP NXTKEY1    ; --
272 ;***********************
273 ; CARRIAGE RETURN
274 ;***********************
```

LISTING 2: NW.BIN Source Code *continued*

```
275  RTN    JSR CKLMT     ; DOCUMENT FULL?
276          BNE CR1       ; NO
277          JMP BAD
278  CR1     JSR CHECK1    ; FURTHER CHECKS
279          LDY CH        ; BEGINNING OF LINE?
280          BEQ CR2       ; YES
281          JSR CHECK2    ; MORE CHECKS
282          JSR CKELN     ; END OF LINE?
283          BEQ CR3       ; YES
284          JSR CKACSR    ; 0 AFTER CURSOR?
285          BNE CR4
286  CR3     INC CRF
287  CR4     JMP GTWROLN1  ; GET LENGTH TO EOL
288          LDY #39
289  CRLP    JSR CCRM      ; --
290          BNE CR5       ; CARR RETURN
291                        ; IN WORD
292          CPY CH        ; TO BE
293          DEY           ; MOVED?
294          CPY CH
295          BNE CRLP
296          JSR CKFDOC    ; DOCUMENT FULL?
297          BNE CR6       ; NO
298          JMP BAD
299  CR6     JSR MBLANKLN  ; MAKE A BLANK LINE
300          LDA IMODE     ; INSERT MODE?
301          BNE CR8       ; NO
302          DEC MRDLEN    ; ONE LESS CHARACTER
303  CR7     JSR MOVWROW   ; MOVE WORD DOWN
304  CR8     LDA CH        ; PUT
305          STA (CML),Y   ; CR IN
306          STA (CML),Y   ; MEMORY,
307          LDA #0        ; MOVE TO
308          STA CH        ; BEG OF
309          JSR SETNXTLN  ; NEXT LINE
310          LDA CRF       ; CR MOVED?
311          BEQ CR9       ; NO
312          JMP NXTKEY
313  CR9     JSR SAVALL    ; WRAP UP
314          JMP NRAP1     ; WRAP UP
315  ; ***************
316  ; - DELETE CHARACTER
317  ; ***************
318  DELETE  JSR CKLMT     ; DOCUMENT FULL?
319          BNE DEL1      ; NO
320          JMP BAD
321  DEL1    JSR CHECK1    ; --
322          BNE DEL2
323          LDY CH
324          BNE DEL4
325          JMP BAD
326  DEL2    JSR CKRINT
327          BNE DEL3
328          DEC FLN       ; SCROLL
329          JSR LF        ; DOWN
330  DEL3    JSR CKRINB
331          BNE DEL4
332          INC FLN       ; SCROLL
333          JSR PRNTDOC   ; UP
334  DEL4    JSR UP
335  DEL5    LDY #80
336          CPY #39       ; <CTRL>-D?
337          BEQ DEL6
338          LDY CH
339          BNE DEL5
340          JSR SETPRELN  ; MOVE TO END
341          LDA #39       ; OF PREVIOUS
342          STA CH        ; LINE
343  DEL6    JSR CKUCSR    ; MOVE TO
344          BNE DEL7      ; CHARACTER
345          DEC FLN
346  DEL7    JSR NXTKEY    ; --
347          DEC CH
348  DEL6    JSR CKUCSR    ; 0 UNDER CURSOR?
349          BNE DEL7      ; NO
350          JMP NXTKEY    ; YES
351  DEL7    JSR CKELN     ; END OF LINE?
352          BEQ DEL8      ; YES
353          JSR CKACSR    ; CR UNDER CURSOR?
354          BNE DEL8      ; NO
355          JSR STORHM    ; PUT 0 IN MEM
356  DEL8    LDY CH
357          LDA #$0D      ; PUT 0 IN
358          STA (CML),Y   ; MEM
359          LDY #CR
360  DEL9    JSR BLANKLN
361          JMP WRAP1
362  DELP2   LDY #39       ; --
363  DEL9    LDA (CML),Y   ; MOVE EACH
364          DEY           ; OF LINE TO
365          STA (CML),Y   ; LEFT ONE
366          CMP #$0D      ; POSITION &
367          BNE DEL10     ; CHECK FOR
368          INC STOPF     ; CR
369  DEL10   JSR CR
370          CPY #39
371          BNE DELP2     ; PUT 0 AT EOL
372          JSR STORHM    ; LINE #1?
373          JSR CKLNI     ; YES
374          BEQ WRAP
375          LDY #CR
376  DELP3   LDA (CML),Y   ; GET WORD
377          INY           ; LENGTH TO
378          CMP #$0D      ; BEGINNING
379          BEQ DEL11     ; OF LINE
```

```
380          CMP #0
381          BEQ DEL11
382          CMP #120
383          BNE DELP3
384  DEL11   STY MRDLEN    ; --
385          LDA CH        ; CURSOR IN
386          CMP MRDLEN    ; FIRST WORD?
387          BCS WRAP      ; NO
388          JSR FNDLEN    ; CR IN
389          JSR CKACSR    ; PREVIOUS LINE?
390          LDA CRF
391          BEQ DEL12     ; NO
392          STA CRF
393  DEL12   JSR RUTLN     ; MOVE TO NEXT LINE
394          JMP WRAP      ; AND WRAP UP
395  DEL12   JSR RUTLN     ; COUNT 0'S AT EOL
396          JSR RUTLN
397          LDA LEN0      ; WILL FIRST WORD FIT
398          CMP MRDLEN    ; AT END OF PREVIOUS
399          BCS WRAP      ; LINE?
400          JSR SETPRELN  ; MOVE TO
401          SEC           ; PREVIOUS LINE.
402          LDA #40
403          SBC MRDLEN
404          CLC
405          ADC CH
406          STA CH        ; SET CH.
407          LDA #0        ; RESET
408          STA SAVALL    ; FLAG.
409          STA STOPF     ; AND
410  DELP4   JSR SAVALL    ; WRAP UP
411          JSR WRAP2     ; WRAP UP
412  ; ---------------
413  ; - WRAP UP WORD
414  ; ---------------
415  WRAP    LDA SAVALL    ; STOP FLAG SET?
416          STA DEND      ; YES
417          BEQ WRAP1     ; NO
418  WRAP1   JSR CHNXTLN0  ; @ AT BEG OF NEXT LINE?
419          BEQ DEND      ; YES
420  WRAP1   JSR CHKWRD    ; ROOM FOR WORD AT
421          LDA STOPF     ; END OF LINE?
422          BNE DEND      ; NO
423  WRAP2   JSR RUTLN     ; MOVE WORD UP
424          JSR MOVLNL    ; FILL IN WHERE
425          JSR MOVLN0    ; WORD MOVED
426          LDA CRF       ; CR MOVED?
427          BNE BLANK     ; YES
428          JSR STOPF     ; CR ON LINE?
429          BNE DEND      ; YES
430          JMP WRAP1     ; CONTINUE TO WRAP UP
431  BLANKLN JSR CKLLN     ; LAST LINE?
432          BEQ DEND      ; YES
433          JSR CKNXTLN0
434          BEQ BLK1      ; YES
435          JSR SETMMD    ; --
436          JSR SETMMS    ; SET MEMORY
437          JSR FENDOC1   ; POINTERS AND
438          JSR SETMWE1   ; MOVE MEMORY
439          JSR MOVWN     ; --
440  BLK1    DEC LLN       ; REMOVE LINE FROM
441  DEND    JSR RESALL    ; END
442          JMP NXTKEY
443  DEND    JSR RESALL
444          JMP NXTKEY
445  ; ---------------
446  ; - NORMAL CHARACTER
447  ; ---------------
448  NORMAL  JSR CKLMT
449          BNE NR1
450          JMP BAD
451  NR1     JSR CKELN
452          BNE NR2
453          JSR CKFDOC
454          BNE NR2
455          JMP BAD
456  NR2     LDA IMODE     ; INSERT MODE?
457          BEQ NR3       ; NO
458          JSR CKBELN    ; 0 AT EOL?
459          BEQ NR4       ; YES
460          JSR CKFDOC    ; DOCUMENT FULL?
461          BNE NR3       ; NO
462          JMP BAD
463  NR3     JSR CHECK1    ; --
464          JSR CKUCSR    ; CR UNDER
465          CMP #$0D      ; CURSOR?
466          BNE NR4       ; NO
467          JMP INSERT
468  NR4     LDY CH
469          BEQ NR6
470          JSR CHECK2    ; CR TO LEFT OF CURSOR?
471          LDA "NR"      ; NO
472          BEQ NR6       ; NO
473          JSR CKELN     ; END OF LINE?
474          BNE NR6       ; NO
475          JSR MBLANKLN  ; MAKE BLANK LINE &
476          JSR SETNXTLN  ; MOVE TO BEG OF BLANK LINE
477  NR5     JSR STORENT   ; STORE ENTRY
478          INY           ; & CR IN
479          STA (CML),Y   ; MEMORY
480          JSR NXTKEY
481  NR6     JSR CKELN     ; --
482          BNE NR5       ; --
483          LDA IMODE
484          BEQ NR7       ; --
485  NR6     JSR INSERT1   ; --
486          JSR INSERT1
487  NR7     JSR CKSPCCK   ; NEW CHAR A SPACE?
```

```
488        BNE NR10        ; NO
489        JSR STORENT
490        JSR NXTKEY
491 NR9    JMP NXTKEY1
492 NR8    JSR CKACSR      ; 0 AFTER CURSOR?
493        BEQ NR9         ; YES
494        LDA INODE
495        BEQ NR9
496        JMP INSERT
497 NR9    JMP NXTKEY1
498        JSR NXTKEY1
499 NR10   JSR CML),Y      ;--
500        JSR GETWRDLN    ; MOVE WORD
501        JSR MOVLNR1     ; WITH
502        JSR MOVWRDN     ; CURSOR
503        JSR SETNXTLN
504        LDA WRDLEN
505        STA CH
506        JSR SAVALL
507        JMP WRAP1
508 *************************
509 * INSERT CHARACTER
510 *************************
511 INSERT JSR SAVALL
512        JSR CKBKLN      ; 0 AT EOL?
513        BNE INS1        ; NO
514        JSR MOVLNR1     ; MAKE ROOM FOR
515        JSR STORENT     ; NEW CHARACTER
516        JMP NXTKEY
517 INS1   JSR GETWRDLN
518        JSR MBLANKLN
519        SEC             ;--
520        LDA #39         ; CURSOR IN
521        SBC WRDLEN      ; WORD TO
522        STA TMP         ; BE MOVED?
523        INC TMP
524        SBC CH
525        BCS INS5        ; NEW CHAR A SPACE?
526        JSR CKSPCK      ; NEW CHAR A SPACE?
527        BNE INS2        ; NO
528        JSR GTWRDLN1    ; GET REST OF WORD
529        JSR MOVWRDN     ; MOVE IT DOWN
530        LDY CH          ;--
531        JSR STRSPCW     ; STORE SPACE
532        JSR BRKXTLN
533        JSR SAVALL
534        LDA CRF         ; CR MOVED?
535        BNE INS3        ; YES
536        JMP WRAP1
537 INS2   JSR MOVWRDN     ; MOVE WORD,
538        SEC             ; SET CH.
539        LDA CH
540        SBC TMP
541        STA CH
542        JSR SETNXTLN    ; MOVE TO NEXT LINE
543        JSR MOVLNR1     ; MAKE ROOM
544        JSR STORENT     ; FOR NEW CHARACTER
545        JSR SAVALL      ;--
546        LDA CRF         ; CR MOVED?
547        BEQ INS4        ; NO
548 INS3   JMP DEND
549 INS4   JMP WRAP1       ;--
550 INS5   JSR MOVWRDN
551        JSR MOVLNR1
552        JSR STORENT
553        JSR SAVALL
554        LDA CRF
555        BNE INS3
556        JSR SETNXTLN
557        JMP WRAP1
558 *************************
559 INSERT1 JSR CKUCSR     ; 0 UNDER CURSOR?
560        BNE INS7        ; NO
561        JSR CKUCSR      ; NEW CHAR A SPACE?
562        BNE INS6        ; NO
563        JSR NXTLN
564        JMP NXTKEY
565 INS6   JSR SAVALL
566        JMP INS1
567 INS7   JSR SAVALL
568        JSR INS8
569        JMP INS1
570        JMP INS1
571 INS8   JSR BNXTLN
572 INS8   JMP INSERT
573        JMP INSERT
574 *************************
575 * GET KEYPRESS
576 *************************
577 KEYIN  LDY CURSOR      ; LOAD CURSOR CHAR
578        STY YSAV        ; SAVE IT
579        LDY CH          ; GET CHAR UNDER
580        PHA             ; ON SCREEN
581        LDA (BASL),Y    ; SAVE IT
582        STA NXTCSR      ; SAVE FOR NEXT CURSOR
583        LDY YSAV        ; GET BACK CURSOR CHAR
584        STA NXTCSR
585        LDY CH          ; PUT IT
586        STA (BASL),Y    ; ON SCREEN
587        PLA
588 KYLP   INC TMP
589        BNE KYN1        ; TIMING
590        LDA TMP1        ; FOR
591        INC TMP1        ; CURSOR
592        EOR TMP1        ; BLINK
593        AND #$40
594        BEQ KYN1
595        LDY CH          ;--
596        LDA (BASL),Y    ; SWITCH
597        LDY NXTCSR      ; CURSOR CHARACTER
598        STA NXTCSR      ; AND
```

```
600        TYA             ; CHARACTER
601        LDY CH          ; ON SCREEN
602        STA (BASL),Y    ;--
603 KYN1   BIT KBD         ; KEY PRESSED?
604        BPL KYLP        ; NO
605        LDY CH          ; RESTORE ORIGINAL
606        LDA (BASL),Y    ; SCREEN CHARACTER
607        LDX NXTCSR      ;--
608        STA (BASL),Y    ; GET KEYPRESS AND
609        STA NXTCSR      ; CLEAR HIGH BIT
610        RTS
611 *************************
612 * PREPARE SCREEN
613 *************************
614 PREP   LDX #FILENAME   ;--
615        LDX #FILENAME/  ; PRINT
616        LDA #MESSAGE    ; FILENAME
617        LDX #ESCMSG     ; AND ESCAPE
618        JSR MESSAGE     ; MESSAGE
619        LDA #1          ;--
620        STA TABV
621        LDY #0
622        LDA #$40        ;--
623 PELP1  STA (BASL),Y    ; "-"
624        INY
625        CPY #5
626        BNE PELP1
627        LDY #0          ;--
628 PELP2  LDA #$BA        ; ":"
629        STA (BASL),Y
630        INY
631        LDX #0          ;--
632 PELP3  LDA #$AD        ; PRINT TOP
633        STA (BASL),Y    ; AND BOTTOM
634        INY             ; LINES
635        INX
636        CPX #4
637        BNE PELP3
638        JSR PELP2
639        LDY #0
640        LDA #$22
641 PELP4  STA (BASL),Y
642        INY
643        LDA TABV
644        STA SAVALL
645        INY
646        CPY #40
647        BNE PELP4
648        LDA #2
649        STA MINDT       ; SET
650        LDA #22
651        STA WINDB       ; WINDOWS
652        RTS             ;--
653 *************************
654 * PRINT MESSAGE TO SCREEN
655 *************************
656 MESSAGE STA TMP
657        STY TMP1
658        LDY #0          ;--
659        LDA (TMP),Y
660        INY
661        STA TMP         ;--
662        LDA (TMP),Y
663        JSR SAVALL
664 WGLP   INY
665        LDA (TMP),Y     ;--
666        BEQ MSG1
667        JSR SAVALL
668        BNE WGLP
669 MSG1   JSR CLREOL
670        RTS
671 *************************
672 * SET MEMORY POINTER TO $7000
673 *************************
674 SETCH  LDA #0
675        STA CMH
676        LDA #$70
677        STA CMH
678        LDA #0
679        STA LN
680        RTS
681 *************************
682 * SAVE VARIABLES
683 *************************
684 SAVALL JSR SAVCSR
685        LDA CML         ;--
686        STA PTRSAV
687        LDA CMH
688        STA PTRSAV+1
689        LDA LN
690        STA LNSAV
691        RTS
692 *************************
693 * RESTORE VARIABLES
694 *************************
695 RESALL JSR RESCSR
696        LDA PTRSAV
697        STA CML
698        LDA PTRSAV+1
699        STA CMH
700        LDA LNSAV
701        STA LN
702        RTS
703 *************************
704 * SAVE CURSOR SETTINGS
705 *************************
706 SAVCSR LDA CH
707        STA CXSAV
708        LDA CV
709        STA CVSAV
710        RTS
```

LISTING 2: NW.BIN Source Code

```
711 .................
712 * RESTORE CURSOR SETTINGS
713 .................
714 RESCSR  LDA CHSAV
715         STA CH
716         LDA CVSAV
717         JSR TABV
718         RTS
719 .................
720 * MOVE MEMORY POINTER TO NEXT LINE
721 .................
722 NXTLN   CLC
723         LDA CML
724         ADC #40
725         BCC NXT1
726         INC CMH
727 NXT1    STA CML
728         INC LN
729         RTS
730 .................
731 * MOVE MEMORY POINTER TO PREVIOUS LINE
732 .................
733 PRELN   SEC
734         LDA CML
735         SBC #40
736         BCS PRE1
737         DEC CMH
738 PRE1    STA CML
739         DEC LN
740         RTS
741 .................
742 * SET MEM & CV TO NEXT LINE
743 .................
744 SETNXTLN JSR LF
745         JSR NXTLN
746         RTS
747 .................
748 * SET MEM & CV TO PREVIOUS LINE
749 .................
750 SETPRELN JSR UP
751         JSR PRELN
752         RTS
753 .................
754 * GO TO BEGINNING OF NEXT LINE
755 .................
756 BNXTLN  LDA #0
757         STA CH
758         JSR SETNXTLN
759         RTS
760 .................
761 * SET LINE TO FLN
762 .................
763 SETFLN  JSR SETCM
764 STLP    LDA LN
765         CMP FLN
766         BEQ SFN1
767         JSR NXTLN
768         JMP STLP
769 SFN1    RTS
```

```
770 .................
771 * MAKE NEW LINE
772 .................
773 NEWLN   LDA #0
774         LDY #40
775 NWLP    STA (CML),Y
776         DEY
777         BPL NWLP
778         INC LLN
779         RTS
780 .................
781 * FIND END OF DOCUMENT
782 .................
783 FENDOC  JSR SETCM
784 FENDOC1 LDY #0
785 FELP    LDA (CML),Y
786         BEQ FED1
787         JSR NXTLN
788         JMP FELP
789 FED1    RTS
790 .................
791 * SET MEM MOVE START
792 .................
793 SETMMS  JSR NXTLN
794         LDA CML
795         STA MMS
796         LDA CMH
797         STA MMS+1
798         RTS
799 .................
800 * SET MEM MOVE END
801 .................
802 SETMME  JSR FENDOC
803 SETMME1 JSR NXTLN
804         LDA CML
805         STA MME
806         LDA CMH
807         STA MME+1
808         RTS
809 .................
810 * SET MEM MOVE DESTINATION
811 .................
812 SETMMD  LDA CML
813         STA MMD
814         LDA CMH
815         STA MMD+1
816         RTS
817 .................
818 * MOVE MEM DOWN
819 .................
820 MOVDN   LDY #0
821         JSR MOVE
```

```
822              RTS
823  ************
824  * MOVE MEM UP
825  ************
826  MOVUP    LDY #3
827  MMLP     LDA (MME),Y
828           STA (MMD),Y
829           LDA MMS
830           CMP MME        ; REACHED START
831           LDA MMS+1      ; OF MEMORY
832           SBC MME+1      ; FOR MOVE?
833           BCS MVP3       ; YES
834           LDA MMD
835           BNE MVP1
836           DEC MMD+1
837  MVP1     DEC MMD
838           LDA MME
839           BNE MVP2
840           DEC MME+1
841  MVP2     DEC MME
842           BNE MMLP
843  MVP3     RTS
844  ************
845  * CHECKS #1
846  ************
847  CHECK1   JSR CKLLN      ; LAST LINE?
848           BNE CK11       ; NO
849           JSR NRTLN
850           JSR NEWLN
851           JSR PRELN
852  CK11     JSR CKMINB
853           BNE CK12
854           INC PLN        ; SCROLL
855           JSR PRNTDOC    ; UP
856  CK12     JSR PRELN
857           RTS
858  ************
859  * CHECKS #2
860  ************
861  CHECK2   LDA #0
862           STA TMP
863           JSR CKBCSR     ; 0 BEFORE CURSOR?
864           BEQ CK21       ; YES
865           CMP #$0D       ; CR BEFORE CURSOR?
866           BNE CK23       ; NO
867  CK21     LDY CH
868  CK2LP    DEY
869           LDA (CML),Y    ; --
870           BNE CK22       ; SPACES
871           JSR STRSPCM    ; FOR 0'S
872           CPY #0         ; BEFORE
873           BEQ CK24       ; CURSOR
874  CK22     CMP #$0D       ; CR BEFORE CURSOR?
875           BNE CK24       ; NO
876  CK23     INC TMP
877           JSR STRSPCM    ; STORE SPACE IN MEM
878  CK24     RTS
879  ************
880  * STORE ENTRY
881  ************
882  ************
883  * STORENT
884  STORENT  LDA KBD
885           LDY CH
886           STA (CML),Y
887           ORA #$80
888           JSR COUT
889           RTS
890  ************
891  * STORE SPACE IN MEM
892  ************
893  STRSPCM  LDA #$20
894           STA (CML),Y
895           RTS
896  ************
897  * STORE ZERO IN MEM
898  ************
899  STORON   LDA #0
900           STA (CML),Y
901           RTS
902  ************
903  * PRINT CHARACTER TO SCREEN
904  ************
905  PRCHAR   LDA (CML),Y
906           BEQ PRC1
907           CMP #$0D
908           BNE PRC2
909           LDA CRSF
910           BEQ PRC1
911           LDA #$2A       ; INVERSE ASTERISK
912           JMP PRC3
913  PRC1     LDA #$20
914  PRC2     ORA #$80
915  PRC3     STA (BASL),Y
916           RTS
917  ************
918  * PRINT 20 LINES OF DOCUMENT
919  ************
920  PRNTDOC  JSR SAVALL
921  PRNTDOC1 JSR SETFLN
922           LDA #2
923           STA TABV
924  PDLP1    LDY #39
925  PDLP2    JSR PRCHAR     ; PRINT
926           DEY            ; ONE
927           BPL PDLP2      ; LINE
928           LDA LN
929           CMP LLN        ; LAST LINE?
930           BEQ PD1        ; YES
931           LDA CV
932           CMP #21        ; OR BOTTOM OF WINDOW?
933           BEQ PD1        ; YES
934           JSR SETNXTLN   ; MOVE TO NEXT LINE

935           JMP PDLP1      ; AND PRINT IT
936  PD1      JSR RESALL
937           RTS
938  ************
939  * PRINT LINE & COL #'S
940  ************
941  PRNTLC   JSR SAVCSR
942           LDA #MSGLC     ; PRINT
943           LDX #MSGLC/    ; LINE/COLUMN
944           JSR MESSAGE    ; MESSAGE
945           LDA #5
946           STA CH         ; PRINT NEW
947           LDA #17        ; LINE NUMBER
948           LDX LN         ; MSB-ACC
949           JSR OUTNUM     ; LSB-X
950           LDA #17        ; --
951           STA CH         ; PRINT NEW
952           LDA #0         ; COLUMN
953           LDX CHSAV      ; NUMBER
954           INX
955           JSR OUTNUM     ; --
956           JSR RESCSR
957           RTS
958  ************
959  * VARIOUS CHECKS & TESTS
960  ************
961  CKELN    LDY CH
962           CPY #39
963           RTS
964  ************
965  CKBRLN   LDY #0
966           LDA (CML),Y
967           RTS
968  ************
969  CKBKLN   LDY #39
970           LDA (CML),Y
971           RTS
972  ************
973  CKBCSR   LDY CH
974           DEY
975           LDA (CML),Y
976           RTS
977  ************
978  CKUCSR   LDY CH
979           LDA (CML),Y
980           RTS
981  ************
982  CKACSR   LDY CH
983           INY
984           LDA (CML),Y
985           RTS
986  ************
987  CKNXTLNB LDY #40
988           LDA (CML),Y
989           RTS
990  ************
991  CKLN1    LDA LN
992           CMP #1
993           RTS
994  ************
995  CKFLN    LDA LN
996           CMP PLN
997           RTS
998  ************
999  CKLLN    LDA LN
1000          CMP LLN
1001          RTS
1002 ************
1003 CKLWT    LDA LN
1004          CMP #241
1005          RTS
1006 ************
1007 CKFDOC   LDA LN
1008          CMP #241
1009          RTS
1010 ************
1011 CKWINT   LDA CV
1012          CMP #2
1013          RTS
1014 ************
1015 CKWINB   LDA CV
1016          CMP #21
1017          RTS
1018 ************
1019 CKSPCN   LDA KBD
1020          CMP #$20
1021          RTS
1022 ************
1023 CKSPCM   LDA (CML),Y
1024          CMP #$20
1025          RTS
1026 ************
1027 CKCRM    LDA (CML),Y
1028          CMP #$0D
1029          RTS
1030 ************
1031 * GET WORD LENGTH FOR WRAP UP
1032 ************
1033 CKWRD    JSR KBD
1034          STA KWD
1035          LDY #0
1036          LDX #0         ; --
1037          LDA (CML),Y
1038          CMP #$20       ; GET LENGTH
1039          BEQ CKW1       ; OF FIRST
1040          CMP #$0D       ; OR FIRST
1041          BEQ CKW1       ; WORD
1042 CKLP1    INY            ; WORD
1043          LDA (CML),Y    ; ON LINE
1044          CMP #$20       ;
1045          BEQ CKW1       ;
1046          CMP #$0D       ;
1047          BEQ CKW1       ;
```

LISTING 2: NW.BIN Source Code

```
1048        BNE CWLP1
1049 CKW1   INY
1050        STY WRDLEN       ;--
1051        SEC              ; COMPARE TO
1052        CPY LENO          ; LENGTH OF 0'S
1053        BEQ CKW2         ; EQUAL
1054        INX
1055        DEY
1056        BCC CWLW1        ; SHORTER?
1057        CPX #1           ; FIRST WORD?
1058        BNE CWLP2        ; NO
1059        INC STOPF
1060        BNE CKW2
1061 CWLP2  DEY              ; STRIP OFF
1062        CPX CKSPCW
1063        BNE CWLP2        ; A WORD
1064        INY
1065        STY WRDLEN       ;--
1066 CKW2   JSR PRELN
1067        RTS
1068 ;**********************************
1069 ; GET LENGTH OF WORD AT END OF LINE
1070 ;**********************************
1071 GWTDLN LDA #0
1072        JSR CKBCLN
1073        CMP #$D0         ; CHECK FOR
1074        BNE GWLP1        ; WORD
1075        INC CRF
1076        BEQ GTW1
1077        CPY #0
1078        DEY
1079        INX
1080        JSR CWLP1
1081        CPX CKSPCW
1082        BNE GWLP1
1083        INX
1084 GTW1   LDA #1
1085        STA WRDLEN
1086        RTS
1087 ;**********************************
1088 ; GET LENGTH FROM CURR TO END LINE
1089 ;**********************************
1090 GTWRDLN1 SEC
1091        LDA #40
1092        SBC CH
1093        STA WRDLEN
1094        INX
1095        RTS
1096 ;**********************************
1097 ; MOVE WORD UP
1098 ;**********************************
1099 MOVWRDUP SEC
1100        LDA #40
1101        STA YHI
1102        SBC LENE
1103        STA YLO
1104 MVLP   LDY THI
1105        LDY YLO
1106        LDA (CWL),Y
1107        LDY YLO
1108        STA (CWL),Y
1109        INC YHI
1110        BNE MVLP
1111        INC YHI
1112        DEX
1113        BNE MVLP
1114        RTS
1115 ;**********************************
1116 ; MOVE WORD DOWN
1117 ;**********************************
1118 MOVWRDN SEC
1119        LDA #40
1120        STA YHI
1121        SBC WRDLEN
1122        STA YLO
1123 MDLP1  LDY YLO
1124        LDA (CWL),Y
1125        BEQ WMD1
1126        LDY YHI
1127        LDA (CWL),Y
1128        INC YHI
1129        LDY YLO
1130        JSR STORDW
1131        INY
1132        STY YLO
1133        CPY #40
1134        BNE MDLP1
1135 WMD1   RTS
1136 ;**********************************
1137 ; MOVE LINE UP
1138 ;**********************************
1139 MOVLNL LDY WRDLEN
1140        STY YHI
1141        LDY #0
1142        STY YLO
1143        LDA (CWL),Y
1144        INC CRF          ; IF CR IN WORD MOVED
1145 WLLP1  LDA (CWL),Y
1146        LDY YHI
1147        LDY YLO
1148        STA (CWL),Y
1149        CMP #$0D         ; CHECK FOR
1150        BNE WLL1         ; CR IN
1151        INC CRF          ; LINE
1152 WLL1   INC YLO
1153        INC YHI
1154        CPY #40
1155        BNE WLLP1
1156 WLLP2  LDA #0
1157        LDY YLO
1158        JSR STORDW       ; FILL REST
1159        INY              ; OF LINE
```

```
1160        CPY #40          ; WITH 0'S
1161        BNE WLLP2
1162        RTS
1163 ;**********************************
1164 ; MOVE LINE RIGHT 1
1165 ;**********************************
1166 MOVLNR1 LDY #39
1167 MRLP   DEY
1168        LDA (CWL),Y
1169        DEY
1170        STA (CWL),Y
1171        DEY
1172        CPY CH
1173        BNE MRLP
1174        RTS
1175 ;**********************************
1176 ; MAKE A BLANK LINE
1177 ;**********************************
1178 MBLANKLN JSR SAVALL
1179        JSR SETMWS
1180        JSR SETMYS       ; SET MEMORY
1181        JSR NXTLN        ; POINTERS AND
1182        JSR SETMWD       ; MOVE MEMORY
1183        JSR MOVUP
1184        JSR RESALL
1185        JSR NXTLN        ; FILL NEW LINE
1186        JSR LINER        ; WITH 0'S
1187        INC LLN
1188        JSR RESALL
1189        RTS
1190 ;**********************************
1191 ; CHECK FOR CR ON LINE
1192 ;**********************************
1193 CHKCR  LDY #0
1194 CKRLP  JSR CKCRW
1195        BNE CR1
1196        INC CRF
1197 CR1    INY
1198        CPY #40
1199        BNE CKRLP
1200        RTS
1201 ;**********************************
1202 ; GET LENGTH OF 0'S AT END OF LINE
1203 ;**********************************
1204 COUNT0 LDY #40
1205 CTLP   LDA #$FF
1206        INX
1207        DEY
1208        LDA (CWL),Y
1209        BEQ CTLP
1210        STA LEN0
1211        RTS
1212 ;**********************************
1213 ; FILL LINE WITH 0'S
1214 ;**********************************
1215 LINE0  LDY #39
1216 LBLP   JSR STORDW
1217        LDA #0
1218        DEY
1219        BPL LBLP
1220        RTS
1221 ;**********************************
1222 ; PRINT DOCUMENT TO PRINTER
1223 ;**********************************
1223 PPRINT JSR SETCH
1224        LDA #0
1225        STA STOFF
1226        STA STOFF
1227        JSR PAUSE
1228        BEQ PPR1
1229 PPR1   JSR PRTIN
1230 PPR1   JSR PRTIN
1231        LDX #0
1232        STY PPOS
1233        STY PPOS
1234        DEY
1235        LDA STROBE
1236 NXTWRD LDA KBD
1237        BPL PPR2         ; ESCAPE KEY
1238        CMP #$9B         ; PRESSED?
1239        BNE PPR2         ; NO
1240        JMP PRTIN        ; YES
1241 PPR2   LDA STROBE
1242        LDX #0
1243 PPR2   LDA (CWL),Y
1244 PPLP2  INY
1245        CPY #40          ; END OF LINE?
1246        BNE PPR3         ; NO
1247        LDA (CWL),Y      ; END OF DOCUMENT?
1248        BEQ PRTN         ; YES
1249        JSR NXTLN        ; MOVE NEW PTR
1250        DEC LN           ; RESET LINE
1251 PPR3   LDY #0           ; RESET Y
1252 PPR3   LDA (CWL),Y      ; IF 0, MOVE ON
1253        BEQ PPLP2
1254        INC PPOS
1255        LDA (CWL),Y
1256        CMP #$40         ; RIGHT MARGIN?
1257        INC PPR4         ; NO
1258        INC CRF          ; SET CR FLAG
1259 PPR4   LDA (CWL),Y
1260        CMP #$80         ; CHARACTER CR?
1261        BEQ PPR5         ; YES
1262        CMP #$20         ; CHAR SPACE?
1263        BNE PPLP1        ; NO
1264 PPR5   STA WRDLEN
1265        LDA CRF          ; CR FLAG SET?
1266        BNE PPR6         ; NO
1267        STY YSAV1
1268        LDA #$80
1269        JSR PAPNG
1270        STA STOFF
1271        BNE PRTIN
1272        JSR PRNTLN       ; PRINT LEFT MARGIN
```

LISTING 2 (continued)

```
1273        LDY #0
1274        STY CRF        ; RESET CR FLAG
1275        LDY WRDLEN
1276        STY PPOS
1277        STY YSAV1
1278 FWRD   LDA #0
1279        INY
1280        TYA
1281        SBC WRDLEN     ; RESET Y TO
1282        TAY            ; START OF WORD
1283 PPLP3  INX
1284        DEY
1285        SEC
1286 PPLP2  INX
1287        LDA (CRL),Y
1288        STY YSAV1
1289        CMP #$0D        ; CR?
1290        BNE PPR6        ; NO
1291        JSR PGEND
1292        LDA STOPF
1293        BNE PRTN1
1294        JSR PRTLN
1295        LDY #0
1296        STY PPOS        ; RESET PPOS
1297        JMP PPR7
1298 PPR6   ORA #$80        ; PRINT CHARACTER
1299        JSR COUT
1300 PPR7   LDA (CRL),Y     ; RESTORE Y
1301        CPX WRDLEN      ; END OF WORD?
1302        BNE PPLP3       ; NO
1303        JMP NXTWRD      ; GET NEXT WORD
1304 PRTLN  JSR COUT        ; FORM FEED
1305        ...
1306 PRTN1  RTS
1307 ; END OF PAGE?
1308 PGEND  LDA #$0D        ; PRINT CR
1309        JSR COUT
1310        INC LN
1311        LDA LN
1312        CMP BM          ; BOTTOM MARGIN?
1313        BNE PGD1        ; NO
1314        LDA #$0C
1315        JSR COUT
1316        LDA #0
1317        STA LN
1318        JSR PAUSE
1319 PGD1   RTS
1320 ; ------------------
1321 ; SET TOP MARGIN
1322 ; ------------------
1323 SETTM  LDA #$0D        ; CR
1324        JSR COUT
1325        INC LN
1326        LDA LN
1327        CMP TM
1328        BCC SETTM
1329        RTS
1330 ; ------------------
1331 ; PAUSE TO LOAD PAPER
1332 ; ------------------
1333 PAUSE  LDA TM
1334        STA CR
1335        LDA #0
1336        STA TABV
1337 PAUSE1 JSR KEYIN
1338        CMP #$9D
```

```
1339        BNE PSE1
1340        INC STOPF
1341        RTS
1342 PSE1   ORA #$A0
1343        BNE PAUSE1
1345        RTS
1346 ; *****************
1347 ; PRINT LEFT MARGIN
1348 ; *****************
1349 PRNTLW LDA #$A0
1350        LDY LM
1351 LMLP   JSR COUT
1352        DEY
1353        BNE LMLP
1354        RTS
1355 ; *****************
1356 ; COMMAND CODES & ADDRESSES
1357 ; *****************
1358 CMDCODE DFC $8D,$98,$90,$88,$9A,$80,$89
1359 CWDADR  DFC $8B,$83,$8C,$99,$9A,$9D,$84,$FF
1360        DFC CHGCSR,CHGCSR
1362        DFC ESC,ESC
1363        DFC WARM,WARM
1364        DFC LARR,LARR
1365        DFC UPARR,UPARR
1366        DFC TAB,TAB
1367        DFC FRSTLN,FRSTLN
1368        DFC CNTRLN,CNTRLN
1369        DFC LASTLN,LASTLN
1370        DFC CLEAREOL,CLEAREOL
1371        DFC SHOWCR,SHOWCR
1372        DFC RTN,RTN
1373        DFC DELETE,DELETE
1374        DFC DELETE,DELETE
1376 ; *****************
1377 ; VARIOUS FLAGS & REGISTERS
1378 ; *****************
1379 CMODE  DFC 0
1380 CRF    DFC 0
1381 CSR    DFC 0
1382 LN     DFC 0
1383 MRGN   DFC 0
1384 WRDLEN DFC 0
1385 FLN    DFC 0
1386 LLN    DFC 0
1387 CNSAV  DFC 0
1388 CYSAV  DFC 0
1389 LNSAV  DFC 0
1390 YSAV   DFC 0
1391 YSAV1  DFC 0
1392 PTRSAV DFC 0
1393 ; *****************
1394 ; ESCAPE MESSAGE
1395 ; *****************
1396 ESCMSG DFC 22,0
1397        DFC 0
1398 ; *****************
1399 ; LINE/COLUMN MESSAGE
1400 ; *****************
1401 MSGLC  DFC 23
1402        ASC 'LINE     COLUMN'
1403        DFC 0
```

END OF LISTING 2

LISTING 3: NW.BIN

Start: 6600   Length: 9FE

```
8E 6600:D8 4C 1C 66 00 00 C6 C9
85 6608:CC 55 BA A0 CG C9 CC C5
13 6610:BA A0 C5 A0 A0 A0 AD AD
A3 6618:A0 C3 CF CC A5 F9 AC AD
16 6620:4C 8E C8 20 58 FC 20 C1
D3 6628:12 58 FC 30 11 20 C3 6B
AC 6630:8H 16 BD 8C CF 6F BC 24
C6 6640:6C 6F 6C 66 69 02 F8 24
EF 6648:A0 85 3E 20 43 6B 20 20
E6 6650:D0 60 20 60 6F 6C 6F 20
25 6658:6F 6C F0 6F 6F F0 6F 69
37 6660:6C A0 0D 0C 20 6F 20 69
90 6668:4F 4C 46 20 20 A6 20 20
E6 6678:A9 00 8D C9 6F 8D C8 6F
AF 6680:28 A4 6A 4B 0E D9 9B 6F
53 6688:F0 0D 0B 10 F0 69 8D 60
39 6690:03 4C 23 6F 4C 20 6B 60
06 6698:0A AB B9 AA 6F 85 7E F9
6A 66A0:A8 8F 85 FF 6C C6 F0 AD
5L 66A8:50 20 6C 6F 05 E6 24
```

```
76 66D8:4C 75 66 20 2C 6D F0 43
FE 66E0:20 3E 67 FD 4A D0 F0 06
FE 66E8:24 20 9C 6D B0 F0 06 20
B5 66F0:06 A0 B6 75 66 EE CF 6D
0E 66F8:8D 68 46 72 66 4A 24 F8
51 6700:05 C6 24 4C 75 66 20 1B
DE 6708:60 F0 18 A9 27 85 24 20
A5 6710:37 6D F0 06 20 A3 6B 4C
32 6718:75 66 CE C6 6F 20 36 6D
EA 6720:4C 72 66 20 3A FF 4C 75
37 6728:66 20 2C 6D F0 43 24 75
BC 6730:66 D0 F8 18 4C 07 67 20
F7 6738:81 6B 8B A3 C9 23 B0
9C 6740:5C A9 23 85 FE 38 A5
E0 6748:2A D0 35 09 05 A9 05 4C
F2 6750:24 C7 79 23 85 FE 38 A5
98 6758:66 69 89 55 FE D0 F0 4D
01 6760:04 46 72 66 20 58 FC 4C
A5 6768:72 66 D0 08 4C 72 66 20
88 6770:86 6B 00 A2 00 8A 95 24
2E 6778:B8 20 58 FC 4C 72 66 A0
8B 6780:4C 46 24 85 38 8E 6F 6D
31 6788:18 A5 08 89 9C 6F 90 6B
46 6790:4C 76 67 4A A4 89 90 11
88 6798:4C 4C 6F 88 8C 55 6F 20
5C 67A0:00 D0 66 73 20 CA 67 80
8E 67A8:4C 04 69 AD CA 6F 49 80
```

```
96 67B0:8D CA 6F 4C 72 66 20 2C
82 67B8:6D 00 03 4C 23 67 22 28
15 67C0:6C A4 24 70 08 20 AD 6C
C6 67C8:20 F4 6C F0 05 20 10 6D
63 67D0:06 4C 4A 67 B0 42 F0 08
37 67D8:20 B8 6D A0 27 20 4C A5
51 67E0:D0 03 EE C9 6F 4B 4C 24
C5 67E8:D0 F0 20 45 6E 4C C9 6F
69 67F0:23 67 20 45 6C A4 27 6F
EB 67F8:4C 24 6D E0 08 4C 72 66
C4 6800:A4 24 B0 11 6A 24 25 6F
A9 6808:F0 03 4C 72 66 20 43 68
82 6810:4C 04 69 C9 AD 20 2C 6D
1A 6820:4C 23 67 20 1B 8D 00 77
10 6828:A4 24 D0 1F 4C 75 66 20
EA 6830:37 6D D0 09 CE CE 6F 20
62 6838:A6 6C 26 66 C7 20 3C 6D
13 6840:D0 09 EE C8 6F 20 A6 6C
F5 6848:06 66 C8 4C 72 66 20 4D
71 6850:17 A4 24 D0 11 20 A3 6B
3E 6858:6B A9 27 85 24 20 58 6D
C9 6860:66 20 D8 6D D0 03 4C 75
C0 6868:24 20 08 6D D0 03 4C 78
F3 6870:66 20 58 FC F9 04 C9 0D
E4 6880:A4 D0 33 C0 27 69 4C
```

```
C8 6B88: 84 69 C8 B1 D8 B4 EB 91 EB
70 6B90: C9 40 D0 03 FE C8 6F EB
F4 6B98: C0 27 D0 EE 20 88 6C 20
62 6BA0: 1B 6D F0 58 A0 00 B1 EB
B8 6BA8: C8 C9 00 F0 08 C9 00 F0 0C
6BB0: 04 C9 2D D0 04 20 88 6C
7A 6BB8: A5 24 CD CD 6F 8D 3D 20
A2 6BC0: 8E 6B F0 08 A9 A0 8D 6F
C8 6BC8: F0 08 A9 A0 8D D5 C9 6F
B3 6BD0: 8D 68 4C FC 68 20 77 6E
83 6BD8: 20 A8 6D 4C 6D 6C CD CD
8D 6BE0: 6F 90 19 20 A3 68 38 A9
96 6BE8: 78 CD 6F AD 18 65 24 85
18 6BF0: 24 A9 00 8D C8 6F 20 43
A4 6BF8: 86 4C 19 20 43 6D 88 A9
F9 6900: 32 2D C1 6D 20 80 6B 20
F6 6908: 6F 90 17 6F 20 08 48 A9
4D 6910: 02 20 C1 6D 20 80 6B 20
F9 6918: 01 6E 8D 6F C9 6F 20 88
69 6920: 2E 8A 28 DD D0 85 6D F0
96 6928: 26 6D F2 20 1B 6D F0 F9
35 6930: 0F 20 78 6B 20 ED 6D 20
25 6938: D0 08 A9 20 8D 48 6C 30
26 6940: CE CF 6F 20 56 6B 4C 72
C4 6948: 6D 20 20 5A 68 83 4C 23
48 6950: 6D 22 4C FC 6C 20 08 20 21
A3 6958: 0D D0 83 4C 23 67 AD E2
EE 6960: 22 4C 6C 20 08 20 8D 39
A7 6968: 48 CC D0 03 8D E4 25
F9 6970: 90 03 8D 40 6C C5 69 04
CF 6978: 22 1D 6D D0 4A 23 E5 FA
67 6988: 30 11 60 04 20 09 DA 2D
34 6990: 9A 4C 04 C5 65 20 24
A9 6998: 30 48 84 6C 45 6A 88 20
80 69A0: 20 A0 00 B1 6C 84 21 C6
DB 69A8: 98 4C 72 66 20 27 65
DA 69B0: 0A 4A 68 0A 20 43 68 FF
E4 69B8: 20 20 6C 85 38 A5 24 25
DA 69C0: 35 24 90 68 20 33 68 20
84 69C8: 68 20 00 20 43 68 4C 04
C6 69D0: 0D 88 98 4C 72 66 20 97
50 69D8: 6D D0 16 A9 03 8D 6F 03
90 69E0: 4C 6C 68 A9 02 8D 0A 01
FC 69E8: A9 00 8D 68 85 6C 91 07
2E 69F0: 20 08 86 6B 20 3C 0A 86
36 69F8: 6D 20 8D 09 A9 00 8D BE
...
86 6D98: 80 20 00 6D C9 0D D0 03
01 6DA0: EE C9 6F C8 D0 F0 D8 E8
12 6DA8: E8 20 47 6D D0 F5 B8 CD
32 6DB0: 6F 60 A9 01 8D CD 6F C8
CD 6DB8: 3A A9 20 8D 68 20 FB CD
44 6DC0: 00 3A A9 28 A9 28 85 FB CC
9A 6DC8: 6F 85 FA AE CD 6F 84 FB
A9 6DD0: B1 38 A4 FB CA D0 F0 BD
D3 6DD8: E6 FB CA D0 FB 60 38 A9
6E 6DE0: 28 B5 FB E9 CD 6F E6 F5
E5 6DE8: FB 90 E5 38 A5 FB E9 A5
E0 6DF0: 91 EB E6 FB A4 CA 20 83
21 6DF8: C6 6C 84 A8 28 00 A8
C6 6E00: EB 08 68 A9 01 A9 09 C9
84 6E08: 48 66 FE 85 24 08 28 0F
8F 6E10: 28 A2 FF 88 E8 B9 00 77
0F 6E18: A4 88 8C EC 6F A9 00 FD
FA 6E20: 88 83 20 30 6D C0 FF B2
15 6E28: 90 A8 89 00 8D BB 6F 11
96 6E30: 3C 8A 20 FE 83 48 A9 63
B6 6E38: E8 4C 6F A2 48 98 63 A9
C6 6E40: 80 D0 90 01 E0 D0 03 A3
29 6E48: 20 67 6D 84 60 A5 FE 05
51 6E50: FD F0 03 1A D5 C9 18 00
97 6E58: 65 24 F0 08 7D 20 88 60
D8 6E60: 85 29 28 76 A5 FB C8 6C
AD 6E68: 6F 2F A5 FA A5 FB 6F A6
7F 6E70: FB 91 67 B1 18 60 18 6D
80 6E78: 2A FA D0 03 EE CD 6F 6E
7C 6E80: 80 28 00 28 47 6D 60 A2
```

TOTAL: D279