

# INTEL/TEKTRONIX-TO-HEXDUMP CONVERTER PROGRAM FOR PCs

Those of you who run assemblers capable of producing Tektronix or Intel format output files have a problem when an available EPROM programmer is not 'intelligent', or when a simple hexdump is required of the object code. Here is a BASIC program to end your misery.

from an idea by S. Mitra

INTEL hex format and Tektronix Hex format are two very popular file formats used for uploading and downloading data between a host computer (such as a PC) and an intelligent EPROM programmer. That is

why most popular cross assemblers and file linkers supplied with different in-circuit emulators provide Intel/Tektronix format file output in addition to executable file output.

During system software development, it is often required to generate a hexadecimal dump listing from the Intel/Tektronix format for documentation or debugging. Doing such a conversion manually takes a lot of

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10 * HDXDRMP.BAS software listing.
20 * Intel/Tektronix Hex format to Standard Hex Dump Listing converter
30 * Written by
40 * Soumya Mitra
50 * 15/2 Rani Sankari Lane
60 * Calcutta 700 026
70 * West Bengal
80 * INDIA
90 *
100 *
110 ON ERROR GOTO 1030
120 KEY OFF : CLS : CLOSE : FLAG=0 : EXIST=-1 : COLOR 14,6
130 PRINT "Intel/Tektronix Hex Format to Standard hexdump Version 1.00"
140 PRINT "      Written by Soumya Mitra 1990"
150 COLOR 14,0
160 LOCATE 7,1 : INPUT "Input File      : ", INFILES
170 OPEN "I", #1, INFILES
180 CLOSE : FORMATS=""
190 LOCATE 8,1 : INPUT "Output File      : ", OUTFILES
200 LOCATE 9,1 : PRINT "Intel/Tektronix (I/T) : "; AS=INPUT$(1)
210 IF AS="i" OR AS="I" THEN FORMATS="I"; GOTO 240
220 IF AS="t" OR AS="T" THEN FORMATS="T"; GOTO 240
230 IF FORMATS="" THEN 200
240 PRINT AS
250 LOCATE 23,1 : COLOR 11,0 : PRINT "esc - to exit  any key to continue"
260 AS=INKEY$: IF AS="" THEN 260
270 IF AS=CHR$(27) THEN END
280 CLS : PRINT "Please wait a moment."
290 OPEN "F", #1, OUTFILES
300 IF NOT EXIST THEN 370
310 CLS : LOCATE 10,20 : COLOR 28,8
320 PRINT OUTFILES: " exists, overwrite [Y/N]"
330 COLOR 7,0 : GOSUB 1180
340 AS=INKEY$: IF AS="" THEN 340
350 IF AS="y" OR AS="Y" THEN 370
360 IF AS="n" OR AS="N" THEN END ELSE 340
370 COLOR 7,0 : CLS : PRINT "Please wait a moment" : CLOSE
380 OPEN "I", #1, INFILES
390 OPEN "O", #2, OUTFILES
400 PAGE=1
410 LINENUM=1
420 HEADERS=SPACES(9)
430 FOR C=0 TO 15
440 HEADERS=HEADERS + HEX$(C) + SPACES(3)
450 NEXT C
460 CLS : PRINT "Please wait, scanning"
470 PAGEHEADS=DATES + "      Hex dump of " + INFILES
480 PAGEHEADS=PAGEHEADS + " software      Page " + STR$(PAGE)
490 LOCATE 19,1 : PRINT PAGEHEADS
500 PRINT #2, PAGEHEADS
510 PRINT
520 PRINT #2, ""
530 PRINT
540 PRINT #2, ""
550 PRINT HEADERS
560 PRINT #2, HEADERS
570 PRINT
580 PRINT #2, ""
590 LINENUM=LINENUM + 5
600 WHILE 1
610 LINE INPUT #1, BUFFERS
620 BUFFERLEN=LEN(BUFFERS)
630 TESTPOSITION=1
640 WHILE 1
650 TESTSTRINGS=MIDS(BUFFERS, TESTPOSITION, 1)
660 IF TESTPOSITION >=BUFFERLEN THEN 970
670 IF TESTSTRINGS=FORMATS THEN 700
680 TESTPOSITION=TESTPOSITION + 1
690 WEND
700 BUFFERLEN=BUFFERLEN - TESTPOSITION
710 IF FORMATS="" THEN GOSUB 1230 ELSE GOSUB 1310
720 IF BYTECOUNT=0 THEN 960
730 HEXDUMPS=""
740 FOR X=1 TO BYTELEN STEP 2
750 HEXDUMPS=HEXDUMPS + MIDS(BUFFERS, X, 2) + SPACES(2)
760 NEXT X
770 IF LINENUM<>22 THEN 940
780 PRINT
790 PRINT "Press any key to continue"
800 BS=INPUT$(1)
810 PAGE=PAGE + 1
820 LINENUM=1
830 PAGEHEADS=DATES + "      Hex dump of " + INFILES
840 PAGEHEADS=PAGEHEADS + " software      Page " + STR$(PAGE)
850 PRINT #2, CHR$(12)
860 PRINT : PRINT : PRINT : PRINT : PRINT : PRINT : PRINT PAGEHEADS
870 PRINT #2, PAGEHEADS
880 PRINT : PRINT : PRINT HEADERS : PRINT
890 PRINT #2, ""
900 PRINT #2, ""
910 PRINT #2, HEADERS
920 PRINT #2, ""
930 LINENUM=LINENUM + 5
940 PRINT ADDRESS$ + HEXDUMPS
950 PRINT #2, ADDRESS$ + HEXDUMPS
960 LINENUM=LINENUM + 1
970 WEND
980 FOR X=LINENUM TO 22
990 PRINT
1000 NEXT X
1010 PRINT #2, CHR$(12)
1020 CLOSE : END
1030 CLS : COLOR 28,0 : LOCATE 12,30
1040 IF ERR=53 AND ERR<290 THEN EXIST=0 : RESUME NEXT
1050 IF ERR<=53 THEN 1090
1060 PRINT "File not found" : GOSUB 1180
1070 COLOR 7,0 : LOCATE 23,1 : PRINT "Press any key to continue"
1080 AS=INPUT$(1) : RESUME 120
1090 IF ERR<=71 THEN 1130
1100 PRINT "Drive not ready" : GOSUB 1180
1110 LOCATE 14,25 : COLOR 7,0 : PRINT "Press any key to continue"
1120 AS=INPUT$(1) : CLS : PRINT "Please wait a moment." : RESUME
1130 IF ERR=61 THEN PRINT "Out of disk space" : GOTO 1160
1140 IF ERR=62 THEN PRINT "WRONG FILE FORMAT" : GOTO 1160
1150 LOCATE 14,23 : PRINT "Basic error "; ERR: " has occurred"
1160 GOSUB 1180
1170 COLOR 7,0 : END
1180 FOR COUNTER=1 TO 3
1190 SOUND 2500, .8 : SOUND 20000, 1
1200 NEXT C
1210 SOUND 20000, 8
1220 RETURN
1230 * INTEL FORMAT CONVERSION *****
1240 BUFFERS=MIDS(BUFFERS, TESTPOSITION + 1, BUFFERLEN - 2)
1250 BYTECOUNT=VAL(MIDS(BUFFERS, 1,2))
1260 IF BYTECOUNT=0 THEN 1300
1270 ADDRESS=MIDS(BUFFERS, 3, 4)
1280 BYTELEN=BUFFERLEN - 10 : BUFFERLEN=(BYTECOUNT+ADDRESS*BLOCKTYPE+CHKSUM)
1290 BYTES=MIDS(BUFFERS, 9, BYTELEN)
1300 RETURN
1310 * TEKTRONIX FORMAT CONVERSION *****
1320 BUFFERS=MIDS(BUFFERS, TESTPOSITION + 1, BUFFERLEN - 2)
1330 BYTECOUNT=VAL(MIDS(BUFFERS, 5, 2))
1340 IF BYTECOUNT=0 THEN 1380
1350 ADDRESS=MIDS(BUFFERS, 1, 4)
1360 BYTELEN=BUFFERLEN - 10
1370 BYTES=MIDS(BUFFERS, 9, BYTELEN)
1380 RETURN

```

Fig. 1. Listing of HD.BAS, the file format converter, written in BASIC.

**SOFTWARE SERVICE**

The program described here is available on a 5¼-inch 360 kB MS-DOS formatted floppy disk under order number ESS1581. For details on price and ordering, please refer to the Readers Services page elsewhere in this issue.

```

:1000000041421040004200000000000000000000DB
:100010003E002175F9068077230520FB21007F1122
:10002000F5F9018000EDB011008D062A21F5F923C4
:100030007E3273FA237E3274FAFD2A73FAFD19FDBB
:100040002273FA2B3A73FA77233A74FA772305204E
:10005000DE21807F1175FA018000EDB011000021D2
:10006000F5F90E007E835F3E008A57230D20F521AF
:10007000F3F97323723E00327AF9CD38011F1FE67F
:100080000306004F21C1FC0986217AF977CB7E282F
:100090000C21C5FC097EE60C217AF98677003E002A
:1000A0003277F93278F93279F9F501FF1FC521C1AC
:00000001FF

02-06-1991                Hex dump of A:HEX.HEX software                Page 1

      0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
0000  41 42 10 40 00 42 00 00 00 00 00 00 00 00 00 00
0010  3E 00 21 75 F9 06 80 77 23 05 20 FB 21 00 7F 11
0020  F5 F9 01 80 00 ED B0 11 00 8D 06 2A 21 F5 F9 23
0030  7E 32 73 FA 23 7E 32 74 FA FD 2A 73 FA FD 19 FD
0040  22 73 FA 2B 3A 73 FA 77 23 3A 74 FA 77 23 05 20
0050  DE 21 80 7F 11 75 FA 01 80 00 ED B0 11 00 00 21
0060  F5 F9 0E 00 7E 83 5F 3E 00 8A 57 23 0D 20 F5 21
0070  F3 F9 73 23 72 3E 00 32 7A F9 CD 38 01 1F 1F E6
0080  03 06 00 4F 21 C1 FC 09 86 21 7A F9 77 CB 7E 28
0090  0C 21 C5 FC 09 7E E6 0C 21 7A F9 86 77 00 3E 00
00A0  1F 77 F9 32 78 F9 32 79 F9 F5 01 FF 1F C5 21 C1
    
```

Fig. 2. Example of an Intel format input file and the hexdump produced by HD.BAS.

```

/00001001064010FE3E38D3C032434097D3C12100A0
/00101002400100207E2F777E2F77BE280176EDA1C6
/00201003EA1400310048971100420600CD28069784
/00301004324A403EC932004B182C4544695453209B
/0040100576657273696F6E20312E302C20636F70B1
/0050100679726967687420456C656B7475757220B5
/0060040A3139383927
/0066100DF331004897325340210A0E0130407E027D
/0076100E23033E40B920F73E40ED4706000EE111A9
/0086100FFFD93E73D3E2D3E33E4FD3E23EFPD331
/00961010E33E9CD3E33EAD3E33E17D3E33EFPD30C
/0000000000

02-06-1991                Hex dump of tek.tek software                Page 1

      0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
0000  06 40 10 FE 3E 38 D3 C0 32 43 40 97 D3 C1 21 00
0010  40 01 00 20 7E 2F 77 7E 2F 77 BE 28 01 76 ED A1
0020  EA 14 00 31 00 48 97 11 00 42 06 00 CD 28 06 97
0030  32 4A 40 3E C9 32 00 4B 18 2C 45 44 69 54 53 20
0040  76 65 72 73 69 6F 6E 20 31 2E 30 2C 20 63 6F 70
0050  79 72 69 67 68 74 20 45 6C 65 6B 74 75 75 72 20
0060  31 39 38 39
0066  F3 31 00 48 97 32 53 40 21 0A 0E 01 30 40 7E 02
0076  23 03 3E 40 B9 20 F7 3E 40 ED 47 06 00 0E E1 11
0086  FF FF D9 3E 73 D3 E2 D3 E3 3E 4F D3 E2 3E FF D3
0096  E3 3E 9C D3 E3 3E 3A D3 E3 3E 17 D3 E3 3E FB D3
    
```

Fig. 3. Example of a Tektronix format input file and the hexdump produced by HD.BAS.

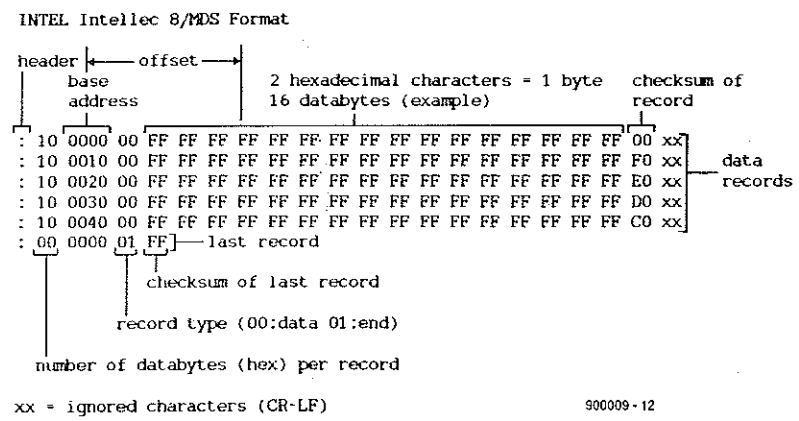


Fig. 4. Analysis of Intel-hex record format.

time, and is therefore much better left to the computer. The program described here reads an Intel or Tektronix format data file and will turn it into a hex dump ASCII print file.

**The program**

The listing of the file converter, HD.BAS, is given in Fig. 1. The program has quite a few error trapping routines, and will handle almost any type of error without crashing your PC. On being run from GWBASIC, the program asks you to enter the input and output file names. Next, it verifies the file format type. If a wrong format is detected, the program terminates with an error message. If the file format is correct, the conversion is started, and you can see the hex dump listing scrolling on your PC screen, while the output file is written to the disk. After each screenful of data, the program will stop and prompt you to press a key to continue.

Two examples of the use of HD.BAS are given in Figs. 2 (Intel format) and 3 (Tektronix format). As you can see, the program is capable of turning what many of you will regard as a cluttered block of data into a neatly formatted hexadecimal dump.