

# Lower Case Letters (With Hi-Res Graphics)

by James Totten  
Software Plus  
1347 Monmouth Dr. Burlington, Ontario  
Canada, L7P 3J7

There are various ways to obtain lower case letters on the Apple II and Apple II Plus computers. However, almost all of these require buying new RAM or ROM boards, or expensive software. But remember, I said **almost** all.

This idea came to me while writing a game in Hi-Res graphics. I needed letters and numbers on the top of the screen, and so I tried to figure out how to combine text and Hi-Res. But I suddenly realized: Why bother with trying to make a graphics/text combination? Why not just do with the letters what I had done with the aliens? So, I sat down and wrote a **master 85-character shape table**.

## THE MASTER SHAPE TABLE

This shape table contains literally every character present on the Apple's keyboard. Lower case letters are defined as standard, and upper case letters are tagged on the end of the table. This is because you'll probably use lower case more often than you will use upper case. **Each character is in its proper ASCII position (the ASCII character 43 is shape number 43), and that makes using the table very easy.**

## ENTERING THE SHAPES

First, type **CALL-151** to enter the Monitor. Then you can begin to enter the shape tables directly into memory by typing **4000:58 00 B2 00 C5 00** etc. from the memory listing. (See the Letters section for more information on entering machine code into memory.)

After you've typed in the character set (whew), you can save it with **BSAVE CHARACTERS, A\$4000.L1930**. Notice that the table is stored in Hi-Res **page two**. This can be changed if you wish; however you will have to alter the values in the two **POKEs** before using relocated shapes (see the demo program). You have to set **LOMEM** just past the Hi-Res page two if the shapes are to be used with a program.

Next, there is a small demo program using the shapes and full screen graphics in Hi-Res page one. When you finish analyzing the program, try some things on your own. You'll love the new letters!

## THE DEMO

The demonstration program shows how the character shapes are used. This program can be modified to fit your needs, or even used as a screen printing subroutine in a major program. Again, if this is done, then **LOMEM** will have to be set just beyond Hi-Res page two. Here is a variable list:

- KS — Key pressed
- DS — DOS operator
- X,Y — screen locations
- UC — upper case indicator
- UL — upper lock indicator
- CS — character typed from keyboard
- CC — character code (ASCII — DRAW value)
- L — loop counter

## PROGRAM DESCRIPTION

**80-130** Loads the character table into memory (if needed), and completes the necessary **POKEs** and variable settings.

- 140** Plots cursor and gets a character (C\$).
- 160-180** Checks to see if C\$ is an upper case set or an upper case lock. If set, then UC = 1 for the next character.
- 190-200** Checks to see if C\$ is a cursor move.
- 210-220** Resets CC to the proper value of the shape.
- 230** If the character is a letter and there is no lower case restriction (UC or UL), then moves Y down by 1 line so that the letter will line up with the other characters. After drawing the character, Y is reset to its proper value.
- 240-260** Clears area and draws the character.
- 270-310** Checks to make sure that the cursor is not going above or below its maximum or minimum allowable value.

## HOW TO USE THE DEMO PROGRAM

To use demo program, you must first have the character shapes in memory. However, this is taken care of by the demo program itself.

After the loading is finished, you'll be presented with a blank Hi-Res screen, and a small white line at the upper left corner. This is your cursor. It can be controlled with either arrow key (they work as they should; they will not erase any character), or by pressing any character on the keyboard. If the cursor should move past the right edge of the screen, it will reappear on the next line (on the left). The RETURN key works normally as well. A note of caution is in order, however. When the cursor reaches the bottom of the screen, it will automatically return to the top of the screen. Therefore, if you continue typing past the lower right corner of the screen, you'll begin over-printing the first line at the top of the screen.

When you wish to use an upper case letter, press the **ESC** key once. You'll hear a beep when you press the key, and then the **next letter** you type will be upper case. This will hold for only one letter. If you wish to do a string of upper case letters, **CTRL-N** will activate the upper case lock. Every letter after **CTRL N** will appear in upper case. To deactivate the upper case lock, type **CTRL-L**. Again, you'll hear a small beep and you'll return to lower case printing. You'll find that Lower Case Letters are useful for games and many other applications. Let us know the uses that you discover!

\*4000.478B

4000-	58	00	B2	00	C5	00	D8	00
400B-	EC	00	02	01	15	01	29	01
4010-	3C	01	4F	01	62	01	75	01
401B-	8A	01	7D	01	B0	01	C3	01
4020-	D6	01	E9	01	FE	01	12	02
402B-	26	02	3B	02	50	02	65	02
4030-	79	02	8D	02	A2	02	B6	02
403B-	C9	02	DD	02	F1	02	06	03
4040-	19	03	2C	03	41	03	55	03
404B-	69	03	7D	03	91	03	A5	03
4050-	B8	03	CC	03	DF	03	F2	03
405B-	06	04	19	04	2C	04	40	04
4060-	54	04	68	04	7C	04	8F	04
406B-	A3	04	B6	04	C9	04	DD	04
4070-	F1	04	05	05	1A	05	2E	05

```

10 REM *****
20 REM # HI-RES CHAR. DEMO #
30 REM # BY JAMES TOTEN #
40 REM # COPYRIGHT (C) 1982 #
50 REM # BY MICRO-SPARC INC #
60 REM # LINCOLN, MA. 01773 #
70 REM *****
80 DS = CHR# (13) + CHR# (4)
90 TEXT : HOME : PRINT : PRINT "HIGH-WRITER": PRINT :
  PRINT "BY JAMES TOTEN": PRINT : PRINT : INVERSE
  : PRINT "NOW LOADING SHAPE TABLE FROM DISK.": PRINT

100 NORMAL
110 PRINT D$:"LOAD CHARACTERS": POKE 232,0: POKE 233,
  64
120 X = 2: Y = 5: SCALE = 1: ROT = 0
130 HGR : HCOLOR = 3: POKE - 16302,0: UC = 0:
140 HCOLOR = 3: HPLLOT X,Y + 8 TO X + 5,Y + 8: HOME : GET
  C$
150 IF C$ = CHR# (14) THEN CALL - 198: UL = 1: GOTO
  140
160 IF C$ = CHR# (27) THEN UC = 1: CALL - 198: GOTO
  140
170 IF C$ = CHR# (12) THEN CALL - 198: UL = 0: GOTO
  140
180 IF C$ = CHR# (13) THEN HCOLOR = 0: HPLLOT X,Y + 8
  TO X + 5,Y + 8: X = 2: Y = Y + 10: GOSUB 270: GOTO
  140
190 IF C$ = CHR# (8) THEN HCOLOR = 0: HPLLOT X,Y + 8 TO
  X + 5,Y + 8: X = X - 7: GOSUB 270: GOTO 140
200 IF C$ = CHR# (21) THEN HCOLOR = 0: HPLLOT X,Y + 8
  TO X + 5,Y + 8: X = X + 7: GOSUB 270: GOTO 140
210 CC = ASC (C$) - 31
220 IF (UL OR UC) AND (ASC (C$) > 64 AND ASC (C$) <
  91) THEN CC = CC + 28
230 IF (UL = 0) AND (UC = 0) AND (ASC (C$) > 64 AND
  ASC (C$) < 91) THEN HCOLOR = 0: FOR L = X TO X +
  5: HPLLOT L,Y TO L,Y + 7: NEXT L: HCOLOR = 3: Y = Y +
  1: DRAW CC AT X,Y: Y = Y - 1: GOTO 250
240 HCOLOR = 0: FOR L = X TO X + 5: HPLLOT L,Y TO L,Y +
  7: NEXT L: HCOLOR = 3: DRAW CC AT X,Y: IF UC THEN
  UC = 0
250 HCOLOR = 0: HPLLOT X,Y + 8 TO X + 5,Y + 8: X = X + 7
  : GOSUB 270
260 GOTO 140
270 IF X > 270 THEN X = 2: Y = Y + 10
280 IF Y > 180 THEN Y = 5
290 IF X < 2 THEN X = 268: Y = Y - 10
300 IF Y < 5 THEN Y = 5
310 RETURN
  
```

407B-	41	05	54	05	67	05	7C	05
4080-	90	05	A3	05	B7	05	CC	05
408B-	E0	05	F4	05	08	06	1C	06
4090-	30	06	43	06	57	06	6B	06
409B-	7F	06	94	06	A8	06	BC	06
40A0-	D0	06	E4	06	F8	06	0D	07
40AB-	21	07	36	07	4B	07	5F	07
40B0-	74	07	49	07	1A	1B	1B	4A
40BB-	49	1A	1B	1B	4A	49	1A	1B
40C0-	1B	4A	49	02	00	09	4D	1A
40CB-	1B	1F	4A	4D	1A	1B	1F	4A
40D0-	4D	1A	1B	1B	4A	4D	02	00
40DB-	69	0D	1A	3B	3B	0A	0D	0D
40E0-	1A	1B	1B	4A	49	1A	1B	1B
40EB-	4A	49	02	00	69	0D	1A	3B
40F0-	3B	2A	2D	2D	1A	3B	3B	2A
40FB-	2D	2D	1A	3B	3B	0A	0D	0D
4100-	02	00	09	4D	1A	3F	3F	6A
410B-	4D	1A	3B	3F	4A	0D	15	1B
4110-	3F	77	69	11	00	6D	09	1A
411B-	1F	3B	4E	69	1A	1B	1F	0A
4120-	4D	11	3B	1F	73	09	2D	02
412B-	00	69	09	1A	1B	1F	6E	4D
4130-	1A	1B	3B	6A	0D	15	1B	1F
413B-	73	6D	15	00	49	0D	1A	1B
4140-	1F	0A	4D	11	1B	1B	53	49
414B-	11	1B	1B	53	49	11	00	09
4150-	4D	1A	1B	3B	6A	49	1A	1B
415B-	1B	6E	49	1A	1B	3B	4A	4D
4160-	02	00	09	4D	1A	3B	1B	4A
416B-	09	15	3B	1B	53	49	15	1B
4170-	1F	53	69	11	00	09	4D	1A

4178- 1F 1F 0E 2D 0D 1A 3F 3F  
4180- 0E 2D 0D 1A 1F 1F 4E 4D  
4188- 02 00 49 09 1A 1B 1F 4A  
4190- 4D 1A 3F 3F 4E 4D 1A 1B  
4198- 1F 4A 49 02 00 49 09 1A  
41A0- 1B 1B 4A 49 1A 1B 1B 4A  
41A8- 6D 1A 3B 1F 0A 6D 11 00  
41B0- 49 09 1A 1B 1B 4A 49 1A  
  
41B8- 3F 3F 4E 49 1A 1B 1B 4A  
41C0- 49 02 00 49 09 1A 1B 1B  
41C8- 4A 49 1A 1B 1B 4A 49 1A  
41D0- 1B 3F 0A 6D 11 00 49 09  
41D8- 1A 1F 1B 4A 69 1A 1B 1F  
41E0- 0A 4D 11 1B 1B 73 49 11  
41E8- 00 29 6D 1A 1F 1B 6E 29  
41F0- 15 3B 3B 33 6D 29 1A 1F  
41F8- 1B 0E 2D 00 02 00 09 4D  
4200- 1A 1B 3F 4A 4D 1A 1B 1F  
4208- 4A 4D 1A 1B 1F 0A 2D 0D  
4210- 02 00 29 6D 1A 1F 1B 4E  
4218- 09 15 1B 3F 53 4D 11 1B  
4220- 1B 33 2D 2D 15 00 1A 3B  
4228- 15 3B 1B 53 09 0D 1A 3D  
4230- 1F 4A 09 15 3B 1B 73 2D  
4238- 0D 02 00 49 0D 1A 3B 1F  
4240- 0A 0D 0D 1A 3B 1B 2E 2D  
4248- 2D 1A 3B 1B 4A 69 02 00  
4250- 2D 2D 15 1B 1B 33 2D 6D  
4258- 1A 1F 1B 4A 09 15 3B 1B  
4260- 73 2D 0D 02 00 29 6D 1A  
4268- 1F 1B 6E 49 1A 3B 3F 6E  
4270- 09 15 3B 1B 73 2D 0D 02  
4278- 00 2D 2D 15 3B 1B 53 09  
4280- 0D 1A 1B 1F 0A 4D 11 1B  
4288- 1B 57 4D 11 00 29 6D 1A  
4290- 1F 1B 6E 09 15 1B 3F 17  
4298- 4D 29 1A 1F 1B 0E 2D 0D  
42A0- 02 00 29 6D 1A 1F 1B 6E  
42A8- 09 15 3B 3F 57 49 15 3B  
42B0- 1B 73 2D 0D 02 00 49 09  
42B8- 1A 1B 3F 0A 6D 11 1B 1B  
42C0- 53 6D 11 1B 3B 57 49 11  
42C8- 00 49 09 1A 1B 3F 0A 6D  
42D0- 11 1B 1B 53 6D 11 1B 3B  
42D8- 17 6D 09 02 00 49 2D 1A  
42E0- 3B 1F 0A 6D 11 1B 1B 77  
42E8- 6D 11 1B 3F 53 09 2D 02  
42F0- 00 49 09 1A 1B 1B 0A 2D  
42F8- 0D 1A 1B 1B 0A 2D 0D 1A  
4300- 1B 1B 4A 49 02 00 6D 09  
4308- 1A 1B 3F 4A 6D 1A 3F 1B  
4310- 4A 6D 1A 1B 3F 2A 4D 11  
4318- 00 29 6D 1A 1F 1B 4E 09  
4320- 15 1B 3F 53 4D 11 1B 1B  
4328- 53 4D 11 00 29 6D 1A 1F  
4330- 1B 6E 0D 15 3B 3F 33 0D  
4338- 0D 15 1B 1B 73 2D 2D 02  
4340- 00 49 09 1A 3B 3F 4A 09  
4348- 15 3B 3F 17 4D 29 1A 3F  
4350- 3F 4A 49 02 00 4D 09 1A  
4358- 3B 1F 2E 4D 15 3B 1B 33  
4360- 6D 29 1A 3B 1F 4E 49 02  
4368- 00 49 09 1A 3B 3F 6A 09  
4370- 15 1B 1B 33 4D 29 1A 3B

4378- 3F 4A 49 02 00 49 29 1A  
4380- 1F 3F 6A 29 15 3B 1B 33  
4388- 4D 2D 1A 1F 3F 4A 49 02  
4390- 00 49 09 1A 3B 3F 6A 09  
4398- 15 3B 3F 37 4D 09 1A 3B  
43A0- 3F 4A 49 02 00 09 6D 1A  
43A8- 1F 3B 0A 4D 11 1B 3B 77  
43B0- 4D 11 1B 1B 57 49 11 00  
43B8- 49 09 1A 1F 3F 6A 29 15  
43C0- 3B 1F 73 6D 15 3B 1B 53  
43C8- 2D 0D 02 00 4D 09 1A 1B  
43D0- 1B 6E 6D 1A 1F 3B 6E 09  
43D8- 15 3B 1B 73 49 11 00 09  
43E0- 4D 1A 1B 1B 0A 6D 11 1B  
43E8- 3B 53 69 11 1B 3F 57 49  
43F0- 11 00 49 29 1A 1B 1B 4A  
43F8- 29 15 3B 1B 53 49 15 3B  
4400- 1D 73 2D 0D 02 00 4D 09  
4408- 1A 3B 1B 6E 4D 1A 1B 3B  
4410- 6E 4D 1A 3B 1B 4E 49 02  
4418- 00 29 4D 1A 1B 1F 4A 4D  
4420- 1A 1B 1F 4A 4D 1A 3B 3F  
4428- 4A 49 02 00 49 09 1A 3B  
4430- 3B 6A 0D 15 3B 3B 33 0D  
4438- 0D 15 3B 3B 73 49 11 00  
4440- 49 09 1A 3B 1F 2E 4D 15  
4448- 3B 1B 33 4D 29 1A 1F 1B  
4450- 4E 49 02 00 49 09 1A 3B  
4458- 3F 6A 09 15 3B 1B 33 4D  
4460- 29 1A 3B 3F 4A 49 02 00  
4468- 49 09 1A 3B 1F 2E 4D 15  
4470- 3B 1B 37 0D 6D 1A 1B 1B  
4478- 6E 49 02 00 49 09 1A 1F  
4480- 3F 6A 29 15 3B 1F 73 6D  
4488- 15 3B 1B 53 49 15 00 49  
4490- 09 1A 3B 1F 2E 4D 15 1B  
4498- 1B 33 4D 09 1A 1B 1B 4E  
44A0- 49 02 00 49 09 1A 3F 3F  
44A8- 6A 49 1A 3B 3F 4A 09 15  
44B0- 1B 3F 77 49 11 00 69 09  
44B8- 1A 1B 3F 0E 4D 11 1B 1B  
44C0- 57 4D 15 1B 3F 53 49 11  
44C8- 00 49 09 1A 1F 1B 6E 09  
44D0- 15 3B 1B 33 4D 2D 1A 1F  
44D8- 3F 4A 49 02 00 49 09 1A  
44E0- 1F 1B 6E 09 15 1B 1F 57  
44E8- 0D 0D 1A 1B 1F 4A 49 02  
44F0- 00 49 09 1A 1F 1F 6E 0D  
44F8- 15 3B 3B 33 0D 0D 15 1B  
4500- 1F 57 49 11 00 49 09 1A  
4508- 1F 1B 0E 0D 0D 1A 1B 1F  
4510- 0A 0D 0D 1A 1F 1B 4E 49  
4518- 02 00 49 09 1A 1F 1B 6E  
4520- 09 15 3B 1F 73 6D 15 3B  
4528- 1B 53 2D 0D 02 00 49 09  
4530- 1A 3F 3F 4E 69 1A 1B 1F  
4538- 0A 4D 11 3B 3F 77 49 11  
4540- 00 29 4D 1A 3B 1B 4A 69  
4548- 1A 1F 1B 4A 69 1A 3B 1B  
4550- 0A 6D 11 00 09 4D 1A 3B  
4558- 3B 6A 09 15 1B 1B 53 49  
4560- 11 1B 1B 53 49 11 00 09  
4568- 4D 1A 3B 3B 6A 09 15 3B  
4570- 1B 33 2D 2D 15 3B 1B 33

4578- 4D 29 02 00 2D 6D 1A 1F  
4580- 3B 0A 4D 15 1B 3F 57 4D  
4588- 15 3B 1B 17 2D 6D 02 00  
4590- 09 6D 1A 1F 3B 6A 49 1A  
4598- 1B 1B 6E 49 1A 1F 3B 4A  
45A0- 6D 02 00 2D 6D 1A 1F 3B  
45A8- 0A 4D 15 3B 1B 57 4D 15  
45B0- 3B 1B 17 2D 6D 02 00 2D  
45B8- 2D 15 3B 1B 33 4D 09 1A  
45C0- 1B 3F 6E 49 1A 1F 1B 2E  
45C8- 2D 2D 02 00 2D 2D 15 3B  
45D0- 1B 33 4D 09 1A 1B 3F 6E  
45D8- 49 1A 1B 1B 6E 49 02 00  
45E0- 29 6D 1A 1F 1B 6E 49 1A  
45E8- 3F 1F 6E 09 15 3B 1B 73  
45F0- 2D 0D 02 00 4D 29 1A 1F  
45F8- 1B 6E 09 15 3B 3F 37 4D  
4600- 29 1A 1F 1B 6E 09 15 00  
4608- 29 6D 1A 1B 1F 4A 4D 1A  
4610- 1B 1F 4A 1A 1B 1F 0A  
4618- 2D 0D 02 00 09 2D 15 1B  
4620- 1F 53 09 0D 1A 3B 1B 4A  
4628- 69 1A 3B 1B 0E 6D 11 00  
4630- 4D 29 1A 3B 1B 6E 4D 1A  
4638- 1B 3B 6E 4D 1A 3B 1B 6E  
4640- 09 15 00 6D 09 1A 1B 3B  
4648- 0A 4D 11 1B 1B 57 4D 11  
4650- 3B 1B 17 2D 2D 15 00 4D  
4658- 29 1A 3F 3B 6E 0D 15 3B  
4660- 1B 33 4D 29 1A 1F 1B 6E  
4668- 09 15 00 4D 29 1A 1F 1B  
4670- 2E 4D 15 3B 3B 33 4D 2D  
4678- 1A 1F 1B 6E 09 15 00 29  
4680- 6D 1A 1F 1B 6E 09 15 3B  
4688- 1B 33 4D 29 1A 1F 1B 0E  
4690- 2D 0D 02 00 2D 6D 1A 1F  
4698- 3B 0A 4D 15 1B 3F 57 4D  
46A0- 11 1B 1B 17 6D 09 02 00  
46A8- 29 6D 1A 1F 1B 6E 09 15  
46B0- 3B 1B 33 0D 0D 15 1B 1F  
46B8- 73 6D 15 00 2D 6D 1A 1F  
46C0- 3B 0A 4D 15 1B 3F 57 0D  
46C8- 0D 1A 1F 3B 2A 4D 15 00  
46D0- 29 6D 1A 1F 1B 6E 49 1A  
46D8- 3B 3F 4A 09 15 3B 1B 73  
46E0- 2D 0D 02 00 2D 2D 15 3B  
46E8- 3B 73 69 11 1B 3B 53 69  
46F0- 11 1B 3B 53 2D 0D 02 00  
46F8- 4D 29 1A 1F 1B 6E 09 15  
4700- 3B 1B 33 4D 29 1A 1F 1B  
4708- 0E 2D 0D 02 00 4D 29 1A  
4710- 1F 1B 6E 09 15 3B 1B 33  
4718- 4D 29 1A 3B 3B 4A 4D 02  
4720- 00 4D 29 1A 1F 1B 6E 09  
4728- 15 3B 1B 33 0D 0D 15 3B  
4730- 1F 37 4D 29 02 00 4D 29  
4738- 1A 1F 1B 0E 0D 0D 1A 1B  
4740- 1F 0A 0D 0D 1A 1F 1B 6E  
4748- 09 15 00 4D 29 1A 1F 1B  
4750- 0E 0D 0D 1A 1B 1F 4A 4D  
4758- 1A 1B 1F 4A 4D 02 00 2D  
4760- 2D 15 3B 1B 73 09 0D 1A  
4768- 1B 1F 0A 4D 11 3B 1B 33  
4770- 2D 2D 15 00 2D 2D 15 3B  
4778- 3F 37 2D 2D 15 3B 3F 37  
4780- 2D 2D 15 3B 3F 37 2D 2D  
4788- 15 00 0C 20