

*Ultimate
type-in
character
editor*

ULTRAFONT

Program by STEVEN LEE

Article by CHARLES JACKSON, Antic Program Editor



UltraFont may be the most powerful character set editor ever published as an Atari type-in program. It lets you create, display and manipulate character sets, or 'fonts'—as many as six characters at a time—in any of five graphics modes. This is an all machine-language program that you type in as a self-converting BASIC data file. (Antic Disk subscribers will find a bonus of several character fonts on this month's disk.) UltraFont runs on all 8-bit Atari computers with at least 24K memory, disk or cassette. A joystick is required.

If you've ever played Space Invaders, worked with a word processor such as PaperClip, or seen Antic's *Color The Cover* contest winner (June, 1985), you've seen redefined character sets (fonts). Using a redefined character set is very similar to using a different typeface on your printer.

A character set is a list of instructions which tells your computer how to draw characters. For example, the numbers 0, 24, 60, 102, 102, 126, 102, 0 tell the computer how to form

the letter A. These numbers, when written in binary notation and stacked one on top of the other, form a "stencil" of the letter A:

0	00000000
24	00011000
60	00111100
102	01100110
102	01100110
126	01111110
102	01100110
0	00000000

continued on next page

If we place our stencil over a blank video screen, and turn on only pixels (picture elements) underneath a number 1, our image (bitmap) looks like this:

```
0  
24      **  
60      ****  
102     **  **  
102     **  **  
126     *****  
102     **  **  
0
```

We can alter the appearance of our letter A by altering the instructions the computer uses to draw it. If we changed all the 102's to 126's, for example, the A would look more like a house:

```
0  
24      **  
60      ****  
126     *****  
126     *****  
126     *****  
126     *****  
0
```

If we change our A to resemble a spaceship, we have the beginnings of a Space Invaders game. If we redefine the characters A, B and C to resemble a man beginning to take a step, a man in mid-step, and a man completing a step, we can create a simple animation sequence. Of course, our animation sequence could not display any words which used the letters A, B, or C—in any text message, these characters would also appear as stick figures.

As you might expect, creating and using redefined character sets from scratch is not all that easy. The Atari's character set starts at memory location 57344 (\$E000) and continues through 58367 (\$E3FF). This 1024-byte block of memory is permanently carved in ROM, and cannot be changed.

The trick here is to copy the *entire* character set from ROM into an appropriate place in RAM, where we can alter it. Then, we tell the computer to

use our RAM-based character set, instead of the one in ROM. Once in RAM, we can redefine any or all of the 128 non-inverse characters.

The computer uses the non-inverse character set as a template for creating the inverse set. Thus, if you redefine a capital M, your inverse capital M also gets redefined.

You can design a redefined character set with a pencil, a pocket calculator, and several reams of graph paper. This is known as "doing it the hard way." Fortunately, there are many speedy programs known as "character font editors" that help you design your own redefined character sets, show you what your completed character set will look like, perform the necessary calculations and SAVE the set to a nine-sector disk file.

UltraFont is a full-featured font editor, the most powerful type-in character editing program ever published in **Antic**. The program's Edit window can accommodate up to six charac-

[D] and it will create a 55-sector object file called CHARFONT.OBJ. If you're using a disk system, be sure your disk has at least 55 free sectors. Be patient; CHARFONT.BAS requires about six minutes to create the new file.

Antic Disk subscribers will find a copy of CHARFONT.OBJ on the monthly disk. As a bonus, you'll also get several complete sample character fonts.

Cassette owners: Once you've created the object file, rewind the tape and press PLAY on your program recorder. Next, hold down the computer's [START] key while turning on the computer. (XL/XE owners should also hold down the [OPTION] key.) Press any key and the program should load and run.

Disk owners have two options: First, remove all cartridges, insert a disk with the DOS.SYS and DUP.SYS files, and turn on the computer. Again, XL and XE owners should hold down the [OPTION] key during this process. When the DOS menu appears, use the [L]oad File option to load and run CHARFONT.OBJ.

Disk owners may also choose to copy the CHARFONT.OBJ program to another disk and name it AUTORUN.SYS. Now, just insert this disk into the drive, turn the computer on (XL/XE owners press the [OPTION] key) and the program will autoboot.

USING THE PROGRAM

The main screen is divided into three windows. At the top, the Drawing window holds your Edit screen, a grid on which you plot your characters. The little white marks at the top of this screen show you where each character is divided. The pink line at the bottom of the screen indicates the position of your drawing cursor.

The Selecting window (in the middle) displays the complete character set. Move the cursor over any character and press the joystick button to bring it into the Edit window.

The bottom window shows what your character will look like when viewed in any chosen graphics mode.

*If you played
Space Invaders
or worked with a
word processor,
you've seen
redefined
characters*

ters and works with GRAPHICS 0, 1, 2, 12 and 13 (ANTIC modes 2, 6, 7, 4 and 5, respectively).

TYPING AND LOADING

Type in Listing 1, CHARFONT.BAS, check it with TYPO II, and SAVE a copy before you RUN it. When RUN, the program asks whether you want to create a [D]isk version or a [C]assette version of the program. Choose [C] and the program will create a machine-language boot tape. Choose

COMMAND SUMMARY

This program has more than two dozen commands. Fortunately, you only need a few to get acquainted with it. To operate any of the following commands, all you need to type is the letter or symbol shown inside the square brackets []. For example, if you've never used this program before, you'll probably want to type an [H] or a [?] to access the [HELP] screens.

[E]EDIT— This command alternately moves your cursor between the Edit window and the Drawing window.

[B]LANK— Changes a series of characters into blank spaces. Place the cursor on the first in a series of characters to erase, press the joystick button, then place the cursor on the last character in the series and press the button again. All of the characters in this range will be changed into blank spaces.

[R]ESTORE— Changes a series of characters back into their original, unaltered forms. This command works the same way as the BLANK command.

[C]OPY— Makes multiple copies of a single character. Move the cursor over the character to copy and press the joystick button. Now, place the cursor over any other character and press the button. This erases the current character and replaces it with a copy of the first character. Press the [ESCAPE] key to leave this mode.

[K]OLOR— Multi-colored characters are rarely used in word processing programs. However, when redefined to look like rockets, aliens and landscapes, they are frequently used in games. ANTIC modes 4 and 5 are four-color character modes designed for this purpose. To adjust the colors of your character, first press the number (1-5) of the color register you wish to alter. Once you've selected a color register, move the joystick left and right to adjust the color value. Move the joystick up and down to adjust the luminance value. Press the joystick trigger to choose another color register to alter.

[F]LIP— Changes the characters in the Edit window into their mirror-images.

[I]NVERT— Inverts the characters in the Edit window.

[G]RID— Lets you choose the size of your Edit window grid. The maximum window size is 6×6 . Since the screen is not large enough to display a grid of this size, the program uses a 6×2 window to scroll vertically through the grid. When using

This is the most powerful type-in character editing program we've ever published

Graphics 2 or ANTIC mode 5, it's best to use a grid no bigger than 6×4 .

[A] TOP— Moves the cursor to the top of the Edit grid.

[Z] BOTTOM— Moves the cursor to the bottom of the Edit grid.

[X] SWITCH— Alternates between two characters. This function is useful for creating animation sequences. Press the [ESCAPE] key to exit this mode.

[] INVERSE— Change the current display to inverse video.

[M]ODES— Select from available graphics modes—Graphics 0, 1, 2 and ANTIC modes 4 and 5.

[S]ELECT SET— Alternate between the built-in character set and the redefined set you're working on.

[P]UT SET— Shows what your character set will look like in the graphics mode you've chosen. Remember that Graphics 1 and 2 only use the lower half of the character set. Press the [ESCAPE] key to exit this mode.

[U]ndo— Restores the characters back to their original form.

[>] UPDATE UNDO— Update the characters to the current data. It's useful when you're making uncertain

changes.

[W]RITE DATA— Scans for characters you've redefined, then writes the data for those characters to disk, tape, printer, or screen. If you write the data to disk or cassette, you may also choose to write this data as source code. This option will generate either BASIC DATA statements, or Assembly language .BYTE statements. The computer asks you for a starting line number, the language you want to use (BASIC or Assembler), and a SAVE file-name for the resulting file. When you're done, simply ENTER the resulting file into your program.

[D] INPUT DATA— This function lets you type in the numbers to form a character, instead of drawing it with a joystick. This is useful if you've already calculated the eight numbers needed to redefine a character. Just choose the first character to change and type in those eight numbers. Press [RETURN] and you'll be prompted to type in the data for the next character. If you don't want to change that character, press [RETURN] to skip that character, and edit the next one. Press the [ESCAPE] key to exit this mode.

[-] SHIFT UP— Shift the characters in the Edit grid up one position. Bits in the top row will wrap around to the bottom row.

[=] SHIFT DOWN— Works like SHIFT UP, but moves the characters UP, but moves the characters left by one position.

[+] SHIFT LEFT— Works like SHIFT UP, but moves the characters left by one position.

[*] SHIFT RIGHT— Works like SHIFT UP, but moves the characters right by one position.

[1] SLOW— Decreases the speed of the drawing cursor.

[2] FAST— Increases the speed of the drawing cursor.

CONSOLE KEY COMMANDS

[OPTION]— Displays a disk directory from any selected disk drive.

[SELECT]— Loads a previously-saved character set. Will also load character sets created by most other

continued on next page

editors.

[START]—Saves the current character set and the values of the five color registers.

GET THE MOST

If you only want to redefine a few characters, put your cursor in the top screen on the character you want to change, press [E] for Edit, select the character you wish to replace it with, and press the joystick trigger. This will perform an UPDATE on the character set information. Now you may continue drawing.

Use the right half of the bottom screen to see what your characters will ultimately look like. The bottom left portion displays your characters in inverse video. Remember that GRAPHICS 1 and 2 use only the lower half of the character set. Normally, you cannot display lower case or inverse video letters in these modes. Instead, the characters will be displayed in different colors. For example, in

Graphics 1 an uppercase, non-inverse "A" will look just like a lowercase, inverse "a"—except the two will be displayed in different colors.

In ANTIC modes 4 and 5, the color register for playfield two (location 710, \$02C6) is not used in inverse video. Playfield three, (location 711, \$02C7) is used instead. This gives us

*UltraFont has
more than two
dozen commands*

five colors to work with, although we can only use four in any one character.

COLOR REGISTERS AVAILABLE
NON-INVERSE
COLOR0 (location 708, \$02C4)
COLOR1 (location 709, \$02C5)

COLOR2 (location 710, \$02C6)
COLOR4 (location 712, \$02C8)
INVERSE
COLOR0 (location 708, \$02C4)
COLOR1 (location 709, \$02C5)
COLOR3 (location 711, \$02C7)
COLOR4 (location 712, \$02C8)

You can also merge two character sets into one. Just put as many as 36 characters of the first set into the Edit grid, load in the second character set, and use the [U] UNDO command to link the two sets.

Antic readers will certainly discover many other creative ways to unleash the power of UltraFont. Don't forget to write and tell us what you have created.

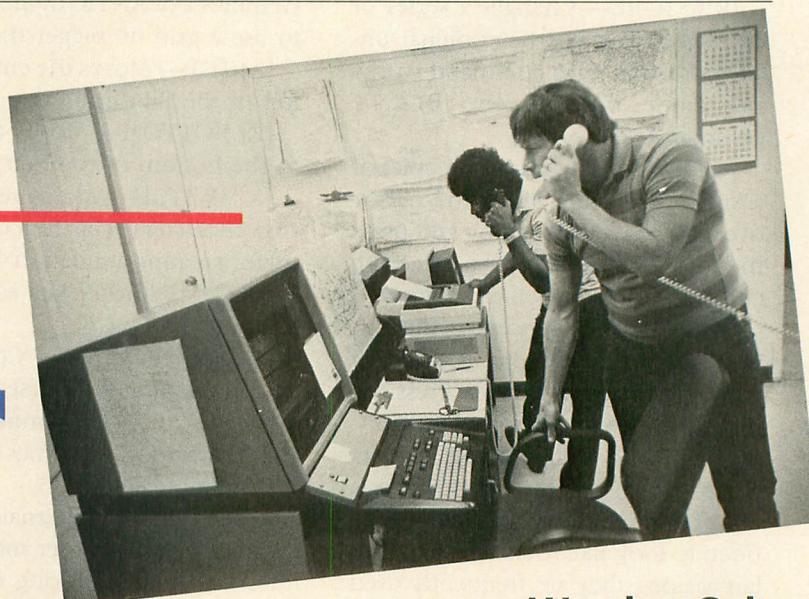
Listing on page 79

Steven Lee, 17, is a Sacramento, California high school student who has been programming his Atari 800 for four years.

A

Coming in September

Tune in Weather Satellite Pictures on Your Atari (8-bit or ST)



Erik Weber

Weather Calc
ACTION! Art Stretcher
BASIC Tracer/Debugger

Reviews: Star Raiders II,
Atari Planetarium,
Megamax C

HOW TO USE TYPO II

TYPO II is the improved automatic proofreading program for Antic's type-in BASIC listings. It finds the exact line where you made a program typing mistake.

Type in TYPO II and SAVE a copy to disk or cassette. Now type GOTO 32000. When you see the instruction on the screen, type in a single program line **without the two-letter TYPO II code** at left of the line number. Press [RETURN].

Your line will reappear at the bottom of the screen with a two-letter TYPO II code on the left. If this code is not exactly the same as the line code printed in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME" [RETURN] (Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

Owners of the BASIC XL cartridge from O.S.S. type SET 5.0 and SET 12.0 before using TYPO II.

Don't type the
TYPO II Codes!

```

WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLS
SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "K":POSITION 11,1:? "TYPE HERE"
EM 32050 TRAP 32040:POSITION 2,3:?"Type
in a Program line"
HS 32060 POSITION 1,4:?" ":"INPUT #2:LINE$:
$IF LINE$="" THEN POSITION 2,4:LIST B:
:GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(CLIN
E$(2,LEN(CLINES))):POSITION 2,4:LIST B:
:GOTO 32060
TH 32080 POSITION 2,10:?"CONT"
MF 32090 B=VAL(CLINES):POSITION 1,3:?" ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12

```

```

ET 32120 ? "R":POSITION 11,1:? "TYPE HERE"
":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINES$:IF
LINES$="" THEN ? "LINE ";B;," DELETED":G
OTO 32050
UU 32150 FOR D=1 TO LEN(LINES$):C=C+1:ANS=
ANS+ $C * ASC(CLINES$(D,D))$ :NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$(
LCODE)
UG 32220 POSITION 2,13:? "If CODE does no
t match press [RETURN] and edit line a
bove.":GOTO 32050

```

ultimate type-in character editor

ULTRAFONT

Article on page 29

LISTING 1

Don't type the
TYPO II Codes!

```

WT 10 REM CHARACTER FONT
YO 20 REM BY STEVEN LEE
GL 30 REM <C> 1986, ANTIC PUBLISHING
VE 40 DIM DEVS$(<1>),DATS$(<91>)
MX 50 GRAPHICS 0:?:?:?"CASSETTE OR DISK";
:INPUT DEVS$:IF DEVS$>>"C" AND DEVS$>>"D"
THEN 50
JB 60 IF DEVS$="C" THEN OPEN #1,8,0,"C":F
OR I=1 TO 35:READ A:PUT #1,A:NEXT I:GO
TO 80
ZY 70 OPEN #1,8,0,"D:CHARFONT.OBJ":PUT #1
,255:PUT #1,255:PUT #1,216:PUT #1,34:P
UT #1,109:PUT #1,61
MK 80 RESTORE 1000:TRAP 200:LINE=1000?: "
":? "LINE "
OW 90 POSITION 7,1?: LINE: :READ DATS:L=LE
N(DATS$):IF L<>90 AND L<>22 THEN 190
LD 100 IF LINE<>PEEK(<183>)+PEEK(<184>)*256 T
HEN "?" IS MISSING!":CLOSE #1:END
CS 110 SUM=0:FOR I=1 TO L-1 STEP 2
LX 120 DIGIT1=ASC(DATS$(<I,I>))-48:DIGIT2=ASC
(DATS$(<I+1,I+1>))-48
EJ 130 BYTE=<DIGIT1-<DIGIT2>9>*7>*16+<DIGIT
2-<DIGIT2>9>*7>
IE 140 PUT #1,BYTE:SUM=SUM+BYTE:NEXT I
ZQ 150 READ CHECK:IF CHECK<>SUM THEN 190

```

```

NR 160 LINE=LINE+10:IF L=90 THEN 90
FZ 170 IF DEV$="C" THEN FOR I=1 TO 71:PUT
#1,0:NEXT I:CLOSE #1:END
PA 180 PUT #1,224:PUT #1,2:PUT #1,225:PUT
#1,2:PUT #1,146:PUT #1,37:CLOSE #1:EN
D
JB 190 ? " NEEDS CHECKING!":CLOSE #1:END
KH 200 ? ?:? "ERROR #":PEEK(195):CLOSE #1:
END
UH 210 DATA 0,54,181,34,215,34,169,60,141
,2,211,169,0,141,231,2,133,14
XH 220 DATA 169,80,141,232,2,133,15,169,1
46,133,10,169,37,133,11,24,96
FW 1000 DATA 00003C66666E606000006E666666
667E00003C7E6666667E00007C666666667E00
007EDB1818181800003C666E,3199
BM 1010 DATA 60607C00003C7E6666666000066
6666767E7E606060666663C00007E66666666E6
00007E666666666700001818,3587
JG 1020 DATA 1818181800007C60606E663C0000
7C60606060E000066666667E3C00007E7E6E
6666E600000060607E66667E,3454
KU 1030 DATA 0000066663C18180000000000000
1E30600000000000000000C18000000000000C1838
6060301C0606CC7818FE3030,1592

```

continued on next page

TI	0890F5A4BD88C4CFB008A000B1B0A00791B24C 002EA007A5C591B2C6BCD0B7,6482	692885B29002E6B3C8C00880034C1433A5BDC5 CFB008A9008D13334C0133E6,5667
LZ	1650 DATA 20AA324CAA26A5CE85BCA5CF85BD 209634C6BDF008B20BD34A6BEBD823D208B34A4 BDC8C4CFD006A007B1B285C5,6048	RP 1950 DATA BCA5BC5CCEB0034CDE326084B486 B5A00084BA4BAB184C9DBF009207732E6BF6 BAD0EF60A00084B10A0A26B1,6333
KL	1660 DATA A006B1B2C891B2888810F7A5BDF0 0BA007B1B0A00091B24C532EA000A5C591B2C6 BCD0B920AA324CAA26A5CF85,6057	KD 1960 DATA 0A26B185B060A5C185BFA5C285C0 206334A0F0B1B049FF91B09838E928A8C0D8D0 F1E6B1A018B1B049FF91B060,6776
WZ	1670 DATA BDA90785BA1808A5CE85BC209634 4CBB2E20BD34A6BEBD823D208B34A4BAB1B028 2A0891B0C6BCD0E828B1B269,5623	NJ 1970 DATA A00088D0FDCAD0FA60A92085C8A9 0185BAAD8402D030A28020E533AD8402F0FBAS BA4901AAA92385BF90285C0,6118
OC	1680 DATA 0091B2C6BA10D1C6BD0C920AA32 4CAA26A5CF85BD90785BA1808A90185BC2096 344CFC2E20BD34A6BEBD823D,5593	NL 1980 DATA 20E03495B6207732C6BA10D8A9E0 85C8203F36A9FF8DFC0260206231ADFC02C91C D0034CEB26A27020E5334CF6,5549
PA	1690 DATA 208B34A4BAB1B0286A0891B0E6BC A6BCCAA4CE90E3289806B1B2098091B2C6BA10 CAC6BDD0C220AA324CAA26A9,6281	QM 1990 DATA 33A5B7C5B6B006A6B685B686B7E6 B760A5B72B03385B2A5B118692085B3A5B620 BB3460A98085B0A94285B1A4,6163
RX	1700 DATA 08D002A90485D84CAA26A902858B A9C585B4A93B85B520EB34A90085BF85C0A904 85BAA92985DD205F35A5BBC9,5662	DW 2000 DATA C0F010A5B018694085B0A5B16901 85B188D0F0A5B01865BF85B09002E6B16020B0 33A5B118692085B16020B0D34,5689
UW	1710 DATA 02D02FA91385BF90285C0A96885 B2A93985B3208332E6BFA97385B2A93985B320 8332E6BFE6BFA97B85B2A939,6041	FM 2010 DATA A6BEBD823D208B34A58085B2A5B1 85B360A201B5C4A4A4A18690195BCCA10F320 BD3460A9004A4B88F0061865,5456
YK	1720 DATA 85B320833220D27C6BBD0B32017 354CAA2620EB34A01AA23A209633202D27A5C3 C91190F7C915B0F309208D29,4712	IX 2020 DATA CE88D0FA1865B8C85BEC6BE60A900 A4CA990006990106990208660A5C20A0A8A0A0A 1865C16020D234A5B885B9A9,4984
LZ	1730 DATA 3A202F36A90085BF85C0A220A903 9D4203A9289D4403A93A9D4503A9069D4A0320 56E410034CF438A90859D4203,4044	WI 2030 DATA 0285B885BF90185C0202F3660A5 B8F00A20D23420BE33A90085B8A92285BFA901 85C06020F3620AA32A5B985,5005
FH	1740 DATA A96E9D4403A93D9D4503A9149D48 03A2202056E410034CF438A200B6E3DC99BF0 0D204C35A5C3207732E6BFE8,4828	AM 2040 DATA B8D00320BE3360E6DBA91085BFA9 0385C0A0E1A239209633202D27A5C3C91190F7 C5DB0F3290F85C5C6C560C9,6054
OF	1750 DATA D0ECA914C5BF002A90085BF002 E6C0AD6F3DC920F00C20E938202D272017354C AA26A5C0C90390B9202D27A9,5158	TE 2050 DATA 20B0056948085C360C960B00338E9 2085C360A5B8D6735A6BAA90285BF209A33E6 C0A5B41865DD85B49002E6B5,5747
KT	1760 DATA 0085C0202F364CE92F20EB34A0E9 A239209633202E38A90785C5A220A9049D4A03 A9039D4203A96E9D4403A93D,4354	MH 2060 DATA CAD0E960A90048A5CCA4D6C002F0 05C004F0014A186952A689D800660A97E2080 35A200C002F00BC004F007A5,5272
LY	1770 DATA 9D4503A9809D4B032056E410034C F438A5C59D4203A9009D44039D4803A9209D45 03A9049D49032056E410034C,3996	CK 2070 DATA CC4A9002A2208E1CD060A5CE85BC A5CF85BD20B34E6BEEA9485B2A93D85B3A200 BD823D208B34A007A5C5F007,5900
UD	1780 DATA F438A9279D4403A9399D4503A905 9D4803A9009D49032056E420E93820D322017 354CAA2620EB34A00F9A23920,4337	CQ 2080 DATA B1B291B04CDF35B1B091B28810EE A5B21869085B829002E6B3E8E4B9E0D66084B0 86B1A00098C6D3A6D3E0FFD0,6948
BN	1790 DATA 9633202E38A90885C5A220A9089D 4A03D08848AD0B0D4C920B00FA9348D0AD48D17 D0A90E8D18D06840C947B00F,4829	PU 2090 DATA 04C6D4300991B0C8D0FEE6B1D0EB 60A98085D3A90285D4A000A24020F335A94085 D3A90185D4A080A24720F335,6197
IT	1800 DATA A90A8D0AD48D17D0A9948D18D068 408A48A2048D0AD4B2D7399D16D0CA10F768AA 6840A5B8F00F6D5300889E0,5586	MR 2100 DATA 60A90085D3A90585D4A080A24220 F33560A90285C0A92185BFA0D9A239209633C6 C0D0F160B92739208E36A900,5532
PX	1810 DATA 20D4344C1E3120D234AD1C02F007 A5DCC90FF00160A5D88D1C02A5B8D06DAD8402 D02AA28020E533AD8402F0FB,5308	AN 2110 DATA AAC003900588888A21586BF84C0 A4B8F00618691488D0FB1869A285B4A93A6900 85B5A202A012B5C591B488CA,5728
GR	1820 DATA 20AA34A6B20E0349D823DA90085 C520B135200F3720DA3220BE33A90185B860AD 780285DC90FF0344820BE33,4786	XO 2120 DATA 10F8209A3360A21086C5C9649006 E964E6C5D0F6A20F838E90A10FA18691A86C6 85C7A5C5C910D017A5C6C910,5954
MD	1830 DATA A6C1A4C2684AB005881002A0034A B007C8C0049002A0004A0005CA1002A21F4AB0 07E8E0209002A20086C184C2,4725	HH 2130 DATA D007A6C7A90085C78A85C5A5C785 C6A90085C760A9D885E7A900885E8A000,6480
MJ	1840 DATA 20BE360AD84802D02F20AA34A6BE BD823D208B34A5C2907A8A5C82907A3A8A900 6ACA10FC51B091B020AA32AD,5119	E436A92885E7A900885E8A000,6480
HB	1850 DATA 7802C90F005A2C020E533AD7802 85DC4846DCB023A4CC88301E207E35C6CC2097 35A4CAC00ED008C6CD20C936,5347	AE 2140 DATA A24084B086B1A20FA5B01865E785 B2A5B165E885B3A027B1291B08810F9A5B285 B0A5B385B1CAD0DF20DA3260,6628
EY	1860 DATA 4C013220D23488888884CA46DCB0 25A4CCC8C4D1B01E207E35E6CC209735A4CAC0 3B008E6CD20D8364C2A3220,5496	ND 2150 DATA A20086BC86BDA5D6C903B012A006 84C5A016A5B0D0A0A85E0D0A0A4C3B37A00384 C5A00BA5B0D0A0A85E0D0A0A18,4676
NS	1870 DATA D234C8C8C884CA46DCB021A6C8CA 100DA5D00A1865D065C985C9A6D0CA86CB85C9 38E90385C91869308D00D46,6148	IT 2160 DATA 65ED65B6C698085B0A947690085B1 BD823D91B0A4C5098091B0E8E6B8C5BCC5CE90 B7A90085BCE6BDA5BDC5C90,6888
GN	1880 DATA DCB020A6C8E8E4D09008BA5D20A0A 38E90385C9A20086C8A5C918690385C969308D 00D068585DC60200B3385B2A5,5762	MF 2170 DATA AB60201036A90085C85CC85CDAA 9D463DE8D0F0AA2239D823D9D463ECA10F7A5CE 0A0A0A85D0A5C5F0A0A0A85D1,5674
YL	1890 DATA B11865C885B3206334A0008C9032 9848B1B2A00091B0981869288D903268A8C8C0 0790EAE6B1B2A01891B060,5619	SX 2180 DATA A6CECABD363985D20A0A85C91869 308000D0A90E85CA20DA32208F3720973560A5 B620B03385B2A5B11869E085,5094
IX	1900 DATA A90085BF85C0A5D785C8A2008A20 7732E6BFA5BFC9209006A90085BFE6C0E810EB A9E085C8A6B8F004CAF00460,6452	FF 2190 DATA B3A5B1692085B1A6B86A007B18291 B08810F9A5B218690885B285B09004E6B3E6B1 E8E4B790E360A21F9A009D5D,6346
IR	1910 DATA 20BE33A90085BCA5CD29078D1333 A5CD4A4A4A85BD5C0A85ED0A1865ED65D285 B2A94085B3A91085D3E6BCE6,5755	EA 2200 DATA 3AC010FAA90585DDA000B180208E 36A6DDA5C505DF9D583AA5C6F01005DFE89D58 3AA5C7F00605DFE89D583AC8,6030
XL	1920 DATA BD20BD34C6B8A6BEBD823D208B34 A0009848A2002901F001CA86E7B1B085DAA202 A0FFA95645E706DA900209FC,5672	US 2210 DATA C008B00CE8A5E09D583AE886DD4C FA3760A98385B2A93985B3208332202D27A6BF A5C3C97ED00FCAE01190F0A9,6117
MX	1930 DATA 06DA0890020903C891B2A9A545E7 28900209F006D0A89002090FC891B2A96A45E7 28900209C006D0A9002093FC8,4511	PO 2220 DATA 00207732C6BF4C2E38C99BD02D9D 5D3DA900207732AD6E3DC944F01DC943F019C9 50F015A90F85BFA90385C0A0,5180
	1940 DATA 91B2CAD0C468A8C6D3F021A5B218	RN 2230 DATA 7EA23A209633202D274CF42660E0 20B0B1207732A5C49D5D3E6BF4C2E3886BC86 BFA98385B2A93985B3208332,5239

continued on next page

no more disk disorganization

FILE MASTER

Article on page 37

LISTING 1

Don't type the
TYPO II Codes!

```

REM FILE MASTER - VERSION 5.0
REM BY JASON WORLEY
REM <c> 1986, ANTIC PUBLISHING
GOTO 2580
C=INT<(C/3)>+1:FOR A=1 TO COUNT-C:LC=
A*20-20+P
IF AREAS<(LC,LC+L-1)><=AREAS<(LC+(20*C),
,LC+(20*C)+L-1)> THEN 120
SAVS<(1,20>=AREAS<(A+C)*20-19>;B=A
AREAS<(B+C)*20-19,(B+C)*20>=AREAS<(B
*20-19>;B=B-C
100 IF B>0 THEN IF SAVS<(P,P+L-1)<AREAS
<B*20-20+P> THEN 90
AREAS<(B+C)*20-19,(B+C)*20>=SAVS<(1
,20>
NEXT A:IF C>1 THEN 60
RETURN
REM PRINT LABEL SUBROUTINE
TRAP 180:?"Disk Name";:INPUT D1$:
LPRINT D1$:LPRINT "Disk #";DN
FOR X=1 TO 4:LPRINT :NEXT X:RETURN

? :? "Make sure printer is on and
connected":GOSUB 220:POP :GOTO 680
REM SUBROUTINE FOR SOUNDS
TONE=14:GOTO 230:REM PROMPT TONE
TONE=2:GOTO 230:REM ATTEN TONE
TONE=4:REM DANGER TONE

```

```

NL 230 FOR Z=1 TO 15:SOUND 0,10,TONE,12:NEXT Z
UW 240 FOR Z=39 TO 1 STEP -1:SOUND 0,10,TONE,Z/3:NEXT Z
RI 250 SOUND 0,0,0,0:RETURN
QZ 260 REM
ZI 270 ? "No records in MEMORY!":GOSUB 220
NO 280 FOR X=1 TO 200:NEXT X:GOTO 1950
DA 290 REM SORT SUBROUTINE
JI 300 IF COUNT=0 THEN GOTO 270
RE 310 TRAP 40000:N=3:CLOSE #4:OPEN #4,4,
0,"K:"
ZN 320 ? "Total number of records is ";COUNT
UF 330 ? "Sort by:"
RJ 340 FOR U=0 TO 4
CW 350 POSITION 12,U+3:? SR$<U*14+1,U*14+14:NEXT U
LT 360 POSITION 12,N:? INSRS<(N-3)*14+1,(N-3)*14+14
JN 370 POKE 764,255:GET #4,CH
MO 380 IF CH=45 THEN IF N>3 THEN N=N-1:POSITION 12,N+1:?
SR$<(N-2)*14+1,(N-2)*14+14:GOTO 360
PU 390 IF CH=45 THEN POSITION 12,3:? SR$<1,14:N=7:GOTO 360
YN 400 IF CH=61 THEN IF N<2 THEN N=N+1:PO

```