the Programmer

ILLUSTRATION BY BARTON STABLER
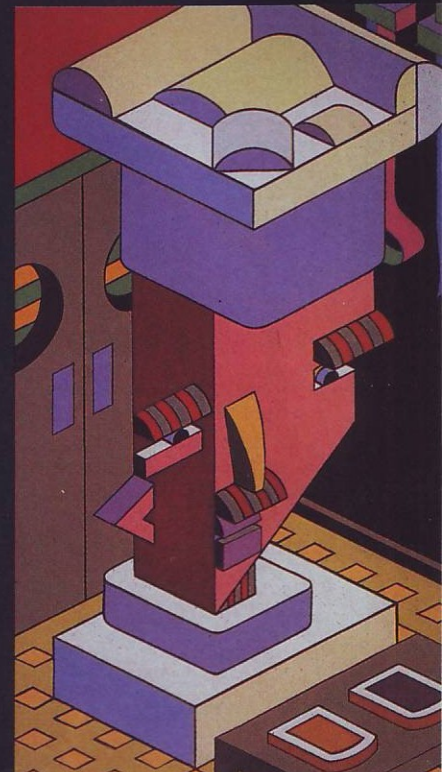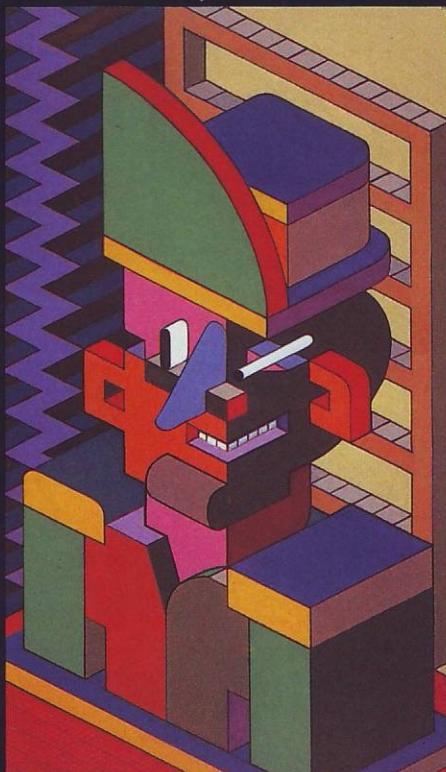
M A Y

ILLUSTRATION BY JAMES CHERRY III

FACE CARTOON

BY JOEY LATIMER
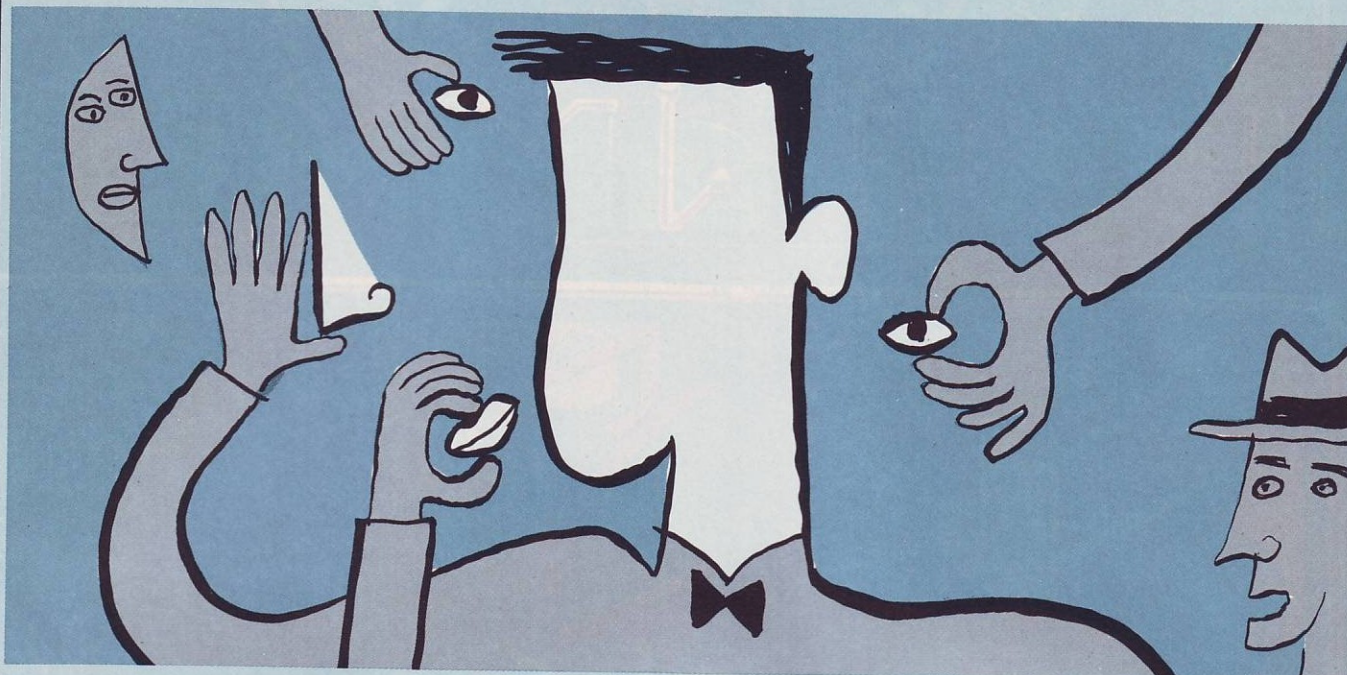
Have you ever thought about how easy it is to tell how someone feels from his or her facial expressions? A frown, a smile, or a mean look can communicate an inner feeling.

Face Cartoon is a program that draws a face on the screen and then lets you make different facial "cartoons" by pressing keys that change parts of the face.

For example, the "1" key lets you select among four types of eyebrows. Pressing the "2" key changes the eyes so that they look left, right, straight ahead, or appear closed. The "3" key lets you choose among four different mouths. On Atari, C 64, IBM PC*jr* and compatible, and VIC-20 computers, the *Face Cartoon* program lets you use the "4" key to change the color of the face.

By altering these facial features, it is possible, for example, to make your cartoon face shift its eyes nervously, raise its eyebrows in surprise, and open and close its mouth to simulate conversation. The expressions can be linked together to create an animated sequence.

To design an original cartoon or animated sequence, you simply record a series of facial expressions and then play them back. To record, you first press the numbered keys until you create the facial expression you desire, and then press the "R" key to record the current face. Each time you press "R," it's like taking a snapshot of the screen. These "snapshots" are stored in sequential order and make up a cartoon, which can be played back at any time by pressing the "P" key. The "C" key clears memory of any recorded cartoons and returns the face to its original appearance. Press "C" before you record, unless you want to add on to a previously recorded cartoon.

If you want to see all of the expressions possible with *Face Cartoon*, press the "A" key, which will cause a randomly generated cartoon of facial expressions to play automatically. Pressing any key stops the random cartoon from playing. Pressing the "H" key halts the program and returns you to BASIC.

Apple II series/*Face Cartoon*

```
10 DIM BR(4,3,5),MO(4,11,4),MT(4)
20 DIM B%(1000),BG%(1000),E%(1000),M%(1000)
30 GR:HOME:PRINT:G$ = CHR$(7)
40 FOR X = 1 TO 4:FOR Y = 1 TO 3:FOR Z = 1 TO 5
50 READ BR(X,Y,Z):NEXT Z,Y,X
60 FOR X = 1 TO 4:READ MT(X):NEXT X
70 FOR X = 1 TO 4:FOR Y = 1 TO MT(X):FOR Z = 1 TO 4
80 READ MO(X,Y,Z):NEXT Z,Y,X
90 FOR RO = 0 TO 27:READ T:FOR X = 1 TO T
100 READ KO,L,R:COLOR= KO:IF KO = 1 THEN COLOR= 13
110 HLIN L,R AT RO:HLIN 39-R,39-L AT RO
120 NEXT X,RO:COLOR= 6:FOR RO = 28 TO 39
130 HLIN 0,39 AT RO:NEXT RO
140 COLOR= 0:VLIN 33,39 AT 6:VLIN 33,39 AT 33
150 PRINT "1 - 3 A)UTO C)LEAR H)ALT P)LAY R)ECORD";
160 LB = 0:R = 0:GOSUB 1000:POKE -16368,0
170 K = PEEK(-16384)-128:IF K < 0 THEN 170
180 K = K-(K > 96)*(K < 123)*32
190 POKE -16368,0:IF K = 72 THEN TEXT:HOME:END
200 ON (K <> 65) GOTO 240:POKE -16368,0
210 IF PEEK(-16384) < 128 THEN 230
220 GOSUB 1000:POKE -16368,0:GOTO 170
230 K = INT(RND(1)*3)+1:GOSUB 6000:GOTO 210
240 IF K <> 82 THEN 280
250 IF R = 1000 THEN PRINT G$;:GOTO 170
260 R = R+1:B%(R) = B:E%(R) = E
270 M%(R) = M:BG%(R) = BG:GOTO 170
280 IF K <> 67 AND K <> 80 THEN 330
290 GOSUB 1000:IF K = 67 THEN R = 0:GOTO 170
300 IF R = 0 THEN PRINT G$;:GOTO 170
310 FOR Q = 1 TO R:B = B%(Q):E = E%(Q):M = M%(Q)
320 BG = BG%(Q):GOSUB 2000:NEXT Q:GOTO 170
330 K = K-48:IF K < 1 OR K > 3 THEN 170
340 GOSUB 6000:GOTO 170
1000 B = 1:E = 12:M = 1:BG = 7:GOSUB 2000:RETURN
2000 GOSUB 3000:GOSUB 4000:GOSUB 5000:RETURN
3000 IF B = LB THEN RETURN
3010 COLOR= 13:FOR X = 2 TO 4:HLIN 10,14 AT X
3020 HLIN 25,29 AT X:NEXT X:B1 = B:B2 = B
3030 IF B = 3 THEN B1 = 2:B2 = 3:GOTO 3050
3040 IF B = 2 THEN B1 = 3:B2 = 2
3050 COLOR= 8:FOR Y = 1 TO 3:FOR X = 1 TO 5
```

Atari

```
3060
3070
3080
4000
4010
4020
4030
5000
5010
5020
6000
6010
6020
6030
7000
7010
7020
7030
7040
7050
7060
7070
7080
7090
7100
7110
7120
7130
7140
7150
7160
7170
7180
7190
7200
7210
7220
7230
7240
7250
```

Atar

```
10 DI
20 DI
30 PR
40 FO
50 BR
60 FO
70 FO
80 FO
90 NE
100 F
110 F
120 C
130 F
140 P
150 P
160 N
170 P
180 R=
190 K=
200 P
210 K=
220 P
230 IF
240 IF
250 P
260 K=
270 F
280 IF
290 IF
300 R=
```

```
3060 IF BR(B1,Y,X) = 1 THEN PLOT X+9,Y+1
3070 IF BR(B2,Y,X) = 1 THEN PLOT X+24,Y+1
3080 NEXT X,Y:LB = B:RETURN
4000 COLOR= 12:FOR X = 11 TO 13
4010 IF X <> E THEN PLOT X,7:PLOT 15+X,7:GOTO 4030
4020 COLOR= 0:PLOT X,7:PLOT 15+X,7:COLOR= 12
4030 NEXT X:RETURN
5000 FOR X = 1 TO MT(M):COLOR= MO(M,X,1)
5010 HLIN MO(M,X,2),MO(M,X,3) AT MO(M,X,4)
5020 NEXT X:RETURN
6000 ON K GOTO 6010,6020,6030
6010 B = B+1:B = B-(B = 5)*4:GOSUB 3000:RETURN
6020 E = E+1:E = E-(E = 14)*3:GOSUB 4000:RETURN
6030 M = M+1:M = M-(M = 5)*4:GOSUB 5000:RETURN
7000 DATA 0,0,0,0,0,0,0,0,0,0,1,1,1,1,1,0,0,1,0,0,0,1
7010 DATA 0,0,0,1,0,0,0,0,0,0,1,0,0,0,0,0,1,0,0,0,0,0
7020 DATA 1,0,0,0,0,0,0,1,1,1,0,1,0,0,0,0,1,9,7,11,9,9
7030 DATA 14,25,16,13,14,14,17,9,15,15,17,15,16,23,17
7040 DATA 9,24,24,17,13,25,25,17,13,14,15,18,9,16,23
7050 DATA 18,13,24,25,18,13,14,14,16,9,15,24,16,13,25
7060 DATA 25,16,13,14,15,17,9,16,23,17,13,24,25,17,13
7070 DATA 14,25,18,13,14,17,16,9,18,21,16,13,22,25,16
7080 DATA 13,14,16,17,9,17,17,17,13,18,21,17,9,22,22
7090 DATA 17,13,23,25,17,13,14,17,18,9,18,21,18,13,22
7100 DATA 25,18,13,14,15,16,9,16,23,17,16,13,24,25,13
7110 DATA 14,14,17,9,15,15,17,15,16,23,17,9,24,24,17
7120 DATA 13,25,25,17,9,14,25,18,2,8,2,10,1,11,19,2,8
7130 DATA 3,8,1,9,19,2,8,3,7,1,8,19,2,8,4,7,1,8,19,3
7140 DATA 9,3,3,8,4,7,1,8,19,4,9,2,2,1,3,4,8,5,6,1,16
7150 DATA 18,9,9,2,2,1,3,3,9,4,4,1,5,5,8,6,6,1,7,7,1
7160 DATA 9,15,1,17,17,9,19,19,6,9,2,2,1,3,3,9,4,4,1
7170 DATA 5,7,1,9,15,9,18,19,7,9,3,3,1,4,4,9,5,5,1,6
7180 DATA 7,1,9,15,1,17,17,9,18,19,5,9,3,3,1,4,8,1,10
7190 DATA 14,1,16,17,9,18,19,6,9,3,1,4,4,9,5,5,1,6
7200 DATA 9,1,15,16,9,17,19,3,9,4,5,1,6,16,9,17,19,3
7210 DATA 9,4,4,1,5,15,8,16,19,2,1,5,14,8,15,19,1,1,6
7220 DATA 19,1,1,7,19,1,1,7,19,1,1,8,19,1,1,8,19,1,1
7230 DATA 9,19,1,1,9,19,1,1,10,19,1,1,11,19,1,1,12,19
7240 DATA 2,6,2,12,1,13,19,2,6,1,13,1,14,19,2,6,0,14
7250 DATA 1,15,19,2,6,0,15,1,16,19
```

Atari 800, 800XL, & 130XE/*Face Cartoon*

```
10 DIM BR$(60),EY$(12),MO$(144)
20 DIM B(1000),BG(1000),E(1000),M(1000)
30 PRINT CHR$(125):POKE 752,1:POKE 712,0:POKE 82,0
40 FOR X=1 TO 60:READ B:IF B=2 THEN B=32
50 BR$(X)=CHR$(B):NEXT X
60 FOR X=1 TO 12:READ B:EY$(X)=CHR$(B):NEXT X
70 FOR X=1 TO 12:READ T:FOR Y=1 TO T:READ B,N
80 FOR Z=1 TO N:MO$(LEN(MO$)+1)=CHR$(B)
90 NEXT Z:NEXT Y:NEXT X
100 FOR RO=0 TO 22:S=0:READ T
110 FOR X=1 TO T:READ CH,N
120 CH=CH+(CH=0)*160+(CH=2)*30
130 FOR CO=S TO S+N-1
140 POSITION CO,RO:PRINT CHR$(CH);
150 POSITION 39-CO,RO:PRINT CHR$(CH);
160 NEXT CO:S=S+N:NEXT X:NEXT RO:POSITION 1,23
170 PRINT "1 - 4 A)UTO C)LEAR H)ALT P)LAY R)ECORD";
180 R=0:GOSUB 1000:POKE 764,255
190 K=PEEK(764):IF K=255 THEN 190
200 POKE 764,255:IF K<>57 THEN 230
210 K=PEEK(764):POKE 710,148:POKE 712,0
220 POKE 752,0:PRINT CHR$(125):END
230 IF K<>63 THEN 280
240 IF PEEK(764)=255 THEN 260
250 POKE 764,255:GOSUB 1000:GOTO 190
260 K=INT(RND(1)*4)+1:GOSUB 7000
270 FOR DE=1 TO 30:NEXT DE:GOTO 240
280 IF K<>40 THEN 310
290 IF R=1000 THEN POKE 712,50:GOTO 190
300 R=R+1:B(R)=B:E(R)=E:M(R)=M:BG(R)=BG:GOTO 190
```

```
310 IF K<>18 AND K<>10 THEN 370
320 GOSUB 1000
330 IF K=18 THEN POKE 712,72:R=0:POKE 712,0:GOTO 190
340 IF R=0 THEN 190
350 POKE 712,90:FOR Q=1 TO R:B=B(Q):E=E(Q):M=M(Q)
360 BG=BG(Q):GOSUB 2000:NEXT Q:POKE 712,0:GOTO 190
370 K=(K=31)+(K=30)*2+(K=26)*3+(K=24)*4
380 IF K=0 THEN 190
390 GOSUB 7000:GOTO 190
1000 B=1:E=1:M=1:BG=19:GOSUB 2000:RETURN
2000 GOSUB 3000:GOSUB 4000:GOSUB 5000
2010 GOSUB 6000:RETURN
3000 B1=B:B2=B:IF B=3 THEN B1=2:B2=3:GOTO 3020
3010 IF B=2 THEN B1=3:B2=2
3020 Y=0:FOR X=B1*3-2 TO B1*3:Y=Y+1
3030 POSITION 10,Y:PRINT BR$(X*5-4,X*5):NEXT X
3040 Y=0:FOR X=B2*3-2 TO B2*3:Y=Y+1
3050 POSITION 25,Y:PRINT BR$(X*5-4,X*5):NEXT X:RETURN
4000 POSITION 11,7:PRINT EY$(E*3-2,E*3)
4010 POSITION 26,7:PRINT EY$(E*3-2,E*3):RETURN
5000 Y=14:FOR X=M*3-2 TO M*3:Y=Y+1:POSITION 14,Y
5010 PRINT MO$(X*12-11,X*12):NEXT X:RETURN
6000 POKE 710,BG:RETURN
7000 ON K GOTO 7010,7020,7030,7040
7010 B=B+1:B=B-(B=5)*4:GOSUB 3000:RETURN
7020 E=E+1:E=E-(E=5)*4:GOSUB 4000:RETURN
7030 M=M+1:M=M-(M=5)*4:GOSUB 5000:RETURN
7040 BG=BG+80:IF BG>255 THEN BG=19
7050 GOSUB 6000:RETURN
8000 DATA 2,2,2,2,2,2,2,2,2,2,160,160,160,160,160,2,2
8010 DATA 160,2,2,2,160,2,2,2,160,2,2,2,2,2,160,2,2
8020 DATA 2,2,2,160,2,2,2,2,160,2,2,2,2,2,160,160
8030 DATA 2,2,160,2,2,2,2,160,60,79,62,79,62,32,32,60
8040 DATA 79,45,45,1,160,12,5,32,1,160,1,32,8,160
8050 DATA 1,32,1,3,32,2,160,8,32,2,3,32,1,160,10,32,1
8060 DATA 3,32,2,160,8,32,2,1,32,12,3,32,4,160,4,32,4
8070 DATA 5,32,3,160,1,32,4,160,1,32,3,3,32,4,160,4
8080 DATA 32,4,3,32,2,160,8,32,2,5,32,1,160,1,32,8
8090 DATA 160,1,32,1,1,160,12,3,2,64,9,2,9,3,2,3,64
8100 DATA 7,2,11,3,2,3,64,5,2,12,3,2,4,64,4,2,12,4,2
8110 DATA 3,0,1,64,4,2,12,7,2,2,0,1,2,2,64,2,0,9,2,3
8120 DATA 0,1,12,2,2,0,1,2,1,0,1,2,1,64,1,2,1,0,1,2,7
8130 DATA 0,1,2,1,0,3,8,2,2,0,1,2,1,0,1,2,3,0,1,2,7,0
8140 DATA 4,10,2,3,0,1,2,1,0,1,2,2,0,1,2,7,0,1,2,1,0
8150 DATA 2,8,2,3,0,1,2,5,0,1,2,5,0,1,2,2,0,3,8,2,3,0
8160 DATA 1,2,1,0,1,2,4,0,5,2,2,0,3,4,2,4,0,2,2,11,0
8170 DATA 3,4,2,4,0,1,2,11,64,4,4,2,5,0,1,2,9,64,5,3
8180 DATA 2,6,0,1,2,13,3,2,7,0,1,2,12,3,2,7,0,1,2,12
8190 DATA 3,2,8,0,1,2,11,3,2,8,0,1,2,11,3,2,9,0,1,2
8200 DATA 10,3,2,9,0,1,2,10,3,2,1,0,1,2,10,2,9,2,0,12,2,8
```

Commodore 64 & 128 (C 64 mode)/*Face Cartoon*

```
10 DIM BR$(4,3),EY$(4),MO$(4,3)
20 DIM B(1000),BG(1000),E(1000),M(1000)
30 BD=53280:CB=55296:SB=1024:PRINT CHR$(147);CHR$(14)
40 FOR W=1 TO 4:FOR X=1 TO 3:A$="":READ T
50 FOR Y=1 TO T:READ B:IF B=2 THEN B=32
60 A$=A$+CHR$(B):NEXT Y:BR$(W,X)=A$:NEXT X,W
70 FOR W=1 TO 4:A$="":FOR Y=1 TO 4
80 READ B:A$=A$+CHR$(B):NEXT Y
90 EY$(W)=A$:NEXT W
100 FOR W=1 TO 4:FOR X=1 TO 3:A$="":READ T
110 FOR Y=1 TO T:READ B,U:IF B=2 THEN B=32
120 FOR Z=1 TO U:A$=A$+CHR$(B):NEXT Z,Y
130 MO$(W,X)=A$:NEXT X,W
140 FOR RO=0 TO 24:S=0:READ T
150 FOR X=1 TO T:READ KO,CH,N:IF CH=0 THEN CH=160
160 FOR CO=S TO S+N-1:Y=CO+40*RO:Z=(39-CO)+40*RO
170 POKE CB+Y,KO:POKE SB+Y,CH:POKE CB+Z,KO
180 POKE SB+Z,CH+(CH=233)*10
190 NEXT CO:S=S+N:NEXT X,RO:POKE 214,23:PRINT
```

GRAPHICS PROGRAM

```
200 PRINT SPC(1);CHR$(144);"1 - 4 A)UTO C)LEAR H)ALT P
)LAY R)ECORD";
210 PM=-1:R=0:POKE BD,12:GOSUB 1000
220 GET K$:IF K$="" THEN 220
230 IF K$<>"H" THEN 260
240 POKE BD,14:POKE 53281,6
250 PRINT CHR$(147);CHR$(142);CHR$(154):END
260 ON -(K$<>"A") GOTO 300:PM=0
270 GET K$:IF K$<>"" THEN PM=-1:GOSUB 1000:GOTO 220
280 K=INT(RND(1)*4)+1:GOSUB 7000
290 FOR DE=1 TO 50:NEXT DE:GOTO 270
300 IF K$<>"R" THEN 330
310 IF R=1000 THEN POKE BD,2:GOTO 220
320 R=R+1:B(R)=B:E(R)=E:M(R)=M:BG(R)=BG:GOTO 220
330 IF K$<>"C" AND K$<>"P" THEN 390
340 GOSUB 1000
350 IF K$="C" THEN POKE BD,14:R=0:POKE BD,12:GOTO 220
360 IF R=0 THEN 220
370 POKE BD,14:FOR Q=1 TO R:B=B(Q):E=E(Q):M=M(Q)
380 BG=BG(Q):GOSUB 2000:NEXT Q:POKE BD,12:GOTO 220
390 K=VAL(K$):IF K<1 OR K>4 THEN 220
400 GOSUB 7000:GOTO 220
1000 B=1:E=1:M=1:BG=7:GOSUB 2000:RETURN
2000 GOSUB 3000:GOSUB 4000:GOSUB 5000
2010 GOSUB 6000:RETURN
3000 B1=B:B2=B:IF B=3 THEN B1=2:B2=3:GOTO 3020
3010 IF B=2 THEN B1=3:B2=2
3020 FOR X=1 TO 3
3030 POKE 214,X:PRINT:PRINT TAB(10);BR$(B1,X);
3040 POKE 214,X:PRINT:POKE 211,25:PRINT BR$(B2,X);
3050 NEXT X:RETURN
4000 POKE 214,6:PRINT:PRINT TAB(11);EY$(E);
4010 POKE 214,6:PRINT:POKE 211,26:PRINT EY$(E);:RETURN
5000 FOR X=1 TO 3:POKE 214,X+13:PRINT
5010 PRINT TAB(14);MO$(M,X);:NEXT X:RETURN
6000 POKE 53281,BG:RETURN
7000 ON K GOTO 7010,7020,7030,7040
7010 B=B+1:B=B+(B=5)*4:GOSUB 3000:RETURN
7020 E=E+1:E=E+(E=5)*4:GOSUB 4000:RETURN
7030 M=M+1:M=M+(M=5)*4:GOSUB 5000:RETURN
7040 BG=BG+1:IF PM THEN BG=BG+(BG=16)*16:GOTO 7070
7050 BG=BG-(BG=6)-(BG=8)-(BG=10)-(BG=14)
7060 BG=BG+(BG=16)*15
7070 GOSUB 6000:RETURN
8000 DATA 5,2,2,2,2,2,5,2,2,2,2,2,7,18,129,2,2,2,2,2
8010 DATA 8,2,2,18,129,2,146,2,2,8,2,18,129,2,146,2,2
8020 DATA 2,8,18,129,2,146,2,2,2,8,2,2,18,129,2,146
8030 DATA 2,2,8,2,2,2,18,129,2,146,2,7,2,2,2,2,18,129
8040 DATA 2,5,2,2,2,2,2,8,2,18,129,2,2,2,146,2,10,18
8050 DATA 129,2,146,2,2,18,129,2,154,60,111,62,154
8060 DATA 111,62,32,32,154,60,111,154,45,45,45,3,18,1
8070 DATA 150,1,32,12,8,2,1,18,1,150,1,2,1,5,1,2,8
8080 DATA 150,1,2,1,6,2,2,18,1,150,1,2,8,146,1,2,2,6
8090 DATA 2,1,18,1,150,1,2,10,146,1,2,1,6,2,3,18,1
8100 DATA 150,1,2,6,146,1,2,3,1,2,12,6,2,4,18,1,150,1
8110 DATA 2,4,146,1,2,4,11,2,3,18,1,150,1,2,1,146,1,2
8120 DATA 4,18,1,150,1,2,1,146,1,2,3,6,2,4,18,1,150,1
8130 DATA 2,4,146,1,2,4,6,2,2,18,1,150,1,2,8,146,1,2
8140 DATA 2,8,2,1,18,1,150,1,2,1,5,1,2,8,150,1,2,1,3
8150 DATA 18,1,150,1,2,12,2,0,0,2,8,0,9,2,0,0,3,8,0,6
8160 DATA 2,0,0,3,8,0,5,2,0,0,4,8,0,4,3,0,0,3,10,0,1
8170 DATA 8,0,3,7,0,0,2,10,0,1,1,32,2,8,0,2,0,0,9,1
8180 DATA 32,3,0,0,1,13,0,0,2,10,0,1,1,32,1,10,0,1,1
8190 DATA 32,1,8,0,1,1,32,1,0,0,1,32,7,0,0,1,32,1
8200 DATA 0,0,1,10,0,1,9,0,0,2,10,0,1,1,32,1,10,0,1,1
8210 DATA 32,3,0,0,1,32,7,0,0,2,10,0,2,10,0,0,3,10
8220 DATA 0,1,1,32,1,10,0,1,1,32,2,0,0,1,32,7,0,0,1
8230 DATA 1,32,1,10,0,2,8,0,0,3,10,0,1,1,32,5,0,0,1,1
8240 DATA 32,5,0,0,1,1,32,2,10,0,2,8,0,0,3,10,0,1,1
8250 DATA 32,1,10,0,1,1,32,4,0,0,5,1,32,2,10,0,0,3,4,0
8260 DATA 32,4,10,0,2,1,32,11,10,0,3,4,0,0,4,10,0,1,1
8270 DATA 32,11,8,233,4,3,0,0,5,1,32,9,8,233,6,1,0,0
8280 DATA 6,1,0,0,7,1,0,0,7,1,0,0,8,1,0,0,8,1,0,0,9,1
8290 DATA 0,0,9,1,6,0,11,1,6,0,11,1,6,0,20,1,6,0,1
```

IBM PC & compatibles w/Color/Graphics Monitor Adapter/*Face Cartoon*

This program has been tested and found to work on the following computers and hardware configurations using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter. w/Disk BASIC D2.00 or Advanced BASIC A2.00. It should also work on many other PC compatibles.

```
10 DEFINT A-Z:DIM BR$(4,3),EY$(4),MO$(4,3)
20 DIM B(1000),E(1000),M(1000)
30 WIDTH 40:LOCATE ,,0:KEY OFF:COLOR 14,0,0:CLS
40 FOR W=1 TO 4:FOR X=1 TO 3:A$=""
50 FOR Y=1 TO 5:READ B:IF B=2 THEN B=32
60 A$=A$+CHR$(B):NEXT Y:BR$(W,X)=A$:NEXT X,W
70 FOR W=1 TO 4:A$=CHR$(32)
80 FOR Y=2 TO 4:READ B:A$=A$+CHR$(B):NEXT Y
90 EY$(W)=A$+CHR$(32):NEXT W
100 FOR W=1 TO 4:FOR X=1 TO 3:A$="":READ T
110 FOR Y=1 TO T:READ B,U
120 FOR Z=1 TO U:A$=A$+CHR$(B):NEXT Z,Y
130 MO$(W,X)=A$:NEXT X,W
140 FOR RO=1 TO 23:S=1:READ T
150 FOR X=1 TO T:READ KO,N
160 IF (RO=13 OR RO=14) AND X=3 THEN CH=178 ELSE CH=21
9
170 FOR CO=S TO S+N-1:COLOR KO
180 LOCATE RO,CO:PRINT CHR$(CH);
190 LOCATE RO,41-CO:PRINT CHR$(CH);:NEXT CO
200 S=S+N:NEXT X,RO:COLOR 14:LOCATE 25,2
210 PRINT "1 - 3 A)uto C)lear H)alt P)lay R)ecord";
220 KMAX=3:R=0:GOSUB 1000
230 K$=INKEY$:IF K$="" THEN 230
240 V=ASC(K$):K$=CHR$(V-(V>96)*(V<123)*32)
250 IF K$="H" THEN COLOR 14,0,0:CLS:END
260 IF K$<>"A" THEN 300
270 K$=INKEY$:IF K$<>"" THEN GOSUB 1000:GOTO 230
280 K=INT(RND(1)*4)+1:GOSUB 7000
290 FOR DE=1 TO 40:NEXT DE:GOTO 270
300 IF K$<>"R" THEN 330
310 IF R=1000 THEN COLOR 0,SC,4:GOTO 230
320 R=R+1:B(R)=B:E(R)=E:M(R)=M:GOTO 230
330 IF K$<>"C" AND K$<>"P" THEN 390
340 GOSUB 1000
350 IF K$="C" THEN COLOR 0,SC,0:R=0:GOTO 230
360 IF R=0 THEN SOUND 400,2:GOTO 230
370 COLOR 0,SC,9:FOR Q=1 TO R:B=B(Q):E=E(Q):M=M(Q)
380 GOSUB 2000:NEXT Q:COLOR 0,SC,0:GOTO 230
390 K=VAL(K$):IF K<1 OR K>KMAX THEN 230
400 GOSUB 7000:GOTO 230
1000 B=1:E=1:M=1:SC=7:GOSUB 2000:RETURN
2000 GOSUB 3000:GOSUB 4000:GOSUB 5000
2010 RETURN
3000 B1=B:B2=B:IF B=3 THEN B1=2:B2=3:GOTO 3020
3010 IF B=2 THEN B1=3:B2=2
3020 FOR X=1 TO 3
3030 COLOR 6,7:LOCATE X+2,11:PRINT BR$(B1,X);
3040 LOCATE X+2,26:PRINT BR$(B2,X);
3050 NEXT X:RETURN
4000 LOCATE 8,11:COLOR 1,7:PRINT EY$(E);
4010 LOCATE 8,26:PRINT EY$(E);:RETURN
5000 FOR X=1 TO 3:COLOR 12,7:LOCATE X+15,15
5010 PRINT MO$(M,X);:NEXT X:RETURN
7000 ON K GOTO 7010,7020,7030
7010 B=B+1:B=B+(B=5)*4:GOSUB 3000:RETURN
7020 E=E+1:E=E+(E=5)*4:GOSUB 4000:RETURN
7030 M=M+1:M=M+(M=5)*4:GOSUB 5000:RETURN
8000 DATA 2,2,2,2,2,2,2,2,2,2,2,219,219,219,219,219,2,2
8010 DATA 219,2,2,2,219,2,2,2,2,219,2,2,2,2,2,219,2,2
8020 DATA 2,2,2,219,2,2,2,2,219,2,2,2,2,2,2,219,219
8030 DATA 219,2,219,2,2,2,219,60,79,62,79,62,32,32,60
8040 DATA 79,45,45,45,1,219,12,5,32,1,219,1,32,8,219
8050 DATA 1,32,1,3,32,2,219,8,32,2,3,32,1,219,10,32,1
8060 DATA 3,32,2,219,8,32,2,1,32,12,3,32,4,219,4,32,4
8070 DATA 5,32,3,219,1,32,4,219,1,32,3,32,5,32,1,219,4
8080 DATA 32,4,3,32,2,219,8,32,2,5,32,1,219,1,32,8
8090 DATA 219,1,32,1,1,219,12,3,0,2,6,9,7,9,3,0,3,6,6
```

```
8100 DATA 7,11,3,0,3,6,5,7,12,3,0,4,6,4,7,13,4,0,3,12
8110 DATA 1,6,3,7,13,7,0,2,12,1,7,2,6,2,0,9,7,3,0,1
8120 DATA 13,0,2,12,1,7,1,12,1,7,1,6,1,7,1,0,1,7,7,0
8130 DATA 1,7,1,0,1,12,1,9,0,2,12,1,7,1,12,1,7,3,0,1
8140 DATA 7,7,0,2,12,2,10,0,3,12,1,7,1,12,1,7,2,0,1,7
8150 DATA 7,0,1,7,1,12,2,8,0,3,12,1,7,5,0,1,7,5,0,1,7
8160 DATA 2,12,2,8,0,3,12,1,7,1,12,1,7,4,0,5,7,2,12,3
8170 DATA 4,0,4,12,2,7,11,12,3,3,0,5,7,11,6,4,3,0,6,7
8180 DATA 9,6,5,2,0,7,7,13,2,0,8,7,12,2,0,8,7,12,2,0
8190 DATA 9,7,11,2,0,9,7,11,2,0,10,7,10,2,0,11,7,9,2
8200 DATA 0,12,7,8,2,0,13,7,7
```

MODIFICATION FOR ANOTHER COMPUTER
IBM PCjr & compatibles/*Face Cartoon*

This program has been tested and found to work on the following computers and hardware configurations using the BASICs shown: IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00.

Use the IBM PC version, with the following alterations:
Add lines 6000 and 7040-7060.
```
6000 PALETTE 7,SC:RETURN
7040 SC=SC+1:IF PM THEN SC=SC+(SC=16)*16:GOTO 7060
7050 SC=SC-(SC=1)-(SC=6)-(SC=12):SC=SC+(SC=16)*15
7060 GOSUB 6000:RETURN
```
Also, change lines 20, 210, 220, 260, 270, 320, 380, 2010, and 7000 to read as follows:
```
20 DIM B(1000),BG(1000),E(1000),M(1000)
210 PRINT "1 - 4 A)uto C)lear H)alt P)lay R)ecord";
220 KMAX=4:PM=-1:R=0:GOSUB 1000
260 IF K$<>"A" THEN 300 ELSE PM=0
270 K$=INKEY$:IF K$<>"" THEN GOSUB 1000:PM=-1:GOTO 230
320 R=R+1:B(R)=B:E(R)=E:M(R)=M:BG(R)=SC:GOTO 230
380 SC=BG(Q):GOSUB 2000:NEXT Q:COLOR 0,SC,0:GOTO 230
2010 GOSUB 6000:RETURN
7000 ON K GOTO 7010,7020,7030,7040
```

Tandy Models III & 4 (Model III mode)/*Face Cartoon*

```
10 CLEAR 1000:DEFINT A-Z:CLS
20 DIM BR$(4,3),EY$(4),MO$(4,3)
30 DIM B(1000),BG(1000),E(1000),M(1000)
40 FOR W=1 TO 4:FOR X=1 TO 3:A$=""
50 FOR Y=1 TO 5:READ B:IF B=2 THEN B=32
60 A$=A$+CHR$(B):NEXT Y:BR$(W,X)=A$:NEXT X,W
70 FOR W=1 TO 4:A$="":FOR Y=1 TO 3
80 READ B:A$=A$+CHR$(B):NEXT Y
90 EY$(W)=A$:NEXT W
100 FOR W=1 TO 4:FOR X=1 TO 3:A$="":READ T
110 FOR Y=1 TO T:READ B,U
120 FOR Z=1 TO U:A$=A$+CHR$(B):NEXT Z,Y
130 MO$(W,X)=A$:NEXT X,W
140 FOR X=1 TO 60:READ A:PRINT@A,CHR$(191);:NEXT X
150 GL$=STRING$(16,CHR$(140))
160 FOR X=1 TO 4:READ A,L:PRINT@A,LEFT$(GL$,L);:NEXT X
170 FOR X=1 TO 16:READ A,CH:PRINT@A,CHR$(CH);:NEXT X
180 PRINT@538,STRING$(12,188);
190 PRINT@970,"1 - 3 A)uto C)lear H)alt P)lay R)ecord";
200 R=0:GOSUB 1000
210 K$=INKEY$:IF K$="" THEN 210
220 V=ASC(K$):K$=CHR$(V-(V>96)*(V<123)*32)
230 IF K$="H" THEN CLS:END
240 IF K$<>"A" THEN 280
250 K$=INKEY$:IF K$<>"" THEN GOSUB 1000:GOTO 210
260 K=RND(4):GOSUB 6000
270 FOR DE=1 TO 40:NEXT DE:GOTO 250
280 IF K$<>"R" THEN 310
290 IF R=1000 THEN 210
300 R=R+1:B(R)=B:E(R)=E:M(R)=M:GOTO 210
```

```
310 IF K$<>"C"AND K$<>"P" THEN 360
320 GOSUB 1000:IF K$="C" THEN R=0:GOTO 210
330 IF R=0 THEN 210
340 FOR Q=1 TO R:B=B(Q):E=E(Q):M=M(Q)
350 GOSUB 2000:NEXT Q:GOTO 210
360 K=VAL(K$):IF K<1 OR K>3 THEN 210
370 GOSUB 6000:GOTO 210
1000 B=1:E=1:M=1:GOSUB 2000:RETURN
2000 GOSUB 3000:GOSUB 4000:GOSUB 5000:RETURN
3000 B1=B:B2=B:IF B=3 THEN B1=2:B2=3:GOTO 3020
3010 IF B=2 THEN B1=3:B2=2
3020 FOR X=1 TO 3:PRINT@21+64*X,BR$(B1,X);
3030 PRINT@38+64*X,BR$(B2,X);
3040 NEXT X:RETURN
4000 PRINT@342,EY$(E);
4010 PRINT@359,EY$(E);:RETURN
5000 FOR X=1 TO 3:PRINT@602+64*X,MO$(M,X);
5010 NEXT X:RETURN
6000 ON K GOTO 6010,6020,6030
6010 B=B+1:B=B+(B=5)*4:GOSUB 3000:RETURN
6020 E=E+1:E=E+(E=5)*4:GOSUB 4000:RETURN
6030 M=M+1:M=M+(M=5)*4:GOSUB 5000:RETURN
7000 DATA 2,2,2,2,2,2,2,2,2,2,191,191,191,191,191,2,2
7010 DATA 191,2,2,2,191,2,2,2,191,2,2,2,2,2,2,191,2,2
7020 DATA 2,2,2,191,2,2,2,2,191,2,2,2,2,2,2,191,191
7030 DATA 191,2,191,2,2,2,191,60,79,62,79,62,32,32,60
7040 DATA 79,45,45,45,1,191,12,5,32,1,191,1,32,8,191
7050 DATA 1,32,1,3,32,2,191,8,32,2,3,32,1,191,10,32,1
7060 DATA 3,32,2,191,8,32,2,1,32,12,3,32,4,191,4,32,4
7070 DATA 5,32,3,191,1,32,4,191,1,32,3,3,32,4,191,4
7080 DATA 32,4,3,32,2,191,8,32,2,5,32,1,191,1,32,8
7090 DATA 191,1,32,1,1,191,12,15,48,78,113,141,178
7100 DATA 201,202,204,243,245,246,264,267,308,311,328
7110 DATA 331,337,348,351,352,355,366,372,375,392,395
7120 DATA 414,415,416,417,436,439,457,458,459,477,478
7130 DATA 479,480,481,482,500,501,502,524,563,589,626
7140 DATA 654,689,719,752,784,815,850,877,916,939,268
7150 DATA 16,292,16,402,10,420,10,273,188,401,131,284
7160 DATA 176,412,131,349,131,350,131,287,176,288,176
7170 DATA 353,131,354,131,291,176,419,131,302,188,430
7180 DATA 131,537,176,550,176
```

VIC-20 w/8K or 16K RAM Cartridge/*Face Cartoon*

```
10 DIM BR$(4,3),EY$(4),MO$(4,3)
20 DIM B(100),BG(100),E(100),M(100)
30 SB=4096:CB=37888:PRINT CHR$(147);CHR$(14)
40 FOR W=1 TO 4:FOR X=1 TO 3:A$="":READ T
50 FOR Y=1 TO T:READ B:IF B=2 THEN B=32
60 A$=A$+CHR$(B):NEXT Y:BR$(W,X)=A$:NEXT X,W
70 FOR W=1 TO 4:A$="":FOR Y=1 TO 4
80 READ B:A$=A$+CHR$(B):NEXT Y
90 EY$(W)=A$:NEXT W
100 FOR W=1 TO 4:FOR X=1 TO 3:A$="":READ T
110 FOR Y=1 TO T:READ B,U:IF B=2 THEN B=32
120 FOR Z=1 TO U:A$=A$+CHR$(B):NEXT Z,Y
130 MO$(W,X)=A$:NEXT X,W
140 FOR RO=5 TO 22:S=0:READ T
150 FOR X=1 TO T:READ KO,CH,N:IF CH=0 THEN CH=160
160 FOR CO=S TO S+N-1:Y=CO+22*RO:Z=(21-CO)+22*RO
170 POKE SB+Y,CH:POKE CB+Y,KO
180 POKE SB+Z,CH+(CH=105)*10:POKE CB+Z,KO
190 NEXT CO:S=S+N:NEXT X,RO:POKE 214,21:PRINT
200 PRINT TAB(5);"1 - 4 A C H P R";
210 PM=0:R=0:GOSUB 1000
220 GET K$:IF K$="" THEN 220
230 IF K$<>"H" THEN 260
240 POKE 36879,27
250 PRINT CHR$(147):END
260 ON -(K$<>"A") GOTO 300:PM=-1
270 GET K$:IF K$<>"" THEN PM=-1:GOSUB 1000:GOTO 220
280 K=INT(RND(1)*4)+1:GOSUB 7000
290 FOR DE=1 TO 60:NEXT DE:GOTO 270
```

```
300 IF K$<>"R" THEN 330
310 IF R=100 THEN POKE 36879,BG+2:GOTO 220
320 R=R+1:B(R)=B:E(R)=E:M(R)=M:BG(R)=BG:GOTO 220
330 IF K$<>"C" AND K$<>"P" THEN 400
340 GOSUB 1000
350 IF K$="C" THEN POKE 36879,BG+7:R=0:GOTO 220
360 IF R=0 THEN 220
370 POKE 36879,BG+6:FOR Q=1 TO R:B=B(Q):E=E(Q):M=M(Q)
380 BG=BG(Q):GOSUB 2000:NEXT Q
390 POKE 36879,BG+7:GOTO 220
400 K=VAL(K$):IF K<1 OR K>4 THEN 220
410 GOSUB 7000:GOTO 220
1000 B=1:E=1:M=1:BG=248:GOSUB 2000:RETURN
2000 GOSUB 3000:GOSUB 4000:GOSUB 5000
2010 GOSUB 6000:RETURN
3000 FOR X=1 TO 3:B1=B:B2=B
3010 IF B=3 THEN B1=2:B2=3:GOTO 3030
3020 IF B=2 THEN B1=3:B2=2
3030 POKE 214,X-1:PRINT:PRINT TAB(2);BR$(B1,X);
3040 POKE 214,X-1:PRINT:POKE 211,15:PRINT BR$(B2,X);
3050 NEXT X:RETURN
4000 POKE 214,6:PRINT:PRINT TAB(3);EY$(E);
4010 POKE 214,6:PRINT:POKE 211,16:PRINT EY$(E);:RETURN
5000 FOR X=1 TO 3:POKE 214,X+14:PRINT
5010 PRINT TAB(5);MO$(M,X);:NEXT X:RETURN
6000 POKE 36879,BG:RETURN
7000 ON K GOTO 7010,7020,7030,7040
7010 B=B+1:B=B+(B=5)*4:GOSUB 3000:RETURN
7020 E=E+1:E=E+(E=5)*4:GOSUB 4000:RETURN
7030 M=M+1:M=M+(M=5)*4:GOSUB 5000:RETURN
7040 BG=BG+16:IF PM THEN 7060
7050 BG=BG-16*(BG=40)-(BG=104)
7060 IF BG>248 THEN BG=8-(PM=0)*16
7070 GOSUB 6000:RETURN
8000 DATA 5,2,2,2,2,2,5,2,2,2,2,2,7,18,144,2,2,2,2,2
8010 DATA 8,2,2,18,144,2,146,2,2,8,2,18,144,2,146,2,2
8020 DATA 2,8,18,144,2,146,2,2,2,2,8,2,2,18,144,2,146
8030 DATA 2,2,8,2,2,2,18,144,2,146,2,7,2,2,2,2,18,144
8040 DATA 2,5,2,2,2,2,2,8,2,18,144,2,2,2,146,2,10,18
8050 DATA 144,2,146,2,2,18,144,2,31,60,111,62,31
8060 DATA 111,62,32,32,31,60,111,31,45,45,45,3,18,1
8070 DATA 28,1,32,12,8,2,1,18,1,28,1,2,1,5,1,2,8,28,1
8080 DATA 2,1,6,2,2,18,1,28,1,2,8,146,1,2,2,6,2,1,18
8090 DATA 1,28,1,2,10,146,1,2,1,6,2,3,18,1,28,1,2,6
8100 DATA 146,1,2,3,1,2,12,6,2,4,18,1,28,1,2,4,146,1
8110 DATA 2,4,11,2,3,18,1,28,1,2,1,146,1,2,4,18,1,28
8120 DATA 1,2,1,146,1,2,3,6,2,4,18,1,28,1,2,4,146,1,2
8130 DATA 4,6,2,2,18,1,28,1,2,8,146,1,2,2,8,2,1,18,1
8140 DATA 28,1,2,1,5,1,2,8,28,1,2,1,3,18,1,28,1,2,12
8150 DATA 3,0,0,8,1,32,2,0,0,1,4,0,0,1,1,32,7,0,0,2,2
8155 DATA 3,0,0,8,1,32,2,0,0,1,4,0,0,1,1,32,7,0,0,2,2
8160 DATA 0,1,5,0,0,1,1,32,7,0,0,1,1,32,1,2,0,1,5,0,0
8170 DATA 1,1,32,6,0,0,1,1,32,1,2,0,2,6,1,32,1,0,0,1
8180 DATA 1,32,4,0,0,1,1,32,2,2,0,2,4,1,32,2,0,0,4,1
8190 DATA 32,2,2,0,3,2,1,32,8,2,0,3,2,1,32,7,0,105,4
8200 DATA 2,1,32,6,0,105,5,1,1,32,0,1,1,32,0,1,1,32,0
8205 DATA 1,1,32,0,1,1,32,0,2,6,0,1,1,32,10,2,6,0,1,1
8210 DATA 1,1,32,0,1,1,32,0,2,6,0,1,1,32,10,2,6,0,1,1
8220 DATA 32,10,2,6,0,2,1,32,9,2,6,0,3,1,32,8
```

MICRO PHONEBOOK: AN ADDRESS BOOK ON DISK

Use Our Program to Keep Neat and Organized Lists of Friends, Family, and Business Contacts

BY PASQUALE M. CIRULLO

Have you ever looked up someone's phone number in your address book and discovered several different numbers listed for the same person? That's what happened to me last weekend. I wanted to call a friend, but when I looked in my phone book, I had only his old numbers. After I finally tracked down his latest number, I decided to write *Micro Phonebook*.

Micro Phonebook is a program that will help you keep all of your addresses and phone numbers neat, orderly, and up to date. Some of my friends are constantly moving and changing addresses, so I had entire pages in my address book devoted to just one friend. But my *Micro Phonebook* doesn't keep old addresses and phone numbers that aren't needed anymore. It erases these entries and replaces them with the most current information. *Micro Phonebook* will also sort your address books any way that you want—for example, by first name, last name, state, or even area code.

Most address books will limit you to two or three pages for each letter of the alphabet. *Micro Phonebook* allows up to 120 entries per file, organized in any way you choose. You can even have entire files dedicated to specific letters.

USING *MICRO PHONEBOOK*

Micro Phonebook uses three menus for its commands: the Main Menu, the Rearrange Menu, and the Open or Close Menu. For all menus, type the number of your choice and then press RETURN or ENTER.

The Main Menu—the first menu you see whenever you run the program—lists the following:

1. START A NEW ADDRESS BOOK

This option lets you start a new address book for each member of your family or for each salesperson in your office. If you choose this option when you've been working with another address book, and you haven't saved your changes—the computer