reaching one of the set limits. Resetting the limits slightly further in will overcome this problem. Note that the X co-ordinate of the start point and the limits of X must be split into hi-byte/lo-byte form, as shown in the demonstration program.

Although Fillsub does not directly rely on any of the other routines we have developed for the Commodore 64, the other three routines (Plotsub, Linesub and Circsub) are loaded by the demonstration program to draw the shapes to be filled by Fillsub.

One final point. When this routine was originally designed, the filling action took place in the horizontal direction rather than the vertical. But it was found that using vertical bars to fill the shape speeds up execution time considerably.

Plotsub/II Loader

This is an amended version of the Plotsub routine first published on page 339. Use it to create a new object file called "PLOTSUB.HEX" on cassette or disk, as explained on page 339

```
10 FORI=49408TO49408+314
20 READA:POKEI,A:S=S+A:NEXT
30 READCC:IFCC<>STHENPRINT"CHECKSUM ERROR"
100 DATA1,0,3,6,0,5,0,0,6,5,5,69,38,2
110 DATA72,138,72,152,72,173,0,193,240
120 DATA83,169,0,133,251,169,4,133,252
130 DATA162,3,160,0,173,2,193,145,251
140 DATA136,208,251,230,252,202,48,8
150 DATA208,244,145,251,160,231,208
160 DATA238,173,1,193,240,24,169,0,133
170 DATA251,169,32,133,252,162,32,160
180 DATA0,169,0,145,251,136,208,251
190 DATA230,252,202,208,246,173,24,208
200 DATA41,240,9,8,141,24,208,173,17
210 DATA208,9,32,141,17,208,76,125,193
220 DATA173,24,208,41,240,9,4,141,24
230 DATA208,173,17,208,41,223,141,17
240 DATA208,104,168,104,170,104,96,72
250 DATA138,72,152,72,173,4,193,141,7
260 DATA193,173,3,193,41,248,141,6,193
270 DATA173,3,193,41,7,141,8,193,173,5
280 DATA193,41,7,141,10,193,162,3,78,5
290 DATA193,202,208,250,173,5,193,141
300 DATA9,193,169,0,141,11,193,141,12
310 DATA193,162,5,173,11,193,24,109,9
320 DATA193,141,11,193,202,208,243,162
330 DATA6,14,12,193,14,11,193,144,3
340 DATA238,12,193,202,208,242,173,11
350 DATA193,24,109,6,193,141,11,193
360 DATA173,12,193,109,7,193,141,12
370 DATA193,173,11,193,24,105,0,141,11
380 DATA193,173,12,193,105,32,141,12
390 DATA193,173,11,193,24,109,10,193
400 DATA141,11,193,173,12,193,105,0
410 DATA141,12,193,173,11,193,133,251
420 DATA173,12,193,133,252,169,1,141
430 DATA13,193,56,169,7,237,8,193,240
440 DATA7,170,14,13,193,202,208,248
450 DATA160,0,177,251,13,13,193,145
460 DATA251,76,125,193
470 DATA37523:REM*CHECKSUM*
```

Strange Device
Line 15 DN=8 indicates that the object files (Plotsub.Hex, etc.) are to be loaded from disk. For tape use, change this to DN=1, and either make one tape with the object files in the order specified by lines 20 to 30 or, if your files are on different tapes, insert this code as lines 22,26 and 28:
INPUT"CHANGE TAPE & HIT RETURN";A$

Fillsub Demo

```
10 REM **** FILLSUB DEMO PROGRAM ****
15 DN=8:REM FOR CASSETTE DN=1
20 IFA=0THENA=1:LOAD"PLOTSUB.HEX",DN,1
25 IFA=1THENA=2:LOAD"LINESUB.HEX",DN,1
27 IFA=2THENA=3:LOAD"CIRCSUB.HEX",DN,1
30 IFA=3THENA=4:LOAD"FILLSUB.HEX",DN,1
40 GOSUB1000:REM SET HIRES
50 REM **** DRAW TRIANGLE ****
60 XA=100:YA=150:XB=300:YB=160:XC=170:YC=20
80 X1=XA:Y1=YA:X2=XB:Y2=YB:GOSUB2000
90 X1=XC:Y1=YC:GOSUB2000
100 X2=XA:Y2=YA:GOSUB2000
102 REM **** DRAW CIRCLE ****
103 XC=60:YC=60:R=50:GOSUB4000
120 REM **** FILL TRIANGLE ****
130 XS=170:YS=130:REM START POINTS
140 MIN=100:MAX=299:REM LIMITS
150 GOSUB3000
161 REM **** FILL CIRCLE ****
162 XS=60:YS=60:REM START POINT
163 MIN=10:MAX=109
164 GOSUB3000
```

Fillsub Demo (cont.)

```
200 GETA$:IFA$=""THEN200:REM AWAIT KEYPRESS
210 POKE49408,0:SYS49422:REM RESET SCREEN
220 PRINTCHR$(147):REM CLEAR SCREEN
225 PRINT"END OF ROUTINE"
230 END
1000 REM **** SET HIRES ****
1010 POKE49408,1:POKE49409,1
1020 POKE49410,7
1030 SYS49422
1040 RETURN
2000 REM **** LINESUB ****
2010 MHI=INT(X1/256):MLO=X1-256*MHI
2020 NHI=INT(X2/256):NLO=X2-256*NHI
2030 POKE49920,MLO:POKE49921,MHI
2040 POKE49922,NLO:POKE49923,NHI
2050 POKE49924,Y1:POKE49925,Y2
2060 SYS 49934
2070 RETURN
3000 REM **** FILLSUB ****
3010 SH=INT(XS/256):SL=XS-SH*256
3020 HAX=INT(MAX/256):LAX=MAX-256*HAX
3030 HIN=INT(MIN/256):LIN=MIN-256*HIN
3040 POKE50955,SL:POKE50956,SH
3050 POKE50957,YS
3060 POKE50958,LIN:POKE50959,HIN
3070 POKE50960,LAX:POKE50961,HAX
3080 SYS50967
3090 RETURN
4000 REM **** CIRCSUB ****
4010 CHI=INT(XXC/256):CLO=XC-256*CHI
4020 POKE50497,CLO:POKE50498,CHI
4030 POKE50499,YC:POKE50500,R
4040 SYS 50521
4060 RETURN
```

Fillsub Loader

```
10 REM **** BASIC LOADER FOR FILLSUB ****
20 FORI=50944 TO 51375
30 READA:POKEI,A:CC=CC+A:NEXT
40 READA:IFCC<>A THEN PRINT"CHECKSUM ERROR":END
100 DATA11,0,6,8,0,3,6,5,136,39,16,60
110 DATA0,60,10,0,109,0,0,1,10,0,16
120 DATA173,11,199,141,20,199,173,12
130 DATA199,141,21,199,172,13,199,169
140 DATA1,141,18,199,141,19,199,140,5
150 DATA199,173,20,199,141,3,193,173
160 DATA21,199,141,4,193,32,131,193
170 DATA173,19,199,208,8,200,192,200
180 DATA240,19,76,82,199,136,192,0,144
190 DATA11,32,246,199,173,22,199,208,3
200 DATA76,46,199,173,18,199,208,31
210 DATA173,20,199,56,233,1,141,20,199
220 DATA173,21,199,233,0,141,21,199
230 DATA205,15,199,208,65,173,20,199
240 DATA205,14,199,208,57,96,173,20
250 DATA199,24,105,1,141,20,199,173,21
260 DATA199,105,0,141,21,199,205,17
270 DATA199,208,34,173,20,199,205,16
280 DATA199,208,26,173,11,199,141,20
290 DATA199,173,12,199,141,21,199,172
300 DATA13,199,169,0,141,19,199,141,18
310 DATA199,76,46,199,173,19,199,208
320 DATA28,32,246,199,173,22,199
330 DATA208,4,200,76,191,199,238,19
340 DATA199,136,32,246,199,173,22,199
350 DATA208,247,76,46,199,200,32,246
360 DATA199,173,22,199,208,4,136,76
370 DATA219,199,206,19,199,208,32,246
380 DATA199,173,22,199,208,247,76,46
390 DATA199,72,138,72,152,72,46,2,199
400 DATA173,20,199,141,0,199,173,21
410 DATA199,141,1,199,173,1,199,141,4
420 DATA199,173,0,199,41,248,141,3,199
430 DATA173,0,199,41,7,141,5,199,173,2
440 DATA199,41,7,141,7,199,162,3,78,2
450 DATA199,202,208,250,173,2,199,141
460 DATA6,199,169,0,141,8,199,141,9
470 DATA199,162,5,173,8,199,24,105,6
480 DATA199,141,8,199,202,208,243,162
490 DATA6,14,8,199,46,9,199,202,208
500 DATA247,173,8,199,24,109,3,199,141
510 DATA8,199,173,9,199,109,4,199,141
520 DATA9,199,173,8,199,24,105,0,141,8
530 DATA199,173,9,199,105,32,141,9,199
540 DATA173,8,199,24,109,7,199,133,251
550 DATA173,9,199,105,0,133,252,169,1
560 DATA141,10,199,56,169,7,237,5,199
570 DATA240,7,170,14,10,199,202,208
580 DATA250,160,0,177,251,45,10,199
590 DATA141,22,199,104,168,104,170,104
600 DATA96
610 DATA50785:REM*CHECKSUM*
```