

Flasher 80: A modified version of PET Flasher

PETER JOHN HAMPSON

Manchester Polytechnic, Manchester, England

Merikle, Cheesman, and Bray (1982) recently reported a machine language subroutine (PET Flasher) for timing visual displays and response latencies. PET Flasher is designed to control the display duration of a string of characters in 16.7-msec steps and to measure reaction time to within ± 1 msec. Although PET Flasher does its job well, it is limited in certain respects. The user is restricted to stimulus displays of between 1 and 31 characters. Also, as its name suggests, the routine has been designed for use with the PET/CBM 2001 microcomputer (with revision 3 ROMs). Without modification, it will not run on the Commodore 8032 machine.

We needed a routine to present stimulus strings longer than 40 characters. Accordingly, we altered PET Flasher for use on the Commodore 8032, a machine that has an 80-column display. Flasher 80, which is used within a BASIC program, is a modified version of the earlier routine. It is listed in Figure 1. The relatively simple changes from the original are as follows: (1) The ASCII code of the stimulus display has been removed from the top 31 spaces in the second cassette buffer (987-1017) to a new location above the top of BASIC pointer. The code is now stored starting at memory location 32673 (line 3165 in the modified program), rather than in location 986 (line 250 in the original). When the display is to be presented, the ASCII code is retrieved by the machine language routine, which required changes in the DATA statement in line 3460 (line 540 in the original). Space was created for this relocation by resetting the top of BASIC pointer in line 10 to exactly 32K. (This line must always be the first in the program.) This modification allows the full 80 columns to be used for the display of characters. (2) To terminate the string, another modification is needed in the routine. Having shown the characters for the appropriate time, a set of blanks is then displayed. In PET Flasher, because of the screen size, only 40 are shown, but this is easily increased to 80 (line 3530; line 610 in the original). (3) The screen location at which the display is printed is altered (line 3182), to produce the string in the center of the screen. As in PET Flasher, any screen position can be chosen. This is achieved by selecting the appropriate low and high byte values from Table 1, which gives the decimal equivalents for each of the 25 screen lines for the Commodore 8032.

Requests for reprints should be addressed to Peter John Hampson, School of Psychology, Manchester Polytechnic, John Dalton Building, Chester Street, Manchester, M1 5GD, England.

```
10 POKE 52,0:POKE 53,125
3000 REM TIMING AND DISPLAY ROUTINE
3005 PRINT "♡"
3010 FOR I=0TO154
3020 READ A
3030 POKE 826+I,A
3040 NEXT I
3050 INPUT "DISPLAY DURATION";DD
3055 INPUT "SPACES TO LEFT";DL
3100 DD=DD*60
3110 POKE 985,DL:REM DISPLAY LOCN
3120 POKE 984,DD:REM DISPLAY DURN
3130 A$="THIS IS AN EXAMPLE OF A LONG STRING"
3140 L=LEN(A$)
3150 POKE 986,L
3160 FOR I=1TOL
3165 POKE 32673+I,ASC(MID$(A$,I,1))
3180 NEXT I
3182 POKE 888,191:POKE 889,131:POKE 941,191:POKE 942,131
3185 PRINT "READY"
3190 IF PEEK(59471)=255 GOTO 3190
3195 IF PEEK(59471)<>255 GOTO 3195
3200 PRINT "♡"
3210 POKE 33767,46
3220 IT=1:S=TI
3230 IF TI<S+(IT*60) THEN 3230
3240 PRINT "♡"
3250 SYS 826
3260 PRINT "♡"
3300 SH=PEEK(981)
3320 H=PEEK(982)
3330 RT=((255-H)+SH*256)*.256
3340 IF INT(RT)<5 THEN RT=0
3350 RC=PEEK(983)
3360 PRINT "RT=";RT
3370 PRINT "CORRECTED RT=";INT(RT)-8;"MSEC"
3375 PRINT "RC=";RC
3390 END
3400 DATA 169,0,141,213,3,141,67,232
3410 DATA 169,255,141,72,232,173,217,3
3420 DATA 24,109,218,3,168,174,218,3
3430 DATA 173,75,232,41,95,9,64,141,75
3440 DATA 232,169,26,141,68,232,165,143
3450 DATA 197,143,240,252,169,65,141,69
3460 DATA 232,189,161,127,41,191,16,4,41
3470 DATA 127,9,64,153,223,129,136,202
3480 DATA 208,238,169,255,141,73,232
3490 DATA 173,79,232,201,255,208,65,173
3500 DATA 77,232,141,77,232,168,41,32
3510 DATA 240,9,174,73,232,142,73,232
3520 DATA 238,213,3,152,41,64,240,224
3530 DATA 206,216,3,208,219,162,40,169
3540 DATA 32,157,223,129,202,208,250
3550 DATA 173,79,232,201,255,208,18,173
3560 DATA 77,232,41,32,240,242,174,73
3570 DATA 232,142,73,232,238,213,3,208
3580 DATA 231,172,73,232,140,214,3,141
3590 DATA 215,3,96
3620 RETURN
```

Figure 1. Flasher 80: A modified version of PET Flasher.

Table 1
Screen Memory Addresses for Each Screen Line
of the Commodore 8032

Line	Address	Byte	
		Low	High
01	32767	255	127
02	32847	079	128
03	32927	159	128
04	33007	239	128
05	33087	063	129
06	33167	143	129
07	33247	223	129
08	33327	047	130
09	33407	127	130
10	33487	207	130
11	33567	031	131
12	33647	111	131
13	33727	191	131
14	33807	015	132
15	33887	095	132
16	33967	175	132
17	34047	255	132
18	34127	079	133
19	34207	159	133
20	34287	239	133
21	34367	063	134
22	34447	143	134
23	34527	223	134
24	34607	047	135
25	34687	127	135

Flasher and Flasher 80 both store the low byte values in locations 888 and 941 and the high byte values in locations 889 and 942. The display location is easily changed by POKEing these with new byte values in line 3182. (4) The fixation point is repositioned to appear at the center of the Commodore 8032 screen (line 3210). (5) The only other substantive change is in the example program in which Flasher 80 is embedded. When the program is RUN, the word "READY" appears on the screen and remains there until the user sends a signal to the parallel user port (line 3195). This is then followed by a 1-sec presentation of the fixation point (lines 3210 to 3230), after which Flasher 80 is called (SYS 826). Otherwise, the routine and the example program function as do their predecessors.

REFERENCE

- MERIKLE, P. M., CHEESMAN, J., & BRAY, J. (1982). PET Flasher: A machine language subroutine for timing visual displays and response latencies. *Behavior Research Methods & Instrumentation*, *14*, 26-28.

(Manuscript accepted for publication March 8, 1984.)