

FREQUENCY COUNTER FOR YOUR C-64

A new use for your light pen.

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■After building the light pen described in the June, 1985 edition of **ComputerDigest**, I began thinking of possible uses for it. One idea, was as an optical tachometer for measuring the speed of rotating objects such as fans or motors. The program presented here is the result. Using this program and a light pen compatible with the Commodore C-64, you can measure the rotational speed of most objects.

The program was originally written in Assembly Language and later converted to data statements to make the program easier to type into the computer. Unfortunately, there is one drawback to this. Without the source code, it is difficult to see how the program functions. However, we'll explain.

How the program works

If it were not for the fact that computers are very-fast adding machines, this system would only work at low frequencies. We take advantage of the computer's speed by having it count the number of times the light pen is activated per second. At the point where the second has ended, the program stops counting and displays the count to the screen for about two seconds. After this, all values are zeroed and the count begins again as sensed by the light pen.

Obviously, timing is everything if this system is to function properly. And all of the timing is accomplished by use of the Jiffy Clock, which is an interrupt-driven clock. The computer keeps a continuous count of the number of times interrupts occur and stores this count at memory locations 160 - 162. However, of these three memory locations, we are concerned only with location 162. This location is updated every 1/60th of a second. All we have to do to check to see if a second has passed, is compare this location with the number 60. When memory location 162 reaches 60, the program stops counting and jumps to a time-out subroutine. This subroutine continuously checks the same memory location (location 160) for a value of zero. This value will *only* be obtained after the count in memory location 162 has passed 255. Once the value in location 162 is equal to zero, the program

```
5 REM* OPTICAL TACHOMETER *
10 PRINT"Q"
20 POKE 53281,1
30 FOR I=32768 TO 32971
40 READ X
50 POKE I,X
60 NEXT I
70 SYS32768
80 DATA169,1,141,255,3,173
90 DATA24,208,9,2,141,24
100 DATA208,32,172,128,169,48
110 DATA141,255,4,141,0,5
120 DATA141,1,5,141,2,5
130 DATA141,3,5,169,72,141
140 DATA5,5,169,26,141,6
150 DATA5,169,0,133,162,162
160 DATA4,24,164,162,192,59
170 DATA176,109,32,150,128,189
180 DATA255,4,109,255,3,157
190 DATA255,4,201,58,208,234
200 DATA233,10,157,255,4,202
210 DATA189,255,4,105,0,157
220 DATA255,4,201,58,208,213
230 DATA233,10,157,255,4,202
240 DATA189,255,4,105,0,157
250 DATA255,4,201,58,208,195
260 DATA233,10,157,255,4,202
270 DATA189,255,4,105,0,157
280 DATA255,4,201,58,208,177
290 DATA233,10,157,255,4,202
300 DATA189,255,4,105,0,157
310 DATA255,4,201,58,208,159
320 DATA233,10,157,255,4,202
330 DATA173,0,220,41,16,208
340 DATA249,173,0,220,41,16
350 DATA240,249,96,165,162,208
360 DATA252,76,16,128,162,0
370 DATA189,186,128,157,50,4
380 DATA232,224,17,208,245,96
390 DATA70,82,69,81,85,69
400 DATA78,67,89,32,67,79
410 DATA85,78,84,69,82,96
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READY.

jumps to the start and is again ready to record events detected by the light pen.

First connect the light pen to joystick port 2. Then turn on the computer and load the program listed. When run, the program should clear the screen and turn the background of the monitor to white. A simple test to check out the program, is to place the light pen against the screen of the monitor. A value of 60 should appear on the screen if the program is functioning properly. (The value may fluctuate between 59 and 61 on some monitors.)

There are some limitations to this program. From tests conducted, it would appear that the limiting readable frequencies are about 10,000Hz. At this frequency, the optical tachometer reads about 9650Hz, some 450Hz from true value. ◀▶