

6 MHz CPC

 www.cpcwiki.eu/index.php/6_MHz_CPC

The 6 MHz CPC is a DIY hardware modification which allows to run the CPC6128 with a CPU speed of 6 MHz instead of the usual 4 MHz.

Contents

Technic

The 16 MHz crystal of the CPC is replaced by a 24 MHz crystal. Both crystals should kept on the main board, but a switch (a DPDT type, switching both lines to both crystals is recommended) selects between them. Keep the wiring tidy and very short. You have to select the CPU and bus speed before you switch on the CPC. Switching the speed while the system is switched on is not advised. **If you attempt this modification, it is at your own risk. None of the authors of this article can or will be held responsible for any damage to your CPC as a result of your DIY work.**

Advantages

- Z80 runs with 6 MHz
- Bus runs with 6 MHz
- FDC is 50% faster
- Disc formats with 50% more sectors can be used
- Sound can be better, since the PSG runs more quickly
- Games run more fluid
- Graphics are better, pixel are about 1/3 smaller in X
- By adjusting the CRTC an higher frame rate can be used (75 Hz)

Disadvantages

- FDC can't read old disc formats any longer
- The horizontal timing of the CRTC is affected. In order to get a stable image, you need to program register 0 at 95 (96 characters line) and Register 2 at 61 (centering for 40 characters default)
- Pixels pitch is 66.7% of their original pitch. Theses pictures show this fact (320×200 mode 1 pixels with black border)
- Original CPC @16Mhz
- Overclocked CPC @24Mhz
- Not every hardware expansion is able to work with the 6 MHz bus speed
- Sound must be reprogrammed





Software

- A lot of games run well with 6 MHz. For example: Nebulus, StarFox, Starstrike and others.
- There is a 6 MHz version of FutureOS

Testing

- Your CPC may work with the higher speed crystal if the rest of the system hardware is able to operate at this speed. You are more likely to be successful if the DRAM chips fitted to your machine are the higher speed versions (lower access time). Please refer to the relevant DRAM data sheet for details of the access time and on the type numbers and markings on the DRAM chips.
- If any part of the hardware system is unable to properly function at the higher speed, likely symptoms of the hardware not being happy are failure to properly initialise to the start up screen. Or symptoms similar to a RAM fault.
- This modification has been successful on some CPCs (manufactured with fast DRAMs) and verified with at least one CPC6128 produced in 1987.

Measurement of speed

- The CPU will operate at an increased speed proportional to the increased frequency of the crystal.
- With a 24 MHz crystal, the 4 MHz clock (CPU speed) should be 6 MHz. This is a 50% speed increase.
- If your machine starts up okay, you can test the modification with this simple program :

```
10 i = 0
20 after 500 goto 100
25 cls
30 i = i +1
40 ? i
50 goto 30
100 end
```

Score is 258 on normal CPC versus 301 when using a CPC fitted with a 24 MHz crystal.

(Theses results can be subject to discussion as we are not sure how interrupt timing is affected).