

CPC RTC – User Manual

Getting Started

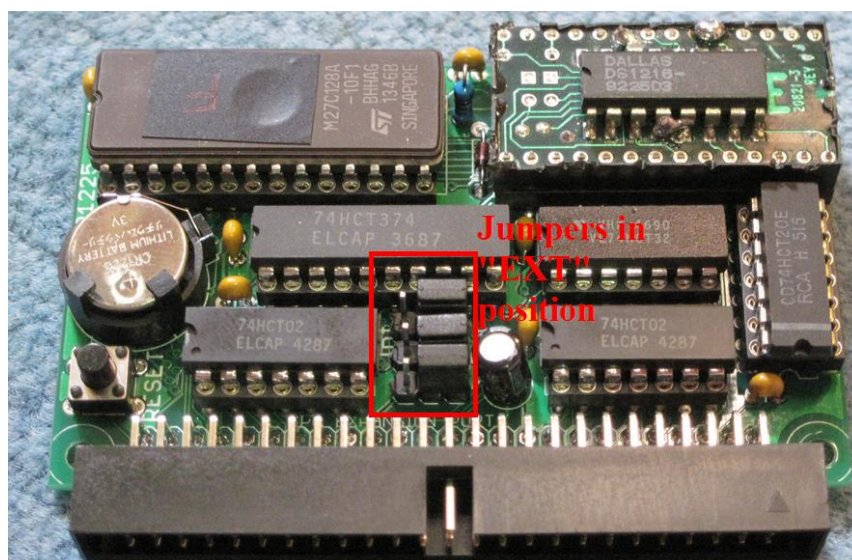
This board brings Real Time Clock (RTC) capability to the whole Amstrad CPC range. Provided software allows easy time and date access from BASIC. Onboard battery is cheap and easily replaceable, while the board is made to minimize power drain from the CPC power supply. Mounting holes and a reset switch are also provided should you wish to case the RTC. Size and pinout comply to MX4 standard.

The CPC RTC is made of the Real Time Clock module itself which has a backup lithium battery, support circuitry, and an EPROM containing the original SmartWatch ROM which provides RSX access to the watch from basic (TIME ROM+). The male 50pin header is used to connect the board to the CPC expansion port or MotherX4 (MX4) board. Jumpers set the EPROM read mode, more below.

First set the jumpers (with power OFF). There are 2 ways of using this board:

- As a standalone: set the 3 jumpers to “Int” (to the left, “Int” is written on the PCB). The TIME ROM+ is read from onboard EPROM, this mode is intended to use the CPC RTC alone on the expansion port. **Caution:** never use this mode when plugging the board on the MotherX4 in parallel with a X-Mem or MegaFlash. The whole board is usable as a standalone on any CPC (464 to 6128+). The TIME ROM+ and RTC module are both located at ROM position 2, allowing Parados in position 6 while being usable on a 464 as is.
- In parallel with a MegaFlash or X-Mem on a MX4: set the 3 jumpers to “Ext” (to the right, “Ext” is written on the pcb). In this case you need to populate a ROM slot of, say, your X-Mem with the provided CPCRTCEN.ROM (English) or CPCRTCEN.ROM (French) file, because the internal EPROM is no longer read. Choose your ROM slot according to this rule: CPC464 and 664: ROMs 6 to 1. All other CPCs: ROMs 15 to 1 (except 7). Above 15 you need to have the Booster ROM in position 15. The RTC module is now located at ROM position &72 (114).

Here is a sample picture showing the jumpers in the “Ext” position:



According to your jumper setting, now connect the CPC RTC to your expansion port or MotherX4.

Caution: on the MX4 board, like for any other MX4 expansion card, it is easy to incorrectly plug the CPC RTC either too far left or right. Check before powering up. Start your CPC: the boot screen now displays the time and date. Pressing CTRL + ESC displays current time on the top right screen corner.

Troubleshooting:

Each board has been thoroughly tested before shipping. First try the standalone mode, as this removes possible errors while programming the X-Mem slot. Most problems come from a dirty edge connector on the CPC side. Clean with cotton swab and alcohol until the swab comes out perfectly clean. Another common mistake is plugging the board too far on the left or right on the 50pin MX4 male connector.

Accessing the Clock from BASIC

Once the board is plugged and working (meaning you get the hour to display during CPC boot), you can use a whole array of new RSX commands to access the clock.

ùshow.time,x,y	display current time (HH MM SS) at x,y coordinates
ùshow.time	cancel time display by previous command
ùtime,a\$	put current time (HH MM SS) into a\$. a\$ must have been previously defined: a\$=" " (8 spaces)
ùdate,a\$	put the date (DayofWeek DD MM YY) into a\$. a\$ must have been previously defined: a\$=" " (11 spaces)
ùtime.set,"HH MM SS"	set the clock to "HH MM SS" time
ùdate.set,"DD MM YY"	set the date to "DD MM YY", the day of the week is calculated by the software
ùwatch.on	start the RTC quartz oscillator: use to start the watch after changing the battery
ùwatch.off	stop the RTC quartz oscillator: use if you don't plan on using the RTC for a long time and want to save the battery
ùchime.on	a beep sound is produced at each new hour
ùchime.off	new hour beep is off
ùalarm,"HH MM SS"	an alarm will sound at "HH MM SS" hour
ùalarm	stop the alarm sound
CTRL + ESC	not a RSX, display real time on the top right screen corner
ùromoff	disconnect all ROMs, excluding BASIC, including AMSDOS
ùromoff,a,b,c,...	disconnect ROMs having number a,b,c,...
ùhelp	list all expansion ROMs connected to the CPC
ùhelp,n	list RSX commands for ROM n
ùbigwatch	show a fullscreen clock
ùzero.clock	reset the stopwatch

<code>ùstart.clock</code>	start the stopwatch
<code>ùstop.clock</code>	stop the stopwatch
<code>ùask.clock,a\$</code>	put current stopwatch time (HH MM SS 1/10s1/100s) into a\$. a\$ must have been previously defined: a\$=" " (11 spaces)
<code>ùstopwatch</code>	display real time stopwatch
<code>ùchesswatch,"HH MM"</code>	a chesswatch (!!), "HH MM" being the total game time, which is split in half on each clock, use any key to alternate between players

Note: BASIC 1.0 (CPC 464) uses a different syntax.

BASIC 1.1 example: `ùdate.set,"DD MM YY"` or `a$="DD MM YY":ùdate.set,a$` becomes in BASIC 1.0: `a$="DD MM YY":ùdate.set,@a$` . Likewise, `ùdate,a$` becomes `ùdate,@a$` .

Note: QWERTY keyboard users must replace "ù" with "|".

FutureOS Specifics

FutureOS use of the CPC RTC implies having the 3 jumpers set to "Ext". FutureOS has it's own built in clock software, so you don't need to have a X-Mem slot populated with the CPCRTC ROM file. However, if you still want to have BASIC access to the RTC, then this file remains needed. When requested to input the RTC module position during FutureOS installation, answer is: 114.

FAQ / Specifications

Q: How do I connect the CPC RTC to my computer?

A: The CPC RTC comes with a male 50pin header like the MegaFlash for example or any MX4 card, for direct connection to your MX4. You can also use your MX4 or MegaFlash edge connector to 50pin female (or any other self made cable) to run the RTC as a standalone. Connecting to the passthrough of the MX4 is also possible however you'll have to provide your own 50pin female-female cable.

Q: Is it compatible with other expansions?

A: MX4 mainboard: yes (check power requirements, see below). MegaFlash: yes. X-MEM: yes. MFII: yes. Other: untested. The address is fully decoded so as long as other expansions do the same it should be fine.

Q: Is it FutureOS compatible?

A: Yes, use at least version .8 20/02/2015.

Q: Is it 6128+ compatible?

A: Yes I tested it with a 6128 and a 6128+.

Q: What is the battery life?

A: I calculated >10 years, anyway the battery is a standard 12mm lithium button cell, user replaceable for cheap.

Q: When do I need to replace the battery?

A: First symptom of a drained battery is that the clock will run very slow when power is removed from the CPC. Time or date can also be replaced by garbage characters. Should you need to replace the socketed CR1225 lithium battery, note that the '+' is on top. **Caution:** there is no reverse voltage protection.

Q: What is the clock accuracy?

A: Quoted value from datasheet is: better than ± 1 minute/month at +25°C.

Q: Was the software written from scratch / Is it free?

A: The CPCRTCEN and CPCRTCFCR files are modded from TIME ROM+, made by Dobbertin for the SmartWatch.

Q: Can I use TIME ROM+ software to populate my X-Mem slot?

A: No you can't, use only CPCRTCEN.ROM or CPCRTCFCR.ROM .

Known limitations:

- When using Firmware 3.15, the clock isn't displayed properly during boot. This is due to FW3.15 using mode 2.
- According to my tests, when using the CPC RTC with 2 other MX4 cards, you don't need an external power supply. However, CPC RTC + X-Mem + MFII + X-Mass implies having an external power supply.

Acknowledgments

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