

# CPM UTools

Toolset for using the Ultimate II+ cartridge for C128 CP/M

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```
CPM UTools: Toolset for using the Ultimate II+ with CP/M
UMount: Image mounter 2023/10/30 09:46:23

ID: ULTIMATE-II DOS V1.2
/usb1/cpm/
Infocom D18 ZPM_System.d81 D81
System DIR
Utils DIR
Work DIR
cpm-zpm.d81 D81
cpmcombined.d81 D81
cpmextra.d81 D81
cpmfast.d81 D81
cpmplus.d81 D81
cpmu2_tools.d64 D64
cpmutools.d64 D64
cpmutools.d71 D71
cpmwork.d81 D81
CPMV2K.D71 D71
dbaseii-1.d64 D64
dbaseii-2.d64 D64
dbaseii.d81 D81
gorilla.d71 D71

Drives:
A: 08, 1571 On
B: 09, 1581 On
C: No target
D: No target

Target is drive A

A-D : Select target
Curs : Navigation
RETURN: Select
P / U : Page Down/Up
T / E : Go to Top/End
DEL : Parent dir
R : Root dir
H : Home dir
S : Save REU
I : Version
ESC : Quit
```

## Version history and download

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[Link to latest build](#)

Version v091-20231030-1147:

- Added CPM UTime: Utility to retrieve present date and time from an NTP server and synch this time to both the Ultimate II+ Real Time Clock as the CP/M system time
- Added CPM UConfig: Utility to set the configuration options for UTime and UMount
- UMount: Bugfixes and added Save REU option
- Added documentation

Version v091-20231021-1542:

- First public alpha of CPM UMount: Utility to mount disk images stored on the Ultimate II+ filesystem in CP/M

## Firmware and setting prerequisites and known issues

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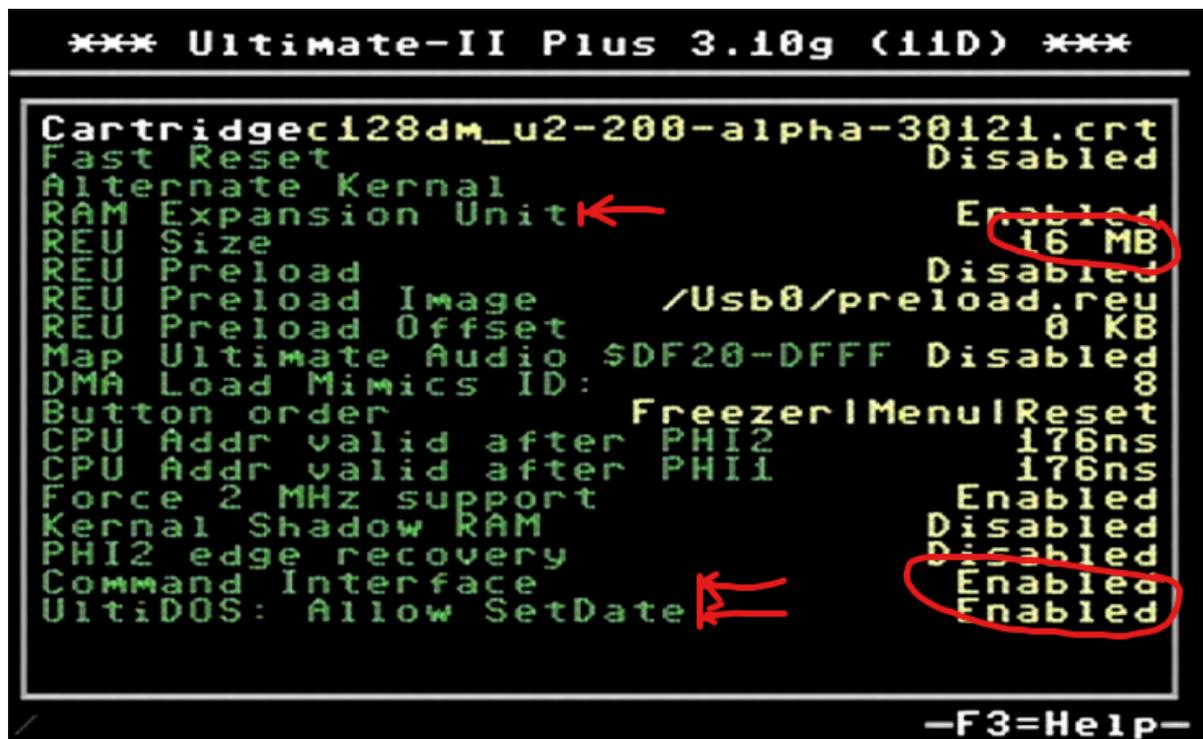
### Ultimate II/II+/II+L firmware requirements

- Firmware 3.10f or newer: fully automatic drive detection and support to detect/mount/save CP/M RAM drives
- Firmware 3.xx: automatic device detection possible. But in firmware older than 3.10f automatic device detection is based on hardware drive IDs of the emulated A and B drives of the Ultimate II/II+/II+L cartridge, instead of the software ID. This might give issues if device IDs have been changed by software. To fix this, choose manual override of the automated detected targets using UConfig.
- Firmware before 3.xx: Automatic target detection is not possible, so setting valid drive targets via UConfig is always needed for CPM UMount to work.

Link to Ultimate II/II+/II+L firmware:

- Official released versions: <https://ultimate64.com/Firmware>
- GitHub: [https://github.com/GideonZ/ultimate\\_releases](https://github.com/GideonZ/ultimate_releases) (might contain newer not yet officially released firmware, or firmware that were temporarily retracted)

### Ultimate II/II+/II+L setting requirements



For CPM UTools it is important to check these settings in the C64 and Cartridge Settings menu after pressing F2 from the UI:

- Command Interface: **IMPORTANT** This setting has to be set to 'enabled' for anything in CPM UTools to work

- UltiDOS: Allow SetDate: This setting has to be set to 'enabled' to allow CPM UTime to change the Ultimate Real Time Clock time
- RAM Expansion Unit: Should be set to 'enabled' to support saving REU memory to a file.
- REU Size: set the desired size of the REU here, maximum is 16 megabytes.

## Introduction

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**CPM UTools** is a little suite of (for now) three utilities to help using the Ultimate II+ cartridge from within CP/M.

### CPM UTime

Utility to set the CP/M system time (and the UII+ RTC clock) the time received from a user defined NTP server.

### CPM UMount

This utility can be used to swap and mount virtual disks on your UII+ cartridge, helpful because the UII+ menu is not available under CP/M 80 column mode.

Images can be selected from a file browser, that filters on showing only directories and disk image files.

### CPM UConfig

Utility to set the configuration for CPM UTime and CPM UMount.

For CPM UTime, enabling or disabling time query of an NTP server, the NTP server hostname, offset from UTC time in seconds and verbosity on or off can be set.

For CPM UMount, automatic valid target detection can be manually overridden, and the default target drive can be set.

## What is on the disk

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In the ZIP file package of a CPM UTools build, two disk images are present, next to the PDF version of this readme file. The .d64 disk image is a C128 CP/M formatted single sided disk image, the .d71 a double sided one.

As a real 1571 drive is way faster than a 1541 drive, also the emulated 1571 drive is faster than the 1541. So if your firmware allows it, using the .d71 is recommended for higher speed. The .d64 is provided for compatibility with older firmwares (or the non-+ version of the Ultimate cartridge).

Contents of both images:

```
A>dir
A:  UMOUNT   COM :  UTIME   COM :  UCONFIG  COM :  CPMUTOOL  CFG
A>
```

Filename	Program	Description
UMOUNT.COM	<b>CPM UMount</b>	Disk mounting tool

Filename	Program	Description
UTIME.COM	<b>CPM UTime</b>	NTP time synching tool
UCONFIG.COM	<b>CPM UConfig</b>	Utility to set configuration options for CPM UTime
CPMUTOOL.CFG	Coniguration file	File containing configuration settings for the tools

Note that on first use, both CPM UTime and CPM UConfig create a configuration file on the disk if no one is yet present. A new file called CPMUTOOL.CFG is added to store configuration data.

Obviously, you are free (even encouraged) to copy these files to another disk target, such as your main RAM drive.

You can start UMount, UTime, or UConfig by typing the filename (typing the .com is not needed) and enter.

## CPM UConfig instructions

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This application sets the configuration options for CPM UTime and saves them in the CPMUTOOL.CFG configuration file. It creates this file on first start if no file is present already.

Interface after application start, showing the present configuration settings:

```

CPM Utools: Toolset for using the Ultimate II+ with CP/M
UConfig: Configuration tool                               2023/10/30 10:35:50

Version: v 0.91 - 20230030-0933
Present configuration.

UMount settings:

Detection override: No
Autodetection of valid drives succeeded.
A           : 08, 1571 On
B           : 09, 1581 On
C           : No target
D           : No target
Target drive : A

UTime settings:

NTP host:
pool.ntp.org
UTC offset   : 3600
Update from NTP : Enabled
Verbose      : Enabled

Select option to edit using Cursor Up and Down. RETURN to select, ESC to quit.

```

Navigate through the editable options by pressing the **CURSOR DOWN** or **CURSOR UP** cursor keys.

**ESC** will quit the configuration program and save the settings if changed.

**RETURN** selects the highlighted option for editing.

## UMount settings

Option	Explanation	How to edit
Detection override	Rely on automated detection of valid target drives (setting is <b>No</b> ), or manually select valid targets (setting is <b>Yes</b> )	Press <b>RETURN</b> to toggle between <b>Yes</b> and <b>No</b>
Autodetection of valid drives succeeded	Shows if firmware support automatic drive detection	Not an option to change
A B C D	Setting per CP/M drive: either is <b>No target</b> or it is a valid target, in which case it shows the drive ID, type and power status	If Detection override is set as Yes, <b>RETURN</b> toggles between No target and Manual Target
Target drive	Drive to which images will be mounted	Press <b>RETURN</b> to edit this option, then press <b>CURSOR DOWN</b> or <b>CURSOR UP</b> to change the drive letter, press <b>RETURN</b> to confirm, or press <b>ESC</b> to cancel.

### Screenshots

- Detection override

```
UMount settings:
Detection override: No
Autodetection of valid drives succeeded.
A : 08, 1571 On
B : 09, 1581 On
C : No target
D : No target
Target drive : A
```

- Toggle targets

```
UMount settings:
Detection override: Yes
Autodetection of valid drives succeeded.
A : No target
B : No target
C : No target
D : No target
Target drive : Not set
```

- Set target

```

UMount settings:
Detection override: No
Autodetection of valid drives succeeded.
A      : 08, 1571 On
B      : 09, 1581 On
C      : No target
D      : No target
Target drive : A
UTime settings:
NTP host:
pool.ntp.org
UTC offset : 3600
Update from NTP : Enabled
Verbose : Enabled

Select target drive using Cursor Up and Down. RETURN to select, ESC to quit.

```

### UTime Settings

Option	Explanation	How to edit
NTP host	Host name of the desired NTP server. The default server is pool.ntp.org.	Press <b>RETURN</b> to select option, then enter desired host by typing it, edit by using the <b>CURSOR LEFT</b> and <b>CURSOR RIGHT</b> keys, <b>DEL</b> to delete, <b>RETURN</b> to confirm entry, <b>ESC</b> to cancel.
UTC offset	Time offset to UTC (Universal standard time) in seconds.	Press <b>RETURN</b> to select option, then enter desired offset by typing it (noting the signing, so do not forget the minus sign if offsets are negative to UTC), edit by using the <b>CURSOR LEFT</b> and <b>CURSOR RIGHT</b> keys, <b>DEL</b> to delete, <b>RETURN</b> to confirm entry, <b>ESC</b> to cancel.
Update from HTP	Sets if time should be synched with the selected NTP server (setting is 'Enabled'), or if only the CP/M system time should be synched to the UII+ Real Time Clock without an NTP request (Disabled).	Press <b>RETURN</b> to toggle between Enabled and Disabled.
Verbose	Enabling this option makes the CPM UTime give visual feedback on the steps it performs, disabling will make CPM UTime perform its actions without any visual feedback.	Press <b>RETURN</b> to toggle between Enabled and Disabled.

*Detailed explanation and screenshots*

- NTP Host: The application will not check validity of the input, to check if it works and the hostname resolves and results in a successful connection the verbose mode is suggested.

```
UTime settings:
NTP host:
pool.ntp.org
UTC offset      : 3600
Update from NTP : Enabled
Verbose         : Enabled

Enter hostname of NTP server, ESC to quit.
```

- UTC offset: Offset is set in seconds (to allow for half hour difference time zones and also for finetuning if desired), so multiply the UTC offset in hours by 3600. And note that the offset is signed, so start with a minus for offsets negative to UTC. Default is set on Central European Time, which requires an offset of 3600. Setting to Central European Summer Time would require 7200. Another example: setting to Eastern Standard Time (EST, time zone for a.o. New York City) would be UTC -5, so  $-5 \times 3600 = -18000$ . See <https://www.timeanddate.com/time/zones/> for all offsets in hours (multiply by 3600 to get to seconds). No input validation is performed.

```
UTime settings:
NTP host:
pool.ntp.org
UTC offset      : 3600
Update from NTP : Enabled
Verbose         : Enabled

Enter NTP time offset in seconds to UTC, ESC to quit.
```

- Update from NTP and verbose:

```
UTime settings:
NTP host:
pool.ntp.org
UTC offset      : 3600
Update from NTP : Enabled
Verbose         : Enabled

Select option to edit using Cursor Up and Down. RETURN to select, ESC to quit.
```

## CPM UTime instructions

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This application is driven by the options stored in the configuration file and does not need further user interaction.

If verbosity is set to no in the configuration file options, nothing will be shown on the screen. If verbosity mode is 'Enabled' and NTP enable is 'Enabled', something like this will be shown on the screen:

```
A>utime
Ultimate datetime: 2023/10/30 10:44:38
Connecting to: pool.ntp.org
Sending NTP request
Reading result attempt 1
Unix epoch 1698655480
Status: 00,OK
RTC clock set to 2023/10/30 09:44:40
Get UII+ RTC. Time: 2023/10/30 09:44:40
CP/M: days since Jan 1, 1978: 16739
Date and time set.
A>date
Mon 10/30/<3 09:44:03
A>_
```

This mode is meant to either debug your configuration settings, or if you are simply curious what happens:

- Connecting to the selected hostname of the desired NTP server
- Sending the data request to that server
- Reiving the data and interpreting result
- Showing UNIX epoch received
- Converting that output to time in selected time zone using the UTC offset
- Setting the UII+ Real Time Clock with that time
- Synching CP/M system time with the UII+ RTC clock.
- Confirming success

Note that on any NTP connection error, the CP/M clock will be synched to the unchanged UII+ RTC clock as fallback.

If NTP enable is switched to off, only the synch between UII+ RTC and the CP/M system time takes place, no NTP time request will be performed.

## CPM UMount instructions

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This application enables to mount disk images on the UII+ filesystem to an UII+ emulated drive in CP/M via a file browser.

## Application limitations and considerations

To facilitate to find disk images quicker and easier in the filebrowsers, all entries not being directories and file images are filtered out.

To properly enable filtering, image filenames should end with the proper corresponding .dxx extension:

- .d64 for 1541 drive type or 1571 drive type
- .g64 for 1541 drive type or 1571 drive type
- .d71 for 1571 drive type

- .d81 for 1581 drive type

Other image types are not presently supported.

Also note that file and dirnames can only be selected if they have a maximum name length of 20 characters, including extension. Reason is memory constraints: allowing for longer filenames would cause less filenames that can be loaded in memory. If you need to select dirs or files with longer names, shorten them first to 20 chars (including extension) at most.

Maximum number of files shown is dependent on the free memory on the target system used. If you have more valid images or subdirectories in your present directory, any entry over that number will not be shown. If you need to reach these dirs or files, consider reorganizing your dir to place the files in subdirs with fewer entries.

## Main interface

After start, this main interface is shown:

```

CPM UTools: Toolset for using the Ultimate II+ with CP/M
UMount: Image Mounter 2023/10/30 09:46:23

ID: ULTIMATE-II DOS V1.2
/usb1/cpm/
Infocom DIR ZPM_System.d81 D81
System DIR
Utils DIR
Work DIR
cpm-zpm.d81 D81
cpmcombined.d81 D81
cpmextra.d81 D81
cpmfast.d81 D81
cpmplus.d81 D81
cpmu2_tools.d64 D64
cpmutools.d64 D64
cpmutools.d71 D71
cpmwork.d81 D81
CPMV2K.D71 D71
dbaseii-1.d64 D64
dbaseii-2.d64 D64
dbaseii.d81 D81
gorilla.d71 D71

Drives:
A: 08, 1571 On
B: 09, 1581 On
C: No target
D: No target

Target is drive A

A-D : Select target
Curs : Navigation
RETURN: Select
P / U : Page Down/Up
T / E : Go to Top/End
DEL : Parent dir
R : Root dir
H : Home dir
S : Save REU
I : Version
ESC : Quit

```

On the left the filebrowser is shown. First line is the ID of the Ultimate file system detected, second line shows the present path on that filesystem.

Below those two lines the filtered file list is shown in two columns. You can navigate to images and browse through directories here.

In the filebrowser section, entries are shown with a three letter explanation of the type:

Code	Description
DIR	Directory
D64	1541 images with .d64 extension
D71	1571 images with .d71 extension
D81	1581 images with .d81 extension
!TL	Name too long to be fully shown. Can not be selected without shortening name

On the right top, the detected drives and present target drive is shown.

```
Drives:  
A: 08, 1571 On  
B: 09, 1581 On  
C: No target  
D: No target  
  
Target is drive A
```

Below that help for the available key commands is shown:

Key	Function
A-D	Select another drive as target by pressing the key to the corresponding drive letter
CURSOR KEYS	Navigate the filebrowser area: move in the corresponding direction up, down, left or right
RETURN	Select the highlighted file to mount (is ignored if a dir (DIR) or if the filename is too long (!TL) )
P / U	Navigate one page up ( <b>U</b> ) or one page down ( <b>P</b> )
T / E	Navigate to the first item ( <b>T</b> ) or to the last one ( <b>E</b> )
DEL	Navigate to the parent directory
R	Navigate to the root directory
H	Navigate to the home directory
S	Save REU file in present directory
I	Show version information
ESC	Quit program

### ***Detailed explanation***

#### **Moving to a subdirectory**

Move to a subdirectory by clicking on the desired directory name shown.

#### **Selecting an image to mount**

Select an image to mount by pressing **RETURN** when a valid filename is highlighted (so type .d64, .d71 or .d81).

On success, the following dialogue is presented:

```

CPM UTools: Toolset for using the Ultimate II+ with CP/M
UMount: Image mounter                                     2023/10/30 09:46:23

ID: ULTIMATE-II DOS V1.2
/usb1/cpm/
Infocom          DIR ZPM_System.d81      D81
System           DIR
Utils            DIR
Work             DIR
cpm-zpm.d81      D81
cpmcombined.d81  D81
cpmextra.d81     D81
cpmfast.d81      D81
cpmplus.d81      D81
cpmu2_tools.d64  D64
cpmutools.d64    D64
cpmutools.d71    D71
cpmwork.d81      D81
CPMY2K.D71       D71
dbaseii-1.d64    D64
dbaseii-2.d64    D64
dbaseii.d81      D81
gorilla.d71      D71
Success! cpmwork.d81 mounted on A, ID 8
Press ESC to exit or any other key to mount another image.

Drives:
A: 08, 1581 On
B: 09, 1581 On
C: No target
D: No target

Target is drive A

A-D : Select target
Curs : Navigation
RETURN: Select
P / U : Page Down/Up
T / E : Go to Top/End
DEL : Parent dir
R : Root dir
H : Home dir
S : Save REU
I : Version
ESC : Quit

```

If this is shown, the selected image is already mounted.

Press **ESC** to exit the CPM UMOUNT application and go back to the CP/M prompt with the new image mounted to the selected target drive.

Press any other key if you want to proceed with CPM UMOUNT (for example if you selected a wrong image or if you want to mount images on other targets as well).

### S: Save REU

By pressing **S**, the contents of the REU memory can be saved to a .reu file in the presently active directory.

First, enter the filename (without .reu extension).

```

CPM UTools: Toolset for using the Ultimate II+ with CP/M
UMount: Image mounter                                     2023/10/30 09:53:28

ID: ULTIMATE-II DOS V1.2
/usb1/cpm/
Infocom          DIR ZPM_System.d81      D81
System           DIR
Utils            DIR
Work             DIR
cpm-zpm.d81      D81
cpmcombined.d81  D81
cpmextra.d81     D81
cpmfast.d81      D81
cpmplus.d81      D81
cpmu2_tools.d64  D64
cpmutools.d64    D64
cpmutools.d71    D71
cpmwork.d81      D81
CPMY2K.D71       D71
dbaseii-1.d64    D64
dbaseii-2.d64    D64
dbaseii.d81      D81
gorilla.d71      D71
Enter filename for the image:
cpm

```

If a file already exists with this name this is shown:

```
File exists. Overwrite? Y=Yes or N=No
```

In this case, press **Y** to proceed and overwrite, **N** to cancel.

Finally, select the memory size to save using the + (increase size) and - (decrease size) keys, press **RETURN** to confirm:

```
Select REU size (+/-/ENTER):  
REU file size: (7) 16 MB
```

Depending on selected memory size, saving can take a while.

### I: Version

Pressing **I** shows the version information. Press a key to continue.

```
Version: v 0.91 - 20230030-1147. Press key.
```

## Credits

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### CPMUMount

Disk mounter for the Ultimate II+ in CP/M

Written in 2023 by Xander Mol

<https://github.com/xahmol/CPMUTools>

<https://www.idreamtin8bits.com/>

Code and resources from others used:

- Scott Hutter - Ultimate II+ library:  
<https://github.com/xlar54/ultimateii-dos-lib/>  
(library for the UII+ UCI functions)
- z88dk C cross compiler for Z80 targets, including C128 CP/M  
<https://github.com/z88dk/z88dk/wiki>
- Jochen Metzinger - ctools  
<https://github.com/mist64/ctools>
- ntp2ultimate by MaxPlap  
<https://github.com/MaxPlap/ntp2ultimate>  
Time via NTP code
- EPOCH-to-time-date-converter by sidsingh78  
[https://github.com/sidsingh78/EPOCH-to-time-date-converter/blob/master/epoch\\_conv.c](https://github.com/sidsingh78/EPOCH-to-time-date-converter/blob/master/epoch_conv.c)
- Bart van Leeuwen for providing CP/M images, testing and advice
- Gideon Zweijtzter for creating the Ultimate II+ cartridge and the Ultimate64, and the Ultimate Command Interface enabling this software.
- Tested using real hardware (C128D, C128DCR) using CP/M 3.0 and ZP/M+.

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