Quick guide to the 1541 Ultimate-II

Thank you for purchasing the "1541 Ultimate-II"-board: The versatile storage solution for your Commodore 64 computer. Although the installation and use of the 1541 Ultimate-II are designed to be intuitive, this quick guide shows you the basic functions.

Installation
Take the 1541 Ultimate-II, and carefully slide it into the cartridge slot of your C=64. Connect a serial cable between the serial port connector to the serial port of the computer. In case you want to use a configuration with a real drive, connect the computer to the drive first and then use the feed through of the drive to attach the 1541 Ultimate-II as the last device in the chain.

Unpack the MircoSD card, and use a modern PC or Mac to transfer your favorite floppy disk images (.D64 or .G64 files), tape archives (.T64 files), tape images (.TAP files), SID music (.SID files) or separate programs (.PRG files) to your MicroSD. You can use the adapter to use this MicroSD in a generic card reader.

Insert the MicroSD carefully into the 1541 Ultimate-II. Make sure that the golden contacts of the card are ***facing up!*** So, once again, the text on the MicroSD is thus facing down! Depending on the board revision, you might need a sharp object to insert and remove the MicroSD card. **Please, do this carefully!**

Concept of operation
The main feature of the 1541 Ultimate-II is the hardware implementation of the CBM1541 drive (and derivates), with an emulation of the actual floppy drive mechanism. In order to let a 1541 drive work, it needs floppy disks. On the 1541 Ultimate-II, these floppy disks are virtual. These virtual disks exist in the form of a file on a storage device, such as the MicroSD card, or on a USB storage device. It is therefore required as the user, to make a 'logical link' between A) the 1541 drive in the cartridge and B) the disk image file (.D64/.G64). This process is called 'mount'. After mounting (which will take a few seconds to complete), the 1541 can access the image file as if it was a real floppy. All standard commands that you are familiar with using a real CBM1541 drive then apply.

The 1541 Ultimate-II provides a user friendly menu driven interface, which can be accessed by pressing the middle button on the back of the cartridge. Pressing this button will interrupt the currently running program on the C=64 and show the menu. Leaving the menu will resume the C=64 gracefully. The main two functions of the menu are: 1) file selection, 2) configuration of the 1541 Ultimate cartridge.

The menu starts with showing the available storage devices that are attached to the cartridge. By default, it will only show the SdCard, as it is the only built-in storage device. When USB-sticks are inserted, one or more items will appear in this list. This screen is the 'root' of the file system. Use the cursor keys to navigate through the file

system and select your file (disk image) to mount. The highlighted line shows the current selection.

Use the keyboard as follows:

CRSR up/down	Move the cursor (highlighted line) up/down
CRSR left	Go one level up (leave directory or disk)
CRSR right	Go one level down (enter directory or disk)
Return / Space	Bring up a context menu with actions to be performed on the selected item.
F1	Page up
F7	Page down
F2	Enter the setup menu
F5	Bring up a menu with actions to be performed.
Quick seek:	Use the keyboard to type the name to search for. You can use '?' as a wildcard.
RUN/STOP	Leave the menu.

More about mounting disks

Remember that 'mounting' a disk means creating a link between the 1541 part of your ultimate cartridge, and a file on a storage device. This means, that when the link has been established, "writes" that the 1541 performs will be written back into the disk image file as well. In this way, the 'real' behavior of a floppy is emulated.

This behavior will not always be what you want. There are two options to avoid this: 'mount' the floppy as read-only, or 'mount' the floppy in 'unlinked' mode. When write protected, the drive itself cannot write to the floppy. In unlinked mode, the writes to the floppy are performed, but do not reflect in the .D64 or .G64 file.[1]

Cartridge emulation

Because the 1541 Ultimate-II will occupy your cartridge slot, a list of popular expansions available for the C=64 are integrated into the 1541 Ultimate-II. These expansions include cartridges, such as the Action Replay, Retro Replay, The Final Cartridge III, Super Snapshot V5, TASM & CodeNet and the Epyx fastloader, but also the CBM1750/1764 RAM Expansion unit.

These cartridges have a reset button and a freezer button. This is the function of the other two buttons on the 1541 Ultimate-II. By default, the left button is the freezer button, and the rightmost button is the reset-button. Through the configuration menu, the buttons can be swapped if desired.

USB storage

At the time of writing, the software version supplied is "2.6K". In this version, the only supported USB devices are of the type 'mass storage', using the 'encapsulated SCSI command set' in 'bulk-only' mode. This sounds technical, but means: most USB sticks

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[1] *Note, that when the storage device is removed, the 1541 drive automatically switches to unlinked mode.*

and Flash card readers. ***Hubs are supported as long as they are powered, and used in high-speed mode only.*** Some USB sticks have been seen that do not correctly function in 'high speed' mode. Go to the configuration menu to experiment when you encounter problems. Some of these issues will be fixed in later versions.

Configuration
As mentioned above, you can enter the configuration menu by pressing 'F2' while you are in the menu structure. This will bring up a screen with the following items:

- USB Settings
- Clock Settings
- 1541 Drive Settings *[one for each emulated drive, if more than one exist]*
- C64 and cartridge settings
- Audio Settings

Use the UP/DOWN cursor keys to navigate and RIGHT to enter the desired configuration screen. Once inside a settings screen, the behavior of the keyboard is slightly different:

CRSR up/down	Move the cursor (highlighted line) up/down
CRSR left/right	Increase or decrease a setting, cycling through the available options.
DEL	Go one level up
Return / Space	For string fields: bring up a text entry box
	For enumerated fields: bring up a context menu with the available options
Run-stop	*Leaves* the configuration menu and saves the new values.[2]

Note that some values will only take effect after reset or a power cycle of your C=64. However, the main menu provides a way to restart the 1541 and the C=64 with the new settings.

LEDs
The 1541 Ultimate-II has four LEDs that are visible on the outside of the plastic case:
   a. Green: 1541 drive power
   b. Red: 1541 drive status
   c. Yellow: Cartridge active
   d. Green: Storage activity

The drive power LED has four states:
- Off: The drive is not powered
- Dim: Powered, but no disk mounted
- Half bright: Powered and disk mounted, motor off
- Bright: Powered, disk mounted and motor running.

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[2] *NOTE: clock settings are only saved into the RTC chip when changes have been made.*

File Systems

Currently, the 1541 Ultimate-II supports the FAT16/FAT32 file system on any storage device, and the ISO9660/Joliet on CD/DVD ROM drives, or ISO files.

DMA loads

The 1541 Ultimate-II is capable of loading files directly through the cartridge port into the memory of your C=64. This is called DMA load. The menu supports loading files of the .PRG type only. It doesn't matter if the PRG is located on the FAT/ISO file system, or inside a disk image (.D64), or inside a tape archive (.T64). Be aware that a lot of programs inside a .D64 file require that the rest of the disk is mounted in the drive. For those programs, use the 'Mount & Run' command.

Tape Support

The 1541 Ultimate-II is capable of emulating a cassette tape deck (CBM1530/1531). To use this function, a special cable needs to be purchased as accessory, or created, that connects the 1541 Ultimate-II to the tape port of your C=64 computer. The connector can be found on the underside, and is available through a small hole in the plastic case. The 6 pins seen there, correspond to the 6 pins found on the tape port of the C=64.

In order to play a tape, browse in the menu to a .TAP file, and press enter and select "Play Tape" from the popup menu. This will initialize the tape streamer from the start of the tape. Use functions in the main menu to pause/resume playback.

In this version it is also possible to capture a tape to a .TAP file, and write a .TAP file back to a real tape, using the Commodore tape deck. The 'F5-menu' will show you the available options. Refer to the manual of the tape extender to see what jumpers need to be set in what mode.

Website

Consult the website **http://www.1541ultimate.net** for more information, or for questions regarding your device.

Notes

At the time of arrival of this 1541 Ultimate-II unit, there might be a newer version of the firmware available for download from the website, with enhanced functionality.
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Disclaimer: The 'firmware' on your 1541 Ultimate-II board consists of a rather large number of functional parts that all work together. Although an insane number of hours have been put into testing and improving the firmware and software, I am very certain that it still has bugs. Feel free to report these bugs on the web-forum, preferably in a nice way. ☺ The device will be improved further as time passes. Check the download section at the website for the newest firmware version. We believe in the end this will sure be the 'ultimate' storage solution for your 8-bit Commodore computer.