

SAVYOUR

User Manual

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Overview

Savyour is a save/load device, disk drive emulator and mouse/joystick interface all in one. It allows you to use modern USB devices with your old Commodore computer.

Savyour targets MSSIAH users, retro gamers and 8-bit enthusiasts who want to use modern peripherals with their beloved Commodores.

Plugs into the joystick port.
No power adapter needed.
No LCD screen needed.



Runs on Commodore 64, 128, SX64
Atari ST (mouse/joystick) - extension cord required!
Commodore Amiga (mouse/joystick)

Works with USB 2.0 low power devices: memory sticks, mice, keyboards and joysticks.

(To use Savyour as a disk drive a 6 pin serial cable between Savyour and the C64 is required)

Features

Commodore 1541 Disk Drive Emulator

- Saves and loads PRG files onto USB memory sticks
- Full 1541 disk drive emulator for D64 files
- Automatic disk change system when running multidisk demos/games.
- Built in directory viewer/loader program for ease of use

Mouse Interface

- Converts USB mice to Commodore 1351 proportional mouse (NTSC and PAL)
- Converts USB mice to Amiga/Atari ST mouse protocol
- Fit for MSSIAH and other mouse intense C64 applications

Joystick Interface

- Converts USB joysticks, Keyboards and Playstation USB controllers to C64/Amiga/Atari
- Autofire with two selectable speeds
- Auto-wiggle left/right, up/down in selectable speeds (keyboard only)

Bonus feature for modders

- Full keyboard interface to replace your C64's main keyboard
(requires modification of Savyour and your C64)

Cautions and Recommendations

Read this manual!

Please take your time and read this full manual through and use it for reference. It's important that you understand how to properly use your Savyour device.

Do not remove or insert Savyour while C64's power is on!

Only insert and remove Savyour when the power of your C64/C128/Amiga/Atari is off!
Neither Savyour nor the controller port is designed to be hotplugged.

Do not connect the serial cable between Savyour and C64 while power is on!

This could damage the controller chips inside the C64/C128.

Don't touch the pins in your C64's controller port

While we're at it, the controller ports are directly connected with delicate chips (6526 "CIA") inside your C64. They can be damaged by electrostatic discharges if you touch them.

Don't pull out the USB memory while saving!

Just like with any platform do not pull out the USB stick while saving a file. It can mess up the file system and make it unreadable.

Don't turn the power off while Savyour is updating its settings!

In this manual there are warnings not to power off Savyour or pull out the memory stick at some points. Follow these warnings without compromises.

Use Low Power Devices Only!

The C64's and Amiga's controller ports do not provide as much power as your PC's USB port. For this reason you should only use low power USB devices with Savyour and respect the too much power-flashes when plugging in a new device. The flashing is adapted for C64/128 levels and not the Amiga. Amigas provide half the power of a C64 port so users need to be even more aware of a device's power requirement.

(Needless to say, you cannot charge your phone with Savyour)

Use USB 3.x Memory Devices With Care

The vast majority of mice, joysticks and keyboards on the market are USB 2.0 devices whereas the major part of USB memory sticks are USB 3.x devices.

While 2.0 memories are enough for saving/loading application data (like in MSSIAH) you may need that faster 3.x memory for many fastloaders and multidisk loaders for modern demos.

Many 3.x devices require more power to run and can therefore cause problems. If a 3.x memory should give you trouble then avoid using it.

A USB 3.x device is easily identified by the blue colours inside its connectors:



..and yet they used a black and white image to illustrate it..!?

Try Out USB Sticks Before Real Use

Try inserting, removing, saving and loading a couple of files with a memory stick before using it in a real situation. You don't want to end up desperately trying to save that masterpiece MSSIAH arrangement noticing your stick behaves erratically or for whatever weird reason doesn't respond to your save and locks up the file operations.

Stick* to the Terminology

The word "Memory Stick" refers to USB devices carrying a memory and interacts with a host providing files off a FAT file system. They come in all shapes and sizes and many names such as *flash drive* or *thumb drive* depending on country and market. It is essentially the same type of device. This manual favours the name *memory stick*.

Other solutions such as SSD drives and self powered USB compatible hard drives may have the same functionality. If using FAT16 or FAT32 formatting and communicating as mass storage devices according to USB standards they should be compatible with Savyour too.

Install the 1541 ROM yourself

This is not a caution but a reminder: To enjoy full 1541 drive emulation Savyour must have a ROM file from the original 1541 disk drive installed. Savyour comes empty why you need to download this file off the internet and install it yourself. Instructions are provided in this manual.

Remember it's an old computer

Savyour goes through an intense quality check before leaving our store to ensure it's fully functioning. To be fully functional in your computer however, your C64 needs to be fully functional too. After all it's over 30 years old and a C64's worn controller chips (CIA) may affect operation of input/output signals. To be able to save and load data, yank the stick spraying bullets in *Commando* or wear out your tendons** mousing around in MSSIAH Sequencer your trusty old Commodore needs to be in good shape.

* Yes, pun definitely intended.

** We do not advocate any destruction of your body or health. Always ensure a correct working position when operating a computer mouse.

How to use Savyour

Powering Up

Make sure your computer is switched off.

Connect one end of the serial cable to your Commodore computer's SERIAL output and the other end to Savyour's top connector.

Make sure the cable's connectors go all the way in.



The serial cable takes care of communication between Savyour and the computer. You need it to use Savyour as a disk drive.

With the computer still switched off, insert Savyour into one of the controller ports no. 1 or 2.

(MSSIAH uses port 2 like in the picture)



Now start up the computer. Savyour lights up the LED and awaits insertion of a USB device.

WARNING:

Never insert Savyour or the serial cable into your computer when the power is on!
This can damage your C64.

In this picture Savyour sits firmly in the controller port.

In case the grip of your port isn't as tight you may need to support Savyour by putting something under it (anything to fill up the space like a piece of cardboard). Just make sure Savyour does not hang down too much.



To insert a USB device you need two hands: Hold Savyour with a steady grip and insert the USB device into Savyour's USB port.

It's important to give Savyour support so it doesn't come out of the port.

When a device is identified the LED goes out.



This manual is divided into chapters covering every type of USB device compatible with Savyour (memory sticks, mice, joysticks and keyboards). Refer to the relevant chapter for details. First read this chapter through since it contains important details on handling Savyour.

Removal of USB Device

Rest the palm of your hand on the side of the computer and keep a firm grip of Savyour. While pulling it towards the computer remove the USB device using your other hand pulling it straight out.

This prevents Savyour from coming out of the controller port since you would need to turn off your computer to put it back in again. It's not designed to be hot plugged.



The LED comes back on again as Savyour awaits a new USB device.

Caution:

When inserting memory sticks Savyour sometimes blinks twice to either confirm a configuration file import or a D64 file remount (more on that later in this manual).

It's important not to remove the stick before the confirmation flash is done, in the case of D64 mounts Savyour could hang up and stop working (needs reboot) and in the case of configuration file imports it could be in the middle of a memory write (when you should never remove stick or cut power).

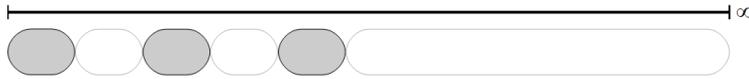
Keep this in mind when inserting memory sticks: always wait for the LED to go out and wait 2-3 seconds to make sure no extra LED flashes are coming.

LED Flashing After Insertion

When a device has been identified Savyour's LED may flash on and off in a sequence most likely any of the following:

1. Three short flashes and a pause

The USB device will not run because it requires too much power for the controller ports to handle. Read more in the section below.



2. Continuous long flashes

The USB device could not be recognized.

Savoyour only accepts mice, joysticks, keyboards and memory sticks.



A full list of flash sequences is provided in the [appendix](#).

Too Much Power Flash

The controller ports on the C64 were not designed to provide full power to host all kinds of USB devices (invented decades later..). They do however provide enough power to run low power devices and luckily that's enough for most mice, keyboards and joysticks on the market. Memory sticks vary but most of them stay within acceptable limits too.

To protect your computer Savoyour will refuse to accept a device that wants too much power and flashes a pattern of three pulses and a short pause.

Savoyour accepts devices requiring as much as 160 milliamps (mA) of current by default. This limit can be changed to anywhere between 150 to 300 mA by setting the MAXPOWER key value in a [savoyour.cfg](#) file. However, we do not recommend it and here's why:

What's the risk?

The C64's motherboard was designed to provide a total of 200 milliamps of current to both controller ports. More power puts the traces on the board at risk of running hot and be burnt. If using one Savoyour only and nothing on the other controller port it's risk free to run devices at 150-160 mA. Using two Savoyours, one in each port, you need to stick to really low power devices (around 50 mA).

If you want to dig deeper into power requirements for a specific device you can use the lastpower feature in savoyour.cfg file to find out how much it asked for ([see appendix for details](#)).

For Amiga users the power limits are even more critical since its controller port only allows half the power its older Commodore brother does. For this reason Amiga users should never use USB devices requiring more than 50 milliamps with Savoyour and one Savoyour device at a time in one port only.

WARNING:

Savoyour refuses to start up devices with a power requirement of more than 160 milliamps. This is to protect your computer.

This level can be overridden by manually changing the limit with a savyour.cfg configuration file. Be advised that this is at your own risk.

The default power limits are made for the C64. Amiga users need to pay extra attention.

LED Functionality

The functionality of Savoyour's top LED differs depending on the current mode of operation.

Not connected	Fully lit
Connecting	Lit or signals error/overpower etc
Mouse	No effect (LED out)
Joystick	No effect (LED out)
Keyboard	No effect (LED out)
1541 Light Mode	Lit during saving/loading/reading directory
1541 Full Emulation	Fully mimics the 1541 drive's LED

**USB Memory Requirements**

Most low power USB 2.0 mice, joysticks and keyboards on the market work well with Savoyour with few compatibility issues. For USB memories there are some requirements to consider depending on what you want to do:

Speed

USB 2.0 memory speed is not an issue when saving and loading application data (like with MSSIAH). It's slightly more critical emulating modern fastloaders. Depending on situation most 2.0 memories tend to be too slow why USB 3.x is recommended.

Low Power

You need to stay within power limits why the memory needs to be low powered. This is generally not a problem with the vast majority of USB 2.0 memories. Chances are much higher that a USB

3.x memory will require too much power and thereby be incompatible.

Recommendation

If you need to use 3.x memories then you really need to try them out to know whether they are fit and compatible. Pull it out and reinsert it a couple of times to make sure everything is ok. Some devices (almost always 3.x ones) are prone to surging power at startup. Savyour’s internal protection cannot handle the extreme cases and especially not combined with a C64 with old worn capacitors. This most often manifests itself in a reset or frozen computer. In case that happens once you plug in a specific USB device, pull it out and do not use it with Savyour. A general rule is that memory sticks causing problems are the ones requiring more than 200 milliamps of power.

Keep a couple of compatible memories around, it’s good if you want to run multidisk software and change disks with a dedicated [MOUNT](#) (savyour.cfg). Make sure to back up your work often.

Here are some examples of USB memory sticks that do and do not work with Savyour. Because of the vast amount of memories on the market we cannot test and keep a list of them all.

Compatible USB 3.x sticks

Low powered memories working well with Savyour

Toshiba USB 3.0 U364 ”Nano” (64 Gb)

Silicon Power Blaze 3.0 16 Gb

Kingston DataTraveler 100 G3 3.0 (16 Gb)



Incompatible USB 3.x sticks

Require too much power and even surge power on startup!
(Great sticks to use with a PC/Mac though)

Sandisk Ultra 3.0 (32 Gb)

Kingston DT50 (16 Gb)



USB 2.0 sticks

Low powered sticks great for saving and loading application data. May fail with modern fastloaders. The retractable metal casing noname stick (on the right) is notoriously slow.

Sandisk Cruzer Switch (8 Gb)

Sandisk Cruzer Blade (8 Gb)

Noname Stick (2 Gb)



Resetting

Some versions of the C64 pass reset signals to the disk drive. That means Savyour will reset too if you have a reset button installed.

It's very convenient after running a game or demo whose fastloader has locked up the drive instead of having to shut power off and back on again.

General Troubleshooting

Consult the chapter for the device in question for more details and troubleshooting.

Savyour blinks when I insert my USB memory?

Have a look at the list of [flash sequences](#) and identify the reason. It's most probably a too much power flash indicating the USB memory wants [too much power](#).

The LED doesn't go out when I insert a device!

The device is most likely not properly inserted. Remove it and try again.

When starting up, Savyour's LED does not turn on.

Is it connected to the serial port on a bus together with a real 1541? If so, power up the 1541 first.

My C64 resets/freezes when I insert a specific device!

The device is pulling way too much power for Savyour to handle, possibly in combination with your computer's aging capacitors. Pull the device out and avoid using it.

Savyour blinks shortly whenever I insert my USB mouse?

You have MOUSESELECT enabled. Read more about in in the [Mouse chapter](#).

Savyour seems to have lost power or reset?

If your controller port is weak and Savyour starts wiggling about in the port it can happen (rare cases) that Savyour loses power and resets. In that case find something to put under Savyour to support it.

Savyour just stopped working when I removed a memory stick?

If you insert a memory stick and directly remove it while Savyour is trying to remount a previously mounted D64 file, there is a risk of Savyour getting stuck. You then need to reset it (turn power off and back on) to make it work again.

Installing the 1541 ROM

First: Install a 1541 ROM File

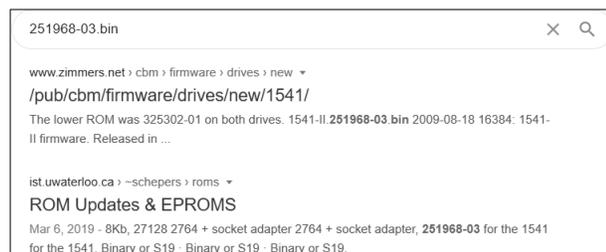
The Commodore 1541 disk drive runs its disk operating system in 16kb of ROM. This ROM file is not provided with Savyour why you need to install it manually before you can enjoy full 1541 emulation. Without the ROM file all you get is a *Device Not Present* error message when trying to access the drive in Full Emulation Mode.

So first thing to do after acquiring a new Savyour device is to install a 1541 ROM file. It's really easy, all it takes is a ROM file and a `savyour.cfg` configuration file. Follow the steps below and you're good to go in no time:

1. Download the ROM File

Search the internet for a 1541 ROM file and download the binary file onto a memory stick.

You can use a search query like "1541 rom file bin" or simply the filename of the binary file itself directly.



We recommend using the 1541-II version named *251968-03.bin*. Type it into a search engine and download it from any of the sources found.

2. Create a Savyour.cfg File

On your PC/Mac, create a text file with the name *savyour.cfg* and copy it onto the same memory stick as the binary file you downloaded. Make sure the file gets a ".cfg" file suffix and not ".txt".

Open up the file for editing with a text editor and put one line of text into it exactly like the one below (capital letters and no spaces):

```
INSTALL1541ROM=251968-03.bin
```

3. Insert the Memory Stick into Savyour

Insert the memory stick into Savyour to import the file. The procedure takes two seconds, LED flashes quickly two to three times and ends with a double flash signalling "Ok", LED then goes out. The ROM file is stored in memory and will stay even after power is turned off.

It is really important that you wait for the Ok signal and do NOT turn off the power or remove the stick. Should anything go wrong (like .bin file is not found, wrong filename or .bin suffix missing) Savyour stops and continuously flashes the [error pattern](#). You then need to check the filenames, spelling etc.

If everything went fine, take out the stick and remove the `savyour.cfg` file so the procedure won't be repeated each time you insert this stick again.

USB Memory Stick

Insert a USB memory stick into Savyour and a serial cable into the C64 and Savyour turns into a Commodore 1541 disk drive. That means you can load/save data and run games or demos, even those that run over multiple disks.



Emulating a Commodore Disk Drive

With its own processor the Commodore 1541 disk drive could download software to its internal 2 Kb RAM and run it inside the drive. This is what paved the way for turbo loaders, i.e., software making the load and data transfer much faster than the 1541's built in operating system. Some demos even made use of the drive's CPU as a co-processor to make calculations in parallel with the main program running on the C64 host.

To emulate such programs executing inside a disk drive you need to fully mimic the internals of the 1541. Savyour does this though it operates in two modes: *Light Mode* and *Full Emulation*. It's important to understand the difference between them to fully enjoy Savyour as your disk drive replacement. This manual will frequently refer to these two modes.

Light Mode

- ..default when a USB memory is inserted first time
- ..emulates basic disk commands like Load, Save, View directory
- ..lists the directory of all PRG and D64 files on a USB memory stick
- ..cannot run fastloaders (e.g. Final Cartridge will not turbo load)
- ..has a burst mode (speeds up loading and saving on newer MSSIAHs)

Full Emulation Mode

- ..runs against D64 disk image files
- ..starts when a D64 file is "mounted" i.e., accessed (load/save/rename)
- ..fully emulates the 1541-II
- ..can execute software inside the disk drive (turbo loaders)
- ..mirrors the 1541's operating system LED

Savoyour uses Light Mode to account for the larger size of a USB memory with amounts and sizes of PRG files that normally cannot be handled by the 1541's operating system. Light Mode allows you to read the directory, load, save, delete and rename files with the C64 OS standard functionality. It's absolutely sufficient for saving and loading work onto memory sticks in applications without a fastloader (like MSSIAH).

If you want to run games, demos or applications making use of the internals of the disk drive (e.g. turbo loaders) you need to enter Full Emulation. Same goes if you actually want to access the files inside a D64 disk image (like on a real floppy) and not just directly on the USB stick's directory.

Savoyour needs a 1541 ROM file installed to be able to run Full Emulation mode.

The file is not provided with Savoyour, you need to download and install it from the internet.

If you haven't already, read and follow the chapter on [how to install the 1541 ROM](#).

Activating Full Emulation Mode

Full Emulation always runs against a specific D64 file so you need to select a D64 floppy disk image on your USB memory stick to activate it. Let's look at our stick and see if we have any..

```
0  *STANDISK CRUIZER*  W 00 27
11  "SAVYOURLOADER"  PRG
77  "FUNKY STUFF"   .ARR"PRG
77  "UPTEMPO"      .ARR"PRG
77  "HAPPY"         .ARR"PRG
77  "SAD"           .ARR"PRG
689 "GAMES"         D64
689 "FLAMES"       D64
689 "NAMES"        D64
664 BLOCKS FREE.
READY.
```

Let's go for the Games disk. By trying to access it, like loading it, full emulation will start. Your C64 responds with an error message *File not found*.

```
LOAD"GAMES",8
SEARCHING FOR GAMES
?FILE NOT FOUND ERROR
READY.
█
```

Even though the C64's file system thinks the file does not exist Savoyour has by this point fired up its virtual disk drive just like if you had turned on a real 1541 drive and inserted a floppy (the D64 image). The D64 disk content is now accessible just like on a real thing.

To confirm that a mount really took place the LED flashes twice.

Savoyour remembers the name of the mounted D64 file once you remove the memory stick and remounts it as you reinsert the stick. The filename is forgotten should the file be missing.

NOTE:

D64 files up to 40 tracks without error bytes are supported. Filename is limited to 16 characters excluding its suffix. Filenames on downloaded demos/games may need to be shortened. Also be aware of [forbidden characters](#).

Running Multi Disk Demos and Games

Multi disk demos/games are programs spanning over more disks (D64 files) than one. At one time you will need to switch disks for the program to continue loading.

Savoyour handles such a disk change by looking for the next filename in sequence with the previous one as you reinsert a USB memory stick:

- If the next file in the sequence exists, Savoyour mounts it.
- If the file does not exist Savoyour remounts the one you mounted first.

For example: Let's say we want to run a demo that consists of three disks:

```

0  MUS: FLASH DISK "00 271
1  "SAVYOURLOADER" PRG
2  "TURBOASSEMBLER" PRG
3  "MYDEMO1" D64
4  "MYDEMO2" D64
5  "MYDEMO3" D64
6  "MSSIAH SONG ARR" PRG
7  "SCREEN FLASH SRC" PRG
8  "4 BLOCKS FREE."
READY.

```

By using a suffix 1-3 when naming the D64 files you will be able to iterate through the disks.

1. Start by mounting the first disk, *mydemo1* (LOAD "MYDEMO1", 8)
Then load and run the actual demo program from the D64's directory.
2. When it's time to flip the disk, pull out the memory stick and reinsert it.
3. Savoyour now increments the last character (1) by one and mounts the file *mydemo2*.
You can spot this by observing the LED flashing a mount confirmation (two short blinks)
4. When the next disk flip comes (expecting disk 3) once again pull out the stick and reinsert it to mount *mydemo3*.

Trying to change from *mydemo3* to *mydemo4* will not work as *mydemo4* does not exist on the memory stick. Savoyour then falls back to the first D64 file you mounted, in this case *mydemo1*, and mounts it instead.

Automatic disk changes only works on the last character in the filename, you cannot use two digits (like 10, 11 etc). Valid letters are A-Y and digits 0-8. If the last character is 9 or Z Savoyour will not increment the filename but instead mount the D64 you mounted first.

Be aware that forgetting to name the first disk correctly makes the sequence fail. Eg. a first disk named *mydemo* makes Savoyour look for *mydemp* as the second disk since P comes after O. And as that file does not exist, the original file is remounted instead.

So what if I'm running a game or application that wants me to jump back and forth between two disks like 2 and 3?

1. Reinsert the memory stick the correct number of times cycling your way to the right disk. This takes some counting in your head.
2. Setup two or more separate USB memory sticks with savyour.cfg files on each stick using the [MOUNT key](#) automatically mounting the files as you insert them. (This is more convenient than counting disks in a cycle).

So what if I want to unmount a mounted D64 completely?

1. Simply insert another memory stick where the same D64 file is missing. Savyour then unmounts, drops and forgets the D64 file and exits to Light Mode.
2. When mounting the D64, mount the file temporarily by adding the *X:* prefix:
`LOAD "X:MYDEMO.D64", 8`
 Savyour then unmounts and forgets the D64 once you pull out the memory stick.
3. Use a savyour.cfg file with the key UNMOUNT=1. This not only unmounts any currently mounted D64 but will also cold start (turn off/on) the internal drive.
 Read the section about [savyour.cfg](#) for more info.

Changing Multidisk Functionality

If you want to change the default behaviour when reinserting a USB memory stick after a D64 file has been mounted, use the REMOUNT key in a savyour.cfg file.

REMOUNT=1

Increments the last character in the D64's filename and looks for that file. If it does not exist the original D64 file is remounted instead. (This is the default setting)

REMOUNT=2

Always look for the previously mounted D64 file.

REMOUNT=3

Always unmount any previously mounted D64 file and enter Light Mode.

Read more about savyour.cfg in the [appendix](#).

Disk Change Emulation

To trick a loader program that a floppy disk is pulled out and another is inserted Savyour generates a series of 200 millisecond pulses on the copy protect sensor. That is how most modern multidisk demos detect a disk change.

The pulse is generated once the memory stick is reinserted and lasts for approximately one second. If you manually try to access a file or directory during this time period the drive LED might flicker and flash *file not found*. If that happens, just try again and it will work.



The pulse can be extended with the DISKCHANGETRIG key in a savyour.cfg file.

Another way to detect disk changes is by reading the disk sectors at a fixed interval and comparing the disk id. If it differs then there probably is a new disk spinning.

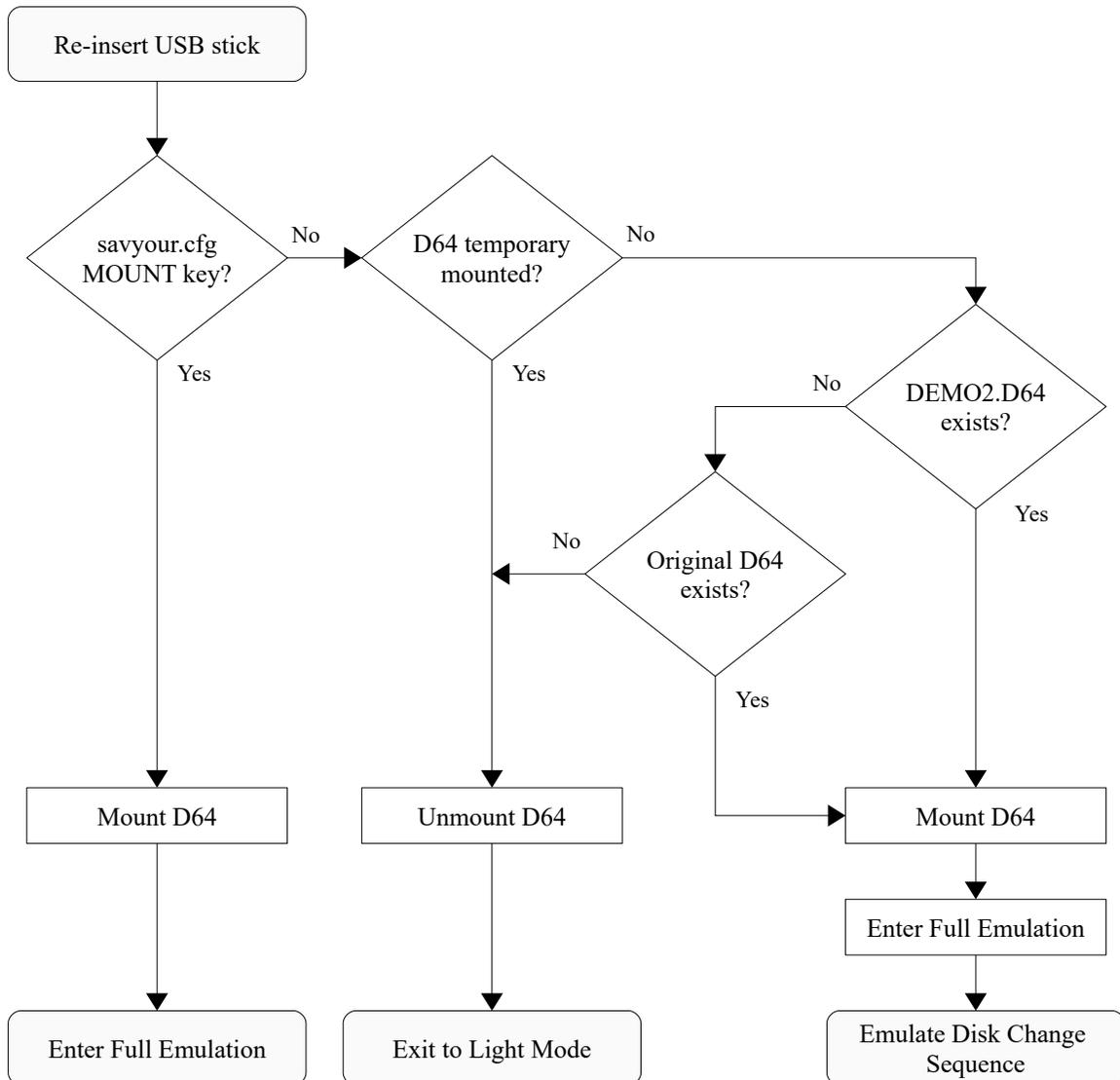
This method is less compatible with Savyour as the emulator saves its state and freezes as you pull out a memory stick. Meanwhile it does not respond to disk reads or data transfers so if the loader then needs an answer from a receiving end and noone is there to answer the procedure might not work exactly as intended.

The only solution is to retry by reinserting the stick until it works. You would need a savyour.cfg on the stick with a [MOUNT key](#) mounting the specific file, pulling the stick out, reinsert, check and try again until the loader catches on. Sometimes it takes a good amount of tries (> 10). Sometimes it helps to disable the confirmation flash (BLINKOK=0) since the virtual emulator will be up and running again much faster.

Disk Change Flow Chart

Did the disk change procedure make you confused? Here is a flow chart that simplifies it:

Input for the flow chart: File *DEMO1.D64* has been mounted and the memory stick is removed.



This chart illustrates the flow of events for the default disk change behaviour. This can be manually altered by using the REMOUNT keyword in a [savyour.cfg](#) file.

1541 Compatibility

The vast majority of C64 games, demos and applications will work with Savyour in Full Emulation mode without a problem. Things that do not work or will be tricky are:

- Games utilizing copy protect methods jumping between tracks and half tracks. D64 files are not designed for such data streams.
- Multi-loaders polling the disk drive while waiting for a new disk to be inserted. Savyour's emulator is frozen when the USB stick is pulled out. Retries may work occasionally depending on the loader.
- USB memory sticks with poor access times. Has an impact on fastloaders and corrupts loading. If a demo or game freezes half way through try another (3.x) memory stick.
- USB memory sticks that load files but cannot save. It's not related to 1541 emulation itself but affects usage. It does not work in Light Mode either.

Make sure the D64 you're trying to mount is a valid D64 file, either 35 tracks (170 Kb) or 40 (192 Kb).

SavyourLoader

Savyour has a built in directory viewer and loader program that always appears as the first file in every directory (Light Mode). SavyourLoader makes it easier to view the directory of USB memory devices, fast load PRG files or mount/temporary mount any D64 file. It can also create empty D64 files on your memory stick.

SavyourLoader uses a special burst mode to list the directory and to load files. It does not work with a real 1541 on the serial bus since all data will be garbled. Burst mode only works when Savyour is configured as device no. 8 (default).

Starting Up

To start SavyourLoader, with Savyour in Light Mode enter:

```
LOAD "SAVYOURLOADER", 8
RUN
```

Alternatively, if no file has been loaded previously you can use the load first/latest command:

```
LOAD "*", 8
RUN
```

Top Menu

The program is controlled by the top menu's function keys. They can be used at any time.

```
F1=DIRECTORY F3=CREATE D64 F7=EXIT
```

- F1 - lists the directory
- F3 - prompts a filename and creates an empty D64
- F7 - exits to Basic prompt

Directory Screen

Press F1 and the directory loads. All files are listed with details of size and type. SavyourLoader lists more files than the standard amount (144) for LOAD "\$".



Use CRSR keys up/down to select a file. Page scrolls as you reach the bottom of the screen. Use CRSR keys together with C= key to page scroll and CLR/HOME to jump back to the top.

RETURN key takes action on the current highlighted file. PRG files will fastload.



The program loads into the address defined by the first two bytes of the file (LOAD ". . .", 8, 1). Top screen shows a progress bar while loading and then exits to Basic prompt where you can start the program with a normal RUN (or SYS if basic program is missing).



Pressing RETURN key on a highlighted D64 file will mount it and start Full Emulation mode.



Mount temp. means a temporary mount i.e., file is not remounted when the memory stick is removed/reinserted.

SavyourLoader cannot view or load files when a D64 has been mounted.

Create Empty D64

Enter a filename and press RETURN key to create an empty D64 file on your USB memory stick.

```

F1=DIRECTORY  F3=CREATE D64  F7=EXIT

FILENAME :
MY DISK     .D64
  
```

When the D64 file is successfully created the screen momentarily flashes green and you can click F1 to reload the directory to see your new D64 file.

If the D64 could not be created (like if filename already exists) the screen flashes red.

The disk id when creating a D64 is '00'. If you want another id you can instead create the D64 manually in C64 basic mode using the N (NEW) [format command](#).

Press F1 or F7 keys to cancel and exit the Create D64 screen.

Replacing the Savyour Loader Program

The SavyourLoader program is installed in your Savyour by default and is present as the first accessible file in all directories. If you want you can replace this with your own program.

All you need is to create a binary file for your program with the following format:

```

myprogram.bin  ▢ ×
00000000  4D 59 50 52 4F 47 52 41 4D 00 00 00 00 00 00 00  MYPROGRAM.....
00000010  01 08 0B 08 0A 00 9E 32 30 36 31 00 00 00 A2 FF  .....2061.....
  
```

Position 0x0000 – 0x000F Filename. Pad with null (0) if less than 16 characters.

Position 0x0010 – 0x0011 Load address (little endian). \$0801 in this example.

Position 0x0012 – 0x0FED Your program's data.

To import the binary file, copy it onto a memory stick and create an empty savyour.cfg file on the same stick. Put the keyword below on one row in the savyour.cfg file.

Your filename must not exceed 16 characters and should end with the .bin suffix:

```
INSTALLUTILITY=myprogram.bin
```

Insert the memory stick into Savyour. When the LED flashes twice the program has been imported and installed. If instead the [error pattern](#) flashes then something is wrong. It's most likely the bin file missing on the stick or the filename is simply spelled wrong.

Don't forget to remove the savyour.cfg once your program is installed.

WARNING:

Do NOT turn the power off while Savyour is importing and installing!
Do NOT remove the memory stick while Savyour is importing and installing!

Mounting D64 Files Automatically

You can mount a D64 file automatically by putting a MOUNT key in a savyour.cfg file. The case insensitive filename should have a max length of 16 characters (excl. suffix) and end with a ".D64" file suffix. Do not enclose the filename with quotes. Savyour looks for the file on the same memory stick and mounts it if it exists.

```
MOUNT=mydisk.d64
```

Read more about savyour.cfg files in the [appendix](#).

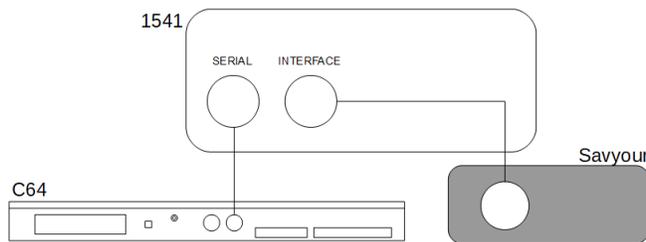
Copying Files Between Savyour and a 1541 Drive

In case you want to transfer old files from 5,25" floppies to D64 files this section will show you how to set it up to make it work with a step by step instruction.

For this purpose we will use the excellent program Dracopy written by Draco.



First you need to connect all the cables correctly. Since not all 1541s have jumpers to change device number easily we will use device no 8 (standard) for the real 1541 and turn Savyour into device no. 9. You need two serial cables and this is how you connect them:



Connect SERIAL from your C64 to SERIAL on the 1541 drive
 Connect INTERFACE from the 1541 drive to the top serial connector of Savyour and put Savyour into one of the controller ports.

If your 1541 has device jumpers like in the right 1541-II image, make sure they are in position as device number 8 (check the manual).

For 1541-II that means both jumper pins are in the upper position.



To alter Savyour's device number, create a file with the name *savyour.cfg* file on the memory stick you will use. Open the file in a text editor on a PC/Mac and put one single line in it:

```
DEVICENUMBER=9
```

Power up your 1541 drive first, then power up the C64 (important!)

Put the memory stick with the *savyour.cfg* file on it into Savyour and watch how the LED flashes twice to confirm that the devicenumber setting has been changed. You can then remove the *savyour.cfg* from the memory stick.

WARNING:

Do NOT remove the memory stick or turn off the power while Savyour is setting the device number!

On your C64, first find the name of your D64 destination disk onto which you wish to copy your floppy files. This example requires the Dracopy D64 to reside on the same USB memory.

```
LOAD "$",9
SEARCHING FOR $
LOADING
READY.
LIST
0 MUSI: [REDACTED] DISK [REDACTED] 010 27]
11 "SAVYOURLUTILITIES" PRG
0009 "MYDISK" D64
0009 "DC10D" D64
0004 BLOCKS FREE.
READY.
```

First temporarily mount the D64 file containing Dracopy and load the application into memory:

```
LOAD "X:DC10D",9
SEARCHING FOR X:DC10D
?FILE NOT FOUND ERROR
READY.
LOAD "DC64",9
SEARCHING FOR DC64
LOADING
READY.
```

Pull out and reinsert the USB memory to unmount the Dracopy disk image.

Now mount the D64 file that is your destination disk. This has to be done since Dracopy uses a disk turbo which Savyour needs to run in Full Emulation mode. It will not work in Light Mode.

```
LOAD "MYDISK",9
SEARCHING FOR MYDISK
?FILE NOT FOUND ERROR
READY.
RUN
```

Finally, run the Dracopy (DC64) you previously loaded into memory.

From here on you are set to go. The C64 is running the copy program, the drives are setup as number 8 (1541) and 9 (Savyour). Savyour is running full emulation with your destination disk mounted. All you got to do now is follow Dracopy's instructions and transfer your files!

USB Memory Troubleshooting

I installed the ROM file but I still get a Device not Present error?

You have not really installed the file. Make sure Savyour confirms the install flashing twice. Check the filename so that the INSTALL1541ROM key has the correct file. Make sure the filename does not exceed 16 characters.

I put the ROM and savyour.cfg on a memory stick but it just blinks three times when I insert it?

The USB memory device wants too much power to run for your C64 too handle. Use another memory stick that needs less power.

I can't mount a disk. I did a LOAD command on the D64 file but when I try to load its directory all I get is a Device not Present error?

You haven't installed the 1541 ROM file.

I have installed the ROM but can't load any files/directory. It's still "Device not present"?

When a USB memory stick isn't inserted, Savyour does not respond to disk drive commands (same as being "device not present"). If the stick isn't inserted properly and the LED isn't out it's the same situation.

Note that removing the USB stick once a D64 is mounted the emulator is frozen and the serial bus is locked up. A drive command will then freeze the computer. You can of course press RUN/STOP to gain control again but the drive is still frozen until you reinsert the memory stick to remount the file (or have the D64 unmounted).

I mounted a D64, reinserted the disk and even though disk change settings are correct (cycle disk) the D64 is not remounted? The LED even blinks twice??

Does the memory stick contain a savyour.cfg? Chances are the cfg file overrides the mount by either an INSTALL1541ROM key or a MOUNT key. Remove the keys or remove the cfg file from the stick completely.

I try to load files with my Final Cartridge III but it freezes?

You are running Savyour in Light Mode. FCIII uses disk turbos to fastload and needs full disk drive emulation. Mount a D64 and try again or kill the FC cartridge and load the file normally or with SavyourLoader.

I try to load the directory but everything freezes.

Did you run a demo with a fastloader that has frozen your disk drive? Do an [UNMOUNT](#) or turn your computer off and on again.

Did you mount a D64 and removed the memory stick? In that case the serial bus is occupied by the emulator. Reinsert the drive and it will work.

Is the memory stick inserted properly? Is the device accepted (LED out)? Does the device require too much power (LED flashing)? Is the cable ok, does all signals come through?

Is the 6526 controller chip (CIA) inside the C64 ok?

I cannot save or load anything on my USB memory. I try saving but the file isn't there/computer hangs.

Try reformatting on a Windows computer. If it's a new one or everything seems to be up to date with the file system (and you have already tried reformatting) then it can be a strange compatibility issue. Those have been observed but are really rare. Find another stick.

Savyour doesn't respond when it shares the serial bus with a real 1541!

Always switch on the 1541 first. Make sure you have connected the serial cables correctly and that the drives are configured with different drive numbers.

I ran a demo and reset my computer. Now Savyour has stopped responding.

Many fastloaders lock up the disk drive and as Savyour is still in full emulation the fastloader is also still running, the normal disk operating system is thereby blocked. You have two options: either turn the system off and on again to clear it or create a savyour.cfg on a memory stick and put an UNMOUNT=1 key in it and then insert it into Savyour. The emulator is dropped and its virtual memory is cleared and reset. [Read more about savyour.cfg.](#)

Note that a simple unmount after a temporary mount is just like pulling the floppy out of your 1541. It does not reset the drive, only UNMOUNT=1 in a savyour.cfg will.

I pushed my C64's custom made reset button and Savyour was reset too?

Yes, some C64 models do send the reset signal on the serial bus and some don't. Your C64 apparently does.

I downloaded this demo off the internet and copied to my USB memory but I can't see it in the directory?**I can't see my file in the directory?**

Is the filename too long? A C64 directory entry only accepts 16 characters (PRG/D64 suffix excluded). Does the filename contain forbidden characters? SavyourLoader does not list files with forbidden chars in the 1541's file system such as { } =. A normal LOAD "\$",8 will but the file does not load or mount.

I saved a file but I can't see it in the directory?

Your stick has a lot of files, directory only lists the 144 first ones. Filenames above 16 characters (suffix excluded) will not show up in the directory either.

I mounted a D64 but then when I do a LOAD "*"*,8 the SavyourLoader loads?

You did not properly mount the D64 file. Either you have the filename misspelled or the file does not exist on the memory stick. Keep an eye on Savyour's LED during mounting. It should flash twice after a successful mount.

It does not work with mounts, everytime I remove the stick the file unmounts?**No matter what file I mount another one is mounted whenever I reinsert the stick?**

You have a savyour.cfg on the stick mounting a specific file or doing a complete unmount.

I think I found an incompatible demo. After a while it just hangs.

Unless the demo is doing something your C64 can't handle (like VSP etc) it could very well be your USB memory stick being too slow. It's recommended to use USB 3.x memories to keep up with fastloaders. Please read the first chapters about memories and what to look for.

I found another incompatible demo. I try to change disks but nothing happens.

It sounds as if the loader senses disk changes by polling the drive at fixed intervals. When you remove the memory stick Savyour halts the emulator so no communication is possible i.e., the polling fails. Retrying does work occasionally.

Also, check that there isn't a conflict with a savyour.cfg file on the disk that in any way unmounts the D64 (did you forget to remove it after installing the 1541 ROM?).

Another thing to try is using a faster 3.x memory.

I'm trying to get two D64s to mount in a sequence but it doesn't work!

Savoyour increments the last character why names such as "DEMODISK[1].D64" won't work.

Also make sure that the filenames are max 16 characters (excluding the D64 suffix).

Demo disks often come with longer names and are numbered like the example above. You need to change the filenames on your memory stick before you can load them with Savoyour.

I was running a D64, pulled it out and later reinserted it. When I try loading the directory the LED flashed really fast and I had a File not Found error.

You were a little too fast for Savoyour as you reinserted the D64. What happens after remounting a file (or changing disk in a multidisk game/demo) is that Savoyour emulates the physical disk insert for approx 1 second. Trying to load anything during this time is the same as loading something from your 1541 with the door lever open.

I mount a D64 but everytime I reinsert the same USB memory the D64 is unmounted?

Did you temporarily mount the D64? If so, it will be unmounted as soon as the stick is removed.

If not, does the USB memory contain a savoyour.cfg file with an UNMOUNT=1 key? Did you insert another stick without the file on it in between causing the file to be unmounted?

Did you accidentally pull out Savoyour too when you removed the USB memory? If so Savoyour was reset and initialized into Light Mode again. This can also happen if Savoyour doesn't sit correctly in the controller port (poor grip?). Put something under Savoyour to support it.

I try to auto mount a D64 file with a savoyour.cfg file but I can't get it to mount?

The name should have allowed characters of the FAT file system, must not be enclosed in quotes and should have the D64 suffix in it. E.g., MOUNT=MSSIAHSONGS.D64.

Does the file exist on the memory stick? Is the filename length (excluding .D64 suffix) within 16 characters? Don't forget the equal sign. It's KEY=VALUE.

Why does Savoyour blink four times when I insert a specific USB memory?

The stick has a savoyour.cfg file that is imported, first double flash confirms that, and then a D64 is getting mounted (shorter blinks in second double flash). It's either a remount because you reinserted the stick or a MOUNT key in the savoyour.cfg file that mounted it.

I mounted demodisk2 and got it to cycle to demodisk3 as I reinserted it. But after the next reinsert it mounts demodisk2 again, not demodisk1?

Once the sequence is up the originally mounted D64 file is remounted. Not necessarily the first in the sequence unless that's the one you mounted first.

I tried to load SavoyourLoader with LOAD "*",8 but some other program loaded instead?

LOAD "*",8 really means "Load the latest program loaded". When started up, SavoyourLoader is default. If you load other programs with the load command, these will become the latest ones.

Note that loading SavoyourLoader in between that does not make it the latest (the "*" one). Try loading SavoyourLoader with LOAD "SAVYOURLOADER",8 instead.

I don't see the SavoyourLoader program?

The Savoyour Loader software only appears in Light Mode. When viewing the directory in the SavoyourLoader program it excludes itself from the list.

SavoyourLoader doesn't work, it says "No Savoyour on bus/Wrong mode"?

SavoyourLoader requires device number 8 and cannot run with a real 1541 on the serial bus.

I try to replace the SavyourLoader application with my own program but the error pattern is blinking when Savyour is trying to install?

Have you setup the correct filename including a .bin suffix? Is the file provided on the same stick? Also, check the filesize.

I try to format with the N command on my C64 but nothing happens

Formatting in Full Emulation mode does not work and will make the program freeze. In Light Mode however a new D64 is created. To format the USB stick itself, use your PC.

I have a problem with a D64 file that doesn't work

These are the standard D64 files that will work with Savyour:

less than 35 tracks	<174848 bytes		Will not mount
35 tracks (no error bytes)	174848 bytes	171 kb	Supported
35 tracks (error bytes)	175531 bytes	171 kb	Not supported
40 tracks (no error bytes)	196608 bytes	192 kb	Supported
40 tracks (error bytes)	197376 bytes	193 kb	Not supported

What is Light Mode? What is the difference to Full Emulation?

Light Mode is a simple protocol emulation reading files directly off your memory stick. Full Emulation is a full 1541 emulator running inside Savyour. Light Mode is sufficient for saving and loading application data when using C64 software (like MSSIAH), Full Emulation is needed to run fastloaders (demos, games etc). Read this chapter through once again to understand the concept. Have a go loading the directory and mount any D64 file (don't forget to install the 1541 ROM file first if you haven't already). Load the directory again. Pull out the stick, insert another, once again check the directory. What happens?

How do I create, modify and remove a savyour.cfg file?

Use your PC/Mac. Name the file "savyour.cfg" and edit it with any text editor such as "Notepad" or "Text Edit". [Read more.](#)

Mouse

Insert a USB mouse or pen tablet into Savyour and you can use it as a Commodore 1351 proportional mouse, Amiga mouse or Atari mouse.

Left, right and middle buttons are supported as well as mouse wheel (1351 mode only).



Select Mouse Mode

To change which mouse to emulate put the key MOUSEMODE in a [savyour.cfg](#) file on a USB memory stick and insert it into Savyour to import it.

You only need to do it once, Savyour keeps the setting after it's been turned off.

```
MOUSEMODE=1
```

- 1 = Commodore 1351 mouse (default)
- 2 = Amiga mouse
- 3 = Atari mouse

Selecting Mouse Resolution Scale

You can reduce the DPI to optimize the performance of your USB mouse. After all it's most likely adopted for a screen size much larger than the C64's.

Put the key MOUSERESOLUTION in a savyour.cfg file and set the amount of reduction:

```
MOUSERESOLUTION=3
```

- 1 = Full
- 2 = 80 % (default)
- 3 = 60 %
- 4 = 40 %

Because of the nature of how Amiga and Atari mice register movement the resolution setting does not affect DPI but instead the delay in which the photo pulses are generated. Default setting usually works fine, if not try any of the three others.

WARNING:

Do NOT turn the power off or remove the memory stick while Savyour is importing a savyour.cfg setting! Wait for the double flash confirming the import.

Configuring the Mouse Manually

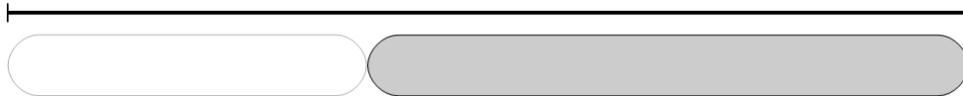
There is a way to configure the mouse manually using the mouse buttons right after you inserted the mouse into Savyour. The LED flashes momentarily to indicate the time window for you to act.

Manual mouse selection is by default disabled and needs to be activated with a [savyour.cfg](#) file with the key MOUSESELECT:

```
MOUSESELECT=1
```

Insert the memory stick into Savyour and wait for the LED to flash twice to confirm the import.

With manual mouse selection activated Savyour will turn off and on its LED for a short moment when a USB mouse is inserted and initialized.



During this time window you can change mouse configuration:

- Click and hold left mouse button (LMSB) to enter configuration mode for mouse mode.
- Click and hold right mouse button (RMSB) to enter configuration mode for mouse resolution scale.

Configuration Mode

Savyour flashes the value one to three times for mouse mode and one to four times for resolution. Clicking the opposite mouse button cycles through the values. Configuration mode stays active until its activation button (LMSB or RMSB) is released.

If the time window runs out without you clicking to activate the configuration mode Savyour continues and jumps right into emulation using previous/default settings. Clicking and releasing LMSB or RMSB directly in the config time window skips configuration mode and goes right into emulation (quick start).

Mouse settings that are altered this way are not permanent and will reset to default (or saved setting) when Savyour is reset.

Selecting Mouse Mode Manually

With MOUSESELECT active, click and hold the left mouse button (LMSB) during the init blink pattern.

While holding LMSB use the opposite mouse button (RMSB) to cycle through the values and release LMSB when the correct mouse is chosen. Savyour then starts mouse emulation.

The value being flashed is the same one used for the key MOUSEMODE in [savyour.cfg](#).

Selecting Mouse Resolution Scale Manually

During the init blink pattern click and hold right mouse button (RMSB). While holding RMSB use the opposite mouse button (LMSB) to cycle through the values and release RMSB when the correct mouse resolution scale is chosen. Savyour then starts mouse emulation.

The value being flashed is the same as for the key `MOUSERESOLUTION` in `savyour.cfg`.

Setting Both Mouse Mode and Resolution at the Same Time

As mouse mode and resolution scale are set at different times you would need to pull out and reinsert the mouse to alter both settings, right? Yes, but there is a way, with some dexterity, to do it all in one take. The trick is to jump from one setting to the other:

When in configuration mode, keep the opposite mouse button depressed when you release the activation button. Savyour then jumps to the other mode.

Example:

- Exit mouse mode configuration releasing LMSB but keeping RMSB depressed.
- Exit mouse resolution scale configuration releasing RMSB but keeping LMSB depressed.

Since the opposite mouse button changes the value you first need to set the correct value and keep the value button depressed at that value, then release the activation button.

1351 Compatibility

Note about 1351 compatibility:

The real Commodore 1351 works in two modes:

- Proportional** like any other PC-mouse
- Joystick** like up/down/left/right on a normal joystick.

A lot of software claim to have 1351 support when they are in fact only implementing the joystick mode. Savyour does not support 1351 joystick mode.

If the software you are trying to use only supports 1351 joystick mode then you can plug in a USB joystick or keyboard and still control it with those devices. If the software really has true 1351 proportional compatibility then you can fully enjoy it with a USB mouse in 1351 mode.

MSSIAH Sequencer supports true 1351 proportional mode.

The 1351 works with the Commodore 64/128 only. It uses the SID circuit to read the mouse signals so faulty or degraded potentiometer functionality in the SID will affect the handling.

Input signals timing differs between TV-systems (PAL or NTSC). Savyour does self adjust but you may want to try out the [trim](#) setting to get it perfect.

The 1351 interface accepts left, right and middle mouse buttons. The mouse wheel is converted to pulses on the joystick left/right pin which is compatible with MSSIAH Sequencer. For information about signal outputs see the [appendix](#).

This is what it looks like, the real C1351 mouse. Easily mistaken for an Amiga mouse being almost identical except for the connector.

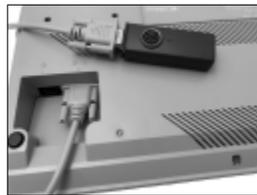


It's a rare find in the classifieds most often twice the price of a Savyour yet it comes without a 1541 emulator and has the responsiveness of an old mechanical mouse. No doubt a collector's item but if you're running MSSIAH we recommend to use Savyour and a modern USB mouse.



Amiga/Atari Mouse

If you plan on using Savyour with a real Atari ST you will need an extension cable since Savyour does not fit in the controller port located under the computer. The extension cable can be a normal DB9 female to DB9 male available in most computer and electronics stores.



When using Savyour on a real (non-modified) Amiga you should be aware of the 50 milliamps power limit on each controller port. That means you can only use one Savyour with nothing on the other port and only use the lowest powered devices. Luckily this goes for most mice and joysticks/keyboards on the market. When setting mouse mode with `savyour.cfg` you need to find a USB memory stick that is really low powered. Go for a USB 2.0 device.



Savyour will work on C64s/128s with software utilizing the Amiga or Atari mice (like MSSIAH). Because of the nature of how these mice are generating signals there is a limit to how fast you can move the mouse without it stopping and wiggling the mouse pointer. That is not a bug in Savyour's emulation or the software itself. A low DPI mouse is recommended

The Amiga and Atari mice protocols support left, right and middle mouse buttons.

USB Mice vs C64

Keep in mind that the C64 has a screen resolution of 320 x 200 pixels. There is no need for a high DPI mouse to control a pointer on such a small screen.

Stick to a mouse with as low a DPI as possible. Standard for desktop mice is about 800 DPI. They work well but if you find one with only 400 that's even better.

If you're using a high DPI mouse try lowering the DPI setting (if configurable). Altering the mouse resolution scale for Savyour might help too.

Trimming the Mouse

Reading the mouse is done by the computer's audio chip (SID). Aging technology means no two C64s are alike reading mouse inputs why tiny quirks can prevent a top notch mouse experience. Especially older SID revisions can yield different results than newer ones.

Savyour has some accessible parameters so you can trim this behaviour and get the best mouse experience possible. The MOUSETRIM setting slightly alters the emulation timing for each direction. There are eight values to choose from, values 1 - 4 tailored for PAL computers and 5 - 8 for NTSC machines.

So if your mouse skips one or two pixels from time to time, try out the mousetrim settings by adding the line below to a savyour.cfg file (with the value of choice):

```
MOUSETRIM=7
```

If your mouse pointer suddenly jumps to another screen position even if you didn't move it you should activate the pullups. To do that, put the following line in a savyour.cfg file:

(And if you never heard of a pullup resistor don't bother, for now you only need to know it's something good)

```
MOUSESYNC=3
```

You may have to change the trim value after activating the pullups. Try out different combinations and experiment.

USB Mouse Troubleshooting

I get no mouse movements with the C64 software!

Has Savyour recognized the mouse and started the emulation (LED out)?

Is the software and Savyour running in the same mouse mode? (1351 proportional/Amiga/Atari)

Is the audio (SID) chip fully functioning in your C64? SID is the chip responsible for reading mouse signals.

Is the software really compatible with 1351 proportional mode?

I have started up a USB mouse in 1351 mode but the 1351 compatible software does not react. Clicking the mousebuttons makes it react a little.

Many programs are listed as compatible with the 1351 but does in fact only support the

Commodore 1351 mouse's "joystick mode", i.e., single up/down/left/right triggers from the

current mouse direction. Savyour does not support this mode with USB mice but you can instead connect a USB joystick or keyboard into Savyour to control it (it's basically joystick mode). MSSIAH Sequencer is one of the applications supporting the 1351 "real" proportional mode.

Clicking one of the mouse buttons does not have an effect.

Are you using the correct controller port? Does the software read the mouse button?
Is the joystick controller chip (a.k.a. CIA) faulty? If so, normal joystick fire will not work either.

It works running 1351 mode with my application but the mouse buttons do not work.

Change controller port.

My mouse is too sensitive for the software I'm running!

Try changing the mouse resolution configuration to a lower one.

My really high DPI gaming mouse acts weird when I connect it.

The C64 has 320 x 200 pixels and does not need a high DPI mouse. Recommended DPI is 400 yet most 800 DPI mice (cheap standard desktop mice) are fine.
If your mouse has adjustable resolution (DPI), try lowering it.

My mouse wobbles like crazy when I move it in Amiga/Atari mode!

It's perfectly normal if the mouse pointer wobbles in Amiga/Atari mode when you are moving the mouse too fast. It's in the nature of how these mice work and nothing Savyour can do much about. If you can't move it in any direction without it behaving erratically you might have the wrong mouse type selected (running as Atari mouse when software expects Amiga mouse and vice versa), it could also be that the USB mouse's DPI is too high so nothing will work.

The mouse pointer sometimes skips areas on the screen when I run the 1351 emulation!

Try out the MOUSETRIM setting with a savyour.cfg file. Use the values 1-4 if you're on a PAL C64 or 5-8 if it's an NTSC machine.

Mousepointers skipping pixels could also be the result of a poor mouse driver and then no mousetrim setting will completely remedy the problem.

I tried the manual mouse selection mode, now I want to change mouse resolution a second time. How do I do that?

Pull out the mouse and reinsert it to trigger the configuration mode (LED blinks) again.

I change mouse mode manually (MOUSESELECT=1) but whenever I start up Savyour again it's the same default mouse mode?

Manual mouse selection does not save any settings. You need to use a savyour.cfg for that.

Joystick

Plug in a USB joystick, USB Playstation controller or a USB keyboard and Savyour will convert those signals to a C64 joystick's.

Savyour converts analogue stick input to simple on/off triggers for left, right, up and down to fit the C64's interface. A configurable deadzone threshold is applied to prevent unwanted inputs.



A USB joystick can have plenty of buttons. Up to eight of them are directed into the C64 joystick's fire button. The first and second ones activate autofire (fast/slow).

If you want to exempt your favourite trigger button from autofire you can reconfigure it at startup.

Autofire speed can be adjusted with a `savyour.cfg` file. If a USB keyboard is acting as joystick, autofire speed can be changed directly. USB keyboards are covered in the next chapter.

Choosing Main Fire Button

If you have set the MOUSESELECT key to 1 with a [savyour.cfg](#) file Savyour enters a manual configuration mode as you connect the joystick to its USB port. That means the LED goes out for a short moment, comes back on again and then out indefinitely:



This is the time window to choose main fire button by pressing it. The main fire button will be exempted autofire. If no button is pressed the joystick's default number one and two buttons are assigned autofire. This procedure needs to be done everytime you insert a joystick to have an effect.

Config buttons on your USB joystick will be disabled. Force feedback will not be applied. Be aware that joysticks with such features may require too much power and therefore be incompatible with Savyour. [Read more.](#)

Using USB Keyboards as Joysticks

USB keyboards plugged into Savyour work as joysticks too. They give a little more options for joystick control. This is fully covered in the next chapter.

Joystick Troubleshooting

I get no reaction from joystick input at all?

Are you using the correct controller port? Has the joystick been recognized by Saviour (LED out)? Is your C64's controller chip (CIA) ok?

Screen outputs characters when I move the joystick?

A classic phenomenon when a joystick is connected to controller port 1. It is a well known C64 quirk and is perfectly normal. Running the joystick in port 2 eliminates the problem.

I don't want my favourite fire button to have autofire! How do I disable it?

You need to activate manual mouse selection mode. Then Saviour's LED temporarily goes out when you insert the joystick. During that time you can press the fire button of choice to be exempted autofire.

I can't make the joystick work on the Amiga?

Is Saviour in the wrong port?

Keyboard

Plugging a USB keyboard into Savyour makes it work like a joystick. Standard PC gaming keys are used and several keys provide fire and autofire. There is also an autowiggle function that alternates joystick left/right or up/down movements automatically.

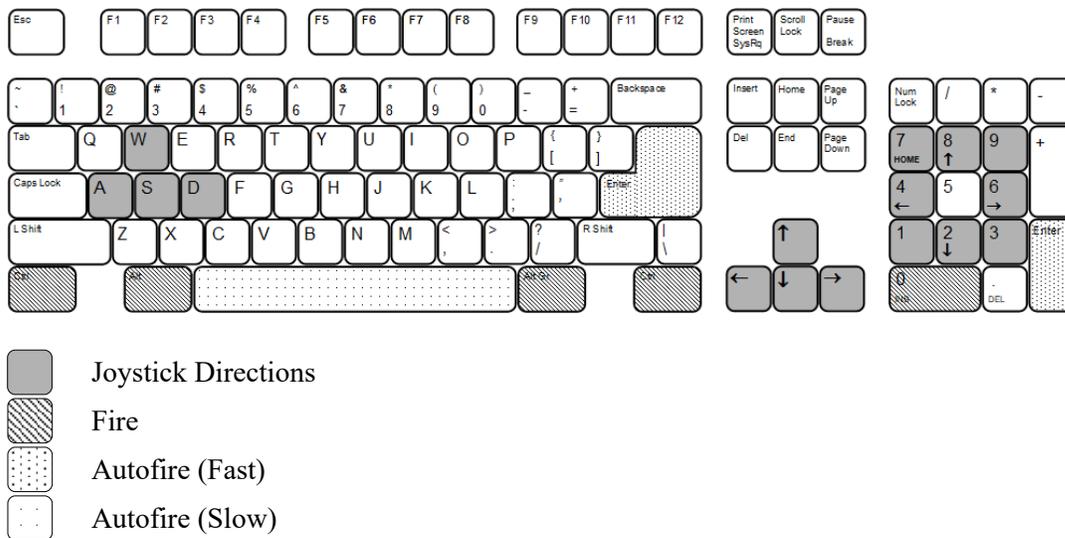


USB keyboards can also replace (or complement) the internal C64 keyboard but requires you to open up and make modifications to your computer as well as solder an additional component onto Savyour itself.

This is because the C64 does not accept full keyboard input through the controller ports, it has an internal connector for that purpose alone.

Using the Keyboard as Joystick

Plug in your USB keyboard and it converts the following keys to joystick signals.

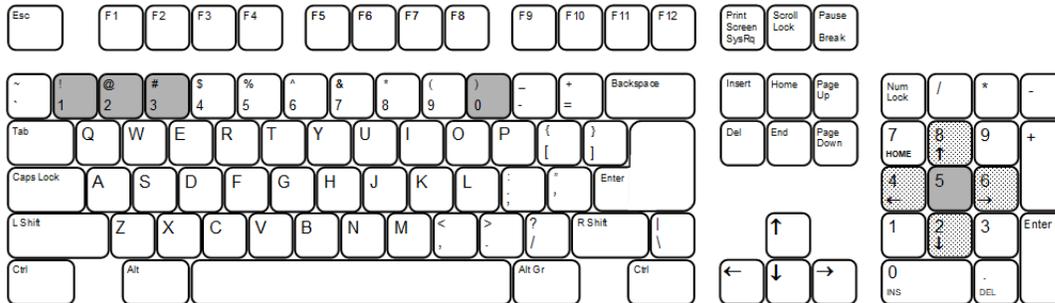


Autofire speed can be modified in three steps by keeping any of the autofire buttons depressed while choosing speed with key 1, 2, and 3.



To automatically wiggle the joystick press numeric pad 5. The joystick wiggles as long as you keep pad 5 depressed. Pressing the numeric pad keys for up/down (8 2) or left/right (4 6) changes direction. Left/Right is default.

By pressing the number keys 1, 2 or 3 while keeping auto wiggle key depressed you can vary the speed. Press number key 0 to shut off auto wiggle function completely.



For a detailed list of keys see the [appendix](#).

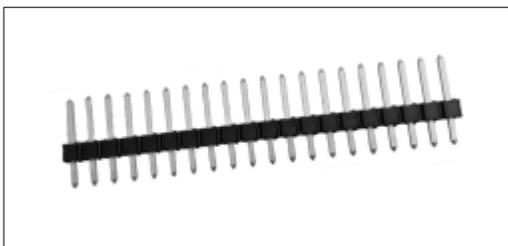
Setting wiggle speed and autofire speed directly with the keyboard does not save the parameters after the power has been shut off. Autofire speed can be set and stored with the AUTOFIRESPEED key in a [savyour.cfg](#) file.

Replacing or Complementing the C64's Internal Keyboard

This is a bonus feature for dedicated C64 modders. Savyour can convert USB keyboard input to readable signals for the C64's full keyboard. That means you could plug in a modern USB keyboard to use instead of the one built in your C64!

It does however need some modifications, both of the Savyour device (voids your warranty) as well as your C64. The reward is besides a seriously pimped up 80s computer something that is actually highly useful. Hacking away on a Filco does make life a bit easier..

In practice what you need to do with Savyour itself is to mount an additional pin header (not provided) onto its prepared space. The pin header should be soldered in place. Then connect a 20 pin wide computer cable between the pin header and the internal keyboard connector and you are good to go.



This manual does not go into details on how to make a permanent installation inside your computer. It is up to your own creativity and depends on your C64 model/motherboard how to make everything fit and what you want to do with it.

If you seriously aim to soup up your Commodore 64 with a USB keyboard feature we advice you to first solder the pin header onto Savyour and hook it up to see that everything works fine. Really worn 6526 (a.k.a CIA) controller circuits can work without a problem with the internal keyboard but fail to respond reliably to Savyour. One side effect being multiple key triggers in the same row. You can observe this with the *keyboardtest.prg* program available for download on our site (pictured right).

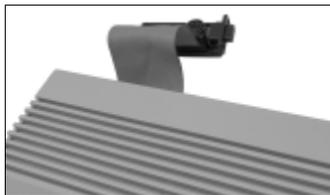


There's not much to do about it but to change the chip to a fully working 6526 or 6526A. Even if this makes you opt out the Savyour full keyboard feature it's a sign that your controller chip could fail on you and you will need to change it any time in the future anyway.

To make a permanent installation you would need to find space inside your C64 to attach Savyour. On some motherboards with very little space you may need to remove some of Savyour's components (serial and controller port outputs). A USB male type A to female type A extension cord could serve between Savyour's USB port and an opening in the side of your C64 (USB port).

Savyour can coexist with the internal C64 keyboard so a tiny circuit board with pin headers bridging them is fully possible.

Of course you don't need to go the full way. A less permanent installation would be pulling a computer cable through the user port and hooking up Savyour from the outside whenever you need it.



Looks lame but less invasive with the same functionality



Keyboard connector placement differs on motherboard revisions



Disclaimer:

The full keyboard feature is built for the Commodore 64. It has not been tested with the Commodore 128 or SX64.

Details

Place a 20-pin pin header (2.54 mm apart) in the pre drilled pad holes on Savyour and solder them in place, be careful not to spill solder around the board shorting other pads. Make sure to check with a multimeter so that no two adjacent pins are accidentally connected and shorted. Cut the pin over the second hole with the missing pad.



You need to enable Savyour to generate full keyboard signals instead of joystick signals. Create a [savyour.cfg](#) file on a USB memory stick and include the key:

```
FULLKEYBOARDMODE=1
```

Put the memory stick into Savyour and wait for the LED to flash twice to confirm the setting has been imported and stored.

WARNING:

Do not turn the power off or remove the memory stick while Savyour is importing a savyour.cfg setting!

As full keyboard mode is activated Savyour does no longer convert keyboard inputs to joystick signals. For that you need to restore the default setting with FULLKEYBOARDMODE=0.

Here is the full keyboard layout and how it translates to C64 keys (US international keyboard). For a full list of keys, see this manual's [appendix](#).



Enjoy using your C64 with a modern USB keyboard!

WARNING:

The power feed for the keyboard connector is even lower than for the controller ports. Unless you bring in power from another place on the motherboard you are advised to only use USB keyboards requiring the lowest amount of power.

CAUTION:

These modifications require adequate skills in soldering and electronics. Do it at your own risk.

Keyboard Troubleshooting

The auto wiggle suddenly stopped even if I press numeric keypad 5?

Hold numeric key 5 and simultaneously press key 1, 2 or 3 (normal keys, not keypad) to set the speed. That should bring back the wiggle.

I soldered a pin header and connected it to the keyboard connector. No reaction.

Have you activated full keyboard mode with savyour.cfg? Did the savyour.cfg really import the parameter (blinking twice)? Is the computer cable connected correctly? Does Savyour power up (watch the LED)?

Does the keyboard initialize fully (Savyour's LED goes out)?

Do you have a short circuit somewhere? A very likely scenario with no quick fixes: you need to double check everything properly.

I installed Savyour as full keyboard. Now the C64 does not power up. Black screen.

This could be one of two reasons: The easiest one to check is whether you have a USB keyboard already plugged in when you start it up. Then remove it and see if it helps.

If the keyboard conversion starts before the C64 is fully started up the computer can get a little confused. For this reason keyboard init. is delayed the first time it happens. Should your C64's startup take too long and Savyour's LED goes out before you gain control of the screen you will most likely have a black screen.

If that's ruled out as a problem you will need to get into reason number 2 by going through every connection and double check your solderings (and connection to the C64). Black screen is most of the time a clear sign of a short circuit.

I installed Savyour as full keyboard but I get weird and irregular key triggers?

Your controller chip inside the C64 is faulty. It might work well with the internal keyboard but not with Savyour's signals. Change the chip (if in a socket) or change C64.

I installed Savyour as full keyboard but the Restore key does not seem to have an effect?

Page up (RESTORE) must be hit quickly to mimic the nature of a real C64 keyboard. It will not react if you keep it depressed too long.

Actually, it's not *that* sensitive but if you're too soft it won't trigger.

I don't understand which C64 keys my PC keyboard keys trigger. Some of them do not seem to be implemented?

All keys should work. Where keys are located on your PC keyboard may depend on which language your keyboard is for. A US keyboard map is available in the [appendix](#).

Joystick does not work when I have installed the full keyboard.

The internal keyboard connector only accepts keyboard input. To use the keyboard as a joystick Savyour needs to be connected to the computer's controller port and have FULLKEYBOARDMODE set to 0.

Savyour and MSSIAH

This chapter describes specifically how to use Savyour with the MSSIAH Cartridge. If you do not own a MSSIAH you can of course still enjoy Savyour with other C64 applications and games.

Saving and Loading

With Savyour's two modes of operation, Light Mode and Full Emulation Mode, you have the choice of either saving your files directly on the USB stick or into a specific D64 disk image.

We recommend using Light Mode, i.e., saving/loading files directly on the memory stick because it has several advantages: You don't need to mount a D64 file first, you never (?) run out of disk space and if your MSSIAH supports burst mode you can fastload/save the files. Besides, copying them in a PC environment is so much easier when they reside in the USB stick's directory instead of inside a D64.

One thing to remember though is that MSSIAH only scans the first 144 files when reading the directory. If your memory stick has more files than that your recently saved arrangement might never show up in the list to be loaded.

Select D64 File

If you want to load and save files on a D64 disk image then you first need to mount it. As MSSIAH completely takes over the system the mounting has to be done with a MSSIAH file application that can "see" the D64 files in the directory. MSSIAH comes with either one of these two:

Directory Viewer

This application is featured on newer MSSIAHs (black circuit board) which also enables fastloading with Savyour's burst mode (in *Light Mode* only).

You can easily find the D64 file in the directory and choose to mount it permanently or temporarily. If you do a temporary mount remember that the file will unmount when you pull out the stick which can be a problem using Savyour for both mouse control and disk by switching units when it's time to save/load (mount window is only visible if Savyour is device 8).



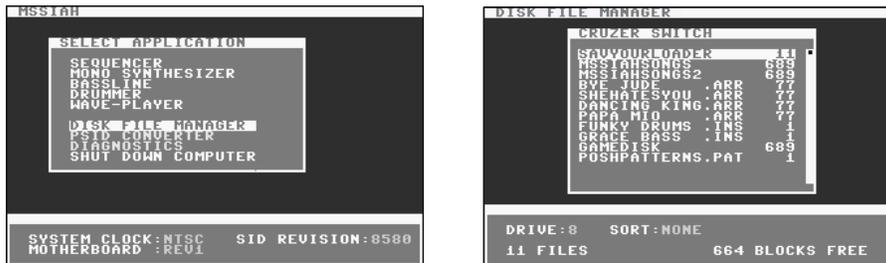
For more info on using Directory Viewer, please consult the *MSSIAH – Getting Started* manual available for download on our site.

Disk File Manager

This is the original file application with more functionality for renaming and deleting files. There is no functionality to explicitly mount or temporarily mount a D64. However, you can use the rename function to actually mount a D64 file (it will not be renamed), just type whatever as new name, it does not matter. What happens is that the disk image gets mounted when Disk File Manager tries to access it. The delete function will not work to mount, neither does it work to delete any D64 files.

Disk File Manager can also be used to create empty D64 files with its format function (Light Mode only).

For more info on the Disk File Manager, look up the *MSSIAH – Getting Started* manual (older version) on our site.



Don't panic if you fail or forget to mount a disk. You can always save your work directly on to the USB memory in Light Mode.

If you want to use several D64 files during your MSSIAH session you need to setup some memory sticks with savyour.cfg files and [MOUNT](#) keys.

Mouse / Joystick

If you are using MSSIAH Sequencer it is recommended to run Savyour in 1351 mode (default) and activate this mode in Sequencer. Select it from the menu or press and hold C= key before Sequencer starts and release it once the program has fully started up.

You can also plug in a keyboard or joystick to control Sequencer in joystick mode.

If using the other MSSIAH applications joystick is the control to use so insert a USB keyboard or a real joystick into Savyour and you are set to go. Joystick is default at startup even with MSSIAH Sequencer.

Switching USB Devices

With one Savyour only you need to switch devices when it's time to load or save a file. This is not a problem though temporary mounted D64s of course will unmount once the stick is removed. Unless you use a permanently mounted D64 loading and saving directly onto the USB stick (*Light Mode*) will be much easier.

Put Savyour in controller port no. 2 if you're using it for mouse or joystick. If you only use Savyour as a disk drive with MSSIAH (and perhaps together with a real 1351 or joystick) then it could be placed in port no. 1

Burst Load/Save

MSSIAH autodetects Savyour if it's in Light Mode and asks for confirmation to use burst mode when saving/loading files (Sequencer and Wave-Player only). Savyour must respond to device number 8 to use Burst mode.



Burst Mode is a built in fast loader capable of loading/saving a Sequencer arrangement file in just a couple of seconds. If you however wish not to use it just choose "No".

You can also press and hold CTRL key while pressing RETURN after selecting a file to load or entering a filename to save. If so MSSIAH will not even check for a Savyour device on the bus.

Note: Burst loads/saves are only available on MSSIAH cartridges with the Directory Viewer application in the startup menu.

It does not work if you're working with mounted D64s.

Overwriting Old Files

When using burst mode you have the possibility to overwrite the old file by putting the letter @ as the first character of the filename.



It's generally a good idea to save different versions of your work to be able to go back if needed but at least you now have the option to overwrite the file in case you would need it.

Besides the downside of one less available filename character, the "@" is included as first letter in the filename and becomes visible as a weird filled character in MSSIAH Sequencer's arrange window title.

Overwriting filenames only works if using burst mode.

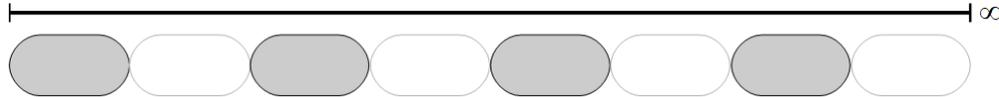
Appendix

LED Flash Sequences

Here are all the flash sequences Savyour blinks out to signal information and errors. The time frame for a sequence is approx 1.6 seconds. Most of the sequences are repeated infinitely. For 1541 LED activity please refer to a 1541 manual.

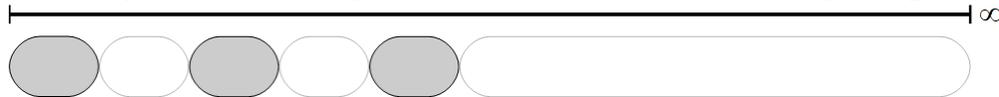
Unknown Device

USB device is not recognized.



Too Much Power Required

Device requires > 160 mA of power. You can set max level with a savyour.cfg file.



Input Configuration

Time window for manual configuration of mice and joysticks. When sequence is done LED goes out and mouse/joystick emulation starts. Needs MOUSESELECT=1 (savour.cfg).



Confirm Savyour.cfg

Savour.cfg has been successfully imported.



Confirm D64 File Has Been Mounted

A D64 file has been mounted manually or automatically by reinserting the stick (same D64 or the next in a sequence).

This is similar to the Savyour.cfg import confirmation but has shorter flash durations.



Value = 1

Blinks during manual configuration of mouse mode or mouse resolution. Signals value of 1.



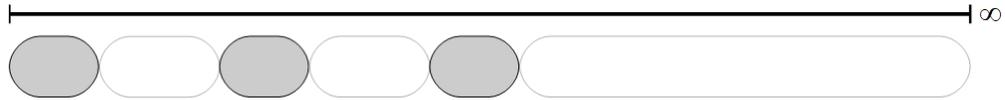
Value = 2

Blinks during manual configuration of mouse mode or mouse resolution. Signals value of 2.



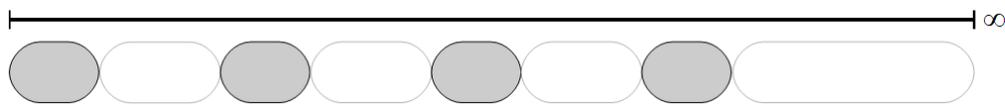
Value = 3

Blinks during manual configuration of mouse mode or mouse resolution. Signals value of 3.



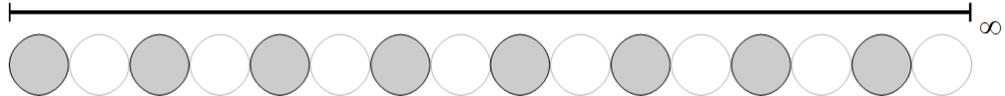
Value = 4

Blinks during manual configuration of mouse resolution. Signals value of 4.



Fatal Error

If Savyour would encounter an unrecoverable error it blinks the fatal error sequence for 100 times and then resets.



Savoyour.cfg

Putting a file named *savoyour.cfg* on a USB memory stick makes it possible to change Savoyour's parameters. The file is the first thing Savoyour looks for when a stick is inserted. If it exists the file content is imported.

The content should be a set of predefined keys and values. If a key and value is valid it's imported and stored into Savoyour's internal memory. Non defined keys are ignored.

Create a text file on your USB memory stick and name it *savoyour.cfg* (make sure it does not become *savoyour.cfg.txt*) and put any of the keys and values from the table on the next pages on separate lines in the file. You only need to provide keys for the settings you want to change. Separate the key and value with an equal sign but do not put spaces in between them. Keys are case sensitive, values are not.

A successful import is confirmed with the LED flashing twice.

Note that using the MOUNT key to mount a D64 or remounting a D64 by reinserting a stick will make the LED double flash twice, first to confirm the *cfg* import and second time to confirm the mount (mount confirmation has a shorter flash duration).

Imported values stay after power is shut off.

Unless you are using the *savoyour.cfg* file to mount a specific D64 it is recommended to remove the file from the stick after parameters have been imported.

WARNING:

Do NOT turn the power off while Savoyour is importing a *savoyour.cfg*!
Do NOT remove the memory stick while Savoyour is importing a *savoyour.cfg*!
Wait for the LED to flash twice to confirm the import.

Examples

```
MOUSEMODE=2  
MOUSERESOLUTION=1  
DEVICENUMBER=9  
REMOUNT=3  
MOUNT=game_disk.d64  
UNMOUNT=1
```

Key	Meaning	Allowed Values
MOUNT	Mount a specific D64 file. Temporary mounts not possible. Wildcard filenames not allowed.	Only FAT-allowed characters. No quotes. Use D64 suffix. Max 16 chars (excl. suffix).
UNMOUNT	Unmount any currently mounted D64 and reset the 1541 emulator.	1 (must be set to 1)
MAXPOWER	Set max allowed required power (mA) for USB device. WARNING! This can damage your computer.	150 – 300 (default = 160 mA)
MOUSEMODE	Select mouse to emulate	1 = Commodore 1351 (default) 2 = Amiga 3 = Atari ST
MOUSERESOLUTION	Reduce mouse resolution on Commodore 1351 mice. Change delay settings for photo pulse emulation on Amiga and Atari mice.	1 = Full 2 = Reduce to 80% 3 = Reduce to 60% (default) 4 = Reduce to 40%
MOUSESELECT	Enable manual selection of mouse mode and resolution at init.	0 = Off (default) 1 = On
MOUSETRIM	Timing presets for emulation 1 – 4 suitable for PAL 5 – 8 suitable for NTSC	1 – 8 (default = 1)
AUTOFIRESPEED	Set autofire speed for joysticks and keyboards.	1 = Slow 2 = Medium (default) 3 = Fast
DEADZONE	Deadzone before joystick indication.	0 – 64 (default = 24)
DEVICENUMBER	Set device number for disk drive (Both Light Mode and Full Emulation)	8 – 11 (default = 8)
FULLKEYBOARDMODE	Generate C64's internal keyboard signals (as opposed to joystick)	0 = Off/Joystick (Default) 1 = On
BLINKOK	Blink twice to acknowledge D64 mounts and savyour.cfg imports	0 = Off 1 = On (default)
REMOUNT	Decide what happens after a D64 mount when USB stick is removed and reinserted.	1 = Cycle Last Char (default) 2 = Remount Original D64 3 = Always Unmount
DISKCHANGETRIG	Settings affecting disk change recognition: Write protect sensor (WPS) pulses - standard or double cycle. Rotate disk when motor is turned on.	1 = Standard WPS (Default) 2 = Double WPS cycle 3 = Standard WPS, Rotate 1/3 4 = Double WPS, Rotate 1/3

MOUSESYNC	Tunings for mouse emulation. Try 3 or 4 if mouse jumps around erratically on the screen.	1 = Trig by X input (Default) 2 = Trig by Y input 3 = Trig by X, Pullup resistor 4 = Trig by Y, Pullup resistor
LASTPOWER	Show power request for previous device (in milliamps)	000
INSTALL1541ROM	Install a 1541 ROM file for running the emulator	Only FAT-allowed characters. No quotes. Use BIN suffix. Max 16 chars (excl. suffix).
INSTALLUTILITY	Install a utility program as first entry in the directory (Light Mode only)	Only FAT-allowed characters. No quotes. Use BIN suffix. Max 16 chars (excl. suffix).

Note

MOUNT key does not reset the 1541 emulator.

UNMOUNT completely restores the 1541 emulator.

DEVICENUMBER changes device number. SavyourLoader and MSSIAH Sequencer needs device number 8 for burst loading/saving.

INSTALL1541ROM and INSTALLUTILITY should not be used with other keys in the same savyour.cfg file.

Reading the Last Power

1. Put the key LASTPOWER=000 in a savyour.cfg file on a memory stick.
2. First insert the USB device you want know power requirements for, then pull it out and insert the memory stick with the LASTPOWER savyour.cfg directly after.
Savyour fills in the 000 value with the real power value in milliamps.
3. To know the config stick's power requirements, pull it out and reinsert it (=latest device).

The LASTPOWER's value retrieved is what the manufacturer has defined as the highest amount of current this device will ever use. In practice that level is rarely, perhaps never, reached.

Savyour.cfg fills in the lastpower value without confirmation blink (flashing twice).

Setting Max Power

Use the MAXPOWER key and add 1 to uneven values, i.e., 175 becomes 176 etc.

The memory stick needs to have less power requirements than the current max limit.

CAUTION: Changing the max power setting is not recommended. Do it at your own risk.

CAUTION: Be careful when using USB 3.x devices. Avoid the ones exceeding 200 mA.

Disk Commands for 1541

Quick reference for those who forgot or those who never knew.

The following is the DOS commands you enter from the C64 basic screen. For quick use, viewing directory, loading files and mounting D64s can be done with the SavyourLoader program.

For more details about these commands please refer to a 1541 manual.

Show Directory

```
LOAD "$", 8
LIST
```

Directory loads into a basic program. View it with the LIST command.

Show Directory Selected Files (Wildcard) Only

```
LOAD "$A*", 8           - Load directory with files starting with an A only
LOAD "$A*=P", 8        - Load directory with PRG files starting with an A only
LOAD "$*=D64", 8       - Load directory with D64 files only
```

Load File

```
LOAD "filename", 8
LOAD "filename", 8, 1  - uses start address in file if other than standard RAM start

LOAD "*", 8           - Loads first file on drive (Second time loads last file loaded)
                       - If running Light mode, SavyourLoader will be the first file.

LOAD "gh?sts and*", 8 - wild card. ? replaces single character, * replaces the rest

LOAD "X:GH*=D64", 8  - Temporarily mount first D64 file starting with filename "GH.."
                       - (yes, you can use wildcards mounting D64s)
```

Save File

```
SAVE "filename", 8    - saves current basic program
```

Save and Replace File

```
SAVE "@0:filename", 8 - overwrites the old program with the same name
```

A bug in early 1541 disk drives made the save and replace command cause all kinds of problems why it's not recommended to use in Full Emulation. It's safe to use in Light Mode.

Rename File

```
OPEN 15, 8, 15, "R:newname=oldname":CLOSE15
```

Savyour does not accept renaming wild card filenames (Light Mode). D64s cannot be renamed.

Scratch (Delete) File

```
OPEN 15, 8, 15, "S:filename":CLOSE15
OPEN 15, 8, 15, "S:f*":CLOSE15
```

Works with PRG files only. Wildcards are accepted for deleting. Be careful!

Get Latest Error Message

1541 error messages are not always displayed for the user. You might need to enter and run this basic program to know what happened:

```
NEW
10 OPEN 15,8,15
20 INPUT#15, A$,B$,C$,D$
30 PRINT A$,B$,C$,D$
40 CLOSE 15
RUN
```

Change Drive Number

You can change Savyour's drive number easily by setting DEVICENUMBER in a savyour.cfg. That will set the drive number permanently, to change it temporarily you can use the old 1541 DOS commands below. Works in both Light and Full Emulator modes. Beware that SavyourLoader and burst loading with MSSIAH Sequencer requires Savyour to respond to device no. 8 to function.

```
OPEN 15,8,15:PRINT #15,"M-W"CHR$(119)CHR$(0)CHR$(2)CHR$(41)
CHR$(73):CLOSE15
```

The last two numbers (arguments to CHR\$) determine the device number:

```
Device 8:          CHR$(40)CHR$(72)
Device 9:          CHR$(41)CHR$(73)
Device 10:         CHR$(42)CHR$(74)
Device 11:         CHR$(43)CHR$(75)
```

Format Disk

The format command is supported and when executed creates a new empty D64 disk image file. Here you can choose an id for the disk which is not possible when creating D64 images in SavyourLoader (they all get '00').

Example:

```
OPEN 15,8,15,"N:MYNEWDISK,52":CLOSE 15
```

Creates an empty D64 image with the name MYNEWDISK.D64 and sets its disk id to 52 (,52 is optional, if you leave it out id is set to '00'). You can then mount and start using this D64 file. (NOTE: This only works in Light Mode. Formatting will not work in Full Emulation mode).

Compatibility in Light Mode

The table below lists what is compatible with Savyour when operating in Light Mode.

PRG files	Supported
SEQ files	Partially supported (saves as PRG without a start address)
REL files	Not supported
USR files	Not supported
Load	Supported Wildcards ? * supported "Savyourloader" reserved name Filename Character Mapping
Save	Supported
Save and Replace @	Supported (@:filename) Burst Mode save and replace with a single '@', no colon.
Directory Load	Supported Wildcard filters supported
Wildcards ? *	Supported
Reading error channel 15	Supported
R ename	Supported (wildcards not supported)
S cratch	Supported (wildcards supported – warning!)
N ew	Supported (creates a D64 disk image file)
I nitialize	Not Supported
V alidate	Not Supported
C opy	Not Supported
Memory Read M-R	Supported (one byte only)
Memory Write M-W	Supported
Memory Execute M-E	Not Supported
Block-Read B-R	Not Supported
Block-Write B-W	Not Supported
Block Execute B-E	Not Supported
Block Allocate B-A	Not Supported
Block Free B-F	Not Supported
Buffer Pointer B-P	Not Supported
User Commands U	Not Supported

Quick Reference How To..

As a quick reference, here are the most common functions and a quick explanation.

Override Max Power Blinking

See [here](#).

Know How Much Power My USB Device Wants?

See [here](#).

Read the Directory

In C64 Basic enter:

LOAD "\$", 8 press RETURN

LIST press RETURN

Use One Savyour as Both Disk Drive and Mouse

If you have one Savyour only you will have to change USB devices from time to time if you intend to use it as both disk drive and mouse emulator. It works as long as the software can let you start loading/saving without the use of a mouse, like MSSIAH.

If you load/save from disk in Full Emulation mode Savyour will remount your D64 anytime you reinsert the USB memory stick. If your software uses multiple disks it is recommended to use two Savyours: one as a disk drive, the other as a mouse. If not, you need to put the D64s on separate USB sticks and use savyour.cfg files with the MOUNT key on each stick to automatically mount disk 1 on stick 1, disk 2 on stick 2 etc. The disk change procedure cycling through disks will otherwise make it nearly impossible for practical use.

Run a demo on a D64

First mount the D64 by loading it, i.e.,

LOAD "diskname", 8.

When the C64 responds "File not found" and Savyour blinks twice the D64 is mounted and you can load the actual demo program on it. Usually it works with

LOAD "*", 8

Run a multidisk demo/game

Name your D64s in a sequence, eg: MYDISK1.D64, MYDISK2.D64 or MYDISKA.D64, MYDISKB.D64. Mount the first one, load the program and run it. When the program asks you to change disks, remove and reinsert the USB memory stick and the next one in the sequence will be mounted automatically. When the sequence stops (eg MYDISK3.D64 does not exist) it starts over mounting the original one again.

Copy Real Floppy Disks to D64

This is covered in [this section](#).

Change Device Number

Savyour doesn't come with jumper switches for device number like the real 1541 does. Two ways of changing device is via a [savyour.cfg](#) file (preferred) or via [software](#) (does not store the setting).

Create a D64

Either create it with PC software such as D64 Editor, VICE or CCS64 Emulators or directly on your C64 with the SavyourLoader program. Press F7 to Create D64. Enter filename and then return key. When the file is created, screen flashes in a green colour once to acknowledge. Another way is to run a standard format command in Light Mode.

Unmount a Mounted D64

Remove USB stick and insert another one without the same D64 on it. Savyour then unmounts the previous D64 and forgets it.

Clear emulator's memory

Edit a savyour.cfg file on a memory stick and put the key UNMOUNT=1 in it. Then insert the stick into Savyour and the emulator will completely clear its memory.

Temporary Mount a D64

Access the D64 file with a X: prefix, i.e. LOAD "X:MYFILE",8 and Savyour will unmount it next time you pull out the USB stick. If you are using SavyourLoader or MSSIAH Directory Viewer you will have an onscreen choice whether to mount temporarily or not.

Switch Between Specific Disks in a Multidisk Game

If the multidisk game only has two disks 1 and 2 there is no problem since they will flip each time you reinsert the memory stick. If the disks in question are for instance no. 2 and 3 in a sequence of three then the easiest way would be to use a savyour.cfg file with the MOUNT key:

- On your PC, copy MYGAME2.D64 on a separate USB stick
- Copy MYGAME3.D64 on another stick
- Create savyour.cfg files on both sticks
- Enter MOUNT=MYGAME2.D64 in the savyour.cfg on the mygame2 stick
- Enter MOUNT=MYGAME3.D64 in the cfg file on the mygame3 stick

As you insert each stick the correct file is mounted.

Load a Program Quickly

To fastload a PRG file on your memory stick in Light mode, use SavyourLoader to select the file and press the return key. The PRG file then loads automatically. When screen says "Ready" type RUN to start it.

Start the SavyourLoader Program

Insert USB stick, enter

```
LOAD "*", 8
```

or

```
LOAD "SAVYOURLOADER", 8
```

or

```
LOAD "SAVYOUURL*", 8
```

Then type RUN to run the program.

Save and Replace a File in MSSIAH Sequencer

See [here](#).

Use a USB Mouse like a 1351 Mouse

Plug in your USB mouse. 1351 is default mode.

Use USB Mouse as Amiga Mouse

Put the key MOUSEMODE=2 in a [savyour.cfg](#) file and insert it into Savyour to import it. Then plug in your USB mouse and it acts as an Amiga mouse.

Change Resolution for My Mouse

Put the key MOUSERESOLUTION in a savyour.cfg file and insert it into Savyour to import it.

Use a Keyboard as Joystick

Plug in your USB keyboard into Savyour. Joystick mode is default.

Auto Wiggle the Joystick in "Decathlon"

This only works with a keyboard. Press 5 on your numeric keypad to trigger the auto wiggle. Press key 4 or 6 on the numeric keypad to set direction left-right (as opposed to up/down with numeric keypad keys 8 and 2). While holding key 5 you can vary the speed with the regular number keys 1-3 (0 to turn off).

Filename Character Mapping

These are the ASCII characters in FAT filenames, how they translate to C64 PETSCII and whether they are allowed in a C64 filename or not (even if FAT may allow it).

For example, an underscore ”_” in a FAT filename shows up as ”←” on the C64. In essence, using the left arrow as underscore when loading and saving on the C64 is perfectly valid.

ASCII	CHAR	PETSCII	Allowed
0 – 31			NO
32	SPACE	SPACE	YES
33	!	!	YES
34	”	”	NO
35	#	#	YES
36	\$	\$	YES
37	%	%	YES
38	&	&	YES
39	,	,	YES
40	((YES
41))	YES
42	*	*	NO
43	+	+	YES
44	,	,	NO
45	-	-	YES
46	.	.	YES
47	/	/	NO
48	0	0	YES
49	1	1	YES
50	2	2	YES
51	3	3	YES
52	4	4	YES
53	5	5	YES
54	6	6	YES
55	7	7	YES
56	8	8	YES
57	9	9	YES
58	:	:	NO
59	;	;	YES
60	<	<	NO
61	=	=	NO
62	>	>	NO
63	?	?	NO
64	@	@	YES

ASCII	CHAR	PETSCII	Allowed
65 – 90	A – Z	A – Z	YES
91	[[YES
92	\	£	NO
93]]	YES
94	^	↑	YES
95	_	←	YES
96	`	—	NO
97 – 122	a - z	Symbols	NO
123	{	■	NO
124		⋮	NO
125	}		NO
126	~	π	NO
127	DEL	◀	NO

Keyboard Chart Joystick Mode

These are the key mappings for keyboards in joystick mode.

USB Keyboard	Joystick		
W	Up	Alt	Fire
S	Down	Alt Gr	Fire
A	Left	Return	Autofire (Fast)
D	Right		
Cursor Up	Up	Autofire + Keys 1 - 3	Autofire Speed
Cursor Down	Down		
Cursor Left	Left		
Cursor Right	Right		
Numpad 8	Up		
Numpad 2	Down		
Numpad 4	Left		
Numpad 6	Right		
Numpad 7	Up + Left		
Numpad 1	Down + Left		
Numpad 9	Up + Right		
Numpad 3	Down + Right		
Numpad 5	Wiggle		
Numpad 5 + 4	Wiggle Left - Right		
Numpad 5 + 6	Wiggle Left - Right		
Numpad 5 + 8	Wiggle Up - Down		
Numpad 5 + 2	Wiggle Up - Down		
Numpad 5 + Keys 1 – 3	Wiggle Speed		
Numpad 5 + Key 0	Wiggle Off		
Numpad 0	Fire		
Numpad Enter	Autofire (Fast)		
Ctrl	Fire		
Space	Autofire (Slow)		

Keyboard Chart Full Keyboard Mode

The keys on a standard US/English PC keyboard maps to the following C64 keys with an international keyboard.

Note: requires pin header soldered to Savyour and attached to C64's inner keyboard connector.

USB Keyboard C64

A – Z	A – Z
0 – 9	0 – 9
Enter	RETURN
Escape	RUN/STOP
Backspace	INST/DEL
Tab	CTRL
Space	SPACE
-	-
=	+
[@
]	*
\	=
;	:
'	;
`	←
,	,
.	.
/	/
F1	F1
F2	F2 + R SHIFT
F3	F3
F4	F4 + R SHIFT
F5	F5
F6	F6 + R SHIFT
F7	F7
F8	F8 + R SHIFT
Insert	£
Home	CLR/HOME
Delete	↑
Page Up	RESTORE (Smack it!)
Left Ctl	Commodore Key

USB Keyboard C64

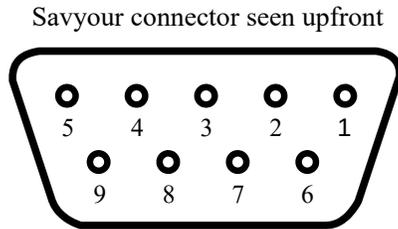
Cursor Right	CRSR Right
Cursor Left	CRSR Right + R SHIFT
Cursor Down	CRSR Down
Cursor Up	CRSR Down + R SHIFT
Numpad /	/
Numpad *	*
Numpad -	-
Numpad +	+
Numpad Enter	RETURN
Numpad 0	0
Numpad 1	1
Numpad 2	2
Numpad 3	3
Numpad 4	4
Numpad 5	5
Numpad 6	6
Numpad 7	7
Numpad 8	8
Numpad 9	9
Numpad .	.

USB Keyboard C64

Left Shift	L SHIFT
Right Shift	R SHIFT
Caps Lock	L SHIFT constant

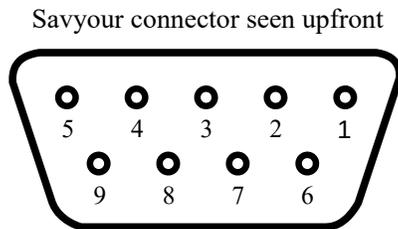
Pinouts

Joystick Pinout



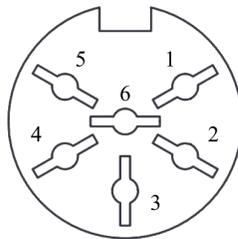
- 1 Up
- 2 Down
- 3 Left
- 4 Right
- 5
- 6 Fire
- 7 5 V
- 8 GND
- 9

Mouse Pinout



- 1 Right Mouse Button
- 2 Middle Mouse Button
- 3 Wheel Down (Pulse)
- 4 Wheel Up (Pulse)
- 5 Y Movement
- 6 Left Mouse Button
- 7 5 V
- 8 GND
- 9 X Movement

Serial Cable



Savyour connector seen upfront

- 1 SRQ
- 2 GND
- 3 Attention
- 4 Clock
- 5 Data
- 6 Reset