TI-99/4A on RetroPie

TI-99/SIM V0.14.0 (25 JUNE 2016) AND RETROPIE V3.8.1 (4 JUNE 2016)

What is a RetroPie?

A RetroPie is a customised Linux image for the Raspbery Pi where you can use mainly vintage computer systems all together (e.g. Atari 2600, Odyssey/Philips VideoPac, Apple II, MS-DOS/DosBox, Nintendo, Super Nintendo, Nintendo64, Macintosh, PlayStation, PSP, etc.). It is very easy to switch between the different systems via the Graphical User Interface called Emulator station which is already integrated in the RetroPie image.

Background RetroPie and TI-99/4A

The first time I heard about the RetroPie and TI-99/4A was when Paradroyd posted a YouTube video about the TI-99/4A emulator on the RetroPie (which is the TI-99/Sim linux emulator of Marc Rousseau:

- TI-99/Sim: **http://www.mrousseau...sim/README.html**)

Paradroyd's YouTube video:

- RetroPie and TI-99/Sim **https://www.youtube....eature=youtu.be**

Why these installation instructions?

People at the TI99 group on Facebook are asking how to install it:

- **https://www.facebook...54007498184844/**

as well more questions come up at the AtariAge forum:

- **http://atariage.com/forums/topic/253671-help-with-retropie-and-ti994a/#entry3531425**
- **http://atariage.com/forums/topic/250294-opinionshelp-regarding-my-quest-to-build-a-pi994a/#entry3497053**

and some videos how to install TI-99/Sim on Raspberry Pi3 (note: this is not the RetroPie image):

- **https://www.youtube.com/watch?v=Pm4WcbTG5L0&feature=youtu.be**

Version 1.0 installation instructions (RetroPie + TI-99/Sim)

Version 1.0 of the installation instructions were based on a RetroPie v3.6 (Raspberry Pi2 or Pi3). I have been using a Raspberry Pi2 Model B V1.1

Instructions

- **http://atariage.com/forums/topic/250767-how-to-install-ti-994a-ti-99sim-on-retropie-v36-raspberry-pi2-or-pi3/#entry3491795**

Video of the installation

- **https://www.youtube.com/watch?v=3BT6eXlbO-Q**

Version 2.0 installation instructions (RetroPie + TI-99/Sim)

Version 2.0 of the installation instructions are based on a RetroPie v3.8.1 (released 4th of June 2016 for Raspberry Pi2 or Pi3, note that there is a Raspberry Pi0/1 RetroPie version as well). I have been using a Raspberry Pi2 Model B V1.1

RetroPie Hardware & Software requirements and base installation

Video with installation instructions to create a RetroPie:

- **https://www.youtube.com/watch?v=xvYX_7iRRI0**

There is a detailed RetroPie first installation procedure, covering:

- Hardware requirements (Raspberry Pi version, power adapter, USB for (wireless) Keyboard and (wireless) Controllers, HDMI cable, WiFi-dongle or Ethernet connection, etc.)
- SD-card requirements (for the RetroPie image)
  - **http://elinux.org/RPi_SD_cards**
- How to "unzip" and install the RetroPie image to the SD-card
- Installation instructions:
  - **https://github.com/retropie/retropie-setup/wiki/First-Installation**

Direct link to the RetroPie v3.8.1 image (for Raspberry Pi2 and Pi3):

- **https://github.com/RetroPie/RetroPie-Setup/releases/download/3.8.1/retropie-v3.8.1-rpi2_rpi3.img.gz**
  (See above installation instructions how to "unzip" and install it)

My setup: base installation (RetroPie image to micro-SD):

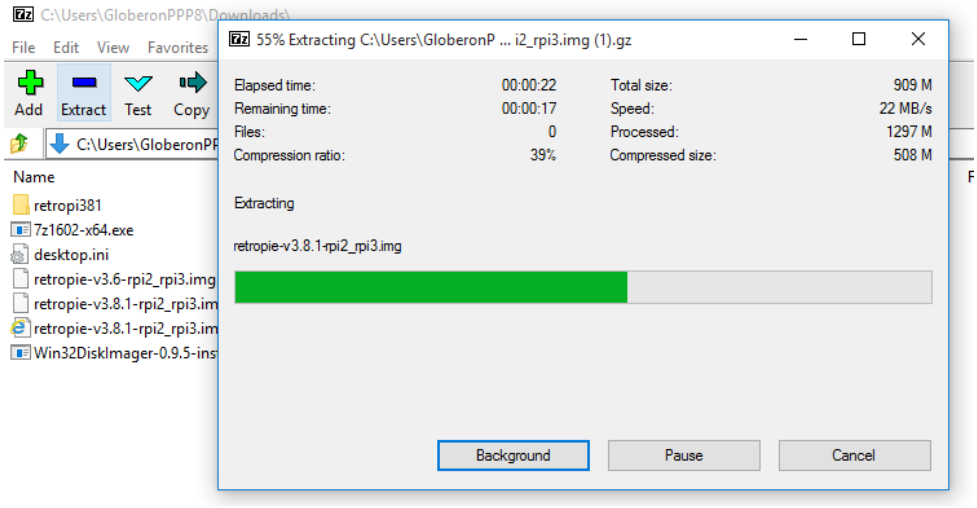
I build the RetroPie image using Windows 10 64-bit Operating System and a USB-Multicard reader/writer with and SD-card adapter to put the image on the SAN-Disk micro-SD card (8 Gb).

Figure 1. USB Multicard reader + adapter for micro-SD card

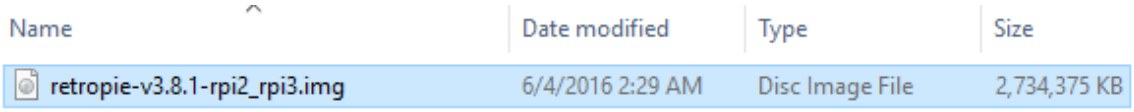
Software used:

7-zip (for 64-bit) to extract the RetroPie .gz (compressed format) to .img format

- **http://www.7-zip.org/download.html**
- (64-bit) **http://www.7-zip.org/a/7z1602-x64.exe**



Result:

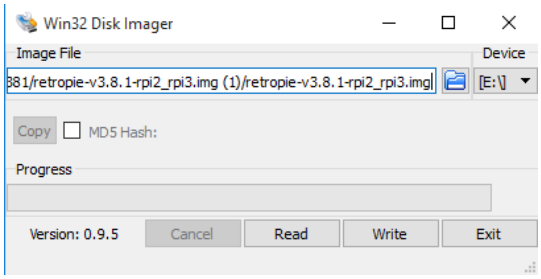


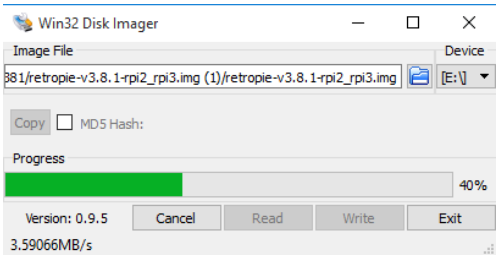
Win32DiskImager to move the .img to the microSD card:

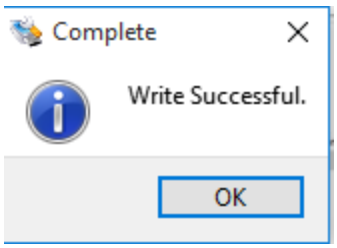
- **https://sourceforge.net/projects/win32diskimager/files/latest/download/Archive/Win32DiskImager-0.9.5-install.exe**

Start **"Run as Administrator"** Win32DiskImager and copy the image

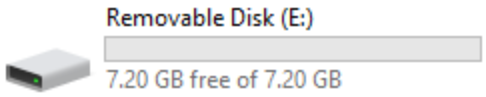
to the Micro-SD card



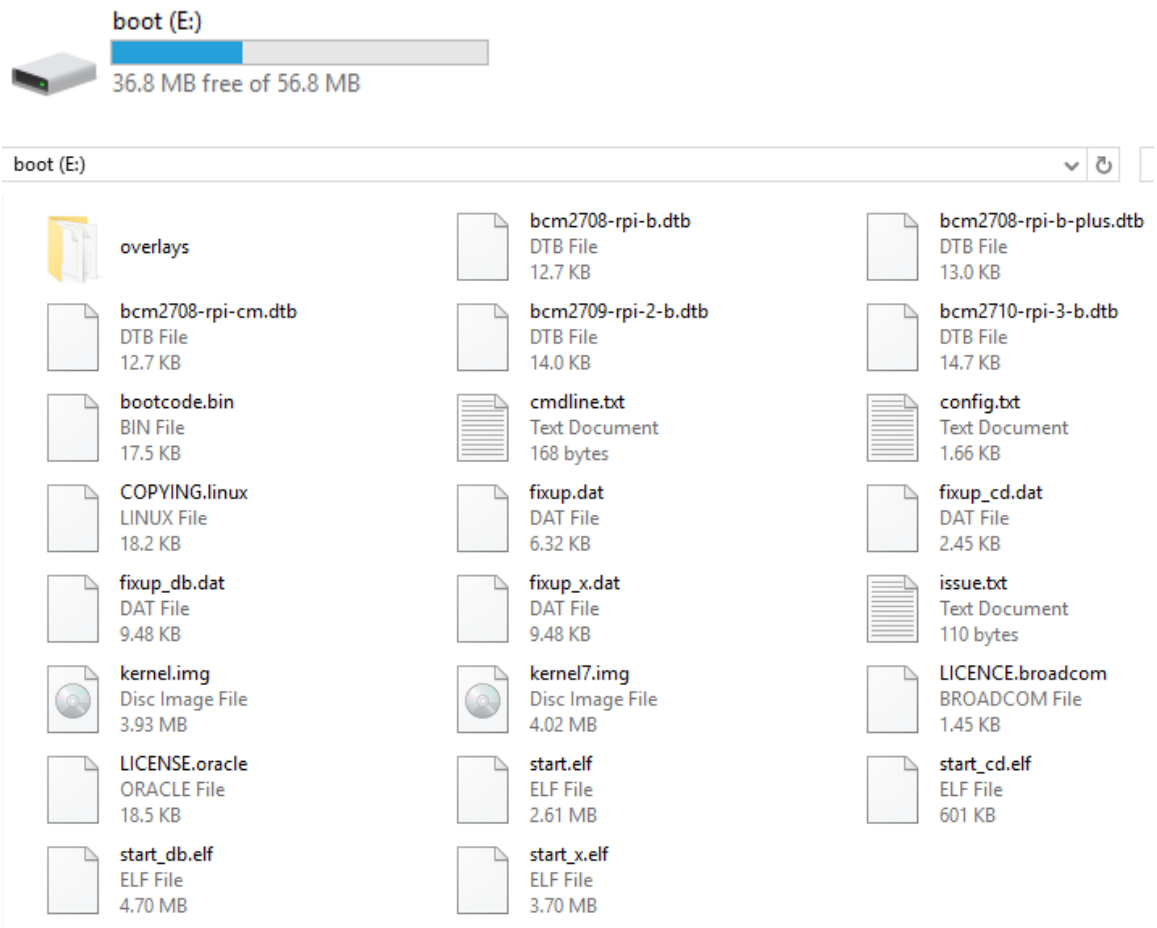




MicroSD card is recognized as Drive E:



Completed (note that the storage size changed):



Setup the hardware and test the RetroPie

After everything has been installed properly on the micro-SD card:

- Remove the micro-SD card from the Multi Reader/Writer and insert the Micro-SD card into the Raspberry Pi

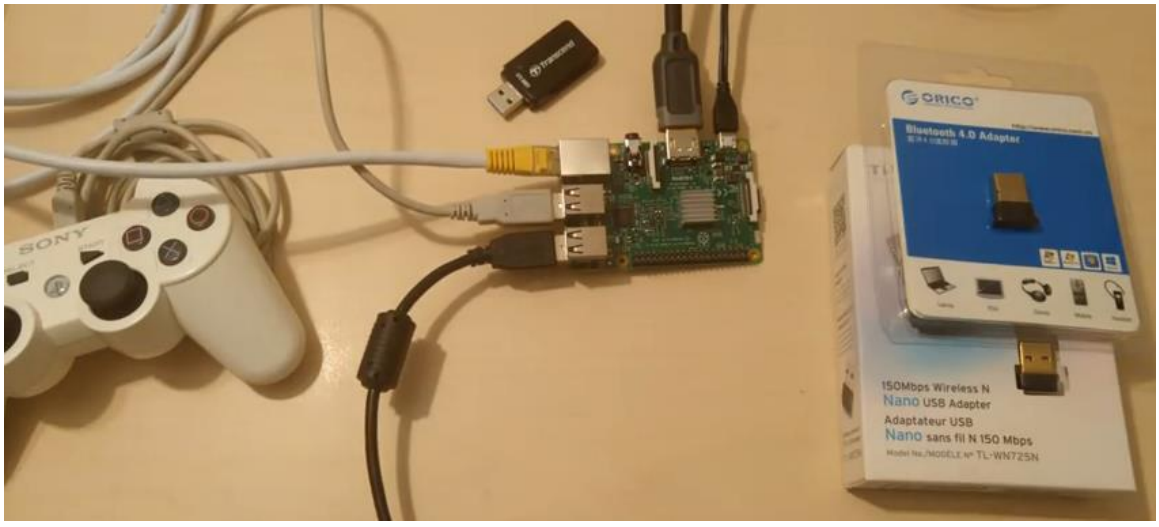
- Connect all your USB-Controllers (to port 1 and 2) and your USB Keyboard to USB port 3 or 4 (as RetroPie image reads the controller in sequence). More details are here about the USB ports:
  Setting up USB controllers with RetroArch:
  https://www.youtube.com/watch?v=AhkEnDdygbQ

- Connect a USB WiFi Dongle (for Raspberry 2) or connect an Ethernet cable (your RetroPie need to be connected to your local WiFi or Ethernet network and to the internet)

- Connect your Raspberry/RetroPie with HDMI to your LCD-TV or Monitor

- Plug in the power adapter (micro-lug) (either via normal power adapter or via the USB-5V interface if your LCD-TV has one, or use an external power bank 5V 2.1A) to boot-up the RetroPie

- See video example for hardware setup:
  https://www.youtube.com/watch?v=xvYX_7iRRI0



1. **USB Controller setup**
   (You need to select the keys / directions to do the initial configuration)
   (to re-map, press "Start" on the controller and "Configure Input")
   More details and links in the bottom
   https://www.youtube.com/watch?v=xvYX_7iRRI0

2. Select with the USB-controller "RetroPie" in the Emulator Station menu

3. Select WiFi (a "MS-DOS" based configuration window appears) and configure the WiFi settings with the USB-Keyboard
   a. Connect to WiFi
   b. You should see your WiFi network (if not, check your WiFi-dongle or try another one, re-insert it and reboot your RetroPie)
      i. I used a RealTek 2870 Chipset dongle, used by Engenius, Cisco WUSB600Nv1, CiscoWUSB600Nv2).
      ii. Another dongle (Atheros chipset AR9170 and chipset AR9104) did not work
   c. Enter your WiFi password (if any) and once connected check your IP-address assigned (in the top of the WiFi window)
   d. Or go one level back and select "Show IP address
      (in this example I used 192.168.100.160 as my RetroPie IP address)
   e. Your RetroPie should be able to access the Internet (via WiFi or Ethernet)

4. Navigate to the "RetroPie", "RetroPie Setup
   a. U – Update RetroPie-Setup Script

   b. Optional - Updating the RetroPie
   https://github.com/RetroPie/RetroPie-Setup/wiki/Updating-RetroPie

      i. P – Manage Packages
         1. U – Update all installed packages
         2. opt – Manage optional packages (emulators).
            Here you can see installed emulators like Atari800, DosBox, etc)

5. Optional – Test 2x emulators on the RetroPie

a. Navigate with the controller ("B" button) to the Emulator Station menu and select with the ("A" Button) "Ports" and select "Doom" and use the "A" button to start the game and navigate through the game with the arrow keys on the controller.
   To exit: **press "Select" and "Start"** at the same time to return to Emulator Station menu

b. Navigate with the controller ("B" button) to the Emulator Station menu and select with the ("A" Button) "MS DOS" and "Start DOSBOX". Type "dir" <enter> and "exit" <enter>

Installation of TI-99/Sim (version 0.14.0, released 25 June 2016) on the RetroPie (version V3.8.1, released 4 June 2016)

Version 2.0 (26 June 2016) by Ronald van Kleunen (Globeron)

Generic TI-99/Sim installation instructions:

- Versions:
  http://www.mrousseau.org/programs/ti99sim/

- Installation instructions:
  http://www.mrousseau.org/programs/ti99sim/README.html#TOC_2B

Preparation of software:

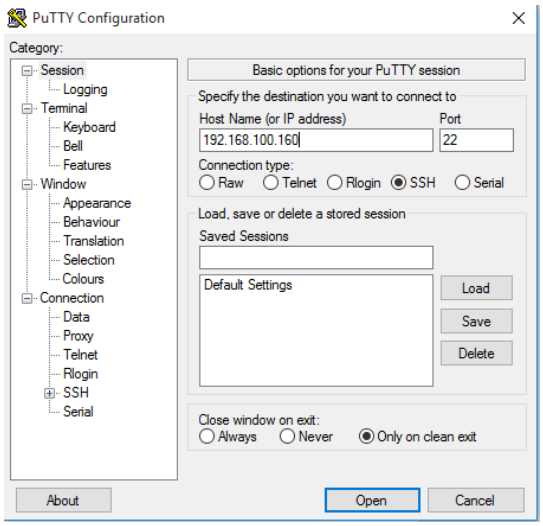
- **Tools:**
  - Putty (for remote secure shell "SSHv2")
    - **https://the.earth.li/~sgtatham/putty/latest/x86/putty.exe**
    - **http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html**
  - Filezilla (for SFTP – Secure File Transfer Protocol)
    - **https://download.filezilla-project.org/client/FileZilla_3.18.0_win64-setup_bundled.exe**

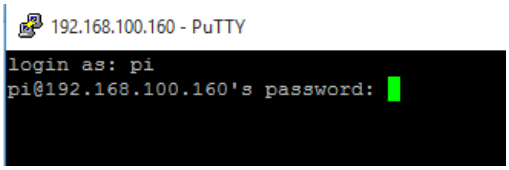
- **Software:**
  TI-99/Sim V.0.14.0 **"arm"** image:
    - **http://www.mrousseau.org/programs/ti99sim/archives/ti99sim-0.14.0.armhf.tar.xz**

  All images:
  http://www.mrousseau.org/programs/ti99sim/archives/

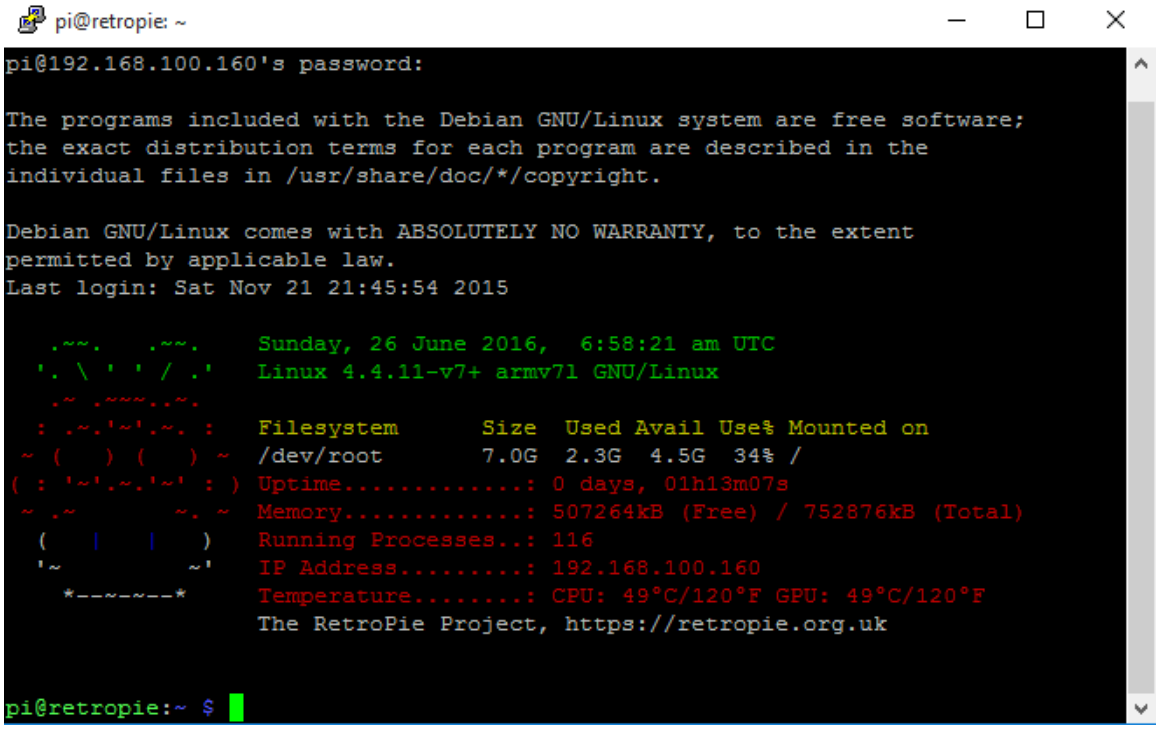
Installation of software:

- Login remotely into the RetroPie using Putty





Login as: **pi**
password: **raspberry**



- sudo passwd root
- Enter new UNIX password: **raspberry**
- Retype new UNIX password: **raspberry**

Go into Super User mode

- sudo su

```
pi@retropie:~ $ sudo su
root@retropie:/home/pi#
```

In Windows, start Filezilla:

Host: **sftp://192.168.100.160**

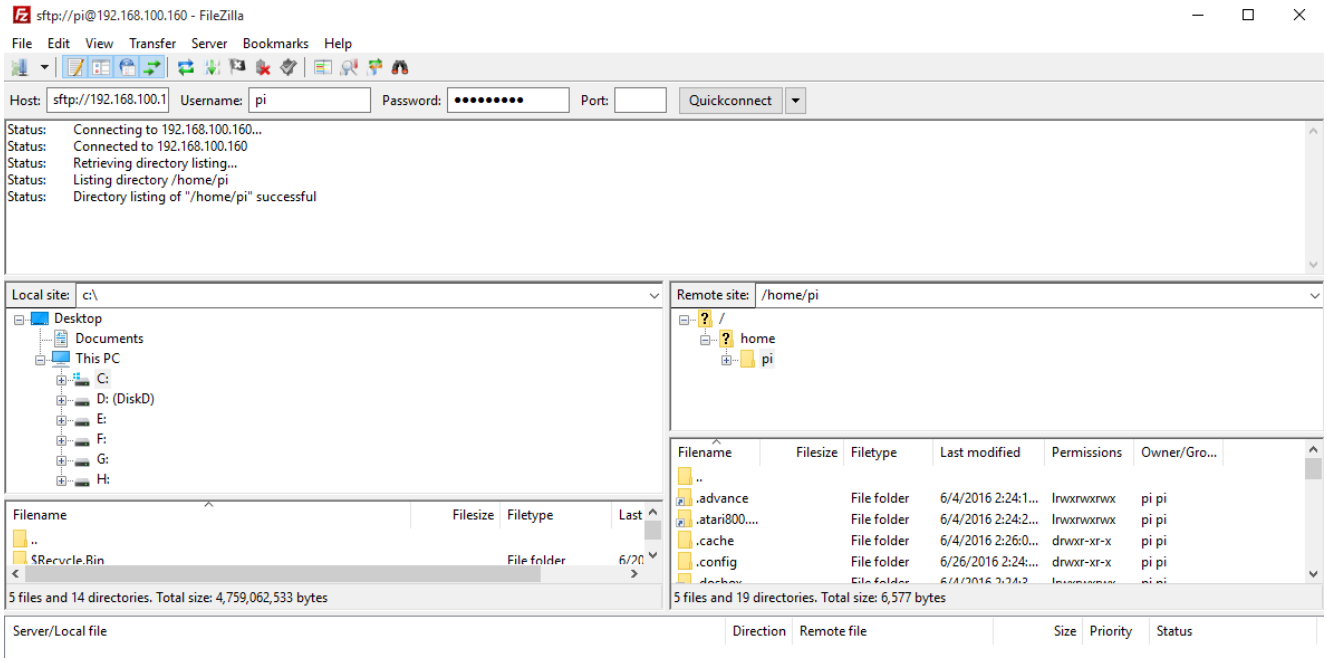
Username: **pi**

Password: **raspberry**

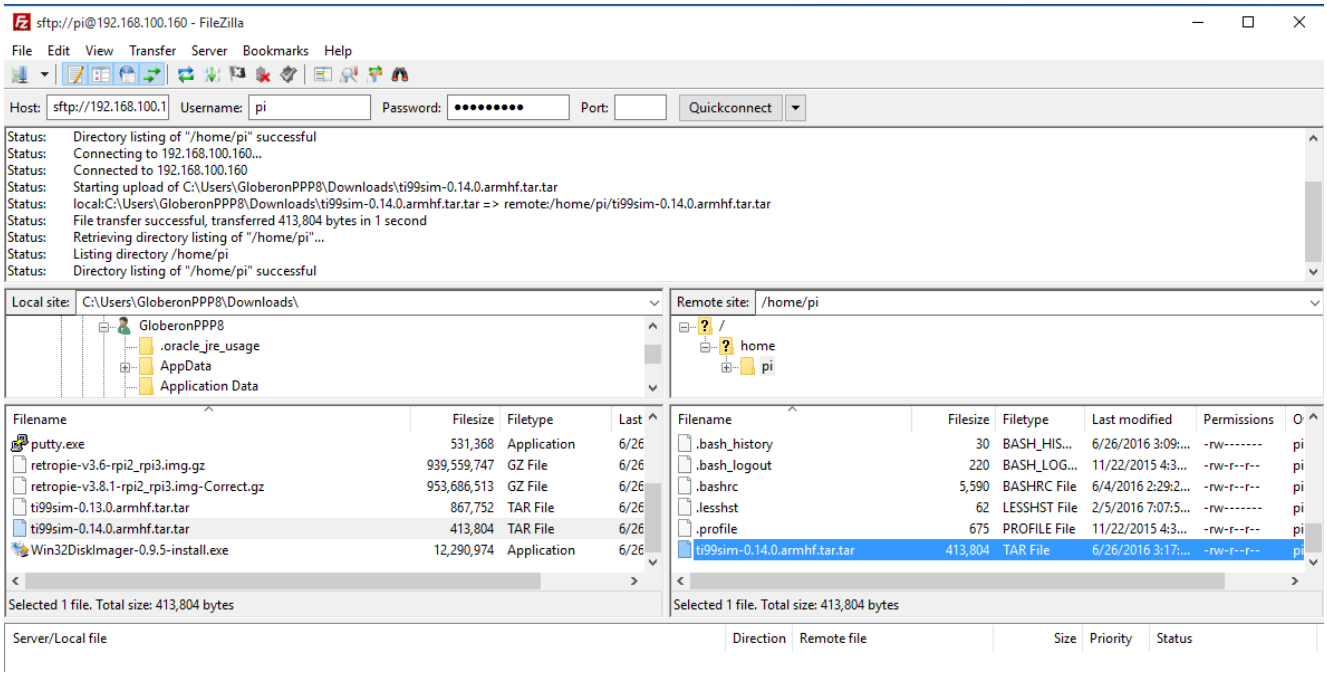
Port: **22**

Press “Quickconnect” in Filezilla and you should be able to login remotely into the RetroPie

Into the directory: **/home/pi**



From the **windows directory** (left side) drag the “ti99sim-0.14.0.armhf.tar.tar” image to the RetroPie **(/home/pi** directory, right side)



Go back to the remote shell (putty) and check if the file is listed

- **ls (for list)**

```
root@retropie:/home/pi# ls
RetroPie  RetroPie-Setup  ti99sim-0.14.0.armhf.tar.tar
root@retropie:/home/pi#
```

Unzip the file, it will create a new directory on the RetroPie ("ti99sim-0.14.0)

Linux hint: you do not need to type the whole filename, just press "Tab" and it fills automatically the rest of the filename

- tar xf ti99sim-0.14.0.armhf.tar.tar

```
root@retropie:/home/pi# tar xf ti99sim-0.14.0.armhf.tar.tar
root@retropie:/home/pi# ls
RetroPie  RetroPie-Setup  ti99sim-0.14.0  ti99sim-0.14.0.armhf.tar.tar
```

- cd ti99sim-0.14.0
- make install

```
root@retropie:/home/pi# cd ti99sim-0.14.0
root@retropie:/home/pi/ti99sim-0.14.0# make install
```

- the following errors will display, but it does not affect the installation. (note ti99sim-0.13.0 does not have these errors

```
root@retropie:/home/pi/ti99sim-0.14.0# make install
/usr/bin/install: cannot stat 'bin/mkcart': No such file or directory
/usr/bin/install: cannot stat 'bin/mkspch': No such file or directory
/usr/bin/install: cannot stat 'bin/say': No such file or directory
root@retropie:/home/pi/ti99sim-0.14.0#
```

Disclaimer:

nor RetroPie, nor Ti-99/Sim, nor myself or any other person is accountable using other ROMs/BINaries or even better own a TI-99/4A system, nothing is better than the real thing.

As mentioned on the TI-99/Sim website, you need to own and obtain your own ROMs/BINaries, Cartridges, etc. for the system to operate it.

(Note: I own a real TI-99/4a since 1982 and it is still operational)

You can extract TI-99/4A ROMs/GROMS/Cartridges/Speech, etc. using a tool called "V9T9, Transfer utility in DosBox"

Non-Official website:

MS-DOS or DosBox version V9T9 6.0 + Transfer utility (and ROMs):

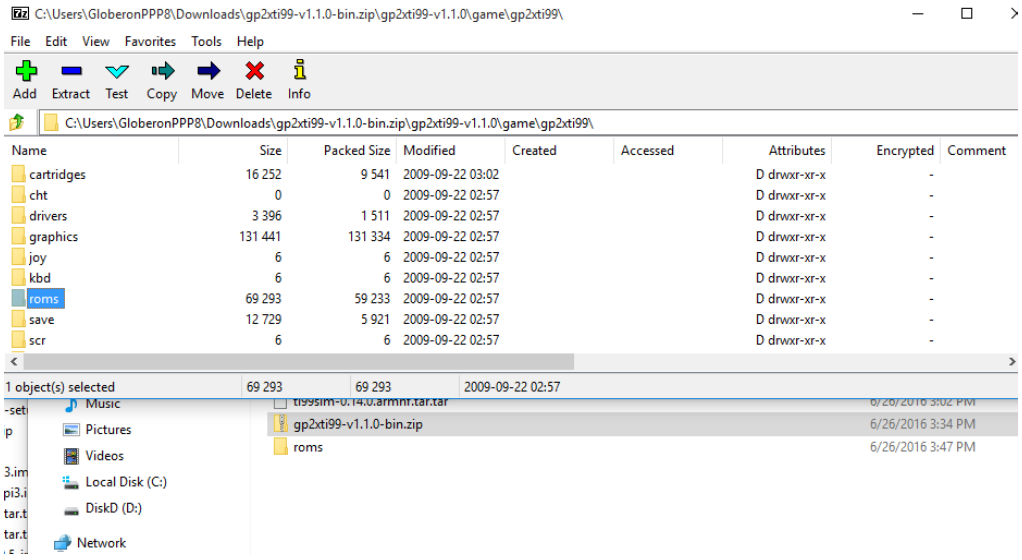
http://www.zophar.net/ti/v9t9.html

Official and latest V9T9 Website (Java version):

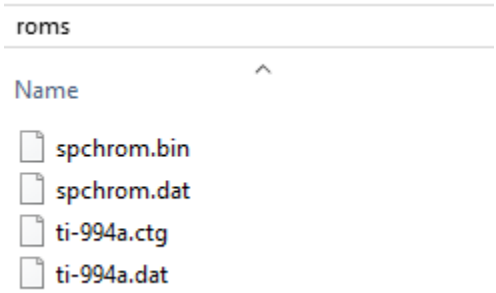
http://eswartz.github.io/emul/

(to test the RetroPie TI-99/Sim setup, for testing purposes only)

- **There is a "roms" directory inside this .zip file) http://dl.openhandhe...d,0,0,0,72,2798**
    - in windows, unzip only the roms directory with 7-zip (drag and drop only the roms directory)



- the roms directory should contain:
  (spchrom.bin, spchrom.dat, ti-994a.ctg, ti-994a.dat)



Note the TI-99/Sim has a converter tool build it to convert .bin files of cartridges/modules into .ctg format.
Use your own .bin to do the conversion.

For testing purposes:

- **There is a "cartridge" directory inside this .zip file) with 1x .ctg file: http://dl.openhandhe...d,0,0,0,72,2798**

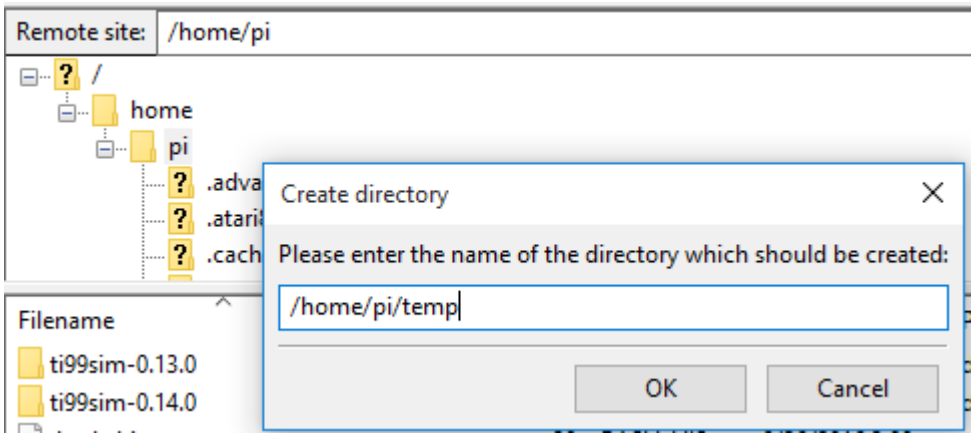
Or use this link to download .ctg files
http://zx81.zx81.fre.../cartridges.zip (recently the website is down)

Installing the ROMs, we do this in 2x steps:

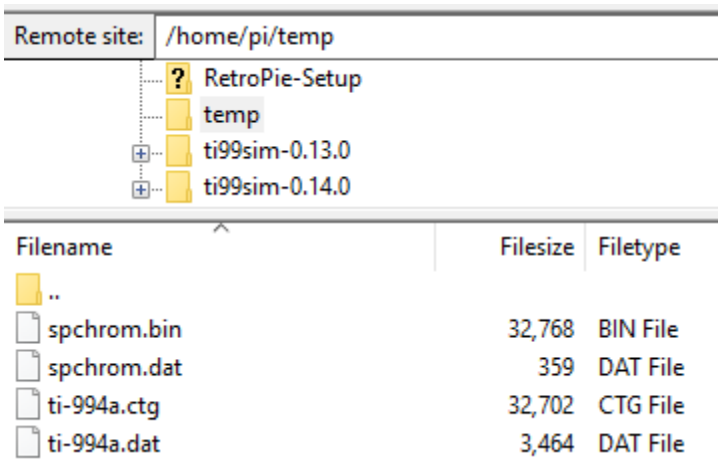
It is not possible to SFTP directly in the **/opt/ti99sim/console** directory

(note the directory changed in v0.14.0, in v0.13.0 it was "/opt/ti99sim/roms")

In FileZilla create a new directory on the RetroPie "/home/pi/temp"



and copy (drag and drop) the rom files to the RetroPie



(Step 2): copy the roms to the "console directory" as follows:

- cd /opt/ti99sim/console (note in 0.13.0 it was /opt/ti99sim/roms)
- cp /home/pi/temp/*.* . (note the second "." (dot))

IMPORTANT (as files are case sensitive, we need to rename 1x file):

- cp ti-994a.ctg **TI-994A.ctg**

The result should look like this

```
root@retropie:/opt/ti99sim#
root@retropie:/opt/ti99sim# cd console/
root@retropie:/opt/ti99sim/console# cp /home/pi/temp/*.* .
root@retropie:/opt/ti99sim/console# cp ti-994a.ctg TI-994A.ctg
root@retropie:/opt/ti99sim/console# ls
spchrom.bin  spchrom.dat  ti-994a.ctg  TI-994A.ctg  ti-994a.dat
```

- Clean up files we do not need:
  - rm ti-994a.ctg
  - cd /home/pi/temp
  - rm *.*

Install cartridges (in 2 steps)

- copy (drag and drop) the .ctg files to the /home/pi/temp directory
- cd /opt/ti99sim/cartridges/
- cp /home/pi/temp/*.* .
- ls

```
root@retropie:/home/pi/temp# ls
MoonPatrol.ctg
root@retropie:/home/pi/temp# cd /opt/ti99sim/cartridges/
root@retropie:/opt/ti99sim/cartridges# cp /home/pi/temp/*.* .
root@retropie:/opt/ti99sim/cartridges# ls
MoonPatrol.ctg
```

Optional:

Clean up the temporary directory and installation files and utilities:

- cd /home/pi/temp
- rm *.*
- cd ..
- rmdir temp
-
- rm ti99sim-0.14.0.armhf.tar.tar
- cd ti99sim-0.14.0/
- rm *.*
- cd bin
- rm *.*
- cd ..
- rmdir bin
-
- cd ..
- rmdir ti99sim-0.14.0

Setup the PATH, so that the RetroPie knows where to find the TI-99/Sim emulator:

- PATH=$PATH:~/.ti99sim:/opt/ti99sim:/opt/ti99sim/bin:/opt/ti99sim/**console**/:/opt/ti99sim/cartridges
- export PATH

```
root@retropie:/opt/ti99sim/console# PATH=$PATH:~/ti99sim:/opt/ti99sim/bin:/opt/t
i99sim/console/:/opt/ti99sim/cartridges
root@retropie:/opt/ti99sim/console# export PATH
```

(note that in TI-99/Sim v0.13.0 the path was:

- PATH=$PATH:~/.ti99sim:/opt/ti99sim:/opt/ti99sim/bin:/opt/ti99sim/**roms**/:/opt/ti99sim/cartridges

Copy the Cartridges (.ctg files) and the BIOS (Console files) to the RetroPie directory

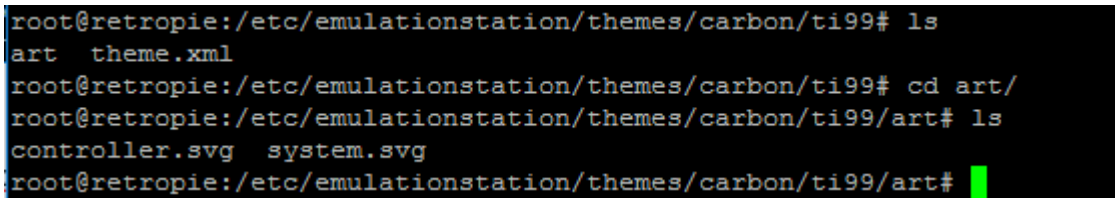
- cd /home/pi/RetroPie/roms
- mkdir ti99sim
- cd ti99sim
- cp /opt/ti99sim/cartridges/*.* .

  (Note: I suggest to copy as many .ctg files first, as the gamelist.xml gets generated and somehow does not get updated after installing more cartridges)

- cd /home/pi/RetroPie/BIOS
- cp /opt/ti99sim/roms/*.* .
- ls

```
root@retropie:/home/pi/RetroPie/roms#
root@retropie:/home/pi/RetroPie/roms# mkdir ti99sim
root@retropie:/home/pi/RetroPie/roms# cd ti99sim/
root@retropie:/home/pi/RetroPie/roms/ti99sim# cp /opt/ti99sim/cartridges/*.* .
root@retropie:/home/pi/RetroPie/roms/ti99sim#
root@retropie:/home/pi/RetroPie/roms/ti99sim# cd /home/pi/RetroPie/BIOS
root@retropie:/home/pi/RetroPie/BIOS# cp /opt/ti99sim/console/*.* .
root@retropie:/home/pi/RetroPie/BIOS# ls
CARTS.SHA      FMPAC.ROM          MSX2PEXT.ROM  palettes      system.bin
CYRILLIC.FNT   gles2n64rom.conf   MSX2P.ROM     PPSSPP        TI-994A.ctg
Databases      ITALIC.FNT         MSX2.ROM      RS232.ROM     ti-994a.dat
DISK.ROM       KANJI.ROM          MSXDOS2.ROM   skip.bin
fast.bin       Machines           MSX.ROM       spchrom.bin
FMPAC16.ROM    MSX2EXT.ROM        PAINTER.ROM   spchrom.dat
root@retropie:/home/pi/RetroPie/BIOS#
```

- The RetroPie v.3.8.1 already has a TI99 "theme" and "art" file:



Optional – Changing the TI-99/4A logo:

Changing the emulator station configuration to add another TI-99/4A logo

To update the logo on the RetroPie:

* You can convert any format to SVG (Scalable Vector Graphics)

e.g. use an online converter: http://image.online-convert.com/convert-to-svg

Example TI-99/4A logo:

- http://atariage.com/forums/index.php?app=core&module=attach&section=attach&attach_id=443160
- Extract the .zip file
  - files system.svg and controller.svg)

- Transfer the .svg files to the temporary directory: /home/pi/temp

Optional (if you want to change the TI99 logo)

- cd /etc/emulationstation/themes/carbon/ti99/art
- cp /home/pi/temp/*.svg .

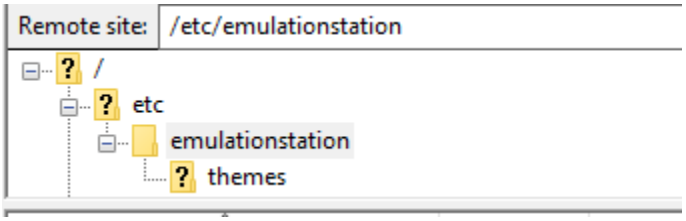
Add the TI-99/4A Computer to the Emulationstation menu

- **Option 1 (difficult)**
- Open the file and edit it in the RetroPie: vi es_systems.cfg
- Note to exit use ":wq" (write and quit) or "!q" (quit without saving))

- **Option 2 (easier)**

In Windows in Filezilla change the directory to "/etc/emulationstation"

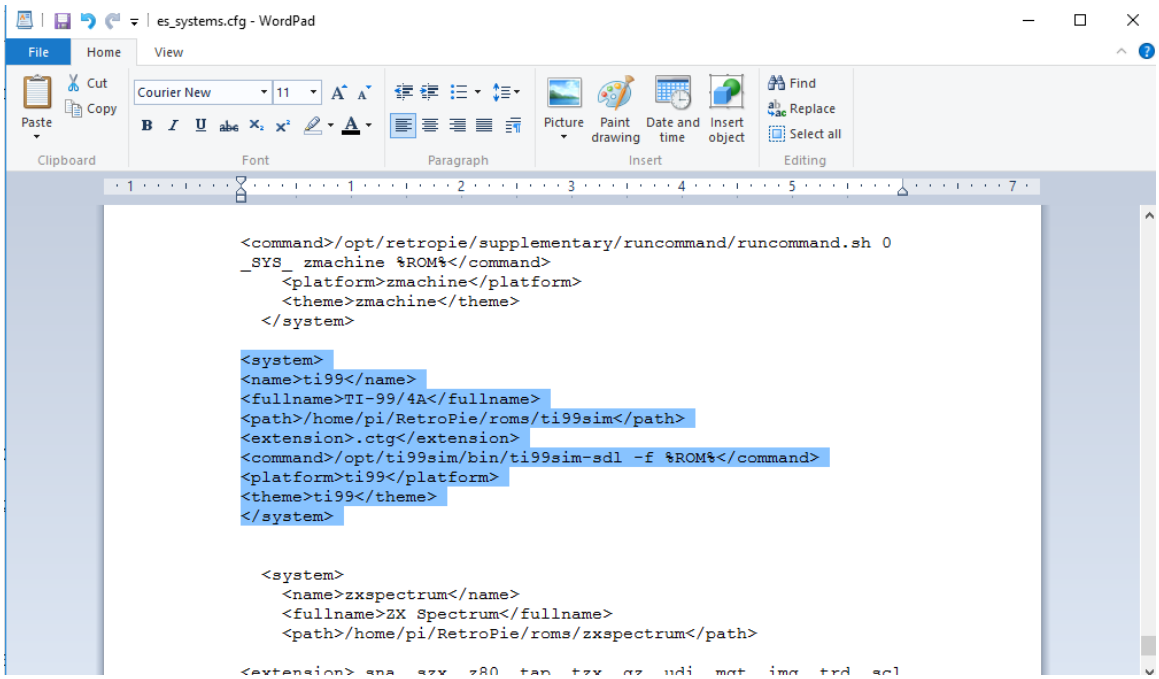
Copy (drag and drop) the es_systems.cfg file to windows.



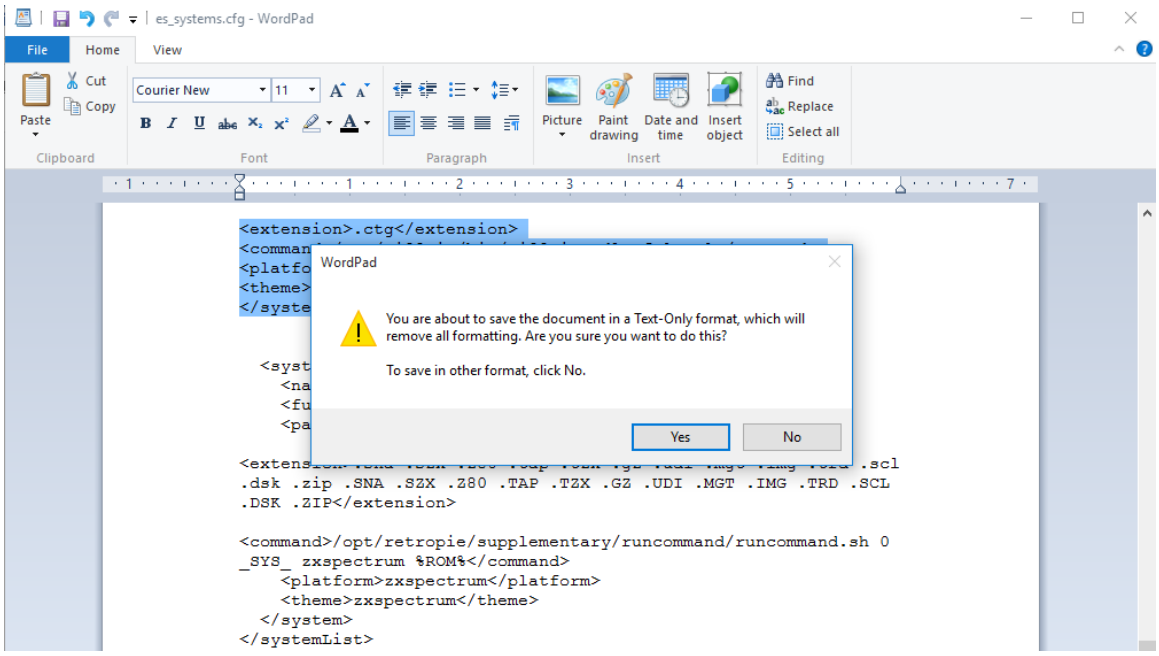
Copy the es_systems.cfg file to the windows directory

Open the file using WORDPAD (not NotePad) and copy paste the following in the file (e.g. before the zx spectrum system)

```
<system>
<name>ti99</name>
<fullname>TI-99/4A</fullname>
<path>/home/pi/RetroPie/roms/ti99sim</path>
<extension>.ctg</extension>
<command>/opt/ti99sim/bin/ti99sim-sdl -f %ROM%</command>
<platform>ti99</platform>
<theme>ti99</theme>
</system>
```



Save the file and select “Yes”



Using Filezilla copy (drag and drop) the "es_systems.cfg" file to the RetroPie

/home/pi/temp directory

Go back to the Secure Shell (Putty)

- cd /etc/emulationstation
- cp /home/pi/temp/es_systems.cfg .

- reboot

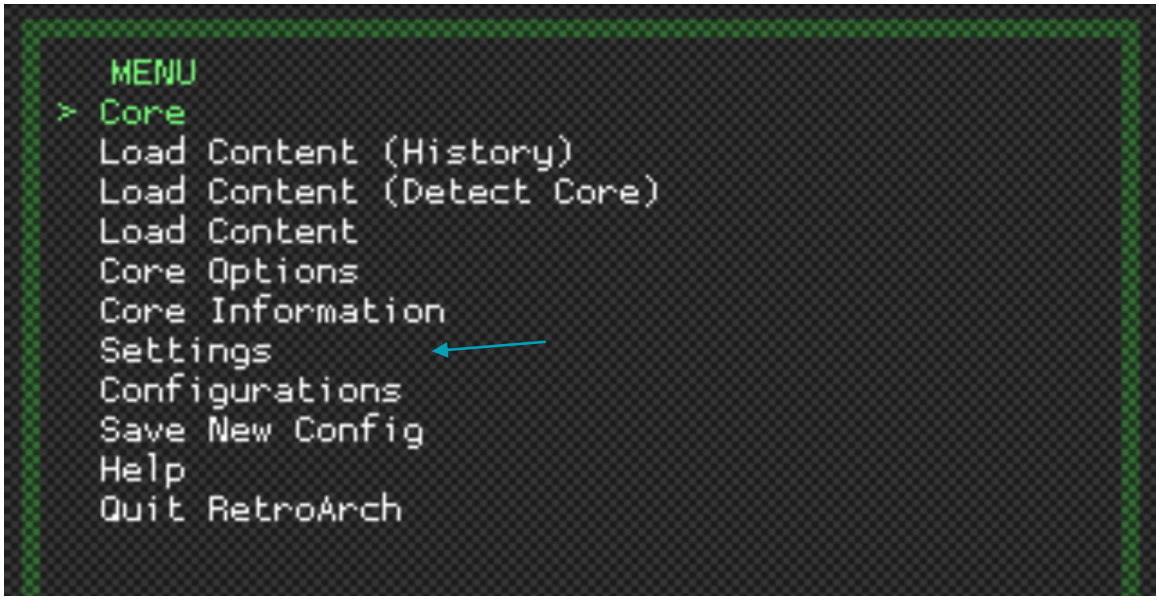
At this point the RetroPie + TI-99/4A is working (but maybe without audio)

- Select TI-99/4A Computer
- Select the game
- Use the keyboard to do selection (like press 1,2,3)
- To exit the TI-99/4A Emulator press Escape (ESC)

RetroPie and “no audio” issue

The following might help, otherwise see the HDMI audio issue.

- Goto the RetroPie Setup
- Select “RetroArch”



- Select “Settings”
- Then Audio
- The Audio Volume Level (db) 0.0 → 9.0

RetroPie Setup

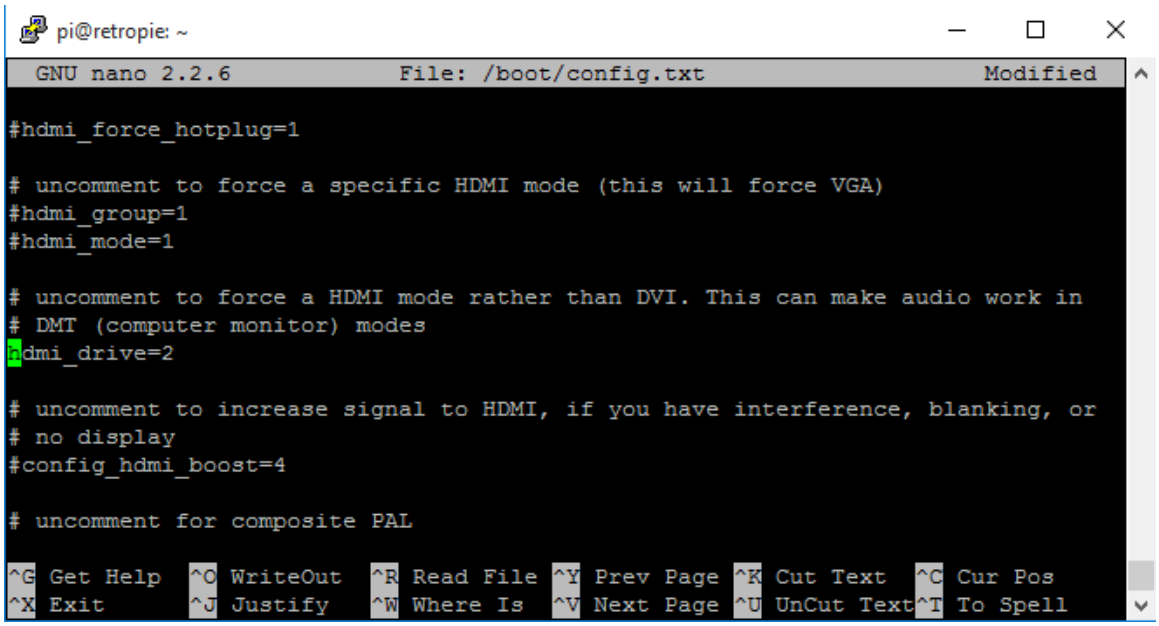
- Audio
- Select HDMI
  (Note: did not enable the sound for me)

RetroPie and "HDMI no audio" issue

If your audio (to HDMI) is not working:

(I was using a Samsung TV with HDMI interface)

- sudo nano /boot/config.txt
- uncomment/remove the "#" at hdmi_drive=2
- uncomment/remove the "#" at config_hdmi_boost=4
- uncomment/remove the "#" at hdmi_group=1
- change hdmi_mode=1 to hdmi_mode=16 (for 1080 60 MHz)
    - More details about video modes: http://elinux.org/RPiconfig



- More info about no sound: https://www.reddit.com/r/RetroPie/comments/3evgyi/retropie_30_no_sound/

- Note: still the sound is very soft for the TI-99/4A after enabling and you need to be careful switching between different systems or to TV mode (as the sound might be too loud)

Adding Cartridges

- Normally it should work to add the additional .ctg files to the /home/pi/RetroPie/roms/ti99sim directory, but somehow the gamelist.xml does not get updated

http://lakeuk.blogspot.co.uk/2014/02/raspberry-pi-retropie.html

This Not working yet (as the gamelist.xml does not get updated)

Use Filezilla and copy (drag and drop) the .ctg files to the RetroPie

directory /home/pi/temp

Use the Secure Shell (Putty) to copy the files to the right directory

- cd /home/pi/RetroPie/roms/ti99sim
- cp /home/pi/temp/*.ctg .
- ls