

# Orix/Twilighte Manual



v2021.1

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## **INTRODUCTION**

## General informations

This documentation must be used when you are with the orix version 2021.1. Or if you want to upgrade the 2020.4 version.

On <http://orix.oric.org>, you will have some link to video which will show how to use some functionnality.

The board has a firmware version. This firmware can be upgraded see « Hardware and firmware upgrade » section.

The board can be upgraded too but you have to send it to upgrade the board see « Hardware and firmware upgrade » section » too.

The card has a 512KB of eeprom, and 512KB of RAM. This RAM is saved with a battery. For instance, only bank 4, 3, 2 and 1 can be switched to see others sets. It's a software limit. In the future, you will be able to displays all bank and starts any binary from theses banks. If you wants to change the set, you can use twil command. This command can switch to eeprom bank or ram bank and can switch to any set.

## Features

- .tap file fast loading (with multitap files)
  - Joysticks support for a lot of games on atmos mode
  - the hobbit, defence-force (and others games) works without any patch for loading (but with special roms).
- in system : kernel update, roms and ram update (with [orixcfg](#) binary)
- 2 DB9 Joysticks (atari)
- 512KB of EEPROM (banking mode)
- 512KB of RAM (banking mode)
- read from sdcard or usb drive (mass storage)
- ram saved with a battery
- drag and drop from the PC to the oric : It will be available on the oric (with WIFI connexion) : It requires extra hardware with a raspberry pi zero
- fast loading : 46KB per second. A game require less than one second to load and start

## **GETTING STARTED**

## Content

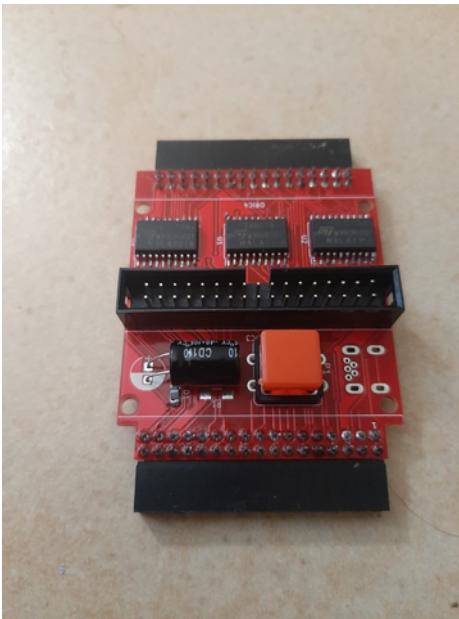


Figure 1 : Expansion board and  
reset button



Figure 2: Twilighte board

## Physicals ports



Figure 1: 2 joysticks port : left port and right port,  
1 usb port



Figure 2: sdcard port

## Hardware limits

The usb controller manage FAT32 only. Sdcard and usb key must be formatted with FAT32 filesystem. If you want to use pi zero gadget trick, you need to do a mkfs to FAT32 file system.

All tests had been done with samsung evo sdcard and sandisk usbkey. A lot of sdcard works, and we did not see incompatibility with sdcard.

Sdcard controller and usb key controller can works with 32GB storage. But it can handle 64 GB sdcard (tested).

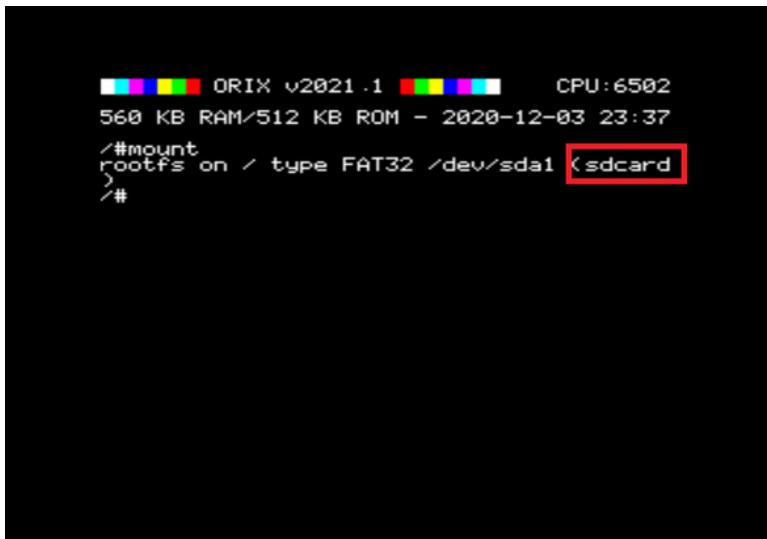
## Software limits

The sdcard/usb controller can handle long filename, but Orix handle 8+3 filename only.

## First boot : Initialize the storage

When the card is sent, kernel is built with a default storage. In order to know which device is the default one, you can type « mount ».

If you see « sdcards », then sdcards will be read by default. You can change it, with a command : « twil -u », it will switch to usbdrive. If you want to have usb drive by default, you can program kernel with the tool « orixcfg ». See Orixcfg section.



Now, if you know which device you will use by default, you can install all software on it.

Plug the device on the PC (sdcard or usbkey), if you have a pi zero w, you can do this with drag and drop solution from the PC.

Download sdcard.tgz from this : <http://repo.orix.oric.org/dists/official/tgz/6502/>

It contains all software for orix there is others which are not available in this tgz.

Now, use 7zip on your PC (or tar/gzip under linux), and unzip all files from this sdcard.tgz. Put all these new file in the device root folder.

Now, you can insert the device (sdcard or usbkey – or pi zero) in the twilight board and play

## Upgrade from v2020.4 to v2020.1

- Download <http://repo.orix.oric.org/dists/official/tgz/6502/sdcard.tgz>
  - untar/gunzip sdcard.tgz (use 7zip under windows) on your device usb or sdcard : It could require some time to copy because there is a lot of small files (tap, hlp etc)
  - you can starts orix on real machine, and type :

```
#cd usr  
/usr#cd share  
/usr/share#cd carts  
/usr/share/carts#cd 2021.1
```

If you want to use USB drive for default device:

```
/usr/share/carts/2021.1#orixcfg -r -s 4 kernelus.r64
```

If you want to use sdcard for default device :

```
/usr/share/carts/2021.1#orixcfg -r -s 4 kernelusd.r64
```

- press ‘y’, and **wait until Orix reboots**

(Don’t switch off the Oric at this step)

## First step : type a command

You can access to available command from many ways :

- From /bin folders, there is binary available on current device, ‘ls’ will show you available commands
- From banks : type « help -b5 » you will see available commands

**BANK**

## Usage

Bank command is command line tool to see which bank are loaded into EEPROM bank and RAM bank. Each bank has a « signature ». Bank allows to see theses banks.

Bank can also starts a ROM with his id. In that case, you don't need to have a rom « orix friendly » and you can start it from command line. In the current bank version, there is restriction to launch a command.

### List active bank

```
/#bank
```

### List all commands from a bank

```
/#help -b5
```

### Start a specific bank

It only works for instance only if NMI is \$c000 address in this ROM

```
/#bank 1
```

**SHELL**

## Flush the current command line

Ctrl+c

## Available commands

You can see available commands with this command :

```
/#help -b5
```

The command line is limited in characters. If you reach this limit, you won't be able to type the complete command line

## Known bugs

- 1) If you return to a line when your command line is bigger than 40 columns, if you try to del a chars at the previous line, you can't.
- 2) « ./ » can not be used to launch a binary

# **BASIC11**

## Load a personal .tap file

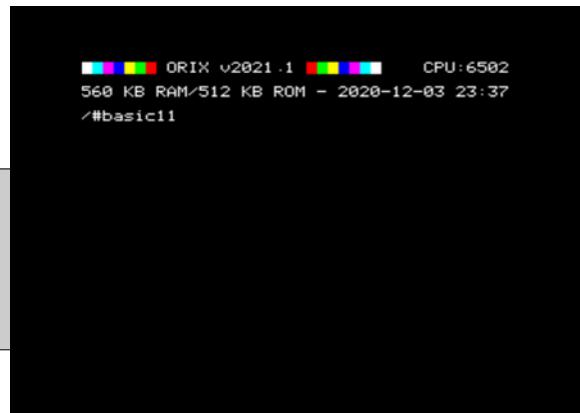
When you starts basic11 commands, the default path is « /home/basic11/ ». Each action on the basic11 mode will be done in this folder (cload/csave). If you cload a tape file, it must be in « /home/basic11 » folder.

You have downloaded a .tap file, and want to use it. Then, you can create a folder /home/basic11/

Under Orix

```
/#mkdir home  
/#cd home  
/home#mkdir basic11  
/home#cd basic11
```

Put you file in this folder from your PC, and start basic11 (you don't need to be in the «/home/basic11 » folder to start basic11 with no parameter. By default, basic11 starts in « /home/basic11/ »



## Oric.org tape file

When you downloaded sdcard.tgz and unzip it into sdcard or usbkey device, there is many tape file included in this archive. You don't need to move these type file, if you know the key, you can starts it from commands line. In this case, it will load the correct basic1.1 rom to start the tape file (see below), and the correct joystick configuration if it's correct.

## Oric.org tape file update

Each week a new software.tgz is generated. You can download it from « repo » and unzip it on the device. It will generate last tape file and last joysticks configuration.

## Search a tape file from command line

Basic11 has also many.tap files inserted in sdcard.tgz

Try to find the software with option -l

```
/# basic11 -l
```

If you find your software, you can do perform **ctrl+c**.

You can type space to do a pause.

On that case, you can launch the tape file like :

```
/# basic11 «KEYDISPLAYED
```

#basic11 -l		
key	NAME	
1815HACK	1815	
X6048	2048	BYTES ZOOMING CIRCLE DEM
266CIRCL	550	
3D	50	
3DFONGUS	SD	FONGUS
3DLUFFAR	SD	LUFFAR-SCHACK
3DMAZ	SD	MAZE/BREAKOUT
3DWALK	SD	MUNCH
FREECELL	3K	FREECELL
4KGRIDS	4K	GRIDS FOR CHILDREN
4KKONG	4K	KONG
4KBBOX	4KB	
4KFIRE	4KFIRE	
4KQIX	4KQIX	
6502ORIC	6502	MAN CMPI DEMO
ACCOUNT	R	ACCOUNT BOOK
ACHERON	A	ACHERON'S RAGE / LA RAGE D'AC
ACROBATE	C	ACROBATES
ADDBOOK	D	ADDRESS BOOK
ADDSOUS	S	ADDSOUS

When KEYDISPLAYED is the key displayed in key column. Please note that the key must be in **UPPERCASE**

# Load a tap file from command line

Note that MYFILE must be in **UPPERCASE**

```
/# basic11 «MYFILE
```

If MYFILE is in the oric.org database, it will launch the software with the filename MYFILE.

If basic11 command does not find MYFILE in the oric.org database, it will try to load it from /home/basic11/ folder.

## Save your program

If you start « basic11 » with no options, basic rom will starts and each csave (or cload) actions will store files in « /home/basic11 » folder

## Start basic11 menu

If you type « basic11 -g » on command line, you will have a menu with all software which have a download link on oric.org (only atmos version and when a tape file is available).

```
/#basic11 -g
```

You can use left and right letters to change to a new letter. If the letter is empty, it means that there is no available tap file for this letter.

You can use up and down link to navigate into software. If you press enter, the software will starts.



Note that not all games are working yet. Some times, chars are corrupted. If the joysticks does not works, there is two case :

- the game does not call rom routine to manage keyboard
- keyboard mapping is not done yet

You can use arrows to navigate into the menu :

- up and down to select the software
- right and left to switch to the menu letters

Some letters are empty. It means that there is no software with tape file available on oric.org for this letter

## Quit basic11

If you want to quit basic11 from interpreter command line, you can type « QUIT ». This will force to reboot to Orix (you can also use reset button)

## How the .tap file starts

If you only type « basic11 », this will start bank 6 (normal basic rom). The default folder in that case is «*/home/basic11* »

If you type « basic11 » with a tape file as an argument, there is 2 cases

1. The tape file (key) is already known in oric.org website, then basic11 try to find it in its databank file (*/var/cache/basic11/* folder). If the key is found, it will start the tape file located in «*/usr/share/basic11/...* »
2. If the key is unknown, it will try to find it in «*/home/basic11* »

If the tap file is in the oric.org db file, basic11 will load the software configuration from the db software file (as joystick configuration, and the id of the rom). Basic11 load the right rom into ram bank, override the default basic11 path to the tape file folder (« *usr/share/basic11/[firstletter software]* »).

It means that if you load this kind of software and you can quit the software, each file action in basic11 rom, will be performed in « *usr/share/basic11/[firstletter software]* ». »

LS

## **Introduction**

« ls » list all the file in the current folder. Token are supported (\*,?) ex : « ls ?e.tap » will list all files with a ‘e’ in the second letter

### **list all the files in the current folder**

```
/#ls
```

### **List all \*.tap files**

```
/#ls *.tap
```

### **List size and datetime of the file**

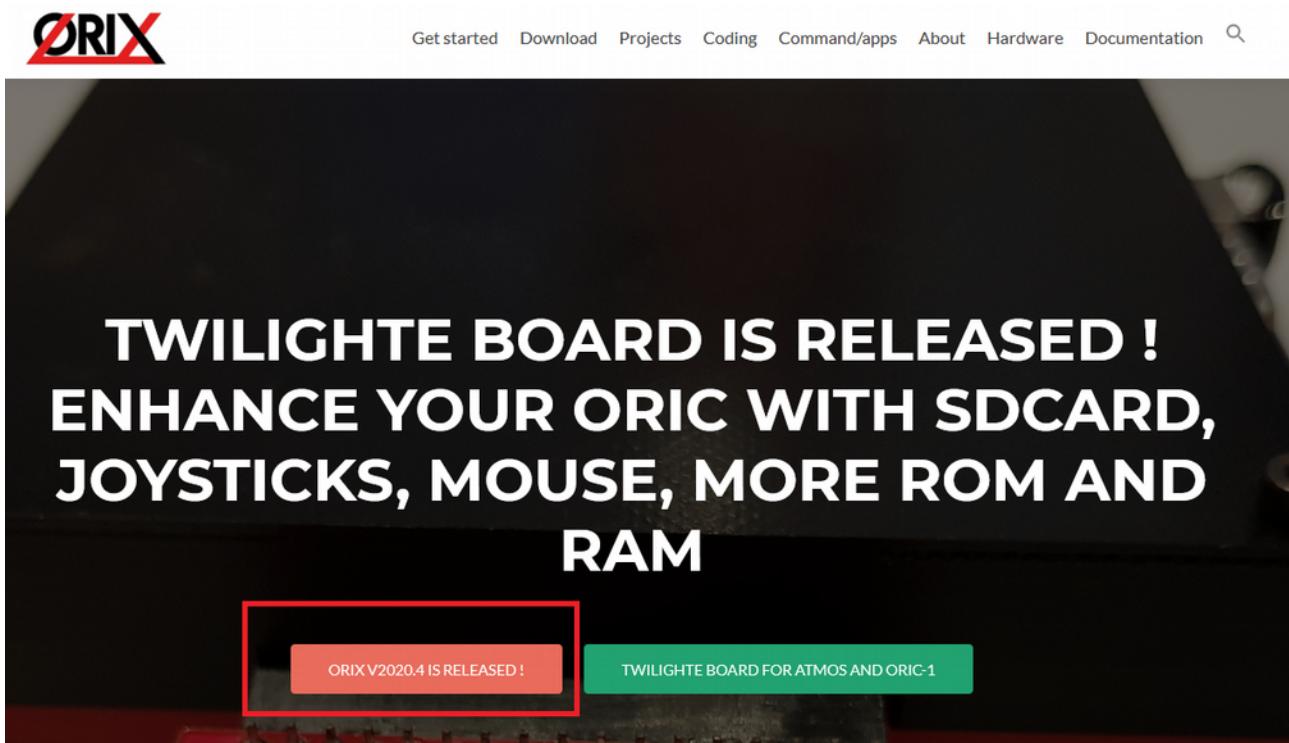
```
/#ls -l
```

**ORIXCFG**

## Update kernel, shell : orixcfg

When a new released is done, you can update the eeprom with the new kernel and new roms.

If you want to know if you need to update the kernel, you can compare your current version, and the last release version. You can go to <http://orix.oric.org> You need to have a look to this release below :



If on your Oric screen, it's not the same value, you can update it. The sequence of the Orix release is Year.X. There is 4 releases a year, and each one must be done until you reach the final one, in order to avoid some case. If your version is v2020.3 and the last available version is v2021.4. You need to update to v2020.4, then v2021.1, v2021.2, v2021.3, v2021.4.

It's maybe possible to jump to version v2021.4, but it's at your own risk because there is a « chance » that some kernel calls changed, and orixcfg could do wrong step.

## Update kernel, shell

When you need to update kernel, you can update it with orixcfg. You just need to define set 4 on the command line. This step is very **dangerous** if you don't load the right file. There is no verification and any file on the command line will be load in the kernel set. Usually, kernel set file is named kernxxxx.r64.

If you did something wrong on this step, you won't be able to start orix again. It means that you will need to remove eeprom from the card and program it with a eeprom programmer

This next command will load kernel.r64 to kernel set. Please wait until Orix reboots. If you have a kernel 2020.3 and you need to load a kernel 2021.1, you will need to load previous kernel set before the update of 2021.1.

.r64 extension means that it's a 64KB set. It's usually used to define that the file contains 4 roms of 16KB.

Please note that we provide 2 kernels version. One named « kernelsd.r64 » which means that the default device will be sdcard, and the other one « kernelus.r64 » which means that default device will be « usb » (usbkey). If you load the wrong kernel at this step, you can use twil command to switch to the right device, and you can start again kernel update with the right file (kernelsd.r64 or kernelus.r64 depending of your configuration).

```
/#orixcfg -r -s 4 kernelsd.r64
```

## Load a ROM into a ram slot

Space between values and switches are not optionnal, orixcfg needs theses spaces

```
/#orixcfg -w -s 0 -b 4 myrom.rom
```

This command will load myrom.rom (in the current path), in RAM bank 4 in set 0

## Load a set of ROM into ROM slot

```
/#orixcfg -r -s 0 myrom.r64
```

This command will load myrom.r64 (in the current path), in set 0. For instance, you can not load one bank, you need to load 64KB set.

## Clear bank ram or initialize it

Ram bank are not initialized when the board is tested. If you have garbage on screen when you uses bank (after you used twil -w). You have to clear all ram bank (ram bank are battery saved).

If you want to clear bank 4 of the set 0, you can do this command. You need to do this command for each bank of each set. For instance, there is no switch to clear all the ram with one command.

```
/#orixcfg -w -s 0 -b 4 -c
```

## **DSK-UTIL**

# Introduction

This tool is useful to extract files from dsk file. You can extract it, and uses command line tool to use it. For example, if you extract a basic program (.bas in FTDOS .dsk file), you can see it with « list » binary. If it's a .hrs/.hir file, you can read it with viewhrs file.

You can create a «/home/sedoric/ » folder and adds .dsk sedoric files in this folder

## List files from .dsk (sedoric)

```
/home/sedoric# dsk-util -s ls sed.dsk
```

## Extract a file from sedoric .dsk file

```
/home/sedoric# dsk-util -s e sed.dsk myfile.hrs
```

## Extract only .hrs files from sedoric .dsk file

```
/home/sedoric# dsk-util -s e sed.dsk *.hrs
```

**TWIL**

## **Introduction**

Twil command can displays the current firmware of twilighte card, and can swap root folder to usbkey or sdcard.

Twil command can also swap bank 4, 3, 2 and to eeprom set or ram set.

## **Displays Twilighte board firmware**

```
/#twil -f
```

## **Swap to sdcard for root file system**

```
/#twil -d
```

## **Swap to usb key for root file system**

```
/#twil -u
```

## **Switch to ram set**

```
/#twil -w
```

## **Return to eeprom set**

```
/#twil -r
```

## **Switch to another bank set**

if you are in ram set, it will display bank 4, 3, 2 and 1. When you start Orix, the default set is 0. There is 7 sets. If you are in eeprom set and set 4, you will see again kernel, shell etc in bank 3 and 1

```
/#twil -s1
```

**BOOTFD**

## Introduction

bootfd is a tool to boot the boot sector when a drive is connected. Insert a disk and type :

```
/#bootfd
```

The binary is located to bin folder. It will load microdisc rom and start it. If the binary displays that it does not found microdis.rom, then place microdis.rom file in the right folder.

If you have firmware 1, you will be able to load « blake's 7 ». If you have firmware 2, all sedoric .dsk should start.

For instance, only Space99 does not work, it stops after intro.

**FORTH**

## Use forth

You can use forth language. It works the same ways than Tele forth (it's teleforth but it write file on sdcard/usbdrive).

You can download Teleforth langage in order to see how to program in forth.

When you type « forth » forth starts with the current folder directory.

If you were in /, forth will load and save file in this folder.

In others cases, you can create a forth folder in home and goes into it in forth for example :

```
/#mkdir home  
/#cd home  
/#mkdir forth  
/#forth
```

if you type « cd forth» in forth environnement, all files actions will be perform in « /home/forth »

## **MONITOR**

## **Usage**

Monitor is a rom which can displays a monitor. It's teleass without assembler part.

**CKSUM**

## **Usage**

Cksum is a tool to compute a checksum of a file

**SHA1**

## **Usage**

Sha1 is a tool to displays a string into sha1 encoding

**STORMLORD**

## **Introduction**

Stormlord is Stormlord game port to Orix. You can use joysticks to plays to this game.

Only one joystick port is working on this version

## **PI ZERO CONNECTION FOR DRAG AND DROP**

## Drag and drop or file copy to the pi zero

If you have a pi zero, you can use it to simulate a usb key with wifi connectivity for drag and drop.

You need to follow this documentation : <http://orix.oric.org/drag-and-drop-files-from-pc-to-the-card/>

Please note that you must connect pi to usb twilighte port on his usb port (not the psu port). Also note that pi consumes power and if you use a psu lower than 2 A, you should have some hardware errors

## **CUMULUS COMPATIBILITY**

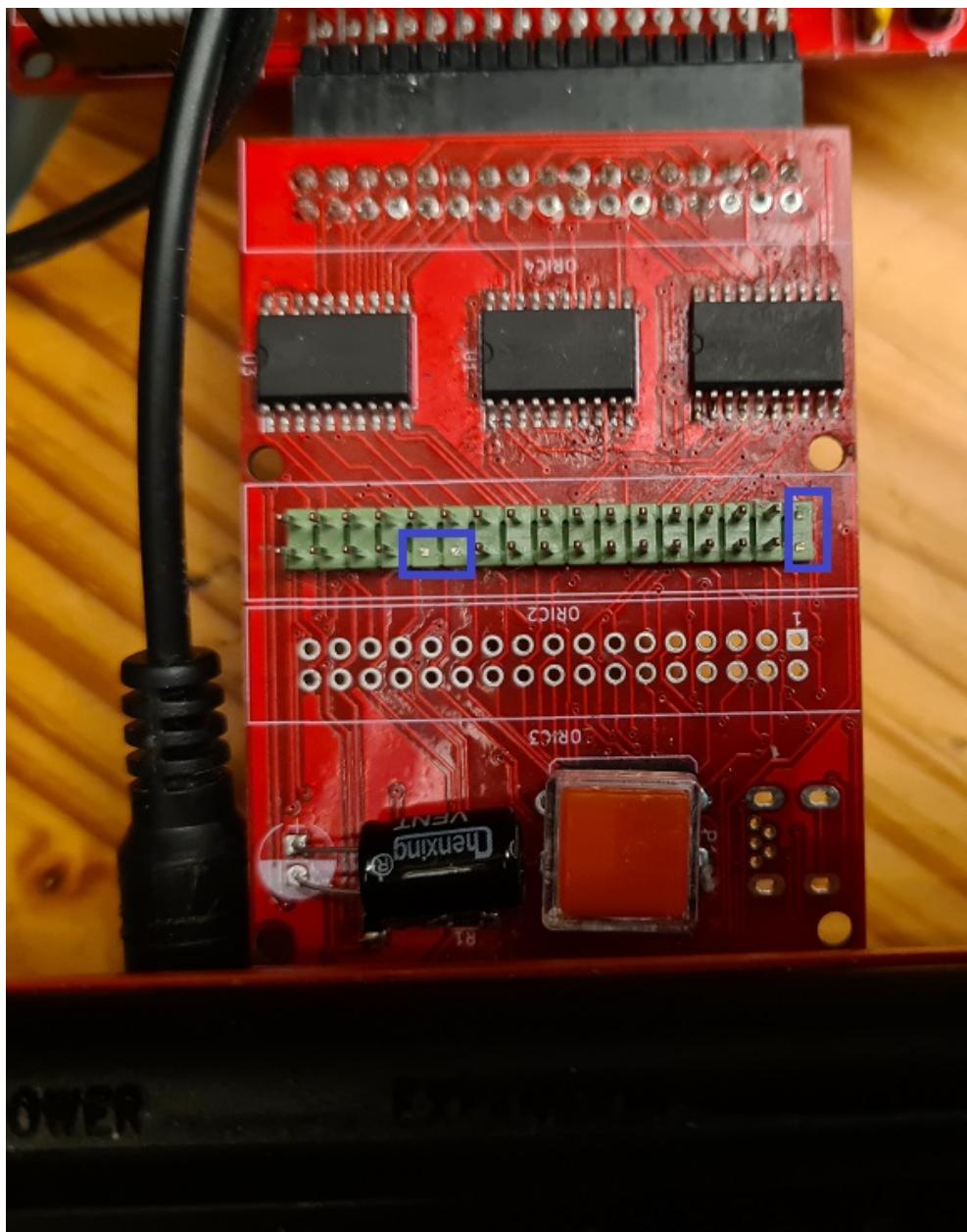
## How to connect a cumulus

On the current firmware (Firmware 1) : and current hardware (board version v0.65), we have to do some hacks to have cumulus working. But, you will only launch two diskfile. Anyway, you can access to drive with no restriction, except bank switching. See « Hardware and firmware upgrade », if you want to avoid theses modifications

In firmware 1, and with board modification, there is only two working disk : Blake's 7 and VIP2015.

If you want to use cumulus, you have to :

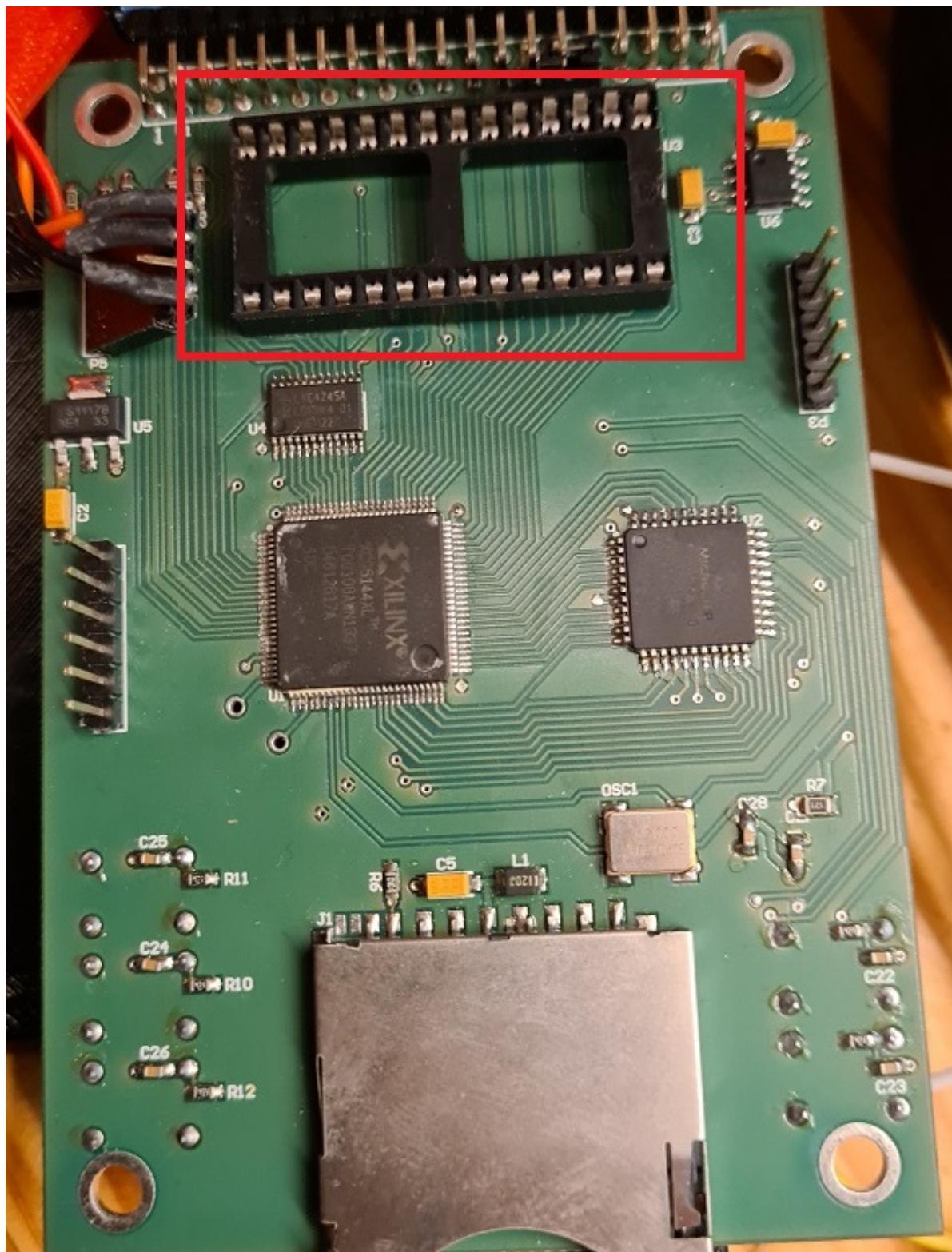
- 1) cut 4 pins on daughter card (ROMDIS, MAP, A14, A15)



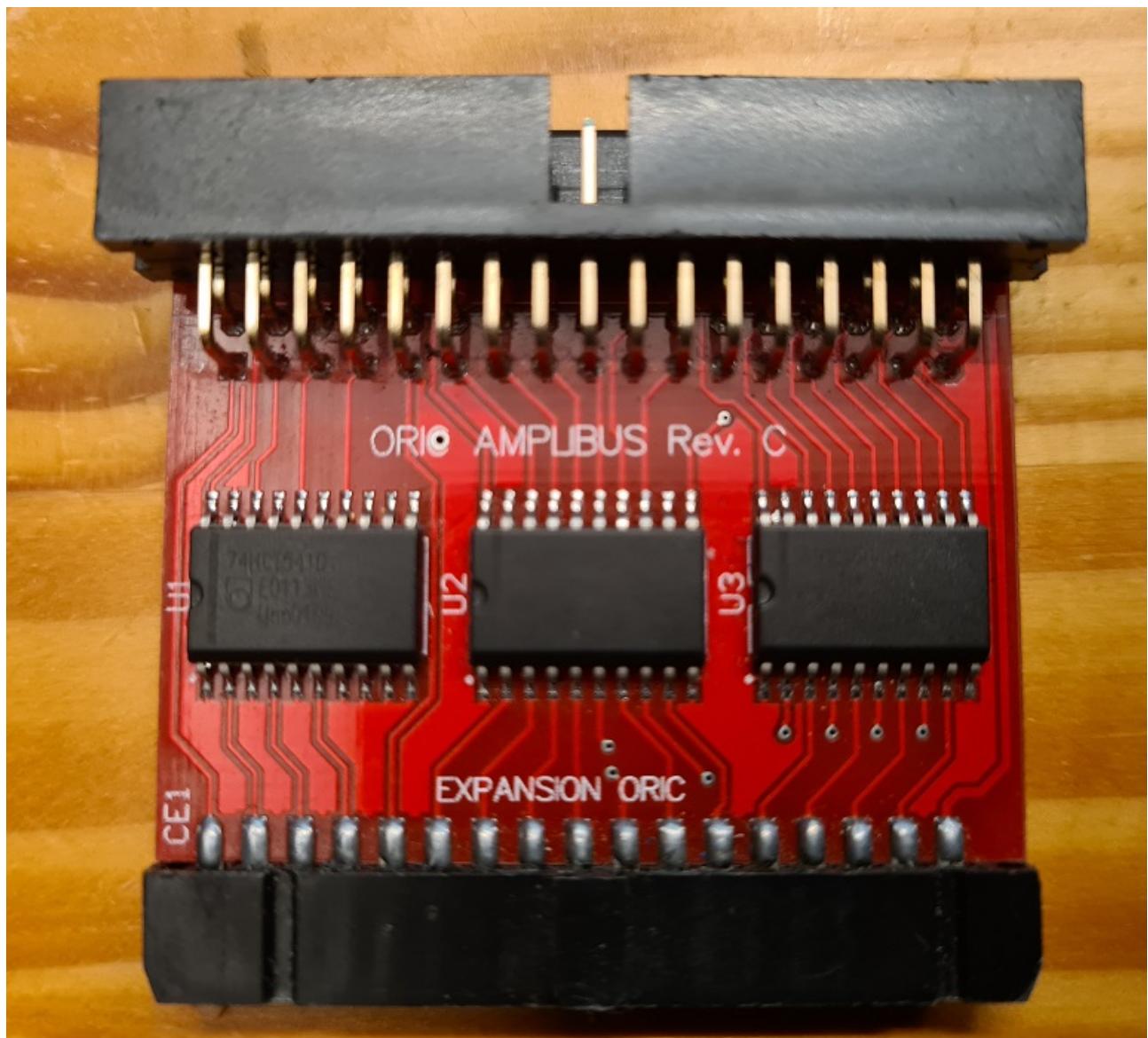
2) remove eprom from cumulus



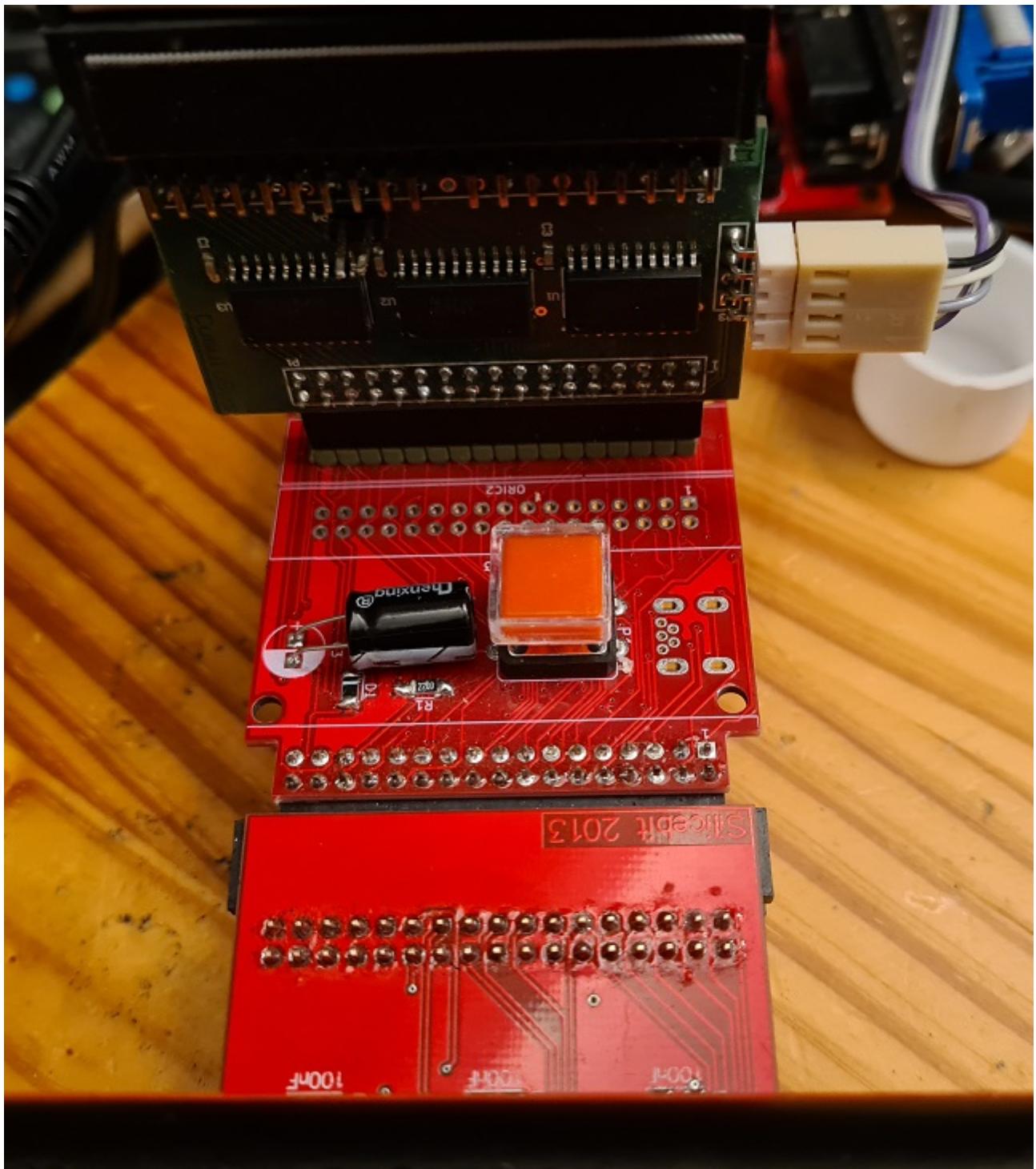




3) add another amplibus before twilighte daughter board



4) Connect all cards to the oric



## Twilights board firmware compatibility

Only firmware 2 is available to use boot sector to start Microdisc disk.

## **HARDWARE AND FIRMWARE UPGRADE**

## **Firmware upgrade**

There is only one firmware available. The version 2 is in development.

### **First method : For those who have programmers and some hardware tool**

But, when it will be released, you could update the firmware with :

- 1) a plcc extractor
- 2) altera software (Quartys v13)
- 3) a Jtag programmer
- 4) solder the jtag connector
- 5) get .pof file

### **Second method : send the card to the author of the card (me)**

In that case, fimware upgrade will be done, and you could ask to upgrade to new board version to add (sometimes new functionnality)

## **TROUBLE SHOOTING**

## **'ls' displays garbage on screen**

Insert your sdcard or your usb drive into your PC. You should have strange « file » on the sdcard : remove theses files.

## **Impossible to mount a usb key or a sdcard**

The sdcard must be in FAT32 format

## **Screen garbage when i use bank**

If you have screen garbage when you switched to ram bank before with « twil -w »

It means that ram bank are not initialized. See orixcfg section to fix it

## Q&A

## **I want to change the current directory**

See « cd » command

## **I want to see which bank are loaded into ROM and RAM**

See «bank» section

## **I want to read a .dsk file**

You can only extract files from a .dsk file (see « dsk-util »)

If you have a cumulus board, you can use « bootfd » and connect your cumulus on expansion board  
« see how to connect a cumulus section »