

CosmosEx User's Guide

CosmosEx for Dummies
V09 – January 2105

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1. Introduction

This document provide information on how to setup and use the CosmosEx (CE) device developed by Jookie. You can find a [Short introduction of the device on YouTube](#) and detailed information about CosmosEx on [Jookie web page](#). Most of the information provided here must be credited to Jookie ☺

Documentation based on release:

- MainApp - 2014-12-21
- Franz - 2014-12-21
- Hanz – 2015-01-02
- Xilinx – 2014-06-20

2. The CosmosEx device

2.1 Presentation of the CosmosEx device

The CosmosEx device is contained in a metal box.



In the front of the box you will find one Ethernet and two USB connectors, Several LEDs (Power, Selected floppy image, FDD and ACSI activity), the floppy image selector button, and the SD Card Slot.

In the back of the box you will find the ACSI, Floppy, and power connectors.

Inside the box (not visible when the box is closed) you will find the IKDB injector connector.

On the side are located the power button and the HDMI monitor connector.



The CosmosEx device can be used outside or inside an Atari. When used inside it replaces the internal floppy drive as the CosmosEx box has the same size and fixing holes than the original Atari floppy drive.

Both solutions have advantages and drawbacks and selecting one depends upon the features you intend to use. Some features requires specific connections of the CosmosEx device to the Atari.

Important: In almost all practical cases you need at least a connection to a power supply and a connection to the Atari ST ACSI bus for the device to work!

If you want to use the FD drive emulator you also need a connection to the Atari floppy data bus, and if you want to replace the keyboard / mouse / joysticks you need a connection to the Atari keyboard input through the IKBD injector.

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2.2 Using the CosmosEx outside an Atari

This is the simplest usage of the CosmosEx device. It is similar to usage with devices like **UltraSatan** or **Satan** drives. In that case you **need** to connect the [ACSI connector](#) of the CosmosEx device to the DSUB19 ACSI connector at the back of the Atari, and to connect a 5V DC power supply using the mini-USB [power connector](#).

Here is a picture of CosmosEx used outside an Atari STE. As you can see the CosmosEx is connected to the ACSI bus with the provided cable and it is powered with a mini-USB power connector.



If you also want to use the *floppy drive emulation* of the CosmosEx device then you need to connect the floppy connector of the CosmosEx device to the Atari DIN14 floppy drive connector. This is explained in [making a CosmosEx Floppy Cable](#). Note that with this configuration you always boot from drive A with real floppies. If you want to be able to boot from CosmosEx you need to modify your Atari to allow switching between drive A and B. This is detailed in [Swapping floppy Drive A and B](#).

If you also want to use the IKBD injector you first have to install the injector inside the Atari (see [IKBD injector](#)). Then you need to route the IKBD injector cable outside of the Atari to the IKBD connector located **inside** the CosmosEx device. Note that the provided cable is long enough to perform this connection.



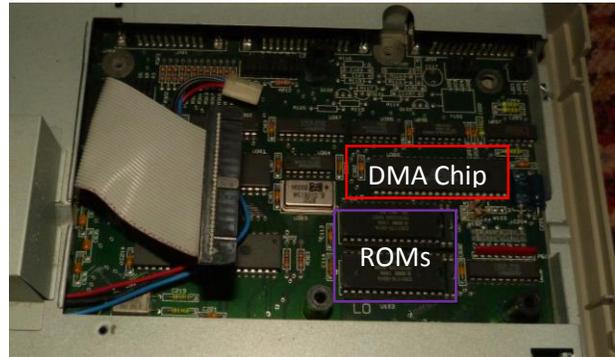
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2.3 Using the CosmosEx inside an Atari

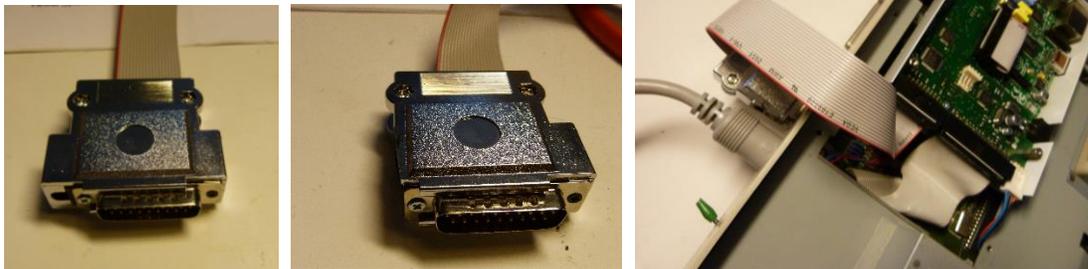
If you intend to use all the features of the CosmosEx device then mounting it inside an Atari is a good option as most of the connections between CE and the Atari are easy to do. In that case the CosmosEx device is installed as a replacement of the internal floppy drive. Let's details the procedure.

If you need help for disassembling the Atari please refer to my [Disassembling Atari](#) web page.

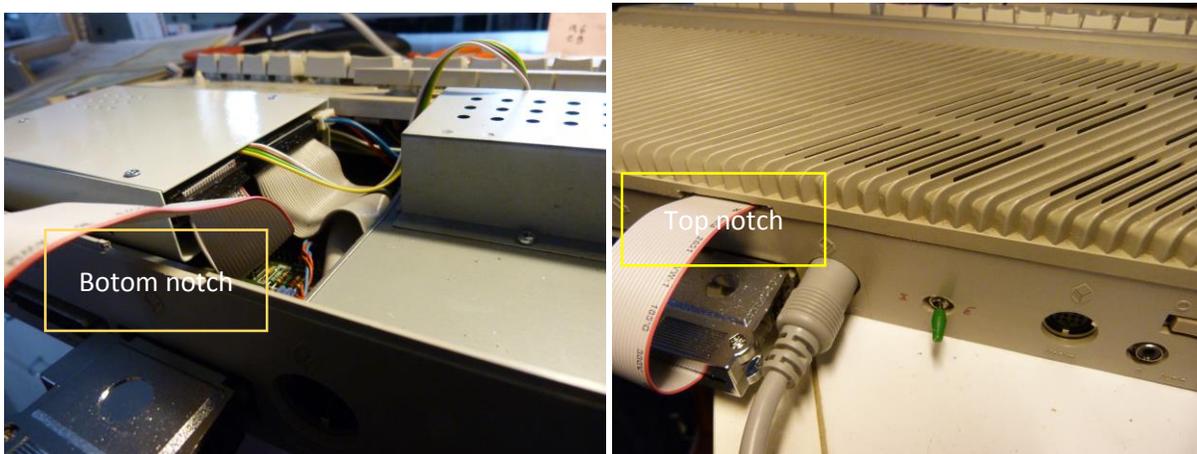
First remove the top cover of the Atari, then remove the floppy connector shield, then remove the floppy drive itself. At this stage it is a good idea to check your DMA chip as it is now visible as shown in this picture. The DMA circuit is located above the TOS ROMs. To find out if your DMA chip is good refer to [Atari STe Faulty DMA chip](#) section. Now you can mount the CosmosEx device in place of the drive. For that matter you can reuse the original floppy drive screws.



Now you need to install the [IKBD injector](#). Do not forget to plus the IKBD cable that goes **inside** the CosmosEx device. Connect the [floppy data connector](#), and the [floppy power connector](#). You also have to connect the CosmosEx [ACSI connector](#) to the Atari ACSI DSUB19 connector. As the DSUB19 connector provided is actually made from a 25 pins connector it is **wider than normal** and therefore it prevents to insert a floppy drive DIN14 connector at the same time. Therefore you need to cut the cover of the DSUB19 connector as shown below so you can connect the ACSI connector at the same time you connect the DIN14 connector.



Routing the ACSI cable outside the Atari presents several problems. The first problem is that we need to provide a path for this cable to go outside of the Atari enclosure. For that matter it is recommended to make a notch in the top plastic cover and another one in the bottom plastic enclosures as shown below:

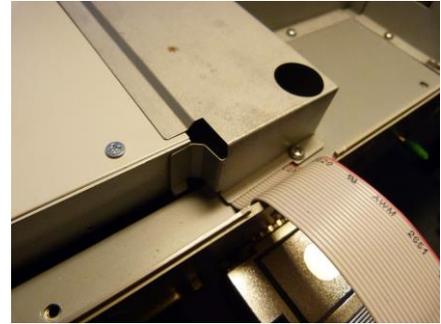


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The next problem is to put back in place the floppy drive connector shield. The best solution is to route the cable below the shield as shown on the right.

The last thing we need to do before we put the Atari cover back is to modify the original floppy "opening" located on the right. We need to make this opening big enough so we can see and access the front side of the CosmosEx device.

Here is an example that I have done using the top cover of an old Atari STF.



Now you can put back all the screws of the cover as we are done.

Before you close the Atari enclosure do not forget to turn on the power switch of the CosmosEx device!

As your internal floppy drive has been removed, if you need to access floppy disks you need to connect an external floppy drive to the floppy drive DIN14 floppy drive connector (thanks we had modify the hood of the ACSI

connector). For example you can connect an Atari SF314, or SF354, or a Cumana CSA354 floppy drive directly to the Atari. This external floppy drive is by default accessed as drive B but this can be changed (for more info look at my [Atari ST Interfaces & Connectors](#) page to change straps inside the Atari).



Note that with this configuration you lose the capability to boot from drive A with real floppies. If you still want this capability (boot from floppy) you need to modify your Atari to allow switching between drive A and B. This is detailed in [swapping floppy Drive A and B](#).

3. CosmosEx Switch and LEDs

- On the side you have the power switch that needs to be turned on to use the CosmosEx device.
- The red power's LED is on when the device receive a DC 5V voltage on its power connector and the power switch is on.
- The push button in front is used to select the images loaded in CosmosEx for floppy emulation. If 3 images are loaded this push button allows to cycle between: none, image 1, image 2, and image 3 and the corresponding image's LED is on. If no image is loaded this button is inactive.
- The three red image's LEDs indicates which image is activated in the CosmosEx device. If none of these LED are on then no image is loaded for floppy emulation (equivalent to floppy empty).
- The blue FDD LED blink to indicate activity on the floppy drive emulator bus.
- The blue ACSI LED blinks to indicate activity on the ACSI bus. Note that at the end of the CosmosEx sequence the ACSI Led blink one time. This can be used as an indication that the Atari can be started

Note that the Raspberry Pi located inside the CosmosEx device has also some LEDs. However they are not visible except if you open the CE device. For more information refer to [Raspberry Pi Led information](#).

4. CosmosEx device connections

4.1 Power Supply Connection

The CosmosEx needs to be connected to a power supply. For that matter you can use either to the mini-USB connector or to the Berg (also known as mini-Molex) 4 pins connector both located at the back of the unit. The power supply need to deliver a DC voltage of 5V with a minimum current of 700 - 1000 mA (the Raspberry model B alone is rated around 400 mA). Many mini-USB power supplies available for portable phone delivers 5V with 2.1A and thus will fit perfectly.

- The mini-USB connector is the preferred solution when the unit is used outside an Atari ST.
- The 4 pins berg power connector is the easiest solution when the CosmosEx is used to replace the internal floppy drive. You should check that the Atari internal power supply deliver enough current to the CosmosEx device to support all the anticipated USB peripherals.

Note that it is also possible to power the CosmosEx device through one of the USB connector. For that matter you can use for example a powered USB hub **with back feed power**. Keep in mind, however, that USB specification says that devices should not do that but some USB hubs and probably other devices do not have protection about back feeding power despite what specification says. This might be handy if you use the CosmosEx device inside an Atari as the original power supply may not deliver enough power.

4.2 ACSI Connection

The CosmosEx ACSI connector always needs to be connected to the Atari's DSUB19 ACSI connector. Normally this is done with the provided cable. But if you intend to connect other devices like UltraSatan on the ACSI bus it is possible to use/build a special cable that allow to daisy chain of the devices (like the one that were provided with the UltraSatan/ Satan devices). If you need to build an ACSI cable please refer to [ACSI Cable](#) section for more information.

 **Note that the ACSI connection should be present in almost all practical usage scenarios.**

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4.3 IKBD Injector Connection

You can connect a keyboard, a mouse and/or a joystick to the USB ports of your CosmosEx device and use them as native keyboard, mouse and joystick. As this solution involved no ST driver, it always works even with games. You can still use the original keyboard, mouse or joysticks simultaneously with the USB versions. You only need to plug the device(s) you want to replace. For example you can plug an USB mouse only.

To use the USB devices you need to insert an IKBD injector between the original keyboard and the Atari motherboard. Two types of injector exist depending of your Atari model. Here we describe the IKBD sandwich injector used for Atari ST/STe. The procedure is the following:

- Open the ST case,
- Uplift the keyboard,
- Disconnect the keyboard cable from the Atari motherboard,
- Plug the keyboard cable to the injector,
- Plug the 4-wire cable to the injector,
- Insert the injector in the original keyboard connector on the motherboard (the 4-wire cable must be turned toward the outside),
- Put the original keyboard back in place,
- Connect the other side of the 4 wire cable **inside** the CosmosEx to the IKBD connector.
- close the ST case



You can find more information on disassembling an Atari in my [Disassembling Atari Web page](#).

 Be careful the IKBD connector should **not to be confused** with the power supply connector at the back of the device. Connecting the injector to the power supply connector is potentially **dangerous**.

4.4 Ethernet Connection

Connect an Ethernet cable between the CosmosEx and a switch/router of your network.

4.5 USB Connections

The CosmosEx device has two USB-2 type-A connectors where you can connect potentially any USB kind of peripheral. Currently CosmosEx SW/FW provides direct support for the following USB devices:

- USB keyboard (only useful in conjunction with IKBD injector).
- USB mouse (only useful in conjunction with IKBD injector)
- USB Joystick (only useful in conjunction with IKBD injector)
- USB flash drive
- USB Wi-Fi adaptor
- USB Hard Disk
- USB Hub: This is to be used if you plan to use more than two USB devices and/or if you plan to use peripherals that consumes more than 150 mA.

Note that only minimal power is provided by Raspberry Pi to the USB ports. However this power should be sufficient for simple peripherals like Keyboard, mouse, joystick, or USB memory stick. If you plan to use auto powered peripherals (for example hard disk drive) that requires more than 150 mA you should use a **powered** USB hub. See also the [Power Supply](#) section.

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4.6 Floppy Connection

The CosmosEx device can serve as a **floppy emulator**: it can load up to three images simultaneously (currently .st and .msa) from any media mounted on the device (e.g. USB flash drive or SD card). A selection button in front of the device allows to switch between up to 3 loaded images. The currently selected image is indicated by having one of the three image's LEDs on the side of the selection button turned on. Floppy images can be directly downloaded from internet to the device using a [simple tool](#). This feature allows to easily load and play old games.

In order to use the floppy emulation it is necessary to connect the CosmosEx floppy connector to the Atari floppy drive data bus:

- If you install the CosmosEx device inside the Atari as a replacement of the internal floppy drive, then you can directly connect the internal floppy data cable to the CosmosEx floppy connector.
- If you use the CosmosEx externally you need to create a cable that connects the floppy disc connector (DIN14) at the back of the Atari to the CosmosEx floppy disk connector. The picture on the right shows an example using a DIN14 to IDC34 board taken from an Atari SF314 external drive. The [Floppy Cable](#) section of this document explains how to make such cable.



 In either case you will have to configure correctly the floppy emulation so that it does not conflict with the real floppy drive (see [Floppy Configuration](#)).

You may also want to look at [Swapping floppy Drive A and B](#) sections of this document.

4.7 HDMI Connector

Normally you do not need to use this connector. However it can be very useful for advanced debug / recovery / development procedures. You just need to connect a monitor or a TV through this connector and it will display the output of the Raspberry Pi system. This is mostly useful if you want to [connect to the Raspberry Pi](#) using for example an USB keyboard at the same time.

Note that for software development there is special version of the Raspberry Pi OS available in the [Jookie's download page](#).

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5. Configuration of the CosmosEx device

By default when you receive your CosmosEx device (or when you [reset all settings](#)):

- ◆ The CosmosEx device is configured with ID 0 on ACSI bus,
- ◆ During boot the Atari loads the CE_DD disk driver on ID 0 drive,
- ◆ The configuration drive called "CONFIG DRIVE" is mounted with letter O
- ◆ This drive is made available on the desktop (as defined in the drive O DESKTOP.INF file).

Note that the configuration drive O is **read only**. Inside this drive nothing (files or folders) can be added, deleted, or changed.

The CosmosEx device can be configured with the CosmosEx configuration tool: **CE_CONF.PRG**. This tool is available inside the configuration drive or on [Jookie download page](#).

The CosmosEx configuration tool starts on a main page window that allow access to several subpages:

- ◆ [ACSI IDs Configuration](#)
- ◆ [Translated Disks](#)
- ◆ [Shared Drive](#)
- ◆ [Floppy Configuration](#)
- ◆ [Network Settings](#)
- ◆ [Other](#)
- ◆ [Update Software](#)

```
>> CosmosEx config tool - 2013 & 2014 <<
Main menu
```

```
[ ACSI IDs config ]
[ Translated disks ]
[ Shared drive   ]
[ Floppy config  ]
[ Network settings ]
[ Other          ]
[ Update software ]
```

Select the subpage you want to access by pressing the up and down arrow keys and hit return to go to the corresponding page.

```
F5 - refresh, F8 - console, F10 - quit
```

From any page you can exit the configuration tool by pressing the F10 key.

The Esc key can be used to get you back from a subpage to the main page. This is equivalent to selecting the Cancel button.

The F5 key is used to refresh the current page.

The F8 key is used to switch to Raspberry Pi Linux terminal. Pressing F8 again return you to normal configuration. For more info see [Login to the Raspberry Pi system](#).

 Once you have modified some information on a subpage **do not forget to save it** before you leave the subpage. Otherwise **no modification** of the CosmosEx configuration will be stored.

5.1 ACSI IDs Configuration page

This page is used to assign ACSI IDs to the CosmosEx device.

5.1.1 ID Assignment

ACSI ID 0-7 can be assigned to the following device types:

- OFF = ID not assigned
- SD = ID assigned to SD media
- RAW = ID assigned to Atari formatted USB drive (RAW access requires a TOS hard disk driver).
- CE_DD = ID assigned to CosmosEx to load CE_DD disk driver.

```
>> CosmosEx config tool - 2013 & 2014 <<
ACSI config
```

ID	off	sd	raw	ce_dd
0	[]	[*]	[]	[]
1	[]	[]	[*]	[]
2	[*]	[]	[]	[]
3	[]	[]	[]	[*]
4	[*]	[]	[]	[]
5	[*]	[]	[]	[]
6	[*]	[]	[]	[]
7	[*]	[]	[]	[]

[Save] [Cancel]

```
off - turned off, not responding here
sd  - SD card (only one)
raw - raw sector access (use HDDr/ICD)
ce_dd - for booting CE_DD driver
```

```
F5 - refresh, F8 - console, F10 - quit
```

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The following rules and restrictions apply:

1. You can have 0, or 1 IDs assigned to SD type. The SD assignment applies to the unique SD slot. If no ID is assigned to SD type then **no SD** card can be used. SD cards are **always** "raw accessed" and therefore requires a [TOS hard disk driver](#).
2. You can have from 0 to 8 IDs assigned to RAW type. The RAW assignments apply to USB slots. Up to eight (this requires usage of an USB hub) USB drives can be connected to CosmosEx. If no ID is assigned to RAW then **no RAW** USB drive can be used. The RAW assignments are **only useful** if the "RAW" radio button is used in the "Mount USB media as" field (see [Translated Disk](#)).
3. You can have 0, or 1 IDs assigned to CE_DD type. Assigning an ID to type CE_DD type is used to request the CosmosEx to load the CE_DD driver if no TOS driver already loaded.
4. At least one ID has to be assigned to something other than "off" otherwise the CosmosEx device cannot be accessed! Note that you will not be able to save a configuration with all ID set to off.
5. If multiple devices are connected to the ACSI bus all the assigned IDs must be **unique**. For example if you already have ID 2 and 3 used by another device like UltraSatan you should not use these IDs in your configuration otherwise the system will not work properly. Note that the CosmosEx configuration tool has no way to check potential conflict in ID numbers.
6. USB drives are accessed either as RAW (Atari formatted) or Translated (DOS formatted). This is specified in the [Translated Disk](#) page. Note that this does not affect the SD card drive (always RAW) or the Network and Configuration drives (always translated)
7. In order to access DOS formatted USB, Network, and Configuration drives you need to have the CE_DD driver loaded in the system.

 **WARNING: Read carefully the information below that explain how the disk drivers are loaded**

During initialization the TOS scans the different units connected to the DMA bus. It starts with unit ID0 and loads the first 512 bytes of the boot sector into a buffer, if its checksum is equal to a magic number the boot loader is executed. This test repeats for ID1 to ID7 and execution is transferred to boot code each time the checksum match. Therefore:

- ◆ If the lowest ID specified in the configuration is of type CE_DD then the CE_DD driver is loaded. The system continue to scan other IDs and if it finds a bootable media it loads the disk driver that it contains.
- ◆ If the lowest ID specified in the configuration is of type SD or RAW then the hard disk driver for this unit is loaded. Depending of the HD driver loaded and TOS version the system may eventually load other drivers (including CE_DD) if found.

Therefore I recommend that you follow these practical rules:

- For SD and/or RAW drives use IDs lower than the one assigned to CE_DD.
- Always assign an ID to type CE_DD. This allows to still access the network and configuration drives if you can't access TOS drives (for example all media removes).
- Check that in normal usage condition the CE_DD driver loads correctly after your TOS hard disk driver. If this is not the case then place the CE_DD.PRG file in the AUTO folder of the boot partition. This will allow to access the configuration and network drives.

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5.1.2 Examples of common configurations

Here we present two common configuration.

- You want to boot from a SD card using a TOS HD driver, and you want to be able to access DOS formatted USB drives, the Network drive, and the Configuration drive:

In that case you can to assign the type **SD to ID 0**, the type **CE_DD to ID 1**, and let all other IDs assigned to off. The SD card needs to be made bootable and the HD driver installed in the boot partition. In order to access the USB, Network, and Configuration drives you need to have the CE_DD driver loaded. For example by adding the **CE_DD.PRG** program in the AUTO folder of the boot partition. Note that the “Mount USB media as” radio button **has to be set to “translated”** in order to use DOS formatted USB drive (setting it to RAW is useless as no RAW ID was reserved).

- You want to boot from a SD card, you want to use translated drives for Network and Configuration, and you want to access two Atari formatted (RAW) USB drives:

In that case you can assign the type **SD to ID 0**, the type **RAW to ID 1 & 2**, the type CE_DD to ID 3 and let all other IDs assigned to off. You also need to select the “RAW” radio button in the “Mount USB media as” section. Install the Hard disk driver on the boot partition of the SD card. This configuration allow to access the Atari partitioned USB drive with the TOS HD driver. In order to access the Network and Configuration drives you need to verify that the CE_DD.PRG driver is loaded (see above).

5.2 Translated Disks

This page allows you to specify the TOS drive letters that will be used by the CosmosEx disk driver:

- The **first translated drive letter** allows to specify the first drive letter which will be used for translated disks. For example if you have 3 TOS partitions on a SD card, they will be mounted by the TOS driver as ‘C’, ‘D’, ‘E’. Setting the first translated drive to ‘G’ indicates to CE_DD driver to mount the first DOS formatted USB drive with letter ‘G’, the next USB drive as ‘H’, and so on.
- The **shared drive letter** allows to specify the letter that will be used to mount a shared folder from Windows or Linux. Of course this letter must not be conflict with any raw or translated drives.
- The **config drive letter** allows to specify the letter that will be used to mount the configuration drive (by default set to ‘O’). This drive is read only (no file/folder can be added/modified/deleted). It contains the tools required to operate the different features of the CosmosEx device. Of course this letter must not conflict with any raw or translated drives.

```
>> CosmosEx config tool - 2013 & 2014 <<
Translated disk
```

```
Drive letters assignment
First translated drive  [OO]
Shared drive           [N]
Config drive           [O]
Mount USB media as [ * ] translated
                   [ ] RAW
[ Save ] [ Cancel ]
```

If you use also raw disks (Atari native disks), you should avoid using few letters from C: to leave some space for them.

```
F5 - refresh, F8 - console, F10 - quit
```

 You have to keep in mind the TOS limit of a maximum of 14 partitions (letters C-P).

The “**Mount USB media as**” section provides two exclusive options selected by radio buttons:

- **RAW**: This will force **all** the USB media to be accessed as Atari formatted drive. In that case it is necessary to use a TOS hard disk driver to access them. Obviously this option is only useful if you have assign the type RAW to at least one ID.
- **Translated**: This will force **all** the USB media to be accessed as DOS formatted drive by the CE_DD translated driver. This will work even if no type CE_DD has been specified as long as the CE_DD driver is loaded (i.e. by placing the CE_DD.PRG program in the AUTO folder of the boot partition).

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5.3 Shared Drive Settings

It is possible to mount a shared folder from another machine as a drive on your ST. The network drive is mounted as a translated drive using the letter specified in the [Translated Disk](#) page.

- **Enabled:** checking it allow to use a shared drive
- sharing protocol:
 - ◆ **NFS:** if you want to use a shared folder from Linux using NFS protocol.
 - ◆ **Samba / CIFS / SMB Windows:** if you want to use a shared folder from Windows. You have to share this folder with full access (read / write)
- **IP address of server:** Enter the IP address of the machine on which your shared folder is located
- **shared folder path on server:**
 - ◆ For Samba / CIFS / SMB Windows use the name of the share, e.g. 'shared' (this is what you see in the network neighborhood). If you want to mount a subdirectory of this share you have to separate the path elements with '/'. For example 'shared/atari'.
 - ◆ for nfs under Linux – this is the path where the shared folder is: something like: '/home/joe/atarishared'
- **Username/Password:** If the sharing protocol requires credentials (for example Windows) you can specify them here. For example if you want to use a shared folder on a Windows 8.1 machine you specify your Windows login name and associated password (usually your live id account password for Windows 8.1).

Notes:

- In order for sharing to work you need to have the network up and running on the CosmosEx device. Please refer to [setup the network configuration](#).
- If you want to share permanently a directory from a server it is better to use a static address for this server. This can be done by defining a static address on this server or by declaring this server as a static machine in your DHCP server.
- The drive letter for the network drive as to be define in the translated disk page of the configuration tool. Of course in order for the drive to be mounted/accessible the CE_DD driver has to be loaded.
- If for some reason the network cannot be mounted successfully you should find inside the network drive two files: MOUNT.ERR and MOUNT.LOG that gives you information about what went wrong.

5.4 Floppy Configuration

This page is used to specify how the CosmosEx device works for floppy emulation.

- When the **enabled** checkbox is checked it is possible to use the floppy emulation of the CosmosEx device. When enabled is not checked the CosmosEx is totally "passive" on the floppy bus and therefore not responding to any command (neither for drive A nor drive B).
- The drive ID radio buttons allow to specify if the CosmosEx drive will respond to commands for drive A (drive ID 0) or drive B (drive ID 1).
- The drive protected checkbox emulate the write tab of a real floppy disk.

```
>> CosmosEx config tool - 2013 & 2014 <<
Shared Drive settings

Define what folder on which machine will
be used as drive mounted through network
on CosmosEx. Works in translated mode.

Enabled [ * ]

Sharing protocol
[ ] NFS
[ * ] Samba / cifs / windows

IP address of server
[192.168.1.12 ]

Shared folder path on server
[Main/Atari ]

Username [Jean ]
Password [***** ]

[ Save ] [ Cancel ]

F5 - refresh, F8 - console, F10 - quit
```

```
>> CosmosEx config tool - 2013 & 2014 <<
Floppy configuration

Floppy enabled [ * ]

Drive ID [ 0 ] [ 1 ]
[ * ]

Write protected [ ]

[ Save ] [ Cancel ]

Can

F5 - refresh, F8 - console, F10 - quit
```

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5.5 Network Settings

It is possible to connect the CosmosEx device to a network that have access Internet. This allows:

- To [check and install](#) new versions of CosmosEx software and firmware,
- To download games from an Internet database for the floppy emulator (see [CE_FDD](#) section),
- To automatically [set Atari date and time](#),
- To mount and access a [shared drive](#) on the local network,
- To access the CE device from a browser (see [CE_CAST](#) section)
- To [login](#) to the Raspberry Pi using an SSH shell.

The network setting page is composed of two sections one for an Ethernet connection and one for a WiFi connection. The network settings are self-explanatory for people that have basic network knowledge.

If the setting are done correctly the next time the CE_DD driver is loaded you should see a line with **eth0:** followed by the IP address assigned to the CosmosEx device.

```
>> CosmosEx config tool - 2013 & 2014 <<
Network settings

Ethernet
Use DHCP [X]
IP address [192.168.7.2 ]
Mask [255.255.255.0 ]
Gateway [192.168.7.1 ]

Wifi
WPA SSID [ ]
WPA PSK [ ]
Use DHCP [*]
IP address [ ]
Mask [ ]
Gateway [ ]

DNS [ ]

[ Save ] [ Cancel ]
```

```
F5 - refresh, F8 - console, F10 - quit
```

5.5.1 Ethernet

If you do have a *DHCP server* in your network (often a router), the simplest configuration is to check the '**Use DHCP**' checkbox and ignore the other fields. All the network configuration information will be pulled automatically from the DHCP server (this is the default settings).

If for some reason you want to set the configuration manually, uncheck the 'Use DHCP' checkbox and enter the configuration manually.

Note that it better to connect the network cable before you start the CosmosEx device otherwise the network take long time to start.

5.5.2 Wi-Fi

 In order to use a Wi-Fi plug you first need to update the CosmosEx Linux to the latest revision provided by Jookie. For that matter look at [Installing CosmosEx SW on Raspberry Pi SD Card](#).

Before you plug in the Wi-Fi dongle, enter the name of your Wi-Fi SSID and the corresponding password. If you do have a *DHCP server* in your network (often a router), the simplest configuration is to check the '**Use DHCP**' checkbox and ignore the other fields. Wait for one minute, turnoff the CosmosEx device, plug the Wi-Fi dongle to a USB port and restart the device.

You should now see that the CosmosEx device is connected to the Wi-Fi access point.

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5.6 Other

The Other page allows to change various settings of the CosmosEx device.

- The **Update time from internet** section allows to update the Atari clock using NTP time server on Internet
 - ◆ **Enable**: checkbox allow usage of NTP server. When NTP is enabled a line with time and date is displayed when the CE_DD driver is loaded.
 - ◆ **NTP server**: allow to specify the NTP server to use. By default this value is set to 200.20.186.76 (d.st1.ntp.br) but you may want to change it to a [server close to you](#).
 - ◆ **UTC offset**: Offset of your local time (can be a negative number) relative to UTC. For example **+2.0** for Paris or **-8.0** for San Francisco.
- **Screencast frame skip** (10-225): Allows to set the refresh rate for the [screencast feature](#).
- Attach first Joystick as JOY 0: When checked the joystick is on port 0 of the Atari otherwise it is (by default) set to port 1.
- **Reset all setting**: When checked the configuration of the CosmosEx device is reset to manufacturing default configuration.

```
>> CosmosEx config tool - 2013 & 2014 <<
Other settings

Update time from internet
Enable [X]
NTP server [200.20.186.76 ]
UTC offset [2.00]

Screencast Frameskip (10-255)
[10 ]

Attach 1st joy as JOY 0 [ ]

[ Reset all settings]
[ Save ] [ Cancel ]
```

```
F5 - refresh, F8 - console, F10 - quit
```

Note you can test the proper connection of an USB joystick with [this application](#) and see if anything happens on joystick 0 or joystick 1 when you press the buttons.

5.7 Software and Firmware Updates

This page is used for updating your device to newer versions of software and firmware (Main App, Franz, Hans, and Xilinx). You can either update from the Web (the default) or from an USB memory stick by selecting it with the **'From Web'** or **'From USB'** buttons.

The current software versions is displayed in the column **'your version'**, and the available versions is displayed in the **'on Web'** or **'on USB'** column. If a new version exists then this last column displays the date of the update, if no new version exist this column displays "the same", and if no information is available (for example if the network connection to web server is not working) this column displays 0000-00-00 or blank.

```
>> CosmosEx config tool - 2013 & 2014 <<
Software & Firmware updates
```

part	your version	on web
Main App	2014-11-12	the same
Franz	2014-08-25	the same
Hans	2014-10-02	the same
Xilinx	2014-06-20	the same

[From web] [From USB]
[Update] [Cancel]

```
F5 - refresh, F8 - console, F10 - quit
```

- In order to get updates from the Web a working connection to the internet is obviously needed as the updates are located on Jookie server.
- In order to update from an USB stick the file **ce_update.zip** has to be present on the root of the drive, otherwise an error message is displayed. Therefore you first have to download the latest version of [ce_update.zip](#) and copy it to the root of an USB stick on a PC. Insert this USB key in one of the CosmosEx USB slot and select update from USB.

To update all the applications which have newer version on the Web server or on the USB media, press the **'Update'** button. You will see some information about the download and the updated version(s) will be installed automatically at the end of the download.

 A message will be displayed to indicate that the system is updating. Do not turn off the system during update or this may leave the system in a non-working state. Wait for the Configuration screen to be redisplayed.

6. Hard Disk driver and CosmosEx

Here we are going to explain how to prepare a CosmosEx device to use an SD card. Then we will explain how to install and use several of the most used hard disk driver on the SD card. As you probably also want to access the network and configuration drives we will explain how to load the CE_DD driver. We are going to review installation and usage of the following drivers:

- HDDRIVER 9.x
- PPDRIVER 1.x
- ICD AdSCSI Pro 6.5.5
- CBHD 5.0.2

More information about Hard Disk driver and Atari file system can be found in my [Atari Hard Disk File Systems Reference Guide on my web](#)

 Note that CosmosEx device need some time to start (Raspberry Pi boot time). It is therefore advised to wait for the ACSI Led to blink before you start the Atari. If the CosmosEx device does not work as expected just press the reset button of the Atari system.

6.1 CosmosEx ID Configuration

The first think to do is to configure the CosmosEx device correctly.

Note that dealing with RAW USB drives on a Windows system is not easy for the following reasons:

- TOS partitions are not visible on Windows system
- DOS partitions are limited to 32MB on Atari system
- Generally only the first partition of multiple TOS&DOS partitions can be accessed
- Long File Name is a problem on TOS&DOS or DOS partitions
- Windows creates invisible directories
- Etc.

Therefore for all these reasons usage of RAW USB drives is reserved for more advance users and here we will only describe installation of a HD driver on an SD card plugged into the CosmosEx device.

We are going to use the following settings in the ACSI ID configuration page:

- ◆ ID 0 is set to type SD,
- ◆ ID 1 is set to type CE_DD and,
- ◆ All other IDs are set to off.

And in the Translated disk page

- ◆ We select the “translated” radio button in the “Mount USB media as” (see [Translated Disk](#)).

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6.2 Which Hard Disk Driver should I use?

This is a short section to help you select a hard disk driver (among PPDRIVER, HDDRIVER, ICD655, and CBHD520) to be used with the CosmosEx device:

- Although working on CosmosEx I discourage usage of the CBHD drivers that is very old, not maintained and has the worst quality.
- If you want a free solution then you have no other choice than using ICD655. This driver is not maintained anymore but works relatively well with CosmosEx device.
- If you are only using CosmosEx and/or UltraSatan devices (not using other SCSI devices) connected to your Atari and you do not need advance features then [PPDRIVER](#) is an excellent choice as it is **not expensive** and has a lot of nice features for gamers.
- The most powerful and maintained hard disk driver is [HDDRIVER](#). It allows to connect all sorts of ACSI and SCSI devices and has many features not found on other driver but it is **expensive**.

The table below summarize the driver's features:

	PPDRIVER	HDDRIVER	ICD655	CBHD502
Boot TOS partition¹	512MB	512MB	512MB	512MB
Boot TOS&DOS	Many	Many	No	No
Multi Boot	At boot time	Yes	No	Yes
FAT16A (32MB)	Yes	Yes	Yes	Yes
FAT16B (2GB)²	No	BigDOS	No	BigDOS
Removable media	Yes	Yes	Limited	?
XHDI	No	Yes	No	Old
Maintained	Yes	Yes	No	No
Price	10 €	45 + 2 €	Free	Free

Note that DOS&TOS Partitions are very convenient to transfer data between Atari and PC

6.3 PPDRIVER 1.x

PPDRIVER is a cheap 10€ package developed by Peter Putnik that you can buy it from [HERE](#). This driver has some limitations compared to HDDRIVER as it has been designed almost exclusively for **Satan**, **UltraSatan** and **CosmosEX** devices but it provides the nice following features:

- Support for Multiple TOS/DOS compatible partitions
- Bootable TOS&DOS Partition (512MB for TOS 1.04)
- Hot-swap support
- Easy selection of active partition during boot
- Low RAM usage, Good Performance (pure ASM only code)
- Works on ST, STE, Mega ST, Mega STE, TT with minimum TOS v. : 1.02
- Ideal for gaming - easy setting, usage, no Timer dependence
- Directly support FAT16A DOS Partitions (< 32MB) and plain AHDI TOS partitions
- Maximal support for gamers: driver loadable without XHDI, in top RAM, with HOLE (for old games, not compatible with higher TOS versions)

¹ The size of the Boot partition actually depends on TOS version. The value presented here is for TOS version bigger or equal to 1.04 and less than 4.x

² BigDOS means support by adding BigDOS program in the AUTO folder

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6.3.1 Partitioning a drive

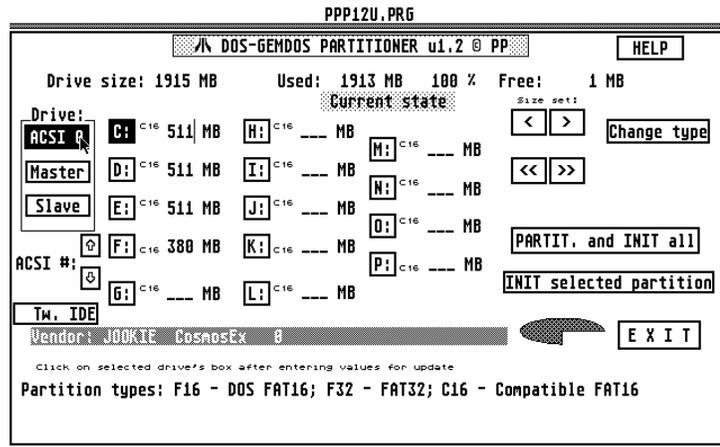
Run the **partitioner** in medium or high resolution.

You first need to select the ACSI Id that contains the CosmosEx device. **ACSI 0** is shown by default. As this is the ID we have defined in our configuration we just need to click on the ACSI 0 button. Vendor shows **JOOKIE CosmosEx 0** and previous partitioning of the SD card is displayed.

You now have to enter the desired sizes for each partitions starting with partition C. Each time you enter a value for a partition the free space field is updated. If the sum of all partitions gets bigger than the available space the free indicator shows NEG and in that case you must decrease the size of some partitions.

C16 is default partition type, which correspond to TOS & DOS compatible FAT16A partition and this is what you want to use as these partitions will be accessible on TOS and Windows. Once you are satisfied with the partition sizes, click the **PARTIT. and INIT all** button then press the **Go on!** Button.

After partitioning, you may check the result by clicking again the Drive button - it should show the new partitions values. Now Click **EXIT**



6.3.2 Installing the auto boot

To install the auto boot driver you need to execute the **USAB10.TOS** program. The driver installer will show all attached ACSI devices with target # and capacity detected. You have to select the device you want by typing the ID target value (0 in our case) and press **I** key to confirm installation.

The program will install the driver. You must now restart the computer that will boot from the SD card, and mount the partitions defined. The drive C appears on the desktop.

Note that PPDRIVER does not need to be configured and can therefore be used immediately. Note also that it does not include FOLDER100. This was done on purpose not to waste any space for gamers.

6.3.3 Removable Medium Drive Support

The PPDRIVER driver provides support for removable medium drives (no need to configure). The driver detects media changes and reinstalls all partitions at the next disk access after the media has changed. You need to hit the ESC key to refresh the desktop.

6.3.4 Accessing Partitions

PPDRIVER allows access to the following type of partitions: DOS16B, TOS, TOS&DOS partitions.

Note that latest version of PPDRIVER allow to access TOS&DOS partitions created by HDDRIVER.

Remember that with TOS 1.04 the size of the partitions is limited to 512MB. It is possible to create several TOS&DOS partitions on a SD card with PPDRIVER, but Windows normally access only the first partition on a removable media. However it is possible to access multiple TOS&DOS partitions using the procedure describe in section 5.1 of [this document](#).

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6.3.5 Driver usage

One of the most interesting feature of PPDRIVER is the capability to select the active C partition during boot: just follow the on screen messages.

6.3.6 Loading CE_DD Driver

We also want the CE_DD driver to be loaded to access DOS formatted USB flash drives, the Network drive, and the Configuration drive. Because ID 1 is set to type TRAN and as the PPDRIVER normally does not block the boot loader chain (depends on TOS version), the CE_DD driver should load automatically. If this is not the case just add CE_DD in the AUTO folder.

6.4 HDDRIVER 9.x

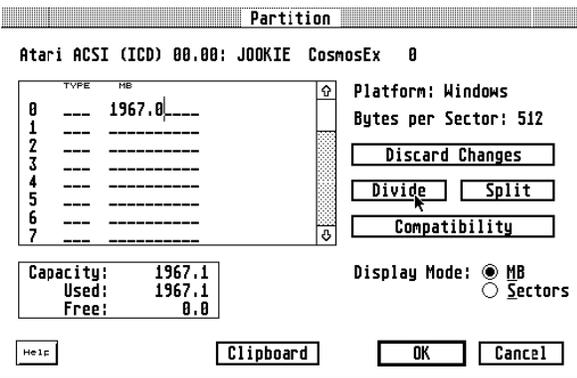
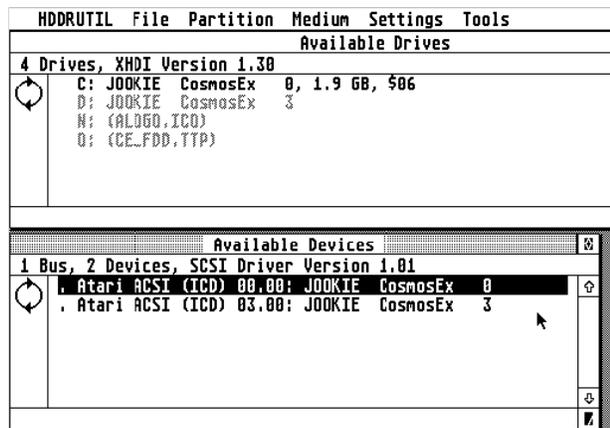
The HDDRIVER package is a commercial application that you can buy for 47 € from Uwe Seimet [HERE](#). This driver is very powerful and provides support for many hardware. Feature list [HERE](#).

6.4.1 Partitioning a drive

Start the **HDDRIVER.PGR** program. The driver displays a welcome screen and displays information about all the connected devices and eventually already existing partitions. Now start the **HDDRUTIL.APP** utilities.

Select the device JOOKIE CosmosEx device with ID 0 from the *Devices Window* and from the *Medium* menu select the *Partition* command.

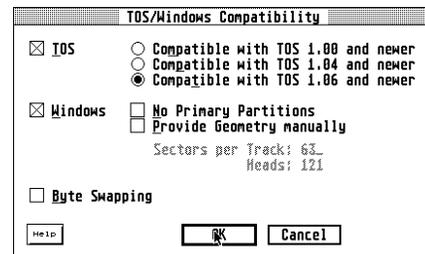
The Partition form will popup. First you need to define the type of partition you want to create



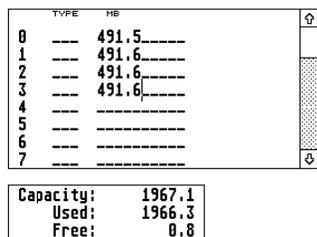
by clicking on the **Compatibility** button in the partition window. This opens the *Compatibility Option* window.

We want to create *TOS&Windows* partitions and therefore we check both the **TOS** and **Windows** checkboxes. Select the TOS level of compatibility you want with one of the radio buttons and leave the two checkboxes in the Windows section unchecked. Click **OK** this returns you to the partition window.

Once you have defined the compatibility



options for the partitions you are returned to the main partition



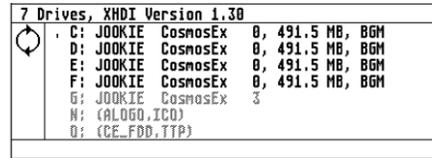
window. In the **MB** field you have to specify the size of every partition you want to create.

Enter the size for all the partitions you want to create. Remember that for example with TOS 1.04 the partitions must be less than 512MB. Verify also that the total size of all partitions you have defined is less than the available capacity.

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Click **OK** to start the partitioning and follow indication.

The Drives Window displays the created partitions. The program proposes to restart the system and it is better to select Now.

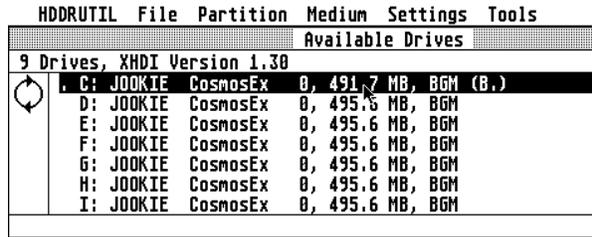


Drive	File System	Medium	Settings	Tools
C:	JOOKIE	CosmosEx	0, 491.5 MB, BGM	
D:	JOOKIE	CosmosEx	0, 491.5 MB, BGM	
E:	JOOKIE	CosmosEx	0, 491.5 MB, BGM	
F:	JOOKIE	CosmosEx	0, 491.5 MB, BGM	
G:	JOOKIE	CosmosEx	3	
H:	(ALDO,ICO)			
Q:	(CE_FDD,TFP)			

6.4.2 Enabling the Auto boot

Execute the **HDDRUTIL.APP** program. Select the Partition you want to use to boot from.

From the **File** menu select the **Install HDDRIVER...** command. A confirmation will be asked and a popup window will indicate that the driver has been installed. Do not quit yet the **HDDRUTIL** program in order to modify the configuration as described below.

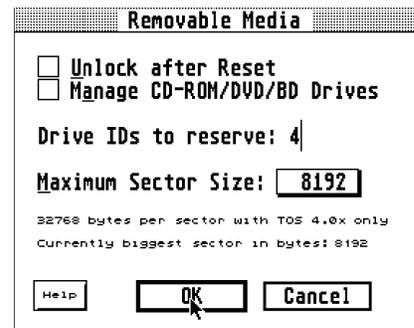


File	Partition	Medium	Settings	Tools
9 Drives, XHDI Version 1.30				
C:	JOOKIE	CosmosEx	0, 491.7 MB, BGM (B.)	
D:	JOOKIE	CosmosEx	0, 495.5 MB, BGM	
E:	JOOKIE	CosmosEx	0, 495.6 MB, BGM	
F:	JOOKIE	CosmosEx	0, 495.6 MB, BGM	
G:	JOOKIE	CosmosEx	0, 495.6 MB, BGM	
H:	JOOKIE	CosmosEx	0, 495.6 MB, BGM	
I:	JOOKIE	CosmosEx	0, 495.6 MB, BGM	

6.4.3 Configuring the HDDRIVER Hard Disk Driver

With HDDRIVER 9.x most of the default values required for **CosmosEx** are already set to what you want. The only thing you need to change are the values for removable medias if you intent to use them.

From the **Settings** menu select the **Removable Media...** command. You are presented a window with the Removable media options. Set the **Drive ID to reserve** to the maximum number of partitions to be expected on any of the media you plan to use. Set the **maximum sector size** to the larger value for all the partitions on all the media (usually 8192).



Removable Media

Unlock after Reset

Manage CD-ROM/DVD/BD Drives

Drive IDs to reserve: 4

Maximum Sector Size: 8192

32768 bytes per sector with TOS 4.0x only
Currently biggest sector in bytes: 8192

Help OK Cancel

6.4.4 Accessing Partitions

HDDRIVER can directly access

- DOS FAT16A partitions of less than 32 Mbytes.
- DOS FAT16B partitions of up to 2GB when used with **BigDOS**.
- TOS Partitions
- TOS&DOS partitions created by HDDRIVER.

Important Warning: never try to access TOS&DOS partitions created by PPDRIVER hard disk driver with HDDRIVER as they are not compatible.

Remember that with TOS 1.04 the size of the partitions is limited to 512MB. It is possible to create several TOS&Windows partitions on a SD card with HDDRIVER. All these partitions can be accessed by the TOS on Atari but on Windows you will need special drivers (refer to the procedure describe in section 5.1 of [this document](#)).

6.4.5 Loading CE_DD Driver

We need to load the CE_DD driver in order to access DOS formatted USB flash drives, the Network drive, and the Configuration drive. Because the HDDRIVER breaks the boot loader chain, the CE_DD driver is **not** loaded automatically. It is therefore necessary to place the CE_DD.PRG program into the AUTO folder of the boot partition on the SD card.

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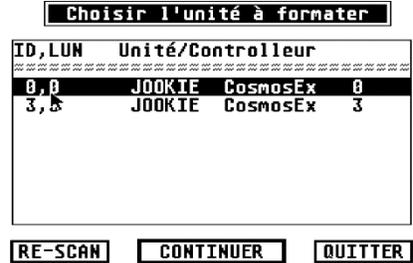
6.5 ICD AdSCSI Pro 6.5.5 Driver Package

This section presents the ICD AdSCSI Pro 6.5.5 hard disk package. This package used to be a [commercial package](#) but is now widely available as an abandon-ware. You can find it [HERE](#).

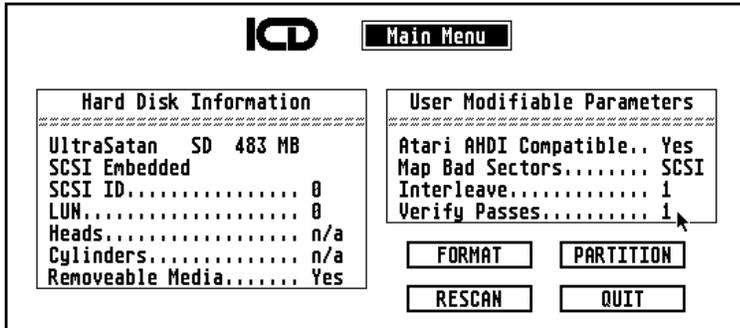
6.5.1 Partitioning a drive

Execute the **ICDBOOT.PRG**. The driver displays a welcome screen as well as information about all the devices connected and eventually the already existing partitions on the drive.

Now run the **ICDFMT.PRG**. After displaying a welcome screen the program will scan for hard drives and controllers. All the units found will be listed in a form. Select the CosmosEx Drive with ID 0 and click **CONTINUE**.



You will be brought to the main menu that displays some information, about the hard disk selected, on the left side and some user modifiable parameters on the right side.



Modify is the **Verify Passes** parameter (it is set to 1 initially). This parameter indicates the number of times each sector will be checked after partitioning to see if it is a bad sector.

Click **Verify Passes**: This will bring a new form. Set the **Passes** parameter to 0, to bypass the sectors verification, and then click **OK**.

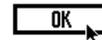
✎ If you do not set the Verify Passes parameter to 0 the partition operation will check all sectors in all the partitions on the drive and this can take a very long time on a large drive.

Click **PARTITION**. You are now presented the partition Main form. If the drive had already been partitioned you will see the values from the previous partitioning otherwise you will see some computed default values.

Change verify cycle passes?

- Options:
- 0: No test for bad sectors. Not a good option, except for SCSI drives.
 - 1: Quick verify (read all sectors once). May not find all bad sectors.
 - 2-99: Perform extended verify cycle. Do read and write of bit patterns on all sectors. Repeat as many times as specified. May find more bad sectors; will be MUCH slower.

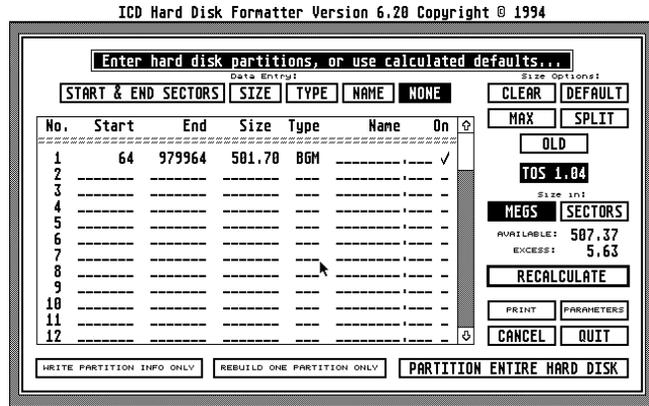
Passes: 0



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Now you have to modify the following parameters:

- **Size** for all the partitions that you want to create. At any time you can click **RECALCULATE** or hit return key to update the excess field (remaining space)
- **Type**: verify that it is set to BGM.
- **Name** is the name of the partitions. The **Show Info...** from the Atari desktop will display this value.
- The **On** column contains check marks for enabled partitions. Normally you always want to set a checkmark for all the partitions otherwise they will not be accessible (hidden).



Note that the size displayed and entered values are in MEGS (1000²) and not in megabytes (1024²).

Click **PARTITION ENTIRE HARD DISK**: This writes the partition information based on values you have entered into the MBR of the hard drive. It will also write the boot sector, FAT, and directory information to each partition.

WARNING: Before partitioning make sure you that you have a check mark in the **On** column for all the partitions. Otherwise the program will warn you. You can click **CANCEL** and set **On** flags.

The program asks you to confirm and displays progress information. As we are using a removable media (SD card) the program also displays a window indicating that a removable drive has been formatted and the maximum number of bytes for the logical sectors. Write down this value as you will need it to set the driver parameters and click **OK**.

Removeable media formatted!

During this session, a removeable-media hard drive was formatted. The largest logical bytes per sector was 2048.

You should use this value to change the maximum logical sector size in ICDBOOT, if this value is less than the current value. Use the Config option of HDUTIL to check or change this value.

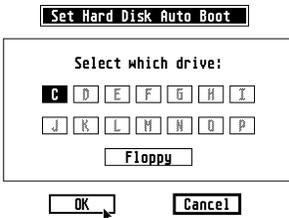
OK

A new window is presented to indicate that the partitions have changed and offers you to reboot the computer, click **OK**. During reboot the ICD driver should display all the drives connected and a list of all the partitions found.

6.5.2 Enabling and Disabling Auto boot

Run the ICD utility program **HDUTIL.PRG**. This brings you to the main menu.

To enable Auto boot, click **Boot** from the main menu. The program default to partition C selected. If you wish to boot from a partition other than C, click on that partition. Locate the **ICDBOOT.PRG** (usually on floppy drive A) and click on **OK**. You will be prompted to be sure that you have the proper disk in. The boot sector of the partition will be modified to reflect Auto boot status, and the **ICDBOOT.PRG** file will be copied to the root directory of the boot partition and renamed to **ICDBOOT.SYS**. When this is done you will be returned to the main menu.



D Hard Disk Utilities Version 5.14 Copyright © 1994



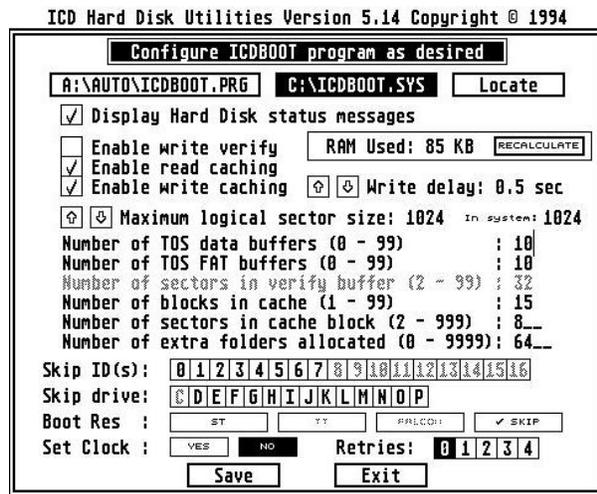
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6.5.3 Configuring the AdSCSI Hard Disk Driver

Run the ICD utility program **HDUTIL.PRG**. This brings you to the main menu.

Click **Config**: All parameters are grayed because you first have to select the driver you want to configure. Select the driver from your boot partition (for example **C:\ICDBOOT.SYS**). You should see all the current parameters of the driver installed. You probably do not want to change any of these parameters with the following exceptions:

- Max size for logical sector: If you are using removable media (e.g. SD cards on an UltraSatan) you must adjust the size for logical sector with the value that was reported at the end of the partitioning operation. This is done by pressing the up/down arrow buttons at the beginning of the line.
- Set Clock: you have to select **NO** for the clock option.



Click **Save**: The program displays a file selector: select save to **C:\ICDBOOT.SYS**. Now click the **Exit** button to terminate the configuration. The program returns to the main screen and you can now click on **QUIT**.

A new window will pop up to remind you that **ICDBOOT.SYS** has been modified and offer you to reboot the computer: click **OK**.

Note: The maximum size for logical sector is an important parameter as it reserves buffers required by the driver. If you are using several SD cards this parameter should set to the maximum of the values reported during formatting of all the partitions on all the cards.

6.5.4 Removable Medium Drive Support

The ICDBOOT driver supports removable medium drives. When the card is changed, the driver recognizes this the next time the drive is accessed, a “Disk Change” message is flashed in the upper right-hand corner of the screen, and the drive is logged again. If the new card has more partitions than the previous, these are added after the currently logged partitions. However with ICD it is not possible to reserve a number of partitions attached to a drive.

6.5.5 Accessing Partitions with ICD

The AdSCSI hard disk driver support the

- TOS partitions
- DOS FAT16A partitions. **Remember that these partitions are limited to 32MB.**
- AdSCSI Hard disk driver does not support XHDI 1.2 and consequently the BigDOS program cannot be used with this driver (i.e. no support for DOS FAT16B).

Important: Never try to access TOS&DOS partition with the ICD AdSCSI hard disk driver. You will get invalid data returned and you will probably **corrupt** the accessed partition.

6.6 CBHD 5.0.2

CBHD works fine with the CosmosEx device but it is a very old and not so good HD driver. If you are interested in using this driver please read [this document](#).

7. CosmosEx Utilities

7.1 Screencast

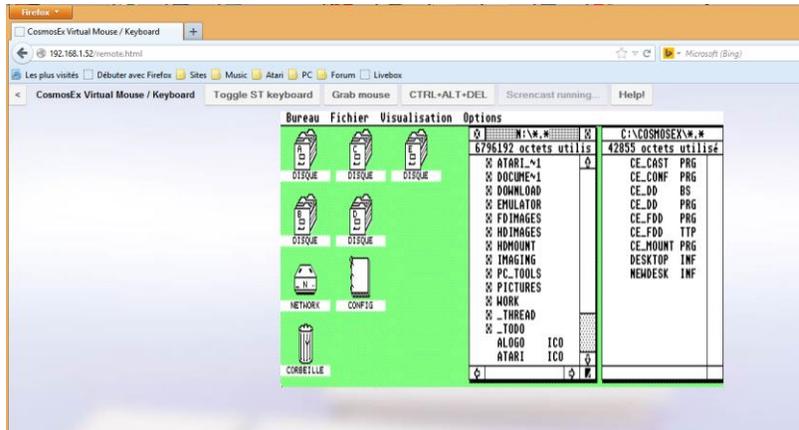
One very cool feature of CosmosEx is the capability to see and control your Atari from a remote Web browser. This is done by starting the **CE_CAST.PRG** on Atari. The CE_CAST program is a TSR that enable the screencast capability of CosmosEx. Once the program is started the ACSI blue LED should blink continuously and it is now possible to use a browser to remotely control your Atari.

Accessing the screencast in the browser is explained in [Access to CosmosEx from a Web Browser](#).

It is recommended to **Grab** the mouse to control your Atari.

```
CosmosEx screencast driver ]
[ ver 2014-08-17 ]
Looking for CosmosEx: 0
CosmosEx ACSI ID: 0
```

Screencast installed. Press a key.



To use this feature you need:

- To [setup the network](#) correctly.
- To have the IKBD injector installed
- The refresh rate of the screen cast images is dependent of the value you have entered in the [Other](#) page of the configuration

7.2 Loading images for the floppy emulator

CE_FDD.PRG Allows to load images in CosmosEx device for floppy emulation.

CE_FDD.TTP allow to load one image

7.3 Configure mounted drive

CE_MOUNT This tool is used to configure drives. It shows what drive letter is assigned to what drive. Pressing letters 'C' to 'P' unmounts the corresponding drive. If you use USB removable drive, then you should do this to avoid data loss as this does sync and unmounts the drive.

8. CosmosEx Web Browser

It is possible to access the CosmosEx device from a Web browser. To use this feature you need:

- A network connection: [Ethernet cable](#), or Wi-Fi plug
- A properly [configured network](#)
- That the CE_DD driver is loaded

During boot time the CE_DD driver display the IP address of the CosmosEX device. Use this address in your browser. Just enter this address in the browser for example <http://192.168.1.52/>

You will be presented this page.

[Home](#) [Manual](#) [Floppy](#) [Remote](#) [Config](#)

Welcome!



You successfully connected your [CosmosEx](#) to the network.

This start page provides important links for your device.

- the [manual](#)
- the [remote](#) - remote control your ST from your browser with this virtual keyboard and mouse
- the [floppy](#) - upload and activate disk images for floppy emulation
- the [config](#) - like ce_conf.prg, but with your webbrowser
- the [debug information](#) - show some information about your CosmosEx
- the [credits](#) - learn about all the opensource components used to build this little webserver

You can reach the different pages by clicking on the links from the home page or from the menu on the top of the page.

The manual link direct you to Jookie CosmosEx manual page http://joo.kie.sk/?page_id=415. The credit page gives you information about the open sources project used by CosmosEx Web browser.

8.1 The Remote Page

This page allow to control remotely you Atari. When you reach the page you will see several button at the top of the page and below a help window that gives information on how to control the Atari and the screen cast display. To close this help window click on the X on the upper right corner of this window (highlighted in red in this picture).

The buttons are:

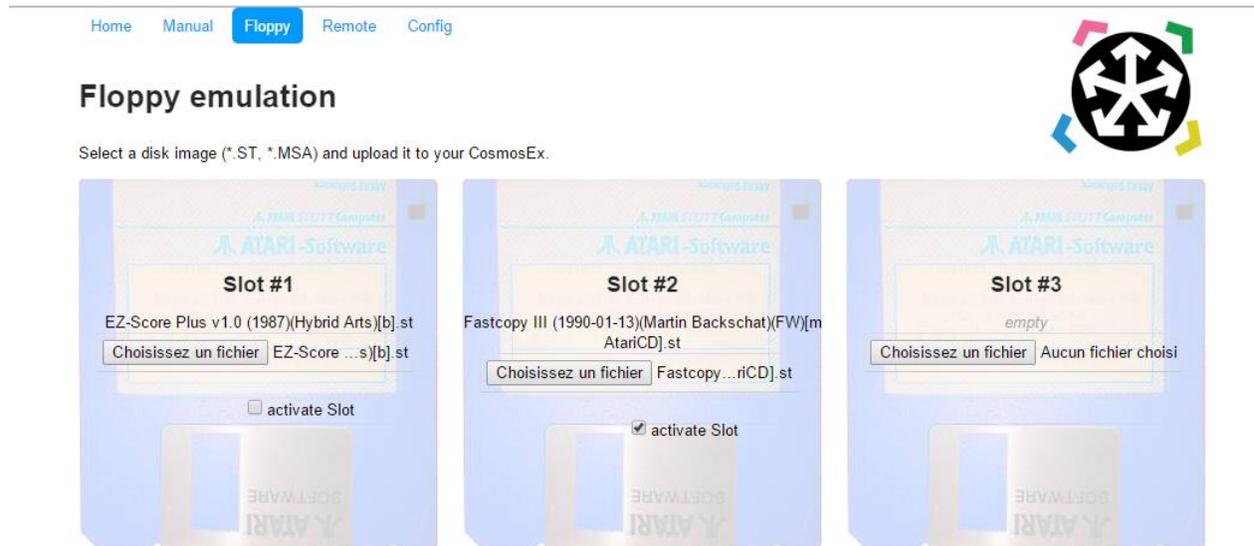
- Toggle ST button: This toggle an virtual QWERTY keyboard at bottom of the page.
- Grab mouse: button to attach your mouse to the emulation window. Press ESC to leave this mode.
- CTRL+ALT+DEL allows to remotely reset your Atari. It is not possible to reconnect remotely as you need to manually restart the CE_CAST.PRG on the Atari.
- Start Screen cast: allows to start the remote control of the Atari. See [screencast](#) section.
- Help: redisplay the help window.



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8.2 The Floppy emulation

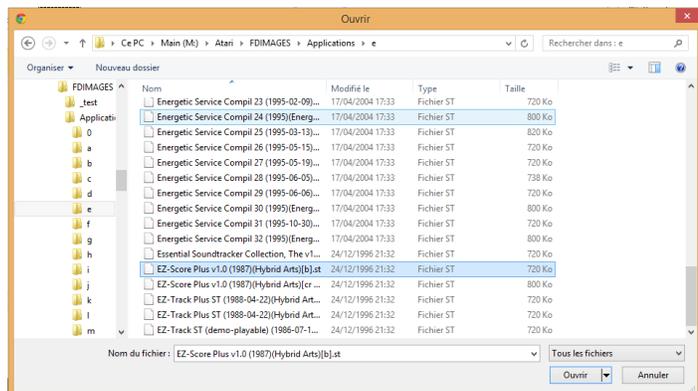
This is another nice feature. You can now download directly from your machine a floppy image to the CosmosEx floppy emulator. The page presents the three available floppy slots.



To load an image just click the select file button. This opens a file selector window and



you just need to select the file you want (currently .st or .msa files). You now need to upload the file on the Atari by clicking the Upload button.



Finally you need to select among the three possible images by clicking the active slot checkbox. It is now possible to use the floppy emulation either directly on the machine or remotely using [screencast](#).

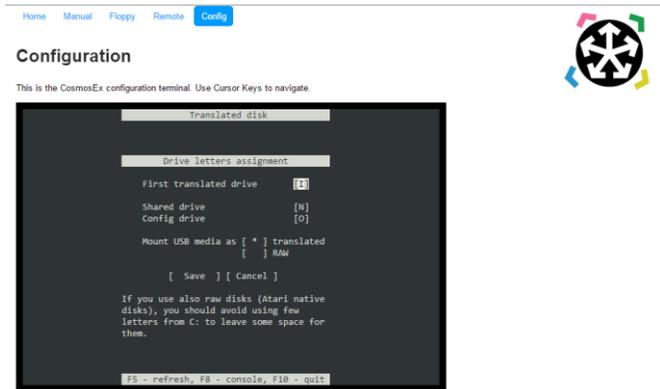
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8.3 The Configuration page

The configuration page is another way to access the configuration utility. Use the configuration utility as described in the [Configuration of the CosmosEx device](#) section. Therefore you need to use the keys for the different options and not the mouse.

8.3.1 Debug info Page

This page display information on the CosmosEX device.



9. Advance information

9.1 Translated versus Raw Drive

- A RAW drive is accessed by a TOS hard disk driver as sectors and no additional logic is done. That means that the hard disk driver handles partitions, directories, and so on. RAW specification always applies to SD card and also applies to USB media if the “Mount USB media as” option is set to RAW (some ACSI IDs have been set to type RAW).
- If you use media in translated mode, the media will be mounted in Raspberry Pi, and the CE_DD driver will make this media available as TOS drive letter. There shouldn't be a limitation on the partition size (although there might be some TOS limitations on how many directory items you might have in a single folder, or how deep can you dive in the directory structure). Note that TOS doesn't know anything about that media, it only uses GEMDOS functions to search for files and directories, and uses GEMDOS file and directory functions to do something with those files and directories. Therefore TOS shouldn't have problems even with very big partitions on translated drive. If the media contains several partitions they will be accessible through several TOS drive letters. It is interesting to note that the driver takes care of converting long file name on DOS partition into unique 8.3 upper-cased name.

9.2 Login to the Raspberry Pi system

Sometimes it can be useful to login to the Raspberry Pi system of the CosmosEx device. This can be accomplished by:

- Using a USB keyboard to input commands and a monitor/TV connected to the [HDMI output](#) to display results. At the end of the boot sequence you should see a login prompt on the monitor saying 'username: '. This type of connection does not require to be connected to a network.
- Using an SSH shell (on Windows you can use the program [PUTTY](#)) to connect at the CosmosEx IP address using port 22. This connection requires that the CosmosEx device is connected to a network.
- Using the configuration tool. During [configuration](#) you can press the F8 key to switch to Raspberry Pi Linux terminal. Pressing F8 again return you to normal configuration screen.

In the first two cases you must login as “**root**” with the password “**ce**”.

9.2.1 Updating the Raspberry Pi system

This an important feature to set your device to the latest version. Once logged on CosmosEx machine as root you can type:

```
cd /ce
wget http://joo.kie.sk/cosmosex/scripts.zip
unzip scripts.zip
chmod 755 *.sh
./ce_update.sh
sync
./ce_start.sh (or turn off and on again)
```

That will download the newest software and apply it to your device. After that you can turn off the device, turn it back on and see if your ST behaves better.

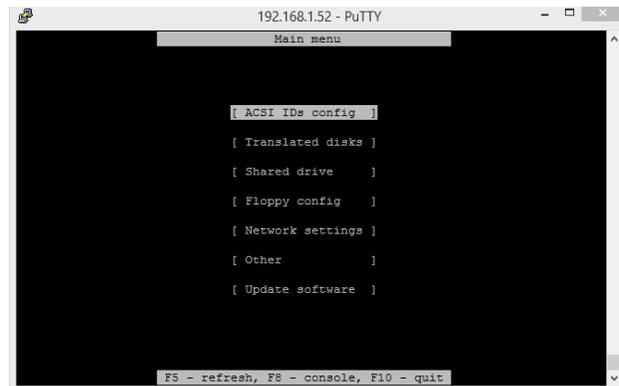
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9.2.2 Running configuration from the Raspberry Pi system

If for some reason you are not able to run the configuration program on your Atari it is now possible to run it from a console login. From a system prompt type

```
/ce/ce_cofig.sh
```

This gives you access to the configuration tools as described in [Configuration of the CosmosEx device](#) with the exception of the F8 key which is useless.



9.2.3 Problem mounting shared drive

Once logged on CosmosEx machine as root you can check the mounted share with the command

```
mount | grep shared
```

It should return the currently mounted share or an empty line if nothing is mounted. In that case you can try to mount the share using the following command:

```
mount -v -t cifs -o gid=1000,uid=1000,username=YOUR_USERNAME,password=YOUR_PASSWORD //SERVER_IP/SHARE_NAME /mnt/shared
```

Where you have to replace all capital letters with appropriate values. If you are getting an error Device or resource busy you first have to unmounts it (umount /mnt/shared). You can find if the mount was executed correctly by using the line

```
ls /mnt/shared
```

You should see the content of the shared directory. Otherwise you will see the files mount.err that contains information while the mount failed.

9.2.4 Network problem

For more information read [CosmosEx network not working - and how to solve it...](#)

9.3 Using WinSCP to transfer data

TODO

Use WinSCP to transfer FTP via SSH

If you need the files which will work with his device (his versions of firmware), just download the files using some tool (e.g. WinSCP, using SCP protocol) to your PC - log in as root (password is 'ce'), the whole content of the configuration drive is in the folder: /ce/app/configdrive

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9.4 Installing CosmosEx SW on Raspberry Pi SD Card

When you receive the CosmosEx device, a customized Linux is installed on the **internal** SD Card of the Raspberry Pi. For some reasons (e.g. you completely destroyed your Linux, you want to load a new image that support WiFi etc.) you may need to install/reinstall the customized Linux software on your CosmosEx device. This can be done following this procedure.

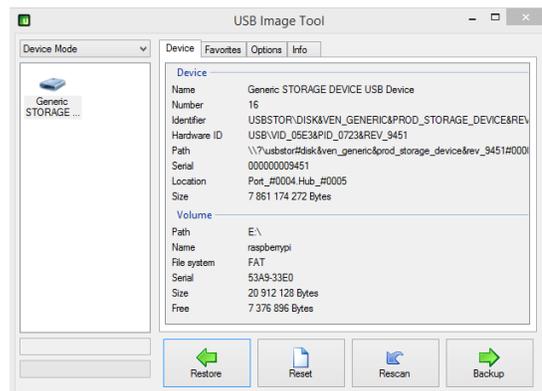
The first thing to do is to remove the SD Card from the Raspberry Pi. You can access this card without opening the CosmosEx box. The card is visible under the Floppy connector but it is located relatively far and therefore not easily accessible. For detail on how to install/uninstall the card please have a look at the "[CosmosEx - mounting and connecting or Raspberry Pi](#)" video.



Now you need to get the latest SD card image from Jookie site named "[Raspberry Pi SD card image for running the device](#)" provided as a zip file (about 37MB). Unzip the **rpi-ce-run.img** content.

To install the image on the SD card it is recommended to use the [USB Image Tool](#) from Alexander Beug. Download the [latest version](#) (V1.70 at the time of this writing) from [this page](#).

Place you SC card into a card reader on your PC and run the USB Image tool (it requires [Microsoft .NET Framework 3.5](#)). Place the USB Image tool in device mode and select your SD card. Be sure that you have selected the right card because installing the image on this card will **destroy its content**.



To install the image click on the restore button and select the **rpi-ce-run.img** file (about 172MB). A confirmation will be asked and the restore should proceed quickly as we are writing only a small image.

Now reinstall the SD card into the Raspberry Pi SD Card reader following the video described above (make sure that the card is fully pushed in).

Reconnect the CosmosEx device and starts your Atari. Be aware that during the restore operation your CosmosEx device was reset to "factory" settings and therefore you will need to reconfigure it.

You need to update the firmware/software to the latest version as the Linux image does not contains the latest versions. See [Software and Firmware Updates](#) section for details.

10. Hardware information

10.1 Making a CosmosEx ACSI Cable

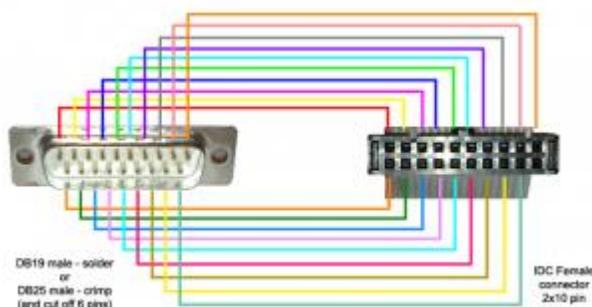
This cable is used to connect the IDC20 male connector on the CosmosEx device to the DSUB19 Female connector on the Atari.

Pin	Name
1	Data 0
2	Data 1
3	Data 2
4	Data 3
5	Data 4
6	Data 5
7	Data 6
8	Data 7
9	Chip Select
10	Interrupt Request
11	Ground
12	Reset
13	Ground
14	Acknowledge
15	Ground
16	A1
17	Ground
18	Read/Write
19	Data Request
20	Not used



ACSI cable for CosmosEx has a simple 1:1 connection between a DB19 male connector and an IDC20 female connector. This means that the left upper pin of DB19 is connected to left upper pin of IDC20 connector, the left lower pin of DB19 is connected to left lower pin of IDC connector, and the right upper pin of DB19 is connected to the right upper pin of IDC connector; meaning that the 1st row of DB19 is connected to 1st row of IDC, and the 2nd row of DB19 is connected to second row of IDC.

To make this cable you can crimp a flat ribbon 20-wires cable in the IDC20 connector. On a DB19 female connector, solder the 1st wire to the 1st pin in the top row, the 2nd wire to the 1st pin in bottom row, the 3rd wire to the 2nd pin in top row and so on...



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10.2 Making a CosmosEx Floppy Cable

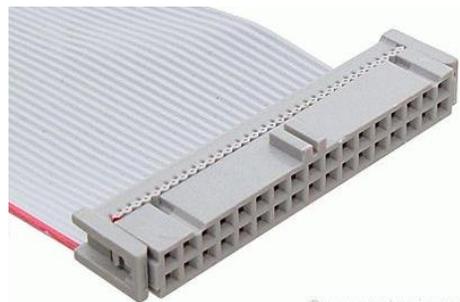
This cable is used to connect the IDC34 male connector on the CosmosEx device to the DIN14 female connector on the Atari.



Description	Name	FD Connector	DIN14 Connector
Index	INDEX	8	4
Device Select 0	DS0	10	5
Device Select 1	DS1	12	6
Motor on	MTRON	16	8
Direction	DIR	18	9
Step	STEP	20	10
Write Data	WDATA	22	11
Floppy Write Enable	WGATE	24	12
Track 0	TRK00	26	13
Write Protect	WPT	28	14
Read Data	RDATA	30	1
Head Select	SIDE1	32	2
Ground	GND	All odd pins	3, 7



You can use a 14 pins DIN plug on one side and a female IDC34 connector on the other side and connect the pins as indicated in the table.

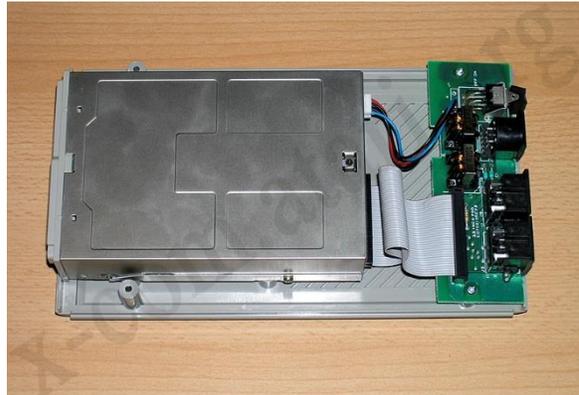


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However as the DIN14 connector is now very difficult to find I present here a solution based on reusing directly the control board of an Atari SF314 external floppy drive.

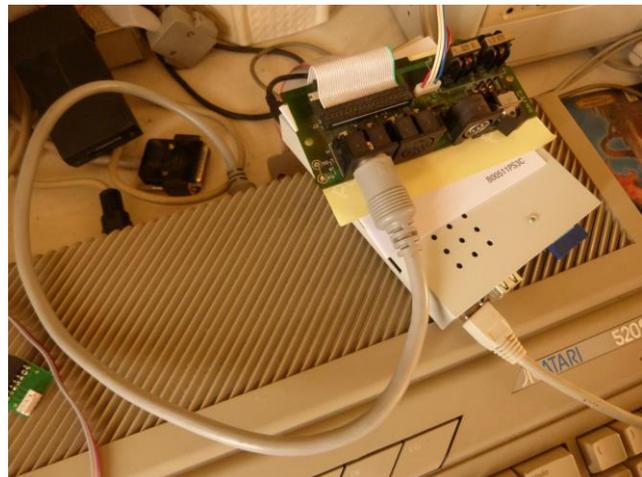
The Atari SF314 has an internal control board that is used to

- Connect two external DIN14 female connectors to an internal IDC34 female FD connector. This cable is connected to the internal floppy disk.
- Connect an external DIN5 female connector to an internal Berg 4 pins FD power connector. This cable is connected to the floppy disk power connector.



Normally the SF314 is connected to the Atari using a DIN14 male to DIN14 male cable and is connected to a power supply with a DIN5 male connector.

It is possible to extract and reuse the SF314 control board. We can just use the floppy connection alone or in conjunction with the power supply.



Check carefully that the Floppy disk connector is **correctly oriented**. In my case it had to be mounted “upside-down” (for that I had to remove the polarizing-tab) in order for the pin 1 to match.

You can power the CosmosEx device with the SF314 power supply. In that case you connect the DIN5 connector of the power supply to the control board and the Berg 4 pins to the CosmosEx berg connector.

10.3 Swapping floppy Drive A and B

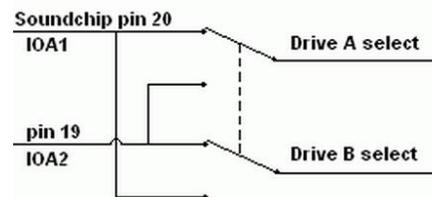
We have seen that you can mount the CosmosEx device inside an Atari and use its floppy emulation as drive A. You can connect at the same time an external floppy drive as drive B.

We have also seen that you can keep your Atari internal floppy as drive A and use at the same time the CosmosEx floppy emulation as Drive B.

But what about being able to swap drive A and B in these two configurations?

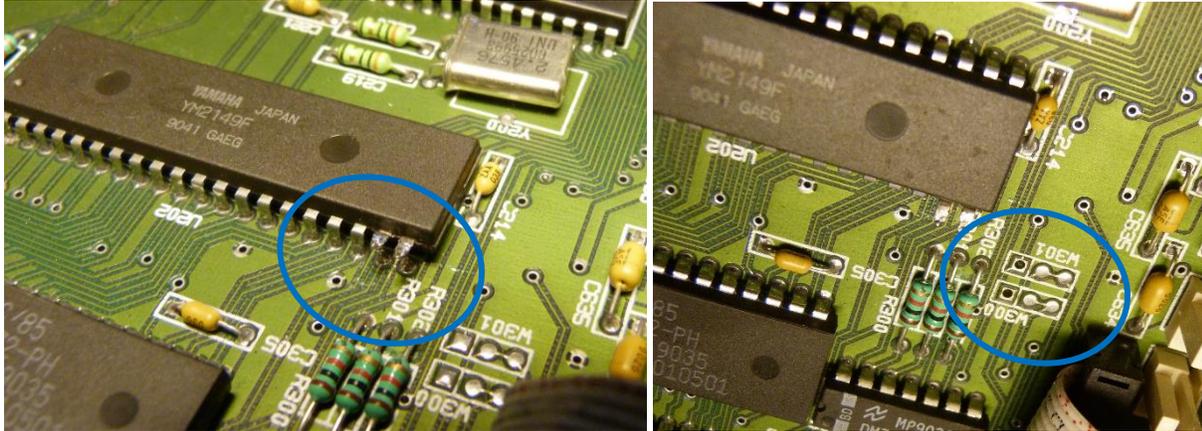
Well this is feasible by using a floppy drive selection switcher. The two drive select signals come from the sound chip on pin 19 and 20. So the principle is that if we insert an inverter on the selection lines then we can swap the drive A and B selection at the flip of a switch.

The procedure has been described in Atari-Forum [HERE](#) for an Atari STF and [HERE](#) for an Atari STE.

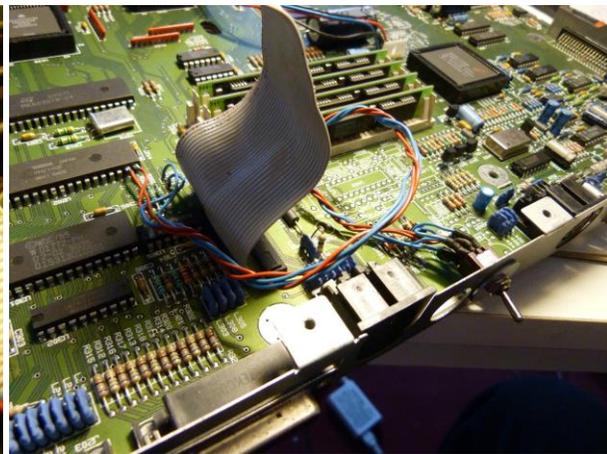
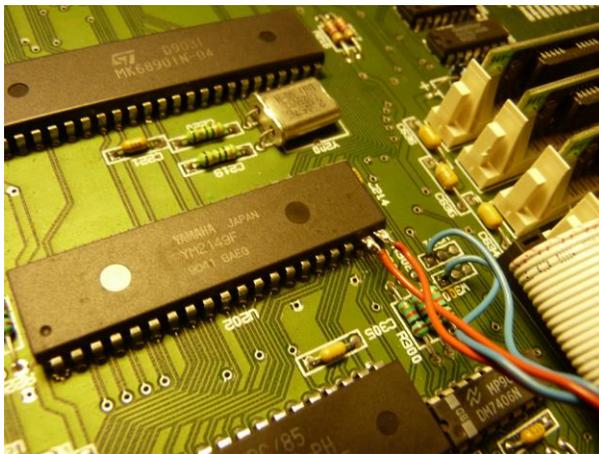
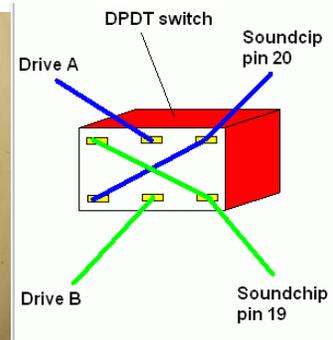
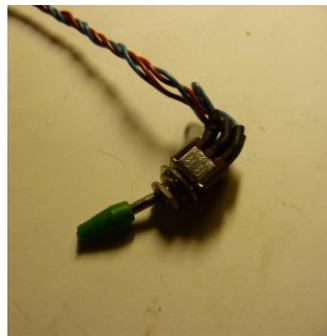


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Here I provide a quick description for installing a drive switcher on an Atari STE. You first have to completely disassemble your Atari so you have full access to the motherboard. Now we need to locate the YM2149F sound chip and the two straps W300 and W301. The first operation consist in cutting the selection paths. In most cases the sound chip is soldered and there is no other choice than to cut the pins 19 and 20 (the last to pins). Once cut, the pins need to be unfolded so we can easily solder a wire to them. We also need to remove the solder on pin 1 of the W300 and 301 straps.



Now we need to prepare the inversion circuit. In this example I use 2 red wires connected at the center pin of the switch and 2 blue wires at edge pins of the switch. Also do not forget the wires that connects the other edge and causes the inversion of the signals. Now we just need to solder the two red wires to the two pins of the sound circuit and the two blue wires to the two pins 1 of the straps (order does not matter)



In my case (no RF modulator) the switch is mounted mechanically in one of the hole between the DIN14 floppy drive connector and the DIN13 video connector.



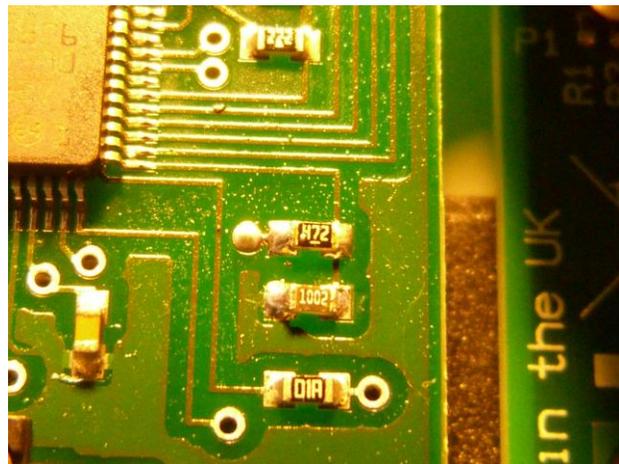
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10.4 IKBD Injector Problem

You have connected CosmosEx through the IKDB injector to the IKDB port of your ST, but it still doesn't work? Here's a couple of things to check...

- First check that it is connected correctly see [IKBD Injector Connection](#)
- Second check your hardware: R1 should be 4K7 (472 written on it) and R30 should be 10K (1002 written on it). If this is not the case then you need to fix it.



[Detailed information on IKBD injector problem on Jookie's page](#)

10.5 Using CosmosEx device with other ACSI devices

If you are running CosmosEx with other ACSI devices (for example an internal hard drive) on the ACSI bus, you have to make sure that there are no ACSI ID collision as the devices would block each other. Remember that CosmosEx comes with the default ACSI ID set to 0 and therefore if you have an internal hard drive with ID 0 it won't work.

So before you connect the CosmosEx device you should run a program that scans the DMA bus and enumerates all the ACSI ID used. This kind of program is available with ICD pro for example. Check that this configuration does not use ID 0.

For example if you internal hard disk uses ID 0 you have two choices:

- Disconnect CosmosEx, and configure the ACSI ID of internal hard drive to something other than 0. Then you can connect the CosmosEx device with the default ID 0
- Disconnect the internal hard drive, connect CosmosEx, and using the CosmosEx configuration tool change the ACSI ID used by CosmosEx to something different than 0. Now you can reconnect the internal drive

Same considerations would apply if you are using CosmosEx for example with an UltraSatan drive.

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10.6 Atari STe Faulty DMA chip

Before we use the CosmosEx device it is a good idea to check if we do not have a **bad DMA chip**.

Some early STe computers released by Atari were equipped with a faulty DMA chip. As this chip handles among other things the hard disk using one of these computer with CosmosEx can result in lost or damage data. Atari has provided ways to circumvent problem with their hard drive and associated software but it is not clear that it works with all combination of CosmosEx and hard disk drivers.

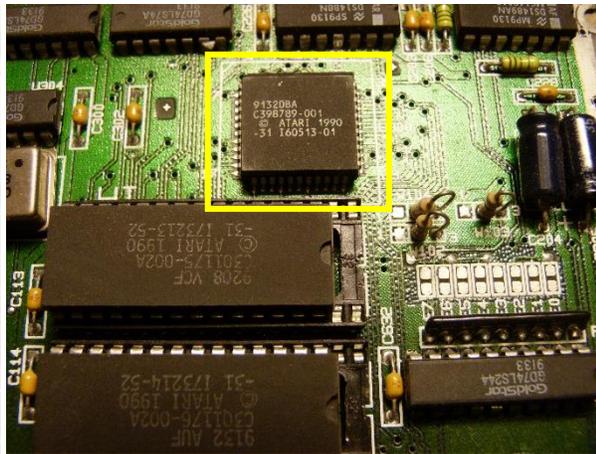
First locate the DMA chip marked as U300. You will find it under the floppy drive (therefore you first have to remove it!) above to the TOS ROM chips.

If the chip is marked **C025913-38** or **C025613-38** then you are in trouble. Note that this is often associated with a handmade patch using a piggy back circuit as shown in the right picture below.



In that case you probably need to buy another Atari or at least change the DMA chip.

A correct DMA chip should indicate **C398379-001A** or if you are lucky enough to have one of the latest Atari STe released by Atari you will have a “square” DMA chip marked **C398789-001**



11. FAQ / Advices

In this section you will find some FAQ and advices

- In almost all *practical cases* you must connect the CosmosEx device to the Atari using the ACSI cable. The only two exception I can think off are using CosmosEx as a Mouse adaptor or a Linux box!
- Probably one of the first thing you should do is to setup a network connection between the CosmosEx and your local network. Through the usage of an SSH shell you will be able to restore your system to a working condition in most cases.
- It is a good idea to keep all the files from the configuration drive on a floppy disk (do not forget to update when new version are available). This allow for example to reconfigure your system if for some reason you cannot access the ce_conf program, or to load the ce_dd driver.
- **Do not forget to update the CE_DD.PRG program in your AUTO folder each time this program is updated in mainapp.**

12. Current Status

12.1 Bug list

- CE_DD driver bombs (4 bombs) when loading (TOS2.06?)
- ALT + characters not working correctly on USB keyboard
- Display ID 0 trans for new/reset device
- Writing to FD not working
- Problem with tree that contains Long File Names (size reported incorrectly and different number of files copied).

12.2 Wish list

- Support .SCP images
- Proper DSUB19 connector or shift connector on the other side ...
- With CE_CAST ACSI led not blink continuously
- save/load configuration from file" option in the CE configuration tool
- Display of Ethernet information
- Boot from network shared drive?

12.3 Tests to be done

- Removable media
- Plug Ethernet cable after startup
- Power supply from USB
- Reset all settings
- KB & HDMI login + open window in Atari
- Test TTP app to load ST and MSA files
- Boot from floppy (ATL key)

13. Links

- [CosmosEx - new device for your Atari ST](#)
- [CosmosEx - updates](#)
- [How to get your CosmosEx working](#)
- [Wishlist](#)
- [Bug reports](#)
- [CosmosEx network not working - and how to solve it...](#)
- [Compatible Atari models with CosmosEX](#)
- [Anyone used Ppera's HD driver?](#)
- [Help me get started with SD HDD?](#)
- [WiFi setup](#)
- [Starting Problem](#)
- [Some technical questions](#)
- [Cannot Config CosmosEx](#)
- [Floppy Emulation issues](#)
- [Can't get this thing working \(Everything OK now!\)](#)
- [Create FAT partition under ICD Pro](#)

<http://vincent.riviere.free.fr/soft/m68k-atari-mint/>

<http://www.alexpage.de/usb-image-tool/download/>

[http://www.raspberrypi.org/forums/viewt ... 44&t=53118](http://www.raspberrypi.org/forums/viewt...44&t=53118)

[http://www.raspberrypi.org/forums/viewt ... 63&t=24982](http://www.raspberrypi.org/forums/viewt...63&t=24982)

[http://raspberrypi.stackexchange.com/qu ... tput-power](http://raspberrypi.stackexchange.com/qu...tput-power)

[http://www.element14.com/community/comm ... r-problems](http://www.element14.com/community/comm...r-problems)

14. Document History

- V0.9 January 06, 2015 – Documented [Installing CosmosEx SW on Raspberry Pi SD Card](#) and [Wi-Fi](#).
- V0.8 December 3, 2014 – Document new remote features (chapter dedicated to Web server).
- V0.7 November 13, 2014 – Added pictures for configurations pages. Corrected error in configuration. Added information about screencast, login to RPi, configuration from SSH. Added SSH section.
- V0.6 October 18, 2014 – Modified configuration information based on modification of MainApp 2014-10-18. TRAN type has been renamed to CE_DD type and F8 added.
- V0.5 October 16, 2014 – Clarified section on ACSI configuration + miscellaneous fixes.
- V0.4 October 7, 2014 – Added full description for internal mounting of CosmosEx device. Added example of drive selection switcher. Added section on faulty DMA. Fixes and improvement.
- V0.3 October 3, 2014 – Added HD driver description, ACSI & FDD cables description, many fixes and improvement.
- V0.2 September 30, 2014 - First public release
- V0.1 September 15, 2014 – Development version