

# **SuperVidel**

## **Installation manual**

revision 5

# 1 History of changes

Revision	Date	Changed
1	12-04-30	First release
2	13-03-14	Added photos of motherboard clock cable assembly. Updated foreword. Updated "Standard falcon case" description. Updated "Standard falcon case with one more board" description. Rewrote section about Motherboard clocks, with new pictures. Added picture to CT60-jumper section. Added Svethlana installation section. Updated SV-JTAG.TTP section to SVUPDxxx.GTP.
3	13-07-01	Wrote Extender section and added pictures. Updated Motherboard clock cable section with new pictures. Updated description of SVUPDxxx.APP program.
4	13-07-04	Added FAQ section. Added CT60 updating to preparations. Updated driver installation.
5	13-08-19	Added FAQ question for updating the ABE and SDR of the CT60.

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## 2 Foreword

Thank you for buying the SuperVidel!

It has more or less been a work in progress since before the CT60 was released, but a full time project since 2008. We who have developed it hope that you will be as pleased using it as we are.

Even though the SuperVidel is fully usable in its current state we have a list of stuff that may be added or optimized in the VHDL and software code after delivery. Some of those features can be found in italics on the SuperVidel project page at [nature.atari.org](http://nature.atari.org).

We who have worked on the SuperVidel are:

Henrik Gildå - Hardware design, VHDL code, SW tools

Torbjörn Gildå - VHDL code, Hardware design, SW tools

Peter Persson – XBIOS, VDI, NVDI drivers and patches

This manual first discusses preparations that you need to do depending on which type of casing you have. Then the general installation chapter gives you the option of better Videl compatibility by soldering two wires on the motherboard. Also discussed is complications made by using more boards on the CT60 than the SuperVidel in a standard falcon case.

## 3 Installation preparations

Before you can install the SuperVidel you need to update your CT60 to the latest ABE and SDR versions. These are 7F and 7D respectively at the time of writing. You should also flash the CT60 with TOS version 1.03c. 2.01 seems to work too, but we've had the problem that it suddenly stopped booting.

Then you are ready to install the SuperVidel.

**Turn the power OFF and disconnect the PSU power cable from the wall socket, before starting any work. There is otherwise power on the +5VSB line even though the computer is off.**

How to install the SuperVidel depends on what type of falcon case you have and if you have other boards to fit on the CT60 like an EtherNat or CTPCI (the Svethlana doesn't count here). Consider these 3 cases:

1. Tower casing. Go to [Tower or other large casing](#)
2. Original falcon casing with only a SuperVidel (+optional Svethlana). Go to [Standard falcon case with only a Supervidel on the CT60](#)
3. Original falcon casing with SuperVidel + either an EtherNat or a CTPCI (+optional Svethlana). Go to [Standard falcon case with the Supervidel and one other board](#)

### 3.1 Tower or other large casing

This casing is the easiest to install in. You can have several boards on top of the CT60 as long as the casing allows it. Note that the CT60 bus will get more delays and noise (signal reflections) the more boards you add, so you can't run the 68060-clock as fast as before.

No other special considerations apply, so go to [General installation](#).

### 3.2 Standard falcon case with only a Supervidel on the CT60

This case is almost as easy as the Tower casing. You can have an optional Svethlana ethernet board on the SuperVidel too. But you need to remove a screw from under the internal keyboard IF you don't install the CT60 Extenders below the CT60. See the next section about the keyboard.

#### 3.2.1 Remove a screw from the internal keyboard

If you intend to keep the original keyboard inside the original falcon case, you need to remove a screw from

under the keyboard and put insulating tape on a bridging pin. Otherwise they may short circuit some pins on the SuperVidel. See the red rings in the image below.



becomes



Then go to [General installation](#).

### **3.3 Standard falcon case with the Supervidel and one other board**

If you intend to put the SuperVidel on top of a CTPCI or put an EtherNat on top of the SuperVidel (with no CTPCI below it) and use the internal keyboard you need to follow these instructions.

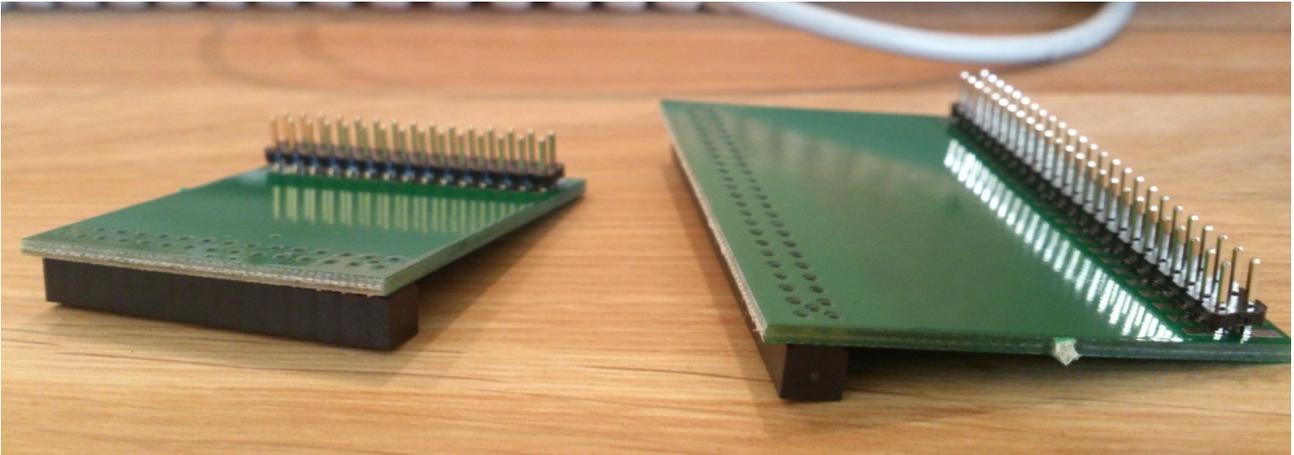
Note the following:

1. Only two boards fit on the CT60. A third board will hit the ceiling of the standard falcon case.
2. If mounting the CTPCI requires putting extra connector sockets between the CT60 and the CTPCI, you **can not** fit a SuperVidel also on top of the CTPCI, since it will hit the ceiling.
3. We have not tested if a SuperVidel + CTPCI **and its PCI slots** actually fit inside a standard falcon case. You may have to remove the floppy drive to accomplish this.
4. See the [CTCM](#) section for a discussion of possible height problems with the CTCM.

The biggest work in this configuration, however, is that you need to fit the CT60 Extender boards below the CT60. See CT60 Extender installation. Then go back here and read [General installation](#).

### 3.4 CT60 Extender installation

Solder the included connectors to each small PCB as the image shows:



Then insert each male connector (pins) from below into each female header on your CT60 board. Put the CT60 with extenders on your Falcon030 motherboard, and connect all cables needed to test that you have soldered the Extender boards correctly. Make sure the falcon works before taking the next step.

Now disconnect the CT60 and Extenders from the falcon motherboard and remove the Extenders from the CT60. **We take absolutely NO responsibility for damage that you may cause to your CT60 while doing this.** Easiest may be to cut the plastic of each pair of pins and then desolder the pair at the same time while pushing it out of its holes.

When you are done, solder the Extenders into the free rows of holes so the Extenders are facing you:



Note that this shows a prototype of the Extender boards, hence the silver colour. Also note that the longer Extender is hidden below the CT60.

Before putting the CT60+Extenders back on the falcon motherboard, put something between the CT60 and the longer Extender board (like a thick piece of eraser/rubber) to give mechanical support when pushing the CT60 down.

## 4 General installation

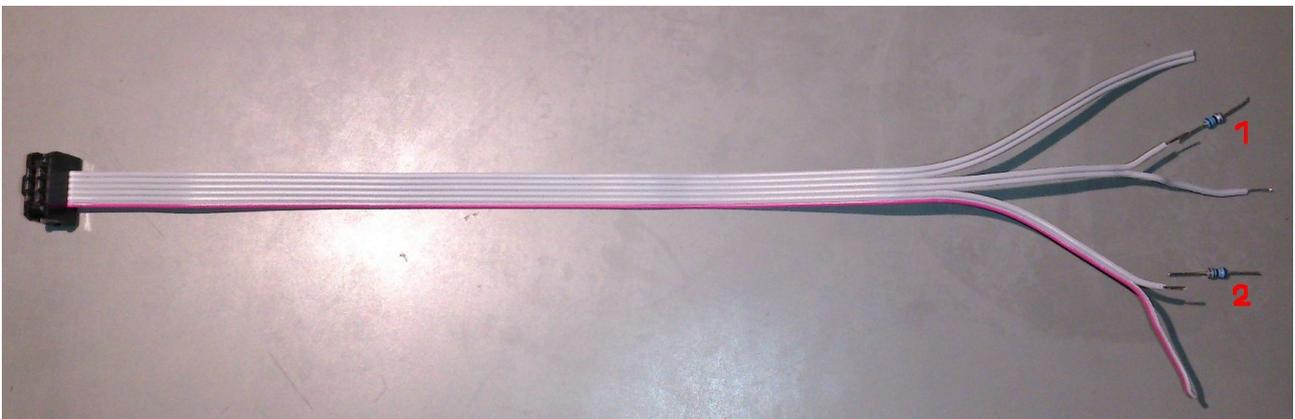
These steps apply to all kinds of falcon cases. Do the steps below **before** putting the SuperVidel on the CT60.

### 4.1 Motherboard clocks

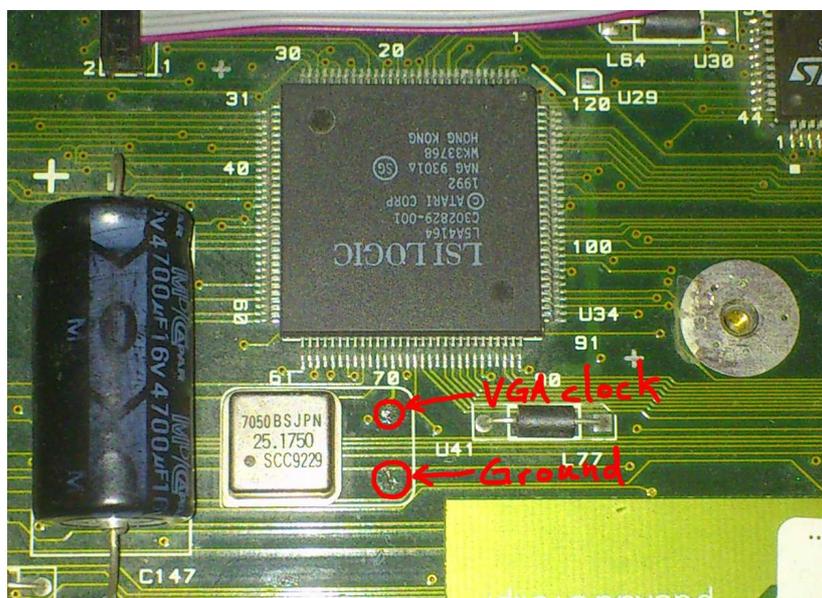
The SuperVidel mimics the Videl output by generating a video clock that differs by only a few ppm in frequency to the real 25.175MHz VGA clock on the motherboard. But since they can never be exactly the same, an emulated Videl output from the SuperVidel will slowly drift out of sync with the Videl video signal over time. This is no problem if you run **desktop stuff only**. Then you can skip this part and go to [CT60-jumper](#)

But if you want to play games which use vertical sync, and especially those that use horizontal sync too (used for palette swapping), you will need to feed the original motherboard video clock and Vsync into the SuperVidel. They are not available as signals on the CT60 connectors, so they must be fed through a separate small flat cable to the JP7 connector on the SuperVidel. Right now the SuperVidel doesn't support RGB modes, so we'll just focus on feeding the VGA clock into the SuperVidel here.

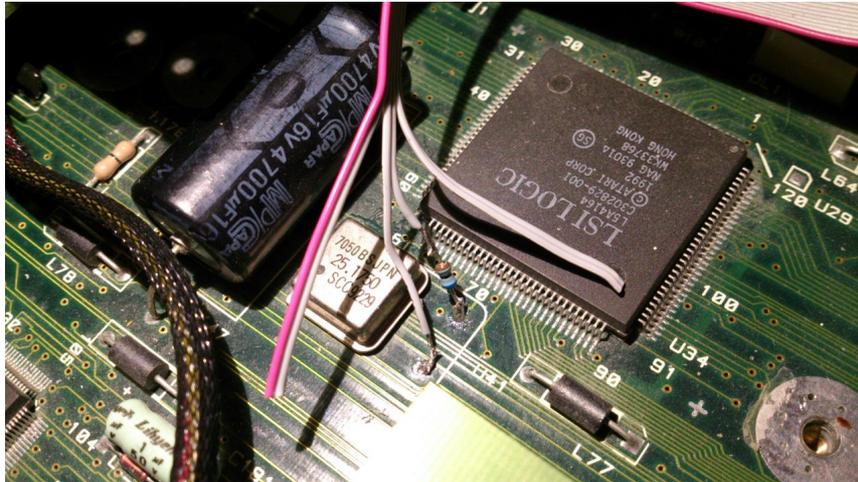
The supplied flat 6-wire flat cable is used for this purpose. Solder the included resistors like the image below. Peel the cables as little as possible, and split the middle and lower pairs as little as possible. Make the wire where each resistor will be soldered shorter than the other wire, so the length including the resistor is the same as the other wire. **Important:** note the direction of the cable head in the image below! Which side the red wire is on is **not** important. Keep the other wires for future use.



Solder the resistor end marked 1 above to the point marked VGA in the next image. This is just right of the big capacitor on the motherboard:

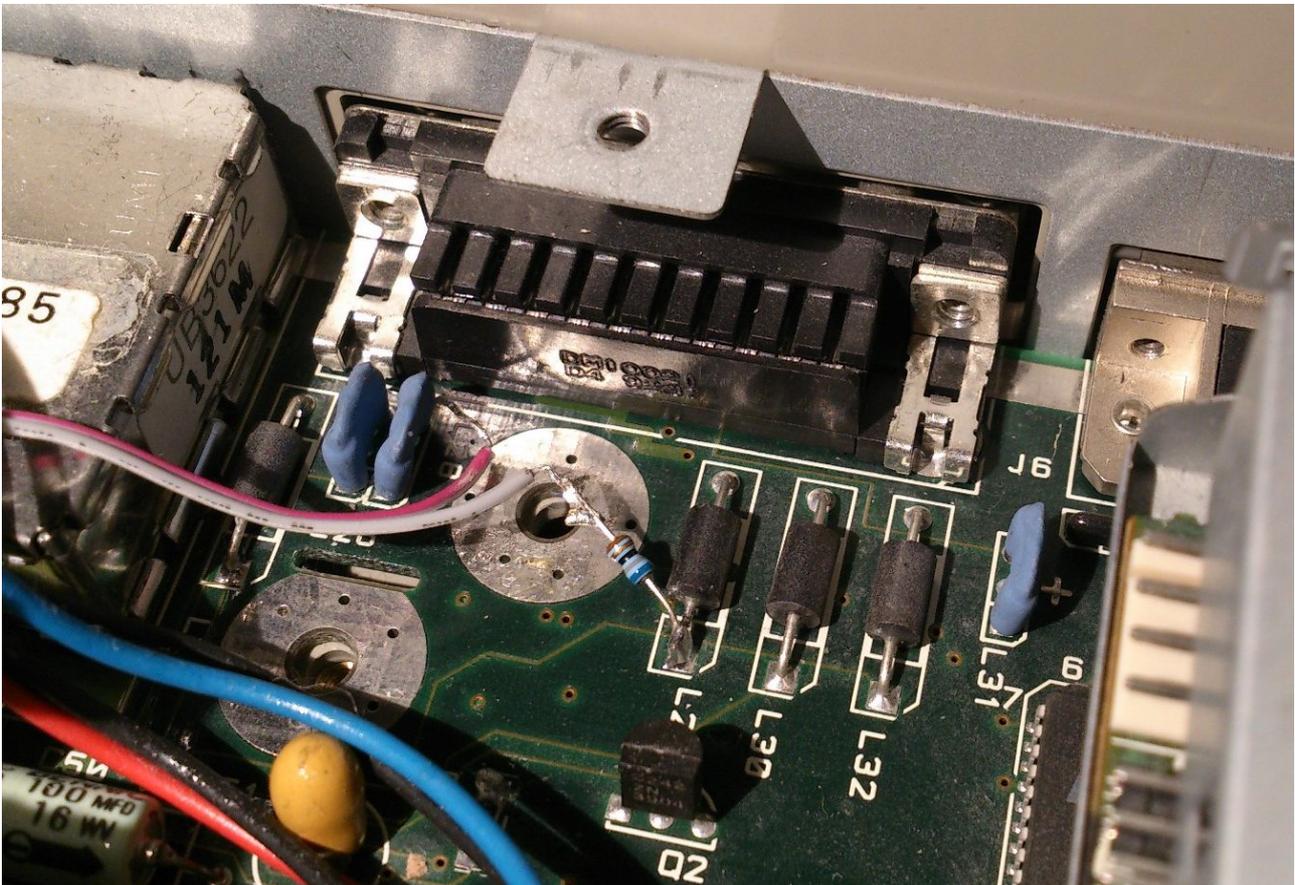


Then solder the other peeled wire next to 1 to the point marked Ground in the image. This is the result:



*Note how the wire where the resistor is soldered is shorter than the ground wire. Also note that resistor 2 has not yet been soldered to the wire.*

Then solder the resistor marked as 2 to the Vsync output of the video port:



*Resistor 2 of the cable soldered to the inner end of L29 going to the video port. Note that the other cable is not connected to anything, but floating in the air. Keep the resistor cable end from touching the round metal surface on the motherboard.*

## 4.2 CT60-jumper

By putting a jumper on J7 (near the front CT60 connector) you enable a filter on the CT60 clock which is necessary for stable operation. See this image:



Only **one** such filter is allowed to be enabled on any board stacked on the CT60.

- If the SuperVidel is the lowest board on the CT60 you should put the supplied black jumper on J7.
- If you have a CTPCI at the bottom, it already has such a filter, so don't put the jumper on the SuperVidel.
- If you will put an EtherNat on top of the SuperVidel, remove the jumper from the EtherNat.

## 4.3 CTCM

The CT clock module, CTCM, is the only thing on the CT60 that is high enough to be able to cause trouble when mounting the SuperVidel on the CT60. **Put some insulation tape on the entire CTCM before putting the SuperVidel on the CT60.**

**Note for original case users with an EtherNat on the SuperVidel:**

If the SuperVidel can not be pushed down enough when the CTCM is too high you will have to lower it by either replacing the CTCM with a fixed oscillator, or lower the CTCM itself by removing its socket.

## 4.4 Possible Svethlana + EtherNat

If you want to use a Svethlana ethernet board together with an EtherNat on the SuperVidel, you should mount the supplied ribbon cable on the SuperVidel JP4 connector **before** putting the EtherNat on the SuperVidel. Read the Svethlana installation section.

## 4.5 Putting the SuperVidel in place

Now that you have read and done all the above you are ready to install the SuperVidel on the CT60. The DVI connector should be facing right.

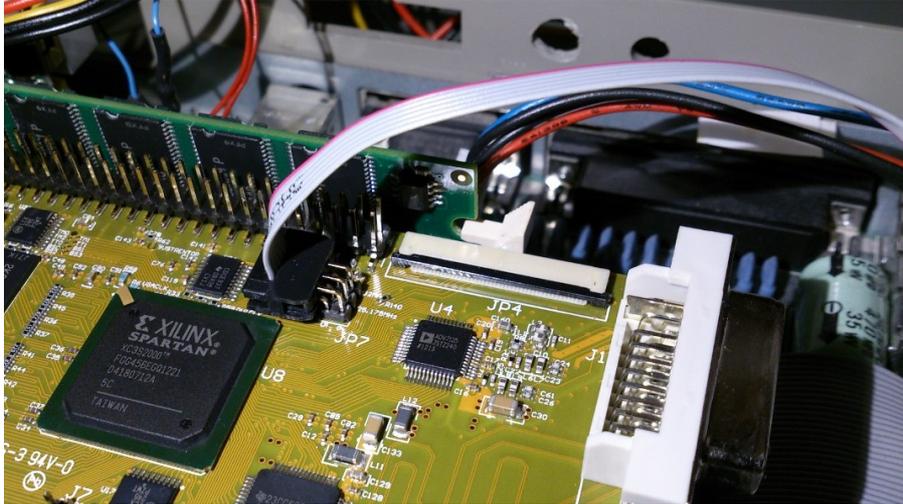
If you have an EtherNat and Svethlana, make sure its flat cable is attached to the SuperVidel **before** putting the EtherNat on the SuperVidel. **Then** you put the whole package of SuperVidel (+ possible EtherNat) onto the CT60 expansion connector (or possibly the CTPCI).

- **Be extremely careful that you align the connector pins correctly before pushing down the SuperVidel! Turning the power on when it is incorrectly aligned could kill any chip on either the SuperVidel or CT60!!!**
- **Be very careful not to apply pressure on ANY CHIP when pushing down the SuperVidel (EtherNat)! Only press on the upward going 50 pin headers on the front and back sides.**
- **Gently push the SuperVidel down a few mm at a time on each side so you don't push it all the way down on one side first!**

- Be aware that the CTCM may be too high to be able to push the SuperVidel down all the way. In that case read [CTCM](#) again.

#### 4.5.1 Motherboard clocks (optional)

When you have put the SuperVidel in place you can install the motherboard clock signal cable (optional) from section [Motherboard clocks](#). Connect the cable head to the SuperVidel JP7 connector like this:



Note: The SuperVidel will still work fine without this cable, since it has sensor logic for detecting if the motherboard clock and Vsync are present and only then it uses them. If not present the VGA clock is emulated with a few ppm error. The cable is only necessary when playing games/demos to not lose the vertical and horizontal sync over time.

## 5 SuperVidel drivers

The SuperVidel works without any drivers and will emulate the current Videl mode. But since the built in VDI uses the motherboard Blitter for its drawing, which the SuperVidel can not "spy" on, you will get garbage on the screen. NVDI doesn't use the blitter, so running it will fix this problem.

But the special SuperVidel drivers both remove the use of the old Blitter and accelerate drawing by putting the video screen in the new SuperVidel graphics RAM, so it is recommended to use them.

All these drivers/programs are available for download on <http://nature.atari.org>.

### 5.1 SV\_XBIOS.PRG

Run this first in the auto folder. Extends the VDI, XBIOS and GEM Desktop, to support new graphics modes, fast video memory, and SuperBlitter acceleration. Also replaces the TOS built in screen resolution selector with a new one where you can select SuperVidel, Videl and ST modes.

### 5.2 SV.INF

Put this in the root of your boot drive. Leave the settings at their defaults. Later you can change default video mode to the modecode of your preferred video mode, by opening the Set video dialog under GEM and selecting a video mode. At the bottom you will see the four digit modecode.

### 5.3 NVDI 5

#### SVSCREEN.SYS, SV\_BPS16.SYS, SV\_BPS32, SV\_BPS8C.SYS

Accelerated drivers for NVDI5, supporting new color depths and screen resolutions. Put the SYS-files in your GEMSYS folder and edit C:\ASSIGN.SYS as follows:

Before:

```
01p SCREEN.SYS
```

After:

```
01 SVSCREEN.SYS
```

Note that the *p* is gone. Do this change for all lines that have SCREEN.SYS.

### 5.4 MagiC

#### CHGRES.PRG

Resolution switcher for MagiC.

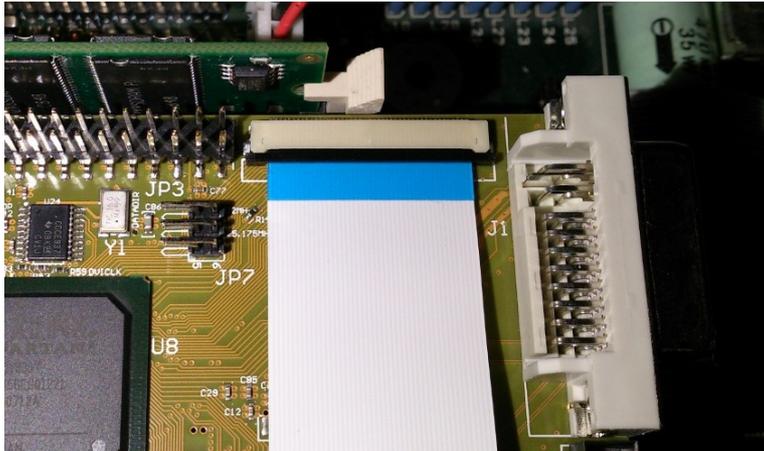
### 5.5 Other programs

#### SVUPDxxx.APP

The SuperVidel firmware is upgraded using this program. It has been tested under Mint and TOS. It is a GEM program, and **must** be run in 060 mode. New firmwares are delivered in a new version of SVUPDxxx.APP where the xxx is the version number and are put on [nature.atari.org](http://nature.atari.org). Just run SVUPDxxx.APP and select "Begin..." to upgrade the SuperVidel firmware. Another BZ2 (bzip2) file can also be selected instead of the built in file. First the BZ2 file is decompressed and then a progress bar with a percentage is incremented as the two Xilinx PROMs on the SuperVidel are erased and programmed. At 47% the second PROM is erased, so a pause is noticed in the progress. **Be aware that you must not cut the power to your falcon during the update. If this should happen the SuperVidel flash chips will be incompletely programmed and your SuperVidel will be "dead" until programmed using a Xilinx Platform USB cable and the Webpack software available from Xilinx.**

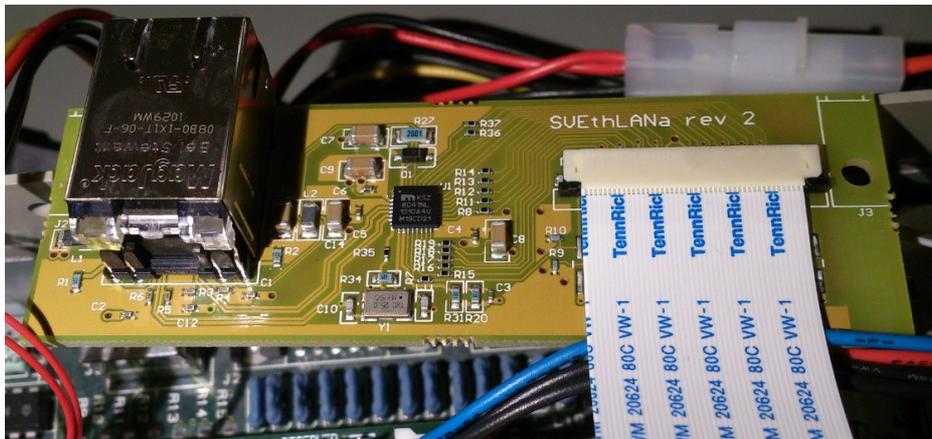
## 6 Svethlana installation

The optional Svethlana board used for networking is installed using the included ribbon cable. First connect the ribbon cable to the SuperVidel since that connection is a bit more difficult than on the Svethlana:



Pull out the black locking mechanism using a finger nail. Then insert the ribbon cable **with the blue side up below** the black locking mechanism. You will have to wiggle the cable from side to side to get it in. Push the cable all the way in and secure it by pushing in the locking mechanism again tightly. **Make sure the cable is stuck** by gently pulling it.

Then insert the other end of the cable into the Svethlana like this:



Note here that the **blue side is down**, so the metallic pins face up. Again pull out the locking mechanism using a finger nail. Insert the cable as far as you can, **above** the locking mechanism. Then tightly close the locking mechanism, and gently pull the cable to check that it is stuck. There should only be a millimeter or so of the metal pins sticking out from the connector.

### 6.1 Svethlana driver

Currently only a driver for MintNet exists. Driver for MagicNet **may** be developed, but Sting is not considered. Please email us if you would like to see a MagicNet driver, or can help do the conversion from MintNet.

#### 6.1.1 MintNet

Download svethlan.xif from nature.atari.org and put it in your Mint-folder, where all other xif-files are. It has been tested with Mint 1.16.C and 1.17.0.

A file called svethlan.inf must be created in the root of your boot drive (C:\ for example) and it should just contain the wanted MAC address for the Svethlana in HEX without 0x. For example: 00204358783a

Make sure this MAC address is not the same as any other one on your network.

## 7 FAQ

### 7.1 How do I change the video mode used by Xaaes?

You need to remove the video-line completely in xaaes.cnf and instead set the default video mode in SV.INF. The modecode that you need you get by opening the Set video dialog under GEM and selecting a video mode. At the bottom you will see the four digit modecode.

### 7.2 How do I upgrade the ABE and SDR chips of the CT60?

Here are some step-by-step instructions for doing the upgrade using a PC running Windows XP:

You'll need to purchase a Xilinx Platform Cable USB, if you don't have one. Here you see a photo of what the Xilinx Platform Cable USB looks like, together with a connector that uses separate leads for easy connection to the CT60:



So just any JTAG cable won't do... Here is a link to a cable on Ebay:

[http://www.ebay.com/itm/Platform-Cable-USB-XILINX-FPGA-CPLD-JTAG-DLC9G-in-circuit-Debugger-Programmer-/261127458640?pt=LH\\_DefaultDomain\\_0&hash=item3ccc68cf50](http://www.ebay.com/itm/Platform-Cable-USB-XILINX-FPGA-CPLD-JTAG-DLC9G-in-circuit-Debugger-Programmer-/261127458640?pt=LH_DefaultDomain_0&hash=item3ccc68cf50)



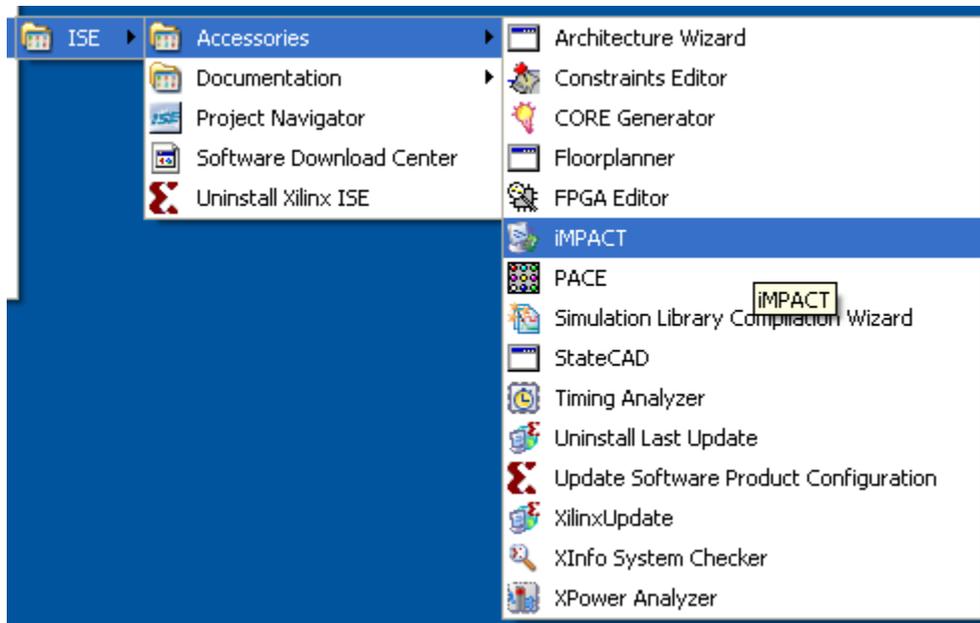
Besides this cable you need to download and install Impact (included in Xilinx ISE Webpack) which is found at

<http://www.xilinx.com/products/design-tools/ise-design-suite/ise-webkit.htm> You will probably have to register an account at Xilinx to be able to download.

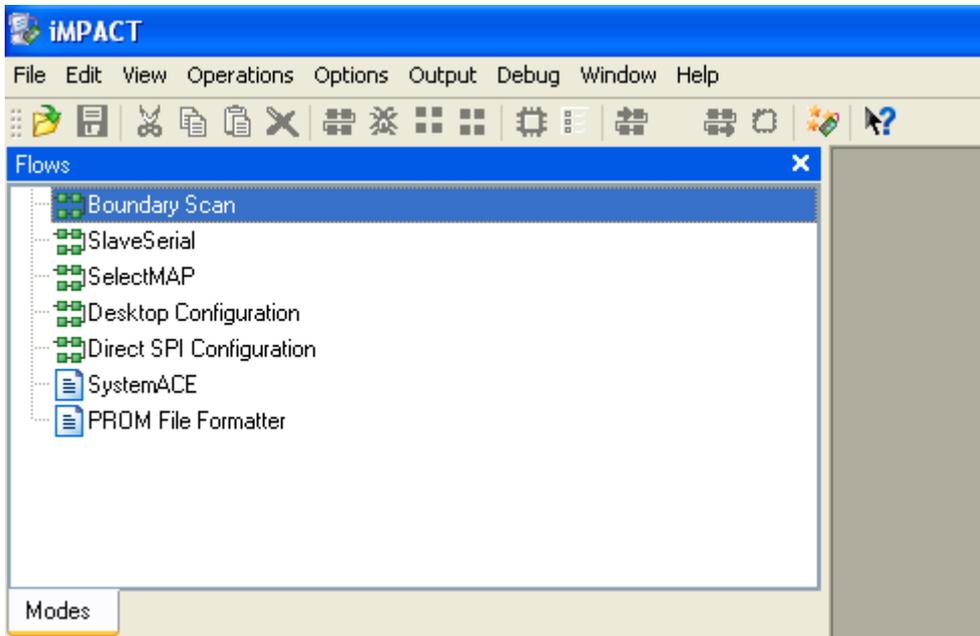
During installation make sure you install the drivers for the Xilinx Platform Cable USB and that you install "accessories" or "lab tools" or "support tools" or whatever they might call it. If unsure, just let it do a full installation, though this will take a few gigabytes.

Then connect your Xilinx Platform Cable USB to your CT60 according to the pinout found at [http://www.powerphenix.com/CT60/english/Fitt\\_nosold.htm](http://www.powerphenix.com/CT60/english/Fitt_nosold.htm) (it's the Reserved pins) and make sure the USB cable is connected to your PC. Make sure your CT60 is set to 030-mode and then power it on.

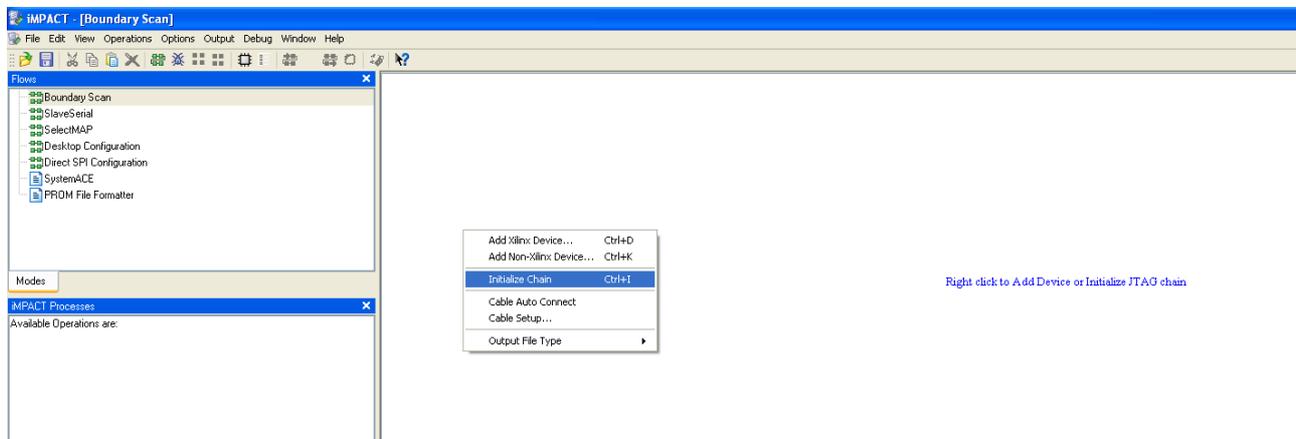
Start up Impact:



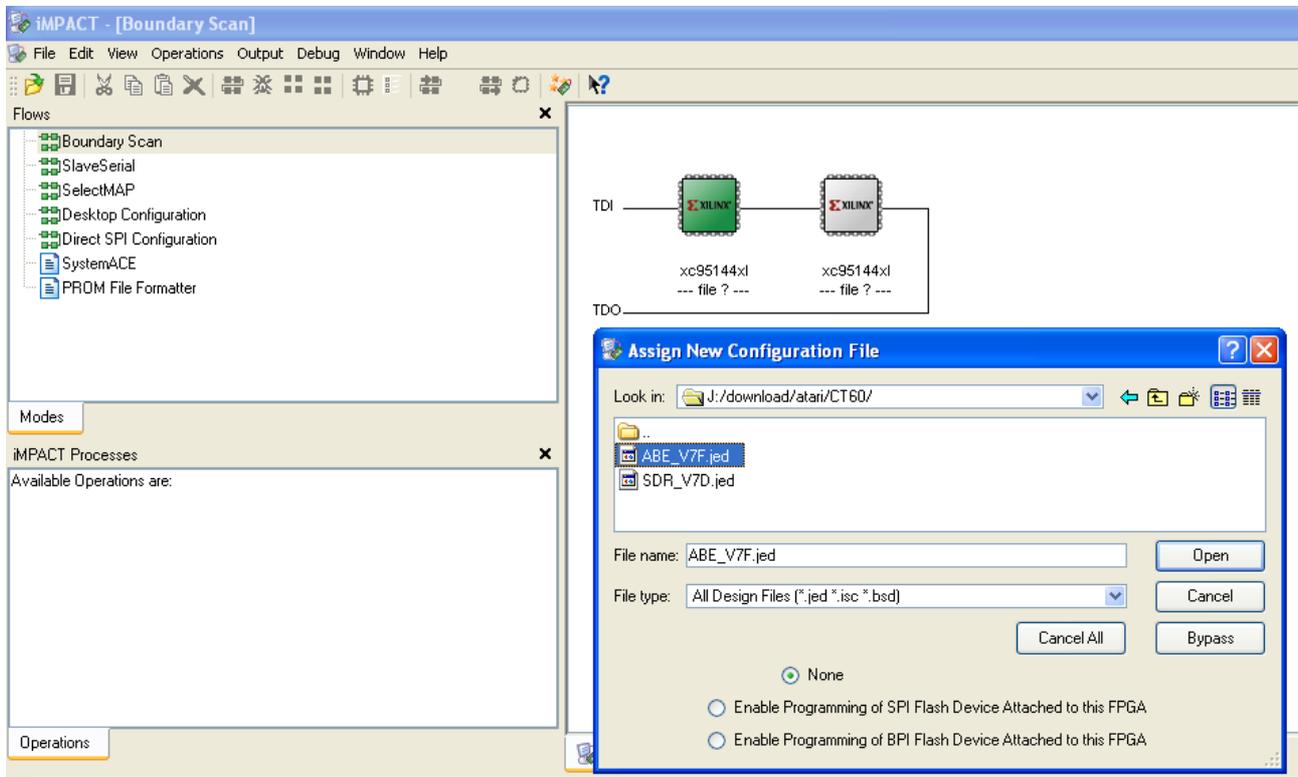
Press cancel in the "Impact Project" window to close the dialog. Then doubleclick Boundary Scan:



and then right click in the big white area that appeared and select Initialize chain:

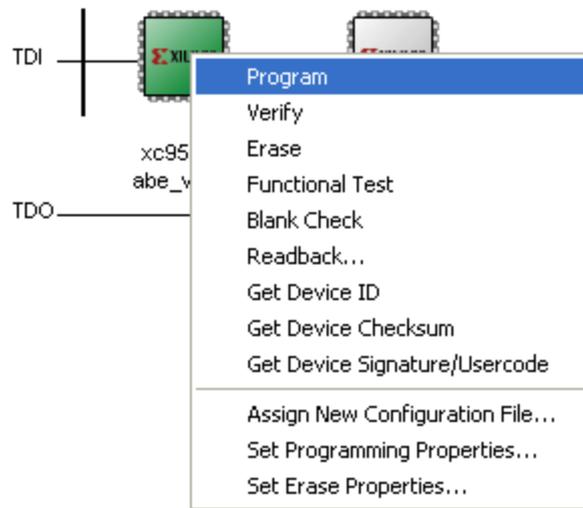


If you've connected the Xilinx Platform Cable USB to your falcon correctly you'll get two chips. Select the ABE\_V7F.jed (downloaded from powerphenix.com) for the first chip and SDR\_V7D.jed for the other chip:



If you then get another dialog with "Device programming properties", just press OK.

Then right-click the left chip and select program:



You should get a blue "Success". Then do the same with the right chip.

You have now updated your CT60 and you can now use it with your SuperVide!! :-)

Exit Impact, turn off your falcon, disconnect the Xilinx Platform Cable USB from your CT60 and switch to 060 mode. Turn on your falcon and it should now work. Continue with the rest of the installation instructions.