

# Retro-Kit

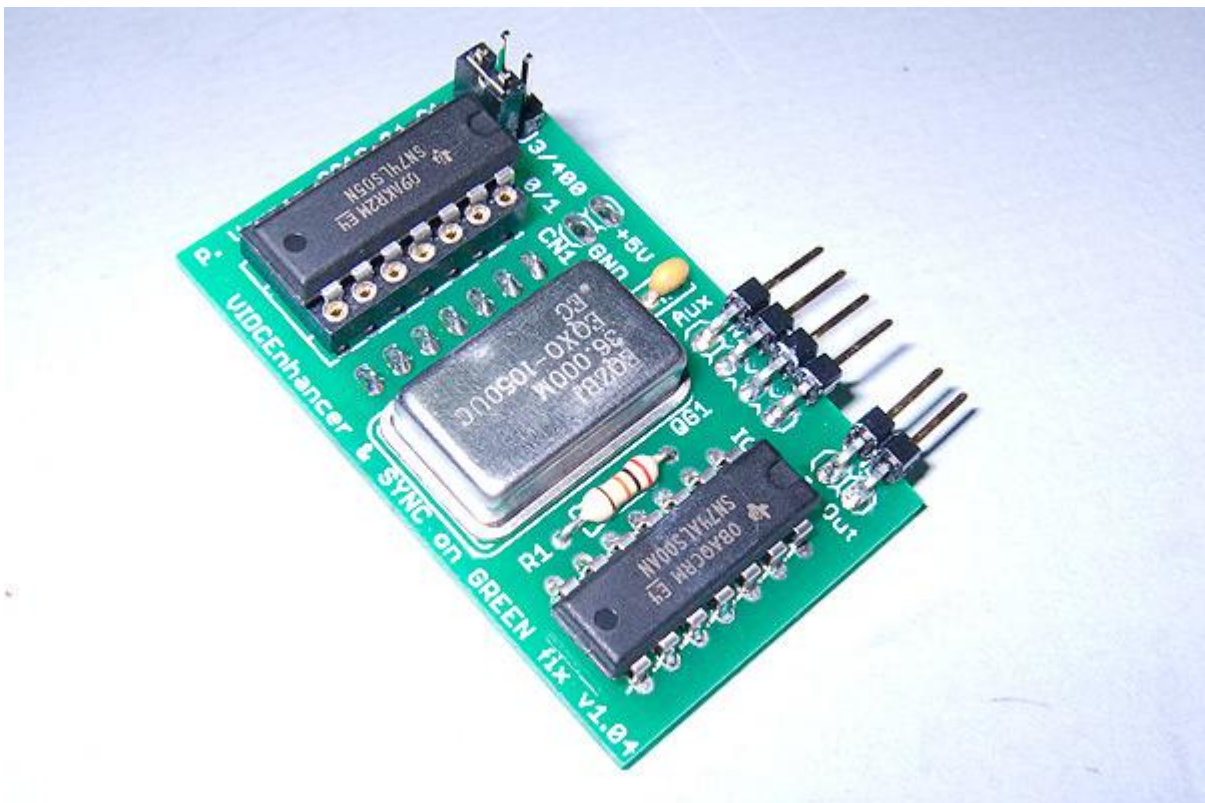
VIDC Enhancer board

and

Sync on Green fix for

Acorn Archimedes

A300, A400, A400/1 and A3000



## Contents

About the Retro-Kit VIDC Enhancer board .....	4
How it works .....	4
Copyright notice.....	4
Disclaimer .....	4
A note about monitors.....	5
VGA display modes .....	5
Differences between RISC OS 2 and RISC OS 3.....	5
VIDC Enhancer board differences for each model of Archimedes .....	7
Riser board configuration .....	7
Non-riser configuration.....	8
Preparing your Archimedes for the VIDC Enhancer board.....	9
Fitting the Retro-Kit VIDC Enhancer board .....	10
All machines.....	10
Tools required.....	10
A3000.....	10
A300, A400, A400/1 .....	10
Orientation of the Archimedes motherboards .....	11
Fitting the VIDC Enhancer board to an Acorn BBC A3000.....	12
Parts list .....	12
Fitting.....	12
To configure the A3000 with VIDC Enhancer for a VGA monitor .....	16
Fitting the VIDC Enhancer board to an Acorn Archimedes A300 or A400.....	17
Parts list .....	17
To strip down the Archimedes .....	17
To fit the additional parts to the A300 and A400 motherboards .....	18
To fit the Retro-Kit VIDC Enhancer .....	21
To configure the A300 and A400 with VIDC Enhancer for a VGA monitor .....	22
Fitting the VIDC Enhancer board to an Acorn Archimedes A400/1.....	24
Parts list .....	24
To strip down the Archimedes .....	24
To fit the additional parts to the A400/1 motherboard .....	25
To fit the Retro-Kit VIDC Enhancer .....	27
To configure the A400/1 with VIDC Enhancer for a VGA monitor.....	29

Powering on your Archimedes after fitting the VIDC Enhancer .....	30
To set your Archimedes' monitor type .....	30
To change your Archimedes' Sync output by resetting the CMOS.....	30
Installing the software for your VIDC Enhancer .....	31
AutoVIDC .....	31
Non-Uniboot installation .....	31
Using your VIDC Enhancer with optional manual override .....	32
Resetting the Archimedes for a Composite Sync monitor .....	33
All Archimedes .....	33
A3000.....	33
A300 and A400.....	33
A400/1 .....	33
Troubleshooting.....	34
Archimedes fails its POST.....	34
Appendices .....	35
Appendix A – RISC OS monitor type definitions.....	35
Appendix B – Screen modes and refresh rates .....	36
Notes on display modes.....	37
Other notes.....	37
Appendix C – Dual VIDC Enhancer .....	39
Appendix D – Overclocking the VIDC chip.....	40
Appendix E – Tested monitors .....	41
Iiyama ProLite E430S.....	41
Proview 780 .....	41
Sony Bravia KDL 40V4000 .....	41
DELL Ultrasharp 3008WFP .....	41
Samsung 191T .....	41
LG Flatron Wide M208WA .....	41

## About the Retro-Kit VIDC Enhancer board

The Retro-Kit VIDC Enhancer board is a hardware upgrade that allows early Acorn Archimedes computers to achieve screen resolutions and refresh rates that are only normally available in later Acorn computers such as the A540, A4000, A5000, A3010 and A3020. The Retro-Kit VIDC Enhancer board also features a way to remove the Composite Sync signal that forms part of the Green signal in the A300, A400 and A400/1 series of Archimedes which is unique amongst VIDC Enhancer board designs.

The board is provided in one of two configurations depending upon the model of Archimedes it was purchased for which comprise of the riser board configuration suitable for the A300, A400 and A400/1 computers and the non-riser configuration for the A3000.

The boards are sold on a non-profit basis.

## How it works

The VIDC Enhancer board allows the Archimedes to achieve higher resolutions and refresh rates by increasing the clock speed at which the VIDC chip runs on the motherboard. Once fitted its operation is transparent to the user and the board will automatically switch between the Archimedes' own 24MHz clock and the new 36MHz clock fitted on the VIDC Enhancer board depending on mode selection.

When enabled, the VIDC Enhancer allows the VIDC chip to deliver a desktop in the SVGA resolution of 800x600 with a horizontal frequency of 35.156kHz and vertical frequency of 56.250Hz.

## Copyright notice

Parts of the design of the Retro-Kit VIDC Enhancer board are based upon the work carried out by Andreas Barth. Andreas' original work can be downloaded from the Retro-Kit website at the following address:

<http://www.retro-kit.co.uk/user/custom/Acorn/3rdParty/RetroKit/VIDCEnhancer/software/autovidc.spk>

Andreas' work was placed in the public domain and the copyright of his work remains with him.

The Retro-Kit board design incorporating the Sync on Green fix is copyright Retro-Kit (P. Vernon) but again is placed in the public domain and in keeping with the original work, unlimited distribution and use is allowed for non-profit use as long as every part is included in the copy WITHOUT CHANGES.

## Disclaimer

This manual contains instructions that include stripping down your Archimedes and potentially performing track cuts and soldering on the motherboard. All of the instructions have been written by working on a machine of the series used and if followed carefully, with a little common sense will take an hour or two to complete successfully. If you undertake the work described on your motherboard, you do so at your own risk and do not hold Retro-Kit responsible for any damage that you may cause.

**If in doubt, find someone with the necessary skills or contact Retro-Kit to perform the work.**

## A note about monitors

In order to support as many Archimedes screen modes as possible, ideally a Multisync monitor capable of horizontal Sync frequencies ranging from 15 to 50kHz and a vertical refresh rate of 50 to 75Hz should be used.

Unfortunately, most flat screen monitors no longer sync down to the lowest frequencies and depending on their age only support ever increasing scan rates. For instance, an Iiyama ProLite E430S which was manufactured in 2002 is capable of supporting horizontal sync frequencies from 20 to 80kHz and vertical refresh rates of 55 – 75Hz whereas a DELL 1703FP flat screen monitor which was manufactured in 2003 supports horizontal scan rates of 31-80kHz and a vertical refresh rate of 56-76Hz.

Some monitors and modern flat screen televisions with VGA inputs actually support display frequencies that are outside of their advertised ranges. For instance, a SONY BRAVIA KDL 40V4000 40" television with VGA input is documented as supporting horizontal frequencies between 31.5 and 64kHz with vertical refresh rates of 60 to 75Hz however after testing, it was found that it would successfully display the VIDC Enhanced MODE 31 which has a vertical refresh rate of 56.250Hz.

What this means is that even with a VIDC Enhancer board the available screen modes will be limited by your choice of monitor and you must do your research to find the best monitor to suit your needs.

## VGA display modes

In later Acorn computers, the VIDC chip can be clocked at 24MHz, 25.175MHz and 36MHz to supply the refresh rates for modes 12-15, 26-28 and 29-31 respectively. With the addition of a VIDC Enhancer, older Archimedes can provide a 24MHz and 36MHz clock speed to the VIDC chip. When displaying VGA screen modes, older Archimedes use the 24MHz clock speed which results in the refresh rates of the VGA signals to be 4.7% slower than the VGA standard requires. This is usually not a problem for most monitors as there is some level of tolerance when accepting VGA signals but some monitors may not display these modes correctly because of the slower refresh rates produced by the Archimedes.

## Differences between RISC OS 2 and RISC OS 3

When using your Archimedes with screen modes 12 – 15 and other modes that have a 15kHz horizontal refresh rate, the way in which RISC OS 2 and RISC OS 3 handles these modes is different when connected to a (S)VGA monitor.

In RISC OS 2, the modes are output exactly as if they were being output to a standard 15kHz capable monitor or television. In RISC OS 3, the modes are re-mapped to modes that are suitable for display on a (S)VGA monitor. This means that any Archimedes running RISC OS 2 will require a full multi-sync monitor capable of accepting the 15kHz screen modes as well as the higher refresh rates required by the VGA and SVGA screen modes.

In RISC OS 3, the 15kHz screen modes are re-mapped to modes that deliver a 30kHz refresh rate and as such all modes should be available on a suitable (S)VGA monitor. Due to the remapping process, the affected modes are displayed with a "letterbox" effect and as noted previously, on older

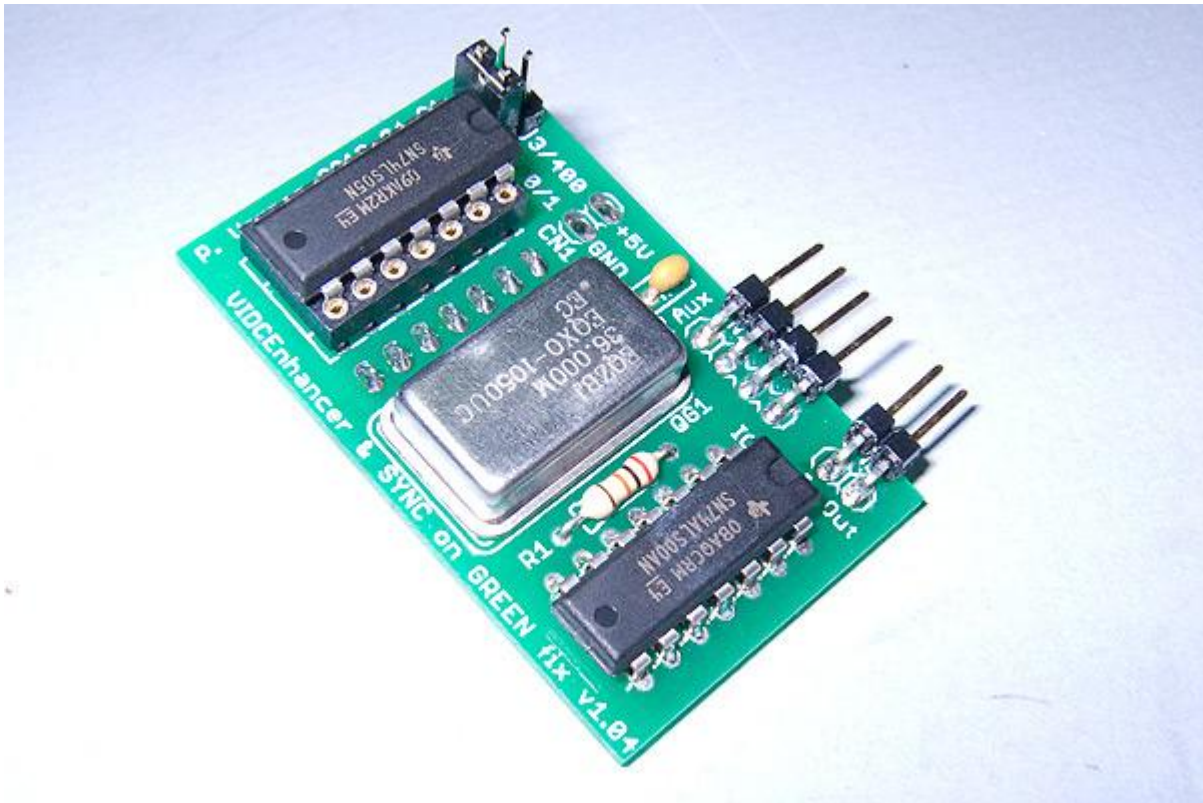
Archimedes, the refresh rates are 4.7% slower than the equivalent modes on the later Acorn computers such as the A5000 due to the lack of a 25.175MHz clock signal.

RISC OS 2 does not support the Super-VGA-type (4) and LCD (5) monitor-types although the LCD definition of monitor type does not cover modern flat screen (S)VGA monitors.

Refer to Appendix A to see all the Monitor Types supported by RISC OS and their values.

## VIDC Enhancer board differences for each model of Archimedes

### Riser board configuration



When the VIDC Enhancer board is supplied in its riser board configuration, it draws its power from the socket on the motherboard to which it is plugged in and therefore requires no extra power connections.

The model of the Archimedes the VIDC Enhancer board is being fitted to dictates which integrated circuit on the motherboard needs to be replaced by a socket to apply the Sync on Green fix that the board features.

In the Original A300 and A400 series, this will be the 74LS05 located in position IC4.

In the later A400/1 series, this is the SN7438 located in position IC9

Finally, although not recommended, in the A3000, this would be the 74HC04N located in position IC47.<sup>1</sup> To see the recommended A3000 configuration, skip to the section covering the non-riser configuration of the VIDC Enhancer board.

The chip that is fitted to the socket IC1 on the VIDC Enhancer board should match the chip on the motherboard and is supplied with a suitable chip for the Archimedes you own. The riser board can be transferred to other models of Archimedes by changing the chip fitted to IC1 as required.

---

<sup>1</sup> It is not recommended to fit the A3000 with a riser board configuration as this model does not have the "Sync on Green" issue and the space underneath the keyboard where the board fits is extremely limited.

The bank of jumpers JP1 on the VIDC Enhancer board will also have different settings depending on which series of machine the VIDC Enhancer is fitted to.

In the A300 and A400, the jumper marked 3/400 controls the Sync on Green fix.

In the A400/1 series, the jumper marked 400/1 controls the Sync on Green fix.

Where a monitor requires the Sync on Green signal, both jumpers should be CLOSED.

Where a monitor is connected to an A300 or A400, the jumper marked 3/400 should be OPEN to remove the Sync signal from the Green component of the RGB output.

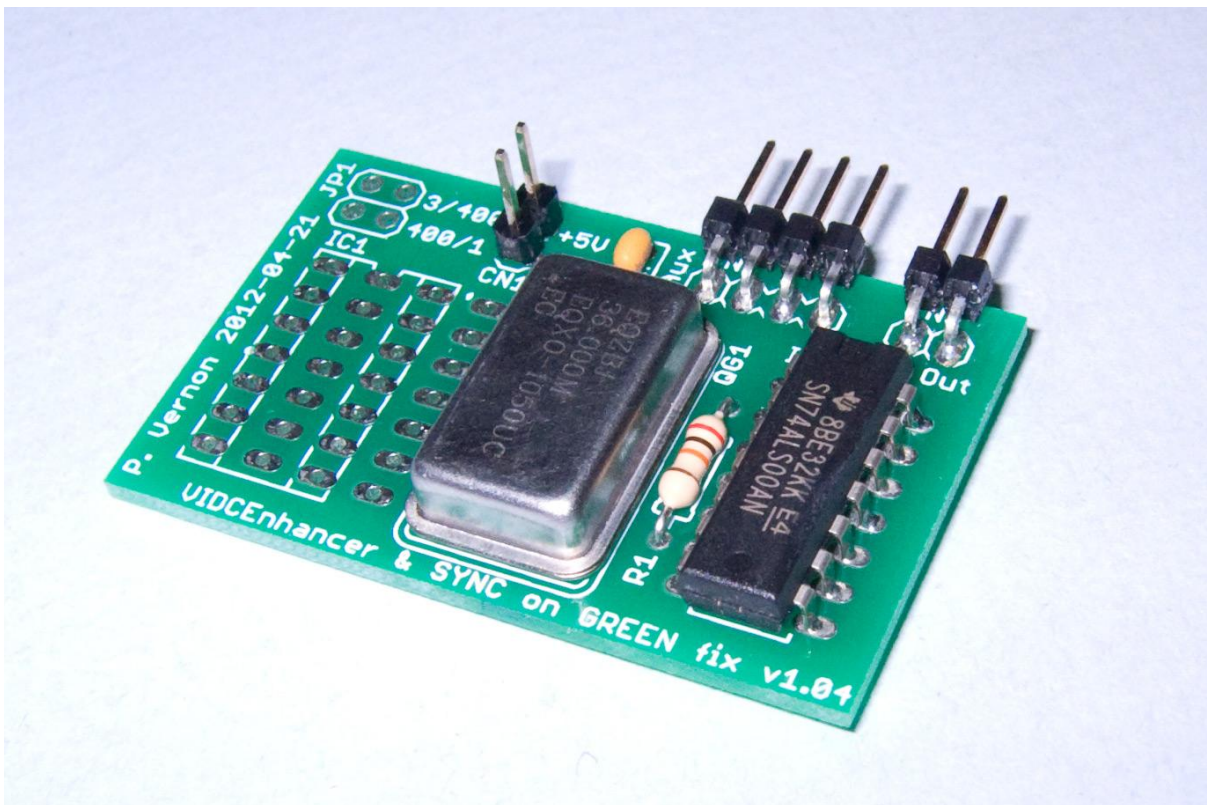
Where a monitor is connected to an A400/1, the jumper marked 400/1 should be OPEN to remove the Sync signal from the Green component of the RGB output.

In the A3000, both jumpers should be closed at all times.

**DANGER:** Fitting a VIDC Enhancer board suitable for one of these series machines into a different series may harm your computer and it is recommended that you double check the series of computer you are fitting the board to and confirm that the integrated circuit on the motherboard you are replacing matches the integrated circuit in the socket of IC1 on the VIDC Enhancer.

### Non-riser configuration

The non-riser configuration of the VIDC Enhancer board is the same for all Archimedes and can be fitted to any suitable machine without changes. This configuration however does not fix the Sync on Green issue that the A300, A400 and A400/1 series Archimedes suffer from.





## Preparing your Archimedes for the VIDC Enhancer board

If you intend to change your monitor immediately after fitting your new VIDC Enhancer then there are a couple of CMOS configuration settings that must be changed. One of these settings is the MonitorType, the other is the SYNC setting which can both be set using the \*CONFIGURE command in RISC OS.

Both the MonitorType and Sync can be changed at the point of power on however when the Sync is altered in this way, many other CMOS settings are reset to factory defaults too.

In order to avoid resetting your CMOS settings, the Sync can be changed using the \*CONFIGURE command set just before you shut down your computer to install the VIDC Enhancer.

From the Desktop, press CTRL + SHIFT + f12 to shutdown.

At the restart requester, press CTRL + SHIFT + f12 to close the desktop and enter Supervisor mode.

At the Supervisor prompt, enter

```
*CONF. SYNC 0
```

This will set the sync type that the Archimedes outputs to the correct setting for a VGA or SVGA monitor.

Turn off your Archimedes.

## Fitting the Retro-Kit VIDC Enhancer board

The riser board configuration has a more involved installation process requiring some solder work to be carried out. If you are at all unsure about your ability to install the board, seek assistance from someone with the necessary skills or contact Retro-Kit for assistance.

### All machines

#### Tools required

Please use an anti-static wrist band when working on your computer and ensure you are earthed correctly before carrying out any work.

#### A3000

For the Acorn BBC A3000, you'll need the following tools.

A set of Philips and flat bladed screw drivers will be necessary to open the case of the A3000. Fitting the board to the A3000 requires no further tools however you can optionally choose to solder the Auxiliary control wire into place.

#### A300, A400, A400/1

For the A300, A400 and A400/1, the following tools are required.

A set of Philips screwdrivers is required to open the case and remove the motherboard.

A soldering iron will be needed to remove a single integrated circuit and add in some headers to the motherboard.

A sharp craft knife, scalpel or PCB track cutter is required for the A300 and A400 models to break a shorting link where one of the headers is fitted.

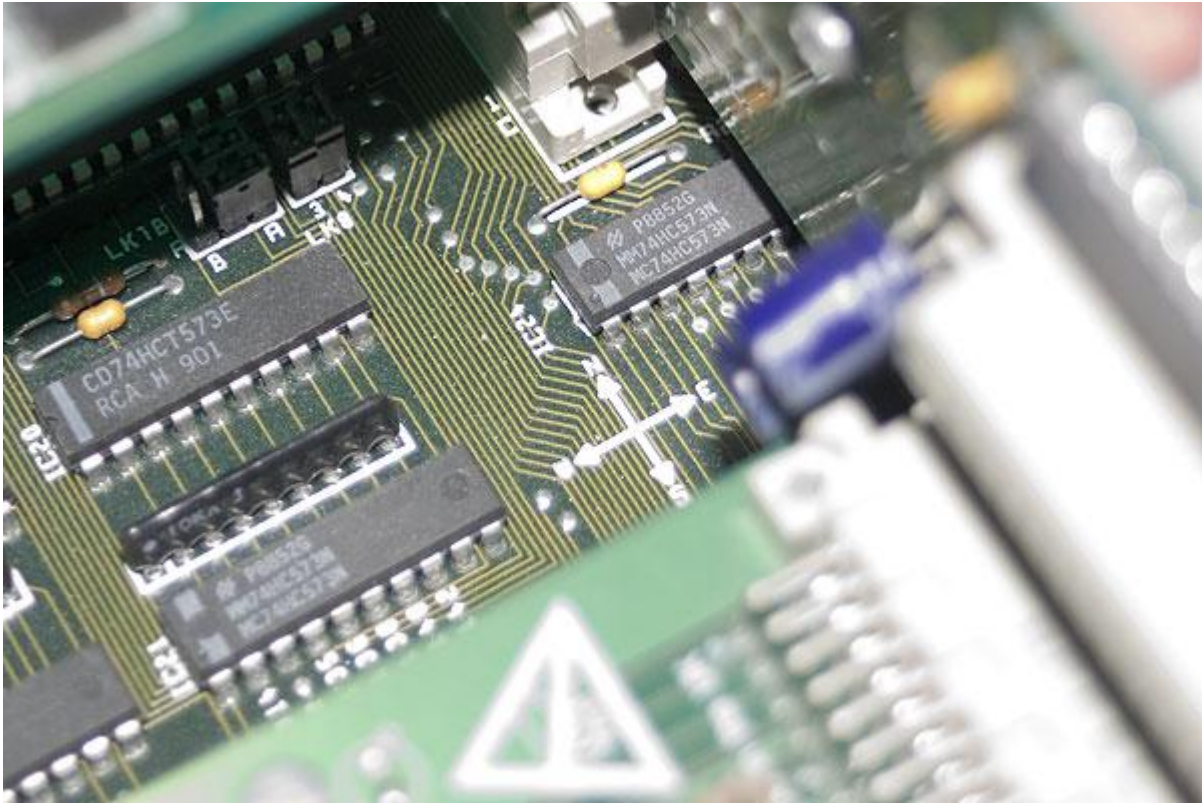
A pair of fine wire snippers.

A pair of fine point pliers.

A roll of solder wick to remove solder from existing joints on the motherboard.

## Orientation of the Archimedes motherboards

All the references to the orientation of the Archimedes motherboards are based on the compass points that are screen printed onto the board as pictured below. In the A300, A400 and A400/1, with the rear of the board oriented on the right hand side, the top of the board as viewed is NORTH, the front of the Archimedes motherboard is EAST, etc.



The orientation on the A3000 is different with the rear of the motherboard being regarded as NORTH and the front of the motherboard being SOUTH, etc.

## Fitting the VIDC Enhancer board to an Acorn BBC A3000

### Parts list

Please check the supplied kit to ensure that you have the following parts for fitting the VIDC Enhancer to your A3000.

- 1 x Retro-Kit VIDC Enhancer board
- 1 x Aux1 probe control cable -OR- Aux1 probe and manual override switch
- 1 x VIDC clock signal connecting cable
- 1 x piggy back VIDC Enhancer power connector cable

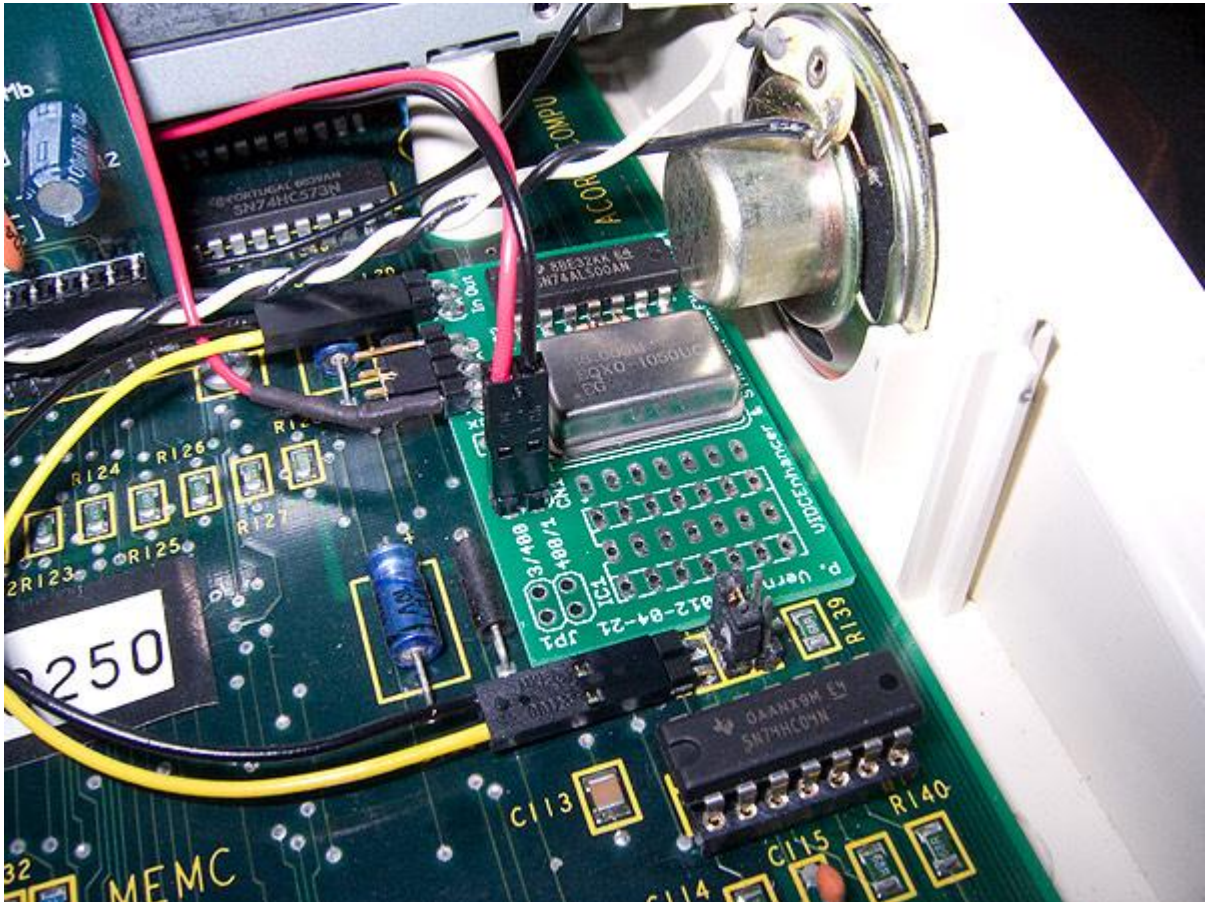
### Fitting

The Acorn BBC A3000 does not require the Sync on Green fix and as such, it is not necessary to fit the board in its riser configuration. There are also differences between early and later issue motherboards that make the riser board configuration unsuitable for the later motherboards.

The instructions below show how to fit the VIDC Enhancer board in the non-riser configuration and are applicable to all revisions of the A3000 motherboard.

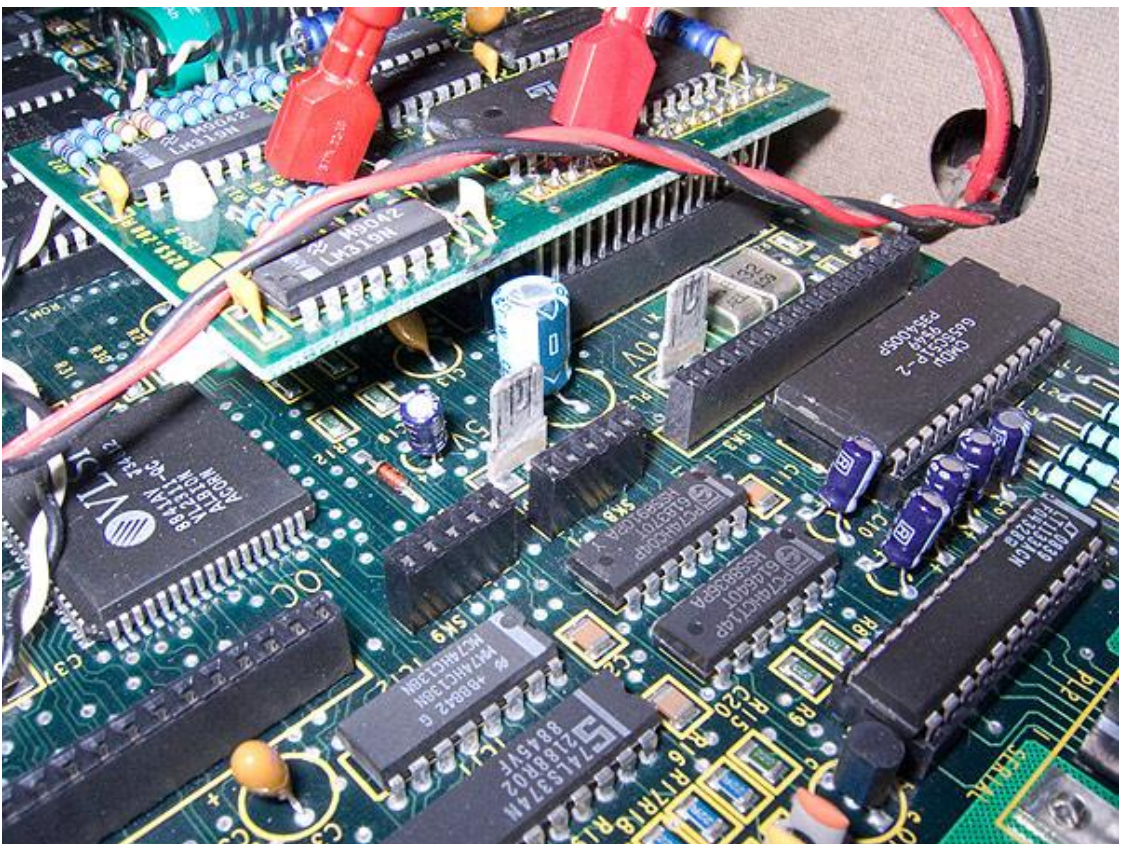
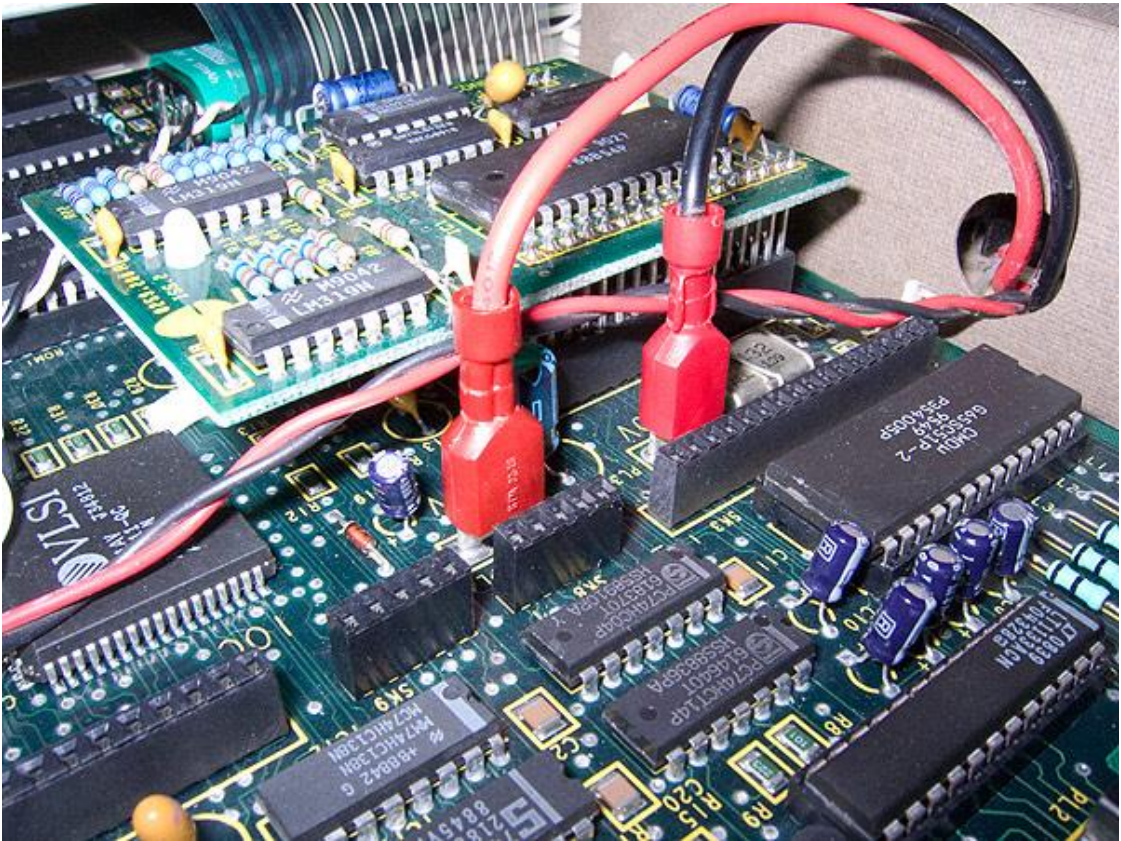
1. Remove the two rear case fixing screws and backing plates
2. Remove the centrally located case fixing screw from the underside of the A3000.
3. Gently lever the two rear case fixing clips out of position and lift the top half of the case clear from the rear.
4. Using a large flat bladed screwdriver, gently lever the front case clips out of position freeing the top half of the case. Place the lid of the computer somewhere safe for re-assembly later.
5. Remove any mini-podule if fitted.
6. Gently remove the keyboard ribbon cables from the motherboard connector and lift the keyboard clear.
7. Remove the floppy drive fixing screws, disconnect the floppy power and data cables and then remove the floppy drive from the Archimedes.

8. Locate a suitable space to place the VIDC Enhancer board close to LK 28.

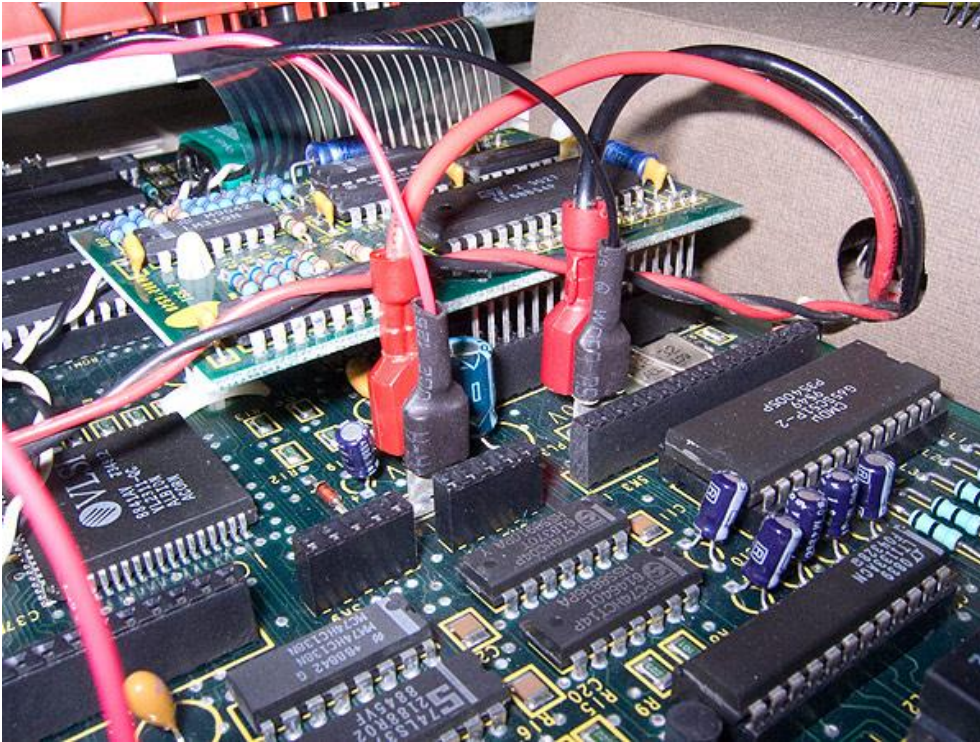


9. Remove the jumper from LK28 and connect the supplied VIDC clock cable to it and link it to CN3 on the VIDC Enhancer board.

10. Remove the black and red power cables from the motherboard that connect to the PSU.



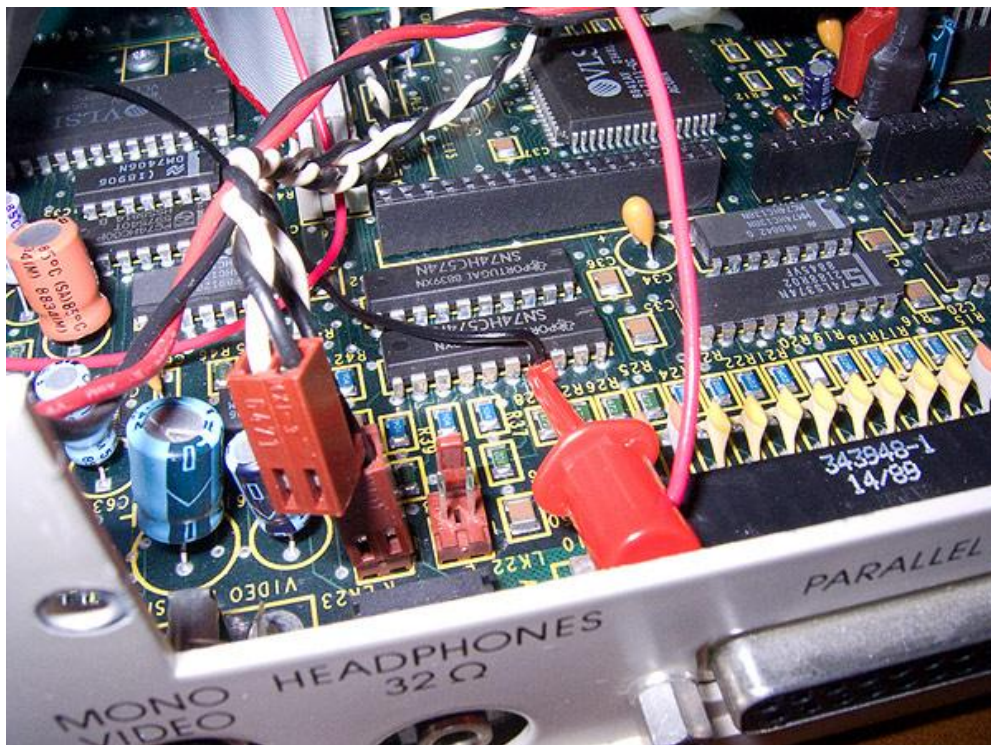
11. Connect the supplied power cables to the motherboard and then the PSU power cables to the piggy back connectors.



12. Connect the supplied VIDC Enhancer power cable to the VIDC Enhancer power connector observing correct polarity.

13. Locate IC18.

- a. Using the supplied probe, connect it to pin 17 (Aux 1). (If you want, cut the probe off and solder this wire in place. Both options are shown in the photo.)
- b. Connect the other end of the probe wire to the pin on CN2 marked "Aux".



### **To configure the A3000 with VIDC Enhancer for a VGA monitor**

1. Locate the links LK24, LK25, LK26 and LK27
2. LK 24 should be set to the NORTH position.
3. LK 25 should be set to CLOSED.
4. LK 26 & LK 27 should be OPEN.

Fitting of the VIDC Enhancer board and configuring the output for a (S)VGA monitor is now complete.

Re-assemble the computer, fitting the floppy disc drive and case in the reverse order of the method used above.

Before powering your A3000 up, please refer to the ***Powering on your Archimedes after fitting the VIDC Enhancer*** section later in this manual.



## Fitting the VIDC Enhancer board to an Acorn Archimedes A300 or A400

Fitting the VIDC Enhancer to the A300 and A400 series Archimedes requires the addition of several headers and the replacement of a chip with a socket on the motherboard. This requires that the motherboard is extracted from the Archimedes case.

### Parts list

Please check the supplied kit to ensure that you have the following parts for fitting the VIDC Enhancer to your A300 or A400 series Archimedes.

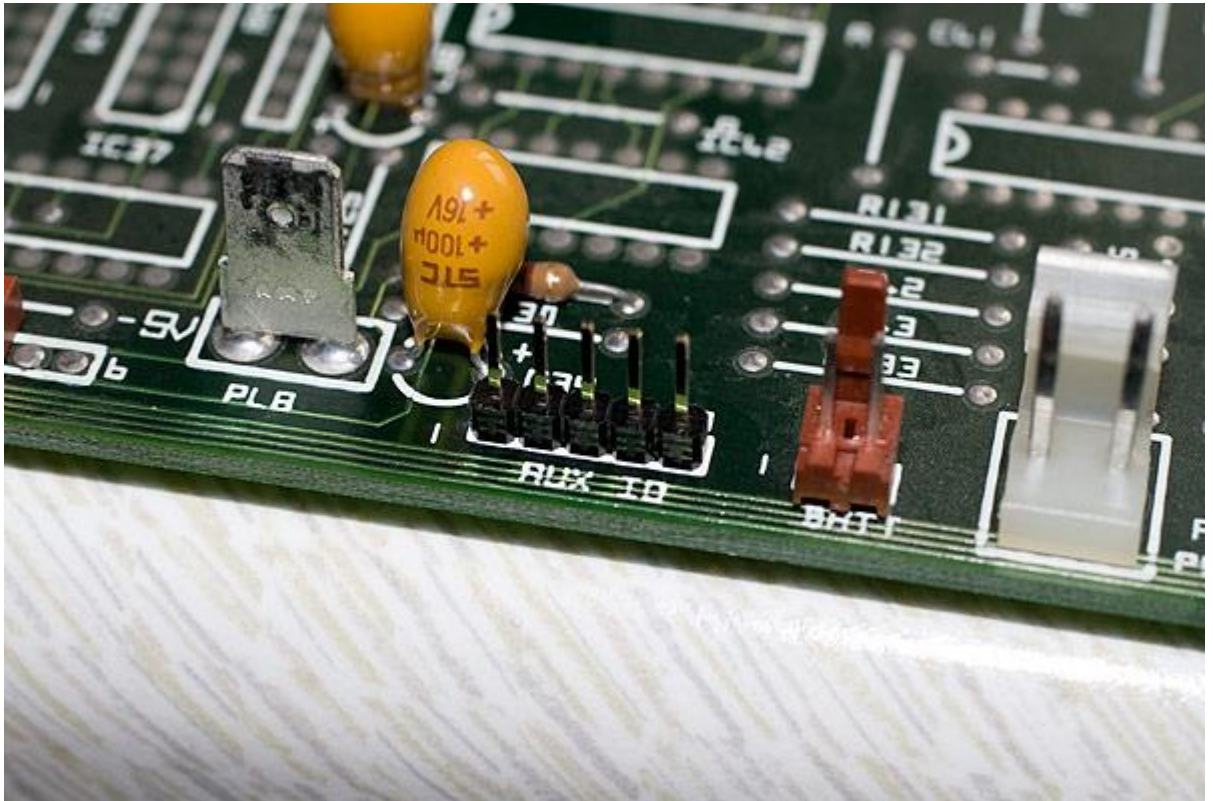
- 1 x Retro-Kit VIDC Enhancer board
- 1 x Aux1 control cable -OR- Aux1 control and manual override switch
- 1 x VIDC clock signal connecting cable
- 1 x 5-way header
- 2 x 3-way jumper headers

### To strip down the Archimedes

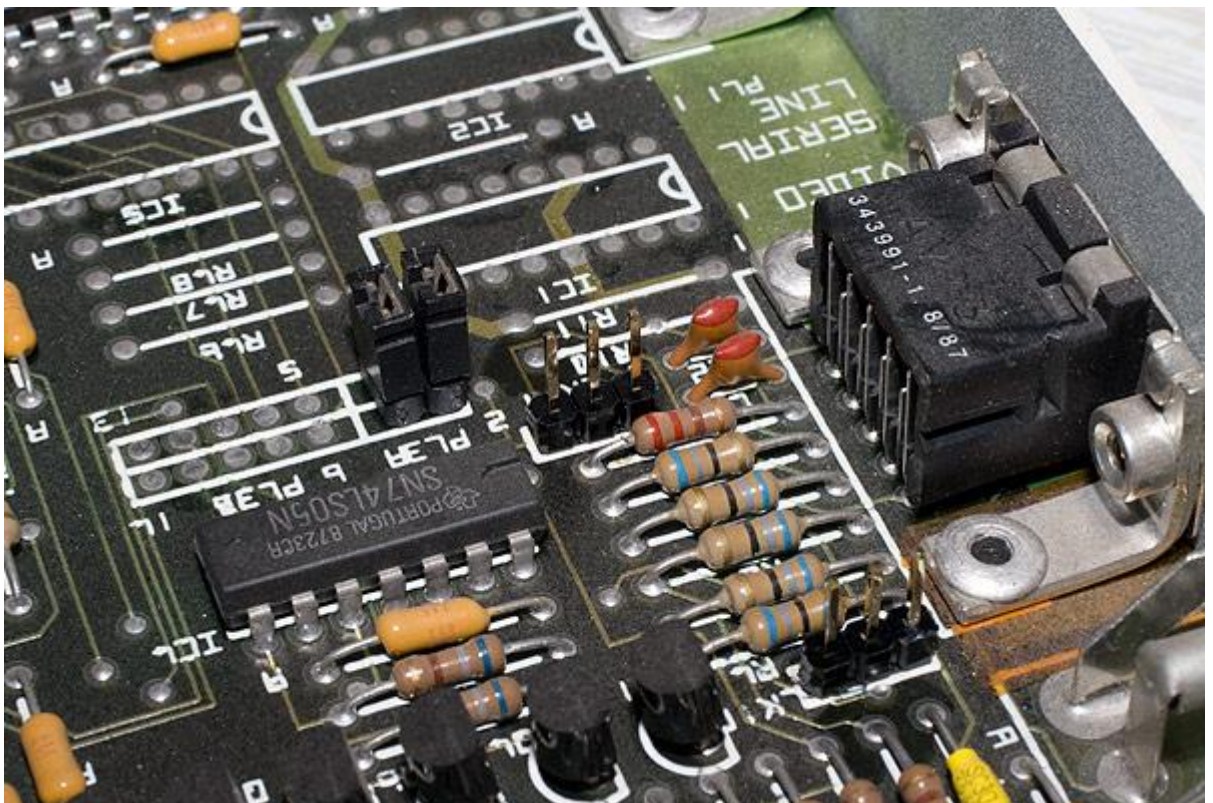
1. Remove the five case screws from the Archimedes (3 at the rear and 1 on each side) and remove the case lid.
2. Remove any podules fitted to the backplane by removing their fixing screws and sliding out the podules from the rear of the Archimedes.
3. Remove the five screws holding the front fascia in place and disconnect the cables from the motherboard (3 screws underneath, 1 on either side).
4. Remove the connecting power cable from the backplane noting their locations.
5. Unscrew the two fixing screws holding the backplane in place and gently extract the backplane by lifting it vertically clear.
6. Remove the floppy drive and hard drive (if fitted).
7. Disconnect the power connectors from the motherboard.
8. Disconnect the battery back from the motherboard.
9. Remove the two fixing screws from the underside of the Archimedes at the rear.
10. Remove the two motherboard fixing screws on the back plate and freeing the mounting posts before gently sliding the motherboard out from its case in a rearwards direction.



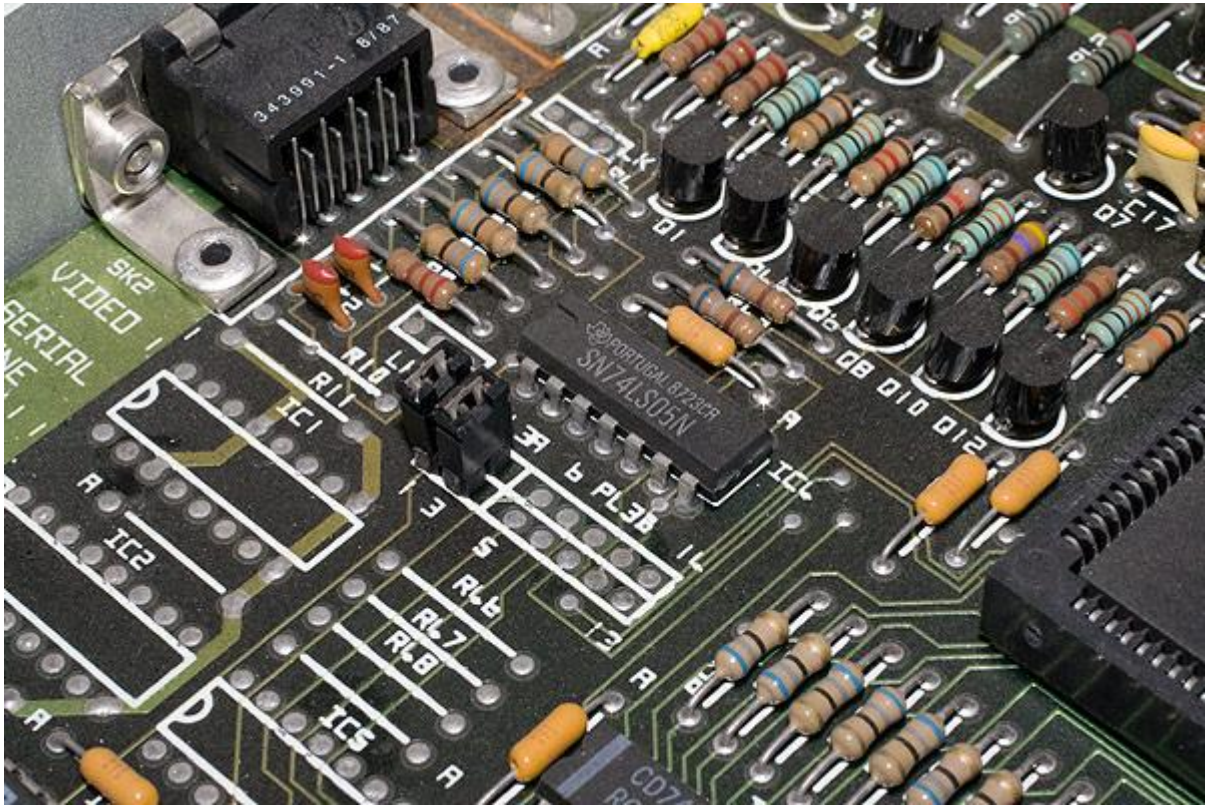
3. Solder in the supplied 5-way header.



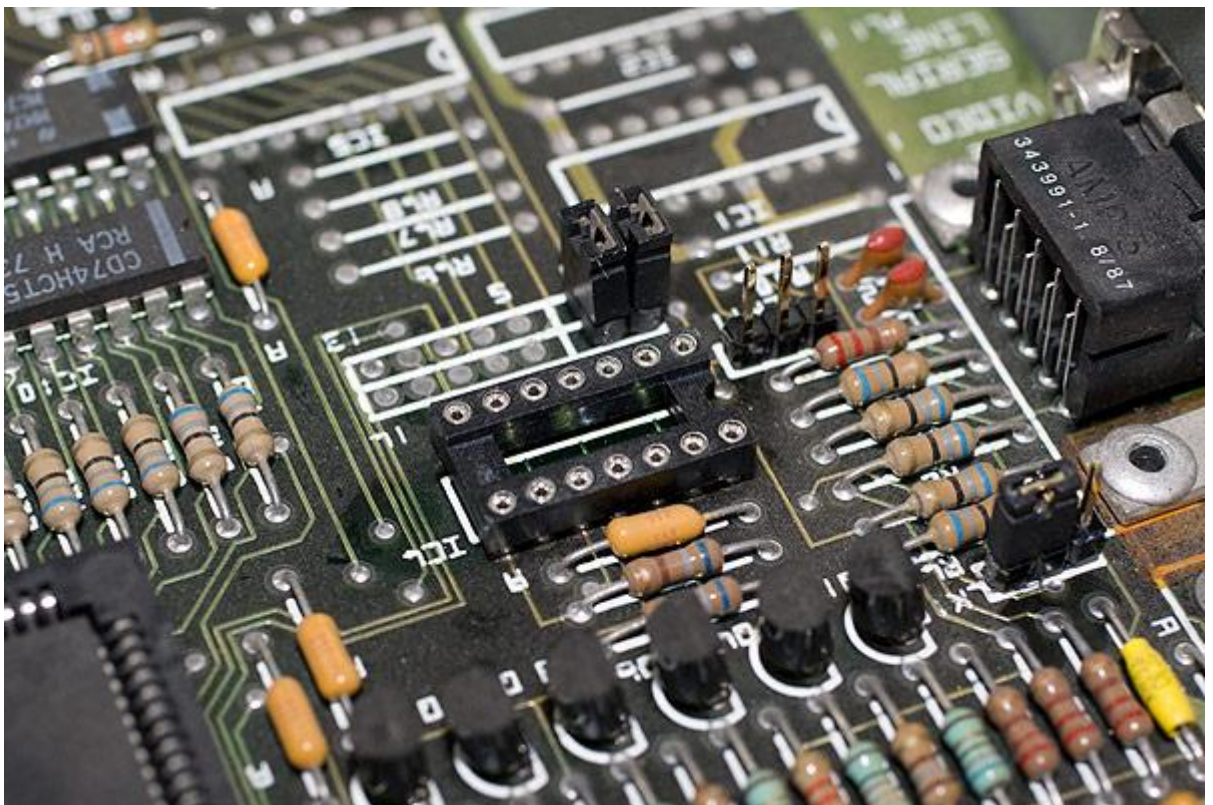
4. Locate the jumper location LK10. Cut the track connecting the inner pin to the outer pin on the underside of the motherboard.
5. Remove the solder from the through hole mounting holes and fit the two 3-way jumper headers to the motherboard.



6. Locate the chip in position IC4 and remove it. TIP: The easiest way to remove a chip like this is to cut each leg to remove the body of the chip and then de-solder the remnants of each leg one by one using some solder wick. A new replacement chip is supplied on the VIDC Enhancer.



7. Fit the supplied 14-way socket in the position of IC4.

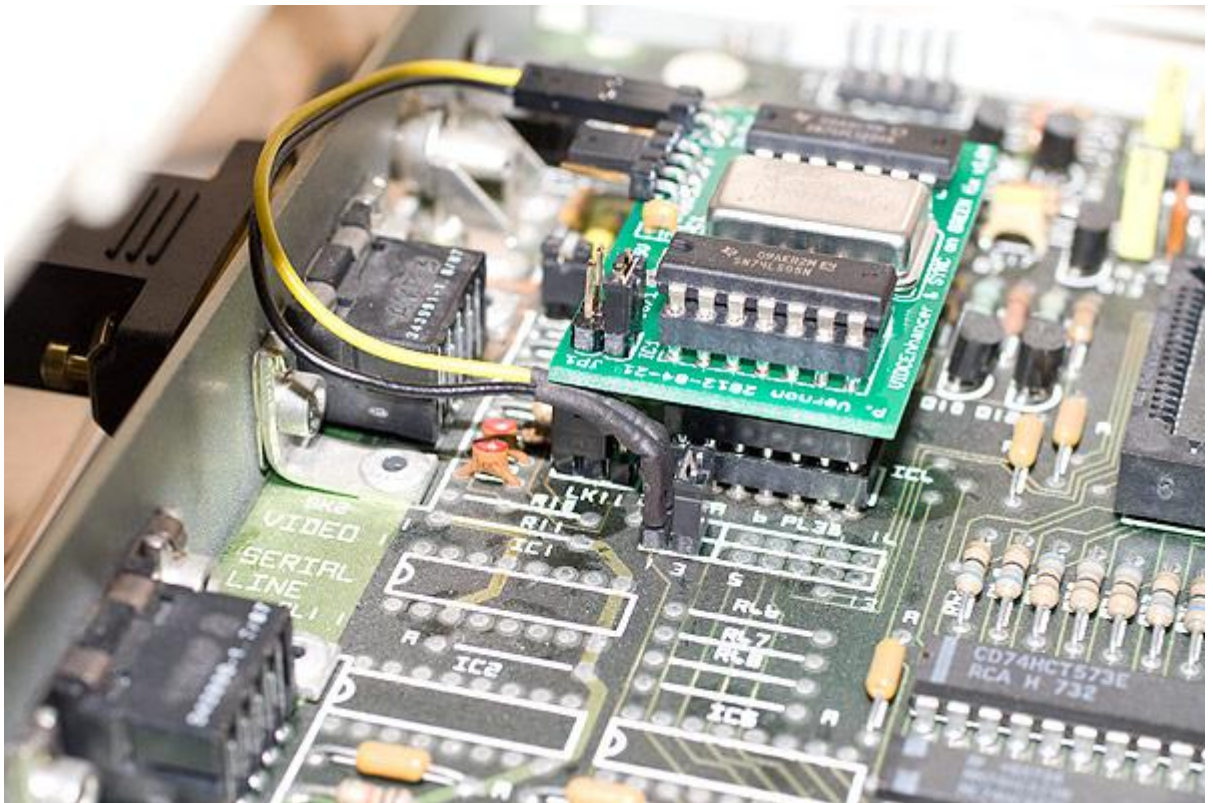


This completes the fitting of the additional parts to the A300 and A400 motherboard and it can be re-fitted to the Archimedes case. Follow the steps in the strip down instructions carrying out points 10 to 3 to reassemble the Archimedes, leaving the podule and lid fitting until after the VIDC Enhancer has been fitted.

### To fit the Retro-Kit VIDC Enhancer

Once the Archimedes is ready to accept the VIDC Enhancer, the following steps should be carried out to complete the installation.

1. Plug the VIDC Enhancer into the newly socketed IC4.
2. Locate the headers on the motherboard marked PL3, remove the jumper from the link marked 1-2 and connect the VIDC clock connecting cable as shown in the photo below.



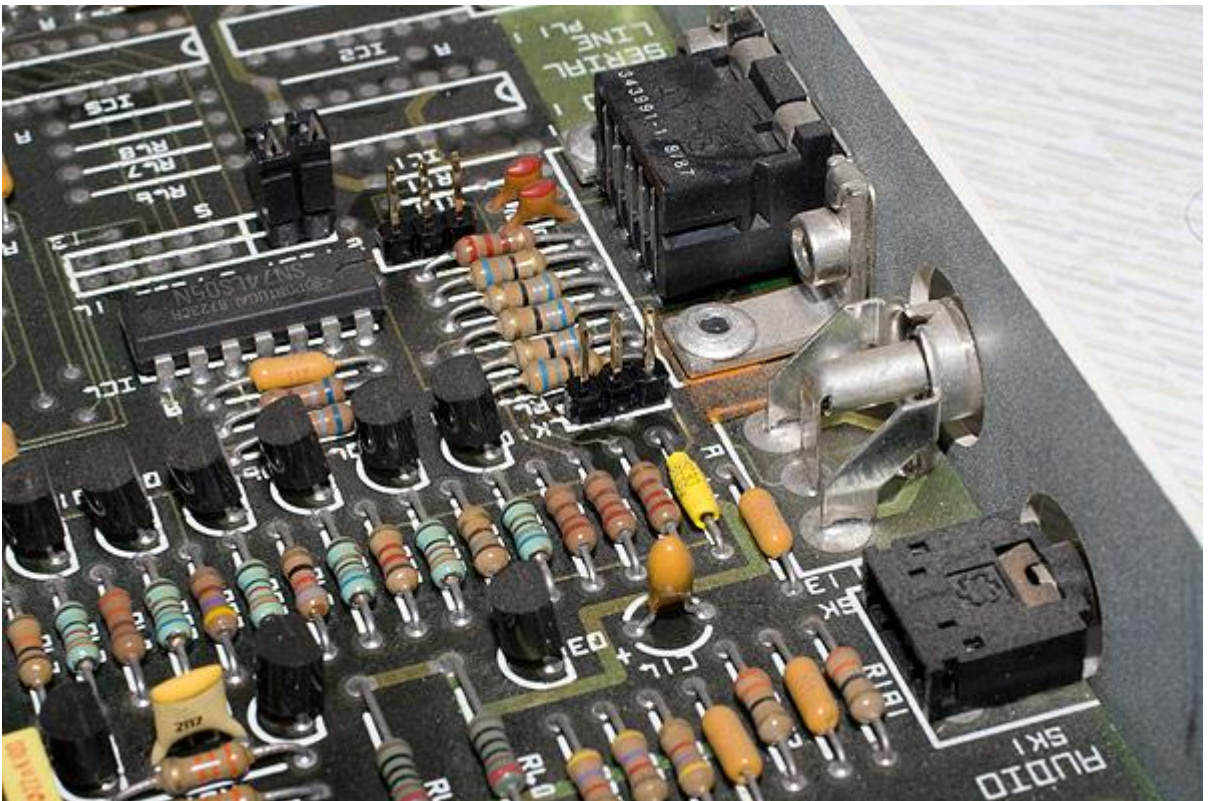
3. Locate the Aux I/O header marked as PL10 and connect the Aux I/O connecting cable to pin 3 (the middle pin).



4. Connect the Aux I/O signal wire to the pin marked Aux on CN2 on the VIDC Enhancer board.

#### **To configure the A300 and A400 with VIDC Enhancer for a VGA monitor**

1. Locate the newly fitted jumpers marked LK10 and LK11 on the motherboard.



2. Set the position of LK10 to the WEST position.
3. Set the position of LK11 to the WEST position.
4. Remove the jumper marked 3/400 on JP1 on the VIDC Enhancer.



This completes the fitting and configuration of the VIDC Enhancer. Follow steps 2 and 1 of the strip down guide to complete the re-assembly of your Archimedes.

Before powering your A300 or A400 series Archimedes up, please refer to the ***Powering on your Archimedes after fitting the VIDC Enhancer*** section later in this manual.

## Fitting the VIDC Enhancer board to an Acorn Archimedes A400/1

Fitting the VIDC Enhancer to the A400/1 series Archimedes requires the addition of a header and the replacement of a chip with a socket on the motherboard. This requires that the motherboard is extracted from the Archimedes case.

### Parts list

Please check the supplied kit to ensure that you have the following parts for fitting the VIDC Enhancer to your A400/1 series Archimedes.

- 1 x Retro-Kit VIDC Enhancer board
- 1 x Aux1 control cable -OR- Aux1 control and manual override switch
- 1 x VIDC clock signal connecting cable
- 1 x 5-way header

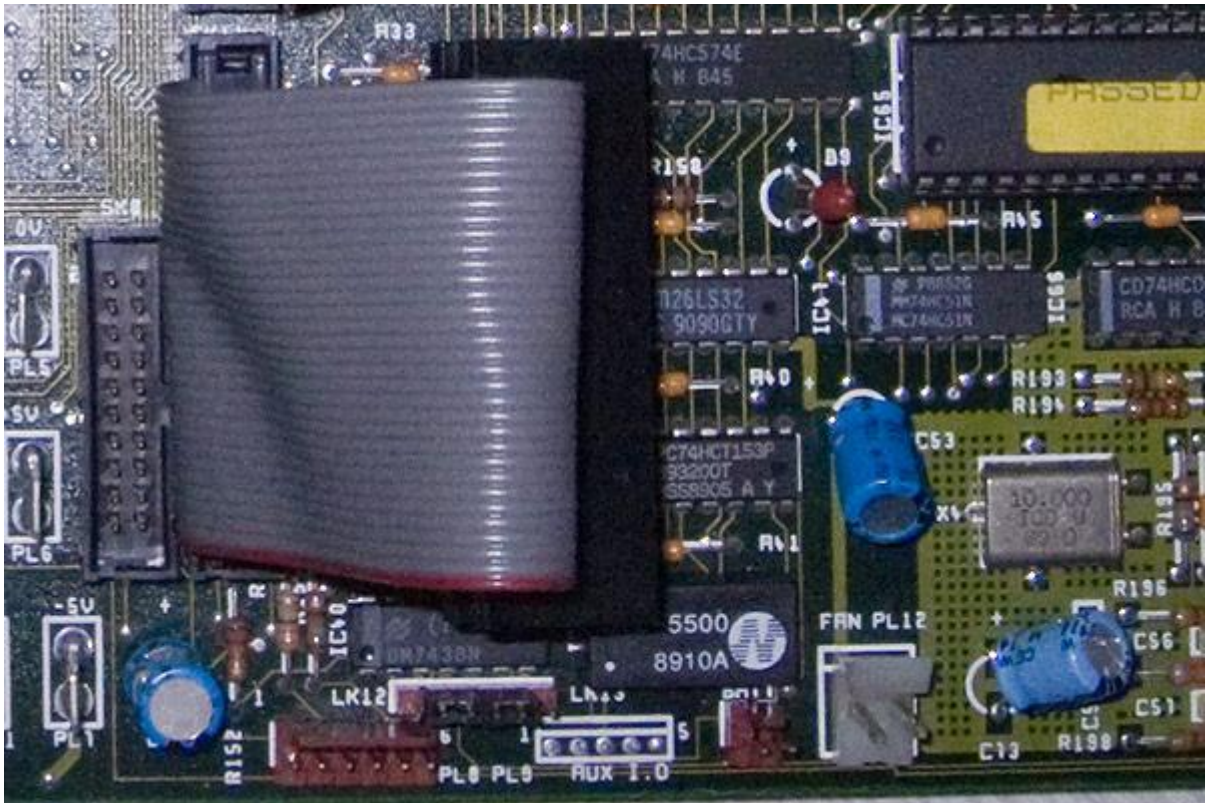
### To strip down the Archimedes

1. Remove the five case screws from the Archimedes (3 at the rear and 1 on each side) and remove the case lid sliding it rearwards.
2. Remove any podules fitted to the backplane by removing their fixing screws and sliding out the podules from the rear of the Archimedes.
3. Remove the five screws holding the front fascia in place and disconnect the cables from the motherboard (3 underneath, 1 on either side).
4. Remove the connecting power cable from the backplane noting their locations.
5. Unscrew the two fixing screws holding the backplane in place and gently extract the backplane by lifting vertically.
6. Remove the floppy drive and hard drive (if fitted).
7. Disconnect the power connectors from the motherboard.
8. Disconnect the battery back from the motherboard.
9. Remove the two fixing screws from the underside of the Archimedes at the rear.
10. Disconnect the earth strap from the front of the Archimedes connecting the motherboard to the chassis.
11. Remove the two motherboard fixing screws on the back plate and gently slide the motherboard out from its case in a rearwards direction.

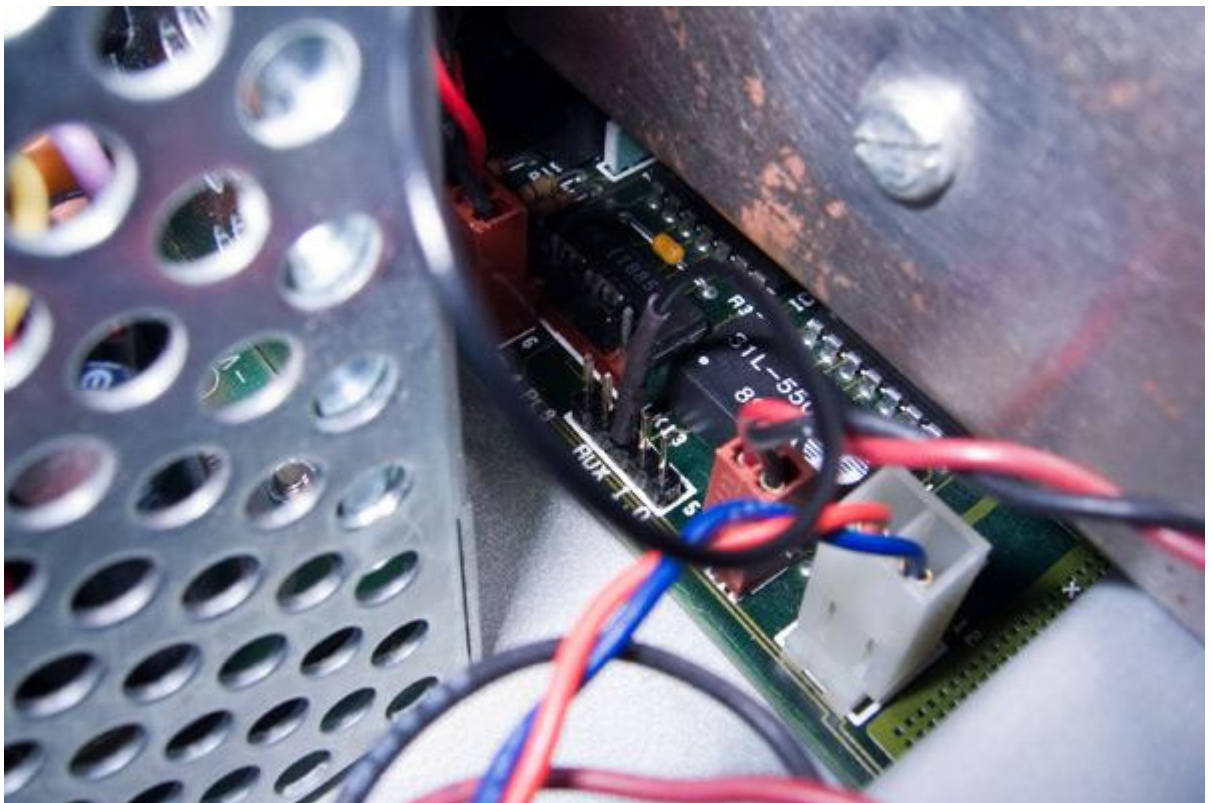


### To fit the additional parts to the A400/1 motherboard

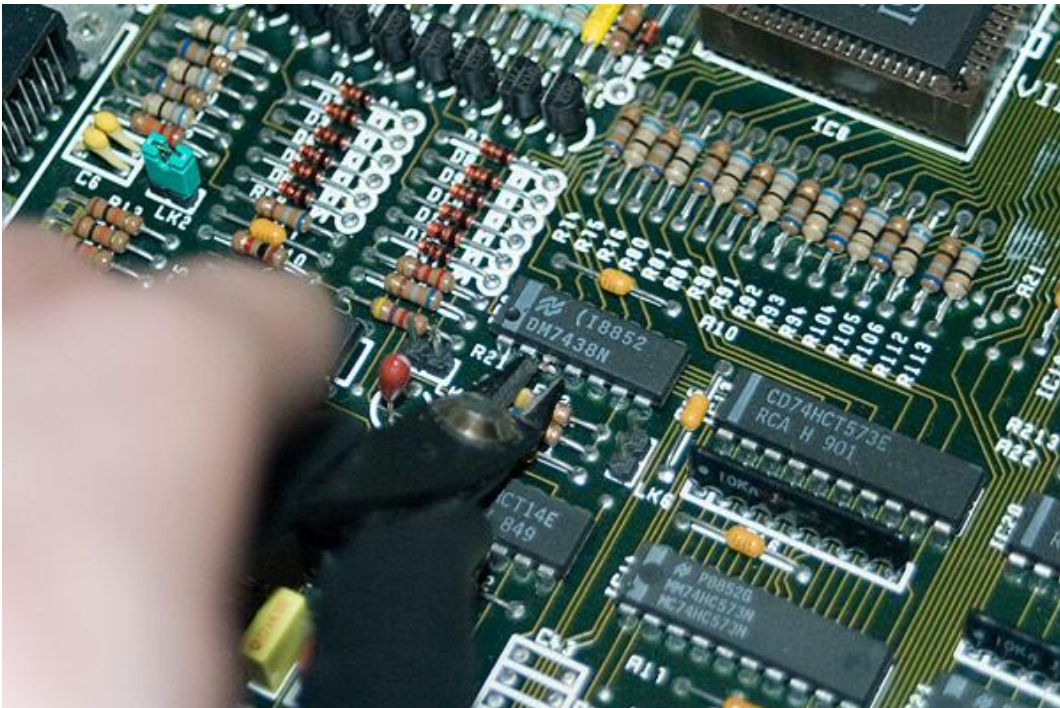
1. Locate the Aux I/O header location on the motherboard marked as PL9.



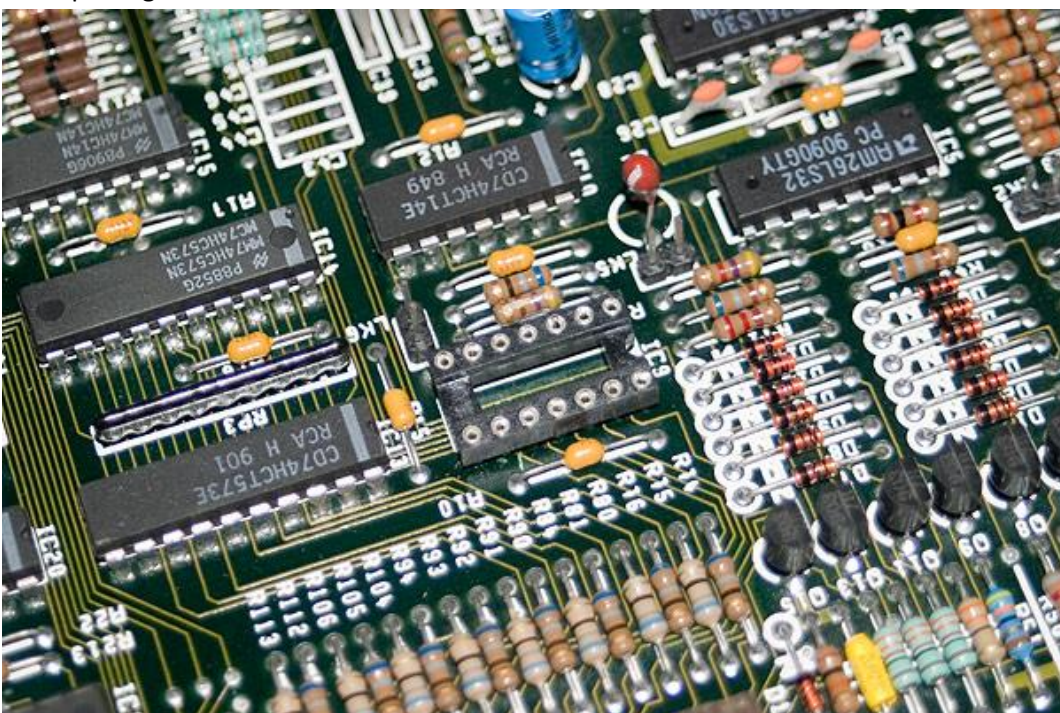
2. If no header is fitted, use some solder wick to remove the solder from the through hole mounting holes.
3. Solder in the supplied 5-way header.



4. Locate the chip in position IC9 and remove it. TIP: The easiest way to remove a chip like this is to cut each leg to remove the body of the chip and then de-solder the remnants of each leg one by one using some solder wick. A new chip is supplied on the VIDC Enhancer.



5. Fit the supplied 14-way socket in the position of IC9 noting the orientation of the socket when placing it on the motherboard.

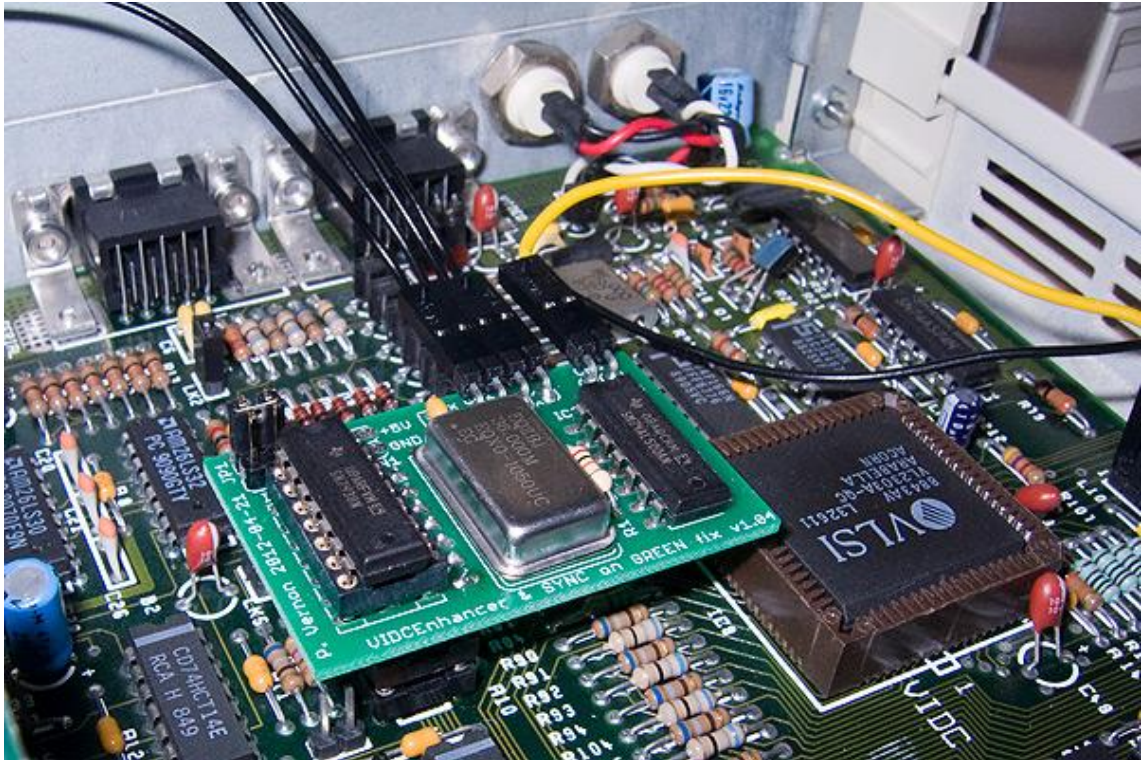


This completes the fitting of the additional parts to the A400/1 motherboard and it can be re-fitted to the Archimedes case. Follow the steps in strip down instructions carrying out points 11 to 3 to reassemble the Archimedes, leaving the podule and lid fitting until after the VIDC Enhancer has been fitted.

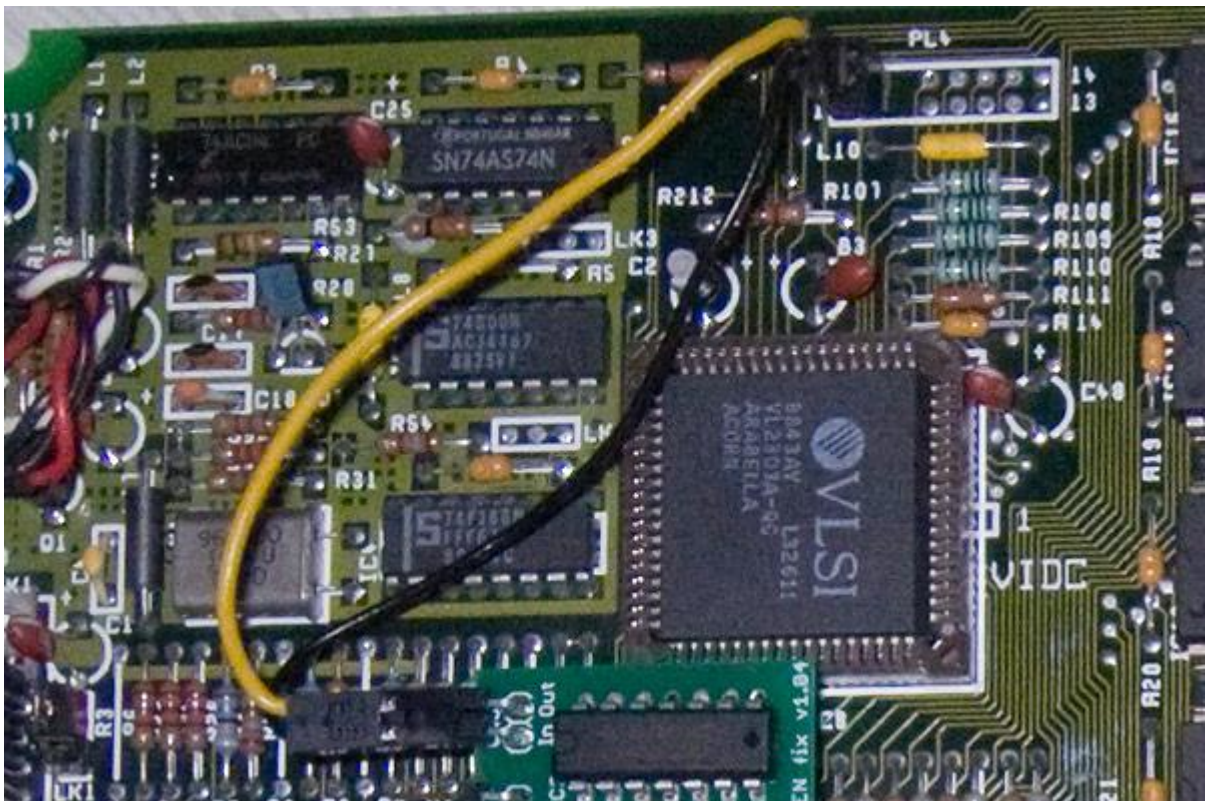
### To fit the Retro-Kit VIDC Enhancer

Once the Archimedes is ready to accept the VIDC Enhancer, the following steps should be carried out to complete the installation.

1. Plug the VIDC Enhancer into the newly socketed IC9.



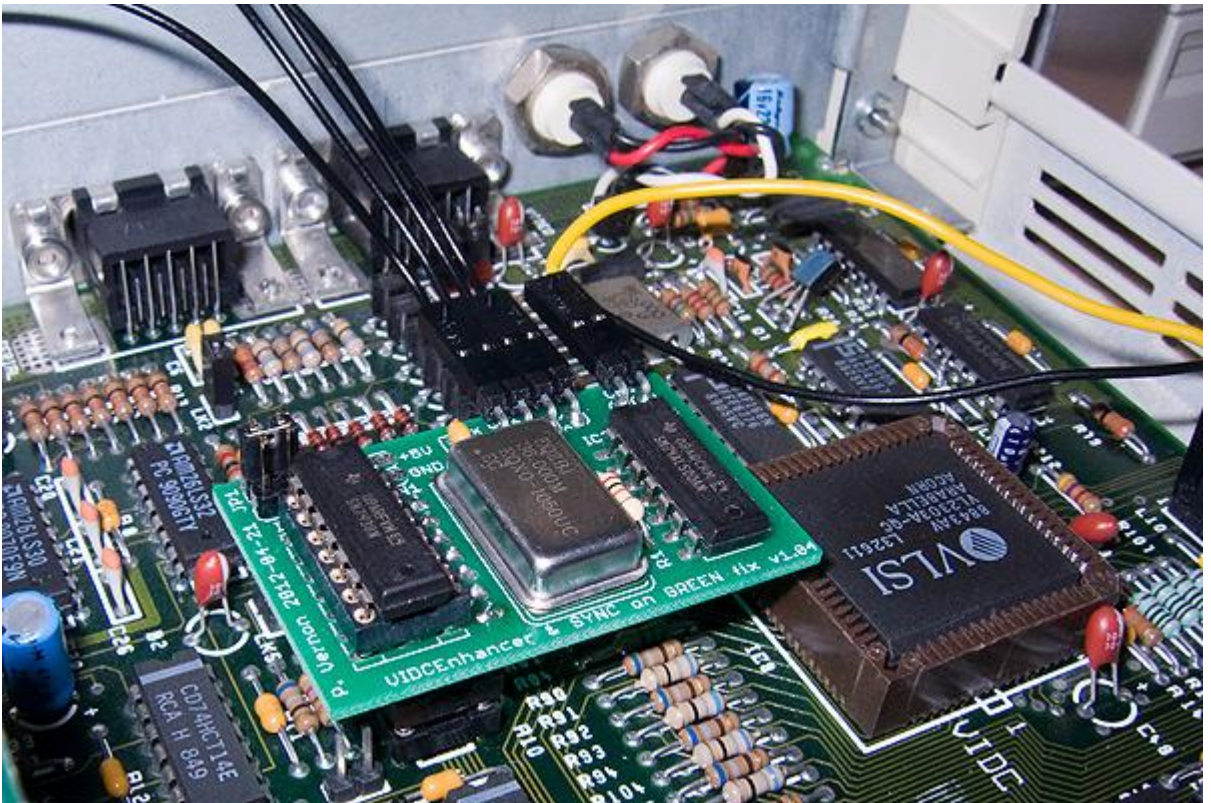
2. Locate the headers on the motherboard marked PL4, remove the jumper from the link marked 1-2 and connect the VIDC clock connecting cable as shown in the photo below.



3. Locate the Aux I/O header marked as PL9 and connect the Aux I/O connecting cable to pin 3 (the middle pin).



4. Connect the Aux I/O signal wire to the pin marked Aux on CN2 on the VIDC Enhancer board. This is the left most pin on CN2 as viewed in the photo below.



### **To configure the A400/1 with VIDC Enhancer for a VGA monitor**

1. Locate the jumpers marked LK1 and LK2 on the motherboard.
2. Set the position of LK1 to the NORTH position.
3. Set LK2 to be CLOSED.
4. Remove the jumper marked 400/1 on JP1 on the VIDC Enhancer.

This completes the fitting and configuration of the VIDC Enhancer. Follow steps 2 and 1 of the strip down guide to complete the re-assembly of your Archimedes.

Before powering your A400/1 series Archimedes up, please refer to the ***Powering on your Archimedes after fitting the VIDC Enhancer*** section later in this manual.

## Powering on your Archimedes after fitting the VIDC Enhancer

**NOTE: Before you power on your Archimedes, please double check your work to ensure the polarity of your connections are correct.**

When you power on the Archimedes for the first time after fitting a VIDC Enhancer, the settings in the CMOS will most likely be incorrect and need resetting and configuring if you have not used a (S)VGA or multi-sync monitor before. Thankfully, these details can be re-configured without the need to see what is on the screen.

### To set your Archimedes' monitor type

If you followed the instructions to prepare your Archimedes before fitting the VIDC Enhancer, all you should need to do now is tell RISC OS what monitor type it is connected to. Refer to Appendix A to see all the Monitor Types supported by RISC OS.

With a suitable (S)VGA monitor connected, press and hold the number 3 (VGA) or 4 (SVGA) on the keypad and power on (Only 3 (VGA) is supported under RISC OS 2).

With a suitable multi-sync monitor connected, press and hold the number 1 on the keypad and power on.

Keep the key pressed down until you hear the POST beep. If your sync setting is correct, you should see a picture shortly after the beep and a notification indicating the monitor type has been changed.

If you see no picture and your monitor reports that the refresh rate is "out of range" or "not supported" then the computers Sync setting probably needs to be changed.

### To change your Archimedes' Sync output by resetting the CMOS

If you followed the instructions to prepare the Archimedes before shutting down your computer and see no picture after setting the correct monitor type using the instructions above, with your Archimedes powered down, press and hold the 'R' key on your keyboard whilst powering on to reset the CMOS.

If you did not follow the instructions to prepare the Archimedes, then with your Archimedes powered down, press and hold the 'T' key on your keyboard whilst powering on to reset the CMOS with the alternate Sync setting.

Resetting the CMOS in this way will also reset the MonitorType setting so it's likely that no picture will appear. Once you hear the POST beep, wait for any hard drive disc activity to stop before powering down again.

Once powered down, set the monitor type according to the instructions above and you should then see an image and notification of change of Monitor Type on your screen.

Once you can see a picture on your screen, you'll need to restore any other custom CMOS settings that may have been changed by the reset process.

## Installing the software for your VIDC Enhancer

The Retro-Kit VIDC Enhancer is compatible with several pieces of software that can control VIDC Enhancers including AutoVIDC by Andreas Barth, the Atomwide VIDC Enhancer software and the Beebug VIDC Enhancer software.

Other software that can control the Retro-Kit VIDC Enhancer is called !CustomVDU which allows the user to create custom screen modes which when used automatically control the state of the VIDC Enhancer using either the Aux1 or Aux2 pin depending on the type of VIDC Enhancer fitted.

AutoVIDC appears to be the most transparent and easy to use software and as such is the software recommended for use with the VIDC Enhancer.

### AutoVIDC

The AutoVIDC sparkplug archive contains a module that is compatible with RISC OS 2 and 3 and can be placed in the PreDesk folder of the Uniboot boot structure to automatically control the VIDC Enhancer. It provides two extra \* commands to manage the VIDC Enhancer board which are:

\*AutoVIDCmap - lists all screen modes and indicates which ones will use the VIDC Enhancer

\*AutoVIDCset - allows a user to set extra modes as being Enhanced.

### Non-Uniboot installation

Where your Archimedes does not have a Uniboot boot sequence installed, the AutoVIDC Module can be placed in your !System.Modules folder and then your !Boot file must be altered inserting the following line towards the beginning of the file

```
RMLoad ADFS::4.$.!System.Modules.AutoVIDC
```

If your Archimedes uses SCSIFS or IDEFS then you may need to change the path to the AutoVIDC file accordingly.

## Using your VIDC Enhancer with optional manual override

The VIDC Enhancer board once fitted and with suitable software installed should be transparent in use and you should have no need to disable it when using your Archimedes.

Unless you intend on doing a lot of mode configuration and creation, the manual control is probably not required for most users.

The manual override switch must be mounted somewhere safely on the exterior of your Archimedes and the photo below shows a suggested mounting position in a spare blanking plate (not supplied).



The switch positions have the following functions:

Position	Function	VIDC clock freq.
I	Software control	24MHz and 36 MHz
O	Off	24MHz
II	Permanently on	36MHz



## Resetting the Archimedes for a Composite Sync monitor

If you wish to return to a traditional 15kHz monitor like the AKF11 or AKF12 or an old multi-sync monitor such as an Acorn AKF50, you do not need to disconnect the VIDC Enhancer. Typically though, these monitors require a Composite Sync signal provided on the Green component of the RGB so you will need to set some jumpers accordingly.

### All Archimedes

Power on your computer with your current monitor and reset the SYNC setting by typing:

```
*CONFIGURE SYNC 1
```

Shutdown your Archimedes and open the case before resetting the jumpers according to the model of Archimedes you own.

### A3000

In the A3000, the jumpers marked LK24 and LK25 must be reset.

LK24 should be changed from the NORTH to the SOUTH position.

LK25 should be changed from the CLOSED to the OPEN setting.

### A300 and A400

In the A300 and A400 series Archimedes, the CSYNC settings and Sync on Green setting must be reset.

LK10 should be set to the EAST position.

LK11 should be set to the EAST position.

Both jumpers at position JP1 on the VIDC Enhancer should be CLOSED.

### A400/1

In the A400/1 series Archimedes, the CSYNC settings and Sync on Green setting must be reset.

LK1 should be set to the SOUTH position.

LK2 should be set to OPEN.

Both jumpers at position JP1 on the VIDC Enhancer should be CLOSED.

## Troubleshooting

### Archimedes fails its POST

If the VIDC Enhancer is left in the permanent ON state, it can cause the RISC OS 3 POST sequence to fail triggering the POST result to report the VIDC Virq (Video Interrupt) and VIDC Sirq (Sound Interrupt) failure codes.

If you see this type of error code before the machine completes its boot sequence and the machine otherwise operates perfectly you can either turn the VIDC Enhancer off when booting, enable software control or, if you must keep the VIDC Enhancer on permanently and you have RISC OS 3.10 or above, you can alter the CMOS to toggle the POST tests using the small BASIC program below.

```
REM Toggle state of power on self test bit in CMOS
REM Read byte
SYS "OS_Byte",161,&BC TO , ,byte%
REM EOR byte with mask for bit 1
byte% = byte% EOR %10000000
REM Write byte back again
SYS "OS_Byte",162,&BC,byte%
END
```

This code toggles bit 7 of byte 188 (&BC) in the CMOS memory to control the long tests in the RISC OS POST. Running the program a second time resets the bit to 0.

- 0 - Enable long tests in POST
- 1 - Disable long tests in POST

**NOTE: In RISC OS 3.00, the VIDC timing tests are not disabled with this code. You can refer to Acorn App Note 225 for more information.**

<http://www.retro-kit.co.uk/user/custom/Acorn/32bit/documentation/RISCOS-POST-AppNote225.pdf>

## Appendices

### Appendix A – RISC OS monitor type definitions

The Archimedes range of computers can support several different types of monitor as standard. Each is assigned a number and the correct monitor type must be selected when a new monitor is connected to the Archimedes.

This is usually carried out by pressing and holding the relevant key on the keypad whilst powering the Archimedes on.

Monitor Type	Description
0	50Hz TV standard colour or monochrome monitor
1	Multi-sync monitor
2	64Hz high-resolution monochrome monitor
3	60Hz VGA type monitor
4	Super VGA type monitor *
5	LCD *

Monitor types marked with a '\*' denote types only available in RISC OS 3.

## Appendix B – Screen modes and refresh rates

Below is a reproduction of the mode definition table that is on page 575 in volume 1 of the RISC OS 3 Programmers Reference Manual published by Acorn Computer.

Mode	Text Resolution	Pixel Resolution	OS units resolution	Logical colours	Mem used	Refresh rate	Bandwidth (M/s)	Monitor types	Notes
0	80 x 32	640 x 256	1280 x 1024	2	20K	50Hz	1	0,1,3,4,5	3
1	40 x 32	320 x 256	1280 x 1024	4	20K	50Hz	1	0,1,3,4,5	3
2	20 x 32	160 x 256	1280 x 1024	16	40K	50Hz	2	0,1,3,4,5	3
3	80 x 25	Text only	Text only	2	40K	50Hz	2	0,1,3,4,5	3, 5, 7
4	40 x 32	320 x 256	1280 x 1024	2	20K	50Hz	1	0,1,3,4,5	3
5	20 x 32	160 x 256	1280 x 1024	4	20K	50Hz	1	0,1,3,4,5	3
6	40 x 25	Text only	Text only	2	20K	50Hz	1	0,1,3,4,5	3, 5, 7
7	40 x 25	Teletext	Teletext	16	80K	50Hz	4	0,1,3,4,5	3, 5
8	80 x 32	640 x 256	1280 x 1024	4	40K	50Hz	2	0,1,3,4,5	3
9	40 x 32	320 x 256	1280 x 1024	16	40K	50Hz	2	0,1,3,4,5	3
10	20 x 32	160 x 256	1280 x 1024	256	80K	50Hz	4	0,1,3,4,5	3
11	80 x 25	640 x 250	1280 x 1000	4	40K	50Hz	2	0,1,3,4,5	3, 8
12	80 x 32	640 x 256	1280 x 1024	16	80K	50Hz	4	0,1,3,4,5	3
13	40 x 32	320 x 256	1280 x 1024	256	80K	50Hz	4	0,1,3,4,5	3
14	80 x 25	640 x 250	1280 x 1000	16	80K	50Hz	3.9	0,1,3,4,5	3, 8
15	80 x 32	640 x 256	1280 x 1024	256	160K	50Hz	8	0,1,3,4,5	3
16	132 x 32	1056 x 256	2112 x 1024	16	132K	50Hz	6.6	0,1	6
17	132 x 25	1056 x 250	2112 x 1024	16	132K	50Hz	6.5	0,1	6, 8
18	80 x 64	640 x 512	1280 x 1024	2	40K	50Hz	2	1	
19	80 x 64	640 x 512	1280 x 1024	4	80K	50Hz	4	1	
20	80 x 64	640 x 512	1280 x 1024	16	160K	50Hz	8	1	
21	80 x 64	640 x 512	1280 x 1024	256	320K	50Hz	16	1	
22	96 x 36	768 x 288	768 x 576	16	108K	50Hz	5.4	0,1	1, 9
23	144 x 56	1152x896	2304 x 1792	2	126K	64Hz	8.1	2	
24	132 x 32	1056 x 256	2112 x 1024	256	264K	60Hz	13.2	0,1	6
25	80 x 60	640 x 480	1280 x 960	2	37.5K	60Hz	2.3	1,3,4,5	
26	80 x 60	640 x 480	1280 x 960	4	75K	60Hz	4.5	1,3,4,5	
27	80 x 60	640 x 480	1280 x 960	16	150K	60Hz	9	1,3,4,5	
28	80 x 60	640 x 480	1280 x 960	256	300K	56Hz	18	1,3,4,5	
29	100 x 75	800 x 600	1600 x 1200	2	58.6K	56Hz	3.3	1,4	1, 2
30	100 x 75	800 x 600	1600 x 1200	4	117.2K	56Hz	6.6	1,4	1, 2
31	100 x 75	800 x 600	1600 x 1200	16	234.4K	56Hz	13.2	1,4	1, 2
33	96 x 36	768 x 288	1536 x 1152	2	27K	50Hz	1.4	0,1	1
34	96 x 36	768 x 288	1536 x 1152	4	54K	50Hz	2.7	0,1	1
35	96 x 36	768 x 288	1536 x 1152	16	108K	50Hz	5.4	0,1	1
36	96 x 36	768 x 288	1536 x 1152	256	216K	50Hz	10.8	0,1	1
37	112 x 44	896 x 352	1792 x 1408	2	38.5K	60Hz	2.3	1	1
38	112 x 44	896 x 352	1792 x 1408	4	77K	60Hz	4.6	1	1
39	112 x 44	896 x 352	1792 x 1408	16	174K	60Hz	9.2	1	1
40	112 x 44	896 x 352	1792 x 1408	256	308K	60Hz	18.5	1	1
41	80 x 44	640 x 352	1280 x 1408	2	27.5K	60Hz	1.7	1,3,4,5	1, 3, 4
42	80 x 44	640 x 352	1280 x 1408	4	55K	60Hz	3.3	1,3,4,5	1, 3, 4
43	80 x 44	640 x 352	1280 x 1408	16	110K	60Hz	6.6	1,3,4,5	1, 3, 4
44	80 x 25	640 x 200	1280 x 800	2	15.7K	60Hz	0.9	1,3,4,5	1, 3
45	80 x 25	640 x 200	1280 x 800	4	31.3K	60Hz	1.9	1,3,4,5	1, 3
46	80 x 25	640 x 200	1280 x 800	16	62.5K	60Hz	3.8	1,3,4,5	1, 3

## Notes on display modes

1. These modes are not available in RISC OS 2.00, nor (except for mode 31) are they available in RISC OS 2.01
2. These modes are not available on early models of RISC OS computers (i.e. the Archimedes 300, 400 and 400/1 series and the A3000), because they are unable to clock VIDC at the necessary rate.
3. These modes are handled differently with a VGA or Super VGA type monitor. **If you are using such a monitor:**
  - RISC OS 2.00 does not implement these modes.
  - These modes are all displayed on a screen having 352 raster lines. Where a mode has fewer than 352 vertical pixels, it is centred on the screen with blank rasters at the top and bottom. Because of their appearance, these modes are known as *letterbox modes*.
  - The refresh rate is 70Hz.
  - The bandwidths shown in the table for these modes are lower than these monitor types consume, because no allowance has been made for the blank rasters.
  - Early models of RISC OS computers (i.e. the Archimedes 300, 400 and 400/1 series and the A3000) scan these modes some 4.7% slow. Again, this is because they are unable to clock VIDC at the necessary rate. Most VGA and Super VGA type monitors can still successfully lock onto this signal, but some may not. Furthermore, these models do not provide a *Sync Polarity* signal. This makes the effect of letterbox modes (see above) more severe.
4. Early models of RISC OS computers (i.e. the Archimedes 300, 400 and 400/1 series, and the A3000) also scan these modes some 4.7% slow with multi-frequency monitors. Again this is because they are unable to clock VIDC at the necessary rate.
5. These modes do not display graphics, and are provided for compatibility with BBC/Master series computers.
6. In these modes, circles, arcs, sectors and segments do not look circular. This is because the aspect ratio of the pixels is not in a 1:2, 1:1 or 2:1 ratio.
7. These are *gap modes*, where the colour of the gaps is not necessarily the same as the text background.
8. These modes are not a multiple of eight pixels high. By default, in these modes the bottom of the screen corresponds to the bottom line of ECF patterns, but the top line will not correspond to the top line of ECF patterns.
9. This mode is not available in RISC OS 3 (version 3.00). It provides a double-sized display suitable for use by visually impaired people. Unfortunately some applications may not provide correct displays when used in this mode.

## Other notes

Mode 32 has not been defined.

If an attempt is made to select a mode which is not appropriate to the current monitor type (or OS 8version), a suitable mode for that monitor is used. For example, an attempt to select mode 23 on a type 0 monitor will result in mode 0 being used.

In 256 colour modes, there are some restrictions on the control of colours. Only 64 base colours may be selected; 4 levels of tinting turn the base colours into 256 shades. Also, the selection from the colour palette of 4096 shades is only possible in groups of 16.

Where a VIDC Enhancer is used, Note 2 does not apply. Where a dual VIDC Enhancer configuration is used, the refresh rates referenced in Note 3 and 4 run at full speed.

## Appendix C – Dual VIDC Enhancer

A dual VIDC Enhancer configuration provides the ability to deliver an extra two VIDC clock frequencies in addition to the original 24MHz dot clock. Typically, the dual VIDC Enhancer configuration provides a 25.175MHz and 36MHz dot clock which allows the Archimedes to deliver full standards compliant refresh rates for all VGA and SVGA screen modes it is capable of driving.



The dual VIDC Enhancer is controlled by way of both Aux IO lines, Aux 1 and Aux 2 where Aux 1 controls the 36MHz VIDC Enhancer and the Aux 2 line controls the 25.175MHz VIDC Enhancer.

## Appendix D – Overclocking the VIDC chip

**NOTE:** Any over clocking of the VIDC chip is done at your own risk and Retro-Kit does not advise that it is done unless you know exactly what you are doing.

The Acorn VIDC chip that controls the video display circuitry is rated to a maximum 36MHz clock speed without extra cooling and the Retro-Kit VIDC Enhancer board provides a 36MHz clock signal for the VIDC chip.

In the past, the VIDC chip has been successfully over clocked to speeds up to 50MHz with extensive cooling being applied which allows the Archimedes to output to displays supporting higher screen resolutions and refresh rates.

The VIDC Enhancer board can be altered to over clock the VIDC chip by replacing the oscillator with one having a higher frequency. The table below shows some standard VGA resolutions, their RISC OS screen modes and the frequencies and clock speed required to achieve them.

Resolution	RISC OS screen mode	Horizontal Frequency	Vertical Frequency	Dot Clock
640x256	8, 12 and 15	15kHz	50Hz	24.000MHz *
	8, 12 and 15	30kHz	66.8Hz	24.000MHz +/***
	8, 12 and 15	31.469kHz	70Hz	25.175MHz +/****
640x480	25-28	30.000kHz	57.1Hz	24.000MHz *
	25-28	31.469kHz	59.940Hz	25.175MHz ****
	25-28	37.500kHz	75.000Hz	31.500MHz
	25-28	37.861kHz	72.809Hz	31.500MHz
	25-28	45.000kHz	85.650Hz	36.000MHz **
800x600	29-31	23.437kHz	37.500Hz	24.000MHz *
	29-31	35.156kHz	56.250Hz	36.000MHz **
	29-31	37.879kHz	60.137Hz	40.000MHz
	29-31	46.875kHz	75.000Hz	49.500MHz
	29-31	48.077kHz	72.188Hz	50.000MHz

\* denotes the Acorn Archimedes native frequencies

\*\* denotes the frequencies available with the standard 36MHz VIDC Enhancer

\*\*\* denotes refresh rates of VGA modes on the original Archimedes

\*\*\*\* denotes the frequencies available with the addition of a 25.175MHz VIDC Enhancer

+ denotes the mapped modes as delivered by RISC OS 3 when connected to a (S)VGA monitor



## Appendix E – Tested monitors

The following monitors/VGA capable flat screen televisions have been tested as follows:

### **Iiyama ProLite E430S**

Displays all screen modes that the RISC OS SVGA monitor type delivers using just a 36MHz VIDC Enhancer. Does not require a 25.175MHz VIDC board.

### **Proview 780**

Supports 36MHz VIDC Enhancer refresh rates for 800x600 screen modes.

Requires a dual VIDC Enhancer to display all MODEs correctly.

### **Sony Bravia KDL 40V4000**

Displays SVGA 800x600 OK but complains that it is “out of range” using the 36MHz VIDC Enhancer.

640x480 VGA modes are not displayed as the 24MHz dot clock cannot generate true VGA Sync frequencies.

Requires a dual VIDC Enhancer to display all MODEs correctly.

### **DELL Ultrasharp 3008WFP**

Supports 36MHz VIDC Enhancer refresh rates for 800x600 screen modes. Requires a dual VIDC Enhancer to display all MODEs correctly.

### **Samsung 191T**

Supports 36MHz VIDC Enhancer refresh rates for 800x600 screen modes. Requires a dual VIDC Enhancer to display all MODEs correctly.

### **LG Flatron Wide M208WA**

Displays all screen modes that the RISC OS SVGA monitor type delivers using just a 36MHz VIDC Enhancer. Does not require a 25.175MHz VIDC board.