# Installation guide for the PCATS Graphics Enhancer

The Graphics Enhancer is normally a very reliable device, but problems are sometimes encountered when installing it. These problems usually show as video noise in some screen modes, and vary from an occasional pixel flickering erratically to more or less complete breakup of the picture. This is caused by the fact that, unfortunately, some Archimedes computers do not meet the quoted specifications for video timings. As a result, not all installations are as simple as just plugging the board in straight from the box. In these circumstances, the Graphics Enhancer must be essentially 'tuned' for the Archimedes it is being used with. This is why we strongly recommend that we perform the installation ourselves, as we have much experience with this procedure. However, we recognise that some dealers and/or individuals will want to, or have to, do the installation themselves. This is why we have written this guide, which expands upon the installation details given in the manual, and details the problems that we have encountered at various times, and solutions for them.

PLEASE NOTE that the warranty of the machine will be voided unless the upgrade is performed by a component level certified service centre. (i.e. us)

## Installation procedure for the 310 & old 440 series Archimedes

The 5x2 way IDC plug supplied with the Graphics Enhancer must be fitted to the motherboard of the computer, in the position marked PL3, which is located roughly in the middle of the rear part of the PCB. This requires the computer to be disassembled, and the motherboard removed. The solder filling the holes of PL3 must be carefully removed with a vacuum solder removal tool, and the header is soldered into the empty holes. To give the correct alignment of the plug, push it into the socket on one end of the 16-way ribbon cable, and connect the socket to the existing 2x2 link block, having first removed the two links. The pins of the plug will fit neatly through the holes, and can be soldered on the underside of the PCB.

The machine can now be reassembled. The end of the ribbon cable which has a small loop of wire connecting pins 3 & 4 should be attached to PL3, with the red stripe towards pin 1. The Graphics Enhancer can be plugged into the backplane in either slot 1 or 3 (left side as viewed from the front). The other end of the ribbon cable is connected to the 16 way header on the Graphics Enhancer, with the red stripe towards pin 1. Note that this results in a half-twist in the cable.

The other cable supplied connects the RGB out socket on the back of the computer to the RGB-in plug on the Graphics Enhancer. The monitor is then plugged into the remaining socket. The two links removed from PIA must be carefully retained, as they must be replaced if the Graphics Enhancer board is ever removed.

## Installation procedure for the 400/1 series Archimedes

As for the 300 & old 440 series Archimedes, the 5x2 way IDC plug supplied with the Graphics Enhancer must be fitted to the motherboard of the computer, but in the position marked PL4, which is located on the right side of the rear part of the PCB as viewed from the front of the computer. The fitting procedure for the connector and the cables is as previously mentioned in the installation instructions for the 300 series Archimedes. The Graphics Enhancer must, however, be fitted to either slot 0 or 2 (right side as viewed from the front).

Note that on some recent 400/1 series computers, PL4 is apparently fitted as standard. Please check this BEFORE removing the motherboard.

## Installation procedure for the A540 series Archimedes

In these machines, the required connector is fitted as standard, and is labeled LK15. It is located approximately in the centre of the motherboard, and runs horizontally across the rear part of the PCB. The fitting procedure for the cables is as previously mentioned in the installation instructions for the 300 series Archimedes.

## Installation procedure for the  A3000

**PLEASE NOTE: The power supply in the A3000 Is partially exposed when the top of the case is removed, and extreme care must be taken not to insert fingers or other body parts Into the openings, as dangerous voltages may be present even when the machine Is not plugged In.**

The A3000 does not have any facility for connecting to the VIDC via a header block, as per the other machincs in the Archimedes range. As a result, a small adaptor board is required. This clips onto the VIDC, and brings out the necessary control lines to a 16 way IDC connector, which the standard ribbon cable connects to.

The top of the A3000 case must be removed, which is done by removing the two screws at either side of the rear of the machine, and releasing the three catches at the front of the case, under the keyboard. The disk drive must now be removed. Remove the 4 screws on the underside of the case, and fold back the disk drive, resting it upside-down on the power supply cover.

The A3000 adaptor board can now be clipped onto the VIDC, with the IDC connector facing towards the rear of the computer. The end of ribbon cable with the loop of wire connecting pins 3 & 4 must be connected to the IDC connector on the adaptor board, with the red stripe towards pin 1. Carefully bring the ribbon cable out over the back of the case, leaving a small amount of slack in it. Replace the disk drive.

Link LK28, which is located under the keyboard at the front right of the motherboard, must be removed. To keep the jumper safe, replace it on one pin only of the link. Put the case lid back on, making sure not to pull on the cable when it is clamped in place by the lid.

The Graphics Enhancer is plugged into the podule slot at the rear of the machine, and the ribbon cable must be connected to the 16-way IDC header on the board. The RGB cable connects to the RGB out socket on the back of the A3000, and to the RGB in plug on the Graphics Enhancer board. The monitor is now connected to the remaining socket.

If at any time the podule is removed, the jumper MUST be replaced on LK28. The adaptor board and ribbon cable can be left in place.

It is strongly recommended that an A3000 podule case is used to protect the Graphics Enhancer board, as otherwise the strain on the 96-way connector could cause problems. A suitable box is available from P.R.E.S.

## Initial Setup and Testing of the Graphics Enhancer

After the Graphics Enhancer has been successfully installed, the various *Configure options must be set. For a basic configuration, enter the following commands;

> *Configure CrystalSlots 0           (sets default occupied sockets)
> *Configure DefaultCrystal 0         (use 24 MHz crystal as default)
> *Configure TurboModes 0             (no mode booster installed)

 Depending on whether an ARM3 is fitted, one of the following commands must be entered;

> *Configure ProcessorType 0          (ARM2)
> *Configure ProcessorType 1          (ARM3 at 20 MHz)
> *Configure ProcessorType 2          (ARM3 at 30 MHz)
> *Configure ProcessorType 3          (A540)

If an ARM3 of a speed other than the above is fitted, use the next highest speed.
Next, the monitor group must be set. Use one of the following commands;

> *Configure MonitorGroup 0           (Philips, Standard or Multisync)
> *Configure MonitorGroup 1           (Taxan 770, 770+, 775, etc.)
> *Configure MonitorGroup 2           (Eizo 9060S, etc.)
> *Configure MonitorGroup 3           (Alternate Taxan)

The alternate Taxan type gives much higher frame rates for modes 103 & 126, thereby

removing screen flicker, but at the expense of not having these modes centred on the monitor. To use monitor group 3, the Auto-phase and Auto-centre buttons on the rear of the monitor must be depressed.

A screensize of 320K should generally be set, to allow use of high resolution modes such as mode 126. The appropriate monitor type should also be set, as per the Archimedes manual.

Once all the CMOS ram settings have been entered, press CTRL-Reset and enter the Desktop. If a hard disk is installed, copy the Graphics Enhancer utilities disk into a suitably-named directory. The new version of the ColourTrans module must now be copied into the !System application on the boot disk, whether hard or floppy. There is an application on the utility disk called !Sysmerge which does this. Double-click on the application, and it will ask for the original !System. Drag the icon for the !System which is on the boot disk onto the ! Sysmerge window and drop it. Next, do the same for the !System icon which is on the utilities disk. The application will update the original !System with the new version of ColourTrans.

Next, check the Graphics Enhancer has been properley installed by double-clicking on one of the two CLEAR files in the 'Clearpics' directory on the utilities disk. This will load and display the appropriate picture. The file named 'Greyscale' is a mode 115 picture, and can be displayed on a standard monitor, while the file named 'Chess2' is a mode 126 picture and needs a multisync monitor. Look very carefully at the displayed picture, and ensure that there is no video noise or dropout. This usually shows as one or more of the horizontal lines in the greyscale picture being the wrong shade of grey, or pixels flickering erratically in the chessboard picture. Such video noise is rare, and is almost always confined to the higher-resolution modes such as mode 126. (NOTE: A small amount of pixel flicker in mode 126 is occasionally present on some Graphics Enhancer/Archimedes combinations when first turned on, and disappears after 2 or 3 minutes. This is normal, and is a result of the timings of some video signals from the Archimedes being slightly outside the correct limits)

## Possible Faults and Their Solutions

Occasionally problems are encountered when installing the Graphics Enhancer. These are usually due to the particular Archimedes in question, and problems with the Enhancer itself are very rare. Below is a list of the symptoms we have so far encountered, and suggested solutions to them. Please note that all these problems happen rarely, and the user will very seldom have any trouble with the Graphics Enhancer, which has so far proved to be very reliable.

(1) Video Noise - This varies from a few random pixels occasionally changing colour

erratically to large areas of the screen flickering on and off. (As mentioned previously, a small amount of temporary video noise sometimes happens when the machine is cold, and disappears as it warms up.) The problem is caused by the timings of the various video signals from the VIDC coming adrift from the correct values, and can occur under the following three situations, listed in order of probability:

    (i) Ribbon cable too long. This was a not uncommon situation with some early Graphics Enhancers, but should be very rare with later ones, as they are now supplied with very short cables (approx 6", except A3000). If the cable that is supplied is longer than this, please contact us.

    (ii) IC7 incompatible with the Archimedes being used. This is rare. Sometimes, due to component tolerances in both the Archimedes and the Graphics Enhancer, a particular example of IC7 will not quite work correctly. The solution is simply to replace IC7 with another one (it is socketed). The Serial Port can supply the correct make of chip for a nominal fee. Please contact us.

    (iii) Faulty VIDC. This is <u>extremely</u> rare. The solution is rather obviously to replace the VIDC. The Serial Port can supply and fit new ones, as can some approved Acorn dealers.

## (2) Video Dropout

**(2) Video Dropout** - This manifests as a complete line of the picture flashing briefly to white and back to normal. It is much rarer than video noise, but shares the same causes and fixes. It only occurs in modes that run the VIDC at 36 MHz, ie. 118, 103, 126, etc.

**(3) Floppy Disk Problems** - On some old 300 series machines, fitted with the old style power supply, the floppy disk drive will give 'drive empty' errors after the Graphics Enhancer has been installed. This is apparently due to a fault in the construction of the power supply, which has a floating Ov line, rather than having it tied to ground. The Graphics Enhancer grounds the Ov line through the back panel metalwork, and this can occasionally cause the disk drive to malfunction.

A temporary cure is to electrically isolate the podule back panel from the case of the machine, but a proper fix is to replace the power supply with a new-style unit. This should be done as a matter of course when upgrading a old-style 300 series machine, as the old power supply has a much lower current rating than the new ones, and can seriously overheat when, for example, a hard disk, extra RAM, etc., is fitted. The old style power supply can be recognised by the fact that the case has dull anodised metalwork, rather than being brightly chromed. Replacing the power supply should only be done by an authorised Acorn service centre, as mandatory safety checks are required after installing a new one. Service centres

**(4) Sticking Relays -** If the machine gets extremely hot, the various relays which switch the video signals may not change over reliably. This can be recognised by odd colour effects when changing to extended palette modes, for instance having no red in the picture. The problem is quite rare, and usually happens on 300 series machines with old-style power supplies, for previously mentioned reasons. It may occasionally happen on other machines if the fan filter gets very clogged with dust. The Archimedes is specified for operation in temperatures up to 45 deg. C, and the relays will not generally give any trouble until around 60 deg. C. At first sight, there would appear to be no problem, but we have found that some heavily upgraded 300 series machines with old style PSU's may reach in excess of 70 deg. C internally. A clogged fan filter on a 400 series machine may drive the internal temperature to over 65 deg. C.

The cure for a dirty filter is to clean it, or even discard it completely, as they seem to have no real purpose in life except for accumulating a huge quantity of dust in about 24 hours, and then becoming totally impervious to any airflow through them. However, discarding the filter may void the warranty, so it is up to the user to decide.

Replacing old-style PSU's with new ones, as per the previous section, will usually solve the problem, but in extreme cases an auxilary fan kit may be needed. Contact us for details.

Please note that if the internal temperature of the machine does reach values such as above, the longterm reliability of the various components may be drastically affected. In addition, the Graphics Enhancer may start giving some video noise, even though it it otherwise functioning correctly.

## Afterword

The preceding pages may give the impression that getting a Graphics Enhancer to work is a miracle on a par with walking on water. However, to reiterate, all the above problems are VERY unlikely to happen, but it is useful to know what to do, just in case.

If you have any problems that this guide cannot help with, please do not hesitate to contact us for assistance.