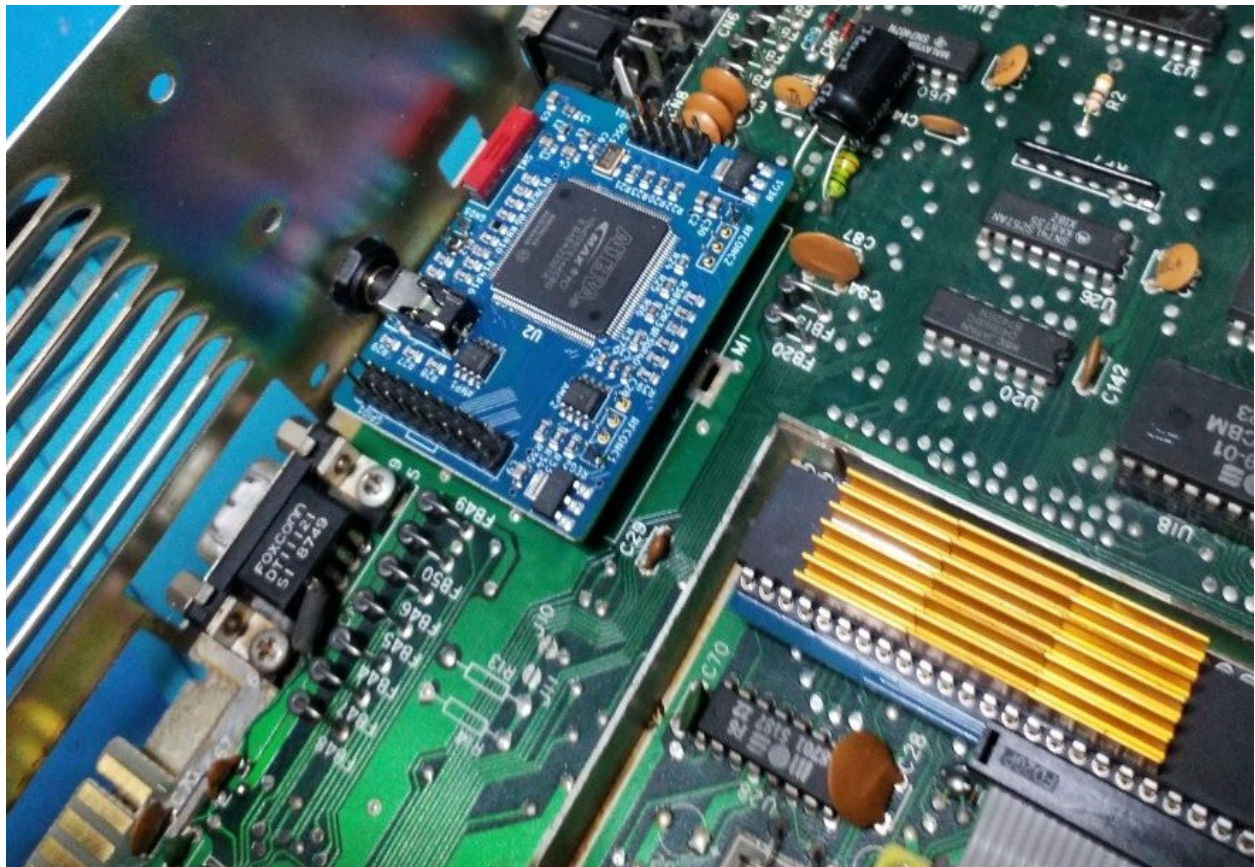


# c0pperdragon C128 Component Video Install Guide Rev 1.0



[videogameperfection.com](http://videogameperfection.com)



This guide describes the Purpose and Installation of the open source FPGA based Component Video kit designed by c0pperdragon.

An installation into a Commodore C128DCR has been demonstrated in this document and minor differences between models will exist but the procedure is similar for all.

The mod is suitable for models C128 / C128D /C128DCR – PAL and NTSC

## **Description and Scope of Installation**

The Commodore C128 is widely regarded as the flagship of Commodore's 8-bit range. Multiple CPU's, 128K RAM, dual video processors and ability to run CPM.. It also provides near 100% compatibility with all C64 software and hardware.

The 80 column output, which is handled by a separate video processor with 16K or 64K video RAM has its own dedicated 9 pin D-type RGBI digital output port. This port is largely compatible with CGA monitors and more recently the RGB2HDMI.

However, the 40 column output is still driven by a slightly enhanced VIC II chip as found in the regular C64. Signals available from the standard 8 pin AV port are composite video, S-video, audio. RF is available from a neighbouring RCA jack.

The VIC II, unlike most video processors of the day, does not generate colour difference or RGB signals but internally processes and produces luminance and chrominance signals directly from its pinouts. Due to this internal processing, specialized PAL and NTSC variants of the VIC II were also required.

This major limitation means we cannot access these video signals any earlier in the processing chain in order to improve them in any manner.

The 5V CMOS 40 Pin VICII used in the C64C did indeed provide a better and cleaner output than the earlier devices. When the C128 was being developed, necessary changes were made to the VIC II to produce a new 48Pin Version known as the VICIIe, which sadly produced a worse image compared even to the early C64. The image has a stronger Jail-bar effect and there are chroma issues causing a purple tint and spots on the image.

c0pperdragon produced a fantastic solution for the C64 and C64C a few years ago which was a great improvement and highly successful. It provided a digitally derived component video output with line doubling and scanline emulation. The full colour palette is also configurable and can be flashed to the board.

Now we have a C128 version of the same solution. Its features and performance are identical to the C64 version, the design is the same and so is the firmware.

This Guide will describe the installation of the "upgrade kit" to a C128 system. You will need some fine soldering skills as well as some knowledge of the C128, as well as a good degree of common sense and patience.

Please read and study this guide in full before attempting any installation, if you are in any doubt regarding your ability to perform the installation then we will be happy to arrange an installation service for you. Your kit will be installed to the highest standard by BetaGamma computing, who we are partnered with. BetaGamma have repeatedly proven themselves to be the best and most professional modding service in the retro

scene today. They are also the authors of this document, so you know your classic computer is in safe hands!

### **Tools you will need are –**

A good temperature controlled soldering station

Good quality desoldering solution of some kind

Some desolder braid, and some 60/40 leaded solder

Various tools to open and dismantle the system

Some IPA cleaning alcohol and brushes to remove flux deposits, new and old

### **The kit is supplied as follows**

1x C128 FPGA board.

1x C128 VICIIe 48pin adapter board

2x 24pin turned pin sockets, used end on end as a riser for the adapter board

10 long pin headers

1x Component Video Break out cable

This document does not discuss the disassembly of the target system, as there are many models of Commodore 128 to choose from. It is assumed that the installer is competent enough to be able to carry the process out carefully and correctly.



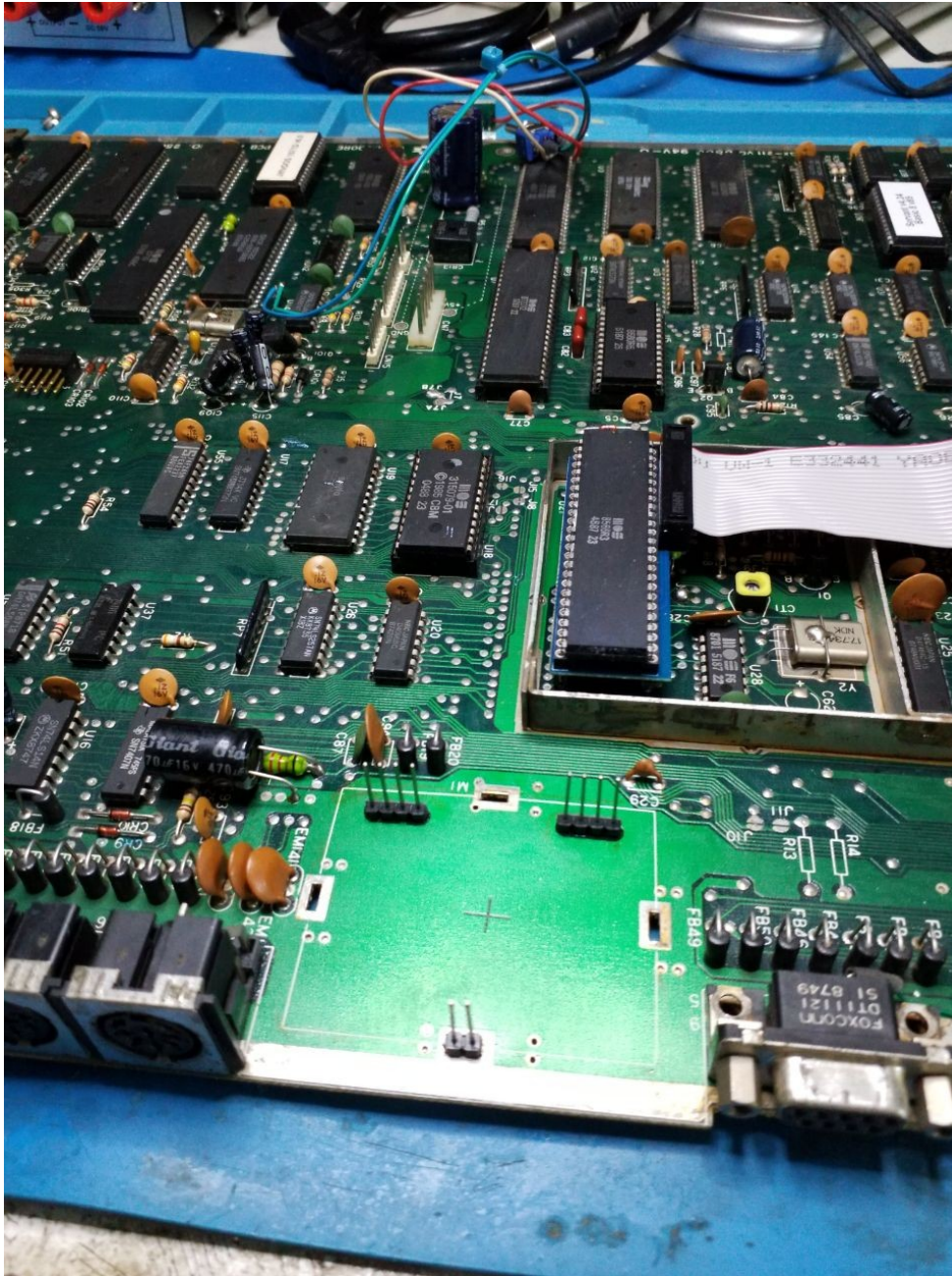
The Existing RF modulator will need to be removed first, all traces of old solder left can be removed using some desoldering braid and then flux removed using IPA.

Remove the top cover of the video processing area to access the VICIIe and carefully remove it from its socket.

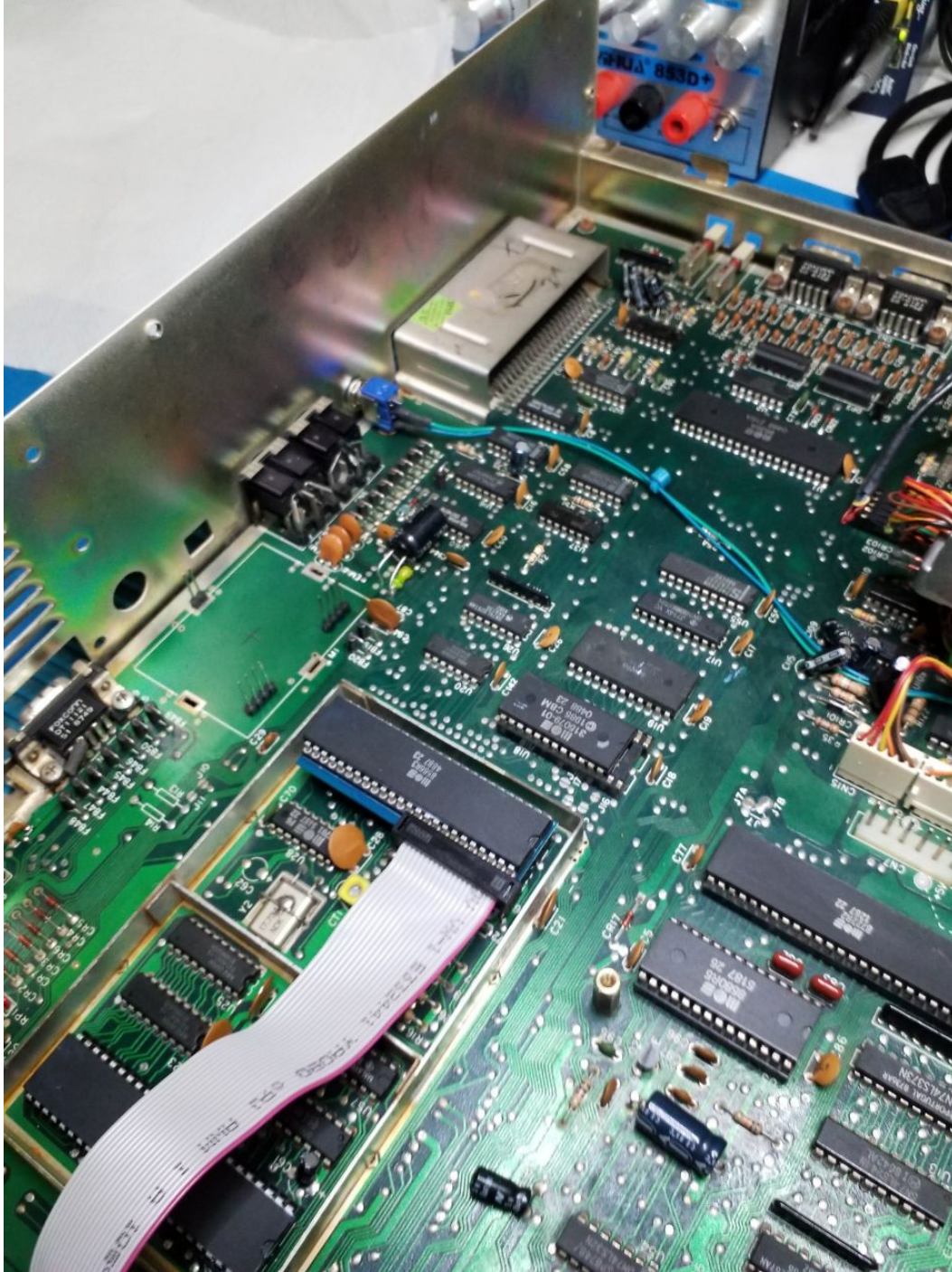
Use the 2x 24 pin sockets supplied to add height to the VICII adapter board, this will ensure all components on the mainboard are cleared on ALL models.

Using the above photo for reference, carefully install the adapter onto the mainboard so that it is a good tight fit into the existing socket, then fit the VICIIe into the adapter board.

Now we will need to prepare our FPGA board mounts.



Install the headers as shown in the photo above, solder them so they are perpendicular to the board and remove any flux.



It is now advisable to reinstall the mainboard back into the lower casing so that the FPGA output jack and mode switch can be lined up to the existing RF out and audio switch cutouts on the rear of the case.

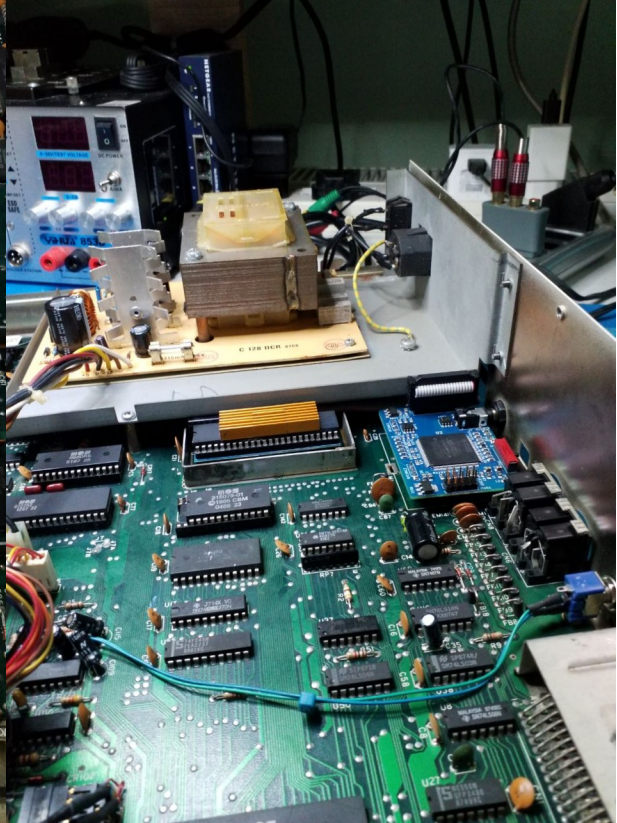
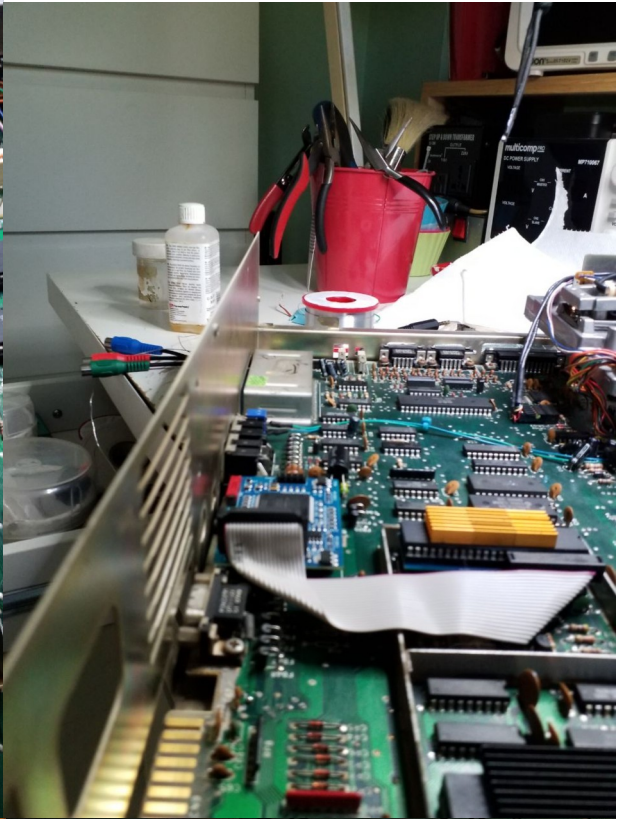
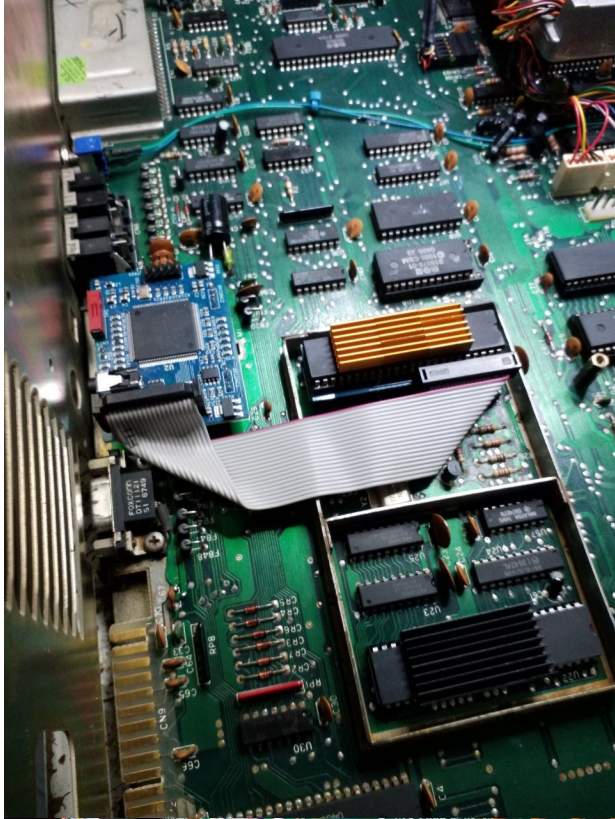


This part requires a lot of patience.

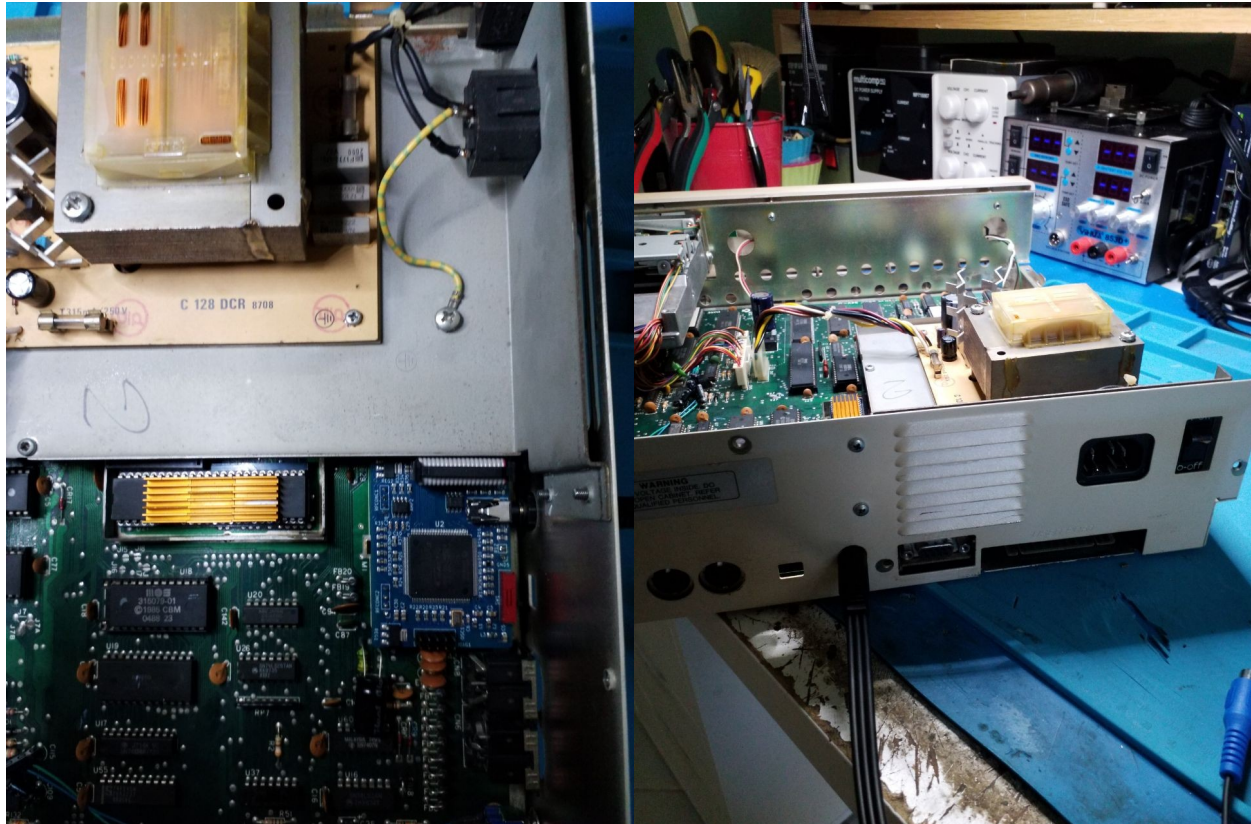
Study the picture above, note the breakout cable is fully inserted and the two rear pins at each end have been lightly soldered.

Look around from all angles and make any height adjustment necessary to ensure easy cable insertion and access to the switch. Ideally, the FPGA board should be parallel to the C128's mainboard in all axis.

When you are satisfied with the placement, final solder all the rear and front pins and clean the flux residue using IPA.







Now, carefully fold the ribbon cable as shown in the above photos and insert the connector at the end into the FPGA board header. Note the FPGA board has silk screen indication of the correct orientation.

It is possible to cut the removed RF cover in half and re-fit it to cover the 80 column VDP. Alternatively, clean the top surfaces of both VDP's and fit suitable heatsinks instead. Fitting heatsinks is highly recommended but left to the installer's discretion, especially if alternative cooling is in place.

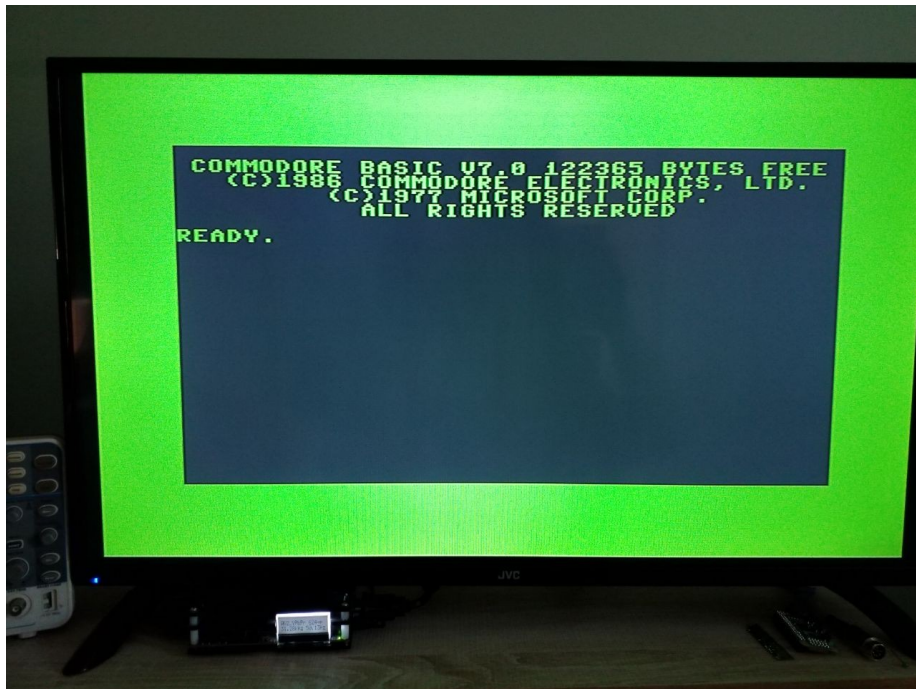
At this point the installation is complete and the system can be tested and reassembled.

#### Reference –

[GitHub - c0pperdragon/C64-Video-Enhancement: Component video modification for the C64 8-bit computer](#)

[GitHub - Hojo-Norem/c0pperdragon-VIC-II-Palette-editor: A C64 based palette editor for c0pperdragon's C64-Video-Enhancement project](#)

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Line doubled component video output through OSSC



Some game-play screenshots