ZXvid

Composite Video Modification
and Back Porch Unit
For the Sinclair ZX81

for RWAP Software

MANUAL

Manual Update 1.0 (October 2011)

www.rwapsoftware.co.uk

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NOTICE

The ZXVid module is based on an original design by Andrew Rea, slightly modified and manufactured by Mutant Caterpillar Games Limited under license.

The manual has been written specifically for users of the ZXvid Composite Video Modification and Back Porch module for the Sinclair ZX81 home computer.

The manual is intended to provide the user with detailed information adequate for the efficient installation and operation of the equipment involved. However, while every effort has been taken to ensure accuracy, the manufacturer assumes no liability resulting from errors or omissions in this manual, or from the use of the information contained herein.

Please note that the manual is intended only for advanced users - if you are not confident of being able to perform the tasks set out in this manual, then please contact us for upgrade options, where we can either supply a modified UHF modulator for you to solder directly to the ZX81 motherboard, or where we can arrange to undertake the fitting ourselves.

The manufacturer reserves the right both to change the specifications of the ZXvid and to revise this publication from time to time without obligation to notify any person of such revision or changes.

RWAP Software
October 2011

OVERVIEW

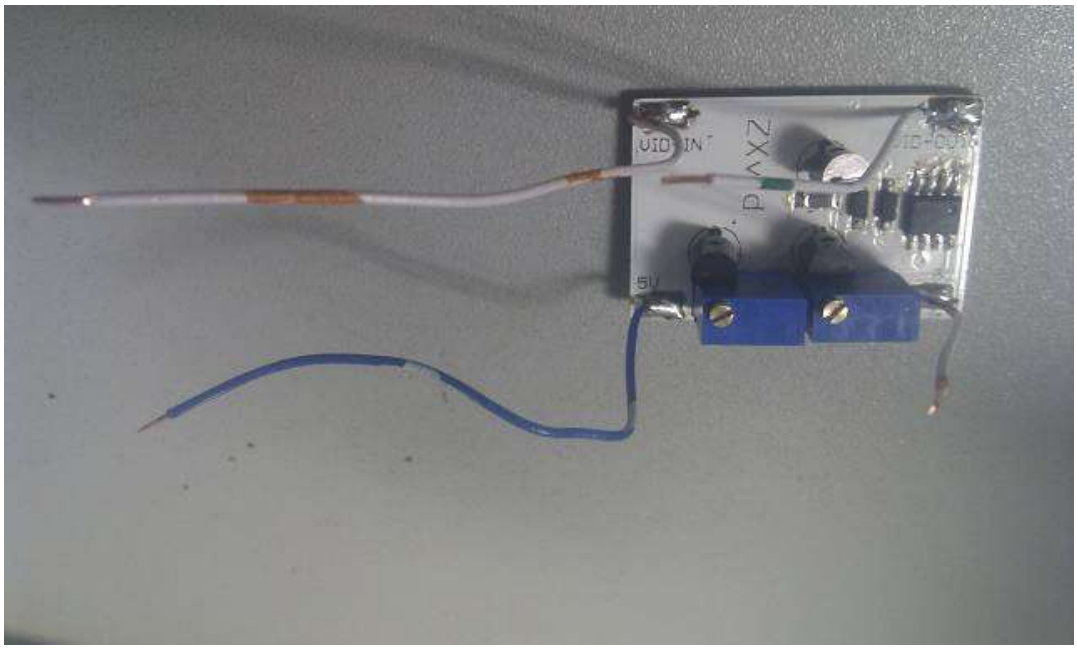
The ZXvid unit is designed to fit into the TV UHF modulator on the Sinclair ZX81. It replaces the inner workings and has been designed to ensure that the ZX81 gives a stable picture on modern and colour television sets, including LCD TVs.

The ZXvid provides the following features:

- Steady Composite Video Out signal
- Back door porch - this was missing from early ZX81 ULAs, and resulted in a very dark picture on most modern TVs.

FITTING THE ZXvid

The ZXvid can be supplied either fitted within a UHF modulator case, or as a bare unit which you need to fit inside your existing modulator.



The bare unit comes with four wires which need attaching to your ZX81.

First of all, you will need to open up your ZX81 case and remove the top - with the ZX81 upside down, so that the expansion port is in the top left hand corner, There are two screw holes visible – top centre and to the right near the EAR socket. The other screws appear underneath the rubber feet at the top left corner and the bottom two corners. Make a note which screw comes from where as they are not all the same length.

The bottom of the case will come away easily, exposing the circuit board, which is attached to the top of the case. There are two more screws to undo here – one is to the bottom right next to the heatsink and the other is just about half-way along the expansion port on the left hand side.

Lift the circuit board gently from the top of the case. You should see two flat cables linking the keyboard to the PCB. Carefully pull these upward without twisting them. They usually pull out easily. Grasp them as near the PCB sockets end as you can. They also tear easily, so try not to leave any bits behind in the sockets.

Now the PCB can be lifted clear of the top of the case. The picture below shows the PCB in situ, resting on the bottom. You are going to need to concentrate on the UHF modulator which is the metal block in the top left hand corner.

Figure 1: The ZX81 motherboard in situ

The UHF modulator has a closely fitted lid which you can gently pull off the unit - keep the lid, as you will need this.

Inside, you will see the old TV output circuit - you will need to remove this to make room for the ZXvid.

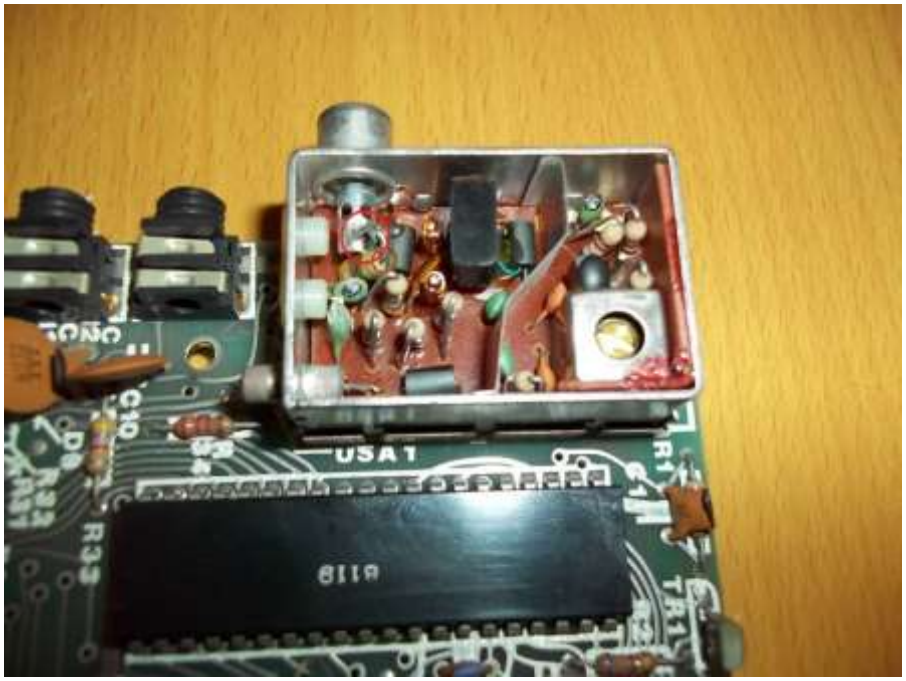


Figure 2: The inside of the TV modulator - this will all be removed!

You need to de-solder the modulator and existing wiring - there are only four contact points on the bottom of the PCB luckily, so this is not too much hard work with a steady hand and soldering iron.

There are two large pins which hold the main modulator unit (indicated by red circles in the photo below), and the two wires which provide power and video to the modulator (indicated by a green and a brown circle in the picture below).

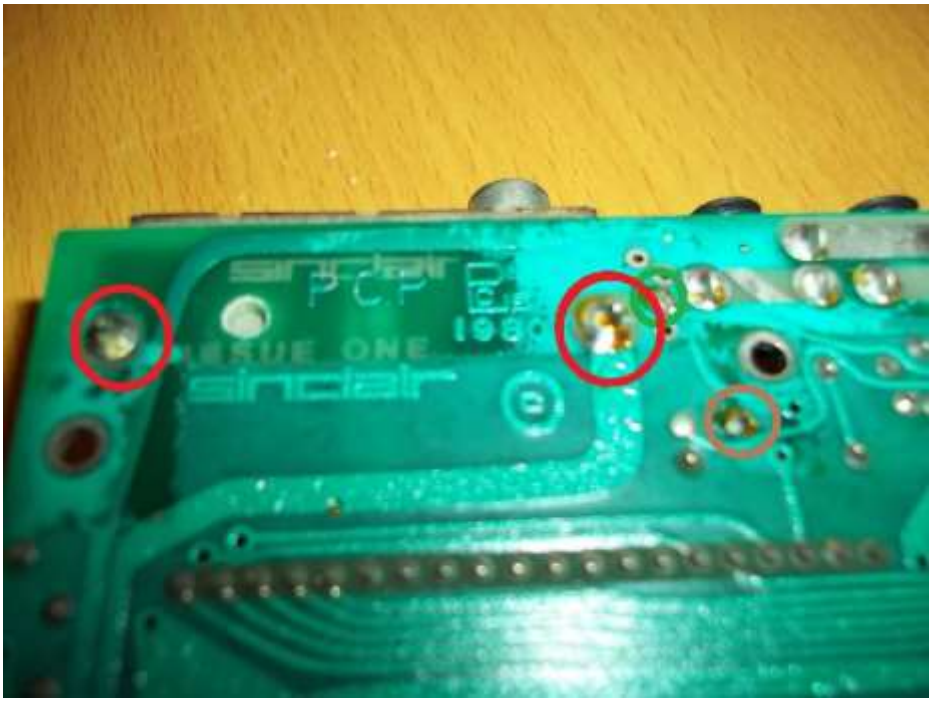


Figure 3: The solder points for the UHF modulator and feed wires

You need to remove all of the solder from each of these four contact points - it is probably easiest to try removing the wires one at a time first, and then lift the modulator clear of the PCB. Ensure all four holes are nice and clean of solder, so that you can later re-insert parts into these holes.

Having freed the UHF modulator, you need to clean out all of the internal parts - you will need to take the bottom off the modulator (it is fitted in the same way as the top), and then remove the solder holding the board in place - you can see the solder contacts on the edges of the board in the photo below. Take care not to damage the plastic insulator or the phono socket into which you normally plug the TV lead.

Figure 4: The UHF modulator with bottom and plastic insulator removed

You will also need to remove the cross-bar to the right hand side of the modulator which is soldered to the board with three legs as you can see in Figure 5 below, leaving you with an empty case.

Figure 5: The UHF modulator once stripped out ready to accept the ZXvid

Please ensure that tabs inside the modulator case are bent back against the casing (you may want to use a little insulation tape to cover them, so that they do not short the ZXvid module).

You can now fit the ZXvid unit - the simplest way to do this, is to pop the ZXvid unit in place of the modulator board, place the plastic insulator underneath the ZXvid and re-attach the case bottom.

As you do this, be sure to push one end of the wire connected to the point marked VID-IN on the ZXvid through the plastic shielding on the side of the modulator and push one end of the wire connected to the point marked 5V on the ZXvid through the hole in the bottom left hand corner of the modulator.

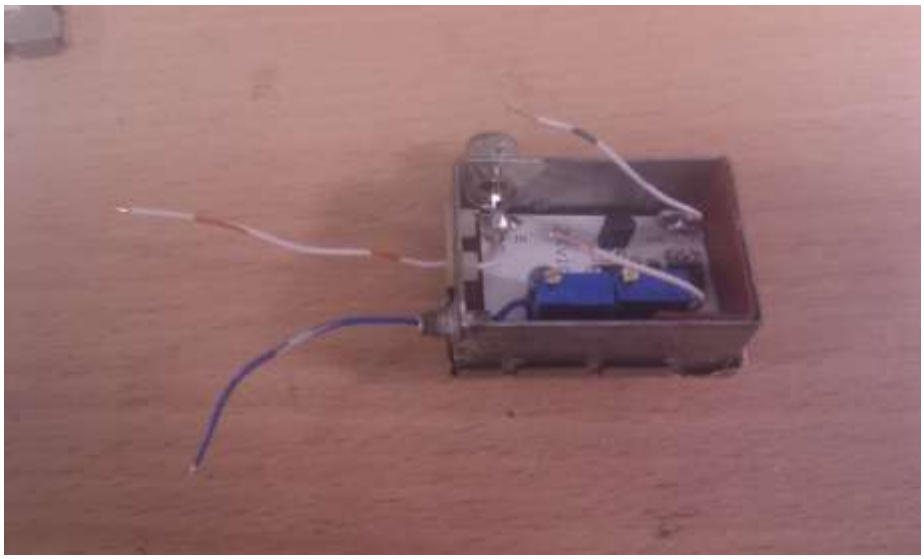


Figure 6: The ZXvid inserted into the UHF modulator ready to be re-attached to the ZX81 PCB

You can now push the UHF modulator back through the two large holes in the PCB and resolder this underneath (see image above).

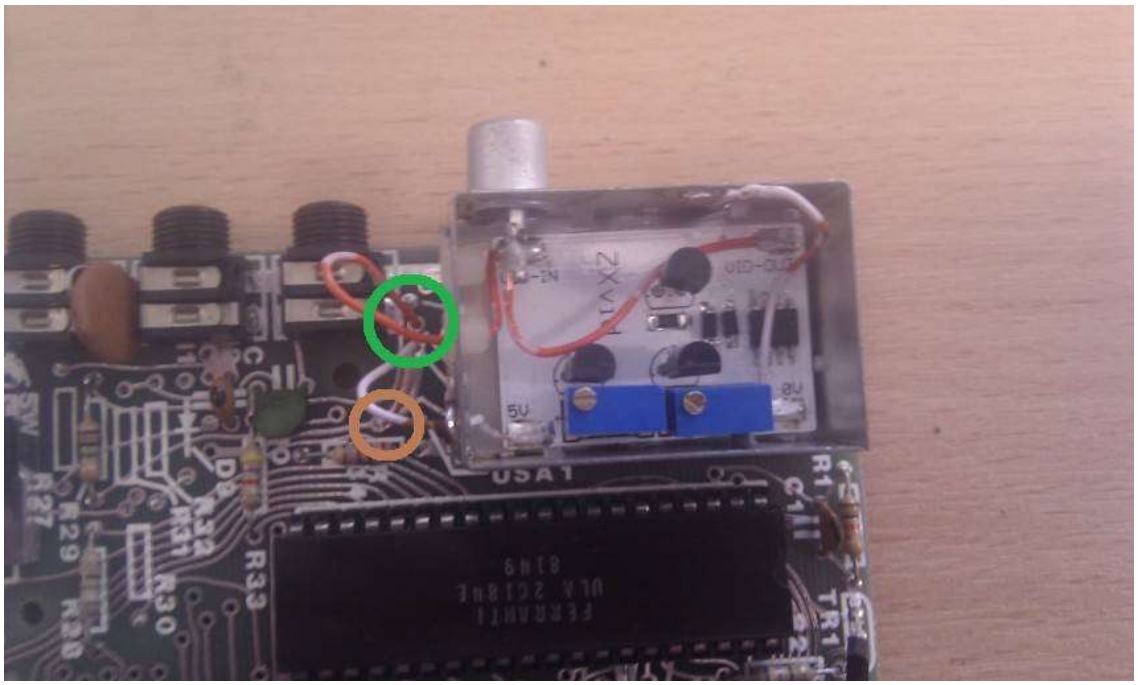


Figure 7: The ZXvid in place - holes for the feed wires indicated

The upper left wire (goes to the point marked VID-IN on the ZXvid) goes through the plastic sleeve on the UHF modulator case, and then connects to the ZX81 board at a point adjacent to the ear socket as shown by the green circle above. Push this wire through the hole in the PCB and solder on the bottom of the PCB at the point marked by the green circle in Figure 3.

The lower left hand wire (goes to the point marked 5V on the ZXvid) goes through the modulator hole where the old lower wire went, and connects to the ZX81 board just above R34 as shown by the brown circle above. Push this wire through the hole in the PCB and solder on the bottom of the PCB at the point marked by the brown circle in Figure 3.

You then just need to connect the remaining two wires from the ZXvid to the modulator itself.

The lower right hand wire (goes to the point marked 0V on the ZXvid) connects to the side of the modulator case for grounding - we have chosen an upper right position. The upper right hand wire (goes to the point marked VID-OUT on the ZXvid) then connects to the prong on the outer sleeve of the phono socket. Both points are indicated by the blue circles in the picture below.

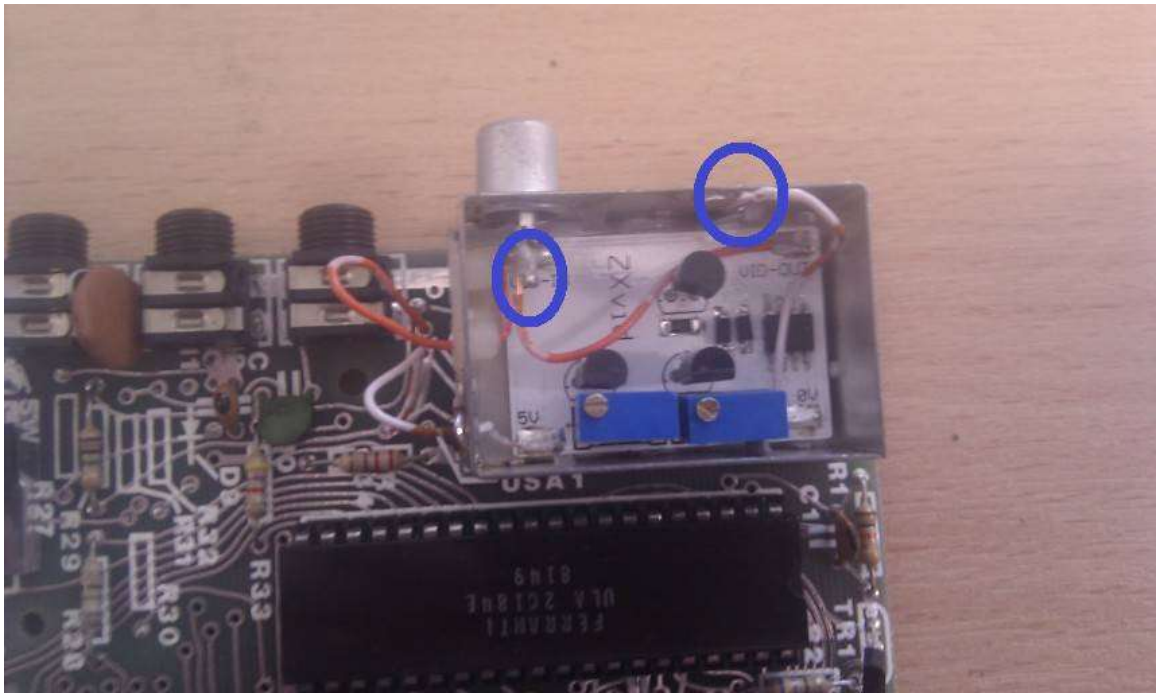


Figure 8: The ZXvid in place - showing the VID-OUT and 0V connections to the modulator

Once complete, connect the ZX81 to your television set using the supplied composite video lead and test the output. You may need to tweak the presets on the two blue boxes by turning the screws to get a stable picture.

The left hand screw affects the contrast on screen - when set optimally further adjustment results in no observable change in contrast.

The right hand screw controls the output level (it kind of controls the brightness) - setting this output level too high can overdrive the input circuits in some tv's or monitors resulting in ghosting.

Both screws can turn about 20 complete revolutions between extremes allowing for quite a lot of adjustment.

Once you are happy with the output, re-attach the top of the modulator and re-assemble the ZX81.

FITTING THE ZXvid to a T/S 1000 or T/S 1500

Installation of the ZXVid is slightly different in the Timex Sinclair computers, owing to the different location of the video output.

For the T/S 1000
The T/S 1000 uses the same motherboard as the UK specification ZX81, and as such the ZXVid should be installed exactly as in the ZX81. Connect the +5V line (the lower left of the module) to the "UK 1" solder hole next to the modulator, and the Video Input to the "UK 2" solder hole.

Ignore the "USA" holes as these are not needed.

For the T/S 1500
The T/S 1500 is a completely different motherboard compared to the ZX81, and so the connection goes to a different place on the board.

If you specified that you were to fit the ZXVid into a T/S 1500, then you will find the "Video Input" wire is much longer than on a normal ZXVid.

If you did not specify this, you will need to solder a longer wire in place of the normal length Video Input wire, or alternatively extend the existing wire with another.

Figure 9: The ZXvid in place - showing the +5V and VID-IN connections

The +5V line of the ZXVid must be connected to the middle pin of the three modulator inputs.

The Video input should connect to diode D19, right next to the crystal (the silver two-legged component just to the left of the ULA, which is the large square chip). The wire should connect to the end of the diode next to the crystal, away from the modulator, which does not have a black bar on it.

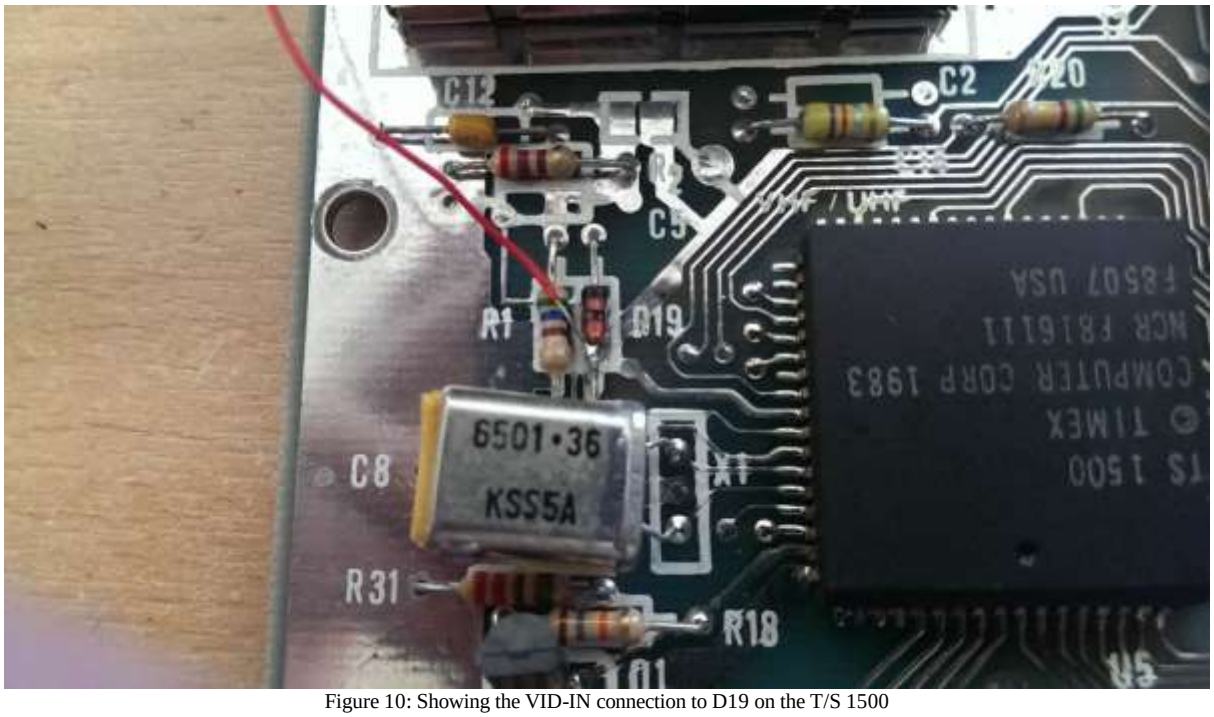


Figure 10: Showing the VID-IN connection to D19 on the T/S 1500

Once installation is completed, your T/S 1000 or 1500 should be ready to go! You may need to tweak the blue dials on the ZXVid but these are usually correct for most televisions and computers.

Enjoy!