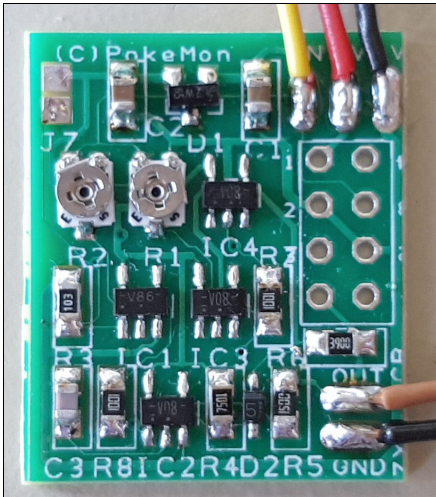


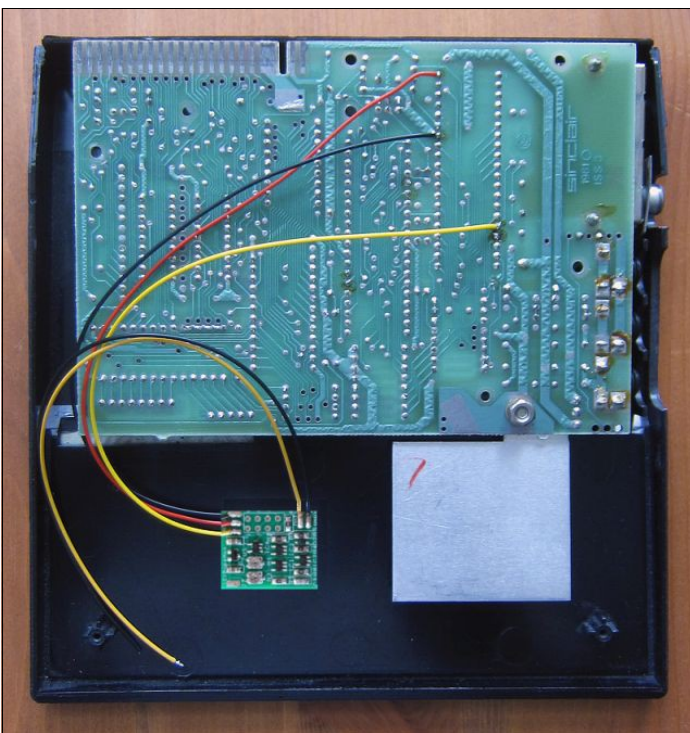
# ZX8-CCB – video out for Sinclair ZX80/ZX81



The board ZX8-CCB improves the video signal from Sinclair ZX81 digital (ULA output) and works together with both ULA versions (C184 or C210) used in the very first model of ZX81 (Issue One) or following models (Issue 3, ISS3). Due to digital work up the noise in the video signal will be eliminated (nearly) full. Additional the board adds a valid back porch in the signal regardless if ULA provides it or not. The result in conjunction with the very fast logic gates (74LVC series) is a very clear picture without any noise in the background and a very sharp and crispy picture.

Via the soldering jumper J7 you can choose either normal video (jumper not set) or inverted picture (jumper set). The circuit delivers approx. 1Vpp at any standard 75R video input. The output is safe against any shorts.

The SDM module has 20 x 25 x 3 mm (L x W x H) and fits into the modulator case (if it's content removed) but could also be fixed with an adhesive tape anywhere inside the case of the ZX81. You only have to remove the back cover of ZX81, not the main board itself. So the very sensitive keyboard membrane will not be touched or damaged. You could also integrate a small video jack (3.5mm) between the two cover parts, which is quite easy.



connectors:

input:

red=+5V, ULA pin 40  
black=0V, ULA pin 34  
yellow=video In, ULA pin 16

output:

brown=video out  
black=0V / GND

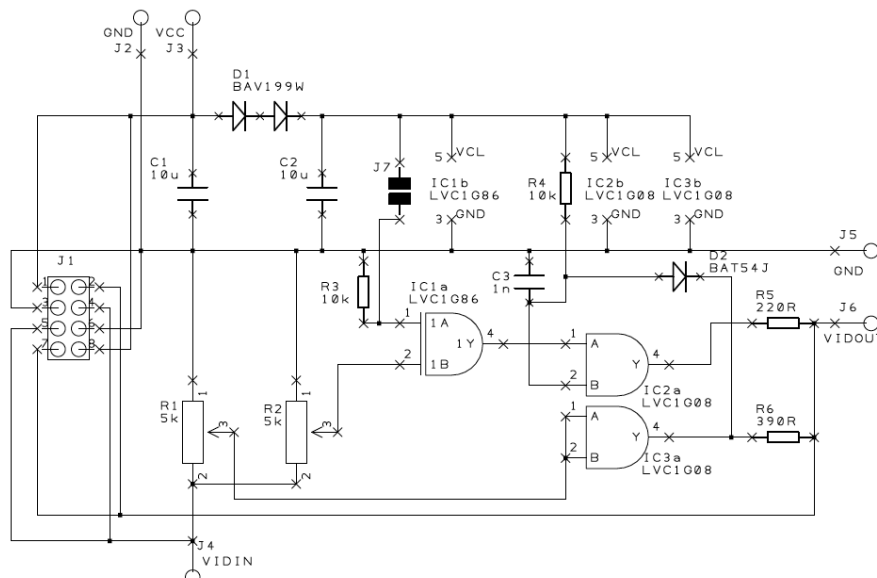
jumper J7 not set = normal picture (black characters)  
jumper J7 set = inverted picture (white characters)

### Adjustment:

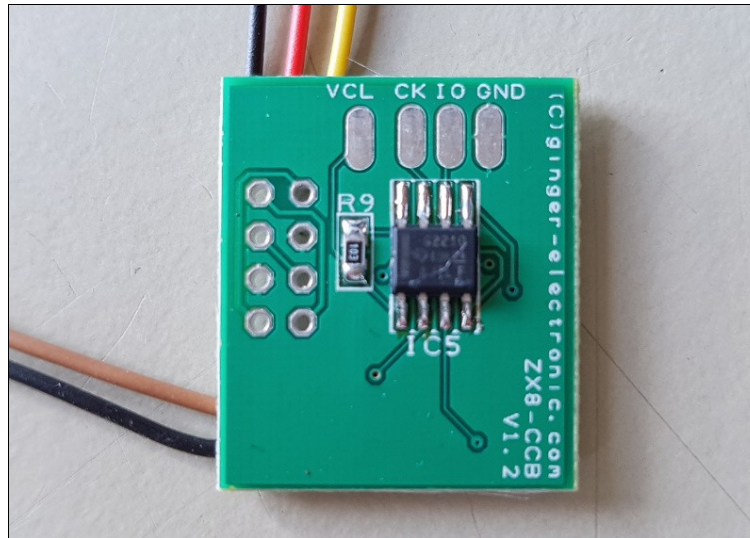
The modul is preadjusted to old ULA type (C184, Issue One). For new ULA (C210, ISS3) it could be necessary to change the adjustment. But for optimal video quality it could be even better to adapt the adjustment on your own ZX81. The trimmer R1 influences the SYNC signal/level, the trimmer R2 adjusts the PIXEL signal. Mostly adjusting R2 is sufficient to get a (better) picture.

For a complete readjustment you can turn the PIXEL trimmer full to the right (clockwise) which will result in a complete white picture with jumper J7 not set. Now you can adjust the SYNC trimmer for a valid picture on

your TV without sync failures, it will be more easy if you choose 4:3 format on a widescreen TV. After you can adjust the PIXEL trimmer for finding the cursor "K" (inverted) on the white background. Maybe you try a command like PRINT for more easy adjustment. After try the normal video display and find the maybe best compromise.



## Description of the sync option (ZX8-CCB-SYNC)



The picture shows the backside of the ZX8-CCB and only the special ZX8-CCB-SYNC version has the shown 8 pin IC on the backside which is a microcontroller providing an empty synced picture. The empty synced picture is shown with a small line in the upper screen indicating the (automatically) activated sync generator. The pads above the chip are used for programming only and not required for the preprogrammed ZX8-CCB-SYNC module.

The ZX8-CCB-SYNC is compatible with PAL and NTSC signal and with normal or inverted picture. During startup (power up) the input signal is measured out if it matches PAL or NTSC and the sync generator will produce exactly the same timing. It is not recommended to change PAL/NTSC settings after power-up as it results in stronger flickering as the timing is measured only in the first starting frames and does not match when changing later.

The invert function can be used any time and switched on/off and is handled correctly by the ZX8-CCB-SYNC. There is no display content shown due to technical reasons, just a small line on top of screen indicating that there is (temporarily) no incoming video signal. During switching on/off the video picture generation there is a very small flicker which can not be removed with this simple sync generator but this won't harm the connected display.