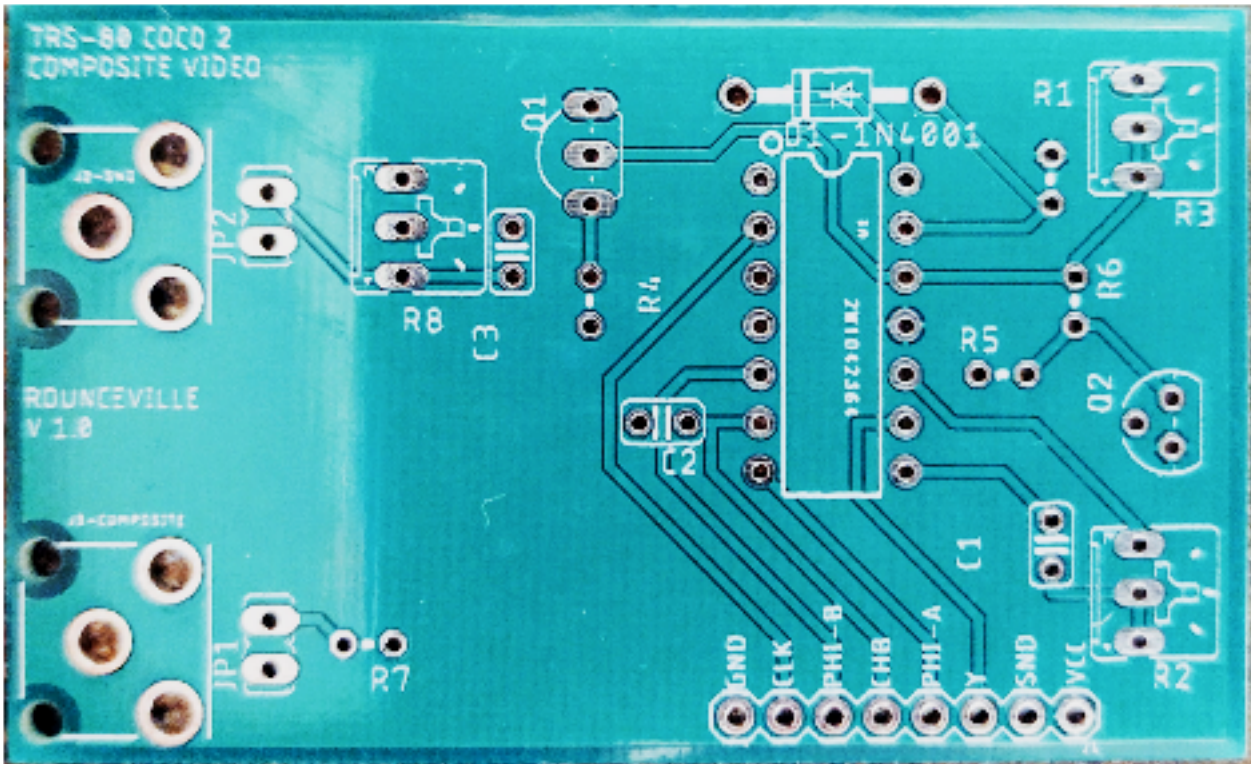
TRS-80 CoCo 2 Composite Video Modification PCB

Rounceville v1.0



Above is a photo of the V1.0 version of the CoCo 2 Composite Modification PCB. In order for it to be useful for anybody other than me, I figured it would be a good idea to document it.

So, first, a description of each component. (All resistors are ¼ watt power rating.)

JP1 - this is the Video Out location. The pin that connects to R7 is the actual signal, and the other pin is ground. The jack holes to the left are for an RCA jack, but they are not electrically connected. It's been my experience that these RCA jacks are never standardized, and so you're wise to just put mounting holes and header holes nearby (JP1), and wire it once you buy your RCA jacks. Alternatively, if you'd rather just use a wired RCA cable, you can simply ignore the RCA holes and connect directly to JP1. Ground should be connected to the outside ring of your RCA jack or cable, and the signal line should connect to the center pin of your RCA jack. It's customary to use a yellow jack for composite video.

JP2 - the audio out jack. The pin that connects to the trim potentiometer (R8) is the signal line. The other

pin is ground. Just like the composite video output, there are holes here to mount an RCA jack to the left, but you need to wire them yourself, just like the composite out. Or, you can use an RCA cable as mentioned above. It's customary to use white or red for an audio jack. The trim potentiometer at R8 controls the gain level, so if the sound is distorted (overdriven), then that's the potentiometer to tweak.

R7 - part of the video out circuit -- 75 ohms.

R8 - audio out potentiometer - 3.3k ohms ideally, but a 5k will work and is probably easier / cheaper to find

C3 - 22nF cap (pumpkin seed cap will work fine, it's not part of an oscillator or anything, but if you want to use a nicer one that's fine too)

R4 - part of the video out circuit: 3.3k ohms

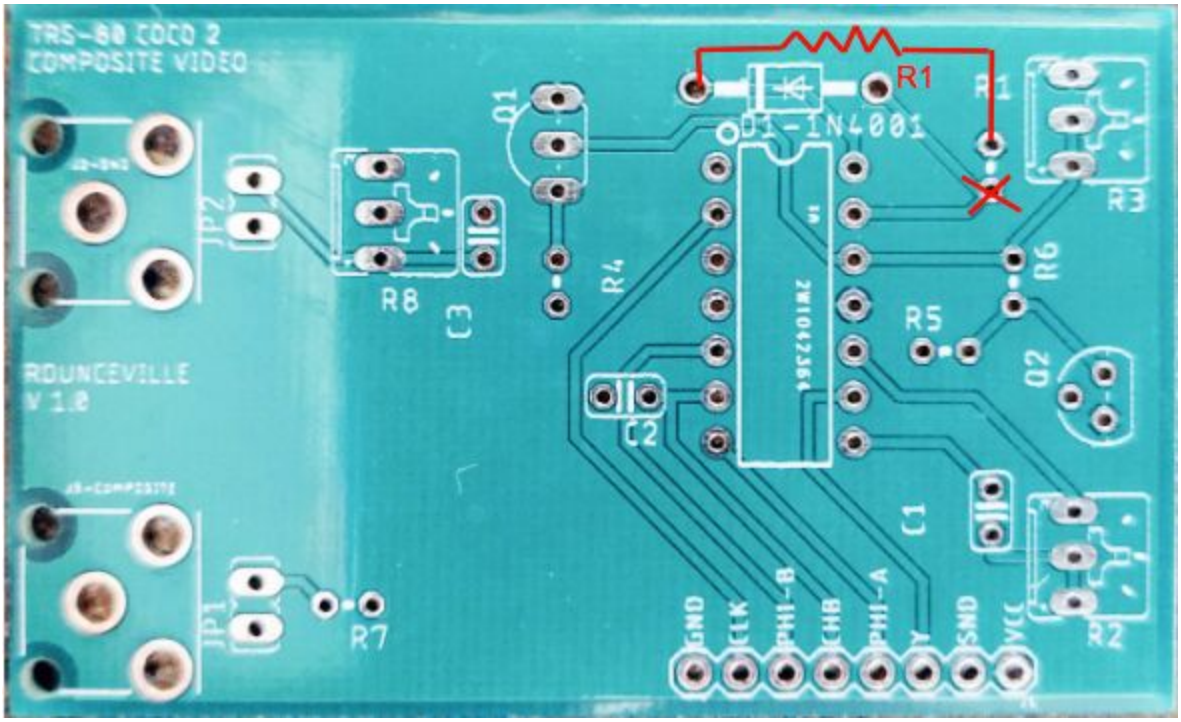
Q1 - part of the video out darlington pair: BC557, it's a PNP transistor. You could also substitute a 2N4403 (that is, if you also substitute a 2N4401 for Q2).

C2 - .1uF cap / 10 (or higher) volts

D1 - a diode, board shows a 1N4001, which will work, but the ideal diode is 1N3064 This diode is there to put the MC1372 IC into a "null modulation" mode. The MC1372 is *intended* to do RF modulation against analog VHF broadcast carriers ("channel 3 or 4"). However, by using a diode across it's "tank circuit inputs" (pins 13 and 14), you basically tell it not to modulate at all -- just to combine the clock, chroma, and luminance signals into a valid NTSC composite signal (CVBS). **Be aware. There is an error in the v1.0 version of this board involving D1 and R1. The correction procedure is spelled out in R1's description.**

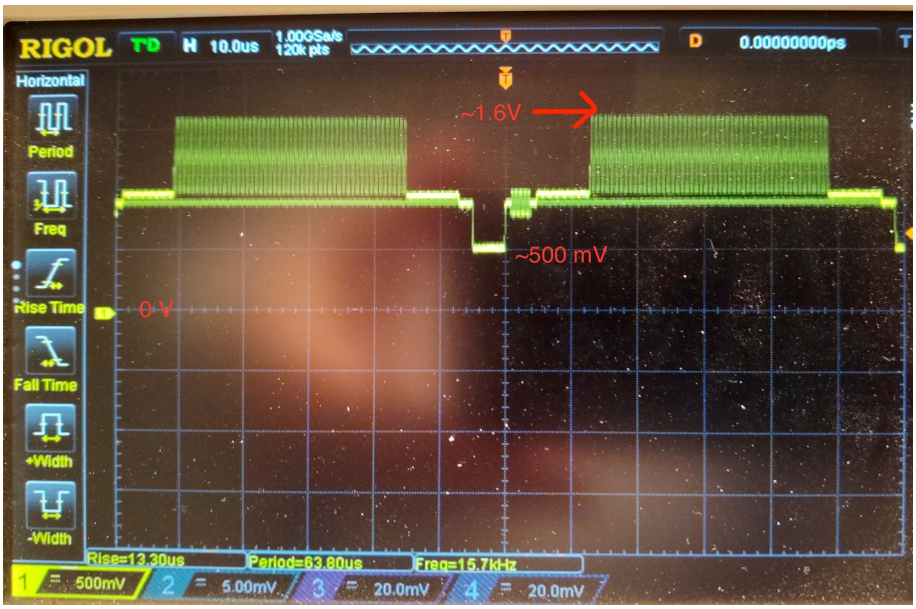
MC1372P IC - this is the integrator chip that merges the raw output of the CoCo 2's video display generator chip and creates a valid NTSC signal. These chips are becoming difficult to acquire, but can be found on EBay. Luckily, if you've already got a CoCo2, there is one of these chips inside its RF modulator can. Open the can and desolder it, and you can reuse that one rather than buying one on EBay. Be careful desoldering though. These chips are a bit sensitive to heat. It's best to use a desoldering suction gun if you've got one. If you use desoldering braid, be careful and let the chip cool down between pins.

R1 - 360 ohms. **NOTE: There is a bug in the PCB for the V1.0 version of this board.** To correct this bug, see the diagram below:



So rather than inserting R1 into the two holes near the R3 trim potentiometer, use only the top hole for one leg, and solder the other leg to the left side of D1. Leave the bottom hole of R1 unused. *This error has been corrected in the V1.1 version of the PCB.*

R3 - 1k trim potentiometer -- this potentiometer controls the bias / amplification of the video output signal. Adjust it until the monitor is able to interpret the NTSC signal. If you have an oscilloscope, you're trying to get the output signal to look something like this:



R6 - 3.9k ohms

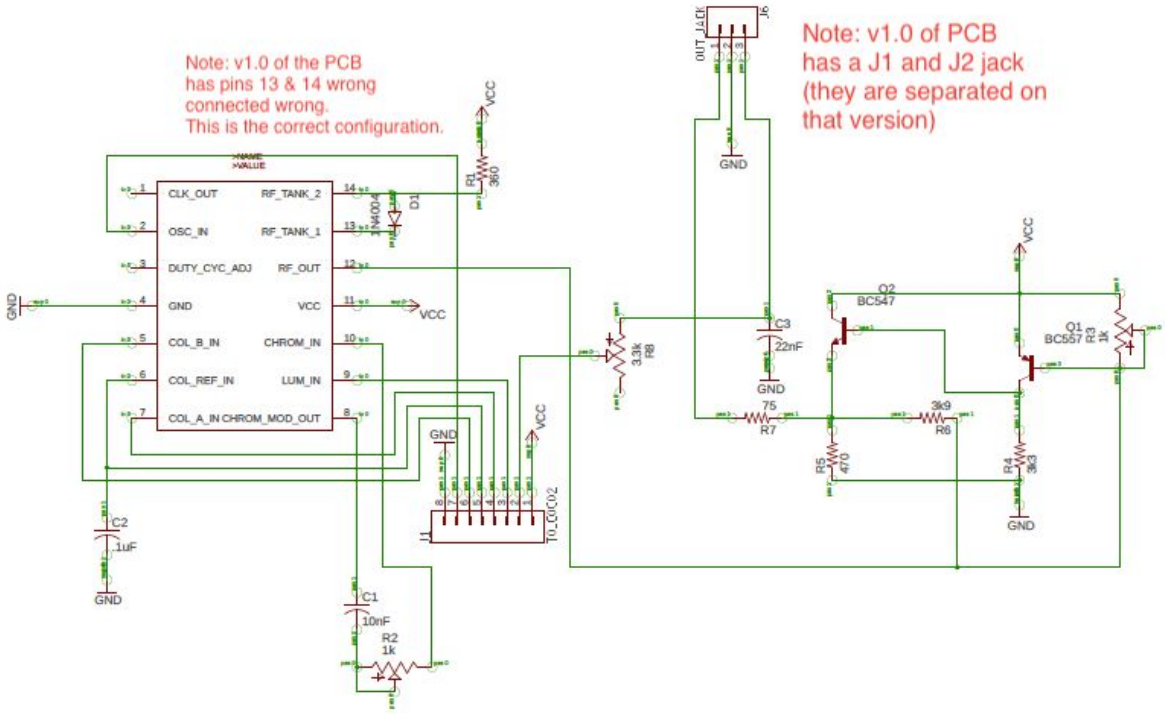
R5 - 470 ohms

Q2 - BC547 (could use 2N4401 if you used 2N4403 for Q1)

C1 - 10 nF / 10 (or higher) volts

R2 - 1k trim potentiometer - this potentiometer adjusts the color level. If you remove this trim pot, you will get a black and white signal.

GND / CLK / PHI-B / CHB / PHI-A / Y / SND / VCC -- this is where you would attach a right angle header if your CoCo2 uses the vertical RF modulator can. If your CoCo uses the horizontal RF modulator can, then you'll have to solder some wires from the motherboard to these pins. Also, be aware that there is no hole in the motherboard for the GND pin. You should run a wire from this pin hole to one of the mounting holes of the RF modulator can after you've removed it. The CoCo2 designers grounded the can's mounting holes, and the original RF modulator literally just grounded itself to the can, rather than running a separate GND line.



Disclaimer: This project was initiated for personal use of the author. Absolutely no guarantees are being made about its fit for purpose or even its safety. By installing this board the installer assumes all liability, including but not limited to, loss of property or resulting injury.