

VGA and HDMI for ZX Spectrum. Rgb2hdmi by AlexEKB

There are several options for connecting the ZX Spectrum to modern TVs and monitors. Direct connection, without using of additional adapters, is not always possible. Therefore, an active adapter must be used.

Commercially available adapters capture an analog signal, but I wanted to work with a digital one, directly from the Spectrum board. Since the Spectrum has a 4-bit color, we need to find digital signals on the board that corresponds to red (RED), green (GREEN), blue (BLUE) and a high brightness bit (BRT). In models with ULA or CPLD, RGB and BRT signals are often available on these directly. In models implemented on separate logic chips without CPLDs, it is easy to find these signals either. The general procedure of the searching is to get from output to input: if the output is RGB, then you just need to find a place where the RGB digital signals are mixed with a high-brightness bit.

As an example, I will give a part of the scheme of the computer "Leningrad-48". From the emitters of transistors, analog signals, and on the DD36 chip there are their digital prototypes.

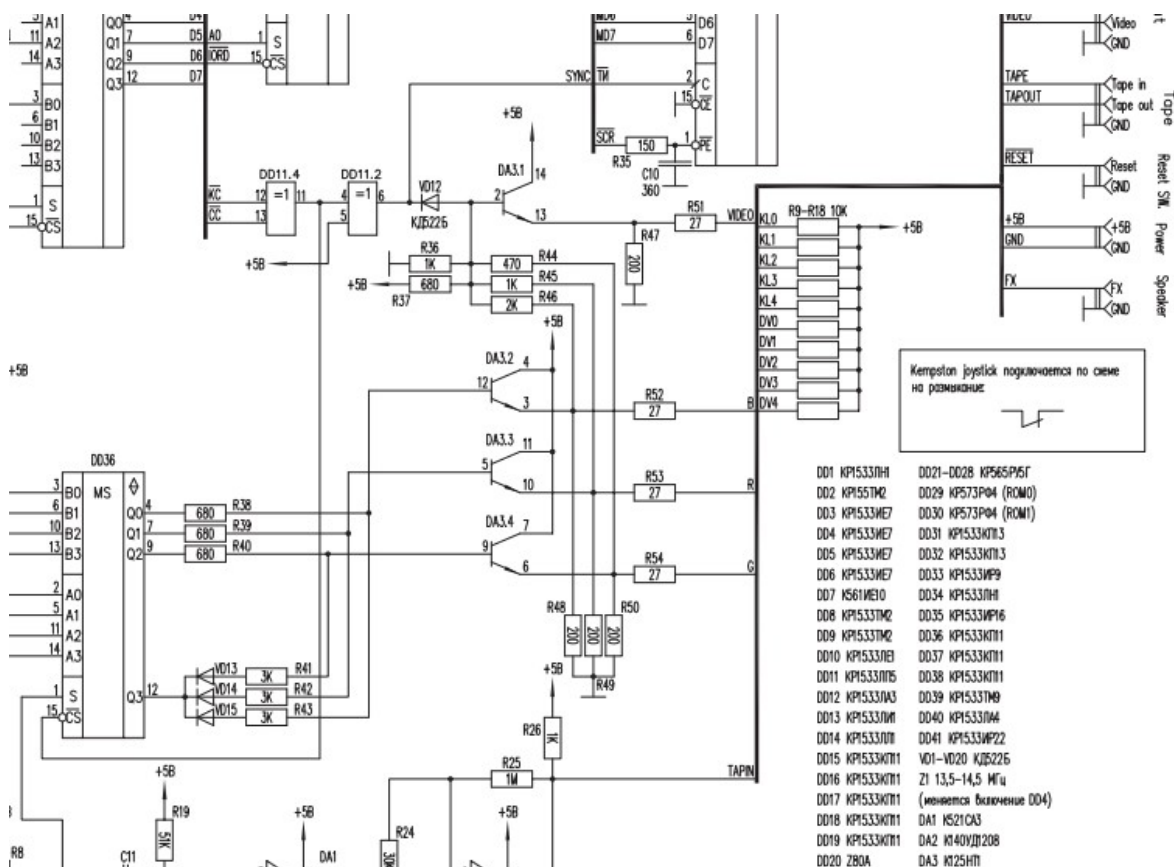
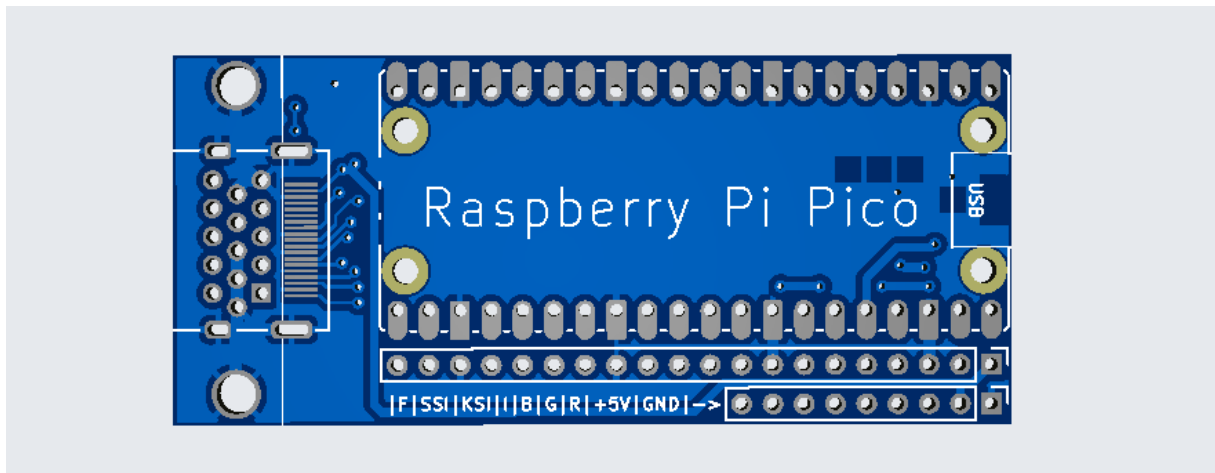
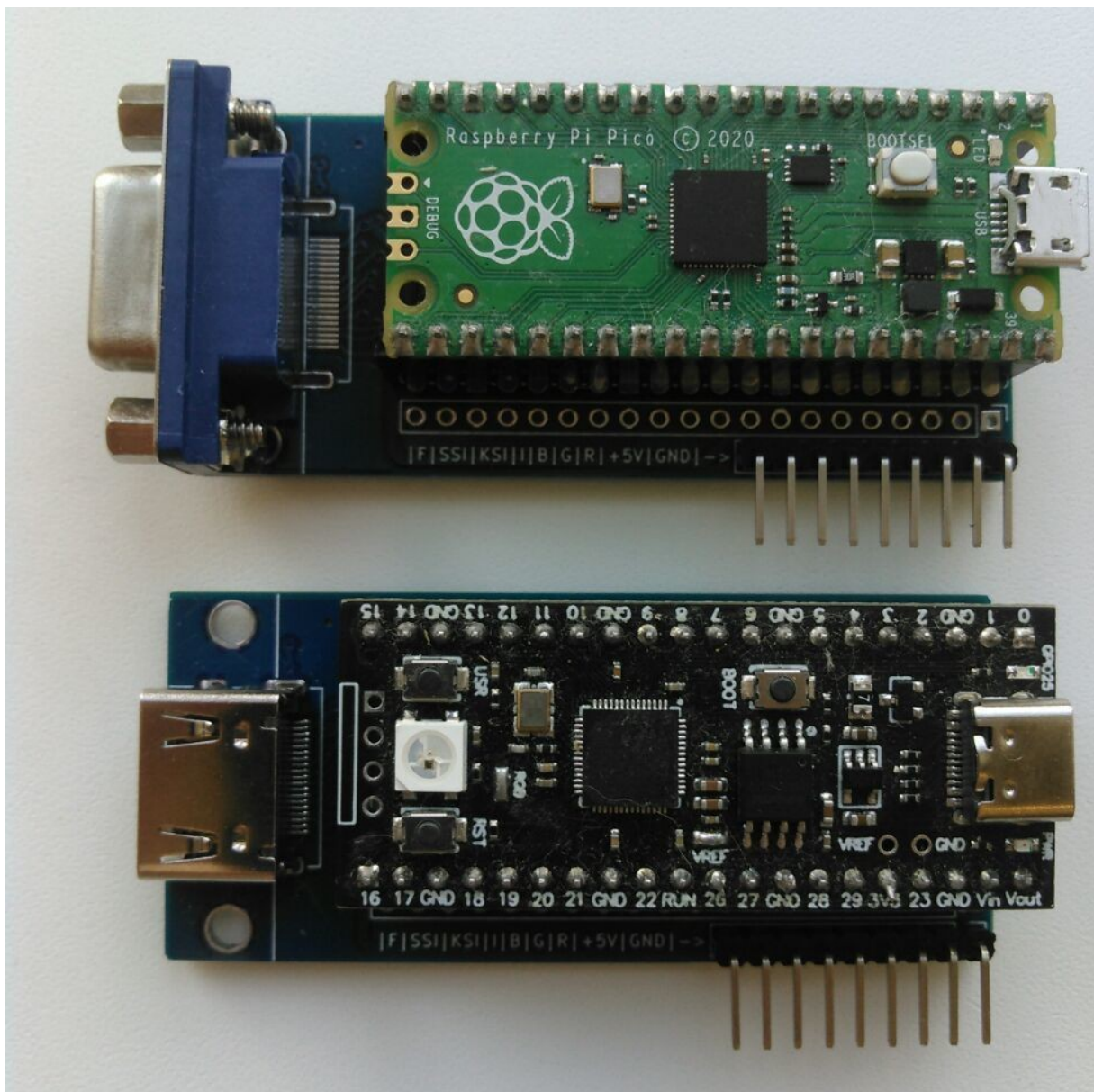


Fig. 1

Here is a part of the ZX Spectrum +2 circuit, where the color component signals are taken from the ULA chip.



Pico has the ability to form an image in the form of a DVI signal, which expands the possibilities for connecting to modern monitors. I developed an universal adapter board that allows you to select the video output by changing the firmware, soldering the desired socket (HDMI or VGA) and corresponding resistor values.



When soldering VGA sockets R1-R8 should be 100,100,390,820,390,820,390,820 ohms respectively. For lighter colors, pairs of 390,820 can be replaced with 300, 1000 ohms. Jumpers JP1-JP3 for VGA must be closed.