

TRS-80 Model-1 modify HDRV from 15.840 to 15.608 kHz

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Rationale

Horizontal drive (HDRV) frequency for PAL monitors is 15.625 kHz

TRS-80 Model-1 has an HDRV of 15.840 kHz

Some (small) PAL TFT flat-screen monitors do not sync at 15.840 kHz

In a single monitor tested, sync required HDRV's between 15.490 and 15.655 kHz

To obtain an HDRV around 15.600 kHz, two modifications can be considered

1) Change X-tal from 10.6445 MHz to 10.4832 MHz (HDRV will become 15.600 kHz)

Unfortunately, such X-tal's aren't available anymore

2) Lower HDRV by adding 10 dots to the horizontal video lines

Originally, a horizontal line has 672 dots ($X\text{-tal } 10.6445 \text{ MHz} / 672 = 15.840 \text{ kHz}$)

Adding 10 dots will result in 682 dots/line (HDRV 15.608 kHz)

This would require adding a single 74LS90, piggy-backed on a 74LS93 in the Model-1

Changes for the original (USA) Model-1 to add 10 dots to the horizontal lines

1) Cut 2 traces:

- the trace to Z50 pins 2+3 (leave the 2 pins connected to each other)
- the trace to Z58 pins 6+7 (leave the 2 pins connected to each other)

2) Look for a spare inverter, e.g., Z42 9-8 and free the input pin (pin 9) from ground

Other inverters may be more acceptable to use, e.g., Z42 11-10, or an inverter from Z9

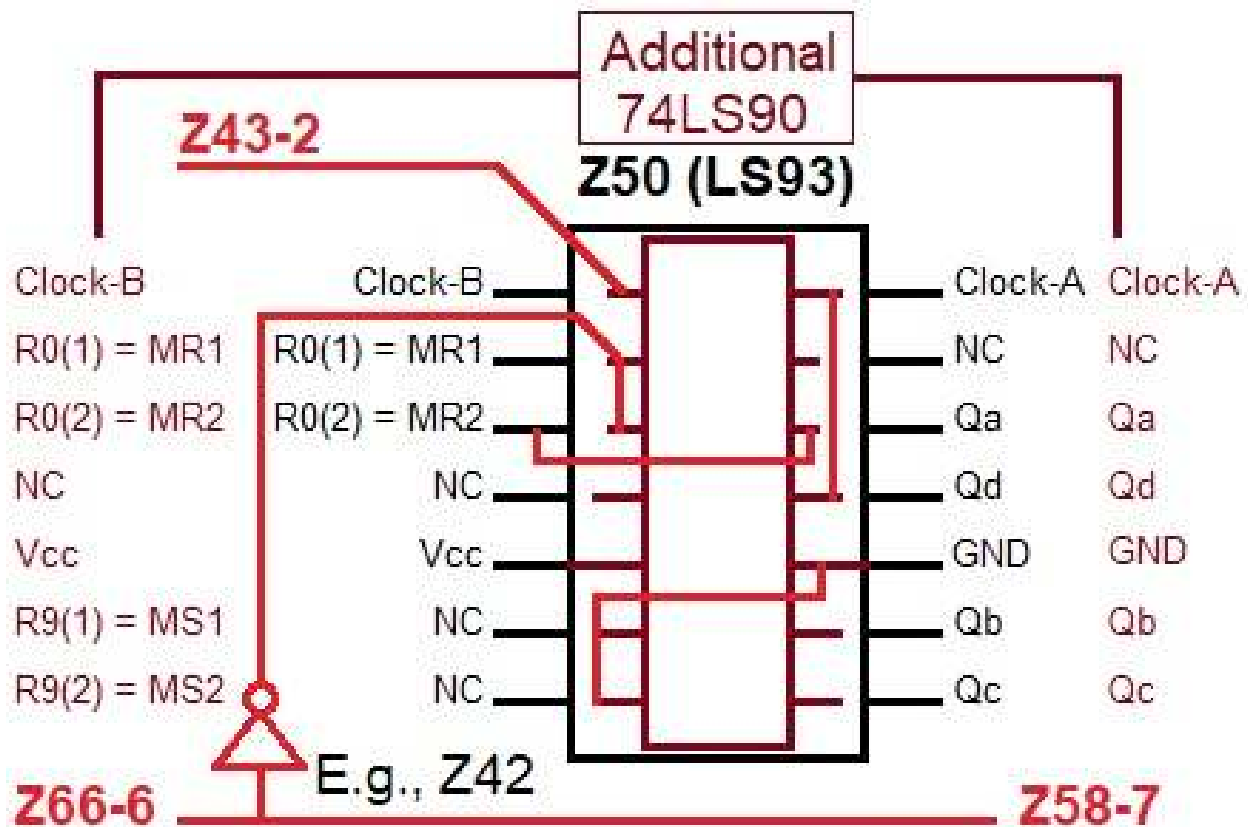
3) Prepare an additional 74LS90

- connect pins 6, 7 and 10 (pin 10, ground, is also used to piggy-back this ic)
- connect pins 11 and 14 (Qd to be connected to Input-A / Clock-A)
- connect a short wire you might wish to run under the 74LS90 to pin 12 (Qa), and connect this wire with Z50 pin 3
- piggy-back the 74LS90 on top of Z50 with pins 5 (Vcc) and pin 10 (ground)
for a more firm connection, you might wish to solder pin 13 (NC), too
- connect 74LS90 pin 1 with Z43-2 ($X\text{-tal} / 2 = 5.322 \text{ MHz}$)
- connect 74LS90 pins 2+3 with the output of the freed spare inverter, e.g., Z42-8
- connect Z66-6 with Z58-7 and with the input of the freed spare inverter, e.g., Z42-9

That's all, now HDRV will be 15.608 kHz

Wiring diagram and schematics on the next pages

Modification "American" Model-1 HDRV from 15840 Hz to 15608 Hz



Cut LS92 Z58 pins 6+7 and LS93 Z50 pins 2+3

In brown additional 74LS90 piggy back
on Z50 (74LS93) with pins 5 and 10

In red additional wiring

Spare inverter required, e.g., Z42 (9-8, 11-10),
or Z9 (1-2, 5-6, 11-10, 13-12)

TRS-80 Model-1

Lowering Horizontal Drive (HDRV) from 15.840 to 15.608 kHz for better PAL Compatability by Adding 10 Dots to the Horizontal Lines Using a Single 74LS90 ic

Schematics of the Early ("American") Version of the TRS-80 Model-1 **Modifications in Red**

