UltraVideo 1.0 for the Atari XE

Following on from UltraVideo 1.0 for the Atari 800XL, I thought it was time to publish an account of what I've managed to achieve so far with the XE. Having done some experiments with my 130XE, I left the machine alone for a while and only threw a diode into the circuit when I powered it up again a few months later to find there was no picture (the problem turned out to be a poorly socketed OS ROM chip). When the machine eventually booted, I was pleasantly surprised by the results of my un-premeditated modifications.

In many ways, my XE video mod is simpler than UltraVideo XL, and derives 90% of its methodology from Charles Cole's famous and widely used SuperVideo XE mod. I should make it clear that I although I'm quite a seasoned modder, I understand very little about electronics and most of the "discoveries" I've made have been the accidental result of carefully trying out different components in what the circuit diagram seems to suggest would be the best place to put them. One of my attempts at smoothing out the XE s-video signal involved a chain of components I was reliably informed shouldn't have worked at all, but they actually did a pretty good job.

Anyway, the first time I saw the XE's s-video output was through an "eBay cable" hooked up to an old TFT TV. It looked pretty good (there was a diode in the cable, designed to clean up the leery signal) until I did a SuperVideo mod on the machine. Then the vertical lines came back with a vengeance. It took me a year to work up the skill to "downgrade" that machine again. Thereafter I was distrustful of SuperVideo, particularly since I eventually favoured – following the success of UltraVideo XL – a "clean" s-video cable for my Ataris.

The XL mod taught me that a sure way to improve the display was to try and isolate luma and chroma from one another. That means getting rid of the composite output altogether, and while that's easy to accomplish on the XL by removing a few resistors, the best way to do it on the XE is to get rid of the RF modulator box. The XE modulator actually outputs the composite signal, so it has to go. I have no intention of ever again hooking up an Atari through via RF in this lifetime, so this is no problem for me. Just be aware that you'll lose composite and RF (although you could easily build yourself a composite switch or manufacture your own composite signal without the RF box: I'll leave that for someone cleverer to explain).

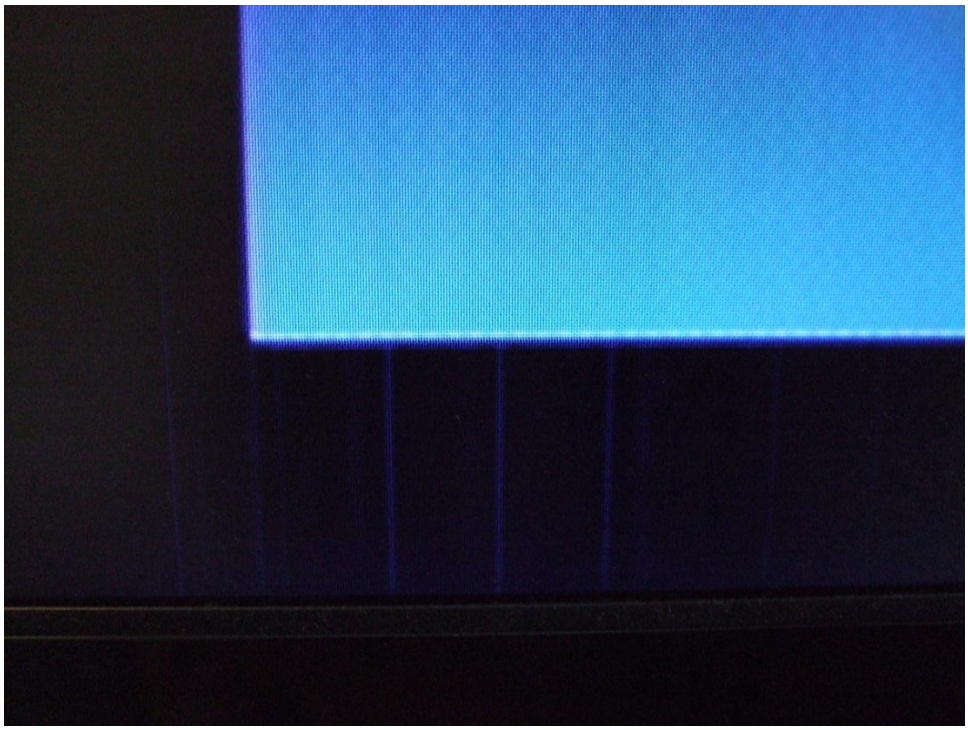
In reality, this mod is most of SuperVideo, coupled with the "eBay cable" diode fitted *inside the* machine, and the severing of the composite signal.

Disclaimer: Before proceeding, be aware that this mod *completely disables composite and RF output on your XE.* It's intended for those who use s-video exclusively *using a plain cable with no noise-reducing diode inside*, and would like the best possible s-video signal. *Note that artifacting will no longer work after this modification is performed*. I also take no responsibility for damage caused by poor soldering/de-soldering or disassembly of the machine. Work is performed entirely at your own risk and I can't guarantee that the results will look the same on another computer/monitor combination as they do on mine.

The Old Display

On my LG Flatron M227WD TFT monitor, my stock 130XE used to produce a display like this through the “eBay” s-video cable:

Not too bad, but those vertical lines were still there, made even worse by the high quality of the LG’s 1080p display. Worse yet, interference was present around the border area:

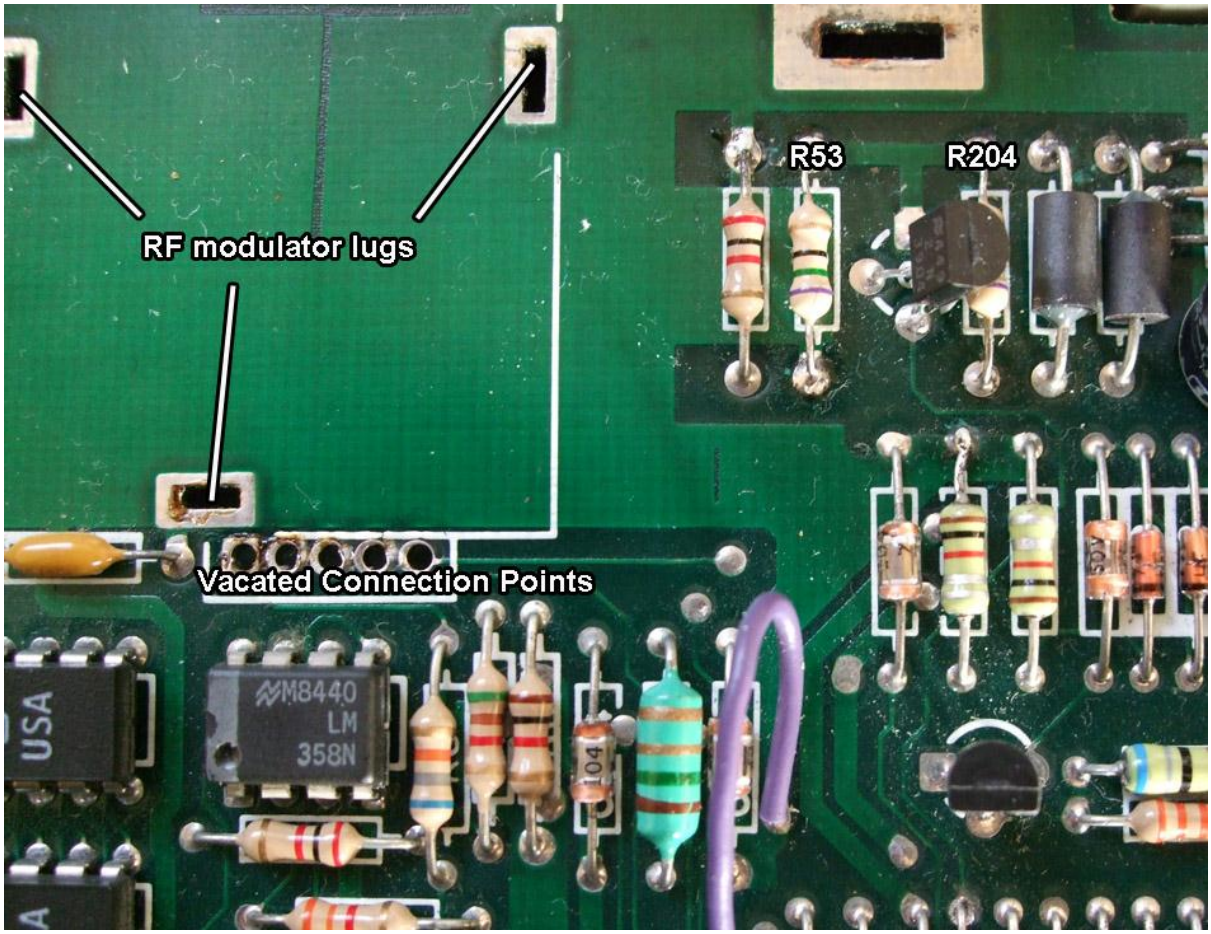


UltraVideo

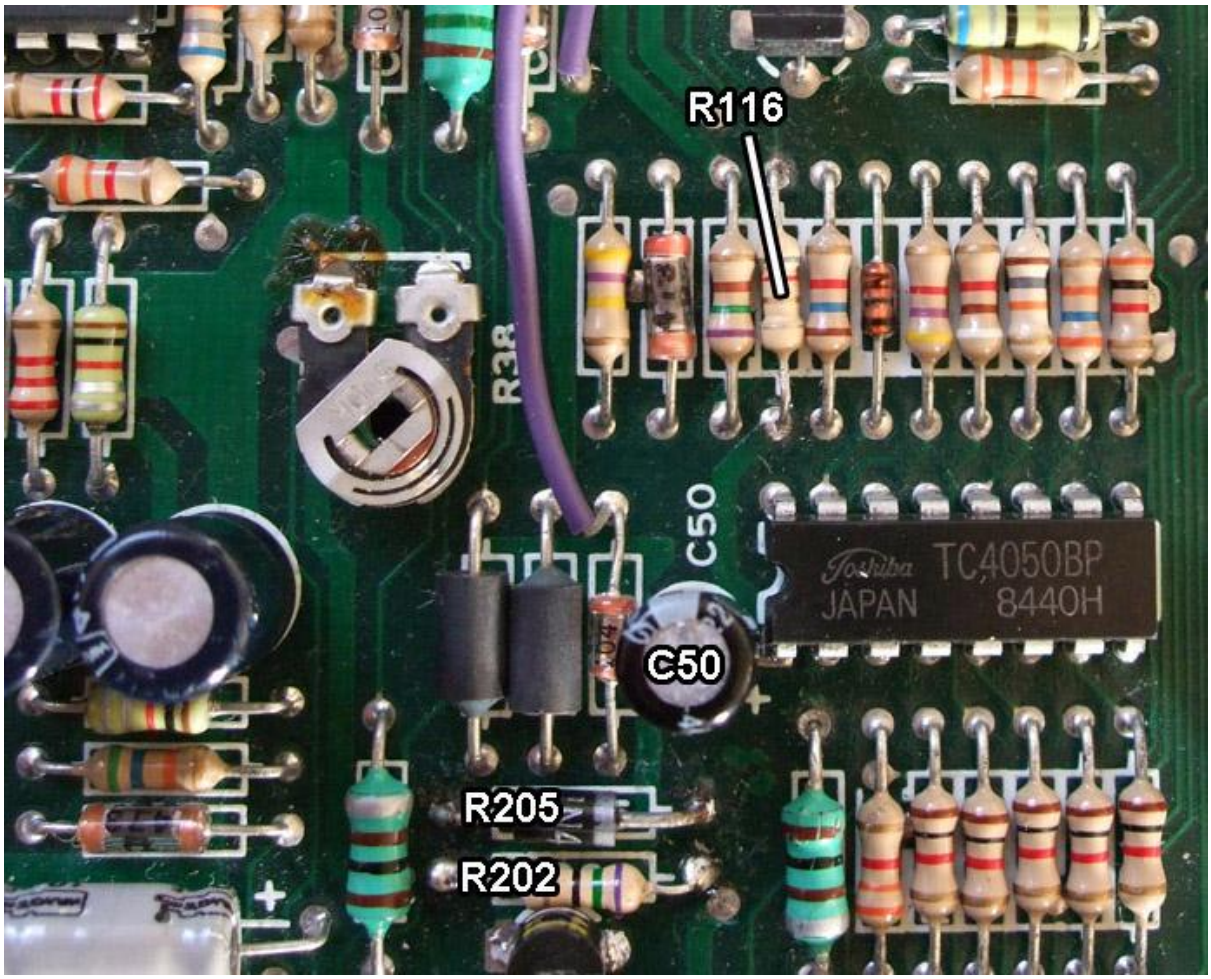
Like the XL UltraVideo mod, the XE version is a mix-and-match of the SuperVideo mod, and I have left out and included modifications according to personal preference. I just went with what gave the best picture. If you want to slavishly follow my design, you will need:

- 1 x 8.2ohm resistor
- 3 x 75ohm resistors
- 1 x 1N4002 rectifier diode
- 1 x 220uf radial-lead electrolytic capacitor

1. The first thing we'll do is totally disconnect and remove the RF modulator. This is the long silver box at the top left of the motherboard, and is secured in place by four lugs soldered into slots in the board (the top lug – at the rear of the board – isn't visible in the photograph). There are also five signal pins soldered to the board. The best approach is to first remove the solder from around the signal pins (using a solder sucker). This means we can then proceed to gradually (and carefully) lever the RF box free by heating the lugs one by one and gently prising the box away from the board. If you're not confident desoldering a component of this size, leave it to someone who can do it for you.



2. With the RF modulator removed, our next job is to replace the resistors R53 and R204 (on either side of the transistor Q3) with 75ohm resistors as shown in the preceding illustration.



3. Now, moving towards the front of the board (pictured above), we need to replace R116 with an 8.2ohm resistor.

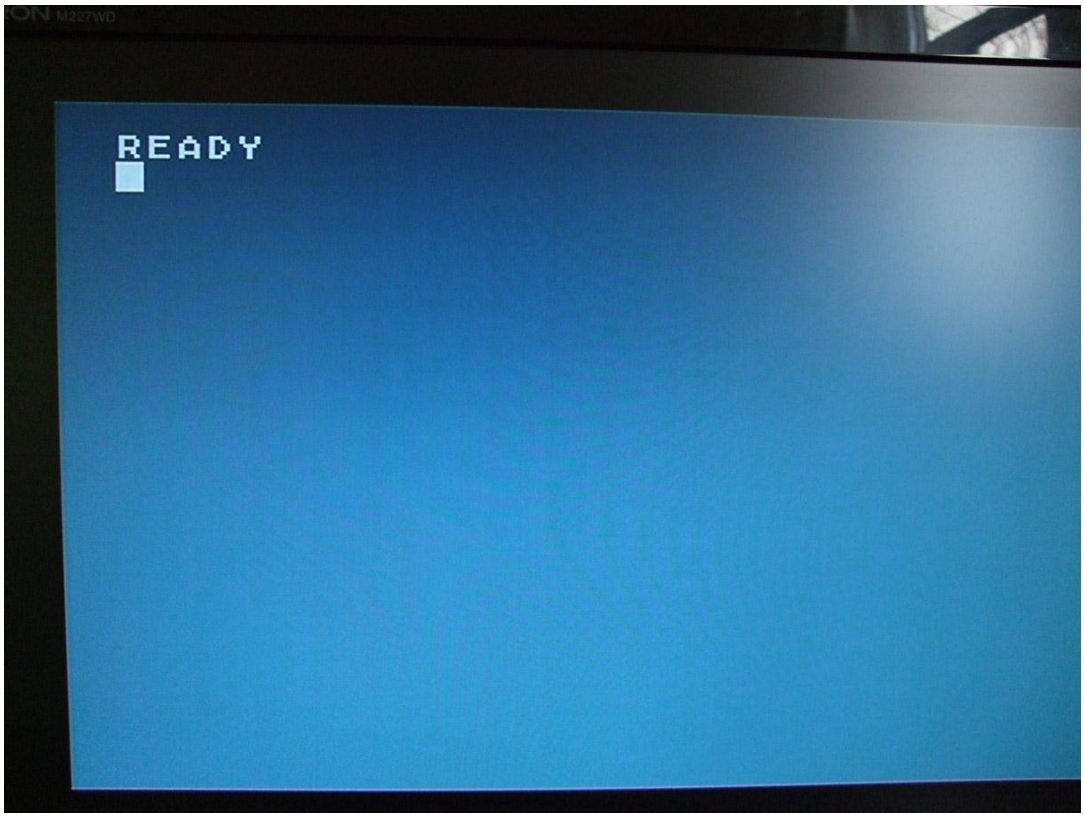
4. The third 75ohm resistor replaces R202, directly behind the output transistor Q2.

5. The 220uf electrolytic capacitor replaces the cap C50 as shown in the picture.

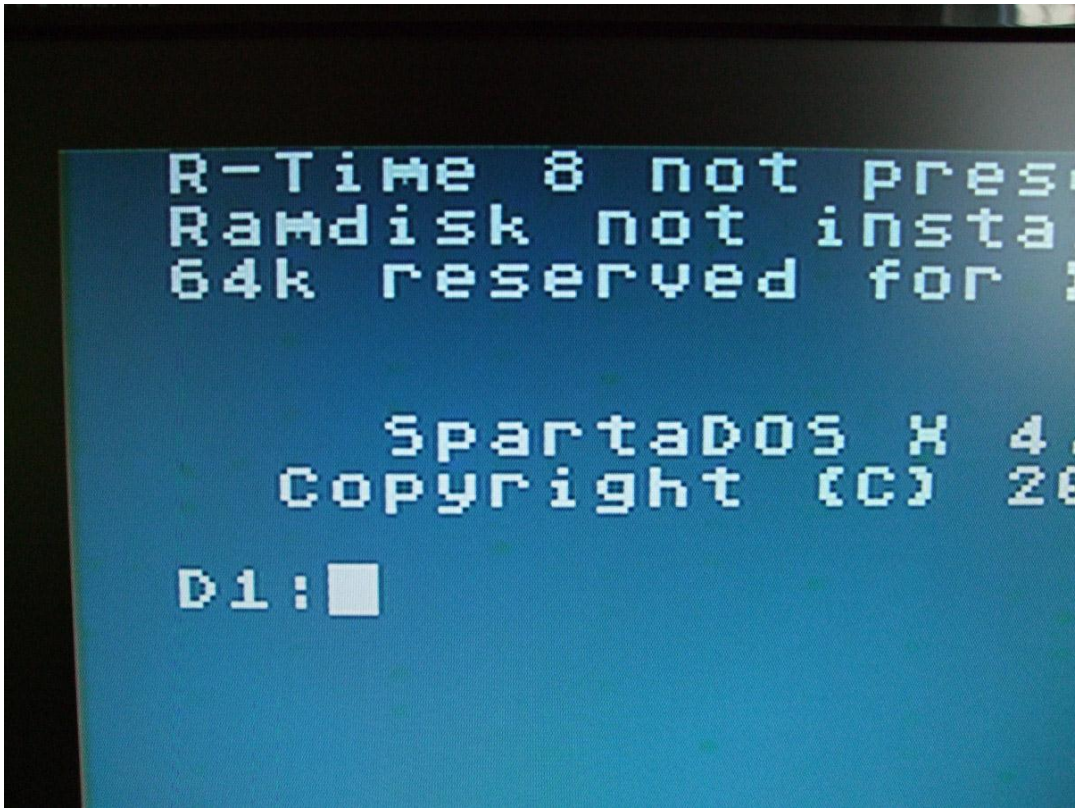
6. Finally, remove resistor R205 and replace it with the 1N4002 diode, positioned with the silver stripe on the right hand side.

We've only missed out step 2 of the SuperVideo mod: feel free to experiment to see if the cap across Q3 and C47/48 improves the picture.

Below are photographs of the resulting s-video output on the LG Flatron through a totally clean 5-pin DIN to s-video cable:



While there is still the merest trace of vertical banding, text is crisp and clear, although not quite as well defined as that of the UltraVideo modded 800XL.



Because the quality of the modified XE video output still lags behind that of the XL, I think there is room for improvement. While the XL modifications were all about removing the source of interference and noise, the XE mod attempts to overcome and supress existing problems. Still, I found it to be a huge improvement, and I hope you do too.

Good luck.

Jon Halliday, January 2010