

TeensyROM Fab v0.2x C128 UltiMax CRT fix

Rework steps to make UltiMax CRT files work on a C128 machine.

Only complete this rework if you are very comfortable with this type of soldering/repair!

Issue Description:

- When emulating “**UltiMax**” CRTs (Deadtest & Jupiter Lander for example) on a **C128 machine** will display some screen garbage on top of the regular display during emulation.
- This issue only impacts UltiMax cartridge emulation and only on C128 systems when using TeensyROM v0.2c and lower PCBs.
- Issue is resolved in the TeensyROM v0.3 design.

Technical Detail:

- The R/*W signal is used to set the data bus buffer direction on fab 0.2x boards. This works well in most circumstances/machines. However, on C128s, this signal changes too early during the 2nd half (VIC access) of the Phi2 clock cycle. Only UltiMax CRTs use this portion of the Phi2 cycle.
- The solution is to control this signal directly from the Teensy module instead of relying on the R/*W signal to control it.

Warning/Disclaimer:

- Only attempt this rework if you are comfortable with small scale solder/rework techniques.
- I cannot be responsible for issues arising from incorrect rework or failure to correctly implement. Failure to complete these instructions as documented could result in damage to your TeensyROM or vintage computer.

Rework Instructions:

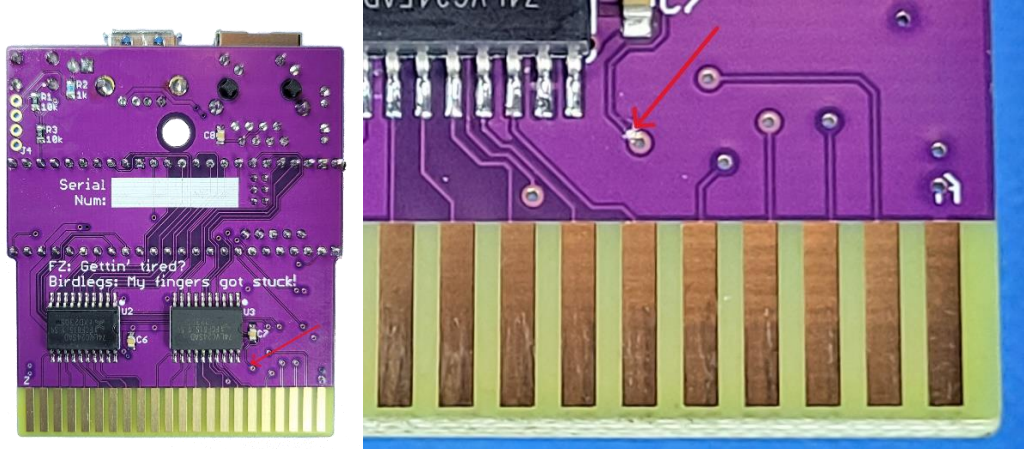
1. Update the firmware on your TeensyROM

- See FW update instructions [here](#).
- FW v0.6.4 and higher supports the direct control of the R/*W signal. Failure to update FW **prior** to applying this rework will render the TeensyROM temporarily inoperable and require [upgrade via USB](#) to recover.
- Beginning with 0.6.4, all future FW will support both configurations.

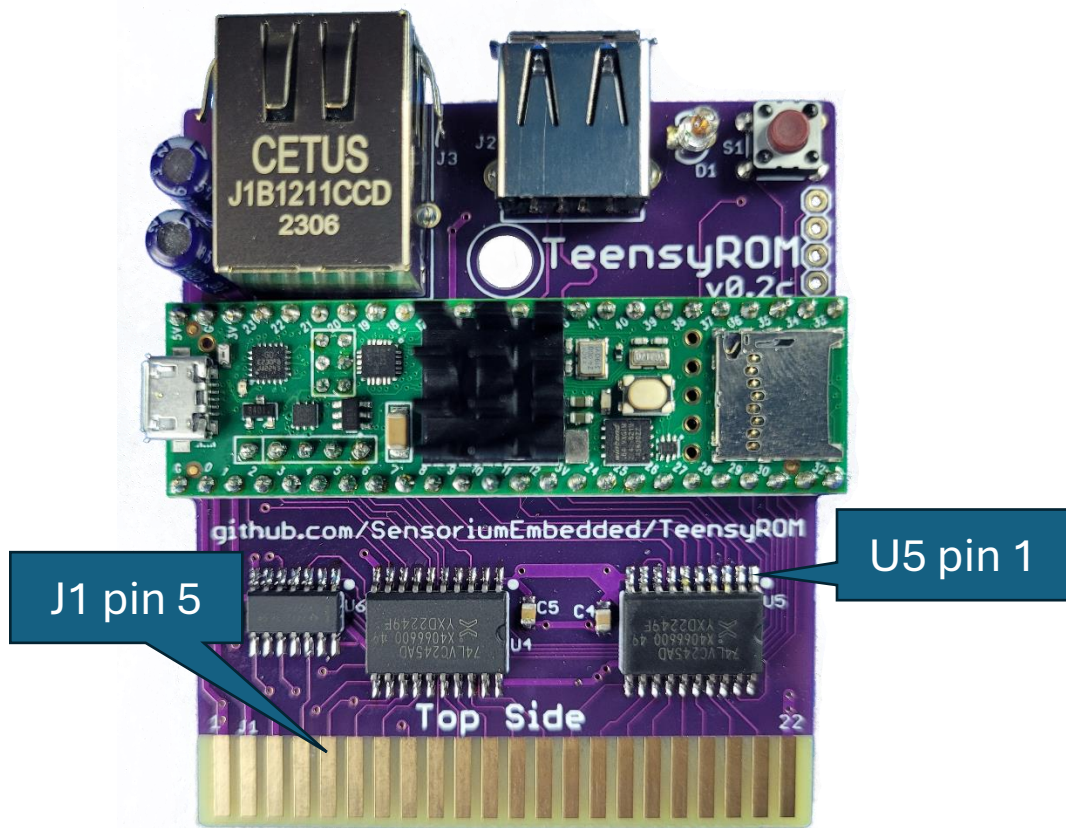
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2. Cut the R/*W trace to the buffer

- Using a sharp knife and magnification, cut the trace at the location shown below on the back side of the TeensyROM.



- Be careful of the surrounding ground plane. It's easiest to cut the trace near the via as shown.
- Verify the trace is cut by measuring resistance between U5 pin 1 and the gold fingers (J1 pin 5) on the top side as shown below. These two points are connected (<1 ohm) before cutting the trace and open (>500k ohm) after cutting it.



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3. Add a wire to directly control the buffer direction

- Recommend using ~30 AWG wire
- On the top side of the TeensyROM, solder one end of the wire to U5 pin 1
- Solder the other end of the wire to the first header pin hole (J4 pin 1)
- Connections are shown here:

