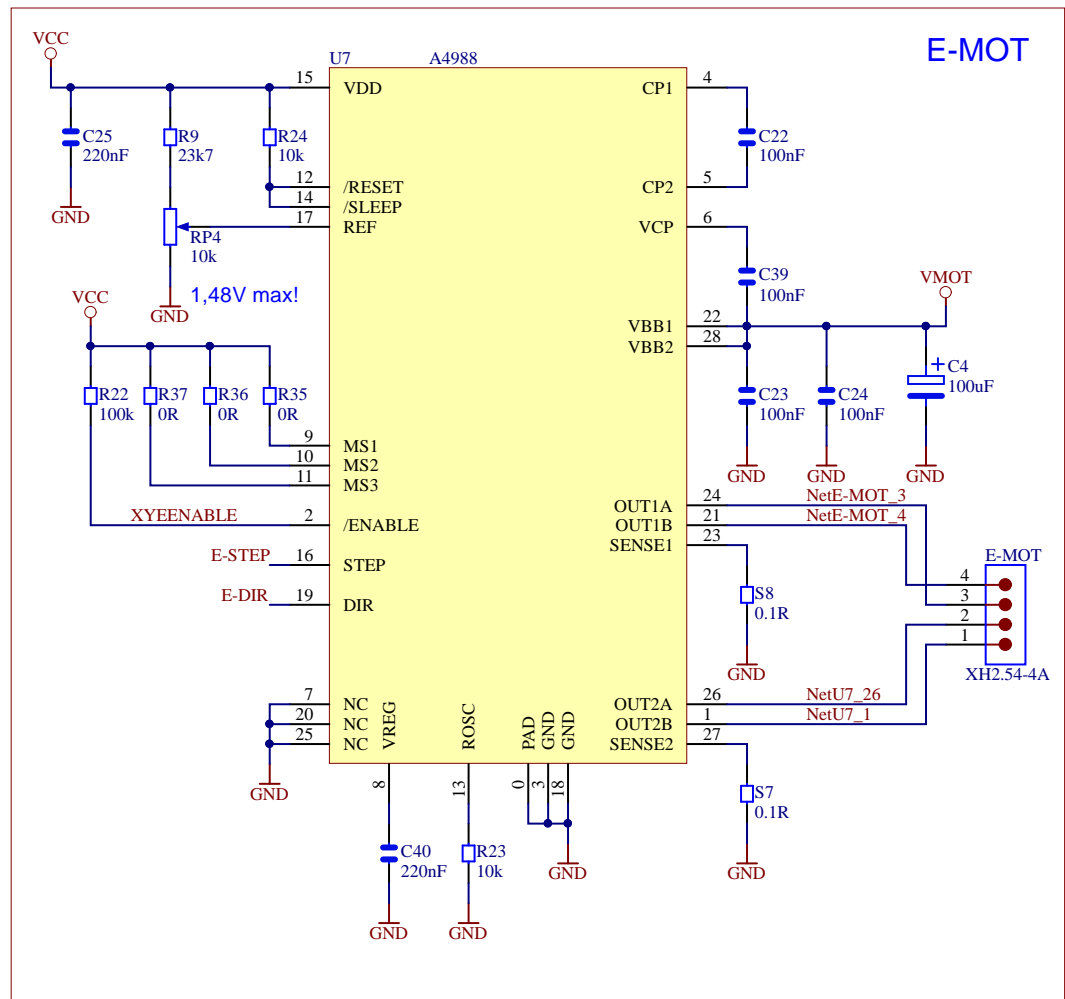
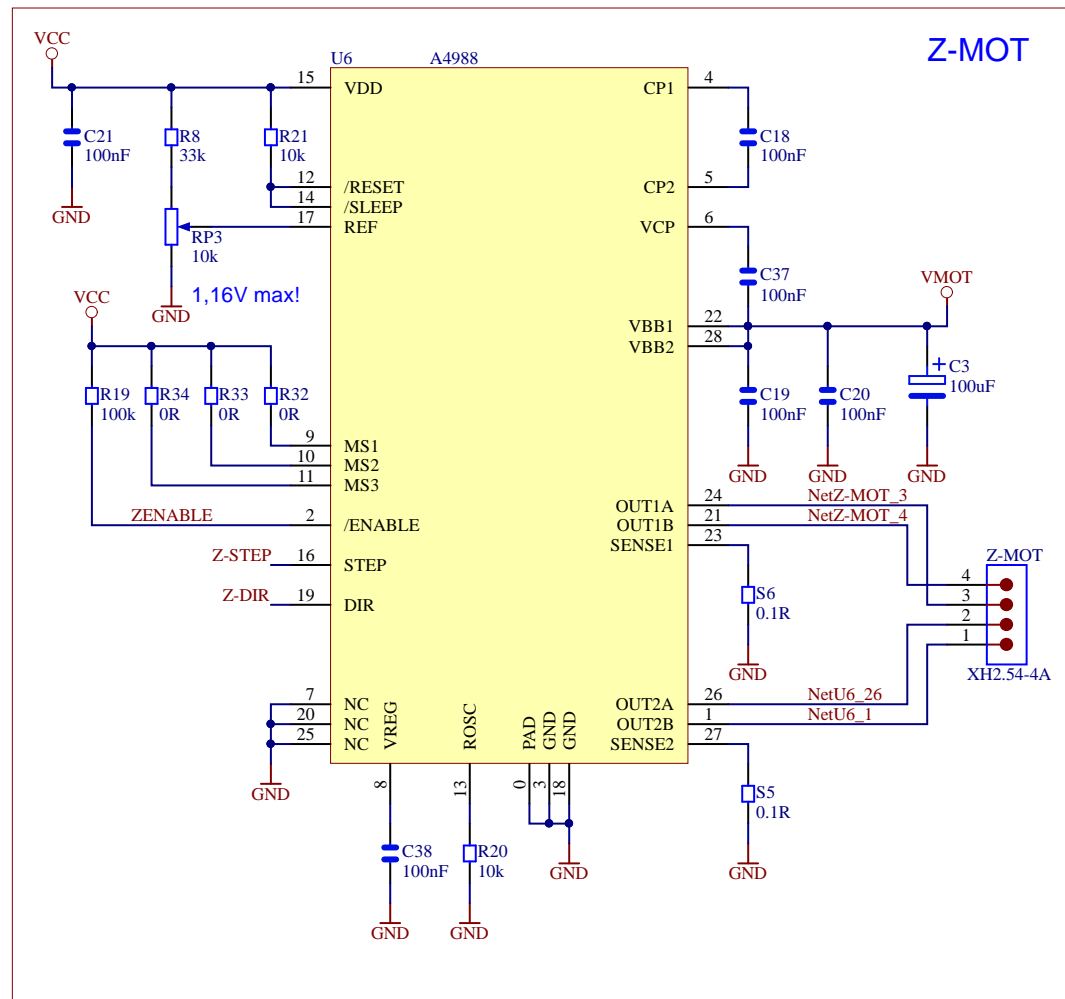
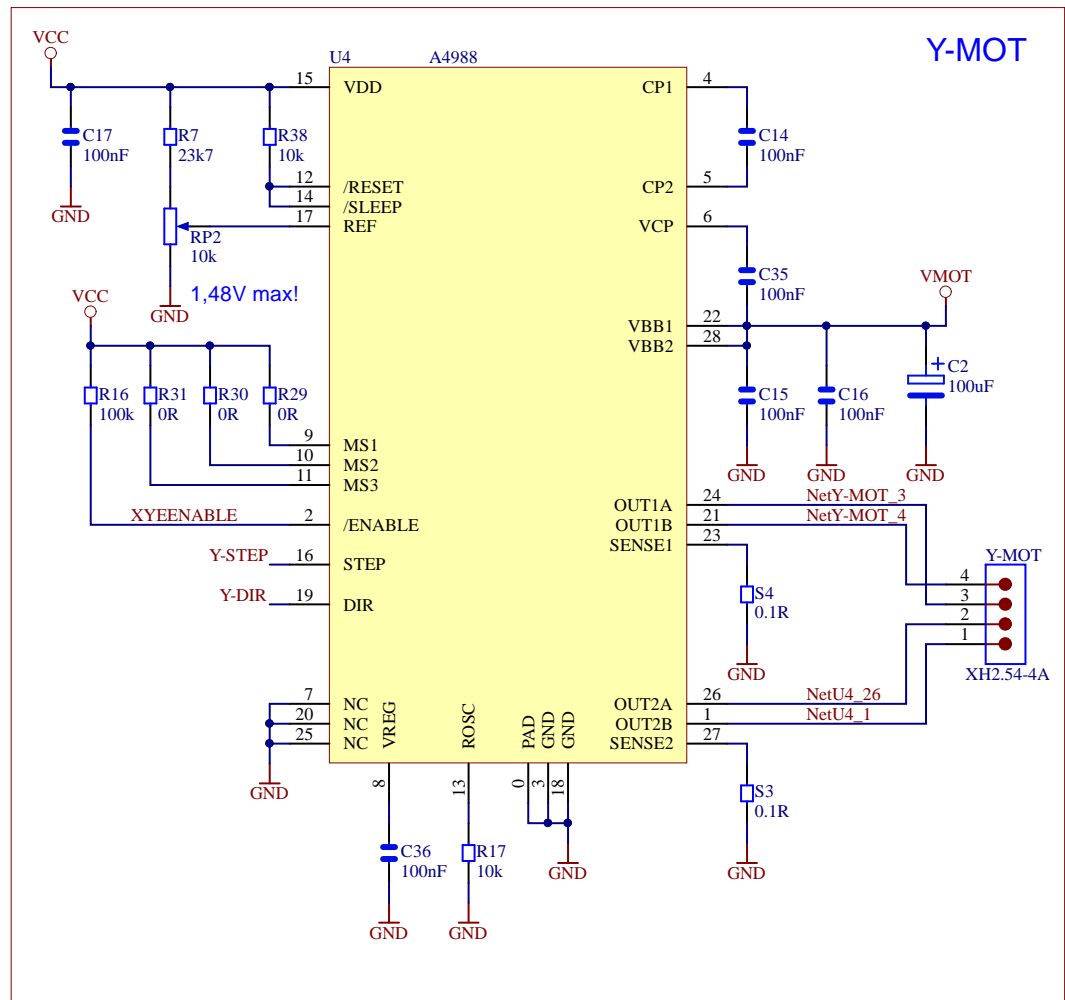
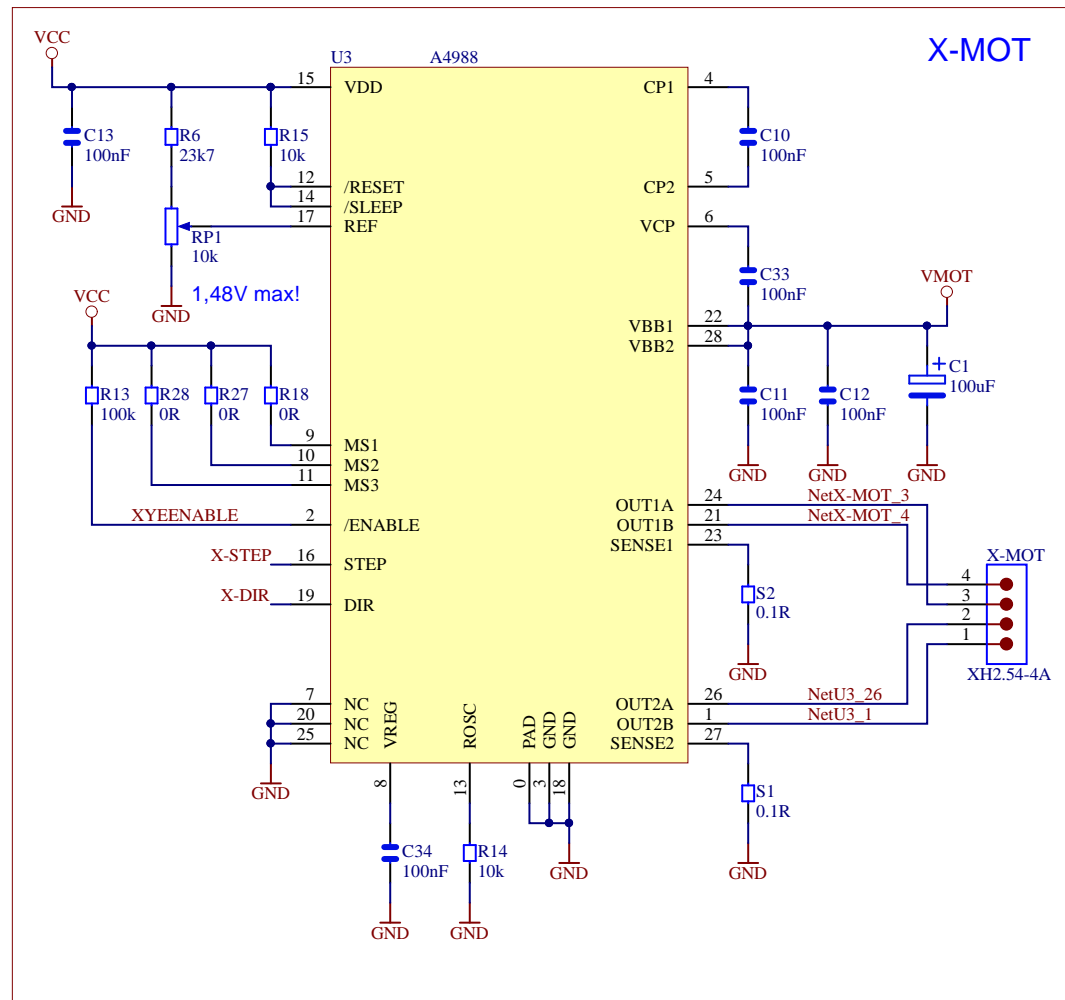


Proposed schematic for CR-10 / Ender-3 Controller-Board Rev 1.2.0
 Reverse-Engineered from "Ender-3.PCB" - V1.1.2 plus V1.1.2 and V1.1.3 boards.
 2019-06 R.Riedel



As Creality3D demonstrates with the V1.1.4 silent upgrade board, an upgrade to TMC2208 drivers is possible with no change to the layout.

The application note AN045 from Trinamic shows what needs to be done.

- obviously swap out the A4988 chips for TMC2208 chips
- the sense resistors need to be changed, Creality3D uses 0,15R
- the CP1/CP2 capacitors need to be changed to 22nF
- for at least the X-stepper Creality changed R6 to 10k
- according to the TMC2208 datasheet the VREG capacitor should be much larger: 2µ2 to 4µ7
- setup new REF voltages

Especially removing the A4988 drivers is not an easy task!
If you are not familiar with QFN chip packages, please to not try this on your own!
You will likely end up with destroying your board!