Upgrade AR3 to use AR4 software

The primary differences between the AR3 and the AR4 other than the software is that the AR3 uses the CUI encoders and also uses the teensy 3.5.

The CUI encoders have a different pulse count than the Stepperonline encoders therefore the teensy sketch you will need to use on your AR3 will be slightly different than the sketch for the AR4. I have made a hybrid sketch called "AR4_teensy41_CUI_enc_sketch" which has all the AR4 software features but uses the encoder values from the AR3 CUI encoders. You can load this sketch on your 3.5 board and use the AR4 software.

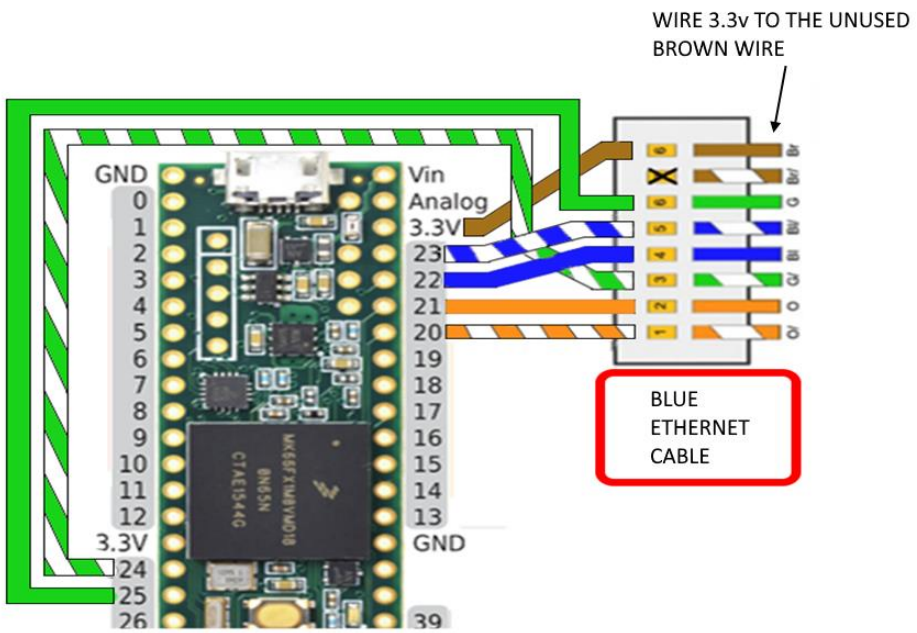
The AR4 uses the teensy 4.1 board which is a faster board than the 3.5 and will give you better performance. You will have a little more work to do if you want to use the 4.1 board on your AR3. Other than the speed the biggest difference between the 3.5 and 4.1 boards is that the 3.5 has 5v tolerant pins whereas the 4.1 has 3.3v only pins. When we wired the AR3 we wired 5v out to the robot base and used this 5v to power the encoders and the limits switches.

In the AR4 architecture we run 5v to the robot base to power the encoders, the encoders output back to the Teesny 4.1 is very low and the Teensy 4.1 can handle the encoder feedback, then we also run 3.3v to the base of the robot to power the limit switches so that the limit swtiches send back 3.3v to the teensy board.

The main issue we are dealing with here is that the AR3 uses 5v for the limit switches and returns 5v to the Teensy – The best way to upgrade to the Teensy 4.1 board is to run 3.3v out to robot base and then rewire all the limit switches to the 3.3v.

NOTE (*I have had many people use the 4.1 board without converting to the 3.3v and they have been getting away with it – I believe there is enough voltage drop through the long run of wires that it has been working but I don't recommend doing this. If you choose to not rewire your robot to use 3.3v for the limit switches this is at your own risk)*

To retrofit your AR3 and send 3.3v out to the base of the robot I would recommend utilizing the unused brown wire from the “Blue” ethernet cable.



Then in the base of the robot you need to locate each of the 6 limit switch red power wires and unwire it from the 5vdc bundle and then rewire each of the limit switch power wire to this new 3.3v source on the blue ethernets cables brown wire.

If you have not yet built your robot and you would like to build the AR4 robot using the AR3 motors and the CUI encoders follow the AR4 manual for majority of the build process but then add the CUI encoders to the motors as shown in the AR3 manual, and wire the encoders to the continuous flex Cat6 cable as shown in this photo.

AR4 using CUI encoder from AR3

AR4 encoder wiring per manual