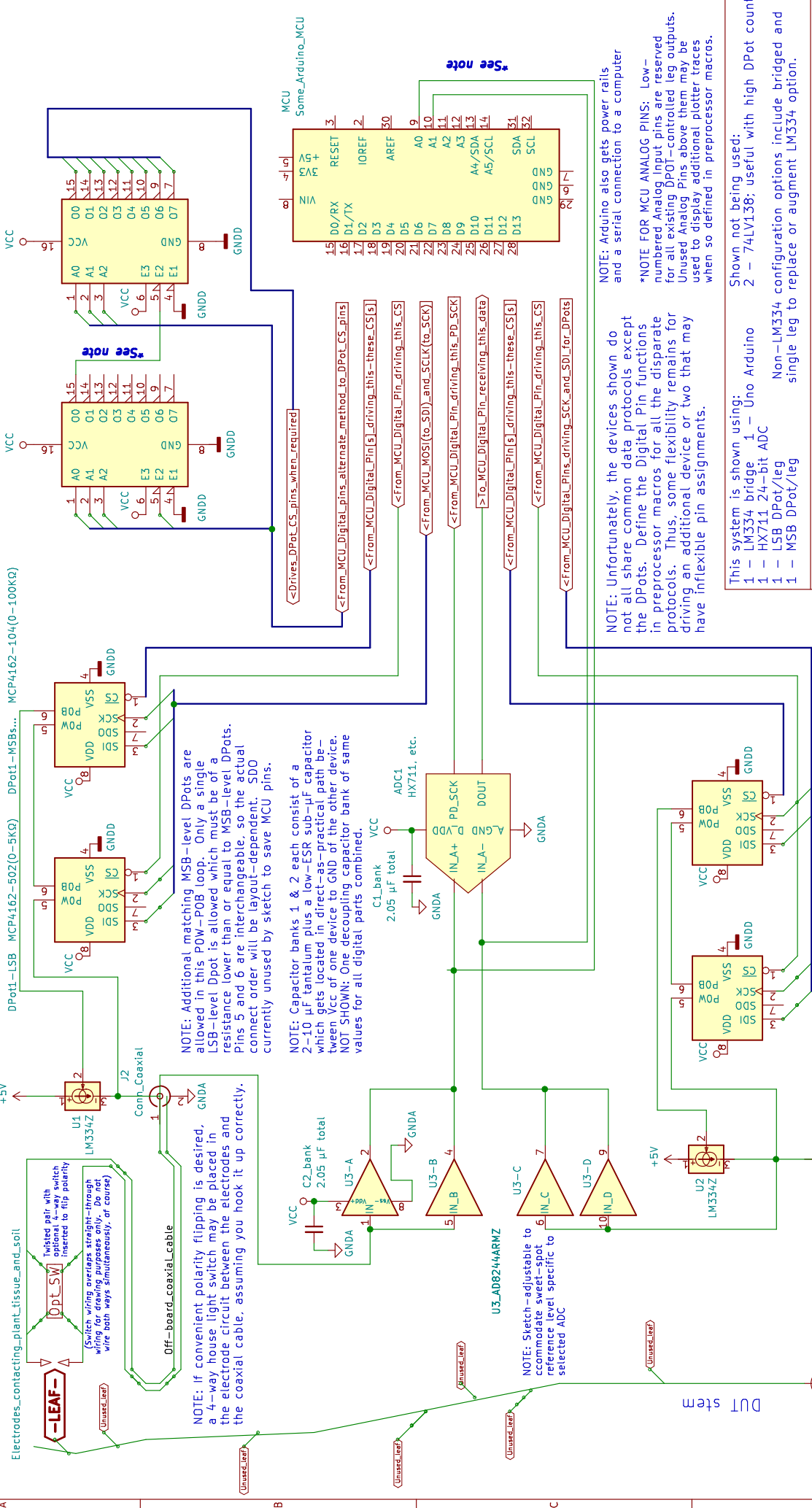


NOTE: ENSURE THAT SOIL (OR AQUAPONIC NUTRIENT SUPPLY), ITS CONTAINER, AND THE PLANT ITSELF ARE ALL ELECTRICALLY ISOLATED FROM EARTH GROUND UNLESS EXTENSIVE PRECAUTIONS ARE TAKEN TO ISOLATE ALL ELECTRONICS IN, AND CONNECTED TO, THIS SYSTEM. OTHERWISE PLOTTED RESULTS WILL REFLECT INTERFERENCE BY POWER GROUND AND NEUTRAL ELECTRICAL CURRENTS. Consult competent electrical advisor if more clarity needed.

The LM334 devices must receive 5 VDC or greater due to their own operating voltage range. Their functional range will be substantially limited if powered by the 3 or 3.3 VDC of many MCUs. If a dedicated 5 VDC positive power supply is used for this purpose, carefully ensure the output levels from them are prevented from exceeding the input range of the remaining circuitry. Alternative: use non-LM334 legs (AKA "bare" legs) & adjust macros – POW/B will then connect +V to DUT or R1



NOTE: Additional matching MSB-level DPots are allowed in this POW-POB loop. Only a single LSB-level DPot is allowed which must be of a resistance lower than or equal to MSB-level DPots. Pins 5 and 6 are interchangeable, so the actual connect order will be layout-dependent. SDO currently unused by sketch to save MCU pins.

NOTE: Capacitor banks 1 & 2 each consist of a 2-10 µF tantalum plus a low-ESR sub-µF capacitor which gets located in direct-as-practical path between VCC of one device to GND of the other device. NOT SHOWN: One decoupling capacitor bank of same values for all digital parts combined.

NOTE: Sketch adjustable to accommodate sweet-spot reference level specific to selected ADC

NOTE: Unfortunately, the devices shown do not all share common data protocols except the DPots. Define the Digital Pin functions in preprocessor macros for all the disparate protocols. Thus, some flexibility remains for driving an additional device or two that may have inflexible pin assignments.

NOTE: Arduino also gets power rails and a serial connection to a computer

*NOTE FOR MCU ANALOG PINS: Low-numbered Analog input pins are reserved for all existing DPOT-controlled leg outputs. Unused Analog Pins above them may be used to display additional plotter traces when so defined in preprocessor macros.

This system is shown using:
1 – LM334 bridge 1 – Uno Arduino
1 – HX711 24-bit ADC
1 – LSB DPot/leg
1 – MSB DPot/leg

Shown not being used:
2 – 74LV138; useful with high DPot count
Non-LM334 configuration options include bridged and single leg to replace or augment LM334 option.

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File: GWAAM-Sea Training Aid.sch
Title: GWAAM Training Aid – System Diagram
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Device Under Test (DUT)

*See note for the above DPot set

