**Components**

Heatsink – 12V

Peltier – 12V

Aluminium Rod – 24mm x 500mm

Pi/Arduino - 5V

Temp probe – Position in tank?

12V Power supply

Mount to fit everything

Relay

Various electrical parts – Resistor, breadboard, wiring etc

**Things to do.**

1. Test Peltier heat temperature with 12V/3A power supply

Thermal paste heat-sink to Peltier cooling plate,

Wire up Peltier to a relay, giving it the full 12V from the power supply

Wire up the heatsink/fan to the other relay, giving it 12V from power supply (might need breadboard circuit to limit current to not blow the fan.

**Test if the heatsink will keep up with the heating of the Peltier plate (use thermistor to find cool temp, log data)**

1. Attach aluminium rod to the Peltier.

May also need to connect to the heatsink, will drill into the rod as required to secure all the parts, may construct another lid, airtight isn’t essential to testing.

Trial with the fermenter with water (might also see about some type of insulation for the tank).

**Use the heat probe to get temperature info and turn on/off both relays, try and cool the water to various temperatures, log valid details like cooling time, duty cycle etc. Be sure to allow air flow for the heat from the fan to not be reabsorbed.**

1. Construct all the mounting for the device if data is good.

Maybe 3D print? Would be the best option, might get Matt to help because I’m useless.

Rod-Plate-Heatsink need to be firmly secured for heat transfer to be efficient. Have first section of rod outside of the lid to attach, use curtain rod holders or something.

Keep the cooling end fully closed in so that heat loss is minimal.

Eventually add to the fermenter lid to use properly.

1. Fermenter Lid Designs

Currently the lid only has the access for the airlock. If a hole is made to fit the cooling apparatus as it will take the most space, and the airlock hole is modified to fit a **Ball Lock Post with Bulkhead Attachment** which will allow us to push the beer through the line at the end. Will need different tubing if stealing the funnel thingy from work. Can then just pump into a keg through the liquid in tap.

New Gravity lids are $20 pressure lids are $40, but do not have space for the cooling rod if that goes through.

Pseudo code:

While (1){

Get\_temp

If (temp > highTempPoint){

Turn on relays

dutyCycleCount++

} else if (temp < lowTempPoint){

Turn off relays

If (coolingTime = 0){

coolingTime = currentTime

}

}

totalCount++

dutyCycle = dutyCycleCount/totalCount

delay(1000)