MAY 15TH 2014

HELLO!

PERRIN
BISHOP-WRIGHT

- Brewing 2 years
- 10 Gallon BIAB All Grain
- Systems Administrator
- General Geek
- Home Brewing Evangelist

DIY TECH FOR BETTER BEER

FERMENTATION CONTROL WITH BREWPI

SO YOU WANT TO MAKE BETTER BEER...

All Grain

Vs

Extract?

NO!

"You don't go to all grain, what you do is get yourself fermentation temperature control."

JAMIL ZAINASHEFF

“You’re really not serious about making good beer unless you are controlling your temperature.”

JAMIL ZAINASHEFF

JAMIL ZAINASHEFF

- 2 time Ninkasi Award Winner (2004 & 2007)
- Author of Brewing Classic Styles and Yeast
- Owner of Heretic Brewing - GABF Gold Medal winner 2012

WHY FERMENTATION CONTROL IS IMPORTANT

- Control yeast growth and health
- Control favor components
    - Fusel Alcohols
    - Acetaldehyde
    - Esters
- Proper Attenuation

PHASE 1
LAG PHASE

3 TO 15 HOURS AFTER PITCHING

- Yeast is acclimating
- Vitamin, minerals and oxygen are being picked up by the yeast in preparation for growth.
- No visible reactions happening.

PHASE 2
GROWTH PHASE
1 TO 4 DAYS AFTER PITCHING

- Yeast starts to consume the sugars in the following order: glucose, fructose and sucrose.
- Produce CO2 and alcohol.
- Rapid growth and reproduction of yeast cells.

PHASE 3
STATIONARY PHASE

3 TO 10 DAYS AFTER PITCHING

- Yeast growth slows.
- Yeast reabsorb diacetyl.
- Hydrogen Sulfur is off gassed.

WHY FERMENTATION CONTROL IS IMPORTANT

- Raising Temperatures at the end of fermentation promotes yeast cleaning up after themselves.

- Some strains create desirable flavors at different temperatures than the pitching temp. (Example: Wyeast 3726 Farmhouse, can go 90+ degrees to achieve some of the spicy phenols.)

- The ability to lager in the middle of a hot summer.

“Why can’t you just use the basement?”

–THE WIFE

WHY DID I WANT FERMENTATION CONTROL?

- Basement temperatures vary from low 40s in the winter to high 70's in summer.
- To make ales and lagers year round
- Let yeast work at optimum temps.

“If you change any component of the beer, it is a different beer.”

Why BrewPi?

THERE ARE SO MANY OTHER OPTIONS...

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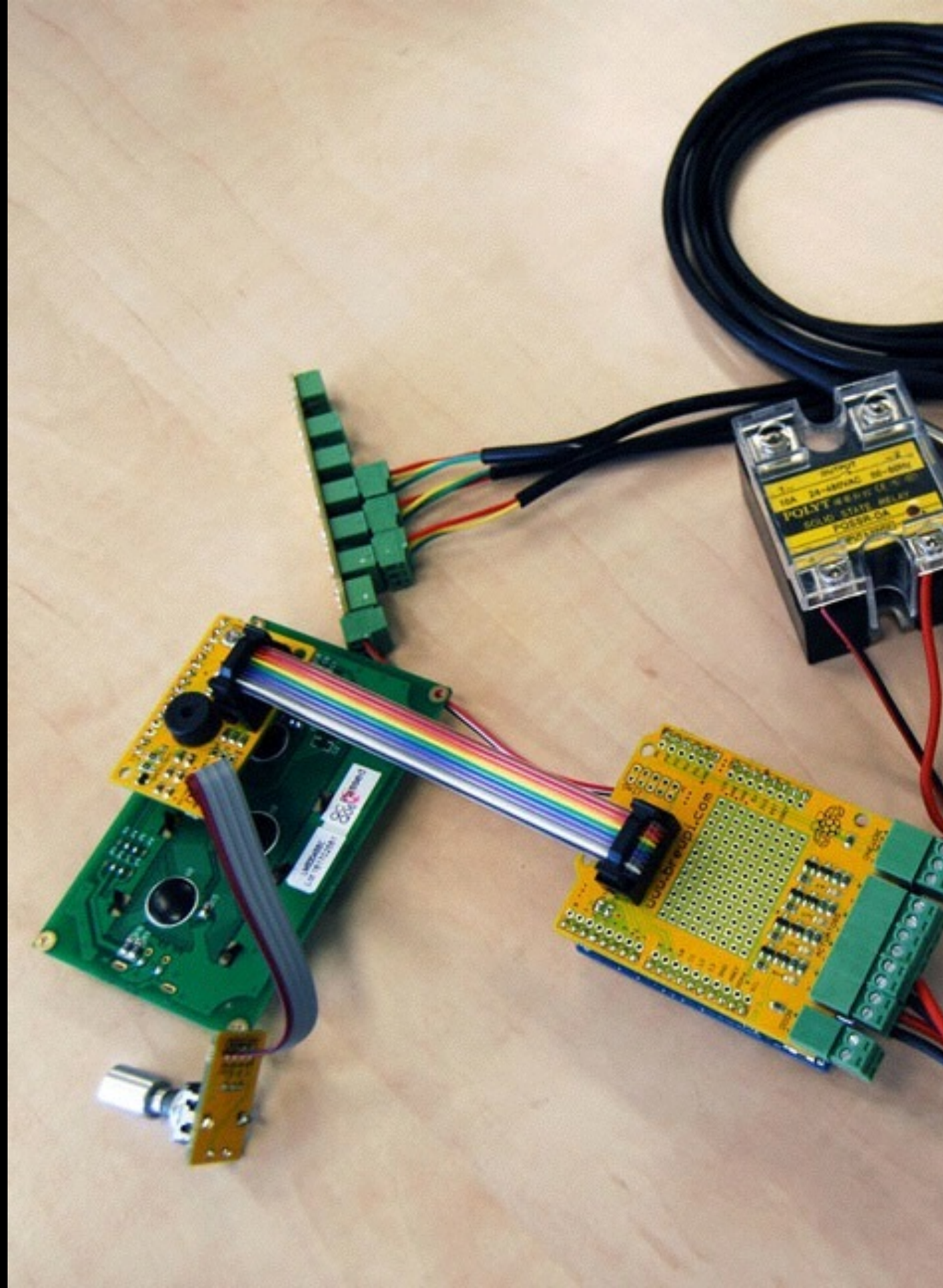
THERE ARE SO MANY OTHER OPTIONS...

I CHOSE BREWPI BECAUSE...

- Open Source, both hardware and software
  - Built on Linux and Arduino.
- Customizable, lots of room to add more relays for power, sensors for temperature and more!
- Remotely accessible
- **I am lazy. Set a program and forget about it till it's done.**

WHAT MAKES A BREWPI SYSTEM?

- Raspberry Pi
- Arduino
- BrewPi Arduino Shield
- Temperature Probes
- Solid State Relays



HOW MUCH DOES IT COST?

- Basic parts $210
- Components can cost less or more and there are lots of little things that can be procured at very little money.

ASSEMBLED BREWPI

HOW MUCH DOES IT COST?
PART 2 - THE THINGS PEOPLE FORGET

- A Cooling Chamber (fridge, freezer, etc)

HOW MUCH DOES IT COST?
PART 2 - THE THINGS PEOPLE FORGET

- A Heat source

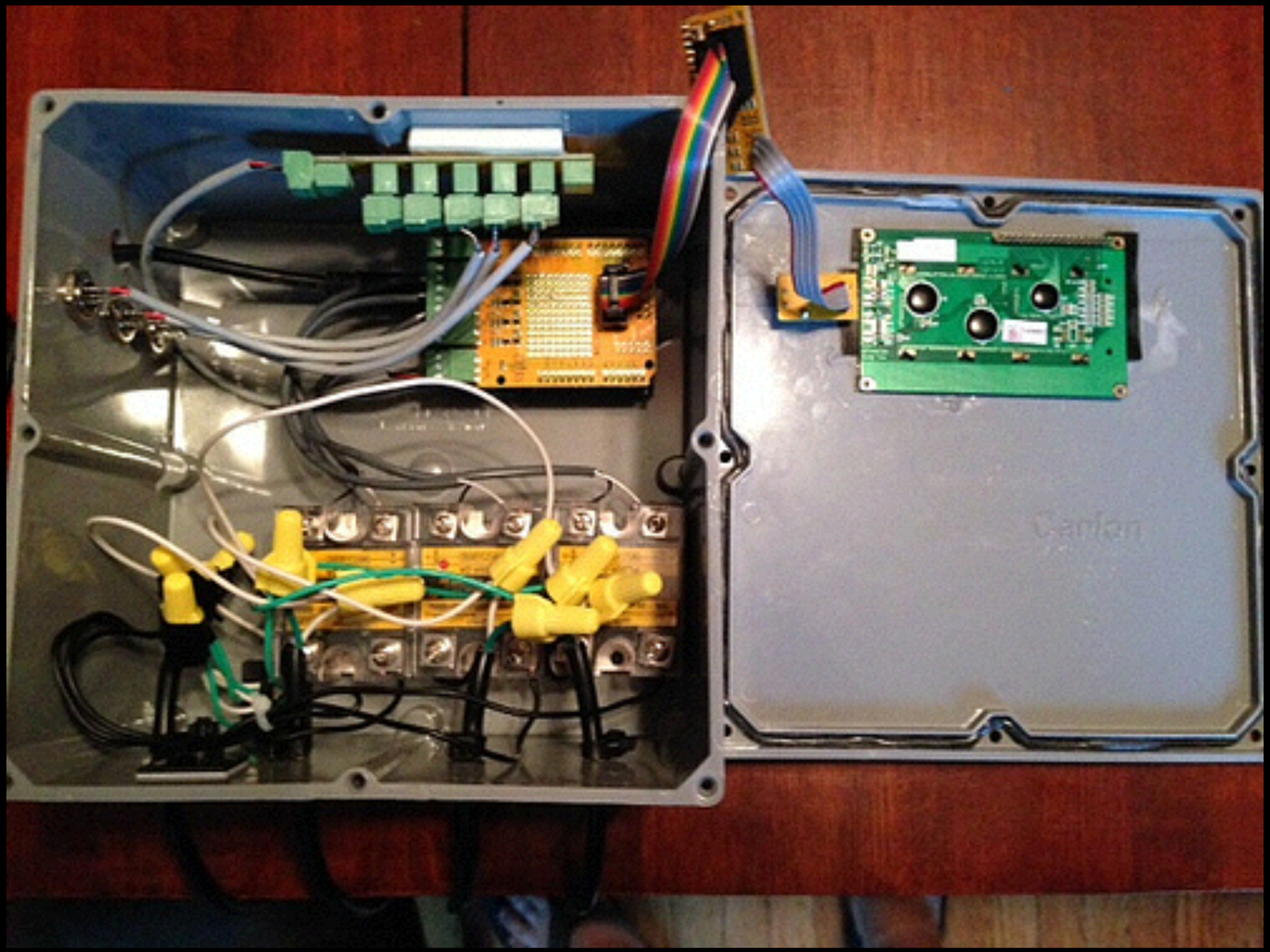
HOW MUCH DOES IT COST?
PART 2 - THE THINGS PEOPLE FORGET

- A Thermowell (What?!)

HOW MUCH DID IT COST TO BUILD YOURS?

“Don’t ask.”

PERRIN BISHOP-WRIGHT



BrewPi
IN ACTION!
BrewPi #1


BrewPi #1

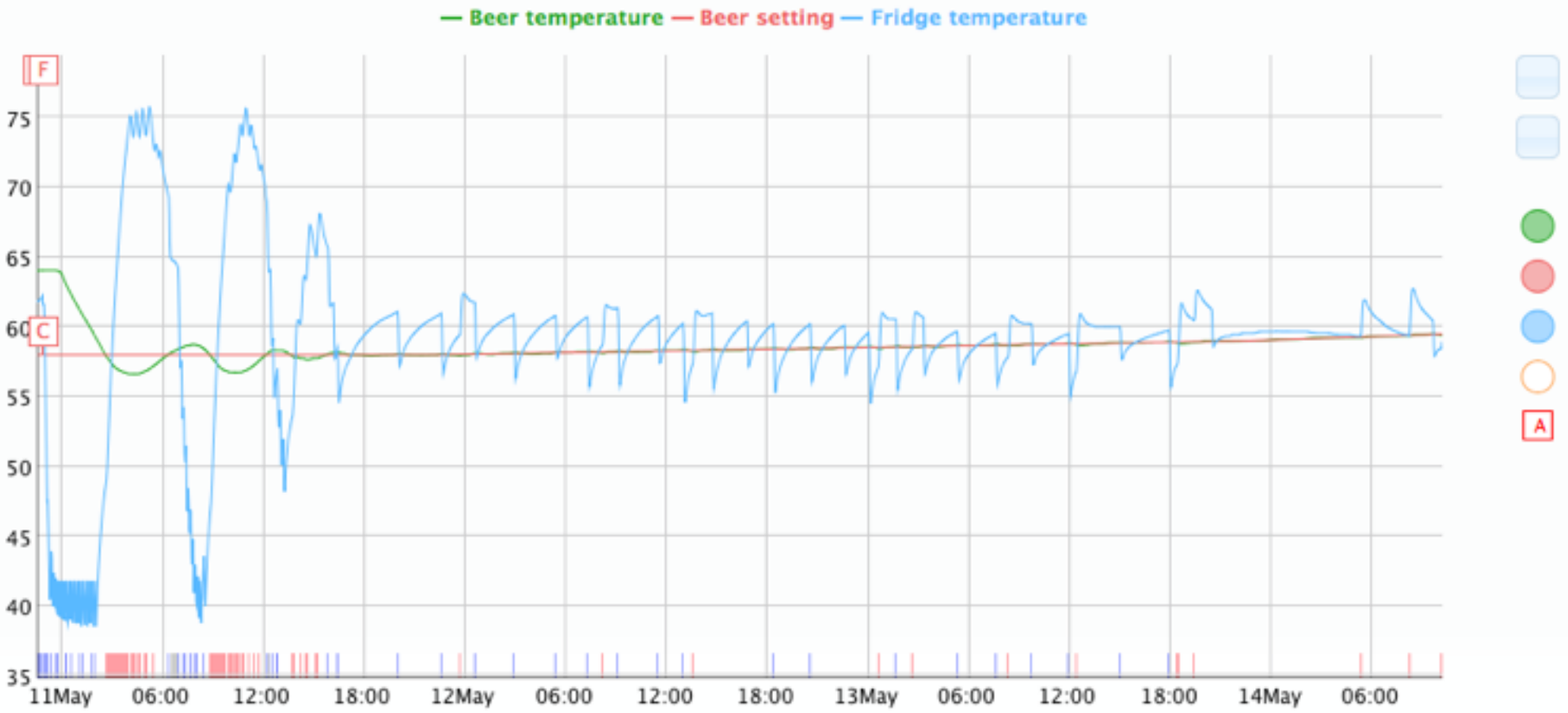
```
Mode    Beer Profile
Beer    59.6  59.6 °F
Fridge  62.6  62.4 °F
Idling for     32m00
```

BrewPi

Fermenting: Spring Kolsch

Script running

Maintenance panel

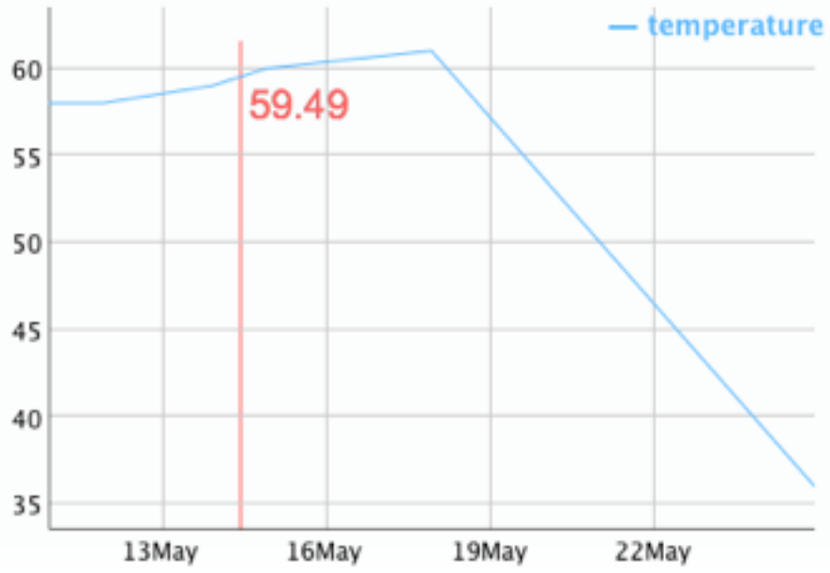


Set temperature mode:

Beer profile | Beer constant | Fridge constant | Off | Apply

Status: Running beer profile: Kolsch

Open
New
Edit
Save As
Refresh
Help



Profile Name: Kolsch

Start Date: 05/10/2014 22:32:32

Day	Temperature	Date and Time
0	58	05/10/2014 22:32:32
1	58	05/11/2014 22:32:32
3	59	05/13/2014 22:32:32
4	60	05/14/2014 22:32:32
7	61	05/17/2014 22:32:32
14	36	05/24/2014 22:32:32

Set temperature mode:

Beer profile | Beer constant | Fridge constant | Off | Apply

Status:

Running beer profile: Kolsch

59.5 °F

Mode	Beer	Profile
Beer	59.6	59.6 °F
Fridge	62.5	61.9 °F
Idling for		37m19

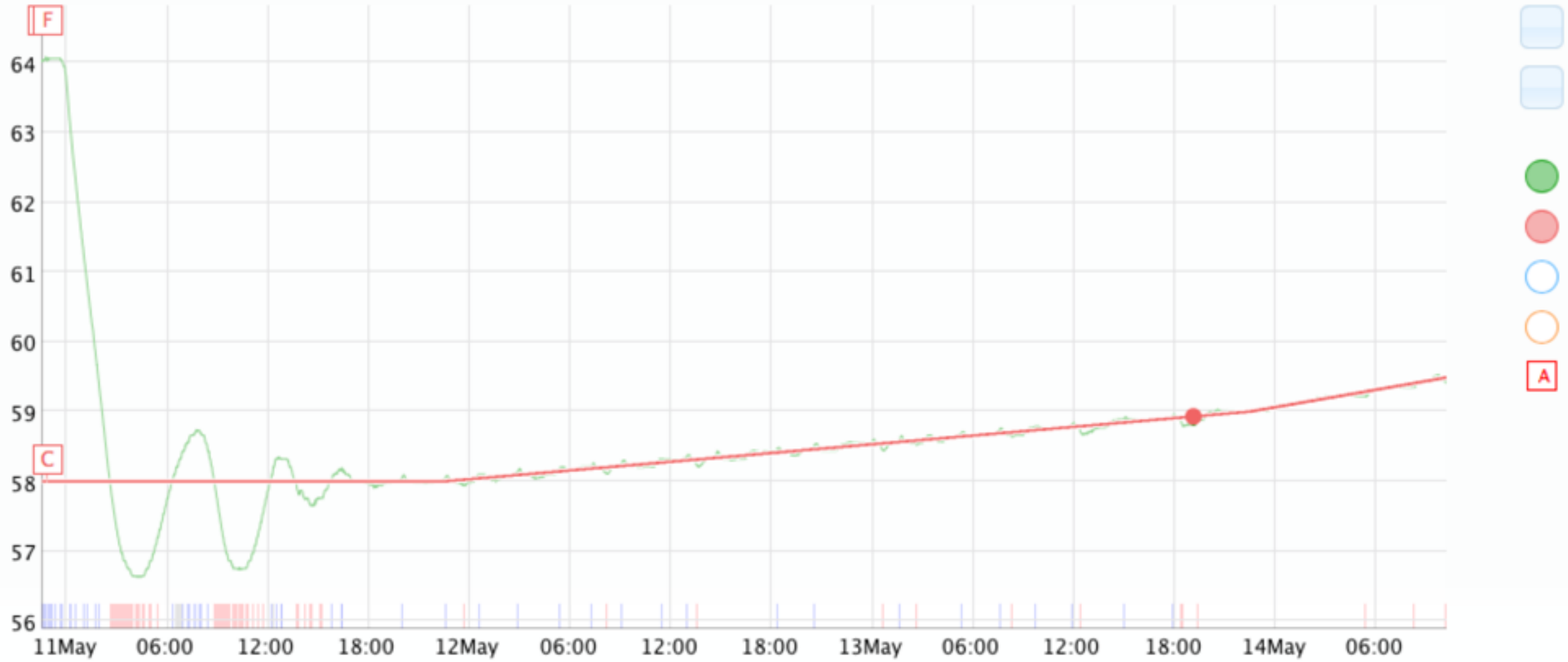
BrewPi

Fermenting: Spring Kolsch

Script running

Maintenance panel

2014/05/13 19:11:14: Beer temperature: 58.84° F Beer setting: 58.93° F



```
Mode    Beer Profile
Beer    59.6  59.6 °F
Fridge 62.4  61.8 °F
Idling for     38m52
```

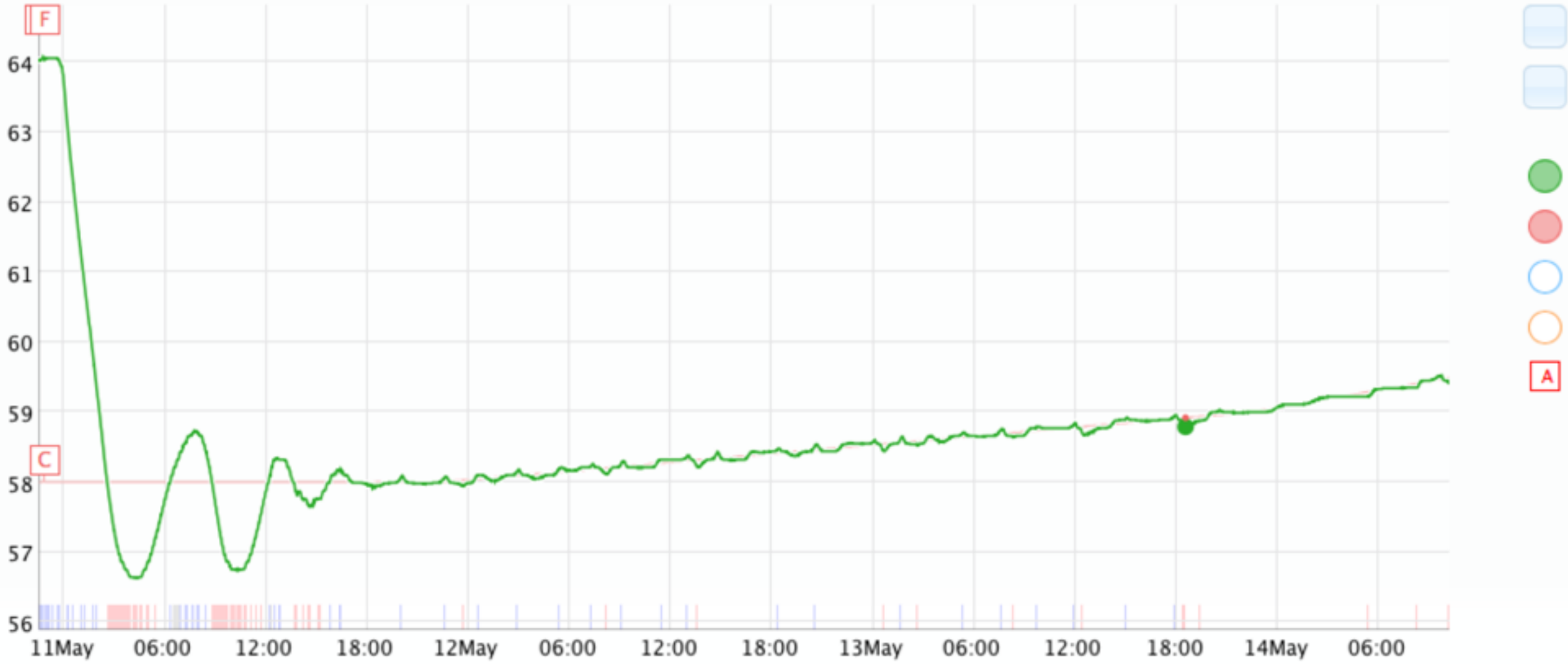
BrewPi

Fermenting: Spring Kolsch

Script running

Maintenance panel

2014/05/13 18:37:04: Beer temperature: 58.79° F Beer setting: 58.92° F



LIVE DEMO?

CONSIDERATIONS

- Knowledge of linux or someone who does is helpful.
- You have to wire power and need to be comfortable working with electricity.
- Not the cheapest solution on the market.
- Currently only works with one cooling chamber, one heat source and one fermenter.

POSSIBLE ITEMS YOU MIGHT BE ABLE TO FIND FREE OR CHEAP

- An old computer (in place of the Raspberry Pi)
- Micro USB cable (for Raspberry Pi)
- USB Wall charger (for Raspberry Pi)
- SD Card (for Raspberry Pi)
- Power cables for wire

Q & A

#1 WHAT IS THE FEATURE YOU REALLY WANT TO SEE FROM BREWPI THAT IS DOESN'T DO?

#2 WHAT DO YOU HOPE TO SEE IN THE FUTRE FROM THIS PROJECT?