

Goal - Control ATO and temperature with the arduino

Disclaimer - I am not an electrician. Make this at your own risk.

Materials (prices don't include shipping, feel free to shop around for better deals)

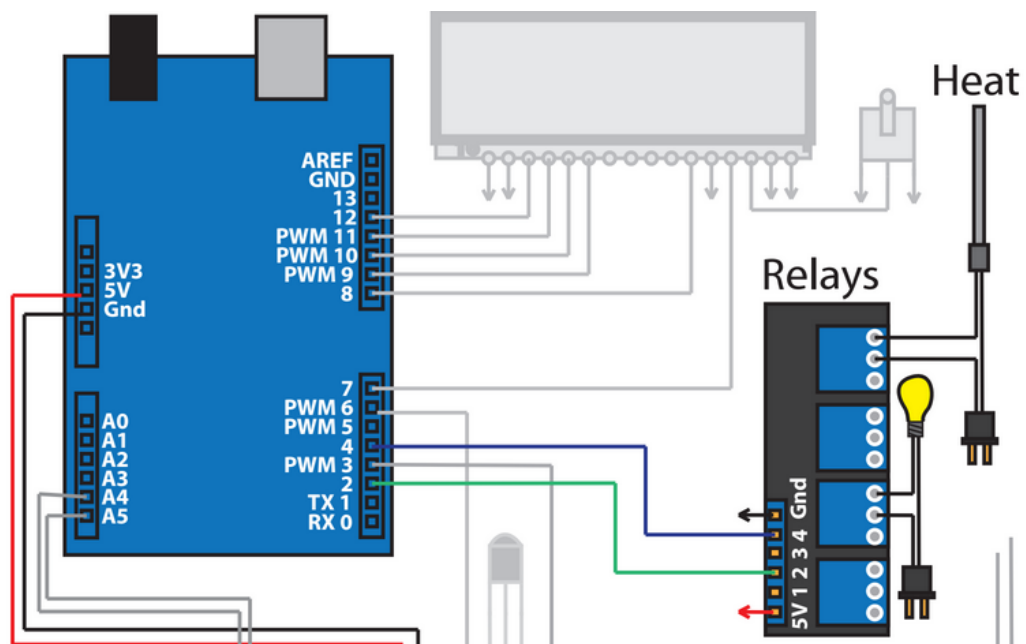
1 x Arduino Uno or <a href="#">arduino nano</a>	\$8.94
1 x <a href="#">7-12v DC wall adapter</a>	\$5.28
1 x <a href="#">Prototype Breadboard</a>	\$8.86
1 x DS18B20 transistor (These come <a href="#">waterproof</a> )	\$9.95
1 x <a href="#">4.7k Ohm Resistor</a>	\$1.29
1 x <a href="#">4 Channel relay</a>	\$7.99
1 x <a href="#">4 Gang electrical box</a>	\$6.20
1 x <a href="#">4 Gang wall plate</a>	\$4.28
2 x <a href="#">two plug wall outlet</a>	\$4.08
2 x <a href="#">waterproof connector</a>	\$2.99
1 x <a href="#">misc jumpers (MaleMale, MaleFemale, FemaleFemale)</a>	\$3.90
1 x <a href="#">float switch</a> (feel free to get two!)	\$4.29
~1' of 16 AWG wire - (although 14 AWG wouldn't hurt)	
1 x grounded wall plug ~3' (think old computer power plug)	

Total ATO + Temp control w/o shipping ~\$70.00

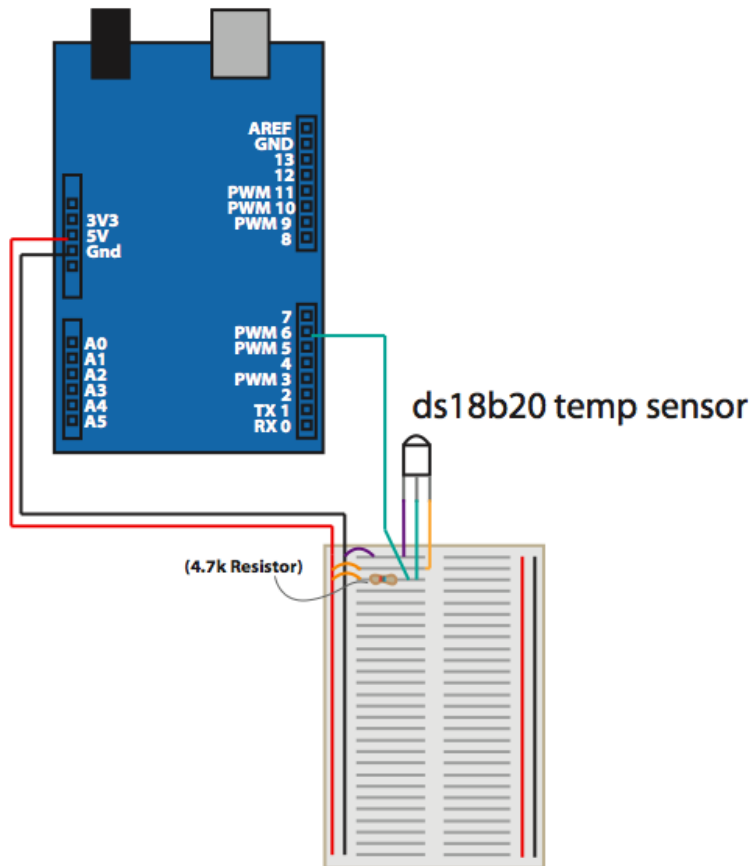
General outline:

1. Build control box, will only be wiring 2 outlets (one for future ATO)
  - a. Cut and strip 16AWG wire to about 5 x 4" pieces with ~1/4" stripped ends
  - b. Connect your grounds, and black lines on the outlets (see diagram)
  - c. Connect your white lines to your relay shields NO port (see diagram)
  - d. Connect your first outlet to the grounded wall plug and common relay ports
  - e. Connect waterproof connector to relay shield power, and relays #1 & #2
  - e. Verify all connections are tight, screw down outlets into box and add faceplate
2. Build arduino circuit
  - a. Upload code to arduino
  - b. Attach arduino to the breadboard, with ground and +5 rails wired to arduino
  - c. Create temp circuit, using second waterproof connector to wire up probe
  - d. Attach other half of waterproof connector from part 1 to the arduino
3. Connect and test!

### Simple circuit diagram - relays output

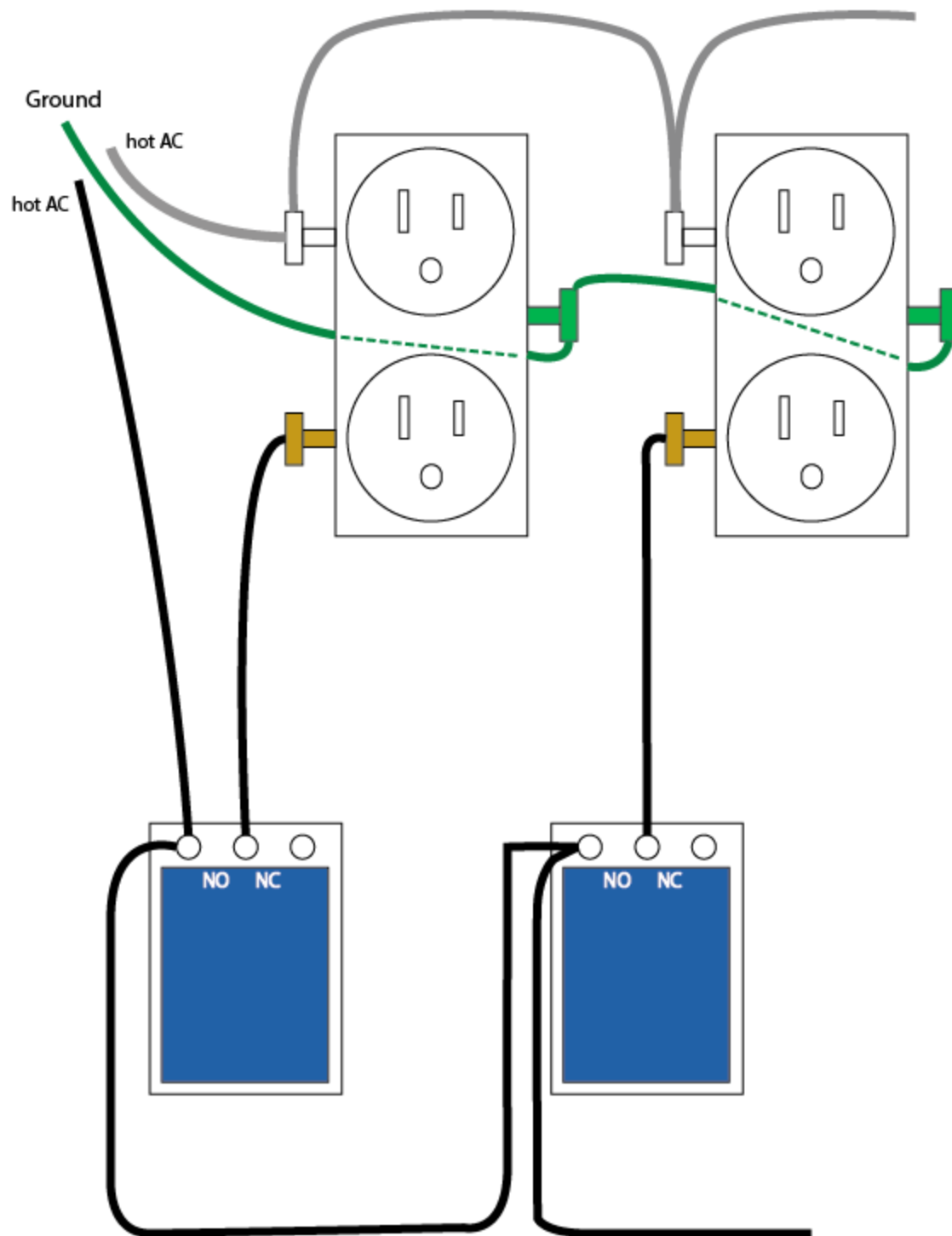


Simple circuit diagram - temp input



### Simple circuit diagram - relay box outlets

Disclaimer - I am not an electrician, AC power is DANGEROUS! Do this at your own risk.



Code for temperature:  
requires [dallas temperature library](#)

```
#include "Wire.h"
#define DS1307_I2C_ADDRESS 0x68 //set rtc
#include <OneWire.h>
#include <DallasTemperature.h>
#define ONE_WIRE_BUS 6 //Define the pin of the temp probe
#include "Wire.h"
#include <OneWire.h>
OneWire oneWire(ONE_WIRE_BUS);
DallasTemperature sensors(&oneWire);

//|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||

OneWire ds(6);
int heat = 2;
int fans = 3;

// place your desired temp here!
int toocold = 81;
int toohot = 82;
const int floatswitch = A3;
int floatstate = 0;
const int topoffpump = A1;

//|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||

void temperature()
{
  sensors.requestTemperatures(); // Send the command to get temperatures
  delay(1500);
  float temp2=0;
  temp2= sensors.getTempFByIndex(0);
  //here you dial in your heaters as close as you can, and add fans or a chiller if needed
  if(temp2>toohot) return heatoff(), fanson();
  if(temp2<toocold) return heaton(), fansoff();
}

void heatoff()
//this looks backwards, however with the relay shield high means off!

{
  digitalWrite(heat, HIGH);
```

```

}

void heaton()
{
    digitalWrite(heat, LOW);
}

void fansoff()
{
    digitalWrite(fans, HIGH);
}

void fanson()
{
    digitalWrite(fans, LOW);
}

void topoff()
{
    floatstate = digitalRead(floatswitch);
    if (floatstate == HIGH){
        digitalWrite(topoffpump, LOW);
    }
    else{
        digitalWrite(topoffpump,HIGH);
    }
    delay (1000);
}

//|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||

void setup() {
    Serial.begin(9600);
    pinMode(heat, OUTPUT);
    digitalWrite(heat, HIGH);
    pinMode(floatswitch, INPUT);
    pinMode(topoffpump, OUTPUT);
    digitalWrite(topoffpump, HIGH);

}

//|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||

void loop()
{
    temperature();
    topoff();
}

```

//|||||