One Minute Reports:

- Can we have two data loggers?
- Do you provide us with cameras?
  {Hardware Checkout after proposal}
- Getting personal hardware back after?
- Do we pay then get paid back or do we get cash upfront?
- Can HOBO record CO2 gas?
- Is the presentation just showing our Proposal with slides?
- Safety class with class for ITLL?
- HOBO demo not quite there.
- We have been really moving fast.
- Extra foam core if box breaks during testing?
- Batteries for HOBO?
- Inputs to HOBO – what kind?
- Difference in reports? Each team member or just one per team?
Lego Drop:

- Thoughts from that experience?

- Increased time – did great!

- Team Dynamics?

- Winners are…

  3rd Place Echo 3 (Team 6) = 311 grams
  2nd Place Axium (Team 2) = 301 grams
  1st Place Team 3 = 165 grams

- Prizes are…
Announcements:

- Grades on website

- Noah Moore on Proposal

- One Minute Reports – write neat please

- 58 Days to launch
Soldering:
Caution:

- Soldering is dangerous if not respected

- Be mindful of where you are and where the soldering iron is

- Eyes and liquid solder

- Everyone is expected to solder

- If you get burned...

- Stay together, don’t work ahead
Soldering

Top View

Side View

Circuit Board

Resistor

Solder Pads
Soldering Iron
Move soldering iron until tip is touching wire & solder pad
Move solder to touch edge of tip.
Hold until solder melts on tip by wire
Move solder back to touch wire only
Move solder in to form a small pocket

Solder
Move soldering iron tip up. This will drag solder up with it.
Look for shiny fillets
Soldering Tips

1. Make sure tip is hot

3. Clean & tin tip

5. Keep tip clean by using wet sponge and cloth

7. Heat until the parts are hot enough to melt solder

9. Hold until solder flashes around pad

11. Do not put too much solder on
Tinned Copper Traces
Solder bridge shorting two traces - bad, bad, bad

But, can be fixed by reheating or using solder sucker
Hands-on: Soldering
Hands-on: Soldering
Hands-on: Soldering
Hands-on: Soldering
Hands-on: Soldering

Step 4: Flip board over and place chip

Step 5: Small circle placed over pin hole "1"
Hands-on: Soldering

Step 6: Flip board over and bend chip leads out
DO NOT SOLDER AT THIS TIME
Hands-on: Soldering

Step 7: Install 120 kΩ resistor (Brown, Red, Yellow)
Hands-on: Soldering
Hands-on: Soldering

Step 8: Install 33 kΩ resistor (Orange, Orange, Orange)
Hands-on: Soldering

- Brown, Red, Yellow: 120 kΩ
- Orange, Orange, Orange: 33 kΩ
Hands-on: Soldering

Step 10: Flip board over

Step 11: Solder Resistors

120 kΩ Brown, Red, Yellow

33 kΩ Orange, Orange, Orange
Hands-on: Soldering

Step 12: Inspect solder joints and trim leads
Step 13: Flip board over and install capacitor.

Gray strip indicates "negative" lead.
Hands-on: Soldering
Hands-on: Soldering

Step 15: Flip over board and solder capacitor

Lead
Hands-on: Soldering
Hands-on: Soldering

Step 17: Install RED LED over 120 kΩ Resistor. Negative side is facing edge of board.

Hands-on: Soldering
Hands-on: Soldering

Step 18: Install GREEN or YELLOW LED over 33kΩ Resistor. Negative side is facing edge of chip.
Hands-on: Soldering

Step 19: Flip board over and solder LED leads
Hands-on: Soldering
Hands-on: Soldering

Step 21: Solder chip to board. Go slow.
Hands-on: Soldering

Step 22: Verify solder joints and look for solder bridges
Hands-on: Soldering
Hands-on: Soldering
Hands-on: Soldering

NOTE: If it doesn’t work, detach battery immediately and have it inspected
Oscillator Demo

Simulation courtesy of Williamson Labs: http://www.williamson-labs.com
Hands-on: Soldering
Hands-on: Timing Circuit, Power & Camera

- Your team will do the following:

- Build the timing circuit
Hands-on: Timing Circuit, Power & Camera

- Test with 12 V power
Hands-on: Timing Circuit, Power & Camera

Parts needed for Timing Circuit Steps:

1. Timing Circuit kit

NOTE: This timing circuit kit was slightly modified by removing the 1 KΩ for resistor R2 and replacing it with a 2 MΩ resistor to increase timing intervals.
Hands-on: Timing Circuit, Power & Camera

Step 1a: Layout timing circuit kits and set parts out
Hands-on: Timing Circuit, Power & Camera

Step 1b: Study the PC Board front and back
Hands-on: Timing Circuit, Power & Camera

NOTE: The following steps are slightly different from those listed on the Velleman box. Both will produce same final product

Step 2: Put connectors together
Hands-on: Timing Circuit, Power & Camera

Step 3: Solder connect to board as shown:

NOTE: Velleman instructions are different.
Hands-on: Timing Circuit, Power & Camera

Step 4: Solder relay to board as shown:
Steps:

1. Solder resistors to board as shown:

   - **R1 = R3 = 1 kΩ**
   - **R2 = 2 MΩ**
Step 6: Solder diodes as shown (watch polarity):

D1

D2

D3
Hands-on: Timing Circuit, Power & Camera

Step 7: Install trimpots as shown. Do not adjust at this time.

RV2=50K=PULSE

RV1=1M=PAUSE
Hands-on: Timing Circuit, Power & Camera

Step 8: Install red LED

LED: Make sure short lead is installed in hole next to relay (flat side)
Hands-on: Timing Circuit, Power & Camera

Step 9: Install Capacitor C1

C1=100 nF
Step 10: Install Capacitor C2 and C3. Watch polarity. Positive lead is the long lead and goes in the positive hole.
Step 11: Solder socket. Be careful of solder bridges.
Step 12: Install 555 Timer chip. Be careful of orientation.
Hands-on: Timing Circuit, Power & Camera

Step 13: Install A23 batteries (12 V) into specially made case

Make sure switch is ON

Step 14: Use voltmeter to verify you have 12 V
Hands-on: Timing Circuit, Power & Camera

Step 15: Hook Up 12 V battery as shown below:

- **Green** wire from switch is GRD
- **Red** wire from battery is +12V on timing circuit
Step 16: Flip switch ON (should here a click and see red LED light up)

NOTE: If not, flip switch OFF and have timing circuit inspected
Step 17: Adjust pause and pulse to get timing interval to around 3 minutes. Picture below is approximately the proper setting.