

# Automated Battery Tester

## **The Need:**

I am an Original Equipment Manufacturer (OEM) that makes batteries. Currently we sample our batteries to check their voltage, which is a very mundane task. We want to build a machine that we can put in the line to test every battery. This will reduce the number of dead batteries that make it through, increasing our quality. I want to see a proof of concept that this can be done, including some sort of mechanical simulation.

## **Problem Statement (in no particular order):**

- ❑ power available is compressed air @ 30-60 psi, and 115VAC
- ❑ Desired batteries are C and D cells
- ❑ must process at least one battery per second (over a ten battery sample)
- ❑ Parts cost of less than \$3k
- ❑ A “bad” battery is <1.5 Volts
- ❑ The loading point must be <30 in. above the table top
- ❑ The controller can read the voltage in about 20 ms
- ❑ Machine needs to count the # of good batteries and bad batteries
- ❑ Operator may enter the size of battery being run on the controller, but not manually adjust anything.
- ❑ Deposit good batteries on one box, bad ones in another box
- ❑ Maximum space for the machine is small desktop
- ❑ Maximum weight is 40 lb, excluding the roll stand and feed rollers
- ❑ I will need 50 to 100 machines eventually
- ❑ Need some sort of start and stop control
- ❑ *more may be added in class*

## **Design Bonus Points:**

- 3 points for the fastest working design, with 2<sup>nd</sup> and 3<sup>rd</sup> place getting 2 pts and 1 pt
- 3 points for the working design with the fewest number of total parts, with 2<sup>nd</sup> and 3<sup>rd</sup> place getting 2 pts and 1 pt

## **Deliverables**

- lab notes
  - Table of Contents showing where everything that follows is located?
  - enough notes to see what happened each session?
  - pages numbered?
  - entries dated and initialed & separated by a line?
  - if deliverable was completed, is it documented in notebook?
- component choices and costs
  - Bill of Materials for actual machine in electronic spreadsheet format
- wiring diagrams
  - sample circuits (I/O)
- sample program(s) pasted in notebook
  - operator input?
- drawings in notebook
  - concept sketches
  - sketches of individual parts
  - overall 3-D view of design
- characterizations
  - report test results (ie. accuracy of results, machine throughput)
    - show test results in table format in electronic spreadsheet format
    - show test results in chart format in electronic spreadsheet format
- communication of results
  - pictures of final assembly
  - summary report
  - claims to any bonus competition points