Team #2
Automated Syringe Loading Device
RERC-AMI Senior Design Project
Week 2 Report
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The Team

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The Device

- Accurately fills 1cc or \( \frac{1}{2} \) cc disposable syringes to user requests within a tolerance of \( \pm \frac{1}{1000} \) mL
- Accepts any size insulin bottle
- User friendly for patients with common diabetes conditions
- Maintains record of dosage volumes and times of fills
- Alerts user of pertinent information
Work Done

• Graphical LCD Monitor
  – Did not come with power cables, so substitutes were found
  – Means of communication were deduced

• The RS-232 port will be used, not the I^2C
Work Done

• Eliminated our original 64 Pin PIC 24 Microprocessor
  – Soldering would be too difficult due to pin arrangement
  – With help from David Price, a better selection was made
  – MPLAB Software was studied
Work Done

• New Clips were designed
  – Original clips were large, costly, and would require modification
  – New clips will be made in Castleman
    • Fit the Syringe better
    • Easier to use
    • Cheaper
Work Done

- New lead screw was obtained
  - Thinner (6mm diameter instead of 10mm)
  - Smaller lead (1mm/rev instead of 2mm)
  - Cheaper
  - Will have 24” of spare lead screw in case damages occur

36” at $8
Vs.
12” at $12
Work Done

- Sleeve nut designed with the plunger claw
  - Easier construction
  - Compact design
Work Done

- Cardboard model of cartridge
- Construction of the cartridge was determined
  - Two pieces of Al will be bent to form two halves of the cartridge, then the halves will be welded together
Work Done

• “Double Check Circuit”
  – Redesigned with new components
  – Variable values were adjusted to work with the new microprocessor.
    • Tests were run in PSpice and in Analog Device's Op Amp Selection Software
    • Tests were successful
Future Work

- Investigate Greyhill keyboards
  - Possibly design a keyboard
- Secure power and communication cables for the monitor
  - Programming can begin
- Order Text to Speech Chip
- Begin cardboard model of the case
- Secure the new CPU
- Continue learning MPLAB interface
- Write small programs for individual components
- Test incoming motors, servos, and potentiometers
- Undergo Al welding training
  - Construct clips, cartridge, plunger claw, and motor assembly
- Finalize “double-check-circuit” design and test it with incoming components
Project Review

• Returning the original microprocessor lost time
• Waiting for training prevented work from being done
• Parts were ordered late
• According to the Project© timeline, the team is behind schedule on a number of things including:
  - Testing motor and potentiometer interaction
  - Double-Check-Circuit construction and calibration
  - Bottle holder construction
  - Cardboard case model construction
  - Cartridge construction
  - And programming
However . . .

- Improvements have been made to the cartridge and clip design
- Better parts were obtained
- Over 300 dollars was saved
- Actual plans for construction are ready to go
Hours Worked

- Kathryn Tempe: 11
- Scott Relation: 14
- Daniel Littleton: 25

Total: 50 Hours