What's so Different about Embedded Design?

- ▶ Much harder than just SW or HW alone
  - ▶ HW and SW communicate asynchronously through interrupts
  - ▶ The HW and SW hardly know the other exists
  - ▶ Interrupts must not step on each other
- ▶ Human Factors are Involved
  - ▶ Flicker rate
  - ▶ Allowable delay to give user feedback
  - ▶ Dexterity of user, speed of rotation of encoders

What's so Different about Embedded Design?

- ▶ Very well documented HW design from beginning
    - ▶ Complete Schematics
    - ▶ Duplicate your design just from schematic?
- ▶ Manditory: Clear picture of SW and HW interaction
    - ▶ Not clear from either just code or hardware
    - ▶ Interrupts: how often, how long
    - ▶ What can be in main(), what can't
    - ▶ ISR code length versus run time
    - ▶ Can main() be interrupted at any point?
    - ▶ No reentrant ISRs
    - ▶ Synchronization flip flops?

What's so Different about Embedded Design?

- Embedded systems do HW and SW design together
- Embedded systems are tested together
- Embedded systems are debugged (very hard) together
- Build a little, test a little