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?
- Mandatory: 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