# Super IO

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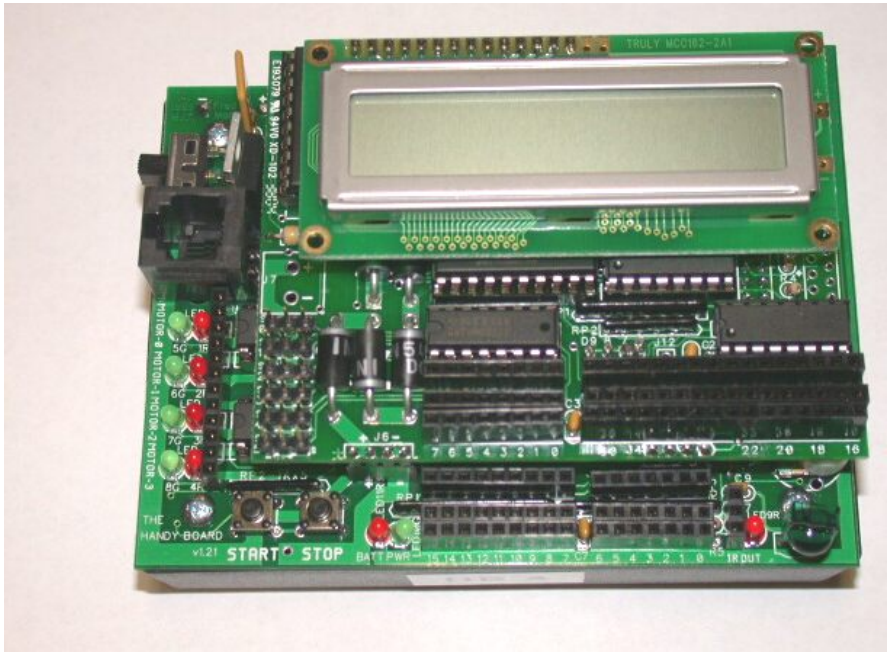
# 6.270 : The Handyboard

- Created by Fred Martin (Media Lab) in 1995
- 2MHz 68HC11 + 32K RAM
- 6 Motors, 6 Servos
- 8 Digital IO, 24 Analog IO
- 2 Shaft Encoders
- LCD, pushbuttons
- All IO controlled from software



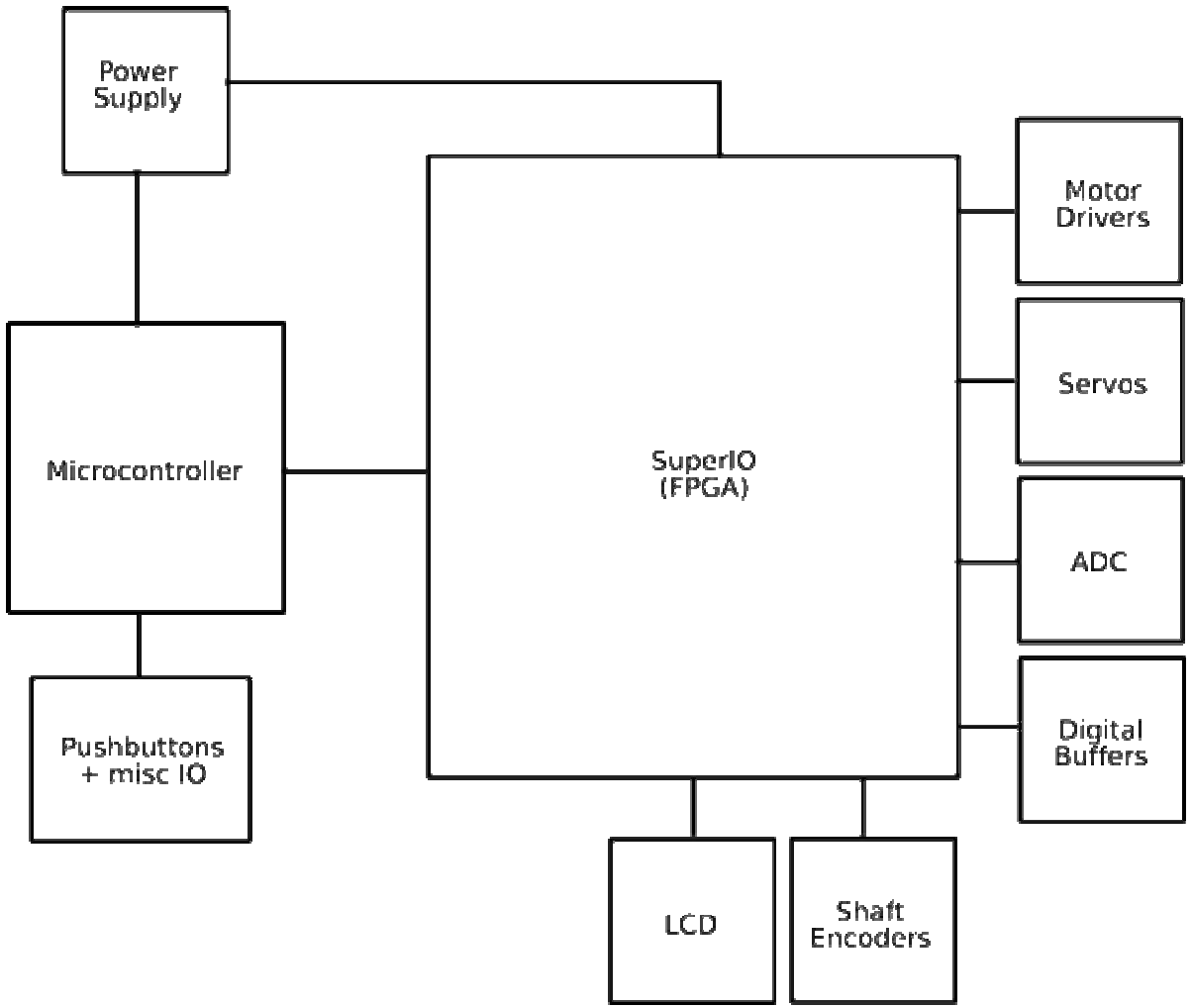
# Problems

- Handyboard is 10 year old design (68HC11 no longer available)
- No significant updates to design since 1999
- Slow, underpowered
- Everything done in software – heavy loading causes problems
- Contestants beginning to push HB beyond its capabilities
- Want new features

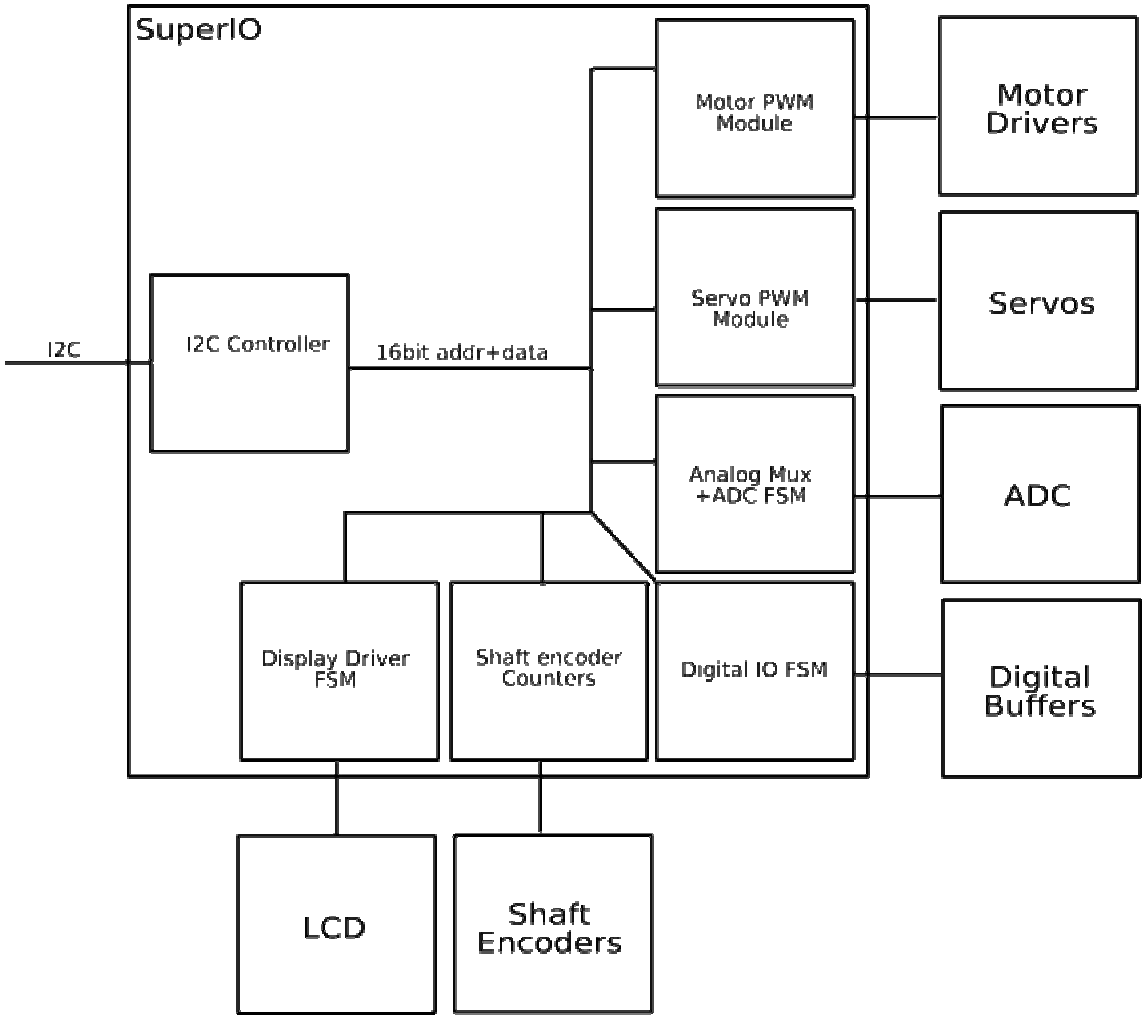
# Proposed Solution

- New board design based around FPGA + Microcontroller
- Microcontroller performs high-level control
- FPGA performs low-level conrol (controls motors, IO ...)
- FPGA (“SuperIO Chip”) - MCU communications via I2C
- All the features of the Handyboard and more
- Built-in closed loop motor control
- Automatic polling of sensor ports
- Graphics LCD controller

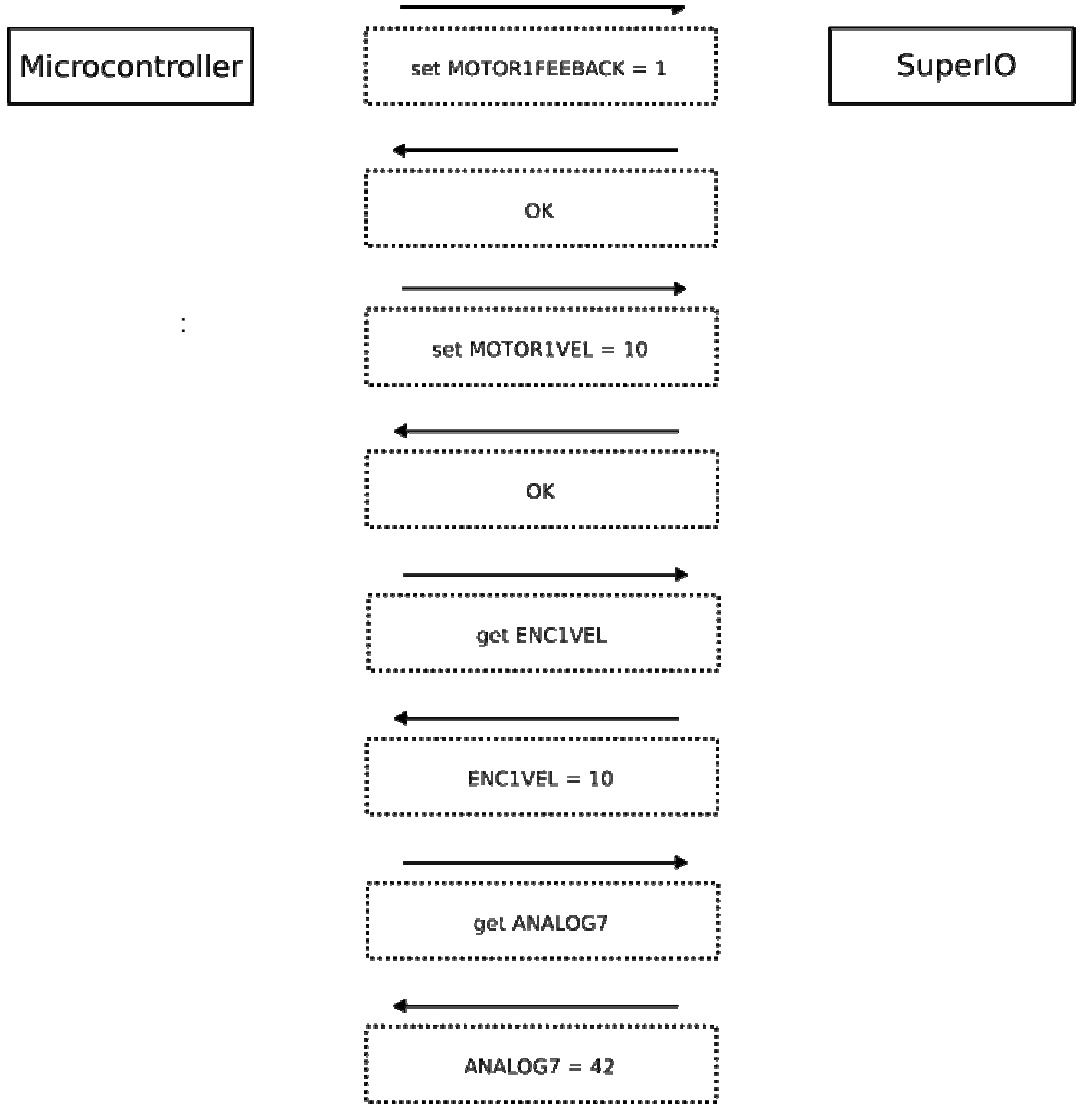
# High Level Design



# SuperIO Design



# Interface I2C



# Addressing Modules

- Each module has a base address + N registers
- Registers accessable over bus
- Address space allocated to each module type
  - 32 regs for motors
  - 24 for analog
  - ...

# Example Driver Modules