Work at Small Design Firm, Inc.
These documents describe projects for which I led electronic hardware design and fabrication while I was employed at Small Design Firm, Inc, an aptly-named multidisiplinary design firm located in Cambridge, MA, under the principal direction of its founder, David Small.

These projects focus on realizing the inherent power of technological expertise integrated with well-developed aesthetic sense and critique, as it pertains to the creative display and manipulation of information. All designs are original.

Photographs are from: http://davidsmall.com
The Illuminated Manuscript of David Small

Sensor hardware / microcontroller sofware design for interactive installation. Words projected onto the blank pages of an oversized book react to the hand movements of readers.

On display at Documenta_11, Kassel, Germany May — September 2002.
I. photographs
Interactive Fountain at the Mary Baker Eddy Library

1. photographs

2. mechanical drawings

3. printed circuit boards

Sensor module and printed circuit board design / fabrication for a permanent interactive installation. 32 infrared distance sensors wired to custom PCB’s pass signals to a computer in control of text projected on the surface of the fountain. As persons approach the installation, words projected on the fountain are pulled towards their locations.

Permanent installation at MBEL, Boston, MA
September 2002 — Present.
I. photographs
Drill Points in printed circuit board, Ø.125".

*note that the each module does not need to be flush to the wall of the foot; the housing can extend the placement of the module out a few inches depending on [the housing's] design.
Cross-section sketch of one segment of housing:
1.5" high, ~3.5" long, ~.25" thick, 3.0" deep

*note - each segment should be connected to the next directly (welded, etc.) rather than with screws if that is possible.
Circuit board for infrared sensor module. Filters sensor data through a simple, adjustable A-D (comparator) circuit, and passes it to one of 8 channels on the data bus, selectable via an 8-DIP mounted behind the sensor.

* see slides for image of fully-populated board
Bus circuit board for the collection of data from, and distribution of power to, the 32 sensor modules described on the previous page.

* see slides for image of printed circuit board
Printed circuit board for LED-indicator panel which monitors the activity of the 32 sensors through a ribbon to data collection board, described on the previous page.

* see slides for image of printed circuit board
Capacitive switch and printed circuit board design / fabrication for interactive museum exhibit [collaboration with John Rothenberg]. Touch-sensitive controls for an interactive map of New York City and information displayed on wall-mounted computer monitors.


1. timeline of operation

2. mechanical drawing

3. printed circuit boards
I.

timeline of operation

* see slides for color image
Solidcore design of (non–mechanical) capacitive-coupling switches with LED indicator.

* see slides for color image
CONNECTION DIAGRAM

bg-control-board-7b.pcb

pwm A signal
connected directly to pwm A
on the adr2100
(controls the common enable pins for the flip flops)

pwm B signal
connected through a 20mA current limiting device to pwm B
on the adr2100
(sends an oscillating pulse to leds that are "on")

master / slave
connected to either +5V (master) or Gnd (slave)
for daisy-chaining

sync in
sync out
connected to either +5V (master) or Gnd (slave)
for daisy-chaining

+12VDC Supply
the more regulated the better,
though since we're not expecting a precise12V level anywhere on
either board, but rather running everything off of local regulators,
this should be able to safely dip to any value above 7V.

General Note
orientation of sockets 9-16 is flipped

General Note
power and ground traces are smaller at points where they cross on opposite sides of the board to reduce unnecessary capacitance

3.
printed circuit boards
Printed circuit board design for rear wall-mounted capacitive-coupling switches.
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2003 Sloan Kulper