APPENDIX B

Equipment

The Kit

There are quite a few parts that are needed to build all the projects in this book. The first time I taught this class, I assembled kits which were sold through the bookstore for $100 each. One kit was required for each lab group of two people. Many of the parts were acquired from surplus stores, so your pricing may be significantly different depending upon your supplier. In addition to the kits, selections of resistors and capacitors were made available in the lab. Since this was a project oriented class, I wanted to give my students the tools to do much of the work outside of lab.

A parts list for a reasonable kit is shown below.

Count	Description	Comments
1	Plastic Box (Shoebox size)	
1	1660 Connection Solderless Breadboard	RSR 03MB104
1	BS2-IC BASIC Stamp 2	Parallax BS2-IC
1	Wire Stripper	RSR 060220
1	Cutters/Pliers/Screwdrivers Set	Jameco 99565
1	9VAC Wall Transformer (≥300ma)	RSR 16AC
1	9V Battery	

Count	Description	Comments
1	9V Battery Clip	RSR 28011290
1	DIP Extractor	RSR 060400
1	25', 22AWG Black Wire	RSR 27022BK
1	25', 22AWG Red Wire	RSR 27022RD
1	25', 22AWG White Wire	RSR 27022WH
1	Speaker (8 ohm or piezo)	RSR 26SPPC or 26TD02
2	Red LEDs	RSR 08L53RD
2	Yellow LEDs	RSR 08L53YD
2	Green LEDs	RSR 08L53GD
1	7805, 5V Regulator (TO-220 style)	RSR 107805-T
1	1000uF, 16V Electrolytic Capacitor	RSR 14ER0251000U
2	1uF Capacitors	
5	0.1uF Capacitors	RSR 14MN050.1U
2	0.01uF Capacitors	RSR 14MN050.01U
2	1 kohm DIP Resistor Network	RSR 13D1K
2	10 kohm DIP Resistor Network	RSR 13D10K
2	4.7 kohm SIP Resistor Network	RSR 13S10,94.7K
2	10 kohm Trimmer Pots	RSR 18STC10K
2	2.2 kohm Resistors	RSR 130052.2K
9	1N4007 Diode	RSR 111N4007
1	LMC660CN Quad CMOS OP Amp	Digi-Key
1	DS2003CN Darlington Driver	RSR 102003
2	Common Anode 7-Segment LED Display	RSR 08MAN72
1	MM5484 16-Segment LED Driver	Digi-Key
1	LM35DZ Temp Sensor	Digi-Key
2	5V DPDT Relay (Omron G4D-287P-BT2 or equivalent)	RSR 22RZ5
8	Momentary Switches	Digi-Key
1	Electret Microphone	RSR 26MPFET
1	30' 28 Gauge Magnet Wire	
1	Serial Download Cable	

Count	Description	Comments
2	Steel blocks (1” x 3”)	
1	Set of Datasheets for all of above!	

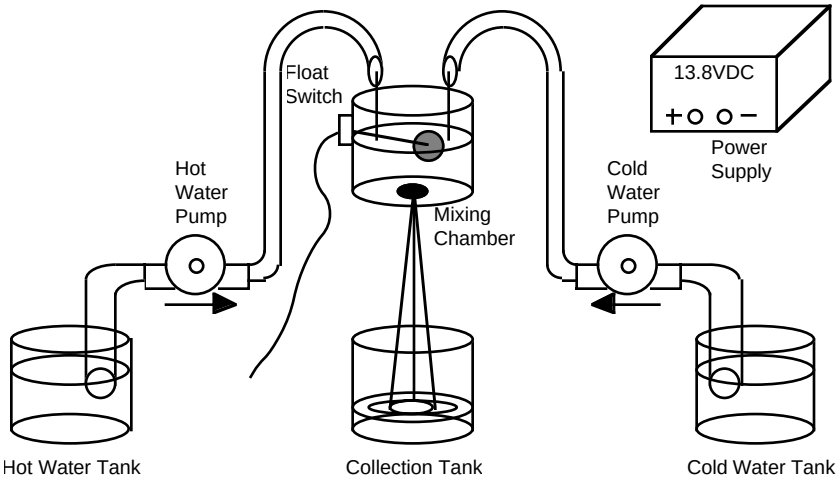
Other Supplies

In addition to the kit, there are some other supplies that will be need to accomplish the projects. However, these can easily be shared among multiple groups. These include some construction materials for building the intersection (a hot glue gun, cardboard, construction paper, etc.) and the Smart Shower setups. I also kept a few extra kits in reserve to replace broken parts.

The Smart Shower

The Smart Shower apparatus is shown below. Hot and Cold water tanks are emptied via two automobile windshield wiper pumps (available at most auto supply stores). These flow into a mixing chamber with a small hole in the bottom. There is also a float switch in the mixing chamber to allow detection of the desired fluid level. Underneath the Mixing Chamber is a Collection Tank which receives the “shower”. A high current automotive type power supply is available which is sufficient to drive both pumps simultaneously. A nice touch is to bring all electrical connections

to a terminal strip for easy wiring. You may also wish to add the LM35D tempera-



ture sensor into the mixing chamber. We found hot glue provided an adequate water tight seal of the electrical connections.

Test Equipment

Some basic test equipment is required to complete the projects. This includes a multimeter and an oscilloscope, which are generally available in undergraduate electronics labs. If it can be afforded, it would be an excellent idea to include an inexpensive DMM in the kit.