

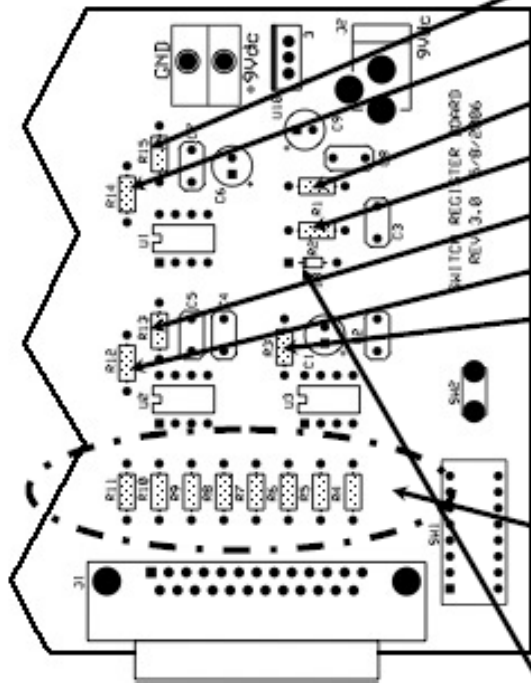
Switch Register Board Assembly Guide
based on the SRB Assembly Guide by Bryan Reemmer, 2006

Parts List

Component ID	Description	Qty.	Check
RESISTORS			
R1	1 M Ω (brn-blk-grn)	1	
R2	100 Ω (brn-blk-brn)	1	
R3	330 k Ω (org-org-yel)	1	
R4-R11	1 k Ω (brn-blk-red)	8	
R12, R14	22 k Ω (red-red-orange)	2	
R13	68 k Ω (blu-gry-org)	1	
R15	680 k Ω (blu-gry-yel)	1	
U7	10 k Ω resistor 8-pack (103)	1	
U8	1 k Ω resistor 8-pack (102)	1	
CAPACITORS			
C1, C6, C9	1 μ F electrolytic	3	
C2, C3, C4, C5, C7, C9	0.01 μ F (103) poly	6	
ICs			
U1, U2, U3	LMC555	3	
U5, U6	ICM7228CIPI	2	
U7	74LS244N	1	
LEDs			
D0-D7	Red LED	8	
U4	Dual 7 Seg Display	1	
MISCELLANEOUS			
+5V, GND	Terminal Block	1	
SW1	8 pos Dip Switch	1	
SW2	Momentary Switch	1	
D8	1N4148 Diode	1	
J1	25 pin DB connector	1	
U10	LM7805C voltage regulator	1	
	Red Banana Jack	1	
	Black Banana Jack	1	
	Foam Bumpers	4	
SOCKETS			
for U1,U2,U3	8-pin sockets	3	
for U7,U8	16-pin sockets	2	
for U9	20-pin socket	1	
for U5,U6	28-pin sockets	2	
OPTIONAL			
AC	AC connector	1	

Assembly Instructions: Resistors

The following directions refer to this section of the SRB:



START ↓	
<i>Note: Bend all resistor leads before inserting the resistors into the PCB.</i>	
<input type="checkbox"/> R15: 680 kΩ (blu-gry-yel).	
<input type="checkbox"/> R14: 22 kΩ (red-red-org).	
<input type="checkbox"/> R2: 100 Ω (brn-blk-brn).	
<input type="checkbox"/> R1: 1 MΩ (brn-blk-gm).	
<input type="checkbox"/> R13: 68 kΩ (blu-gry-org).	
<input type="checkbox"/> R12: 22 kΩ (red-red-org).	
<input type="checkbox"/> R3: 330 kΩ (org-org-yel).	
<input type="checkbox"/> Solder the leads to the board and cut off the excess lead lengths.	
Insert eight 1 kΩ resistors (brn-blk-red) at:	
<input type="checkbox"/> R4.	
<input type="checkbox"/> R5.	
<input type="checkbox"/> R6.	
<input type="checkbox"/> R7.	
<input type="checkbox"/> R8.	
<input type="checkbox"/> R9.	
<input type="checkbox"/> R10.	
<input type="checkbox"/> R11.	
<input type="checkbox"/> Solder the leads to the board and cut off the excess lead lengths.	
<input type="checkbox"/> D8: Align the black strip on the diode with the white strip on the PCB. Install and solder.	

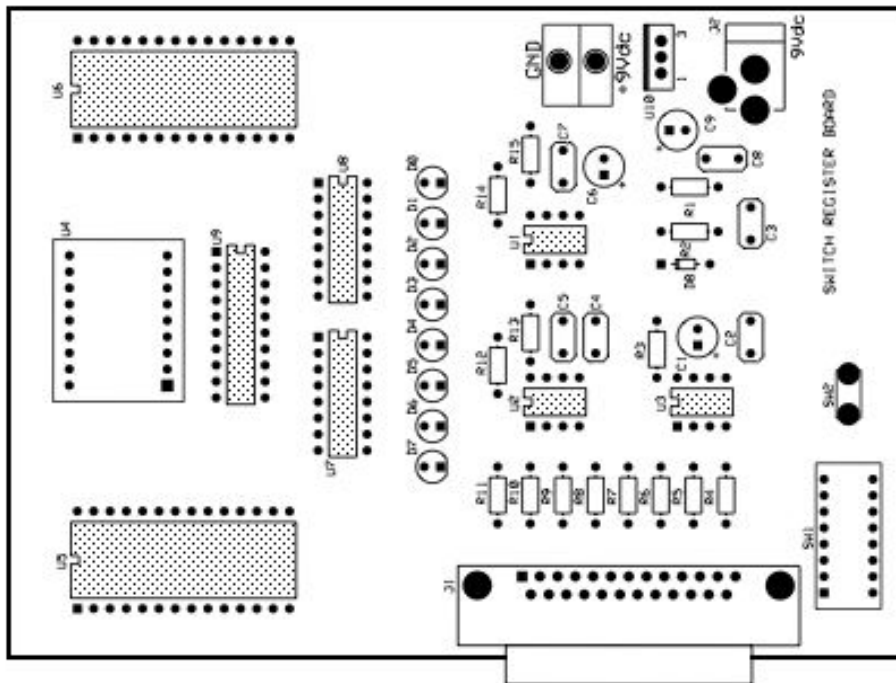
Assembly Instructions: Sockets

START ↓

Note: It is very easy to form a solder bridge between pads on the circuit board. After each solder step, carefully inspect the pads for solder bridges and remove any that have formed.

If a solder bridge has occurred, hold the circuit board component-side-up, and hold the soldering iron tip between the two points that are bridged. The solder will flow toward the heat of the soldering iron tip.

The following directions refer to the entire SRB:



CONTINUE ↓

Note: Be sure to align the notches in the sockets with the notches shown on the PCB. Solder each socket one at a time as you insert them into the PCB.

Insert and solder three 8-pin sockets at:

- () U1.
- () U2.
- () U3.

Insert and solder two 16-pin sockets and one DIP switch at:

- () U7.
- () U8.
- () SW1.

() Insert and solder a 20-pin socket at U9.

Insert and solder two 28-pin sockets at:

- () U5.
- () U6.

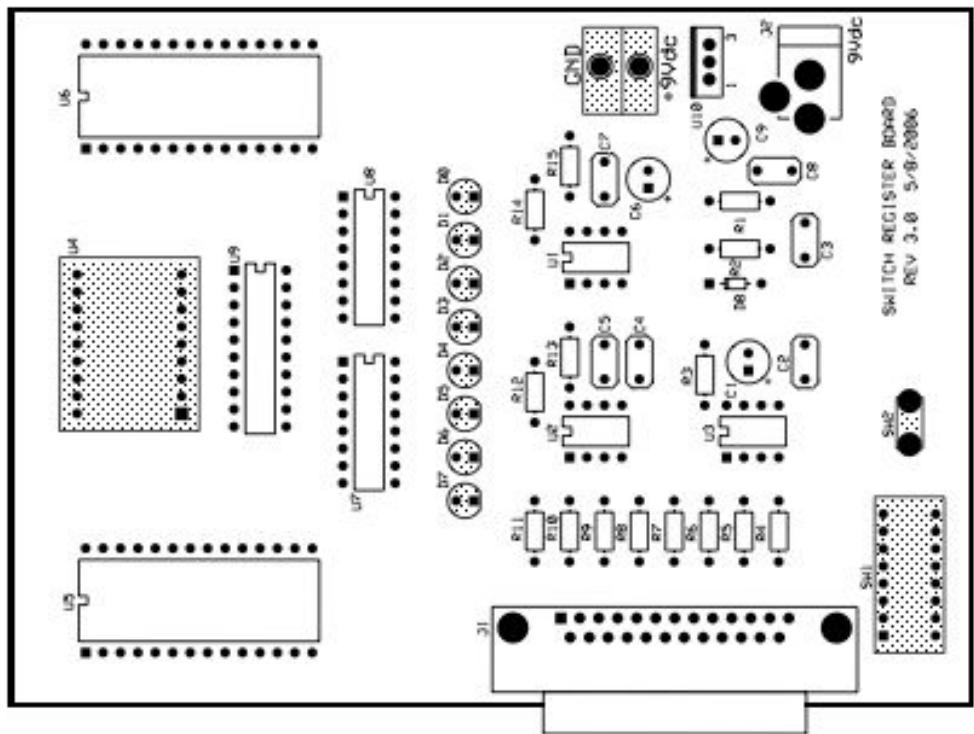
Assembly Instructions: 7-Segment Display, Switch, LEDs

The following directions refer to the entire SRB:



START ↓

() +9V/GND: Dual terminal block. Insert, making sure the openings for the wires face the outside of the board.



CONTINUE ↓

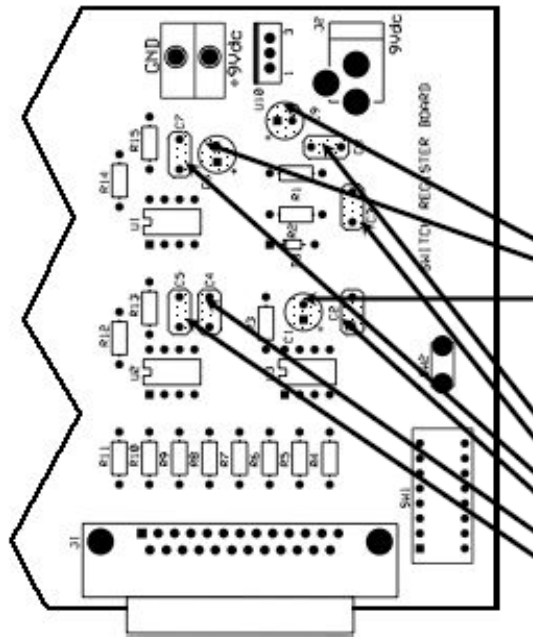
- () U4: Dual 7-segment display. Insert such that the decimal points are towards the bottom.
- () Mount the Momentary Contact Switch (SW2) flush against the SRB and solder.
- () Turn the board over and solder all components.

Caution: The eight LEDs you will install in the following steps can be easily damaged if you install them backwards. Be sure to line up the flat edge on the LED with the flat edge drawn on the board.

- Install and solder eight LEDs at:
- | | |
|---------|---------|
| () D0. | () D4. |
| () D1. | () D5. |
| () D2. | () D6. |
| () D3. | () D7. |

Assembly Instructions: Capacitors

The following directions refer to this section of the SRB:



START ↓

Note: When you install poly capacitors, do not push the insulated portion of the leads into the circuit board holes. This could make it difficult to solder the leads to the board.

Warning: When you install electrolytic capacitors, ALWAYS position the negative mark (shown by a black line) on the capacitor away from the positive (+) mark on the board.

Install three 1 μ F (105) electrolytic capacitors at:

- C9.
- C6.
- C1.

Install five 0.01 μ F (103) poly capacitors at:

- C8.
- C3.
- C7.
- C2.
- C4.
- C5.

Solder the leads to the board and cut off the excess lead lengths.

Assembly Instructions: Transistor and Connector

START ↓

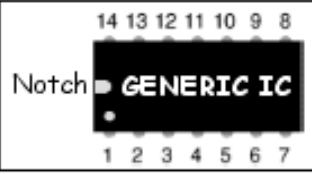
Insert and solder the transistor (U10) making sure that the metal backing faces away from the text at the bottom of the board.

Snap in and solder the 25-pin DB connector.

Assembly Instructions: Integrated Circuits

START ↓

Pin Numbering: The pins are numbered counter-clockwise around the IC (chip) starting to the left of the notch or dot. The diagram shows the numbering for a 14-pin IC, but the principle is the same for all sizes.



Chip Orientation: When installing the ICs into the sockets, be sure to line up the notch in the IC with the notch in the socket (which should be lined up with the notch on the PCB).

Bending IC Pins: To fit the ICs into the sockets, the pins must be bent perpendicular to the body. To bend the pins, press each side against a level surface (such as a table top) and apply gentle pressure. **Be careful, as the pins are easily broken.**

Bend the pins of the following ICs as described above and insert them into their respective sockets:

- U1: 555 timer.
- U2: 555 timer.
- U3: 555 timer.
- U5: ICM7228CIPL.
- U6: ICM7228CIPL.
- U7: 10k resistor 8-pack.
- U8: 1k resistor 8-pack.
- U9: 74LS244

This ends Part 1 assembly

Connection Instructions (for Part 2 of the lab)

START ↓

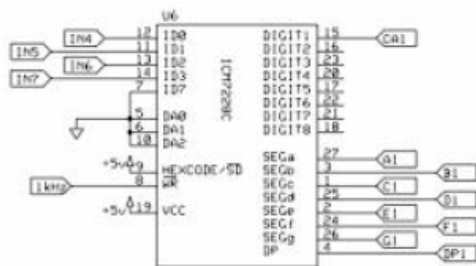
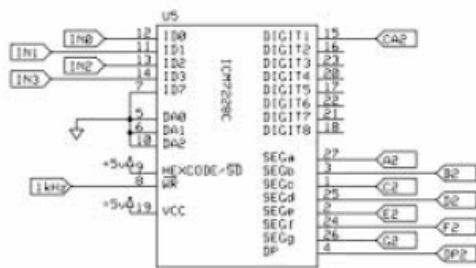
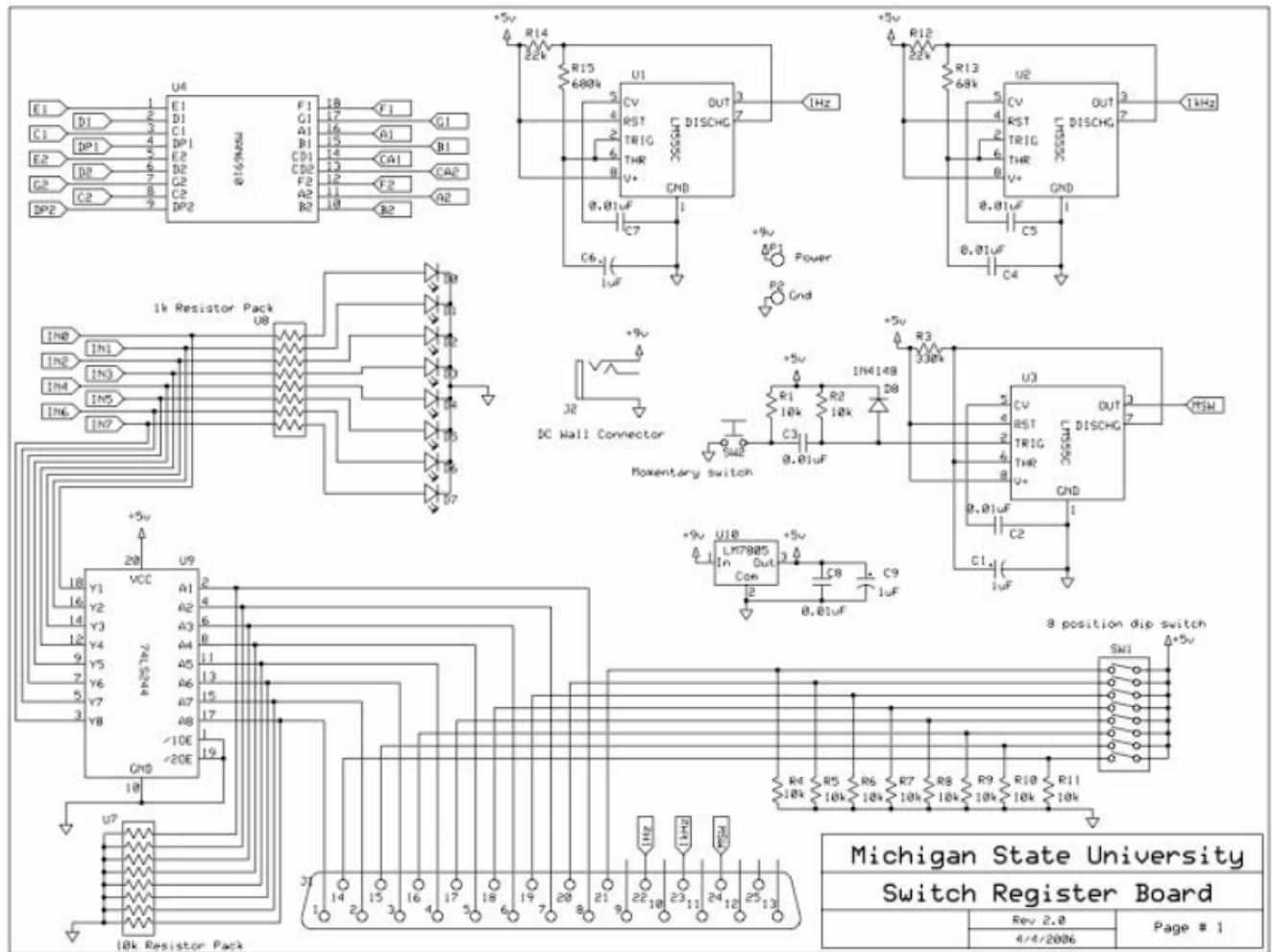
Connect the input pins to the output pins on the DB connector.

- Connect pin 1 to pin 14
- Connect pin 2 to pin 15
- Connect pin 3 to pin 16
- Connect pin 4 to pin 17
- Connect pin 5 to pin 18
- Connect pin 6 to pin 19
- Connect pin 7 to pin 20
- Connect pin 8 to pin 21

25-Pin DB Connector Pin List

Pin #	Function
1	Input (D7) MSB
2	Input (D6)
3	Input (D5)
4	Input (D4)
5	Input (D3)
6	Input (D2)
7	Input (D1)
8	Input (D0) LSB
9	Not Connected
10	Not Connected
11	Not Connected
12	Not Connected
13	Not Connected
14	Output (SW8)
15	Output (SW7)
16	Output (SW6)
17	Output (SW5)
18	Output (SW4)
19	Output (SW3)
20	Output (SW2)
21	Output (SW1)
22	1 Hz Clock
23	1 kHz Clock
24	MC Switch
25	Not Connected

Schematics



Fully Assembled SRB

