

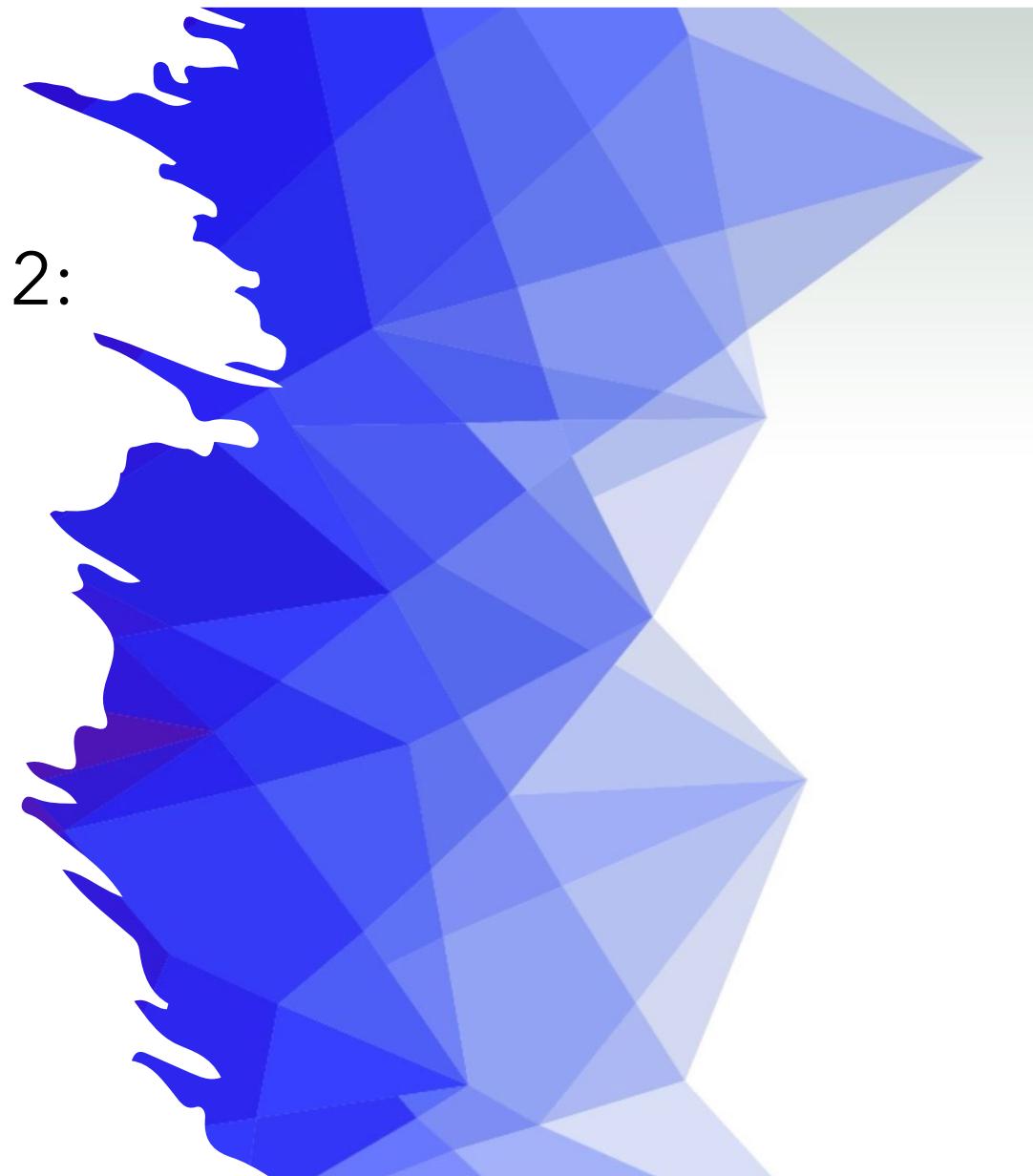
ECE3520 Lab Session 11&12:

Debouncing Switches and
Seven Segment Display

Two Digit Stopwatch

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Step1: Lab Preparation

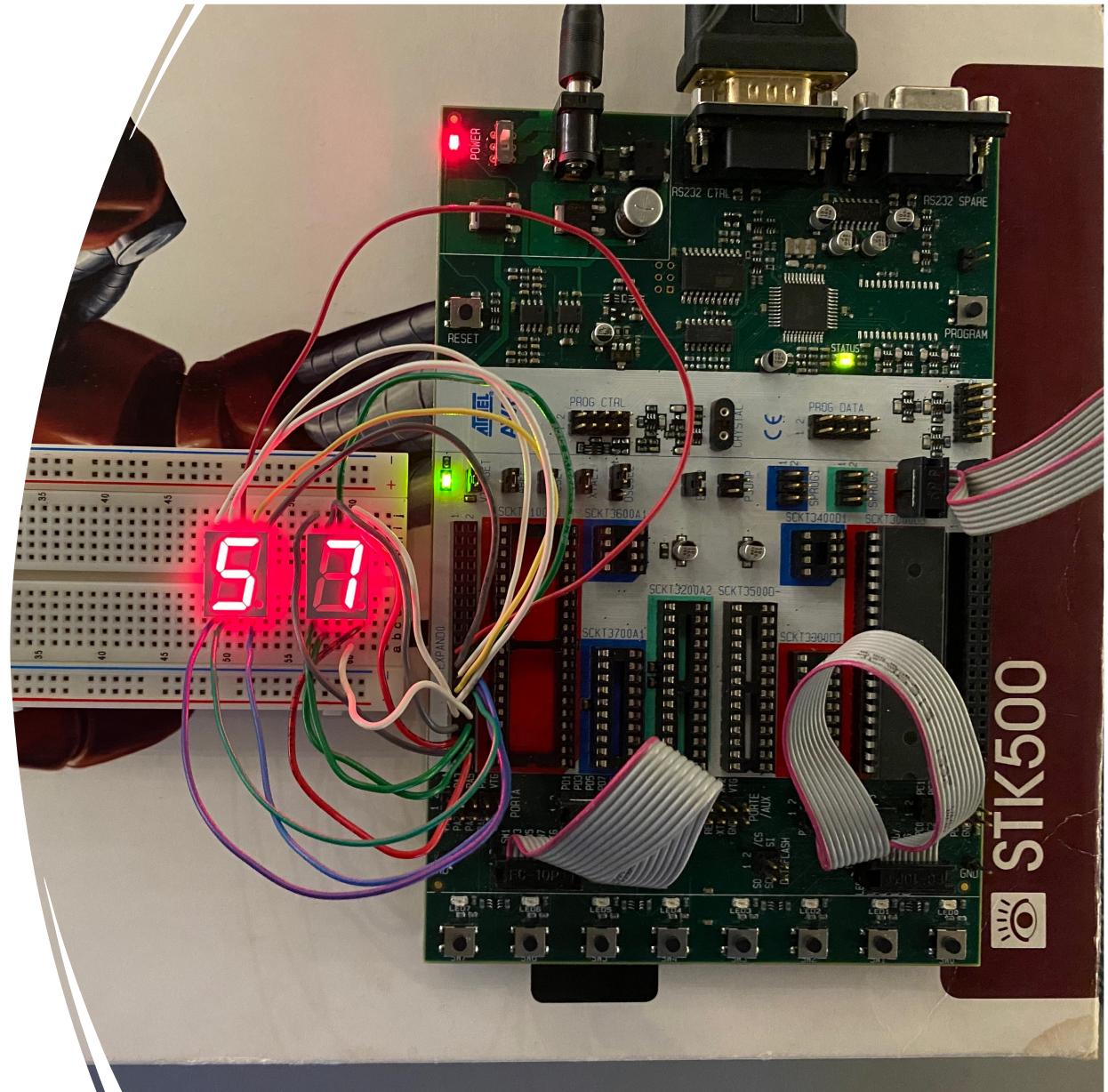
- Lab11: Write First C program for STK500
 - read debounced switch presses
 - display results to two digit seven-segment displays
 - connect to Port A (lower digit) and Port C (upper digit)
 - display the switch number to the lower digit
 - shift previous displayed value to the left (upper digit) when pressing a switch
 - For example, if you press 5, 2, 3 in sequence, your display will change from 00 to 05, 52, and 23 in sequence.

Step2: Lab Preparation

- Lab12: Write Second C program to Implement 2 Digit Stopwatch
 - show elapsed time to two digit seven-segment displays
 - connect to Port A (lower digit) and Port C (upper digit)
 - clear the display when Switch 0 is pressed
 - start stopwatch when pressing Switch 1
 - stop stopwatch when pressing Switch 2

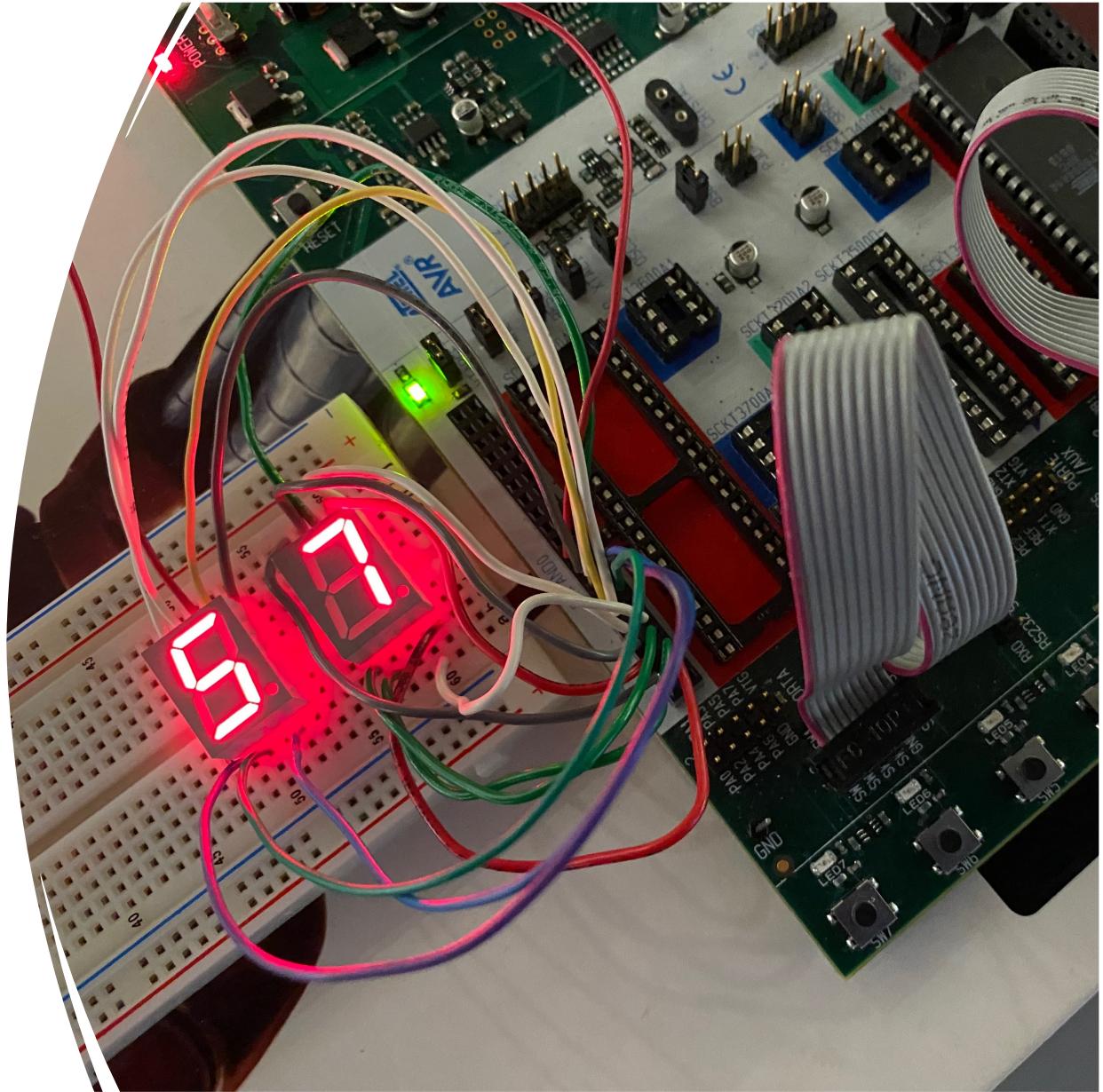
Step3: Configure Experiment

- Set up the STK500 board as in Experiment 4
- Write program for AT90S4414 using C language
- Download the Hex file onto board after compiling your C code



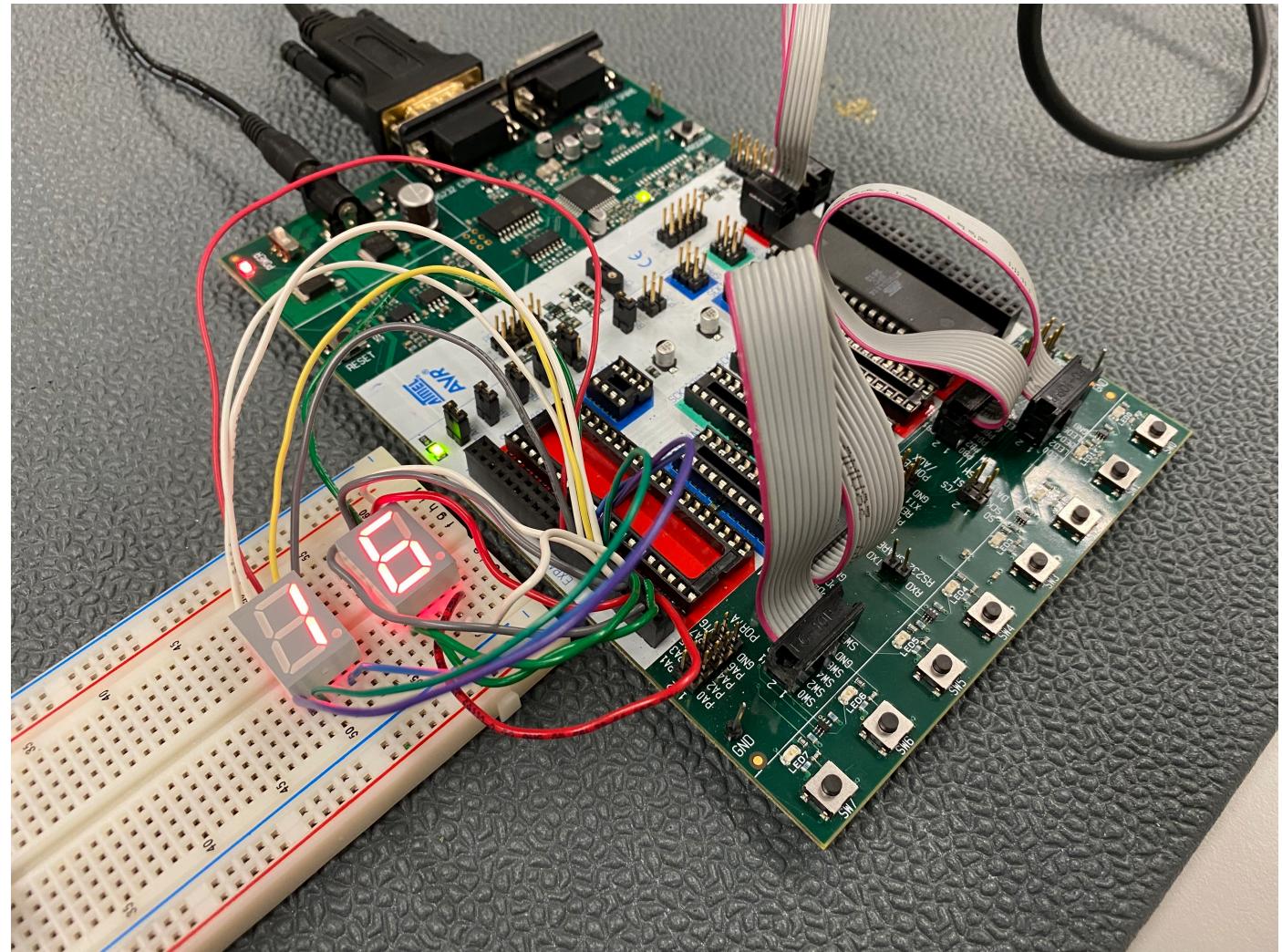
Step4: Test and Observe Debounced Switch Presses

- Test if your program works correctly



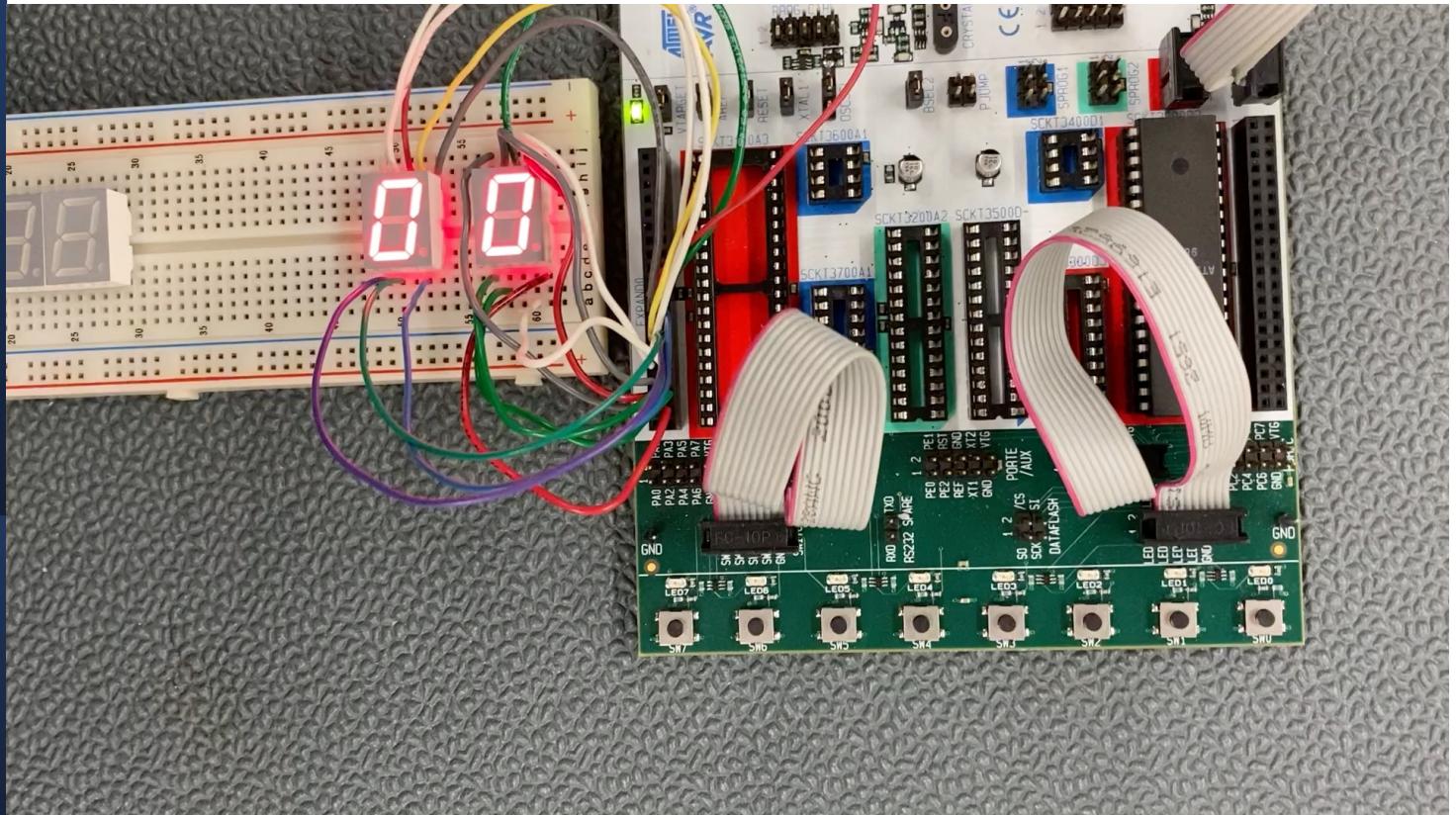
Step5: Test and Observe Two-Digit Stopwatch

- Test if your program works correctly



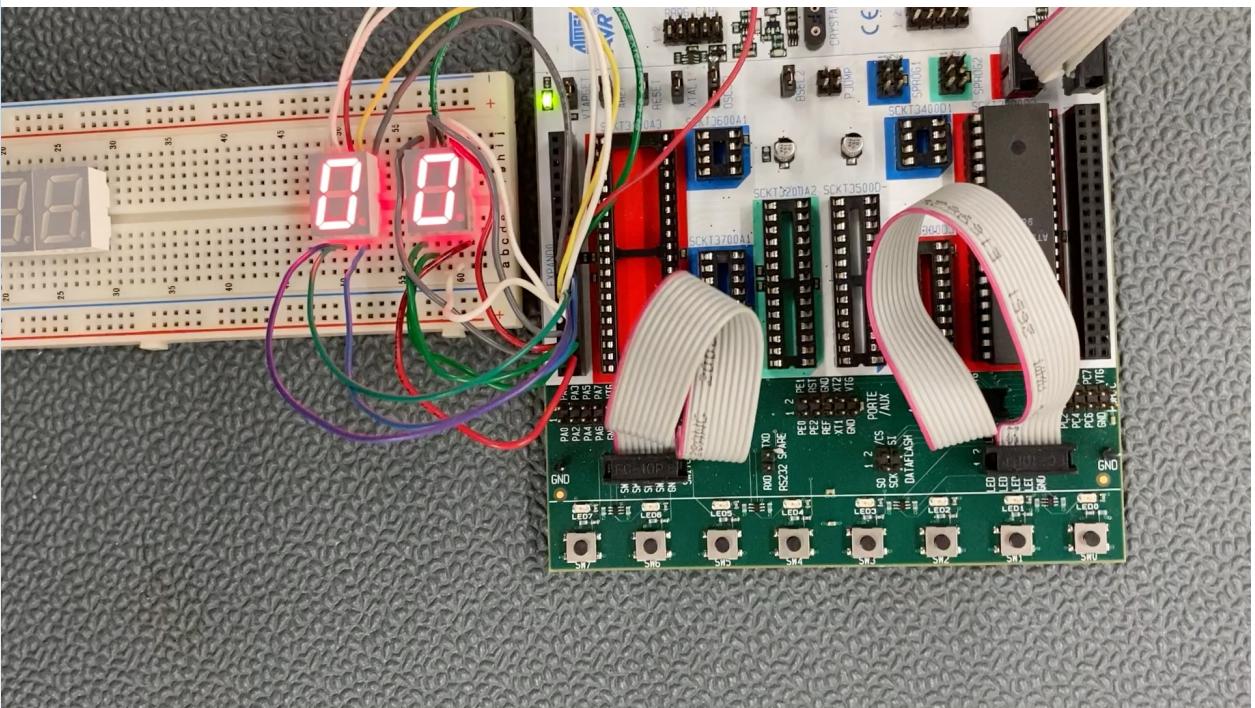
Step6: Demo Video for Shifting Value Debounced Switch Presses

- Please reference the video after you finished the experiment.



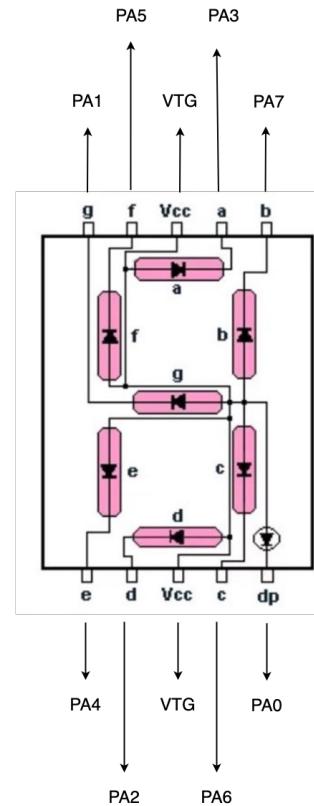
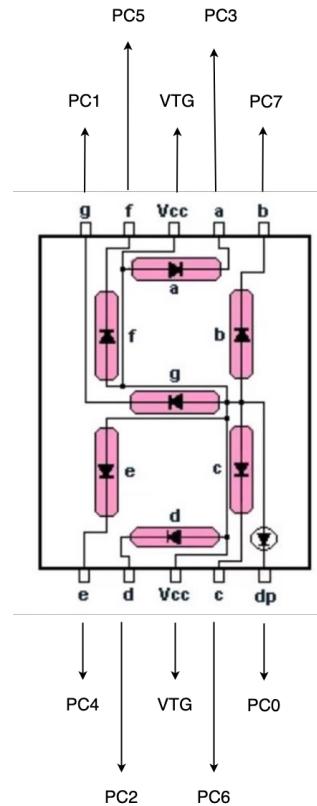
Step7: Demo Video for Stopwatch

- Please reference the video after you finished the experiment.



Schematics for Seven Segment Display

"0" – 1111 1100 -0xFC
 "1" – 1100 0000 -0xC0
 "2" – 1001 1110 -0x9E
 "3" – 1100 1110 -0xCE
 "4" – 1110 0010 -0xE2
 "5" – 0110 1110 -0x6E
 "6" – 0111 1110 -0x7E
 "7" – 1100 1000 -0xC8
 "8" – 1111 1110 -0xFE
 "9" – 1110 1110 -0xEE



Expansion Connector 0 Pinout

GND	1	■	2	GND
AUXIO	3	●	4	AUXO0
CT7	5	●	6	CT6
CT5	7	●	8	CT4
CT3	9	●	10	CT2
CT1	11	●	12	BSEL2
NC	13	●	14	REF
RST	15	●	16	PE2
PE1	17	●	18	PE0
GND	19	●	20	GND
VTG	21	●	22	VTG
PC7	23	●	24	PC6
PC5	25	●	26	PC4
PC3	27	●	28	PC2
PC1	29	●	30	PC0
PA7	31	●	32	PA6
PA5	33	●	34	PA4
PA3	35	●	36	PA2
PA1	37	●	38	PA0
GND	39	●	40	GND