NOW SERVING PROJECT

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Digital Electronics

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Introduction

In this project, students have the opportunity to draw together all of the concepts and skills that students have developed pertaining to the topic of asynchronous counter design. Students will design, simulate and build a Now Serving Display. Some of the skills students learned during this project were, working with breadboard, computer simulated circuits, multiplexer and AOI logic.

Design Brief

Client – Shoprite

Target Consumer – The people

Designer – Keyur Rana

Design Statement – To design, simulate and build a Now Serving Display

Constraints –

- Two output displays are Common Cathode seven segment display
- The two displays require a multiplexed design
- The one unit display is controlled by an asynchronous counter designed with a 74LS93 MSI counter IC. The PLD mode equivalent of the 74LS93 is the CNTR_413IN_AS
- The tens-unit display is controlled by an asynchronous counter designed with SSI logic gates
- Any additional logic may be used as needed to support the counter designs
- Add a design feature that holds the counter when it reaches 80.

Deliverables –

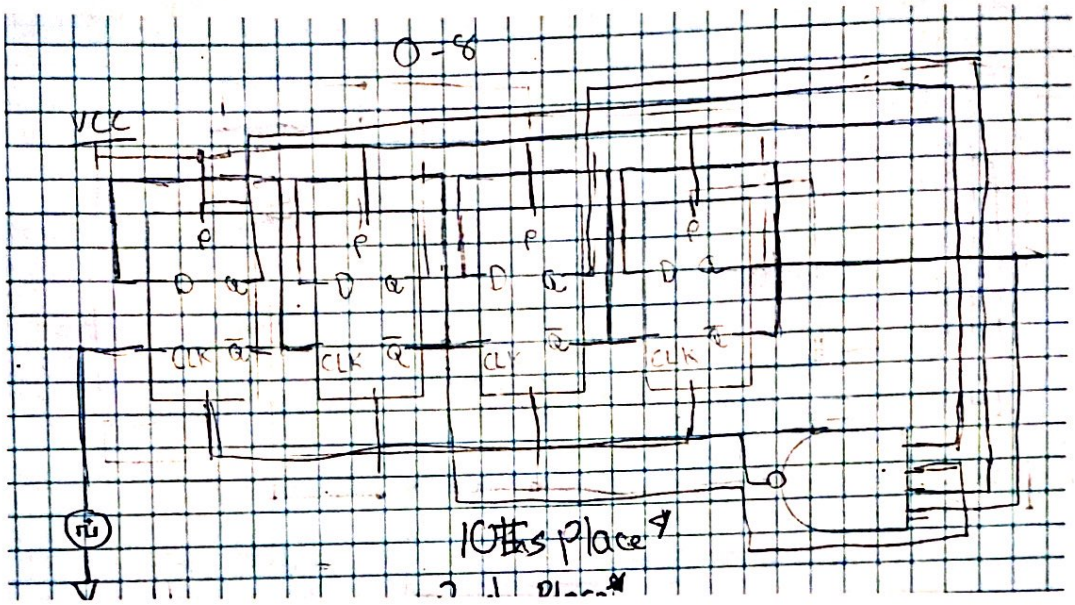
- AOI and NAND – NOR Logic
- Multisim

Materials

Description	Quantity	Part #
Multism	1	14.1
Wires	-	-
Breadboard	1	800949B-01
FPGA	1	CMOD S6
myDAQ	1	-

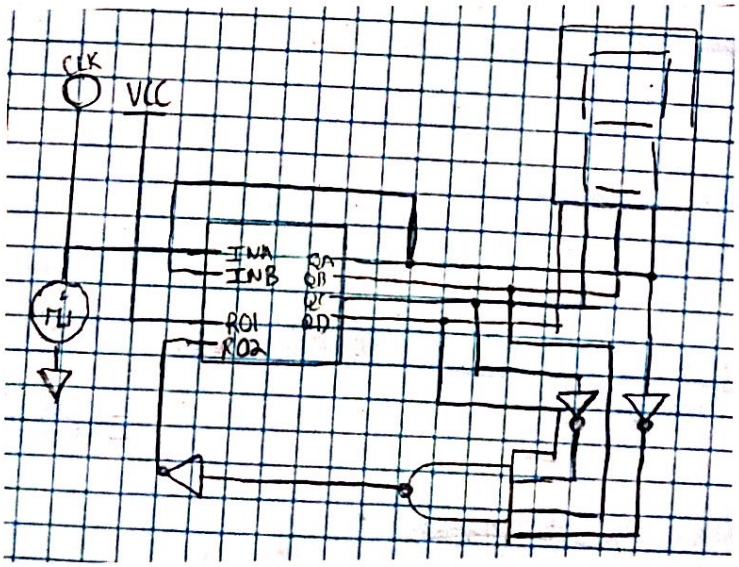
Procedure

1. Sketch by hand the circuit for One's unit display using SSI



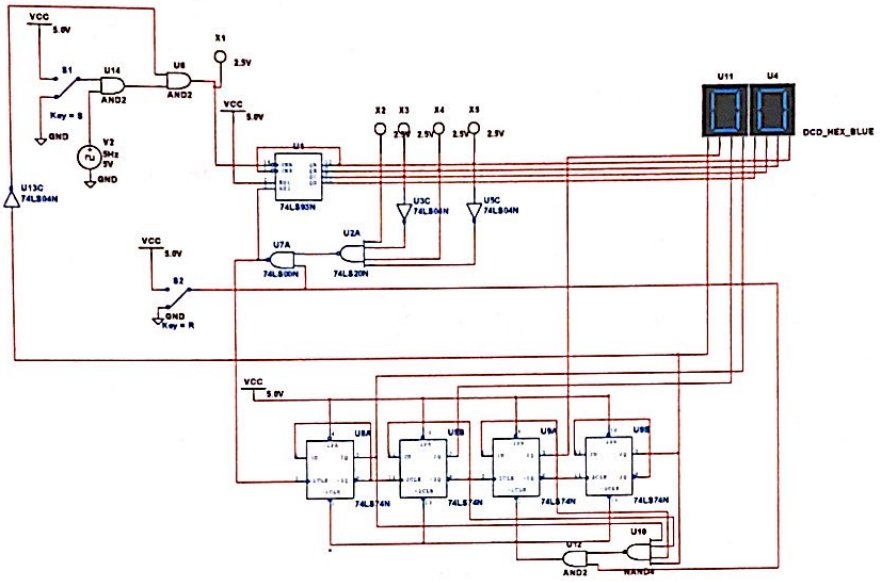
Circuit of the 10s place

2. Sketch by hand the circuit for Ten's unit display using MSI



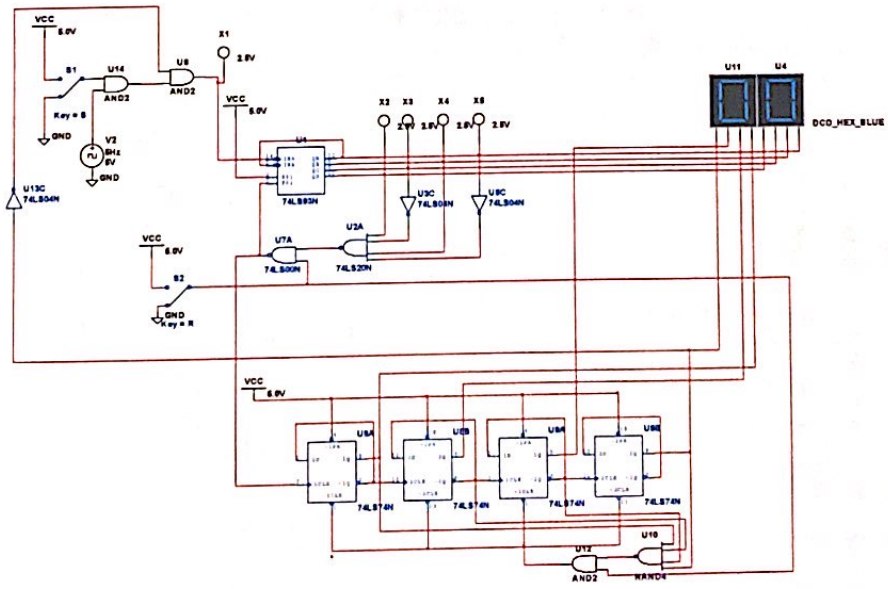
Circuit of the 1s place

3. Build the circuits on Multisim 14.1

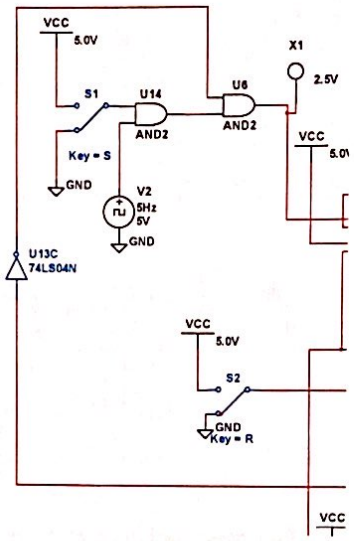


Fully constructed circuit on Multisim

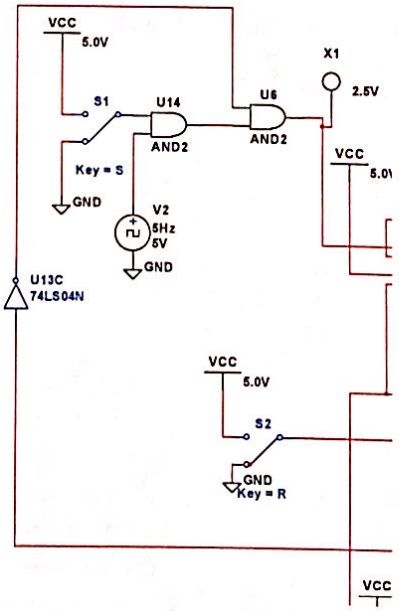
4. The circuit counts from 0-9 and toggles SSI when it hits 9.



5. Make sure the clock stops when it hits 80. To make this, you want the clock to stop when the SSI counter reaches 8.

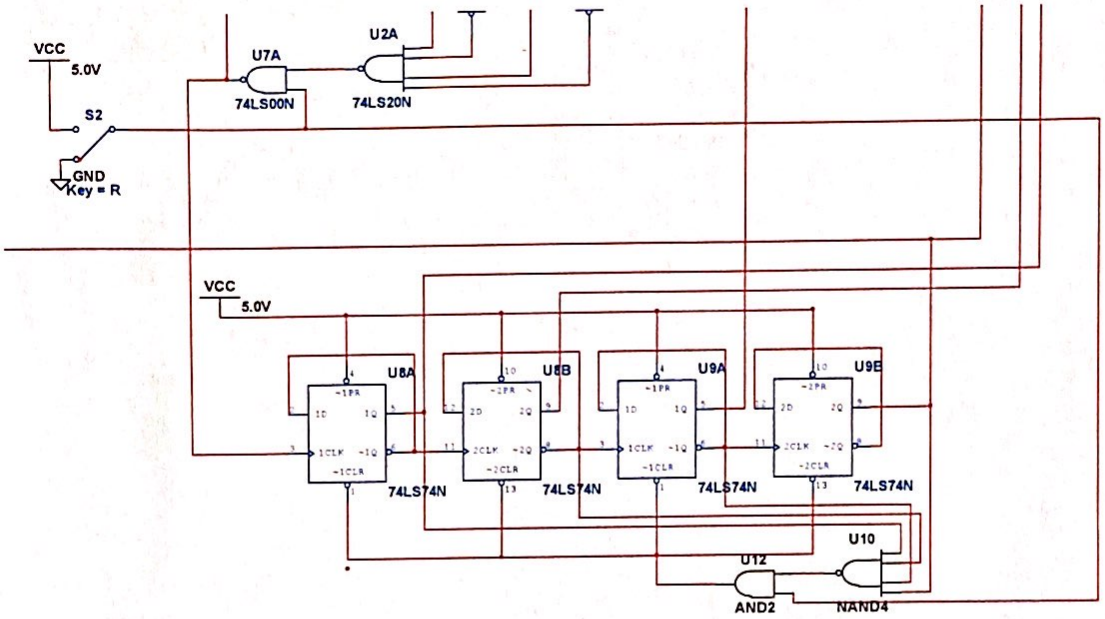


6. To suspend, make the flip flop stop.



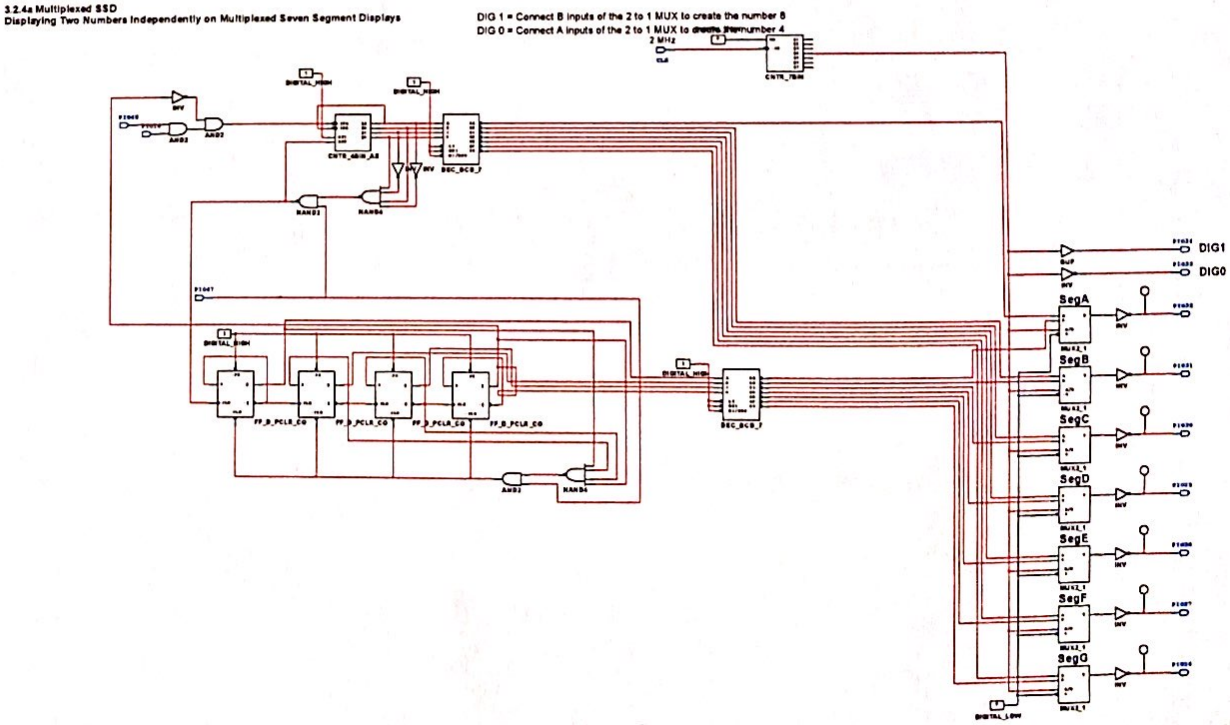
The circuit that makes the flip flops stop

7. To make the display clear, set reset to ground

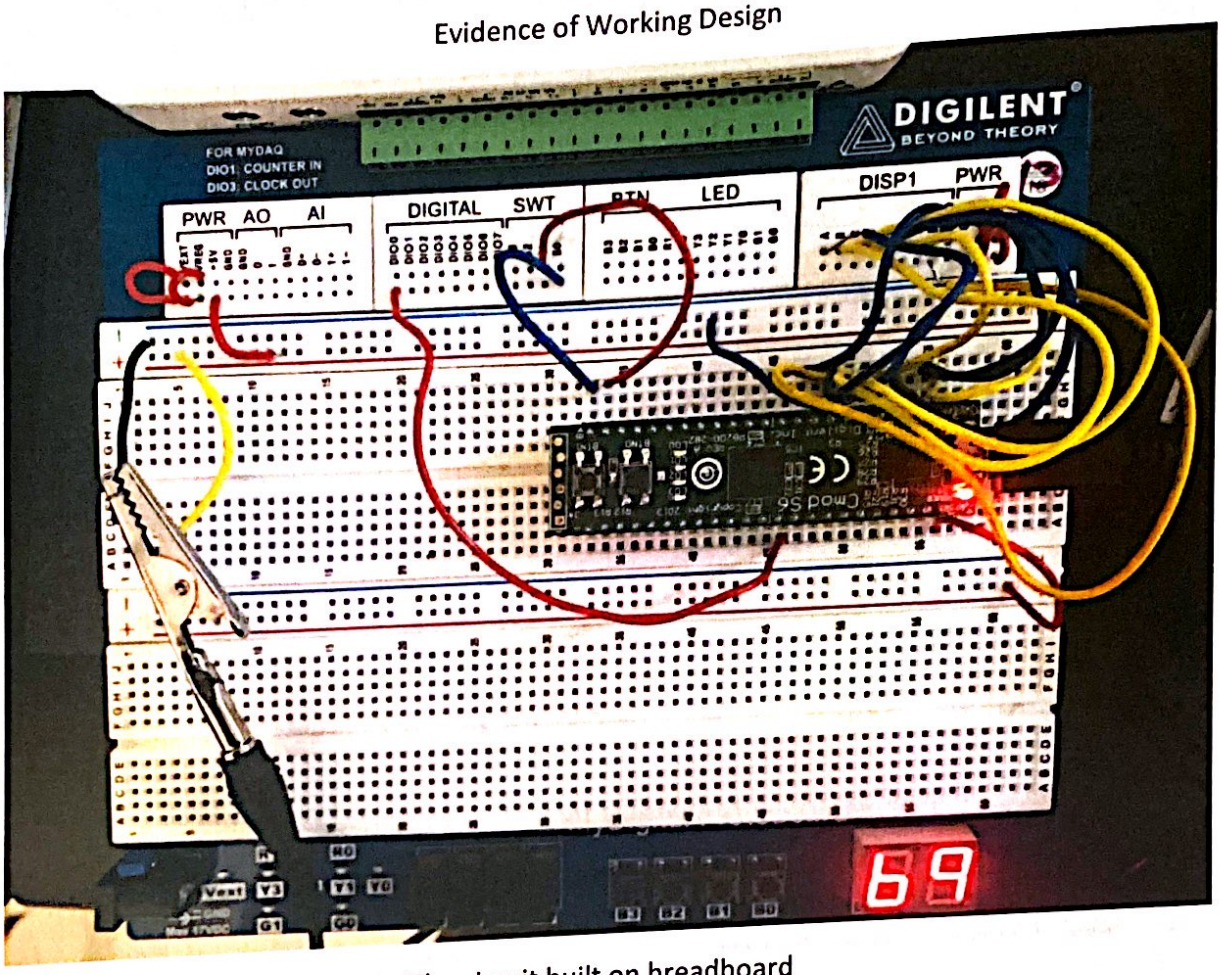


Part of the circuit responsible for making the display clear

8. Later, create a PLD programmable circuit hooked up with 7-segment display driver and 84. This will be sent to the CMOD S6 Chip.



Evidence of Working Design



The circuit built on breadboard