

# Practical 1 Instructions

Device Family: **MAX 10 (DA/DF/DC/SA/SC)**

Device: **10M02SCU169C8G**

Design, construct, and demonstrate the circuits that meets the following specifications. Use the switches, LEDs, and resistors needed to create the necessary inputs and outputs for your demonstration.

- Use only the following 74'xxx chips: ---
- Use of your PLD is --- (either allow or not allowed)
- Inputs: --- (activation-levels specified)
- Outputs: --- (activation-levels specified)
- DAD requirements will be specified

## Description:

Design a circuit to ...

1. Design a next state truth table for the described circuit **on your scratch paper**.
2. Design a voltage table showing only inputs and outputs for the described circuit **on your scratch paper**.
3. Design the entire circuit **on your scratch paper**.
4. **Draw all of the switch and LED circuit diagrams on your scratch paper.**
5. Design the entire circuit **in Quartus**.
6. Simulate the design in Quartus.
7. If necessary, build the circuit(s) with the specified 74'xxx chips.
8. If necessary, program the PLD (using the pof, **not** sof). Then remove power by disconnecting the two devices from your computer's USB ports.
9. Design the necessary switch and LED circuits on your breadboard.
  - A. On your scratch paper, make a legend indicating the **true positions** of the switch(es), as you did in lab.
  - B. On your scratch paper, make a legend for the LEDs to indicate **which** LEDs correspond to **which signals**, as you did in lab.
10. Connect the necessary switch and LED circuits to the PLD and/or 74'xxx chips. Restore the PLD's USB cable to your computer to power your circuits.
11. Verify **to yourself** that your circuit is functioning properly.
12. Archive this Quartus project and submit it as part of this practical, as described below.
13. Use **CamScanner** (or equivalent), as described below, to make a pdf file to submit as part of this practical.

## Demonstration:

1. You will show your Quartus simulation to match the **appropriate** table.
2. You will demonstrate the proper functioning of your circuit.

**You will have only ONE chance to demo your work.**

- If you think you are ready, read the question **again** to be sure that you completed **ALL** parts of this practical.
- Do **not** ask us for any feedback on your design.

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- Be prepared to show (and re-run) your simulation and to run your design, as instructed, by a PI or Dr. Schwartz.
- If ready prior to the end of the practical, use Zoom's chat to tell your PI that you are ready by sending **READY**.

You **MUST** complete the two file uploads (see below) **before the end** of your practical.

1. If you have not already done so, when there are **five minutes** remaining in your practical, you should stop working and start this process.
2. You must archive your Quartus design and upload it (in the next problem).
3. In the last problem, you must upload a **single pdf file** (use CamScanner or equivalent) containing a **clear** picture of your breadboard that shows your circuit and also contains clear pictures of your **scratch paper**, showing the **next state truth table**, the voltage table, any **equations** that were derived, the switch and LED **legends**, and the **circuit diagram**.
4. Failure to upload these files before the end of the practical will result in a grade of zero.