Lab 3 – Interfacing Keypad

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Grading Rubrics and Schedule

- **Pre-lab assignment (10 points):** Due on Oct. 15, 2018
- **In-lab assignment (90 points):**
  - **Basic requirement:** 75 points
  - **Something cool:** 15 points
  - **Dates:**
    - **Oct. 15, 2018**
    - **Oct. 22, 2018**
    - **Oct. 29, 2018**
- **There is NO post-lab assignment for this lab!**

Basic requirement

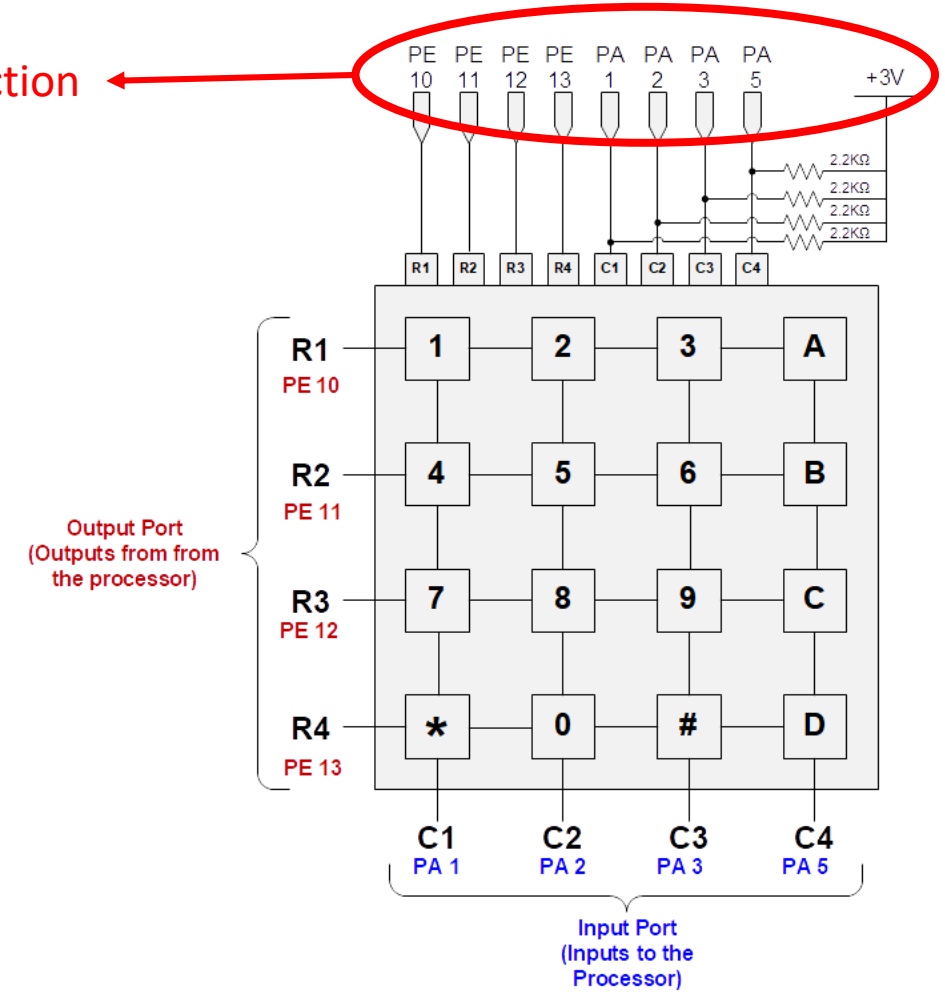
- Use polling method to scan keypad and display the inputs on LCD **(75 points)**:
  - When a key is pressed, its value is then displayed on the LCD. The LCD should be able to display up to six digits.
  - The basic requirement is to display only the numerical digits from the keypad. However, you are free to use other keys to do something cool and different.

Something cool

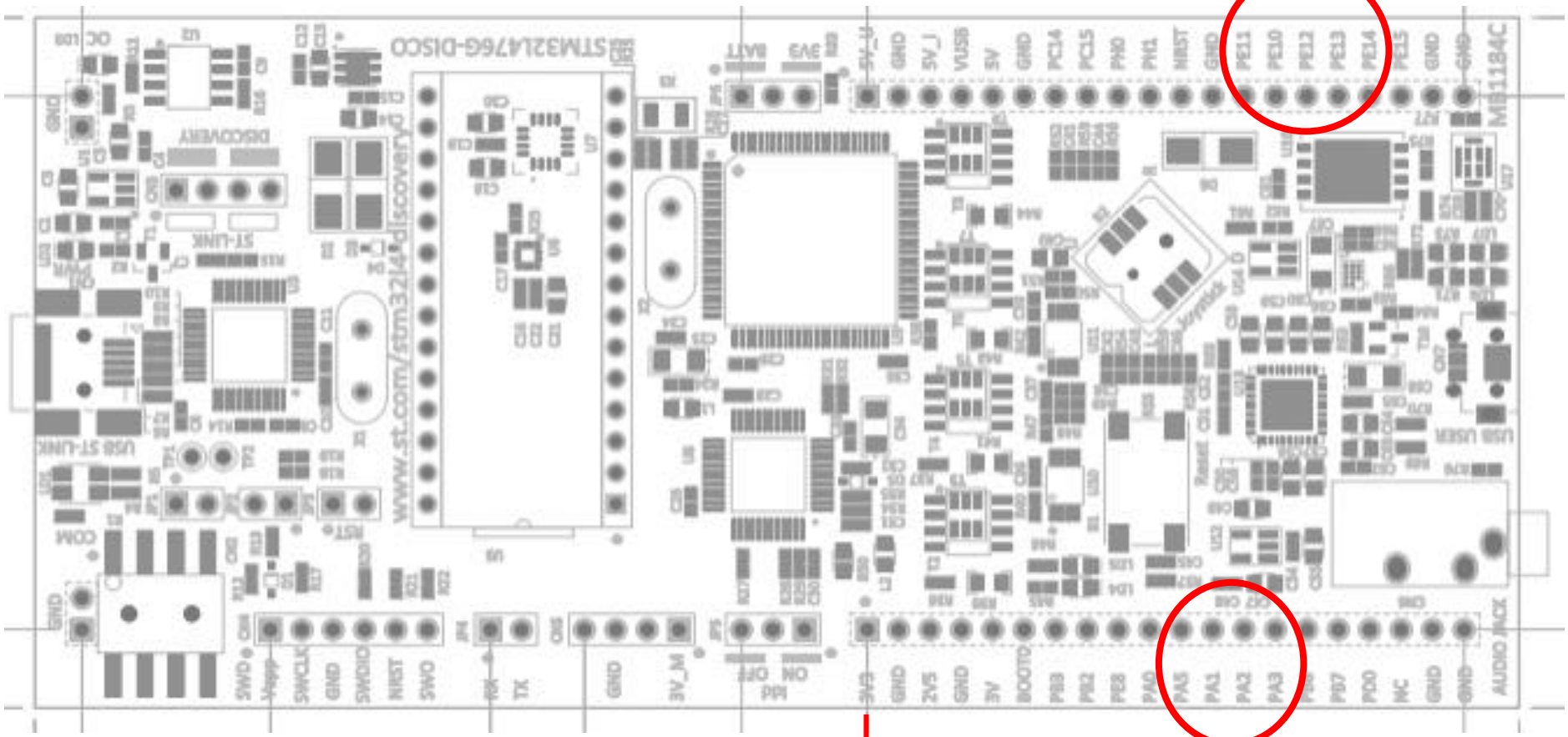
- **These are some examples of something cool:**
  - When a key is pressed for a long time, generate a periodical input with an interval of 2 seconds.
  - Use the “*” key to delete the previous input. Pressing “*” key again keeps deleting the previous input.
  - Use the “#” key to repeat the previous inputs.
  - Detect and recognize if multiple keys are pressed simultaneously.
  - Use correct software debouncing
  - Etc.
- **NOTE:** If you want to get 100 points in this lab, you will have to do something cool!

Physical Connection

- Use a breadboard and four 2.2k resistors in order to connect the keypad with the development kit.



Physical Connection



Programming

- A startup Keil uVision project is available online. It contains the following files: ***main.c***, ***LCD.c***, and ***keypad.c***.
- Extract the zip file and open **Lab03.uvprojx** to start working (no need to set up anything in the project).
- In order to complete the basic lab requirement, you only have to write code in the ***keypad.c*** file.
- More specifically, you should complete two methods:
  - **Keypad_Init() (10 points)**:
    - This is based on this and previous pre-labs (complete the missing masks).
  - **Keypad_Scan() (65 points)**:
    - You should complete this method by following the scanning algorithm found on **Figure 14-26** in the textbook.

Programming

- **Keypad_Scan()**:
  - It is mostly empty!
  - Student should follow the instructions in the comments to complete the assignment.
  - Every week, I will disclose more information to help students complete this method.

- **Academic Integrity:**
  - Students are allowed to discuss the assignment.
  - However, every student should work individually!
  - Keypad_Scan() is mostly empty. There is no way two students can write the same identical code without copying!
  - Any student found with identical code will be graded **F** for this lab!

Office Hours

- Office hours will be **ONLY** on **Wednesdays from 2pm to 4pm**!
- If you need more time to finish the assignment, do not miss classes and/or office hours!

- **No additional office hours will be offered!**