Lab 1 – Part 1: Introduction to the Programming Environment

Instructor:
Dr. Carl Latino
carl.latino@okstate.edu

Graduate Teaching Assistant:
Francisco E. Fernandes Jr.
feferna@okstate.edu

School of Electrical and Computer Engineering
Oklahoma State University
Fall 2019

Office Hours

- **Office Hours with Dr. Latino:**
  - Mondays and Fridays from 9:00 A.M. to 11:00 A.M. at GAB 209.
- **Office Hours with the T.A.:**
  - Mondays from 5:30 P.M. to 6:30 P.M. at ENDV360.
  - Wednesdays from 10:00 A.M. to 12:00 P.M. at ENDV360.
- For appointments at other times please contact the instructor or TA.

ENDEAVOR General Safety

ENDEAVOR General Safety

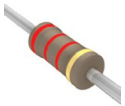
Lab Overview

- **Lab 1 is a two weeks lab:**
  - **Week 1 (August 26, 2019):**
    - Get familiar with the STM32 Cube IDE development environment
  - **Week 2 (September 09, 2019):**
    - Write a small assembly program.
    - Learn how to debug your program.

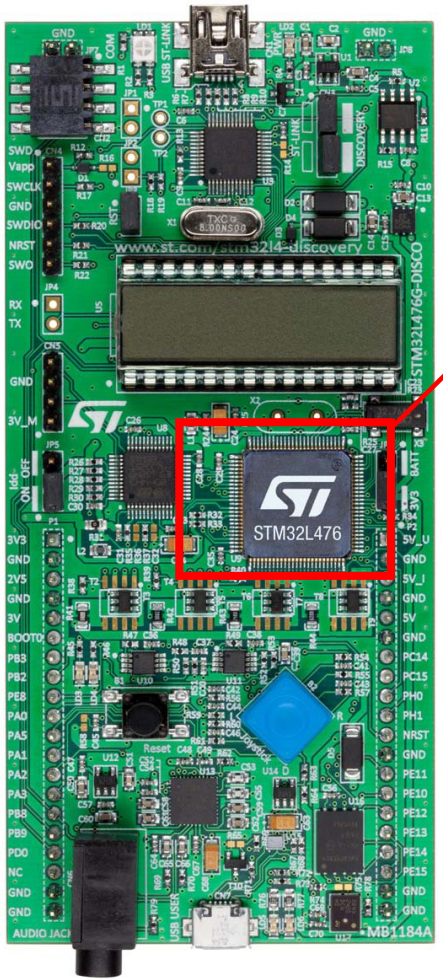
Today's Goals

- Get familiar with the STM32 Cube IDE development environment:
  - **Create an Assembly project for STM32L4 discovery kit.**
  - **Compile and send the project to the STM32L4 discovery kit.**

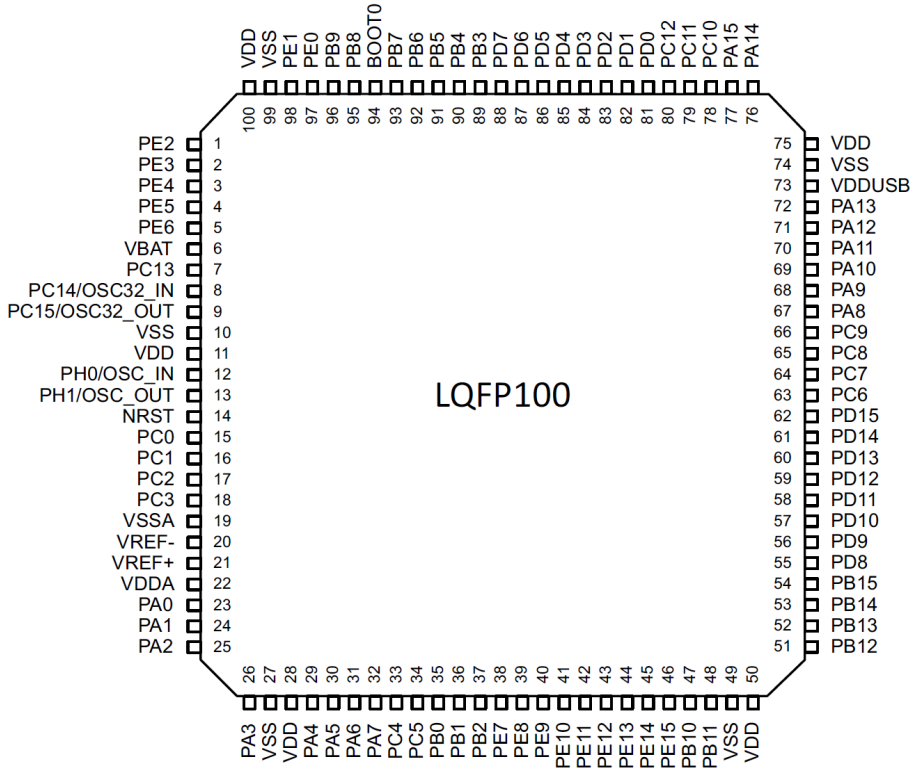
Basic List of Lab Materials

	Description	Where to buy	Price
	Part#: STM32L476G-DISCO	Mouser	$25.00
	One USB cable (A-Male to Mini-B)	Amazon	$4.80
	Two solderless breadboards	Amazon	$9.99
	One 4 x 4 matrix keypad	Amazon	$9.99
	One 28BYJ-48 5v stepper motor + ULN2003 driver board	Amazon	$13.99
	Through hole 2.2 kOhms resistors	Amazon	$5.79
		Total:	**$69.56**

Introduction to the Discovery Kit

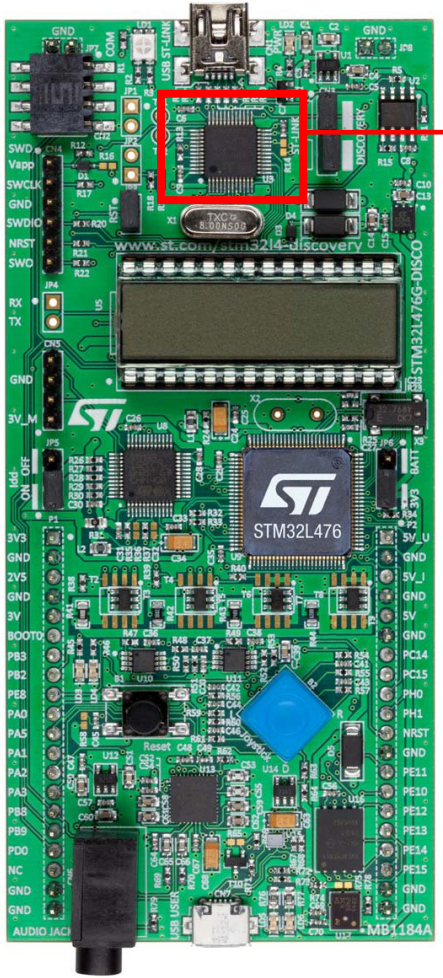


STM32L476G



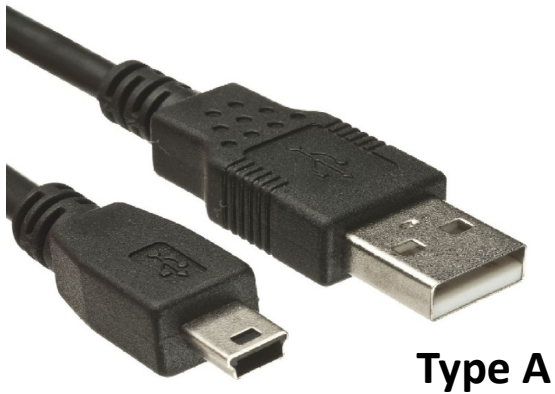
All pins are only 5V tolerant. Do not burn it!

Introduction to the Discovery Kit



ST-Link / V2-1

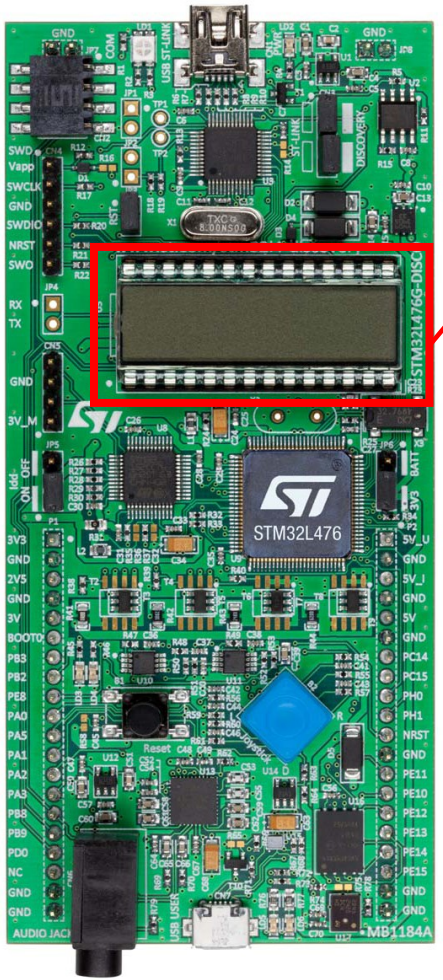
- **For programming and debugging**
- **Implemented by using an ARM Cortex-M3**



Type A

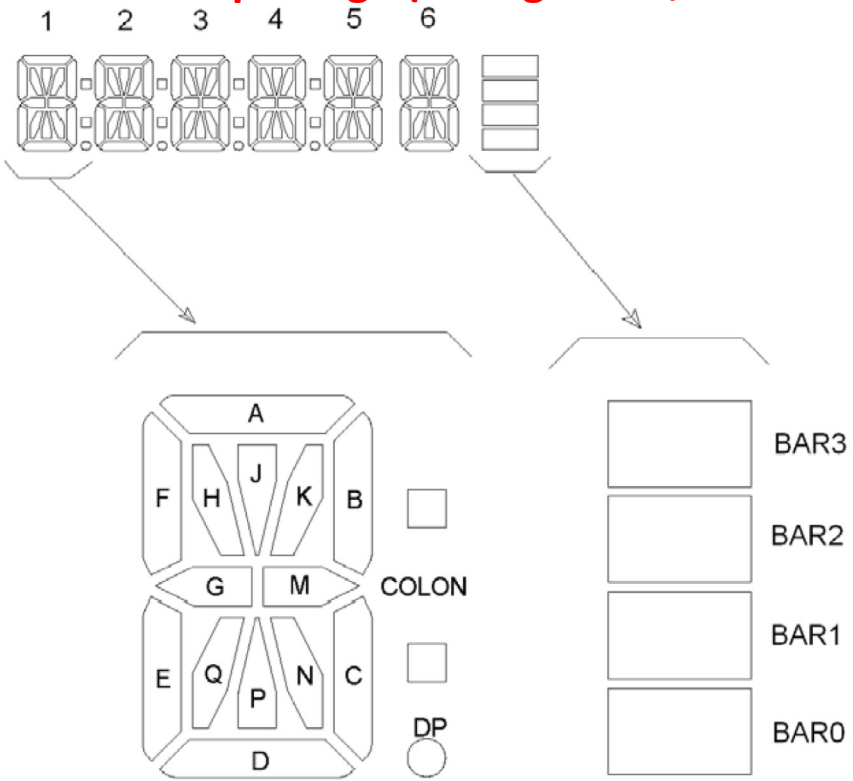
Mini B

Introduction to the Discovery Kit

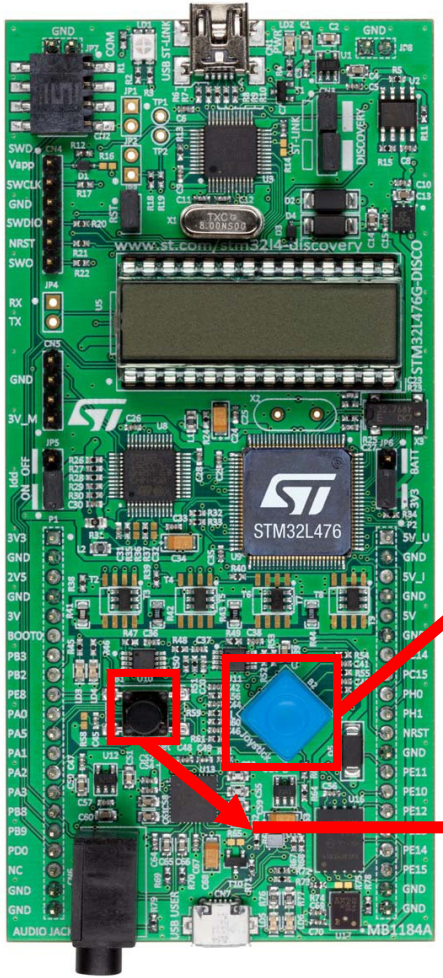


LCD

- **96 segments/pixels**
- **DIP 28 package (24 segments, 4 commons)**



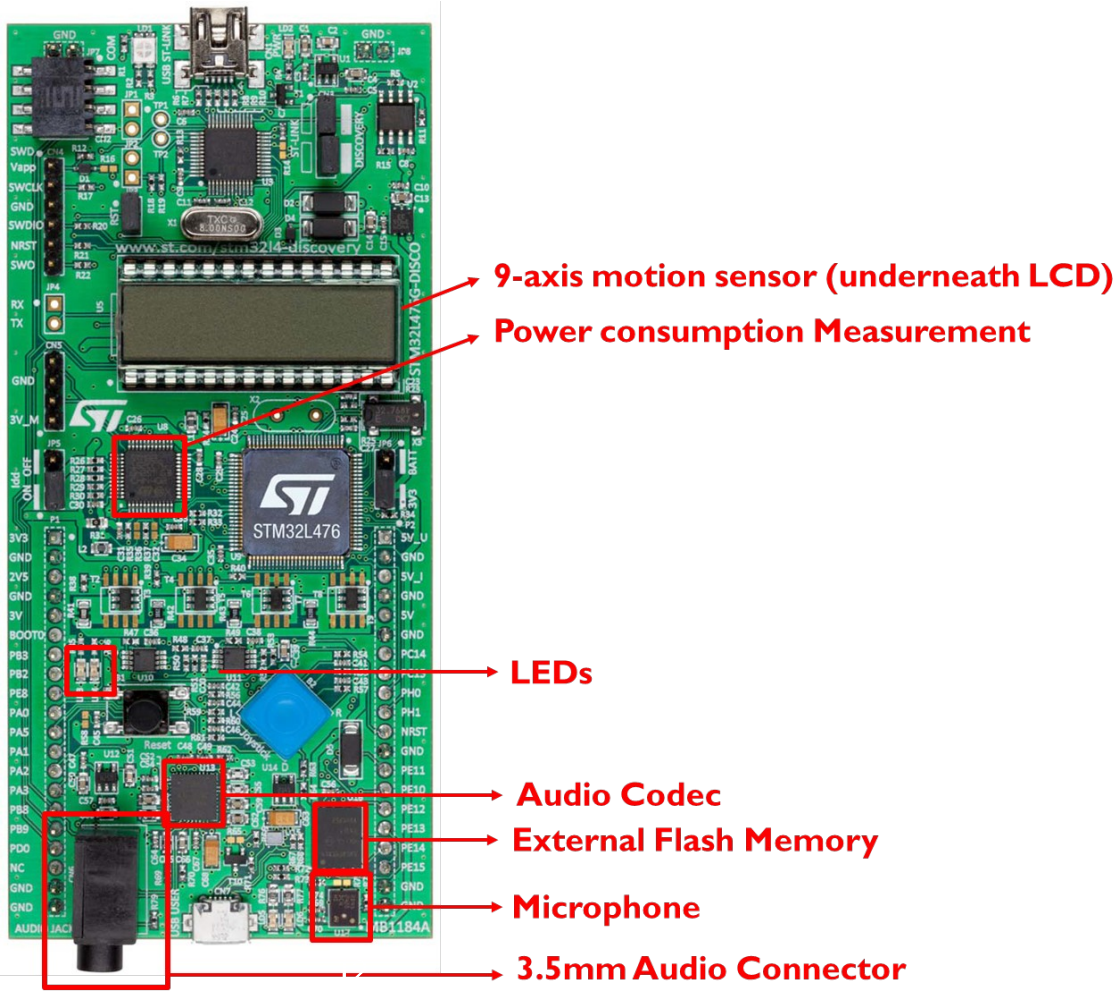
Introduction to the Discovery Kit



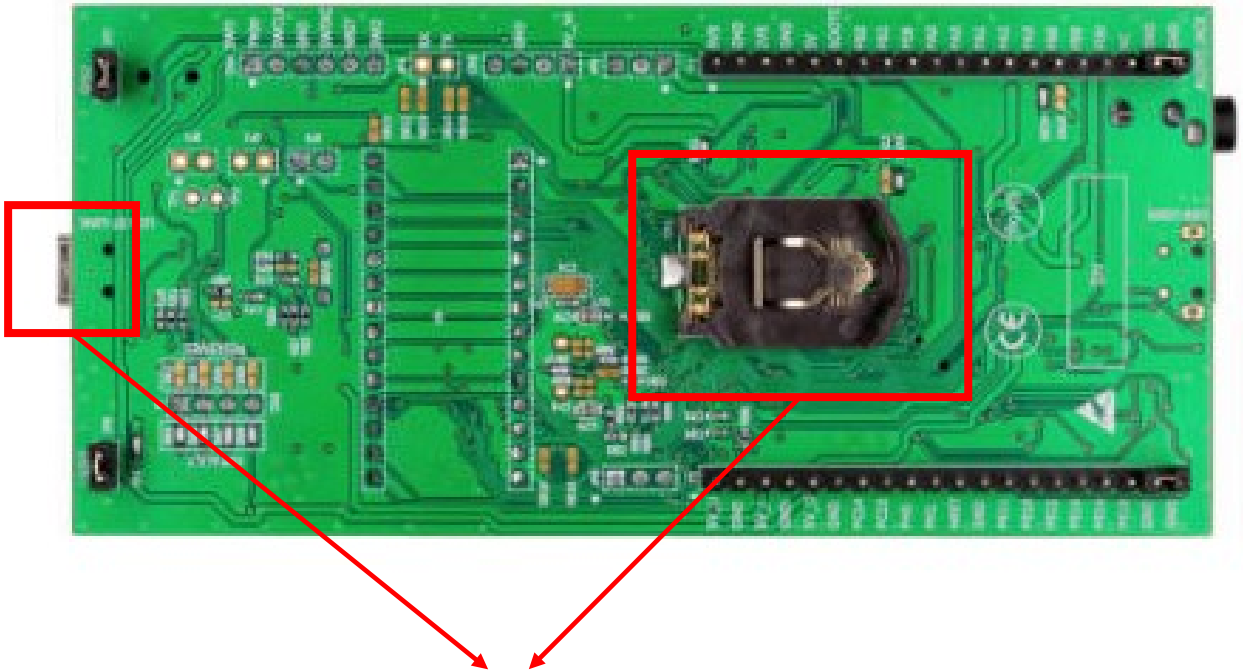
Joystick (up, down, left, right, center)

Pushbutton (reset)

Introduction to the Discovery Kit



Introduction to the Discovery Kit



Powered either by

- **USB**
- **3V Coin Battery (CR2032)**

Lab Assignment

- **Complete the ENDEAVOR Safety Training:**
  - Add the following course to your **Canvas**:
    - **CEAT ENDEAVOR and NCL**
    - https://canvas.okstate.edu/enroll/KEBPFG
  - Complete the **Safety Video and Quiz** following the instructions in the link below:
    - https://canvas.okstate.edu/courses/50825/pages/endeavor-safety-orientation-and-quiz
  - Bring your **Safety Card NEXT CLASS** and sign the **Safety Sheet**!

Lab Assignment

1) Download the zip-file containing the sample codes for this lab from **Canvas**.
2) Extract the sample codes into your computer. You need the following files in your computer:
    1) **main.s**;
    2) **setup_hardware.s**;
    3) **stm32l476xx_constants.s**.
3) Follow ***Tutorial 2 - Creating a New Project from Scratch*** found on **Canvas** to create an Assembly project in the STM32 Cube IDE from scratch.
4) Follow ***Tutorial 3 - Compiling and Deploying*** found on **Canvas** to compile and send the code to the STM32L4 discovery kit. You will need to copy all three files from before in order to compile the project correctly.
5) Try to create the same project a couple of times in order to get used to the software.
6) **Once you are feeling confident, call a T.A., and show him the process of creating a project.**

Note 1: Do not leave class without showing the process of creating a project to a T.A.!

Note 2: You do not need to write any code for this lab! All needed code are provided!