

How to use the Zduino LEE Module with the Trainer Board

Note: If you are going to use the Arduino/Zduino module for this distance training workshop, please download the Arduino software:

1. Connections and settings of Zduino LEE Module with the Trainer Board Rev2.

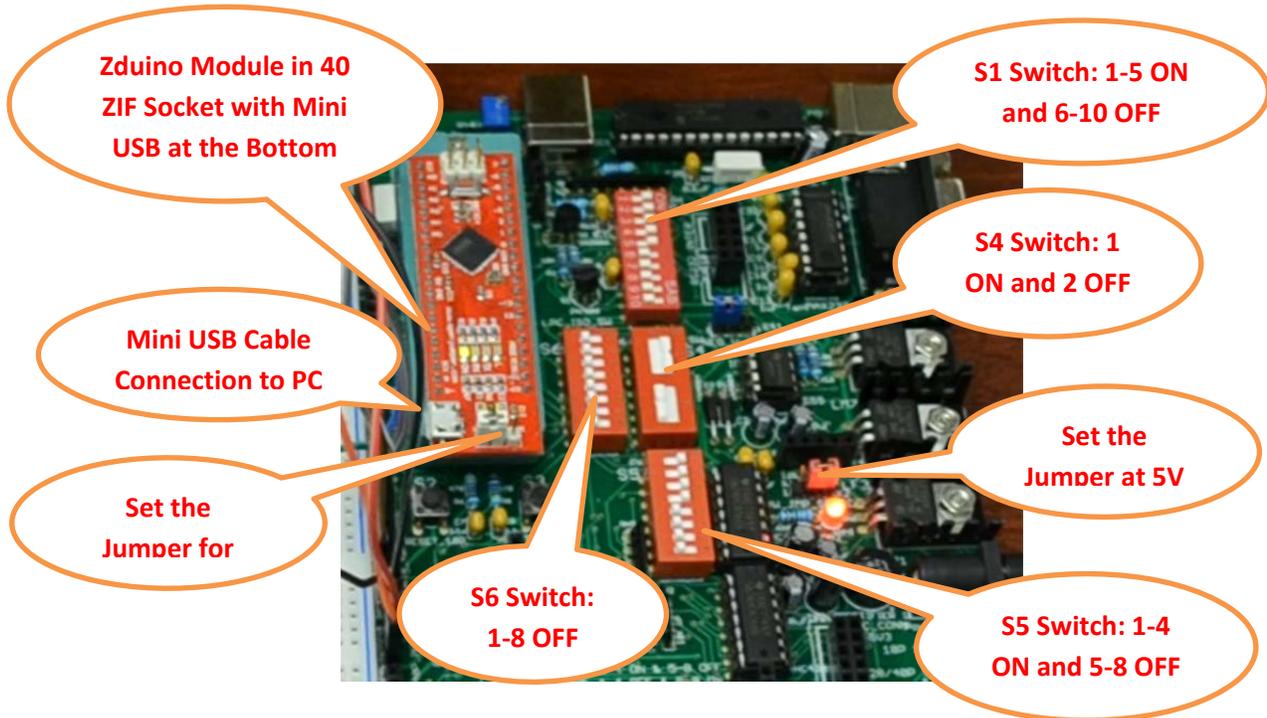


Figure 1. Zduino Module with Rev2 Trainer Board

2. Go to <http://arduino.cc/en/Main/Software> and download Arduino 1.0.5 onto your PC. You can either run the “Window Installer” directly (recommended) or download the “Windows (ZIP file)”. The default file location is C:/Program Files (X86)/Arduino additionally a folder named “Arduino” will be created under the (user) Documents folder when installing the software. This is the folder and location of the Arduino “Sketchbook” files and location where user- created files are stored. The “Example” files are stored in “Program Files” folder in the Arduino folder.
3. Alternatively you may unzip (extract) the file to a location of your choice after completion of the download process. Locate the “Arduino.exe” installation files and double-click to run the setup application.
4. After the Arduino software has been installed you are may run Arduino application (i.e., Application file type) in the folder, Arduino-1.0.5 on your PC. Click on *Arduino* application and run, the Arduino programming window will appear as shown in Figure 2.

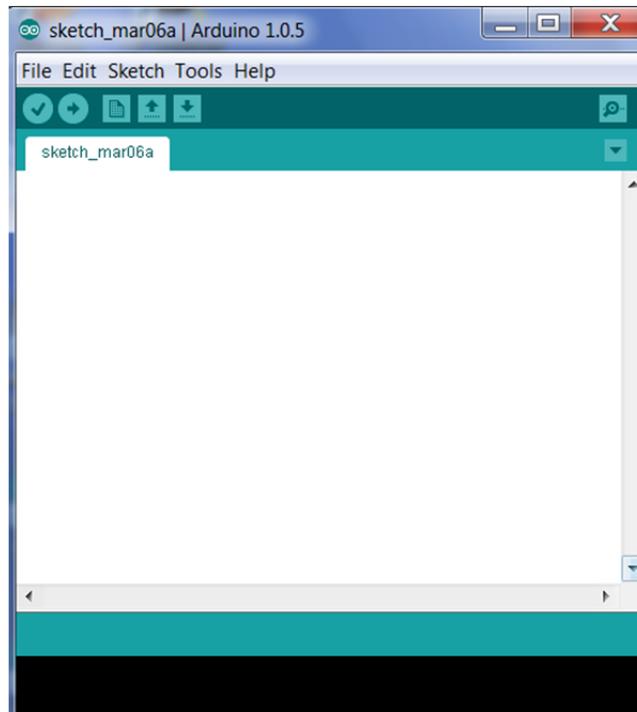


Figure 2. Arduino Window

5. Once the software driver of the Arduino board is installed, the PC should automatically recognize the Arduino board and install the appropriate driver. Otherwise, you may have to manually install the Arduino driver using the following steps:
 - (a) Plug the Arduino to a USB port on the computer; Windows will try to install drivers if it fails. You may close any error messages.
 - (b) Next, you will need go into the *Device Manager* through file search on PC, Under "*Other Devices*" there will be a device labeled "Arduino Micro. "
6. Right click on that device label.
7. Click on *update driver software*.
8. Click on "*Browse my computer*" for driver software.
9. Browse to where you extracted the Arduino files and they are in the *driver* folder, in this example, it is "C:\Users\Administrator\Desktop\arduino-1.0.5-windows\arduino-1.0.5\drivers". Figure 3 shows a similar path for Arduino-1.0.5.
10. Click *next* on the right lower corner of the window (if any warnings messages, just "*allow*" or continue "*install anyway*").

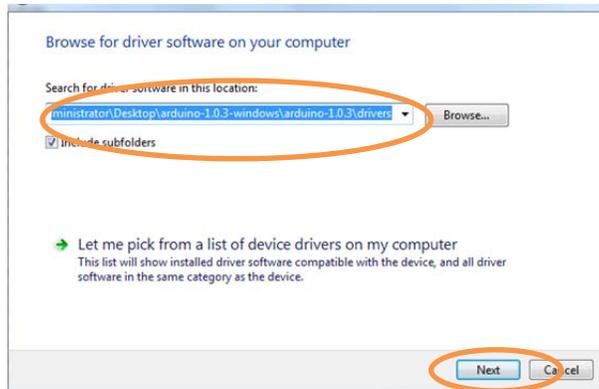


Figure 3. Driver Software Link for Arduino-1.0.5

11. You need to make sure the right software driver is installed for the Arduino board you intend to use. If the installation is correct, you can find a device labeled *Arduino Micro or Uno* in *Device Manager* under *Port*. Your COM port number will be displayed next to your device, i.e., Arduino Uno. In this case, your COM port number is 4. See Figure 4. On other computers, the COM port number may be different.

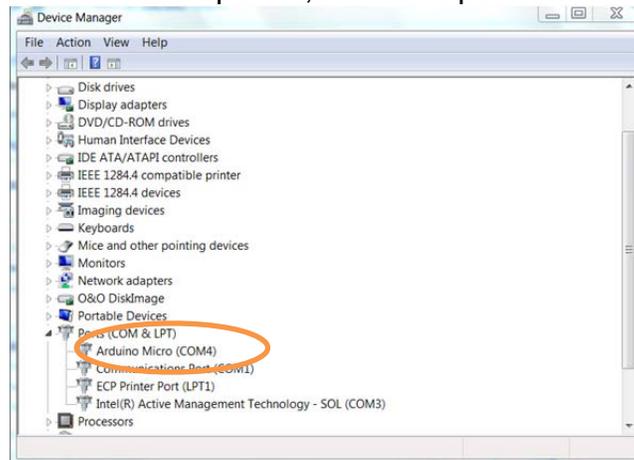


Figure 4. Device Driver Window

12. The installation has to be repeated, if you can't find *Arduino Uno* in *Device Manager* under *Port*. In this case, you need to point to the same folder "C:\Users\Administrator\Desktop\arduino-1.0.5-windows\arduino-1.0.5\drivers" and repeat the installation process starting from Step 5.

13. Run the LED-Demo Program:

- (1) Download the LED_Demo.ino from www.ucdistancetraining.org, then select **Pre Workshop Preparations** or you can download it from www.ucdistancetraining.odu.edu
- (2) Connect 8 jumper wires from X12 to X6 on the trainer board Rev2
- (3) Connect 3 jumper wires from pin #3, #4, & #5 on X14 to pin #1, #2, & #3 on X32.

(4) Under the Arduino application window, Click on *File> Open > LED_Demo.ino*. It will open the window shown in Figure 8. Figure 9 is the display of the contents of LED_Demo.ino source code file.

Note: The following code example describes how to build a circuit and to turn ON-and-OFF a set of 8 physical LEDs through DIP switch controls under Arduino environment.

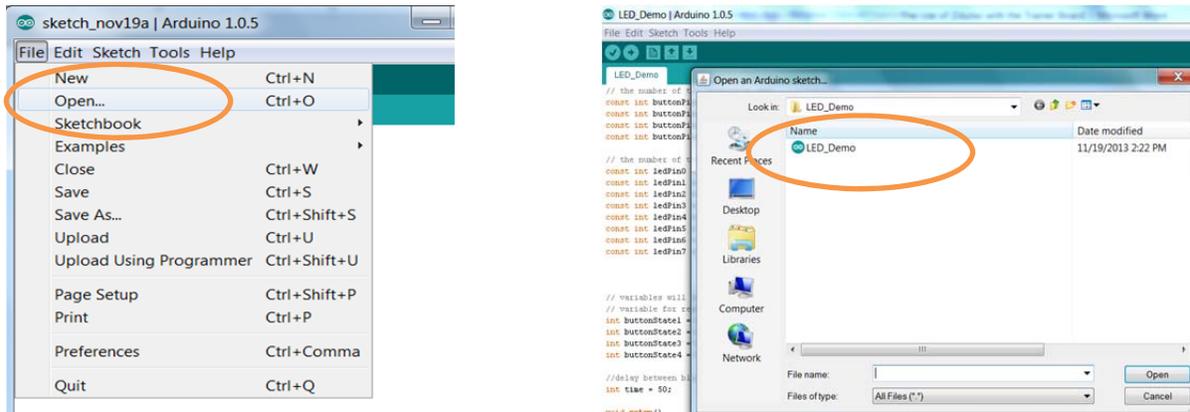


Figure 8. Open with LED_Demo.ino

Note: The LED_Demo.ino file is available at www.ucdistancetraining.org then select **Pre Workshop Preparations** or you can download it from www.ucdistancetraining.odu.edu

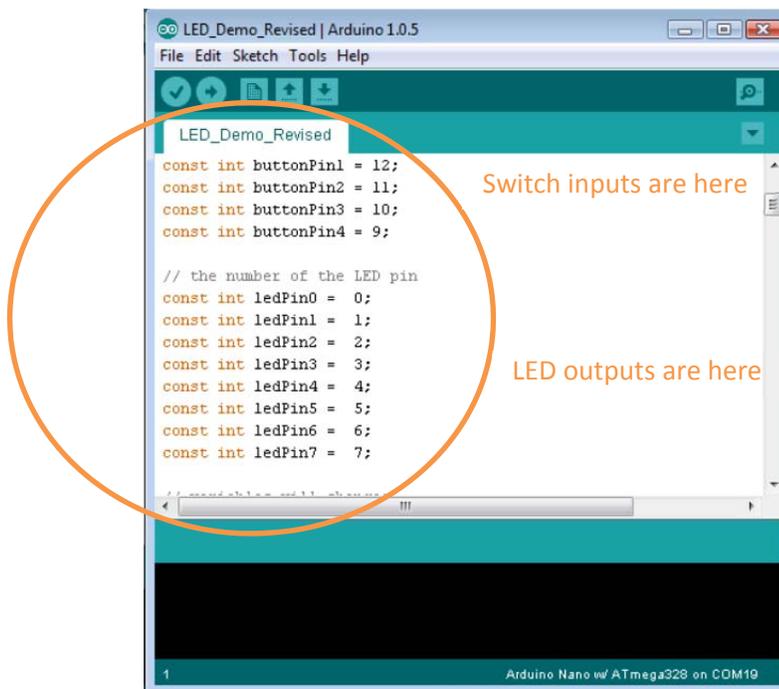


Figure 9 LED_Demo example of programming editor Window.

- (5) Select the board. Tools-> Board -> Arduino Micro. Figure 10 shows the choices of the board window.

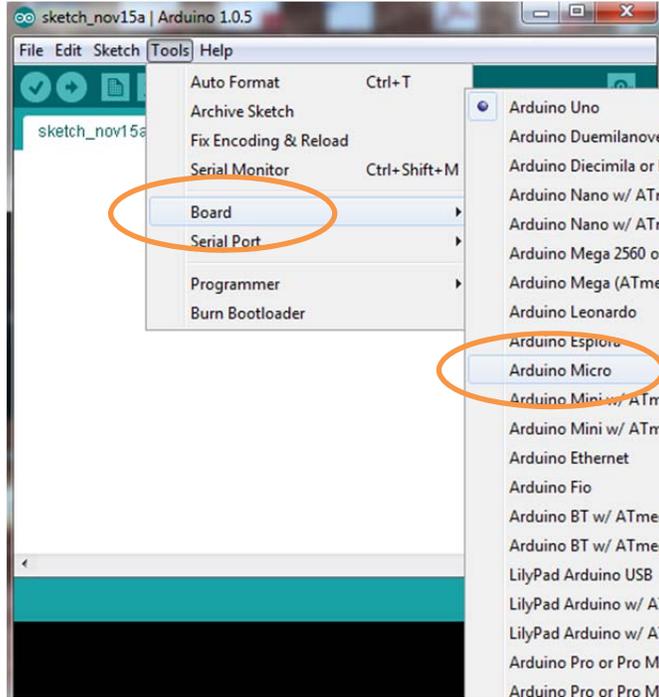


Figure 10. Arduino drop-down and slide-out windows for board selection.

- (6) Select the appropriate serial port. It is generally the one with the highest number. Different computers may have a different number. Figure 11 illustrates COM4 port as the Serial Communication port for this PC. The Arduino software will automatically select the correct serial port.

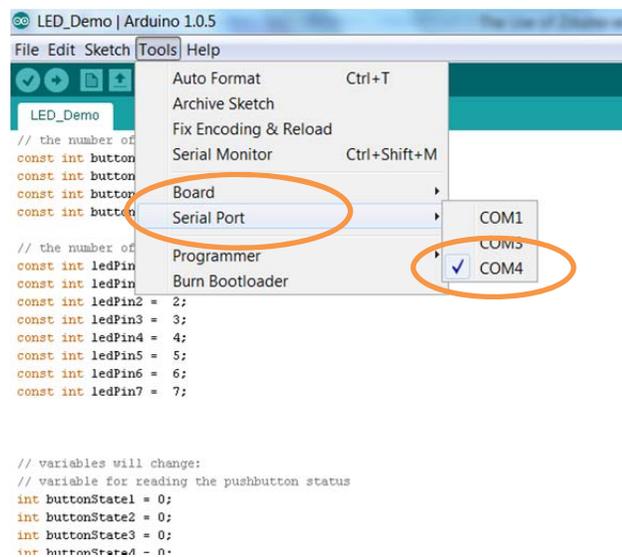


Figure 11: Serial Communication Port Window

- (7) Compile and upload the LED_Demo source code to Zduino module by clicking on the upload button.



(8) Observe the program execution trainer board result and have fun!

14. Please view the video demo file named: "Rev2 with Arduino" that is available on www.ucdistancetraining.org then select **Pre Workshop Preparations** or you can download it from www.ucdistancetraining.odu.edu

15. Where to get this Zduino LEE Module?

The Zduino LEE Module can be found at [ebay.com](http://www.ebay.com):

http://www.ebay.com/itm/261334279067?ssPageName=STRK:MESELX:IT&_trksid=p3984.m1558.l2649#ht_305wt_881

A Zduino LEE kit in the box comes with a Zduino LEE board and a USB cable. Figure 12 shows the content of the package. Figures 13 and 14 are the Zduino module top and bottom view respectively.

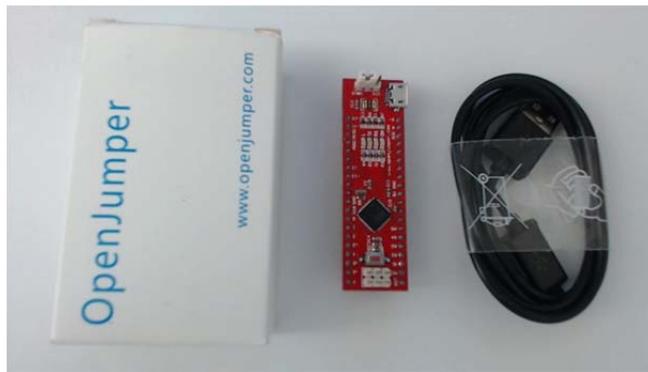


Figure12. Zduino Package

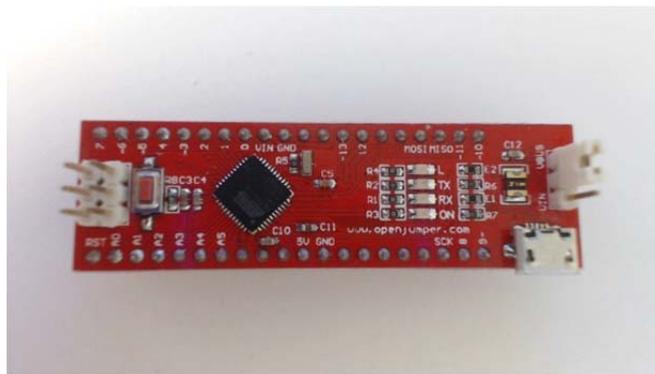


Figure 13. Zduino Module Top View



Figure 14. Zduino Bottom View

The Hardware Relationship between the Zduino Module and the PIC Trainer Board

- The available I/Os and peripherals of the Zduino module on the trainer board. There are a total of 14 I/Os from the Zduino module that are mapped to 40 Pin layout of Port B and Port D on the trainer board as following:

Zduino Module		Trainer Board (X12: POETB_40P_INTER)
D0	=====>	Port B, RB0
D1	=====>	Port B, RB1
D2	=====>	Port B, RB2
D3	=====>	Port B, RB3
D4	=====>	Port B, RB4
D5	=====>	Port B, RB5
D6	=====>	Port B, RB6
D7	=====>	Port B, RB7
D8	=====>	Port D, RD0
D9	=====>	Port D, RD1
D10	=====>	Port D, RD2
D11	=====>	Port D, RD3
D12	=====>	Port D, RD4
D13	=====>	Port D, RD5

There are 6 Analog Inputs from the Zduino module that are mapped on the trainer board with 40 Pin layout as follows:

Zduino Module		Trainer Board (X11: PORTA_40P_INTER)
A0	=====>	Port A, RA0
A1	=====>	Port A, RA1
A2	=====>	Port A, RA2
A3	=====>	Port A, RA3
A4	=====>	Port A, RA4
A5	=====>	Port A, RA5

The SPI communication controls from the Zduino module that are mapped on the trainer board with 40 Pin layout as following:

Zduino Module		Trainer Board(X13: PORTC_40P_INTER)
SCK	=====>	Port C, RC3 (SCK)
MOSI	=====>	Port C, RC5 (SDO)
MISO	=====>	Port C, RC4 (SDI)

The pins layouts of the Zduino Module are:

<u>Zduino Module Pi</u>		<u>Function of the Pin</u>
Pin #1	=====>	RESET
Pin #2	=====>	Analog Input A0
Pin #3	=====>	Analog Input A1
Pin #4	=====>	Analog Input A2
Pin #5	=====>	Analog Input A3
Pin #6	=====>	Analog Input A4
Pin #7	=====>	Analog Input A5
Pin #8	=====>	N/A
Pin #9	=====>	N/A
Pin #10	=====>	N/A
Pin #11	=====>	+5V
Pin #12	=====>	GND
Pin #13	=====>	N/A
Pin #14	=====>	N/A
Pin #15	=====>	N/A
Pin #16	=====>	N/A
Pin #17	=====>	N/A
Pin #18	=====>	SCK
Pin #19	=====>	D8
Pin #20	=====>	D9
Pin #21	=====>	D10
Pin #22	=====>	D11
Pin #23	=====>	MISO
Pin #24	=====>	MOSI
Pin #25	=====>	N/A
Pin #26	=====>	N/A
Pin #27	=====>	D12
Pin #28	=====>	D13
Pin #29	=====>	N/A
Pin #30	=====>	N/A
Pin #31	=====>	GND

Pin #32	=====>	VIN
Pin #33	=====>	D0
Pin #34	=====>	D1
Pin #35	=====>	D2
Pin #36	=====>	D3
Pin #37	=====>	D4
Pin #38	=====>	D5
Pin #39	=====>	D6
Pin #40	=====>	D7

The Zduino LEE Environment: This is the same as the regular Arduino Micro or UNO applications.

Note: The LED_Demo program requires the interface connections as following:

Output to LEDs:

Port B, RB0	=====>	X6, Pin1 (LED3, RED)
Port B, RB1	=====>	X6, Pin2 (LED4, YELLOW)
Port B, RB2	=====>	X6, Pin3 (LED5, GREEN)
Port B, RB3	=====>	X6, Pin4 (LED6, RED)
Port B, RB4	=====>	X6, Pin5 (LED7, YELLOW)
Port B, RB5	=====>	X6, Pin6 (LED8, GREEN)
Port B, RB6	=====>	X6, Pin7 (LED9, YELLOW)
Port B, RB7	=====>	X6, Pin8 (LED10, YELLOW)

Input from S7 DIP Switch:

Port D, RD1	=====>	X32, Pin8 (S7, DIP Switch Pin 8)
Port D, RD2	=====>	X32, Pin3 (S7, DIP Switch Pin 3)
Port D, RD3	=====>	X32, Pin2 (S7, DIP Switch Pin 2)
Port D, RD4	=====>	X32, Pin1 (S7, DIP Switch Pin 1)

- Zduino LEE can be used to develop a variety of interactive projects. Inputs from switches or sensors can be used to control lights, motors, and other physical outputs that are available on the trainer board or any other additional interface on the breadboard per user's preference.
- Many Arduino projects using Micro or UNO can be constructed using the Zduino LEE module.