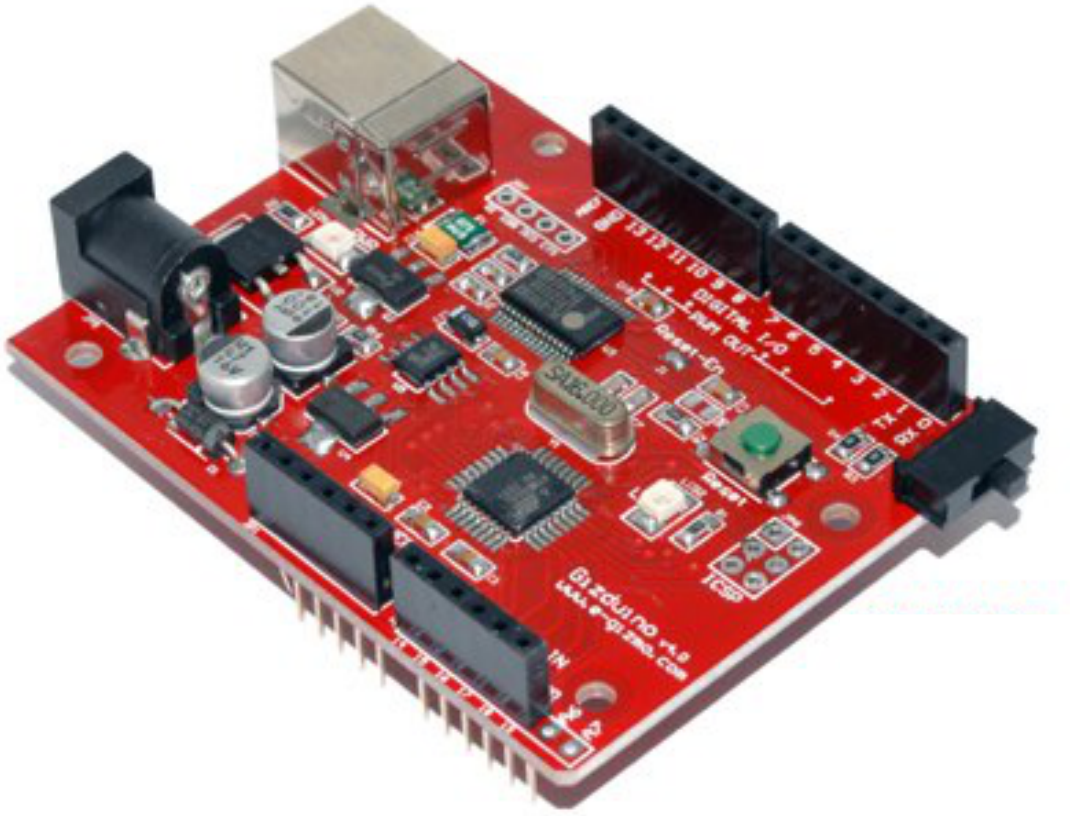
GIZDUINO V4.0

Technical Manual Rev 1r1



GIZDUINO V4.0 ATMEGA168/328

The Gizduino v4.0 is the improved version of the e-Gizmo Gizduino microcontroller boards. Similar to the previous version, it has 14 digital I/O pins and 6 analog programmable inputs pins, an on-board 16 MHz crystal oscillator, DC power jack, ICSP header, reset button, USB connection. One of its additional features is the RX-EN rocker switch that promotes hassle-free programming when dealing with serial communication to avoid the common "not in sync" problem upon uploading. Unlike the other versions, the v4.0 doesn't need to be shorted for external or internal supply input.

The Gizduino microcontroller board can be easily used for prototyping, research, thesis, and a lot more. It is open source thus makes coding and interfacing easier since libraries are available for download on the net for user's convenience. The microcontroller board is very flexible in terms of applications especially in sensors, serial devices, and alike. It is compatible for almost all platforms such as Windows XP, Vista, 7 and 8, Mac OSX, and Linux.

It also has its available add-ons that are so-called "shields" that makes prototyping easier. Some shields available are the GSM shield, GPS shield, Motor Driver shield, and a lot more.

Features and Specifications

- Microcontroller: ATMega168/328
- User interface: USB Port, DC Jack, Reset, Serial enable switch
- Debugger port: ICSP port
- Power input: 8-12V Max, 5V USB
- Crystal oscillator: 16MHz
- Req'd driver: Prolific USB Serial Driver 2009 and above

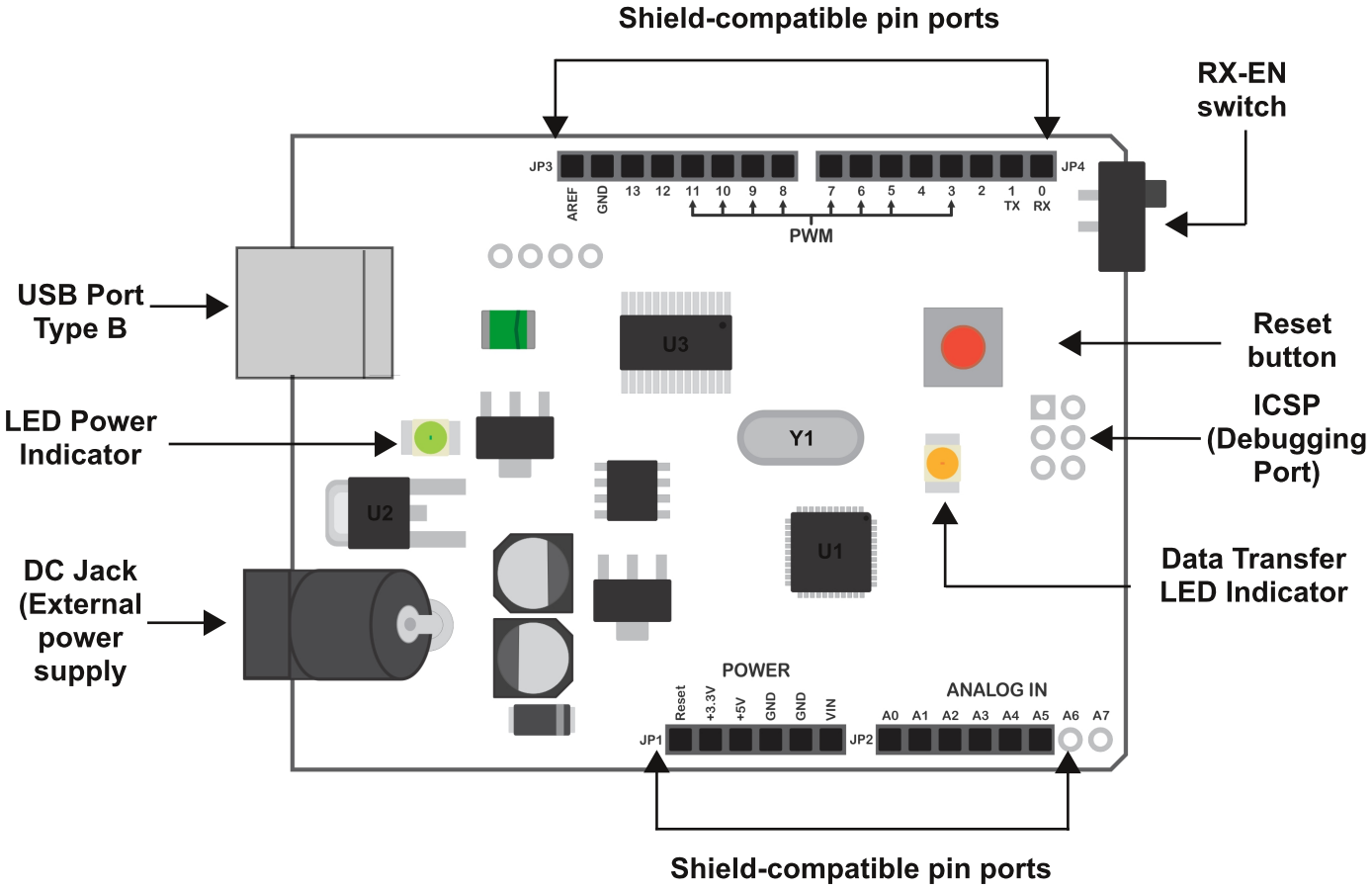


Figure 1. Gizduino 168/328 Major Parts Presentation

Component specifications:

U1 - ATMEGA168/328 Microprocessor chip
U2 - On-board 5V Voltage Regulator
U3 - PL-2303 USB to RS232 Bridge Controller
Y1 - 16MHz crystal oscillator

ATMEGA Chip Comparison

ATMEGA 168
16KB (Flash memory), 512 bytes EEPROM, 1KB RAM
ATMEGA 328
32KB (Flash memory), 1KB EEPROM, 1KB RAM

Table 1. *JP3, JP4, Digital I/O Pin assignments*

No.	I.D.	Description
1	AREF	Analog Reference
2	GND	Ground
3	13	Digital I/O (SCK)
4	12	Digital I/O (MISO)
5	11	Digital I/O (PWM/MOSI)
6	10	Digital I/O (PWM)
7	9	Digital I/O (PWM)
8	8	Digital I/O
9	7	Digital I/O
10	6	Digital I/O (PWM)
11	5	Digital I/O (PWM)
12	4	Digital I/O
13	3	Digital I/O (PWM)
14	2	Digital I/O
15	1	Digital I/O (TX)
16	0	Digital I/O (RX)

Table 2. *JP2 Analog I/O Pin assignments*

No.	I.D.	Description
1	A0	Analog I/O or Digital I/O
2	A1	Analog I/O or Digital I/O
3	A2	Analog I/O or Digital I/O
4	A3	Analog I/O or Digital I/O
5	A4	Analog I/O (SDA) or Digital I/O
6	A5	Analog I/O (SCL) or Digital I/O
7	A6	Analog I/O
8	A7	Analog I/O

Table 3. *JP1 Power Pin assignments*

No.	I.D.	Description
1	Reset	Reset
2	+3.3V	3.3VDC Device Power supply
3	+5V	5VDC Device Power supply
4	GND	Ground
5	GND	Ground
6	Vin	+5V(USB) / Vin(Ext)

Tips and reminders:

For I2C interface, A4 (SDA) and A5 (SCL) can be used.

Reset can be used externally by adding a two pin tact switch with one leg of the switch on the reset pin, and the other one to the ground.

As shown, A6 and A7 cannot be used as digital pins.

The Gizduino can be powered up by wiring a positive DC supply on your Vin pin noting that Vin is limited to 12VDC, and a negative power supply on the GND pin.

Pin 13 is also the pin used by the data transfer LED indicator.

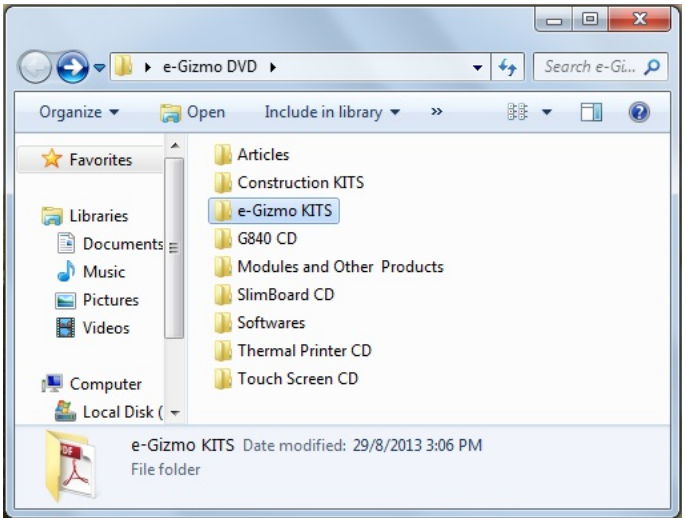
In software installation, you need the CD/DVD from e-Gizmo when you buy one of our kits. But if you don't have the CD. you can always download the IDE from the Arduino website just go to http://arduino.cc/en/Main/Software look for the latest version of the IDE or visit our Google Drive cloud storage:

https://docs.google.com/folder/d/0BxdLxDCD6HidOGpmX21aS3pPWW8/edit?usp=sharing

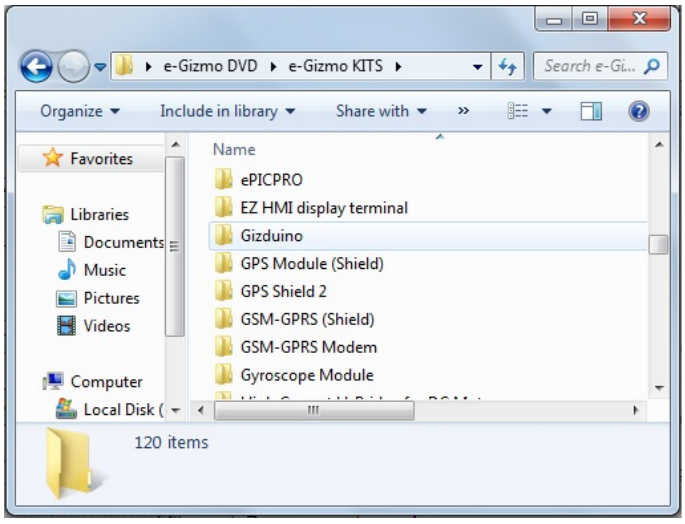
Part 1: How to install the Arduino Software form the e-Gizmo DVD?

Step 1: Software installation

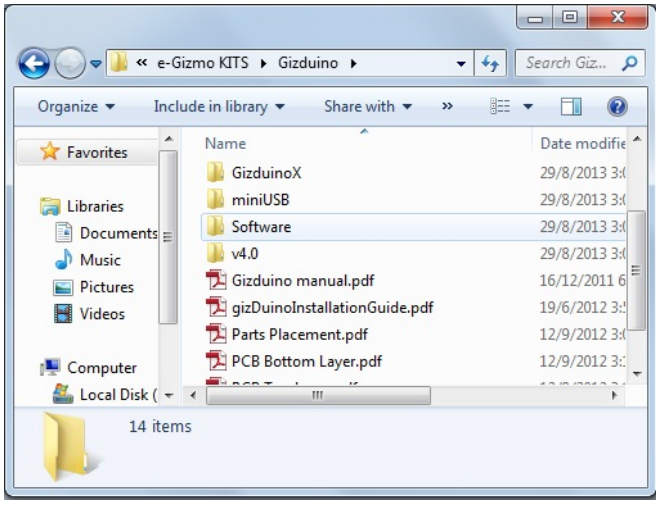
1. Insert the CD on your CD-ROM/DVD-R drive then open the "e-Gizmo KITS" folder



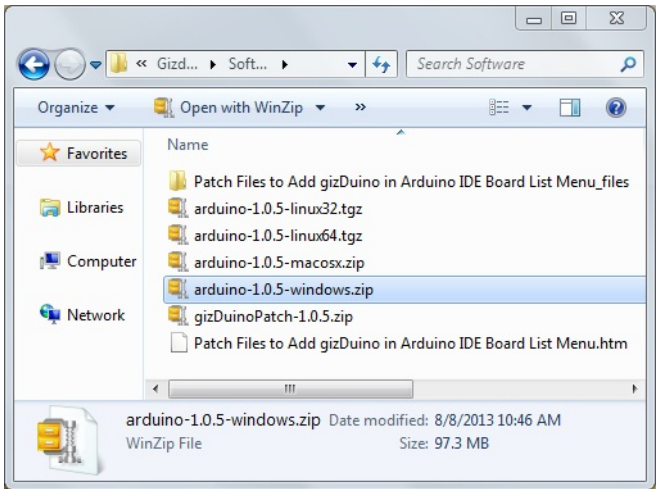
2. Find the "Gizduino" folder then open it.



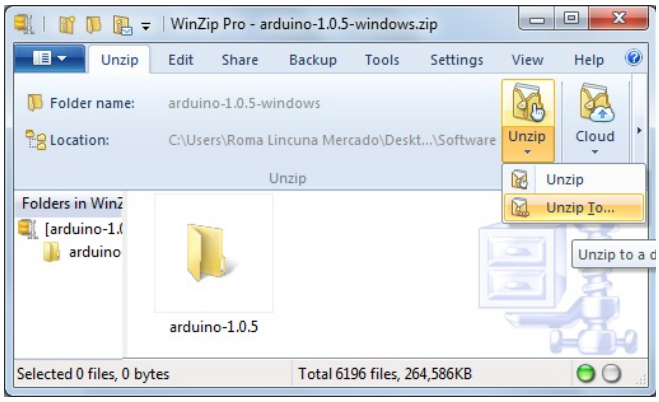
3. Open the "Software" folder.



4.Unzip Arduino-1.0.5-windows (winZiip/WinRAR) if you are using WindowsXP,7,8 or Arduino-1.0.5-macosx (WinZip/WinRAR).



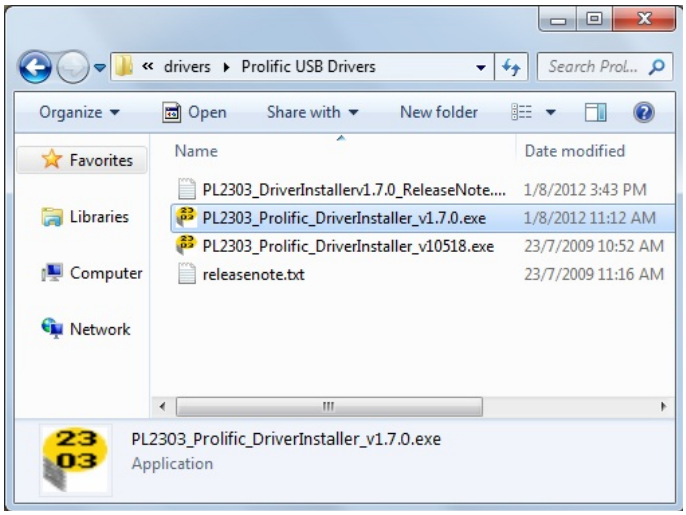
5. Unzip to.. a different location (e.g C:\Arduino-1.0.5) or into your computer Desktop or wherever you are comfortable with.



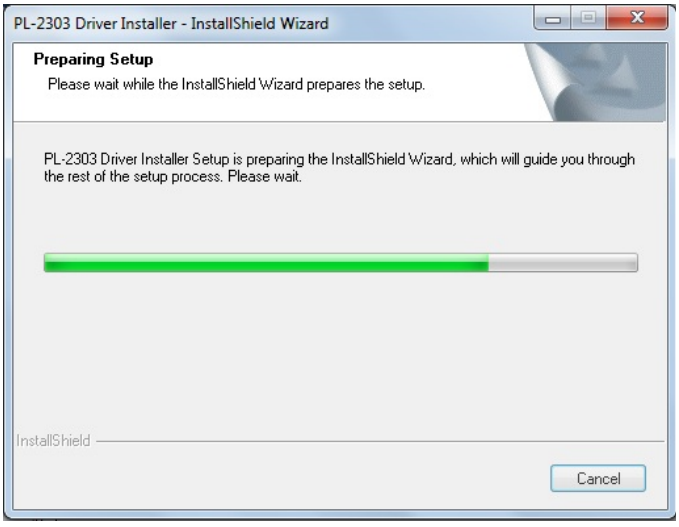
Step 2: Driver installation

1. Open the "Arduino-1.0.5" folder.

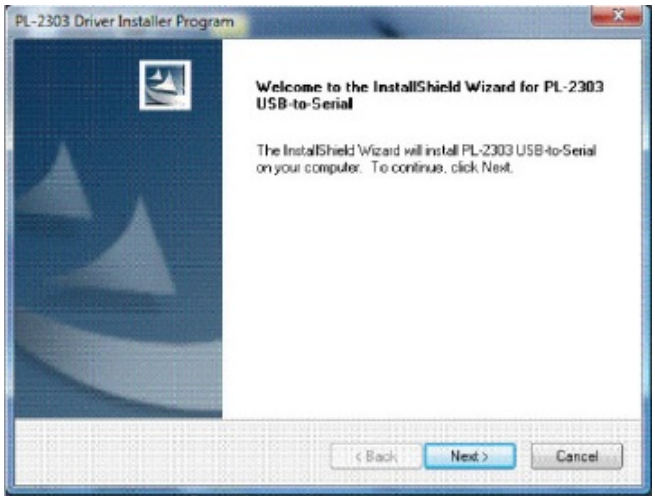
2. Go to "DRIVERS" folder>"PROFILIC DRIVERS" folder>Double-Click the PL2303_PR.._v1.7.0.exe to install the driver. You can also download this driver from the prolific website.



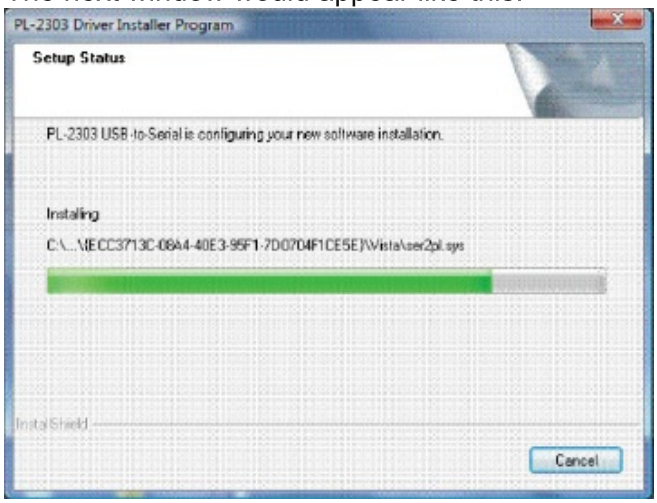
After which, it shall direct you to the installation wizard.



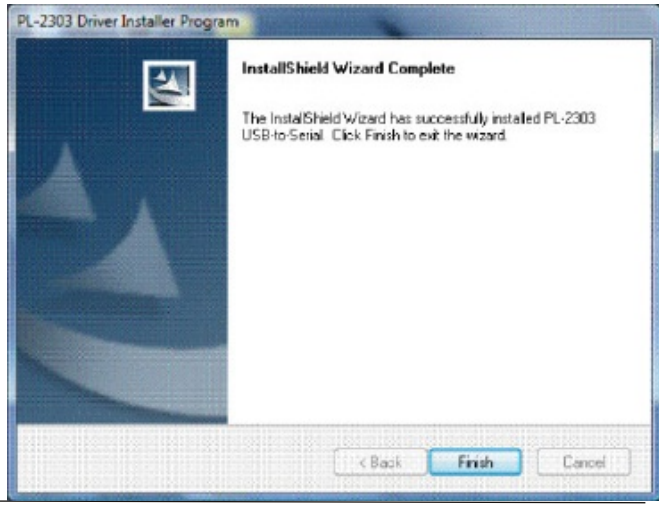
After the preparing setup you can now install the PL-2303 driver, continue this by clicking on <Next>.



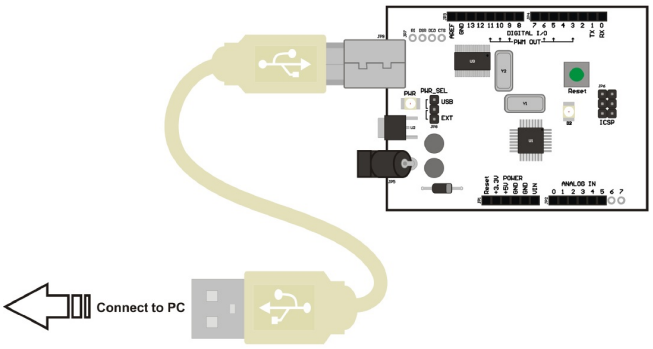
The next window would appear like this.



When the InstallShield Wizard has successfully installed PL-23023 USB-to-Serial. Click<Finish> to exit the wizard.



3.After you installed the driver. Connect your Gizduino to the PC using a USB A-B connector.



Then it will appear on your task bar.
(Fig 1 and Fig 2)

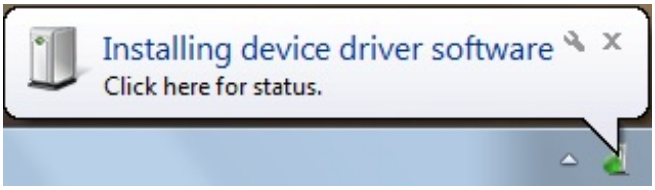


Fig 1. Shows the installing device driver.

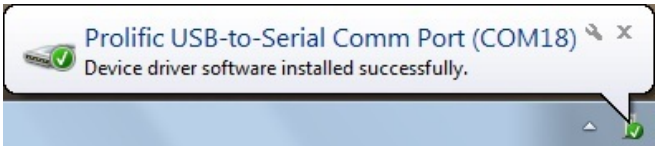


Fig 2. The device driver software installed successfully.

Note: here you can see the assigned COM port number.

Step 3: Device/Port Checking
1. Go to the "Device manager". (Fig 3.)

Control Panel>System and Security>System (Click the "Device Manager")

2. Look for ports(COM & LPT).

3. Get the (COM #). This should be the assigned port for your arduino (Serial Port).

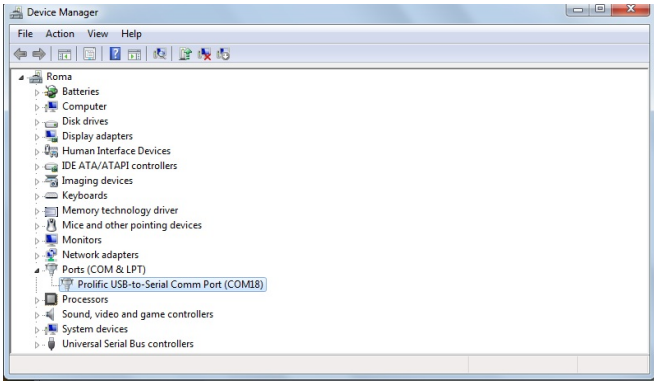


Fig 3. the device manager where you can see the COM number assigned for your Arduino IDE Serial Port.

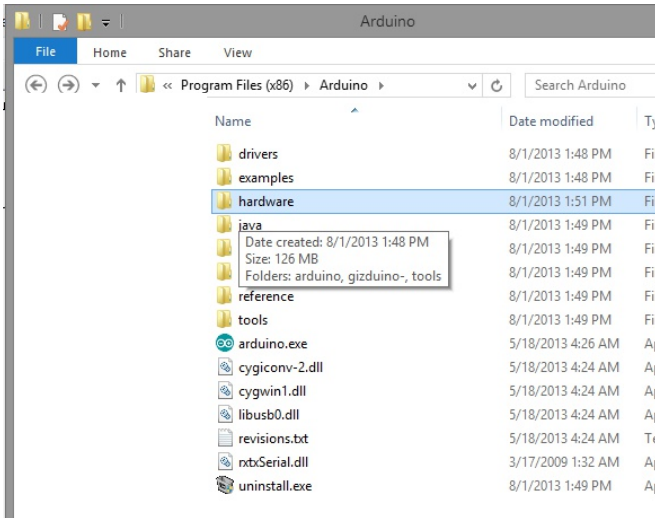
Part 2: What's next before I can upload any of my sketches?

After getting the assigned COM port for your Gizduino, configure your Arduino IDE using the following settings:

1. Boards installation
Install the boards on your Arduino IDE by simply unzipping and copying the patch files from the CD at e-Gizmo CD\e-Gizmo KITS\Gizduino\Software\ gizDuinoPatch1.0.5-windows.zip

OR, download it from http: //e-gizmo.blogspot.com/201 3/03/patch-files-to-add-gizduino-in-arduino.html?view=flipcard

then, paste it to your assigned Arduino directory at Program Files\Arduino\hardware.
(this may differ for Windows 7/Windows 8 users depending on their OS)



2. Choosing the right board

After installing the boards, open your Arduino IDE. After which, on the menu bar, go to Tools>Boards

(Choose the type of board that you are using, just in case you don't know, you may always check it out on the board you bought)
e.g Gizduino (mini) w/ ATmega328

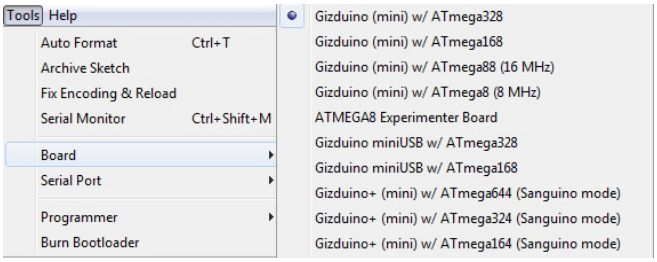


Fig 3. Check your BOARD.

Note: If you can't see the Gizduino board list. You may have forgotten to extract the patch files on your hardware folder.

II SERIAL PORT
Make sure that you are connected the right Serial Port COM number.
MENU BAR>TOOLS>SERIAL PORT>
(Choose the assigned COM port on your USB Cable connections to PC)

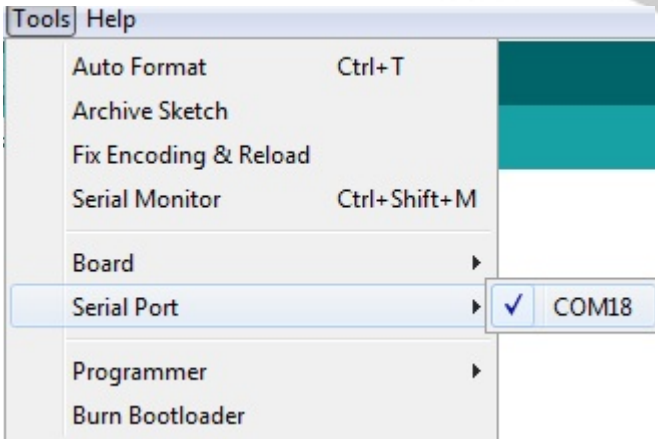
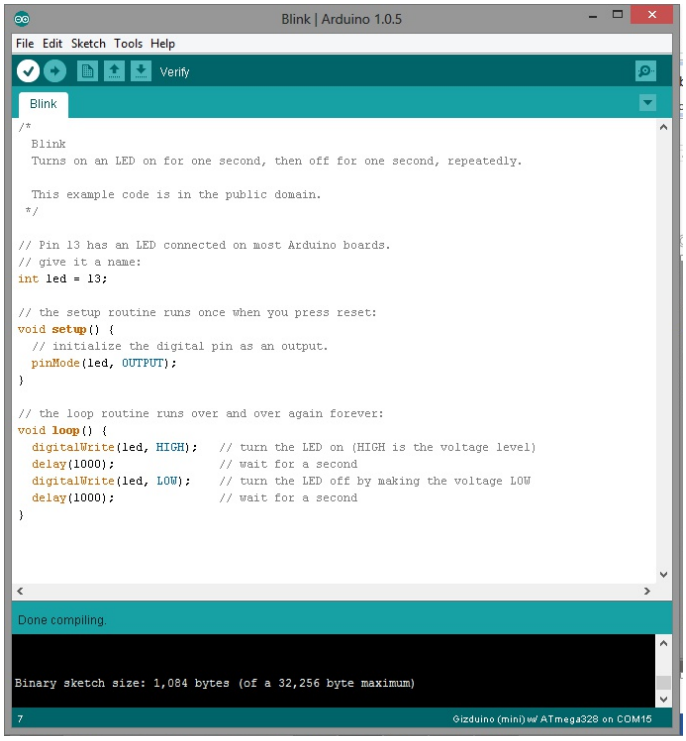
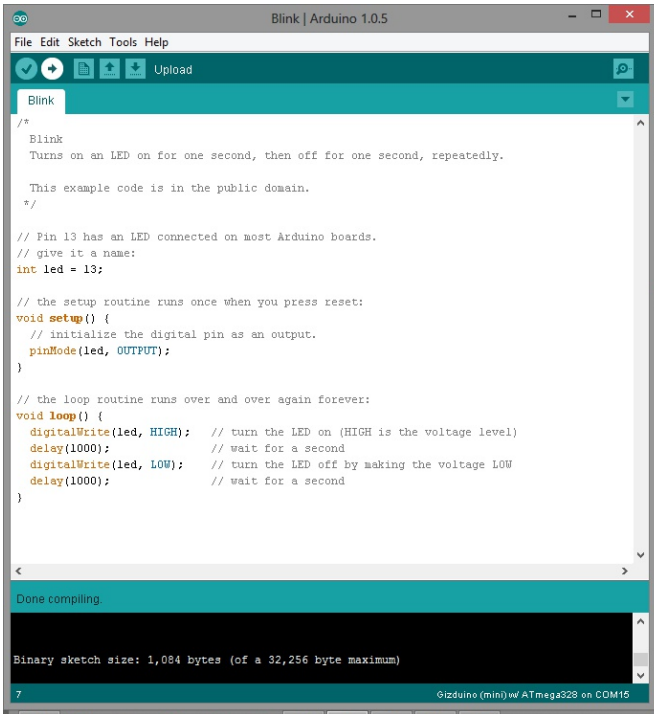


Fig 4. Check your COM PORT number.

After choosing the right COM port and Board, what is left is how to upload a sketch. For the most basic example, on your Arduino IDE, click File>Example>1.Basic>Blink. After that, click the upper leftmost icon (check mark) to VERIFY your sketch. Verifying is only used to check if there are no syntax errors or issues in your sketch. Next, click the icon with the arrow point to the right, that is your UPLOAD button. It simply uploads your program to your MCU board. Then, that's it, the data transfer LED indicator should blink as stated on the description of the sample sketch.



STEP 1: Verify: In this way, the sketch is check for syntax errors or issues in library, etc. This is optional and you may proceed to uploading immediately.



STEP 2: Upload: Sketch is uploaded into your MCU board. Unlike other MCUs, the uploaded sketch can be changed any time as the user wishes.

Common issues:

(1) avrdude: Expected signature for ATMEGAXXX is XX XX XX. Double check chip, or use -F to override this check.

--> It simply means that you chose the wrong board on the boards list. Select the correct board and re-upload your sketch.

(2) avrdude: stk500_getsync(): not in sync: resp=0x00 avrdude: stk500_disable(): protocol error, expect=0x14, resp=0x51

--> You may try to reconnect your Gizduino to the USB port and try uploading again.

--> If you are dealing with Serial interface, make sure RX is disabled by switching up the RX-EN switch

For more information of the syntax of the Arduino IDE, you may go to Help>Reference on you Arduino IDE. These are offline webpages, so you can view it without an internet connection

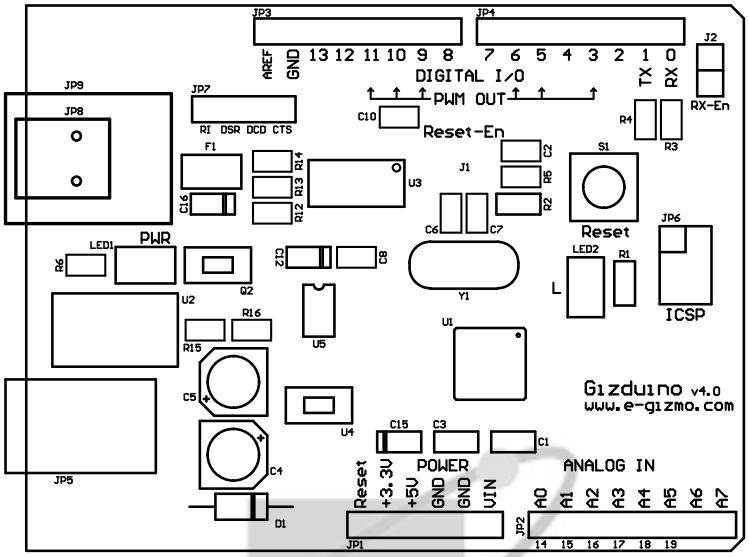


Figure 2. *Gizduino v4.0 Silkscreen layout*

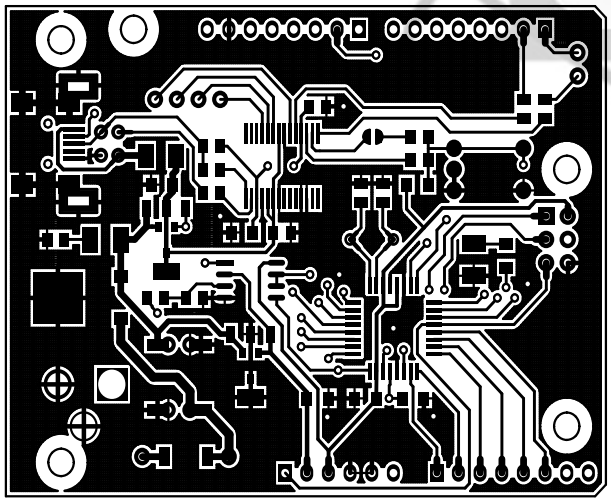


Figure 3. *Gizduino v4.0 Top PCB layout*

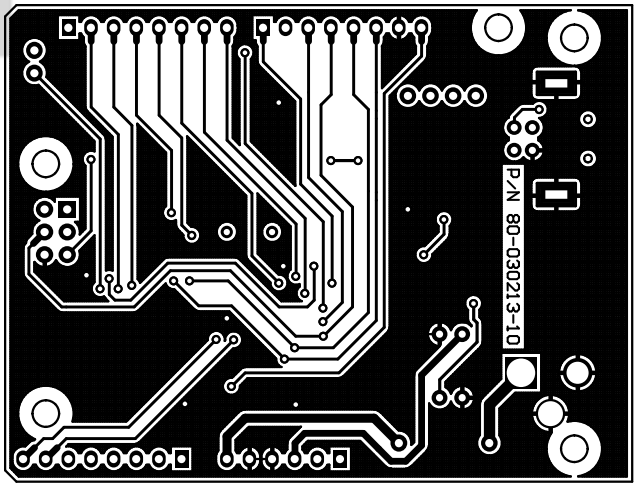


Figure 4. *Gizduino v4.0 Bottom PCB layout*

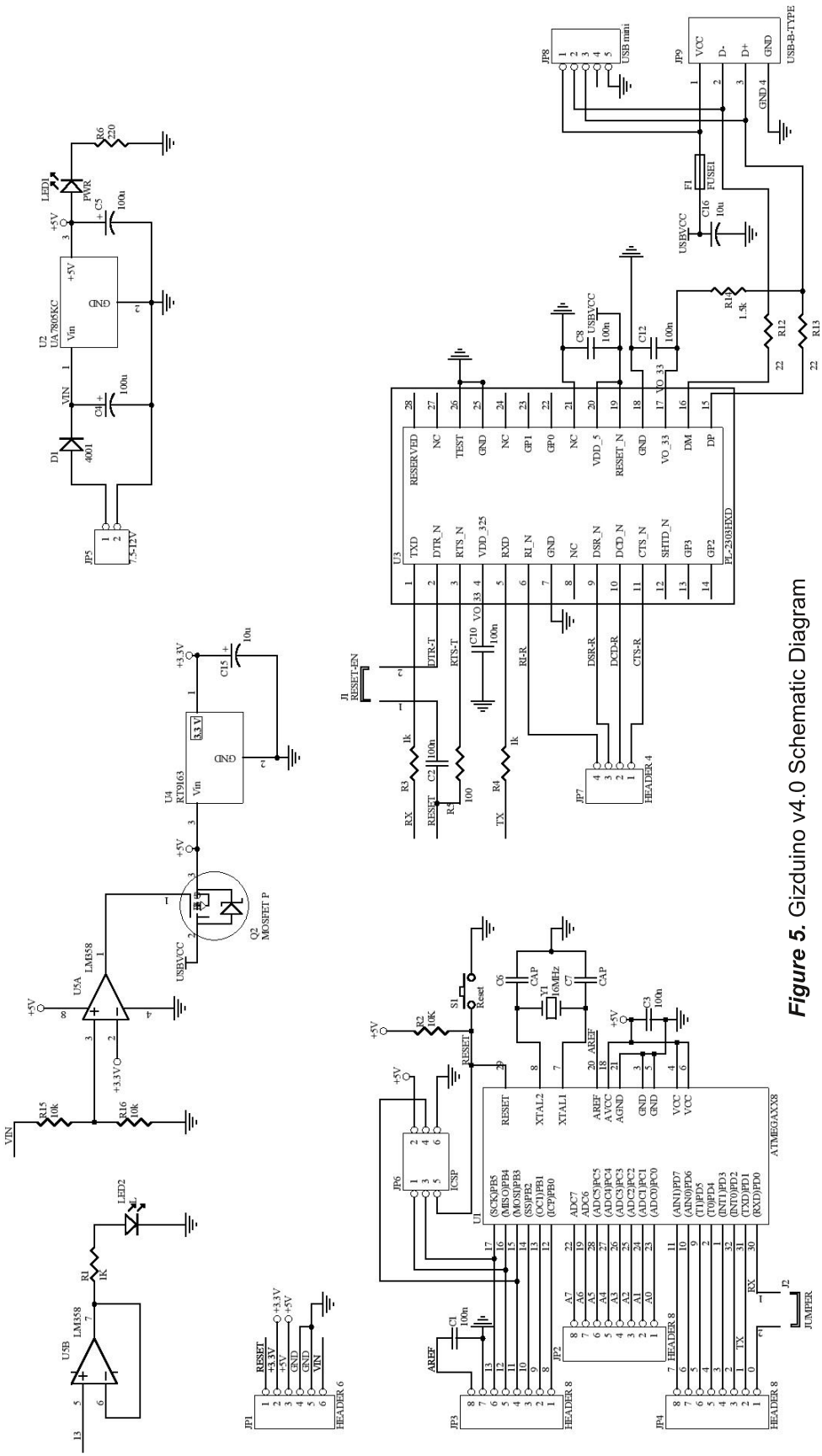


Figure 5. Gizduino v4.0 Schematic Diagram