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Technical Description

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Mechanism Description of Arduino

Arduino is an open-source microcontroller board based on the ATmega328. It was structured in 2015 in Italy. Arduino stage was intended to give an economical and simple path for specialists, understudies and experts to make gadgets that interface with their condition utilizing sensors and actuators. Arduino platform has turned out to be well-known in light of the fact that anybody can program, erase and reprogrammed at any instant of time. In addition, Arduino offers understudies and instructors to see clear programming framework since it makes things less demanding because of the simplified version of C++. Moreover, Arduino being open-source hardware implies that others can change and produce subordinates of Arduino boards that give considerably more structural elements and usefulness. An Arduino Board can be arranged into two sections: Hardware and software. Figure 1 represents the labeled diagram of an Arduino board

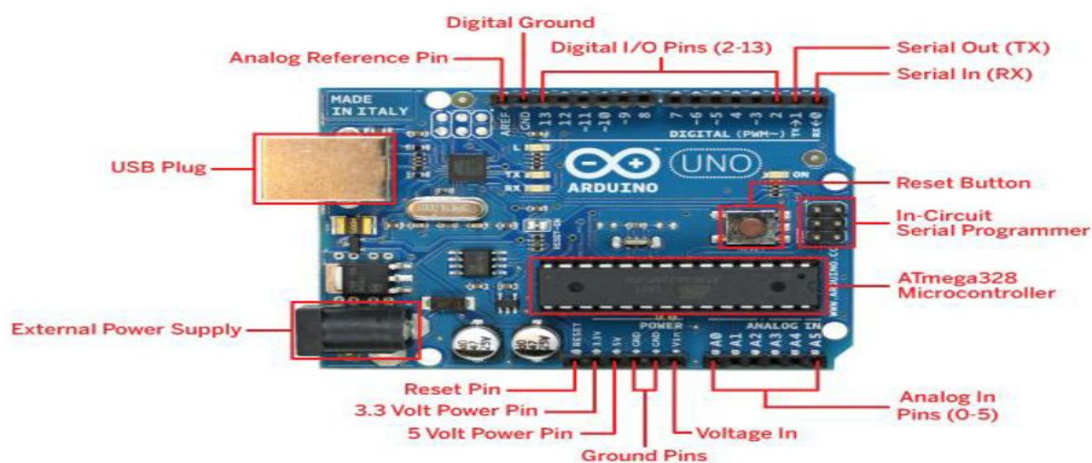


Figure 1 : A labeled diagram of an Arduino Board.

Hardware

The Arduino Development Board has various components that together make it work.

There are some major components that are important to run an Arduino. The major components

are:

1. Microcontroller

2. External Power

Supply

- Power and

Ground Pins

(Power: orange,

Grounds: light

orange)

3. USB (yellow)

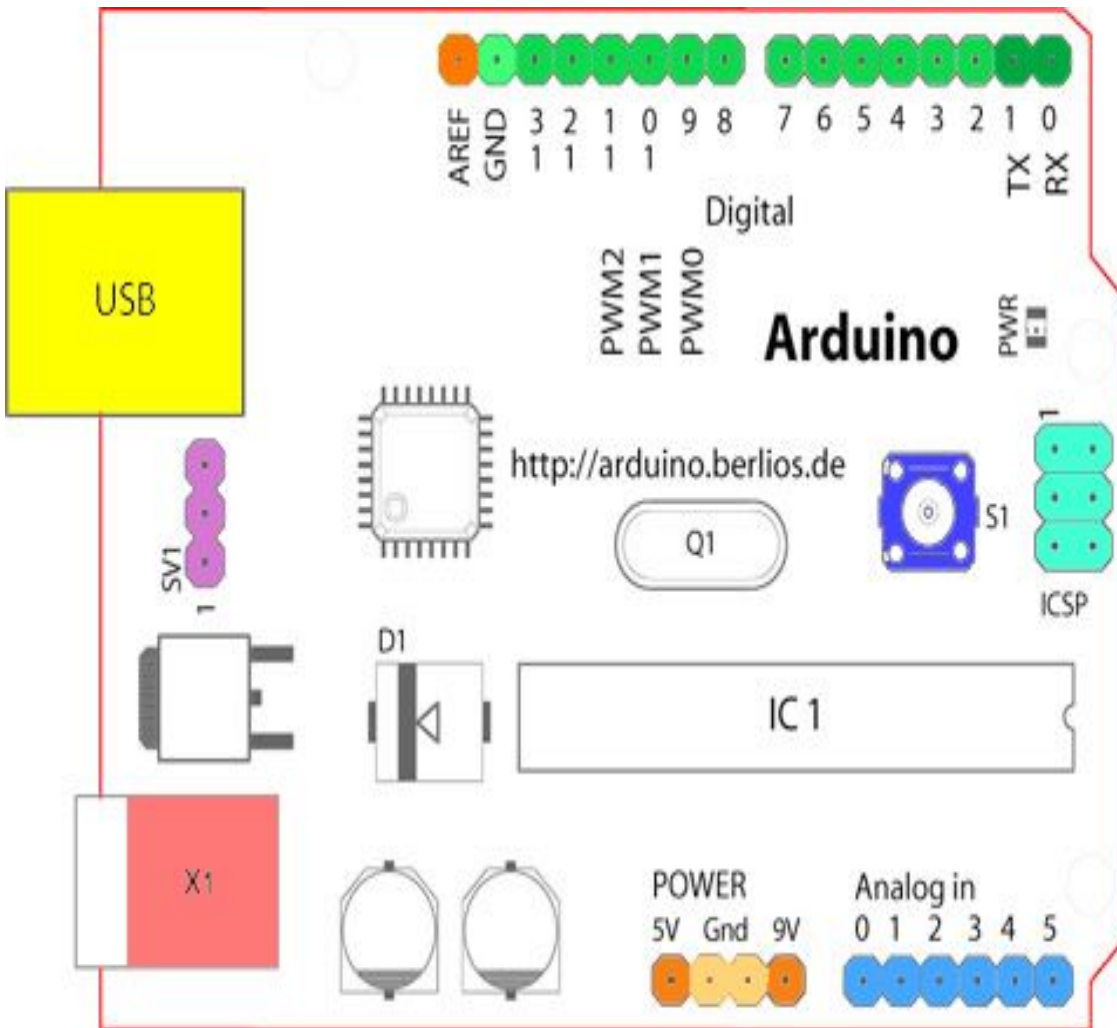
4. Reset Button -

S1 (dark blue)

5. Pins:

- Digital Pins

2-13



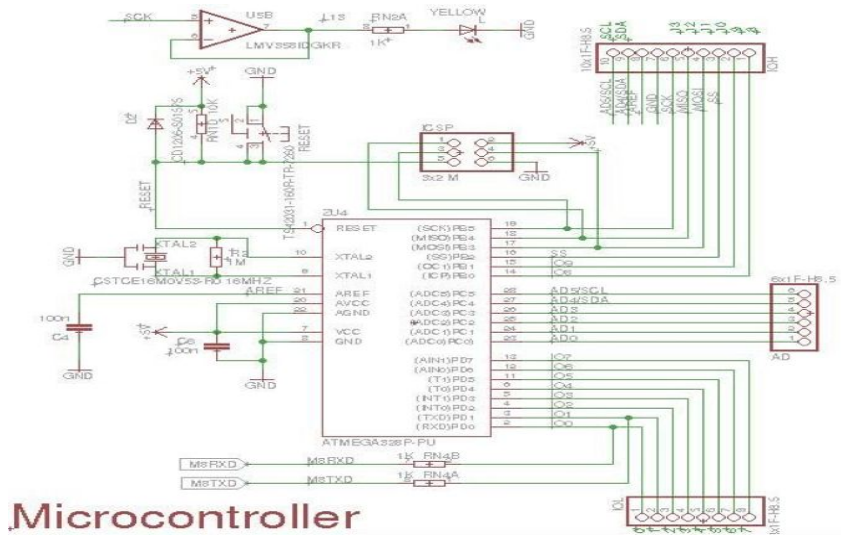
- Digital Pins 0-1/serial in/Out-TX/RX (dark green).

- Analog Pins 0-5 (light blue)

- Analog Reference pin (orange)

Microcontroller

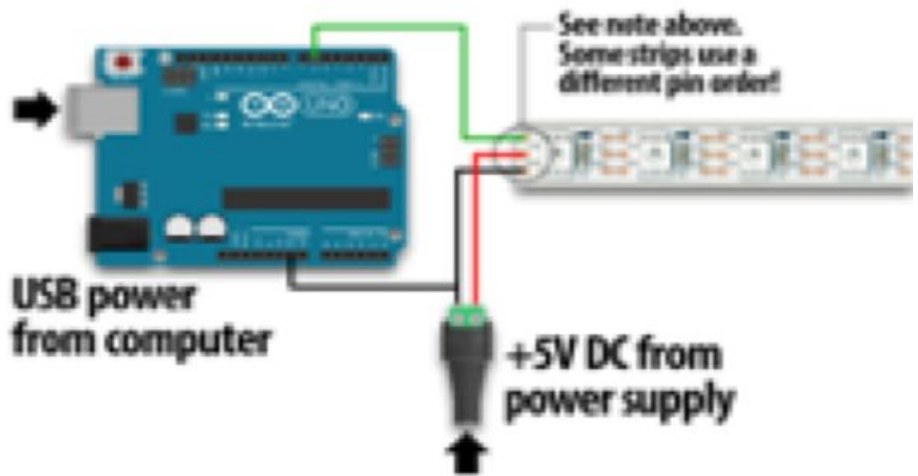
This is the core of the advancement board, which fills in as a smaller than normal PC what's more, can get just as send gadgets associated to it. The microcontroller utilized varies



from board to board; it likewise has its own different specifications (Louis, 2016, p. 23).

External Power Supply

External Power Supply is utilized to control up the entire circuit board and other hardware on the smaller scale controller board. This circuit board can deal with 9-12V DC current. In any case, the board is additionally composed of power pins. One of the pins called VIN (some of the time named "9V"). This pin takes the info voltage to the Arduino board when it's utilizing an outer power source. Another pin called 5V, which is used to control supply to power the microcontroller and other components on the Arduino board. It can come either from VIN with an onboard



controller or be provided by USB or another managed 5V supply.

USB Plug

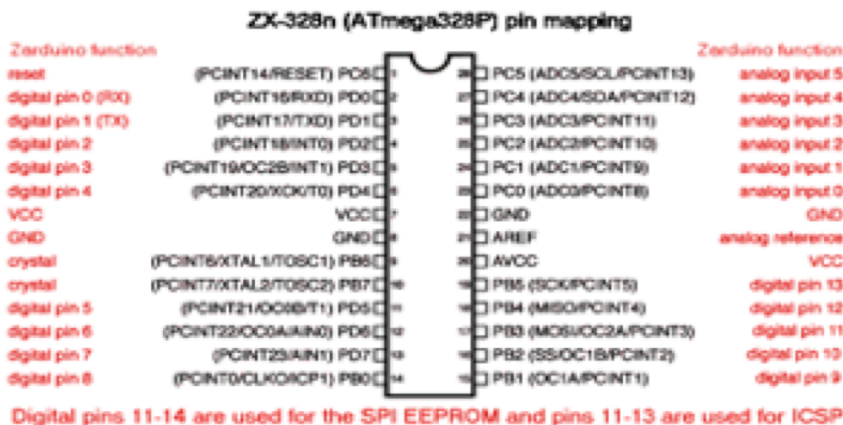
USB is the yellow port on the board that is appeared in the diagram (Figure 2). The USB plug is a critical port in this board. It is utilized to transfer a program to the microcontroller using a USB cable. It has a managed intensity of 5V which additionally controls the Arduino board in situations when the External Power Supply is missing (Louis, 2016, p. 24). This USB also works like the phone USB that we used to charge our phone and download music from computers.

Reset Button

Reset Button job is to reset the entire system of a circuit. This button can be used manually. Also, it can be used through software. By using a Reset command, the system can be changed easily from the Arduino software. Pushing the reset button will interface the reset pin to ground and restart any code that is loaded on Arduino. This will helps to test a code multiple times although the code doesn't repeat.

Pins

Pins are a standout amongst the most critical parts of Arduino. Pins work as the input of the board. The circuit board comprises of digital, analog, and power pins. Power pins are utilized



to control up to the circuit board to a specific measure of voltage relying upon the work Arduino is doing. However, digital

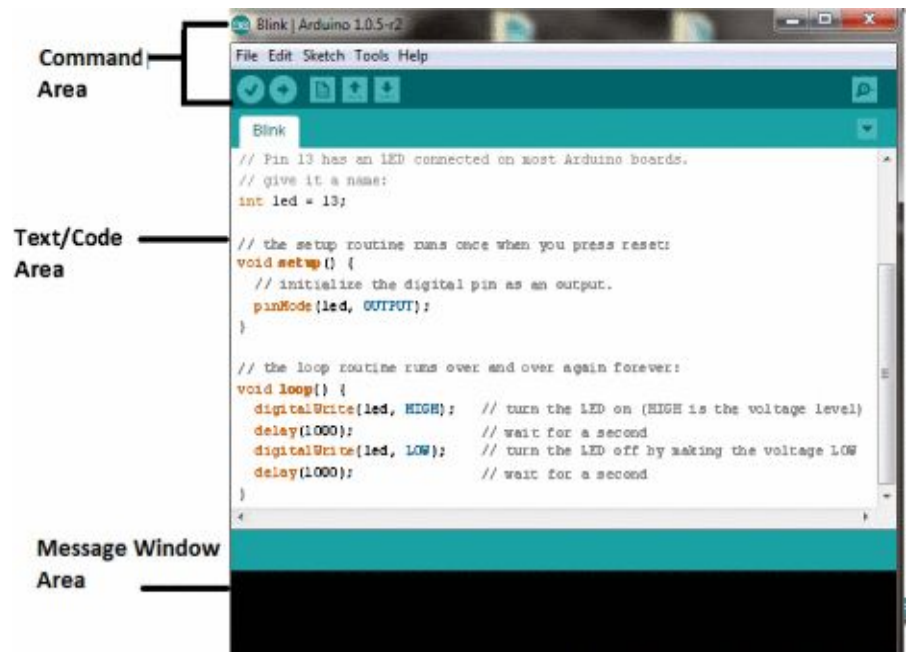
Figure 5: Digital and Analog Pins

and analog pins are in all probability utilized as input and output purposes. Analog pins are analog input pins from A0 to A5. These pins are utilized for the analog input/output. The analog input pins support 10-bit analog-to-digital conversion (ADC) using the analogRead function. The analog input 0 can also be used as digital pin 14 and the analog input 5 as digital pin 19. However, analog inputs 6 and 7 can not be used as digital pins. Digital pins are the digital input/output pins from 2 to 13. These pins are used to receive (RX) and transmit (TX) digital data.

Software

The program code composed for Arduino is known as a sketch. According to Louis, “The software used for developing such sketches for an Arduino is commonly known as the Arduino IDE.” The Arduino IDE is divided into three main parts: command area, text area, and message window area.

1. Command Area: It has the menu for the program, for instance, File, Edit, Sketch, Tools, Help, and Icons like Verify Icon for confirmation, Upload Icon for transferring your program, New, Open, Save and Serial Monitor used for sending and



accepting of information between the Arduino and the IDE (Yusuf, 2014).

2. Text Area: This is the area where people compose their code. It is also known as a sketch. In the text area, the improved code can be composed using a disentangled variant of C++ programming language that makes it easier to write.
3. Message Area: It displays error as well as gives input on saving and sending out the code (Louis, 2016, p. 24).

All of these components function together to produce great output. The purpose of Arduino is to give the young people an understanding of how to create new things and in the future, it will lead them to understand the broader field of creating new things and interact with the physical world. By using the physical platform like Arduino, the next famous innovators will probably find a new way for the computer to deal with the physical world. This is a great opportunity for students in the engineering field whose job is to make things simpler for people. They will be able to solve small problems by creating new things and later with that knowledge they can solve bigger problems. Arduino is a great invention and it can guide our young generation to the possibilities of making new interactive objects.

References

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