**IoT - Arduino UNO**

**L. Vinay Kumar Reddy**

**1-st MCA-A**

**Department of Computer Science,**

**CHRIST (Deemed to be University)**

**Bangalore – 29**

**vinaykumar.reddy@christuniversity.in**

**Abstract**

The Internet of Things (IoT) is the network of physical objects or “Things” embedded with electronics, software, sensors, and network connectivity, which enable these objects to collect and exchange data [1]. IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating an opportunity for more direct integration between the physical world and computer-based systems, resulting in improved efficiency, accuracy, and economic benefits [1]. The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a [USB](https://www.javatpoint.com/usb-full-form) connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms.

**Keywords:** Arduino UNO, IOT, Pins, Circiut, Programming

**Introduction**

The Arduino Uno is one kind of microcontroller board based on the ATmega328, and Uno is an Italian term that means one. Arduino Uno is named for marking the microcontroller board's upcoming release, namely Arduino Uno Board 1.0. This board includes digital I/O pins-14, a power jack, analog i/ps-6, ceramic resonator-A16 MHz, a USB connection, an RST button, and an ICSP header. All these can support the microcontroller for further operation by connecting this board to the computer. The power supply of this board can be done with the help of an AC to DC adapter, a USB cable, otherwise a battery. This article discusses an Arduino Uno microcontroller, Arduino Uno specifications or features, and applications. [Arduino](http://arduino.cc/) is an open-source platform used for building electronics projects. Arduino consists of a physical programmable circuit board (often called a [microcontroller](http://en.wikipedia.org/wiki/Microcontroller)) and a piece of [software](http://arduino.cc/en/Main/Software), or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

**What does it do?**

The Arduino hardware and software were designed for artists, designers, hobbyists, hackers, newbies, and anyone interested in creating interactive objects or environments. Arduino can interact with buttons, LEDs, motors, speakers, GPS units, cameras, the internet, and even your smartphone or your TV! This flexibility combined with the fact that the Arduino software is free, the hardware boards are pretty cheap, and both the software and hardware are easy to learn has led to a large community of users who have contributed code and released instructions for various Arduino-based projects.

**What's on the board?**

### Power (USB / Barrel Jack)

### Pins (5V, 3.3V, GND, Analog, Digital, PWM, AREF)

### Reset Button

### Power LED Indicator

### TX RX LEDs

### Main IC

### Voltage Regulator

**Programming The Board**

Once the Arduino IDE tool is installed in the PC, attach the Arduino board to the computer with the help of a USB cable.  Open the Arduino IDE & select the right board by choosing Tools–>Board>Arduino Uno, and select the suitable Port by choosing Tools–>Port. Depending on the Wiring, this board can be programmed with the help of an Arduino programming language.

To activate the Arduino board & [flash the LED](https://www.elprocus.com/blinking-led-using-555-timer-ic/) on the board, dump the program code with the selection of Files–> Examples..>Basics..>Flash. When the programming codes are dumped into the IDE, click the button ‘upload’ button on the top bar. Once this process is completed, check the LED flash on the board.

### **Features of Arduino UNO**

### Quick start: The board has a reset pin that helps you reset the whole circuit board.

### Low voltage requirement: This board needs 5V to get turned on.

### USB interface: This board features a USB interface. With this feature, you can develop serial communication with other devices.

### More number of instructions per cycle: The UNO board integrates the Atmega328 microcontroller. This microcontroller has features such as PWM, I/O pins, timers, and interrupts.

### Greater flash memory: This board features a flash memory of 13KB which helps store instructions in code.

### More storage: Arduino UNO PCB supports [Micro](https://www.raypcb.com/arduino-nano-vs-micro/) SD cards to help store more data.

### Power alternatives: There are other power alternatives aside from the USB. Arduino allows users to power the board with an AC adapter or battery.

### Plug and Play: This board requires no fast interface to link devices. Users need to plug the external device into the board’s pins.

### **Applications of Arduino Uno**

* Home Automation System
* Auto Intensity Control of Street Lights
* Plant Watering System
* Security and defense
* Embedded System
* Digital Electronics and [Robotics](https://www.raypcb.com/3-laws-of-robotics/)
* Weighing machines
* Parking Lot Counter
* Medical instrument
* Traffic Light Count Down Timer
* Home Automation
* Industrial Automation
* Emergency Light for Railways

**Conclusion**

Arduino UNO PCB is a low-cost microcontroller that comes with advanced features. Unlike other microcontrollers, its software runs in OS, windows, Mac, Linux. The Arduino UNO board is a good platform for developing pilot projects and innovation of new technologies. This board features various components which play crucial roles in its functioning.

It is a user-friendly board for beginners as it helps them quickly build their electronic projects. Due to the features of this board, it is the most popular of all the Arduino boards. As a newbie in developing electronic projects, the Arduino UNO PCB will help you have an enjoyable experience.

**References**

1. Sayyed Ayesha Baji, Mangalagiri Lavanya, Sirasani Jhansi, Naladimmu Dhanalakshmi Lakshmi, P.Narayana Swami, “Home Automation using IOT Application”. International Journal of Research Studies in Science, Engineering, and Technology Volume 6, Issue 2, 2019, PP 48-53. ISSN 2349-476X DOI: <https://doi.org/10.22259/2349-476X.0602007>.
2. Hamid Hussain Hadwan, Y. P. Reddy, “Smart Home Control by using Raspberry Pi & Arduino UNO,” International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 4, April 2016.
3. Y. Laxmi Narasimha Rao, and G. Ravindranath, “Implementation of DTC-SVM (Sample Reference Phase Voltages) of Induction Motor Using Arduino UNO.”, EEE Dept, Matrusri Engineering College, Saidabad, Hyderabad, India Received: August 31, 2021. Accepted: December 9, 2021.
4. Md. Monirul Islam, Mohammod Abul Kashem, Jia Uddin, “An Internet of things framework for real-time aquatic environment monitoring using an Arduino and sensors”, International Journal of Electrical and Computer Engineering (IJECE) Vol. 12, No. 1, February 2022, pp. 826~833 ISSN: 2088-8708, DOI: 10.11591/ijece.v12i1.pp826-833
5. Prof. Bhushan Mankar, Mr. Akshay Thakare, Mr. Hrutwik Dalvi, Mr. Rushikesh Kale, Mr. Nikhil Deshmukh, Mr. Suraj Mahalle, “WEATHER MONITORING SYSTEM USING IOT,” International Research Journal of Modernization in Engineering Technology and Science ( Peer-Reviewed, Open Access, Fully Refereed International Journal ) Volume:04/ Issue:03/March-2022 Impact Factor- 6.752 [www.irjmets.com](http://www.irjmets.com)
6. Prof. C.K. Shejwal, Mr. V.V. Mhaske, Mr. S.C Thorat, Miss. J.D. Chavhan, “ARDUINO BASED ACCIDENT PREVENTION SYSTEM USING EYE BLINK SENSOR”. International Research Journal of Modernization in Engineering Technology and Science ( Peer-Reviewed, Open Access, Fully Refereed International Journal ) Volume:04/Issue:01/January-2022 Impact Factor- 6.752 [www.irjmets.com](http://www.irjmets.com)
7. Radovan Rabrenović, Marko Tadić and Radovan Stojanović, “ARDUINO BASED SMART FARMING FOR THERAPEUTICAL MICRO PLANTS”. UNIVERSITY OF MONTENEGRO FACULTY OF ELECTRICAL ENGINEERING Podgorica, Montenegro, 2022.
8. Vincent Lusterio, Robert Christian Montecer, Dr. Neil Balba, “Multiple Laser Alarm System using Arduino Uno”, LPU-Laguna Journal of Engineering and Computer Studies Vol. 4 No. 3 October 2020
9. Vijay Jadav, Nayan Machhi, Dhananjay Biawat, Rintu Das, Prof. Jyoti Mali, “Review for Arduino based Portable Ventilator for COVID-19”. International Journal of Creative Research Thoughts (IJCRT), © 2022 IJCRT | Volume 10, Issue 1 January 2022 | ISSN: 2320-2882
10. Yaser S. A. Shaheen, Hussam M. I. Alkafrawi, Tarek R. S. Al Aga, Ismail M. Elkafrawi and Massoud A. Omar Imaeeg, “Arduino Mega Based Smart Traffic Control System”, Asian Journal of Advanced Research and Reports 15(12): 43-52, 2021; Article no.AJARR.84793 ISSN: 2582-3248
11. Md Saifudaullah Bin Bahrudin and Rosni Abu Kassim, “Development of Fire Alarm System using Raspberry Pi and Arduino Uno”, 2013 International Conference on Electrical, Electronics and System Engineering
12. Chinnasami Sivaji, M. Ramachandran, Vidhya Prasanth, Soniya Sriram, Sowmiya Soundhraj, “Application of Arduino Devices in various IOT Application”, DOI: https://doi.org/10.46632/rne/1/1/7 Copyright@ 2022 REST Publisher 39 Renewable and Nonrenewable Energy Vol: 1(1), 2022 REST Publisher; ISBN: 10978-81-948459-2-8 Website: <http://restpublisher.com/book-series/renewable-and-nonrenewable-energy/>