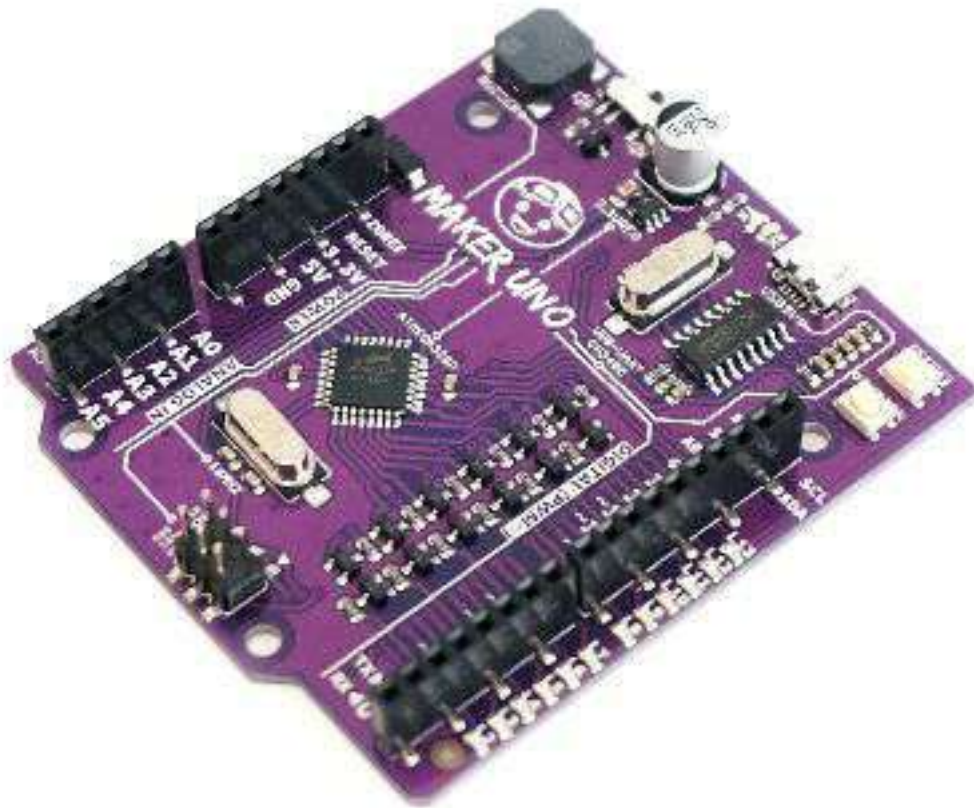




## Maker Uno

# MAKER-UNO



## User's Manual

Rev 1.0  
Dec 2017

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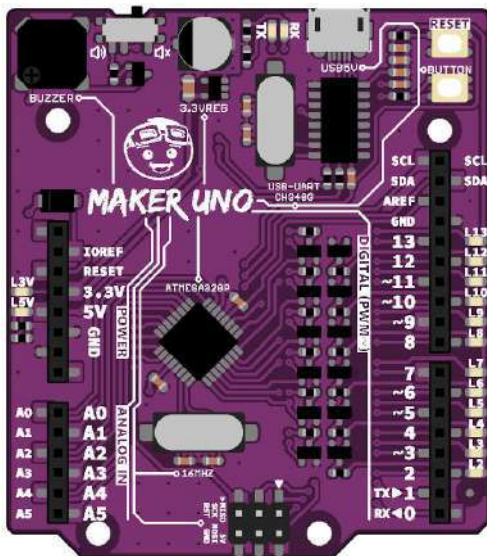
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## 1. INTRODUCTION

We bring you the Maker UNO, an Arduino UNO compatible board designed and developed specially for students to learn coding and microcontroller. We named it Maker UNO to encourage everyone to be a maker by getting started with this amazing board. By the way, it is in **PURPLE!**

3 years ago, we re-engineered Arduino UNO and introduce [CT-UNO](#). It has been used in many projects development, among students, engineers, teachers, and makers. We have also been conducting training using CT-UNO for several years, and from the observations and feedback gathered; there are some features are under-utilized, yet there are some features which are needed for beginner. Working hand in hand with [ARUS](#) and [rero](#) team, we initiate the redesign of CT-UNO, making it more affordable, and more beginner friendly. It is Arduino UNO R3 compatible, and by that, Maker UNO can be programmed via Arduino IDE and compatible with all the example code and libraries for Arduino UNO.

*"We named it Maker UNO to encourage everyone to be a maker by getting started with this amazing board!"*



We have removed the DC jack (12V adapter input) and the 5V linear regulator as 90% of the beginner and projects use 5V from USB only. so the board can be offered at more affordable price. But don't get us wrong, Maker-UNO is not removing components, we actually design-in more components to help everyone to learn programming, coding and microcontroller. We added a piezo buzzer that will act as simple audio output, of course you can program it. Yet, to ensure the compatibility of Arduino UNO, we have also added a slide switch to disable this piezo buzzer and leave the IO as it is. Aside from the standard LED on pin 13, Maker-UNO comes with a programmable LED on every digital pin, from pin D0 to D13 :) That is a lot of LEDs. We believe LEDs provide very good visual/light digital output where the eyes can observe, while piezo buzzer offers sound feedback where the ears can hear. That is good enough for outputs, how about input? We reserve the reset button and added a programmable push button. How good is that? Now you can learn digital input, output, PWM (piezo buzzer and LED brightness) with just the Maker-UNO board.

Not to forget the change of FTDI chip to CH340 IC, the low cost yet stable USB to UART IC. Maker-UNO combines the simplicity of the UNO Optiboot bootloader (which load program faster), the stability of the CH340 and the R3 shield compatibility of the latest [Arduino UNO R3](#).

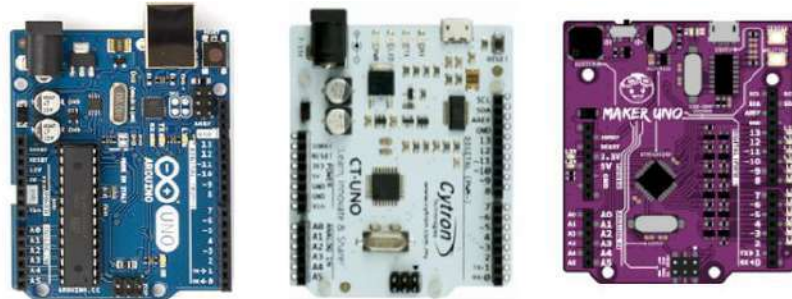
Of course, we preserve the good feature of CT-UNO, the USB Micro B socket for program loading and to power the board. This enable everyone to utilize the USB cable of Android smart phone and power bank. Program can be loaded from your computer by utilizing your Android phone USB cable. Select "Arduino/Genuino UNO" for the "Board" in Arduino IDE and choose the correct COM port, you are ready to upload the code. If you do not have the [Micro-B USB cable](#), please get it as it is sold separately.

Maker-UNO has all the amazing features Arduino UNO has to offer, 14 Digital I/O pins with 6 PWM pins, 6 Analog inputs, UART, SPI, external interrupts, not to forget the I<sup>2</sup>C too. The SDA, SCL and IOREF pins which being broken out on UNO R3 are on MAKER-UNO too. We has also populated the ISP header pins (SPI and power). With this, Maker-UNO will be compatible with all Arduino UNO shield.

#### Features:

- SMD ATmega328P microcontroller(the same microcontroller on Arduino UNO) with Optiboot (UNO) Bootloader.
- USB Programming facilitated by the CH340.
- Input voltage: USB 5V, from computer, power bank or standard USB adapter.
- 500mA (maximum) 3.3V voltage regulator.
- 0-5V outputs with 3.3V compatible inputs.
- 14 Digital I/O Pins (6 PWM outputs).
- 6 Analog Inputs.
- ISP 6-pin Header.
- 32k Flash Memory.
- 16MHz Clock Speed.
- R3 Shield Compatible.
- LED array for 5V, 3.3V, TX, RX and all digital pins.
- On board programmable push button (pin 2, need to configure as INPUT\_PULLUP).
- On board piezo buzzer (pin 8).
- Utilize USB Micro-B socket.
- **PURPLE PCB!**

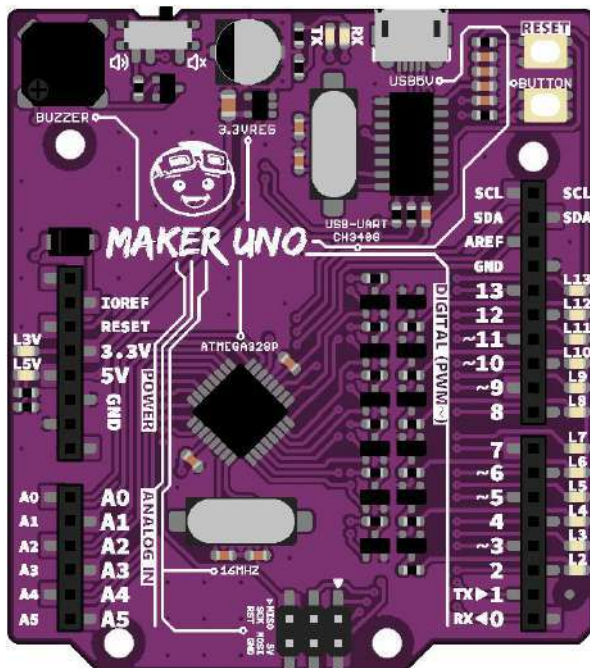
## Maker Uno Comparison Table



| FEATURES                           | Arduino Uno R3   | CT UNO  | Maker UNO   |
|------------------------------------|--|---|---|
| <b>Microcontroller</b>             | ATmega328P   | ATmega328P  | ATmega328P  |
| <b>Operating Voltage</b>           | 5V   | 5V  | 5V  |
| <b>Input Voltage (recommended)</b> | 7 - 12V<br>(Adapter)   | 7 - 12V<br>(Adapter)  | 5V<br><b>(USB only)</b>   |
| <b>Input Voltage (limit)</b>       | 6 - 20V<br>(Adapter)   | 6 - 20V<br>(Adapter)  | 5V<br><b>(USB only)</b>   |
| <b>Digital I/O Pins</b>            | 20   | 20  | 20  |
| <b>PWM</b>                         | 6  | 6   | 6   |
| <b>Analog Input</b>                | 6 (10-bit)   | 6 (10-bit)  | 6 (10-bit)  |
| <b>UART</b>                        | 1  | 1   | 1   |
| <b>SPI</b>                         | 1  | 1   | 1   |
| <b>I2C</b>                         | 1  | 1   | 1   |
| <b>External Interrupt</b>          | 2  | 2   | 2   |
| <b>DC Current for 5V</b>           | 1A   | 1A  | USB Source  |
| <b>DC Current for 3.3V</b>         | 50 mA  | 500 mA  | 500 mA  |
| <b>DC Current per I/O Pin</b>      | 20 mA  | 20 mA   | 20 mA   |
| <b>Flash Memory</b>                | 32 KB  | 32 KB   | 32 KB   |
| <b>SRAM</b>                        | 2 KB   | 2 KB  | 2 KB  |
| <b>EEPROM/Data Flash</b>           | 1 KB   | 1 KB  | 1 KB  |
| <b>Clock Speed</b>                 | 16 MHz   | 16 MHz  | 16 MHz  |
| <b>USB to Serial Chip</b>          | ATmega16U2   | FT231X  | CH340G  |
| <b>Programming IDE</b>             | Arduino IDE  | Arduino IDE   | Arduino IDE   |
| <b>Extra Features</b>              | <ul style="list-style-type: none"> <li>• Programmable LED at pin 13</li> </ul> | <ul style="list-style-type: none"> <li>• Programmable LED at pin 13</li> <li>• Extra GPIO pads with standard pitch</li> </ul> | <ul style="list-style-type: none"> <li>• Programmable indicator LED at every digital pins (pin 2 to pin 13)</li> <li>• Programmable push button at pin 2</li> <li>• Piezo buzzer at pin 8 with selector switch</li> </ul> |
| <b>Price</b>                       | RM 96.00 (~USD 25.00)  | RM 58.80 (~USD 15.00)   | <b>RM 26.50 (~USD 6.50)</b>   |

## 2. PACKING LIST

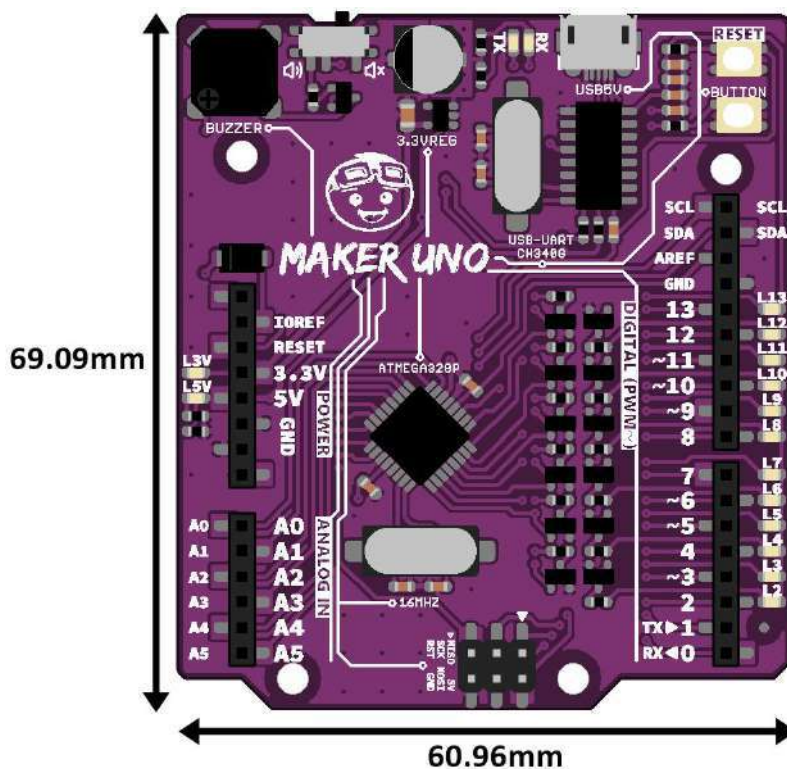
Please check the parts and components according to the packing list. If there are any parts missing, please contact us at [sales@cytron.io](mailto:sales@cytron.io) immediately.



| No | ITEMS                       | QUANTITY |
|----|-----------------------------|----------|
| 1  | Maker Uno (Code: MAKER-UNO) | 1        |

### 3. PRODUCT SPECIFICATIONS

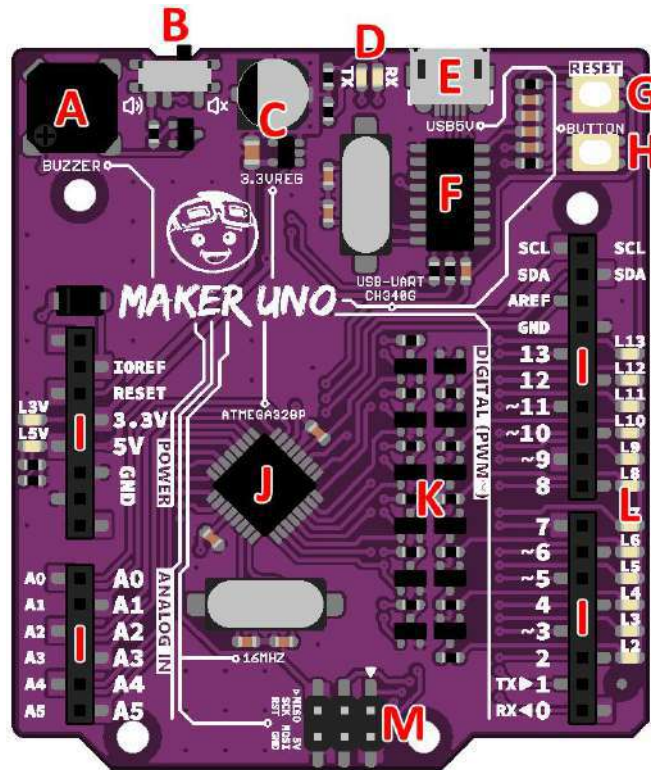
Dimension:



Absolute Maximum Rating of Maker Uno:

| No | PARAMETERS                               | Min | Typ | Max | Unit |
|----|--|-----|-----|-----|------|
| 1  | Input Voltage via USB connector          | 4.8 | -   | 5.2 | V    |
| 2  | DC Current for 3.3V Pin (Max Continuous) | -   | -   | 500 | mA   |
| 3  | DC Current per I/O Pin (Max)             | -   | -   | 20  | mA   |

## 4. BOARD LAYOUT



| LABEL    | FUNCTION  |
|----------|---|
| <b>A</b> | <b>ON BOARD PIEZO BUZZER</b><br>Piezo buzzer is connected to pin 8 through slide switch (labeled B).  |
| <b>B</b> | <b>PIEZO BUZZER SLIDE SWITCH</b><br>Slide switch to connect between pin 8 to piezo buzzer (labeled A). To use piezo buzzer, slide the switch on and program the buzzer. To use pin 8 for other purpose, slide the switch off. |
| <b>C</b> | <b>VOLTAGE REGULATOR 3.3V</b><br>Voltage regulator 3.3V used to regulate 5V USB to 3.3V and connected to pin 3.3V (labeled I).  |
| <b>D</b> | <b>LED INDICATOR FOR USB-SERIAL</b><br>Indicates USB-Serial data for uploading process or debug purpose (Serial Monitor).   |
| <b>E</b> | <b>USB MICRO B CONNECTOR</b><br>Main supply for Maker Uno. Used for program and debug purpose (Serial Monitor) too.   |
| <b>F</b> | <b>USB-SERIAL IC CONVERTER (CH340G)</b><br>Converts USB data to serial data. Used for program and debug purpose (Serial Monitor).   |
| <b>G</b> | <b>RESET BUTTON</b><br>Button to restart Maker UNO program.   |
| <b>H</b> | <b>PROGRAMMABLE BUTTON</b><br>This button is connected to pin 2 and GND. To use it, user need to configure it as INPUT_PULLUP.  |
| <b>I</b> | <b>ARDUINO UNO R3 STANDARD FEMALE PIN HEADER</b><br>Maker UNO female header pin follows Arduino UNO R3 standard. The only difference is, Maker UNO does not have Vin.   |



|          |   |
|----------|---|
| <b>J</b> | <b>MAIN MICROCONTROLLER (ATMEGA328P)</b><br>Main controller for Maker Uno is ATmega328P, same as Arduino Uno R3.  |
| <b>K</b> | <b>SERIES OF MOSFET</b><br>These series of MOSFET is a 'secret' why you can control LED or make it as indicator for input, even for pull-up input.                |
| <b>L</b> | <b>SERIES OF LED FOR DIGITAL I/O</b><br>Every digital IO is equipped with LED, where you can control it or make it as indicator for input.                        |
| <b>M</b> | <b>ARDUINO UNO STANDARD ISP PIN HEADER</b><br>These are 2x3 header pins, standard for loading program via AVR programmer. Some uses it for SPI communication too. |

## 5. HARDWARE INSTALLATION

### 5.1 Maker Uno Power Supply

Main power for Maker-UNO is through USB connection.



If you would like to make your Maker-UNO portable, you can use power bank or [Cytron LiPo Power Shield](#).



#### NOTE

*It is advisable to have 1 power source only at 1 time.*

## 5.2 Using Arduino Uno Shield

Since Maker-UNO doesn't have Vin, any Arduino shield that require Vin is not compatible. However, if the shield have option to choose power source (either Vin or external voltage), it can be used with Maker Uno (by using external voltage). For example:

- [Cytron 3A Motor Driver Shield](#)
- [Cytron G15 Shield](#)
- [Cytron 10A Motor Driver Shield](#)
- Etc...

The rest, it is fully compatible with Maker Uno. For example:

- [LCD keypad Shield](#)
- [Cytron XBee Shield](#)
- [Cytron SKM53 GPS Shield](#)
- Etc...

So which Arduino shield is not compatible with Maker Uno? Below is the example of shield that need Vin and it don't have option to select power source.

- [GPRS Shield V3.0](#)
- Etc...

### NOTE

*How do I know either the shield is working with my Maker Uno?*

*You can refer to the product's schematic (Arduino shield) and check for the Vin connection. For further questions, please visit to our [technical forum](#) for similar question or post your question there.*

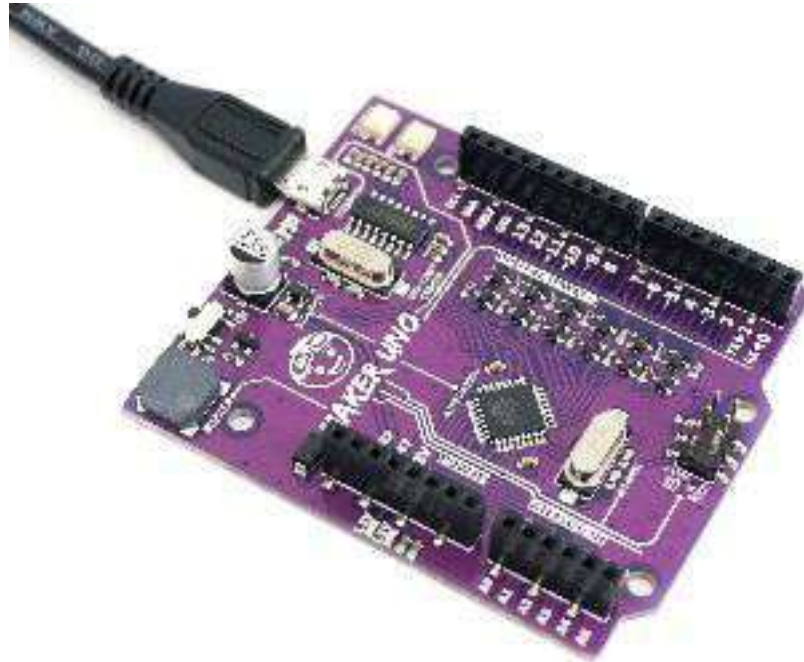
## 6. GETTING STARTED

### 6.1 Preparing Hardware

To get started, you must have:

- **Maker-UNO board.**
- **USB Micro B Cable.**
- **Laptop/PC.**

Please connect as follows to your laptop/PC.



### 6.2 Install Arduino IDE

Download the latest Arduino IDE at [www.arduino.cc/en/Main/Software](http://www.arduino.cc/en/Main/Software). Please choose appropriate installer depends on your laptop or computer OS(Operating System, Windows, Mac OS or Linux). Complete the download, proceed with the installation as usual.

A screenshot of the Arduino IDE download page. On the left, there is a teal circle containing the Arduino logo (an infinity symbol with a minus sign on the left and a plus sign on the right). To the right of the logo, the text reads "ARDUINO 1.8.5" followed by a paragraph describing the IDE as open-source software that runs on Windows, Mac OS X, and Linux. Below this, it states that the software can be used with any Arduino board and refers to the Getting Started page for installation instructions. On the right side of the page, there is a teal sidebar with links for "Windows Installer", "Windows ZIP file for non admin install", "Windows app" (with a "Get" button and the Windows logo), "Mac OS X 10.7 Lion or newer", "Linux 32 bits", "Linux 64 bits", and "Linux ARM". At the bottom of the sidebar, there are links for "Release Notes", "Source Code", and "Checksums (sha512)".

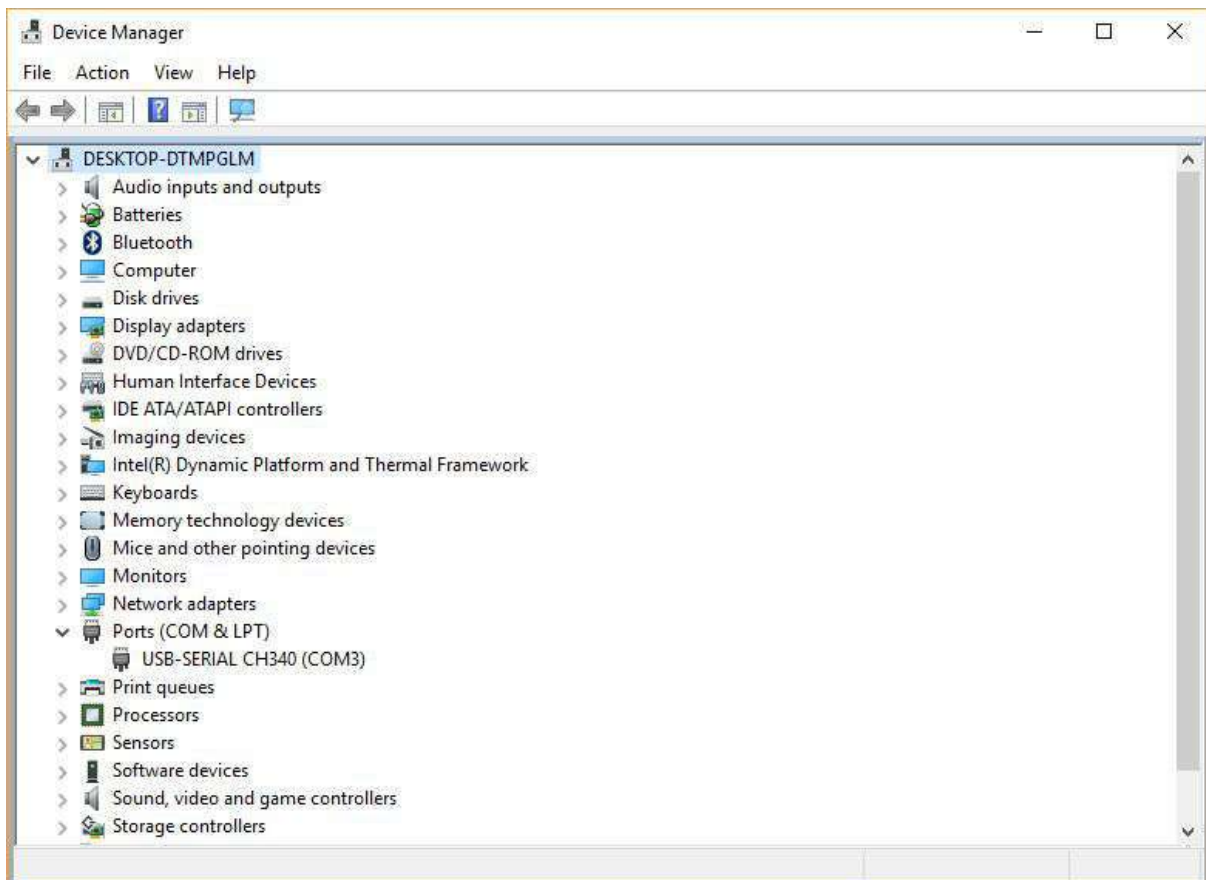
### 6.3 Install Maker Uno Driver

Download Maker-UNO driver at [Maker Uno product page](#) (under Attachment tab). Please choose appropriate driver depends on your OS. Complete the download, proceed with the installation as usual.



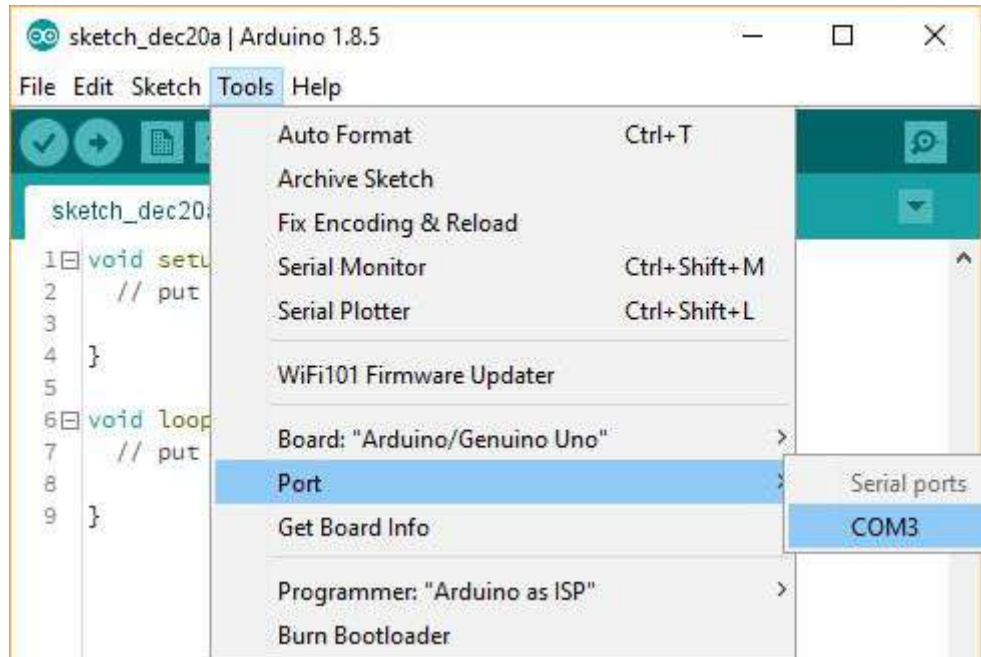
| DESCRIPTION                  | ATTACHMENT | LOWEST PRICES | REVIEWS (0)              |
|------------------------------|------------|---------------|--------------------------|
| Q & A (2)                    |            |               |                          |
| Description                  | Date Added | Size          | Action                   |
| CH341 Driver (Windows 10)    | 15/12/2017 | N/A           | <a href="#">Download</a> |
| CH341 Driver (Mac OS Sierra) | 15/12/2017 | N/A           | <a href="#">Download</a> |
| Maker UNO Schematic          | 15/12/2017 | N/A           | <a href="#">Download</a> |
| Maker UNO Fritzing File      | 15/12/2017 | N/A           | <a href="#">Download</a> |
| Maker UNO PCB Eagle File     | 15/12/2017 | N/A           | <a href="#">Download</a> |
| Arduino IDE                  | 15/12/2017 | N/A           | <a href="#">Download</a> |

After installation is complete, your Maker-UNO port should appears at Device Manager under Ports (COM & LPT) - e.g. *USB-SERIAL CH340 (COM3)*. Please remember the port number.



## 6.4 Try Blink Example

Open Arduino IDE, select Board: "Arduino/Genuino Uno" and your Maker-UNO Port number (e.g. COM3). Try Blink example (File - Examples - 01.Basic - Blink). Click Upload icon to upload Arduino code to Maker Uno.



### MAKER UNO ONLINE TRAINING

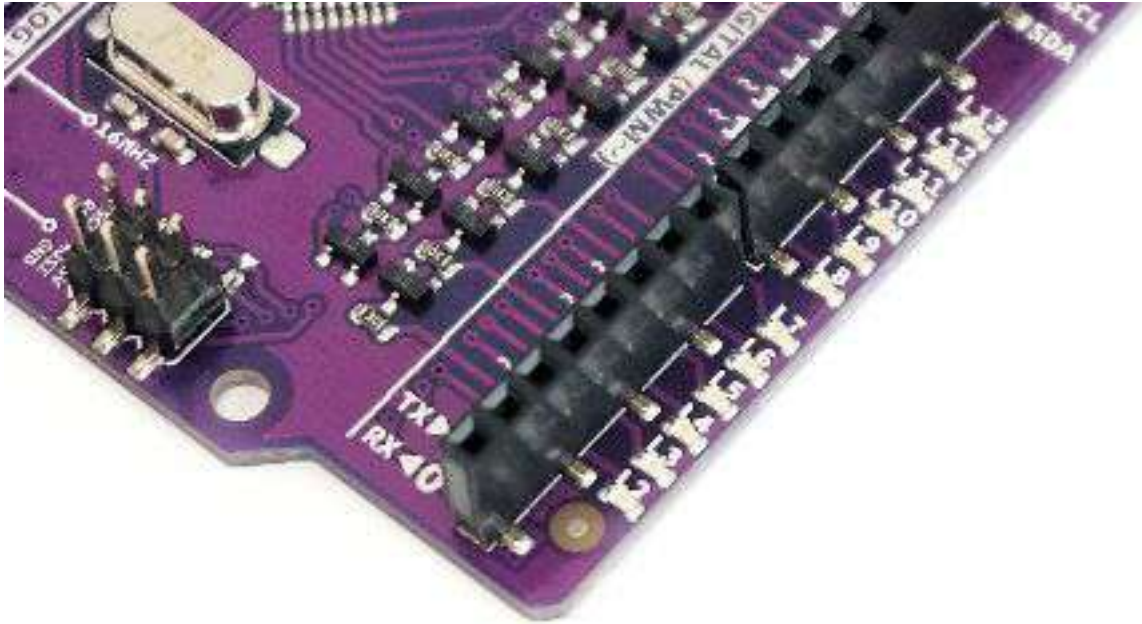
For more detail you can refer to *Maker Uno Online Training* at Cytron Youtube channel.

[MAKER UNO ONLINE TRAINING \(YOUTUBE\)](#)

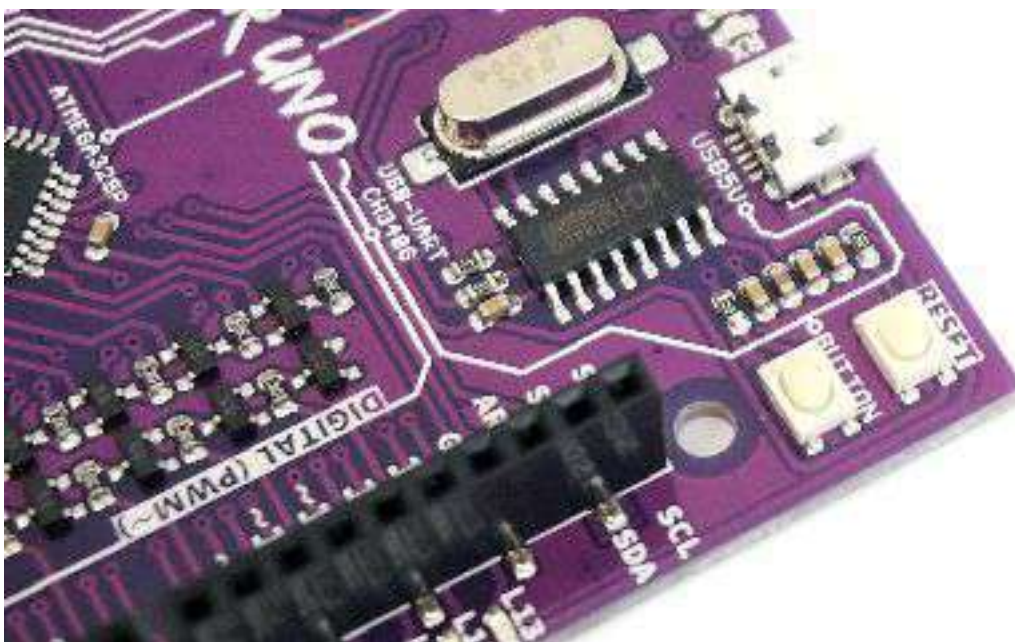
## 7. EXTRA FEATURES

Maker-UNO incorporates 3 extra features which make it interesting and more suitable for beginner. Below are the detailed descriptions for each feature.

### 7.1 LEDs at Every Digital Pins



### 7.2 Programmable Push Button



### 7.3 On-board Piezo Buzzer





## 8. WARRANTY

- Product warranty is valid for 6 months.
- Warranty only applies to manufacturing defect.
- Damaged caused by misuse is not covered under warranty.
- Warranty does not cover freight cost for both ways.

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