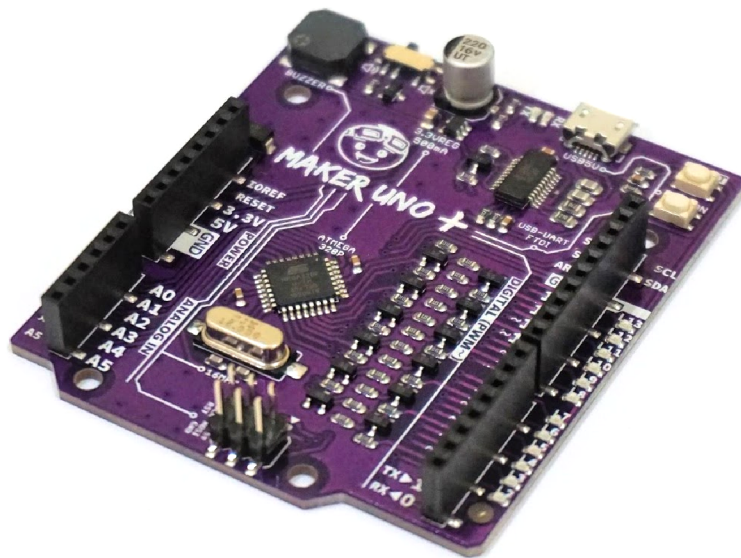




## Maker Uno Plus

# MAKER-UNO-PLUS



## User's Manual

Rev 1.0  
Oct 2018

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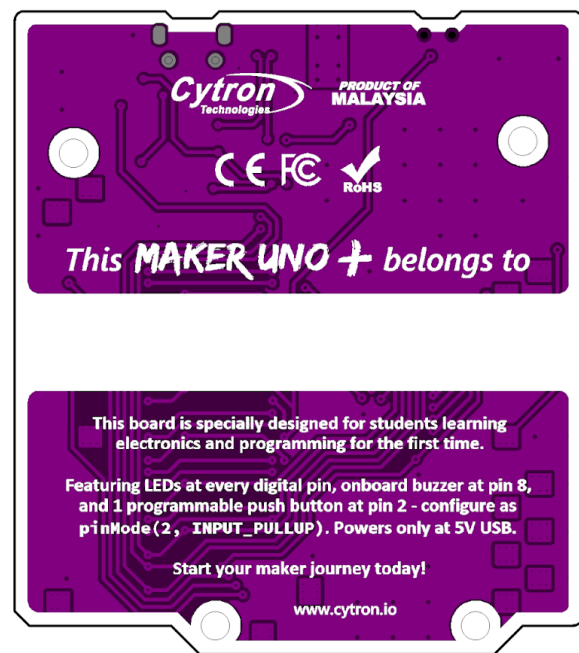
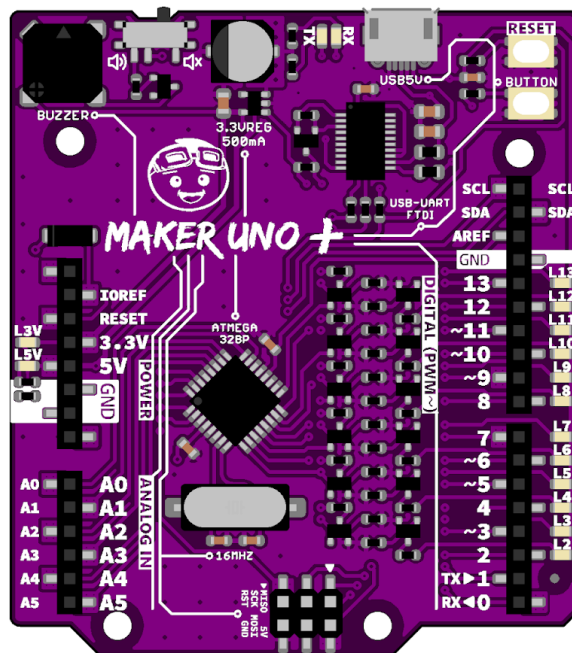
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# 1. INTRODUCTION

We bring you the Maker UNO Plus, an Arduino UNO compatible board designed and developed specially for students to learn coding and microcontroller. We named it Maker UNO Plus 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 Plus 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 ATmega16U2 chip to FTDI 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 FTDI 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.

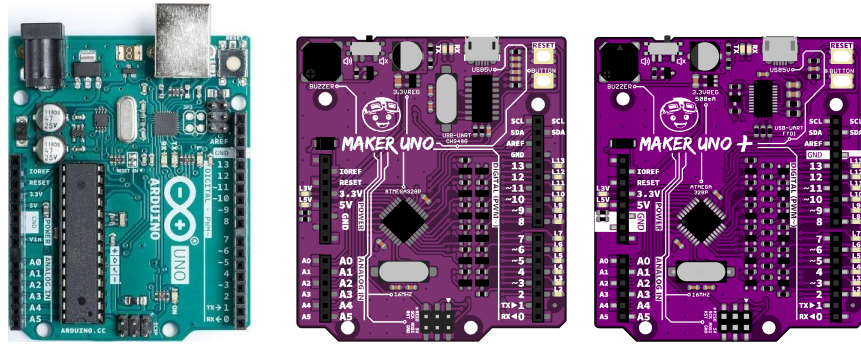
Maker-UNO has all the amazing features Arduino UNO has to offer, 14 Digital I/O pins with 6 PWM pins, 6 Analog inputs, UART, SPI, external interrupts, not to forget the I<sup>2</sup>C too. The SDA, SCL and IOREF pins which being broken out on UNO R3 are on MAKER-UNO too. We has also populated the ISP 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 FT231X.
- 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!**



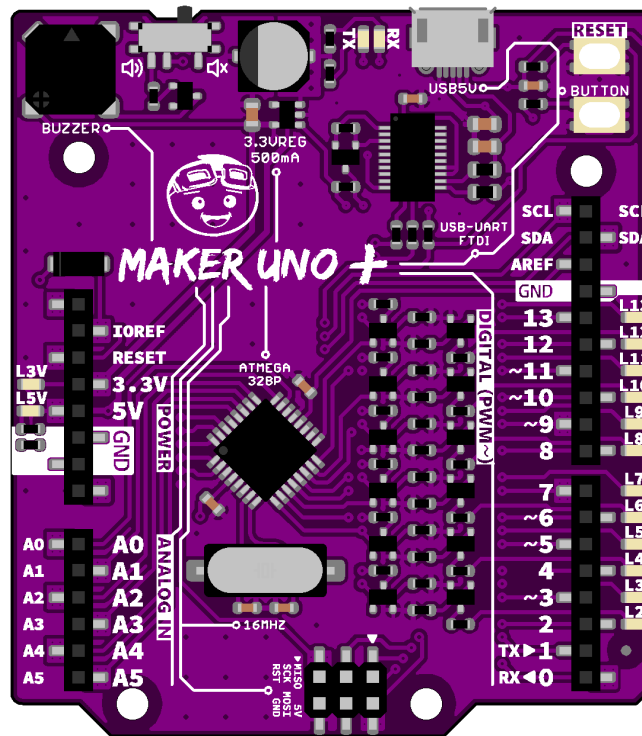
## Maker Uno Plus Comparison Table



FEATURES	Arduino Uno	Maker UNO	Maker UNO Plus
Microcontroller	ATmega328P	ATmega328P (SMD)	ATmega328P (SMD)
Operating Voltage	5V	5V	5V
Input Voltage (recommended)	7 - 12V (Adapter)	5V (USB only)	<b>5V (USB only)</b>
Input Voltage (limit)	6 - 20V (Adapter)	5V (USB only)	<b>5V (USB only)</b>
Digital IO Pins (PWM)	20 (6)	20 (6)	20 (6)
Analog, UART, SPI, I2C	6, 1, 1, 1	6, 1, 1, 1	6, 1, 1, 1
External Interrupt	2	2	2
DC Current for 5V	1A	USB source	<b>USB source</b>
DC Current for 3.3V	50mA	500mA	<b>500mA</b>
DC Current / IO Pin	20mA	20mA	20mA
Flash, SRAM, EEPROM	32KB, 2KB, 1KB	32KB, 2KB, 1KB	32KB, 2KB, 1KB
Clock Speed	16MHz	16MHz	16MHz
USB to Serial Chip	ATmega16U2	CH340G	<b>FT231X</b>
Programming IDE	Arduino IDE	Arduino IDE	Arduino IDE
Extra Features	Programmable LED at pin 13	<ul style="list-style-type: none"> <li>• Programmable indicator LED at every digital pins (pin 2 - 13).</li> <li>• Programmable push button at pin 2.</li> <li>• Piezo buzzer at pin 8 with selector switch.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Programmable indicator LED at every digital pins (pin 2 - 13).</b></li> <li>• <b>Programmable push button at pin 2.</b></li> <li>• <b>Piezo buzzer at pin 8 with selector switch.</b></li> </ul>
FCC, CE, RoHS	Yes	No	<b>Yes</b>
Price	RM96 (~USD25)	RM29 (~USD7.5)	RM60 (~USD15)

## 2. PACKING LIST

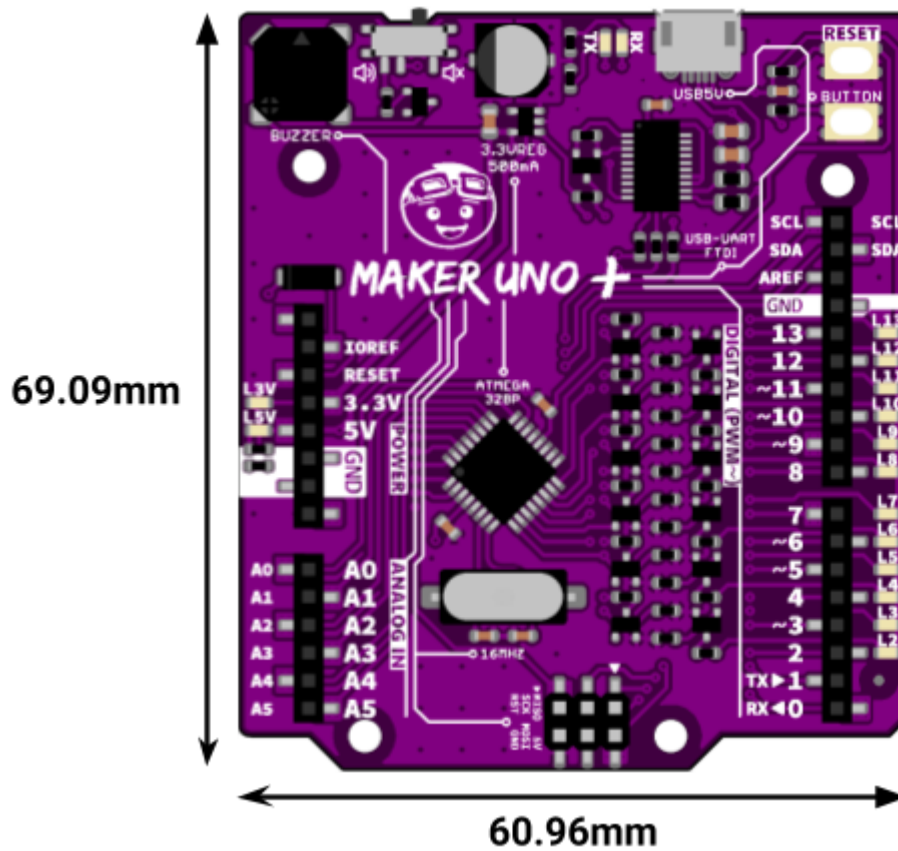
Please check the parts and components according to the packing list. If there are any parts missing, please contact us at [sales@cytron.io](mailto:sales@cytron.io) immediately.



No	ITEMS	QUANTITY
1	Maker Uno Plus (Code: MAKER-UNO-PLUS)	1
2	Micro USB cable	1
3	Pin Header Sticker	1

### 3. PRODUCT SPECIFICATIONS

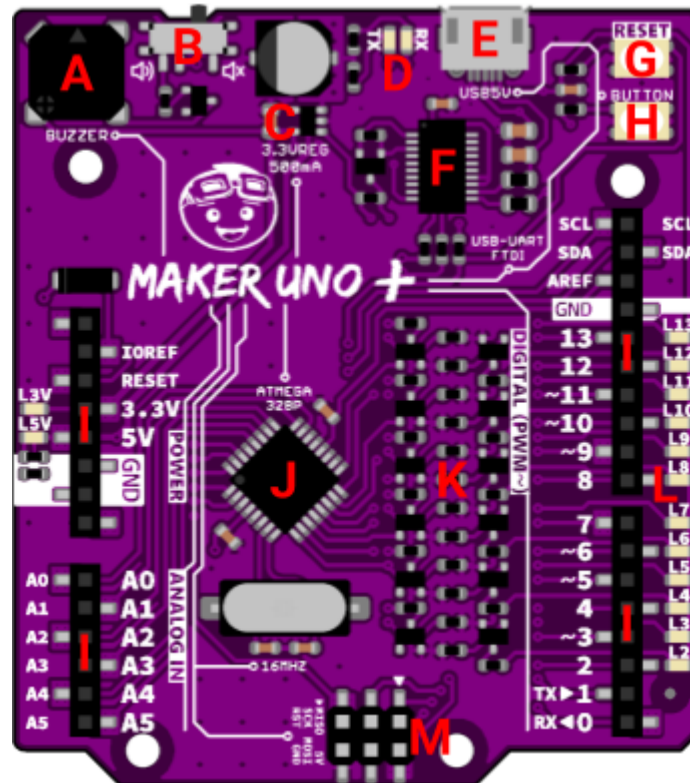
Dimension:



Absolute Maximum Rating of Maker Uno Plus:

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



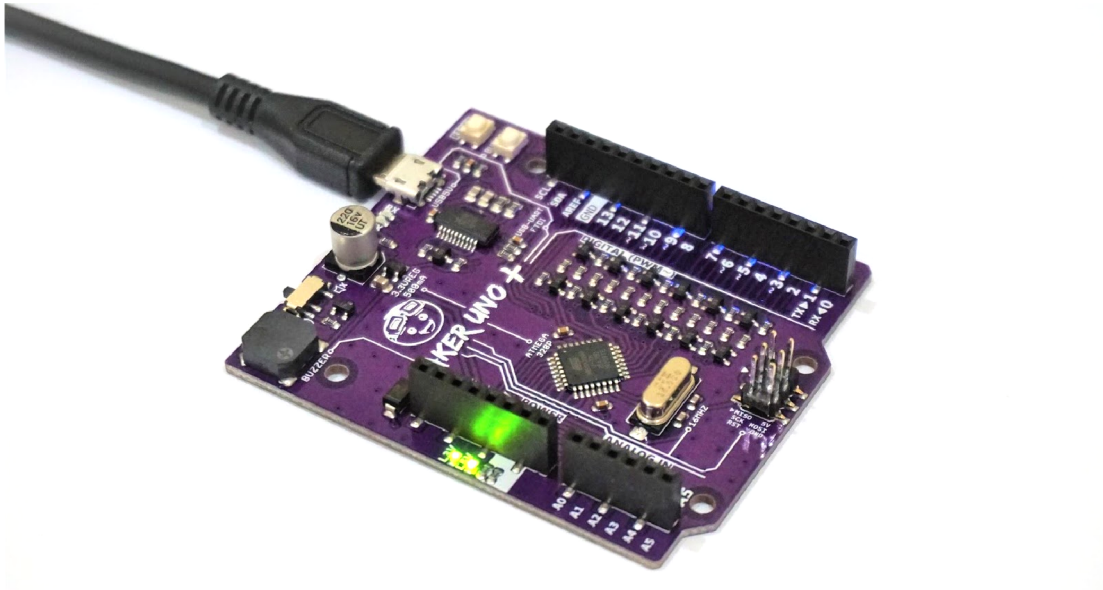
LABEL	FUNCTION
<b>A</b>	<b>ON BOARD PIEZO BUZZER</b> Piezo buzzer is connected to pin 8 through slide switch (labeled B).
<b>B</b>	<b>PIEZO BUZZER SLIDE SWITCH</b> Slide switch to connect between pin 8 to piezo buzzer (labeled A). To use piezo buzzer, slide the switch on and program the buzzer. To use pin 8 for other purpose, slide the switch off.
<b>C</b>	<b>VOLTAGE REGULATOR 3.3V</b> 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> Indicates USB-Serial data for uploading process or debug purpose (Serial Monitor).
<b>E</b>	<b>USB MICRO B CONNECTOR</b> Main supply for Maker Uno. Used for program and debug purpose (Serial Monitor) too.
<b>F</b>	<b>USB-SERIAL IC CONVERTER (FT231X)</b> Converts USB data to serial data. Used for program and debug purpose (Serial Monitor).
<b>G</b>	<b>RESET BUTTON</b> Button to restart Maker UNO program.
<b>H</b>	<b>PROGRAMMABLE BUTTON</b> 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> 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> Main controller for Maker Uno is ATmega328P, same as Arduino Uno R3.
<b>K</b>	<b>SERIES OF MOSFET</b> 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> 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> These are 2x3 header pins, standard for loading program via AVR programmer. Some uses it for SPI communication too.

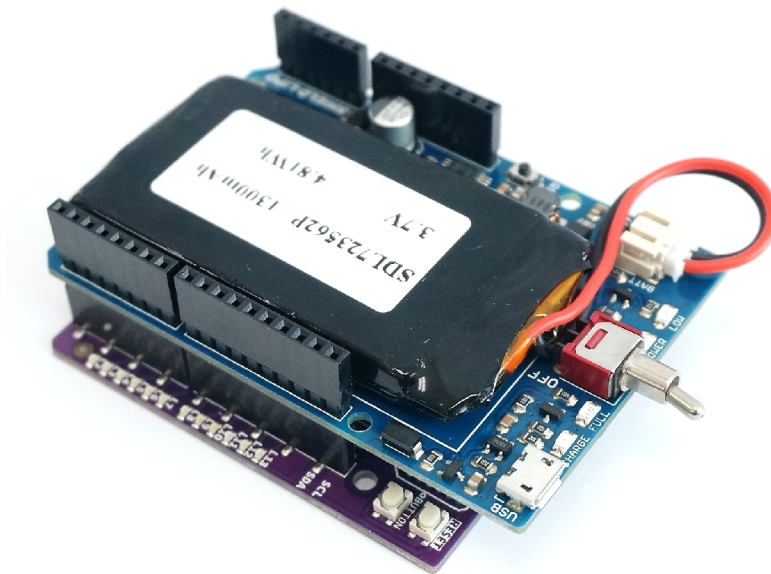
## 5. HARDWARE INSTALLATION

### 5.1 Maker UNO Plus Power Supply

Main power for Maker UNO Plus is through USB connection.



If you would like to make your Maker UNO Plus 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 Plus 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?*

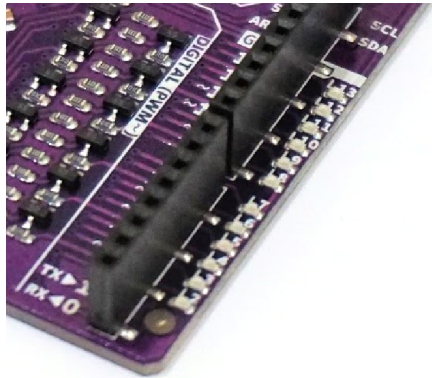
*You can refer to the product's schematic (Arduino shield) and check for the Vin connection. For further questions, please visit to our [technical forum](#) for similar question or post your question there.*



## 7. EXTRA FEATURES

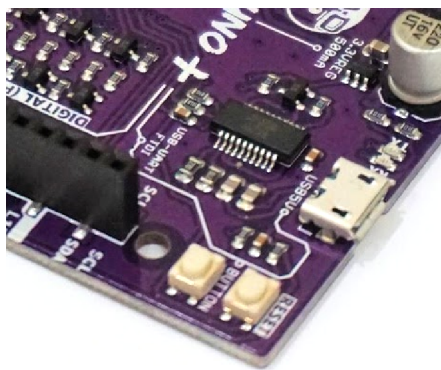
Maker UNO Plus incorporates 3 extra features which make it interesting and more suitable for beginner. Below are the detailed descriptions for each feature.

### 7.1 LEDs at Every Digital Pins



Each digital pins (pin 2 - 13) is equipped with LEDs. Those LED can be controlled as an output or can be act as an input (signal monitoring). In other words, all digital pins that connected to the LED, can be configured as output, input and input pull up.

### 7.2 Programmable Push Button



1 unit of programmable push button are included in the Maker Uno Plus. To utilize it, user need to configure push button pin 2 as input pullup.

```
pinMode(2, INPUT_PULLUP);
```

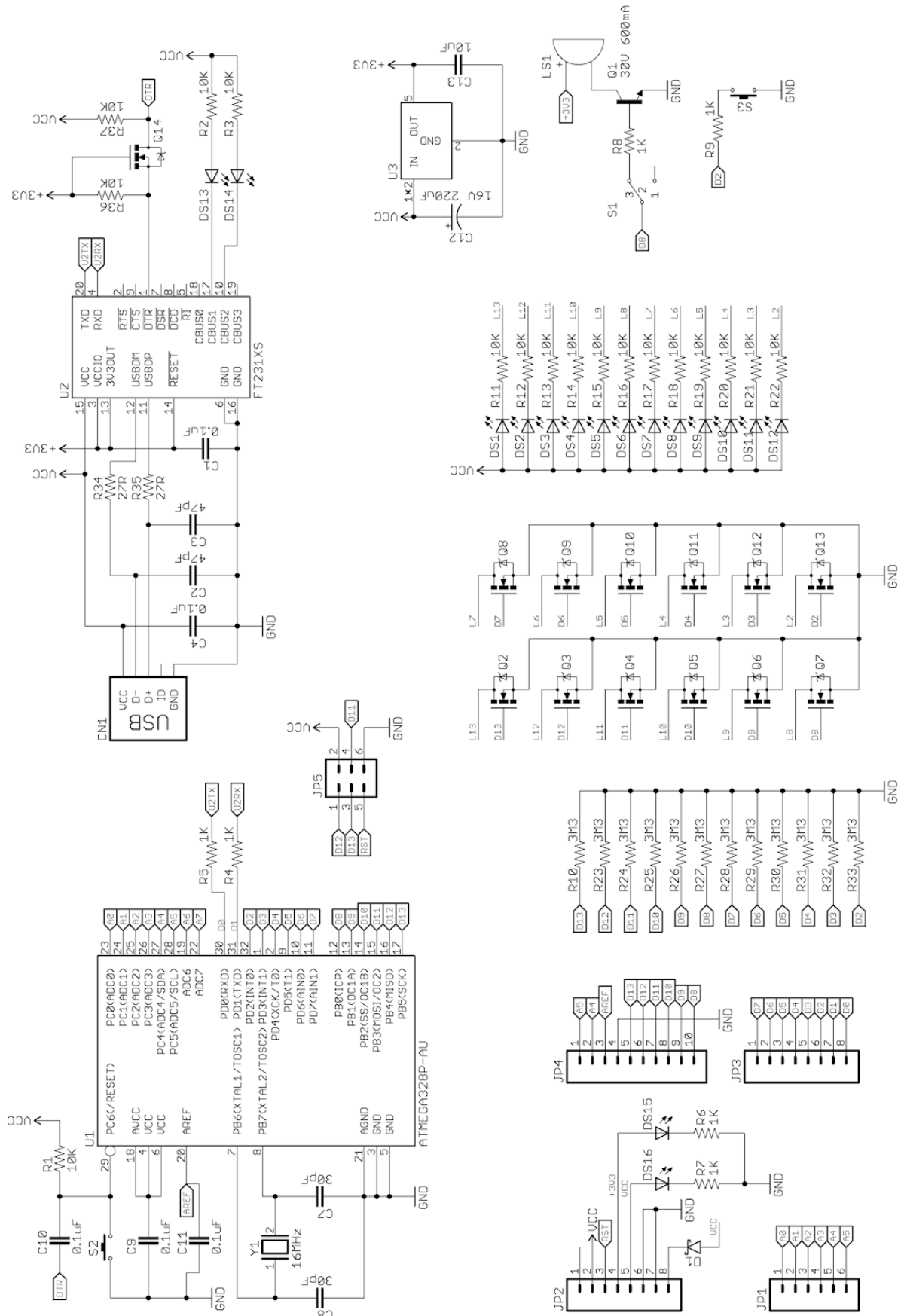
### 7.3 On-board Piezo Buzzer



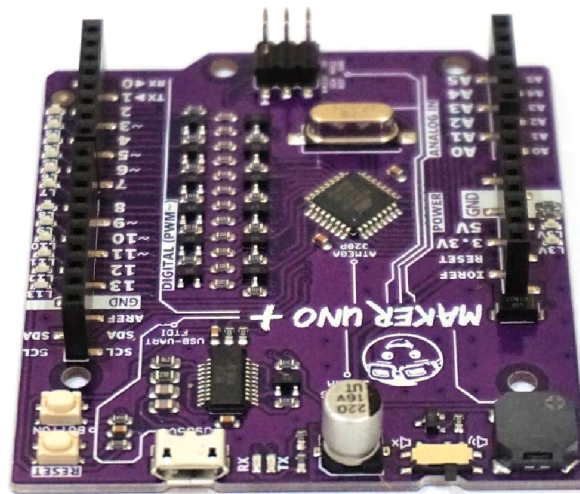
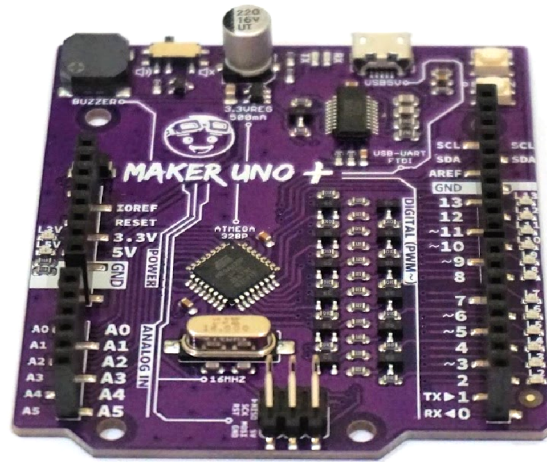
Maker Uno Plus also comes with on-board piezo buzzer. It is connected to pin 8. This piezo can generate various tone based on the frequency. Example **toneMelody** (File - Examples - 01.Digital) helps you to play with piezo buzzer.

**Note:** In case user want to use pin 8 for other purpose, please slide the switch (beside buzzer) to mute.

## 8. SCHEMATIC



## 9. GALLERY



## 10. 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.

*Prepared by:*

***Cytron Technologies Sdn Bhd***

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