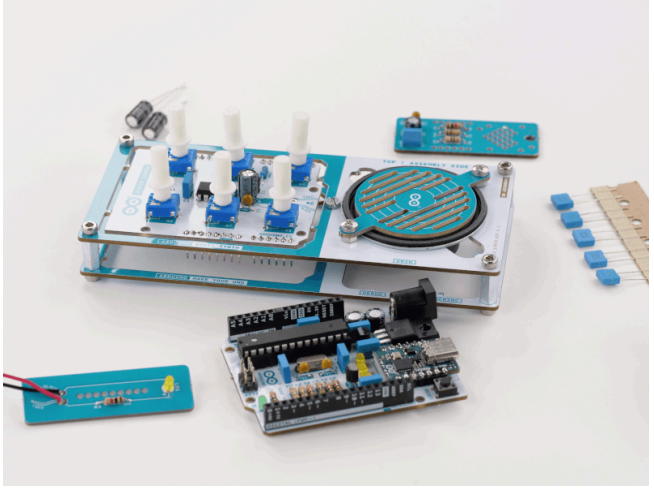
User Manual
SKU: AKX00037



Description

The **Arduino® Make Your UNO Kit** is the perfect kit to learn the basics of electronics and coding by assembling your own **Arduino® UNO**. Become familiar with soldering by mounting every single component, unleash your creativity with the **Audio Synth Shield**, and learn how to code using your new **UNO** board to create amazing projects!

Target areas:

Maker, introduction, education

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Features

Make Your UNO board		
Component	**Details**	
ATMega328P Processor	Memory	AVR CPU at up to 16 MHz 32 kB Flash 2 kB SRAM 1 kB EEPROM
	Security	Power On Reset (POR) Brown Out Detection (BOD)
	Peripherals	2x 8-bit Timer/Counter with a dedicated period register and compare channels 1x 16-bit Timer/Counter with a dedicated period register, input capture and compare channels 1x USART with fractional baud rate generator and start-of-frame detection 1x controller/peripheral Serial Peripheral Interface (SPI) 1x Dual mode controller/peripheral I2C 1x Analog Comparator (AC) with a scalable reference input Watchdog Timer with separate on-chip oscillator 6x PWM channels Interrupt and wake-up on pin change
USB-C® Serial PCB Board	The USB-C® Serial PCB contains the ATMega16U2 processor and a USB-C® socket to program and power the board.	
	ATMega16U2 Processor	8-bit AVR® RISC-based microcontroller
	Memory	16 KB ISP Flash 512B EEPROM 512B SRAM debugWIRE interface for on-chip debugging and programming
	Power	2.7V-5.5V

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Audio Synth Shield			
Component	**Details**		
Audio Synth Shield	Potentiometers	5x 10kΩ - Trimmer potentiometer - User programmable 1x 10kΩ - Trimmer potentiometer - Directly connected to the audio amplifier	
	Audio	Amplifier: LM386	Class-AB 4Ω Load 0.325W
		Speaker: L50EJ	Impedance @2kHz: 8Ω Max Power 0.5W Output: 81dB +-3dB Diameter 45mm Weight: 48g

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CONTENTS

1 The Kit **6**
1.1 Application Examples 6
1.2 Related Products (Not Included) 6
1.3 Solution Overview 7
2 Ratings **8**
2.1 Recommended Operating Conditions 8
2.2 Power Consumption 8
3 Make Your UNO Board **9**
3.1 Functional Overview 9
3.1.1 Board Topology And Bill Of Materials 9
3.2 Processor 11
3.3 Power Tree 11
3.4 Board Operation 12
3.4.1 Official Instructions 12
3.4.2 Getting Started - IDE 12
3.4.3 Getting Started - Arduino Cloud Editor 12
3.4.4 Getting Started - Arduino Cloud 12
3.4.5 Sample Sketches 12
3.4.6 Online Resources 12
3.5 Connector Pinouts 13
3.5.1 JANALOG 14
3.5.2 JDIGITAL 14
3.6 Mechanical Information 15
3.6.1 Board Outline & Mounting Holes 15
4 The Audio Synth Shield **16**
4.1 Functional Overview 17
4.1.1 Board Topology and Bill of Materials 17
4.2 Connector Pinouts 19
4.2.1 JANALOG 19
4.2.2 JDIGITAL 19
4.3 Mechanical Information 20
4.3.1 Board Outline & Mounting Holes 20
4.3.2 Potentiometers Outline 21

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5 Certifications **22**
5.1 Declaration of Conformity CE DoC (EU) 22
5.2 Declaration of Conformity to EU RoHS & REACH 211 01/19/2021 22
5.3 Conflict Minerals Declaration 23
6 FCC Caution **23**
7 Company Information **24**
8 Reference Documentation **24**
9 Revision History **24**

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1 The Kit

1.1 Application Examples

The **Make Your UNO Kit** is like any **UNO** board but created by yourself. The **UNO** board is the flagship product of Arduino.

Regardless if you are new to the world of electronics or will use the **UNO** as a tool for education purposes or industry-related tasks.

First entry to electronics: If this is your first project within coding and electronics, get started with our most used and documented board **UNO** and create one by yourself using the **Make Your UNO Kit** is a great choice. It is equipped with the well-known ATmega328P processor, 14 digital input/output pins, 6 analog inputs, USB connections, ICSP header and a reset button. This board includes everything you will need for a great first experience with Arduino.

Education purposes: Although the UNO board has been with us for about ten years, it is still widely used for various educational purposes and scientific projects. The **Make Your UNO Kit** is the perfect way to teach and learn about basic circuits, electronics components, soldering and coding microcontrollers, being the perfect board to create basic and advanced projects of all kinds.

Audio synthesizer for educational and artistic performances: The kit comes with an **Audio Synth Shield** that can be attached to the **Make Your UNO Kit** to learn about and experiment with audio synthesizers, being a perfect device to play and experiment in the classroom and at the same time a great instrument for artistic performances.

1.2 Related Products (Not Included)

- Arduino UNO R3 (A000066) and Arduino UNO R3 SMD (A000066)
- Arduino Starter Kit (K000007)
- Tinkerkit Braccio Robot (T050000)
- Arduino 4 Relays Shield (A000110)
- Arduino 9 Axis Motion Shield (A000070)
- Arduino Ethernet Shield 2 (A000024)
- Arduino Motor Shield Rev3 (A000079)

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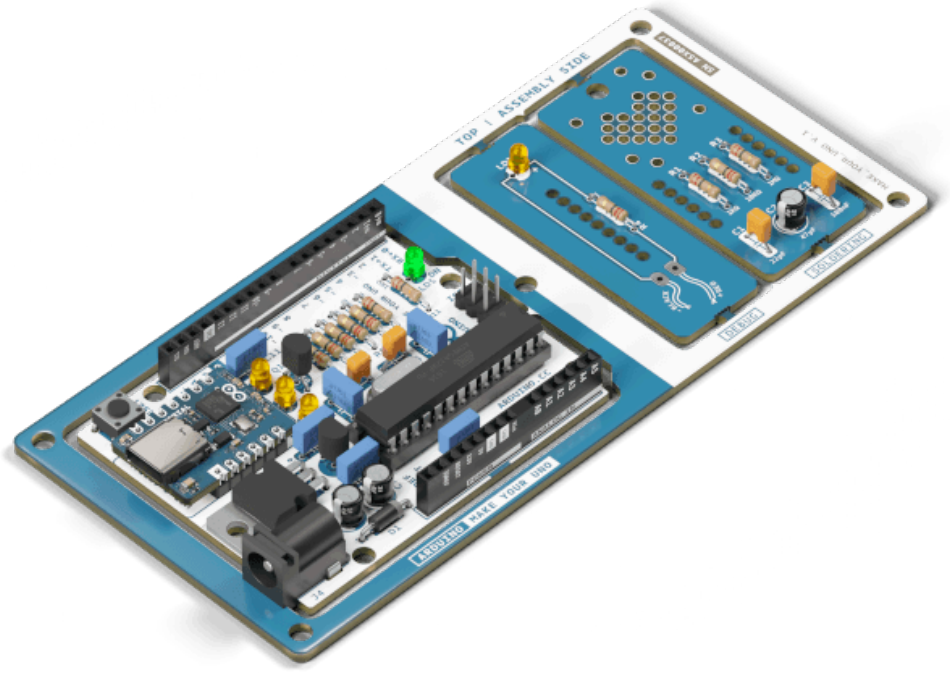
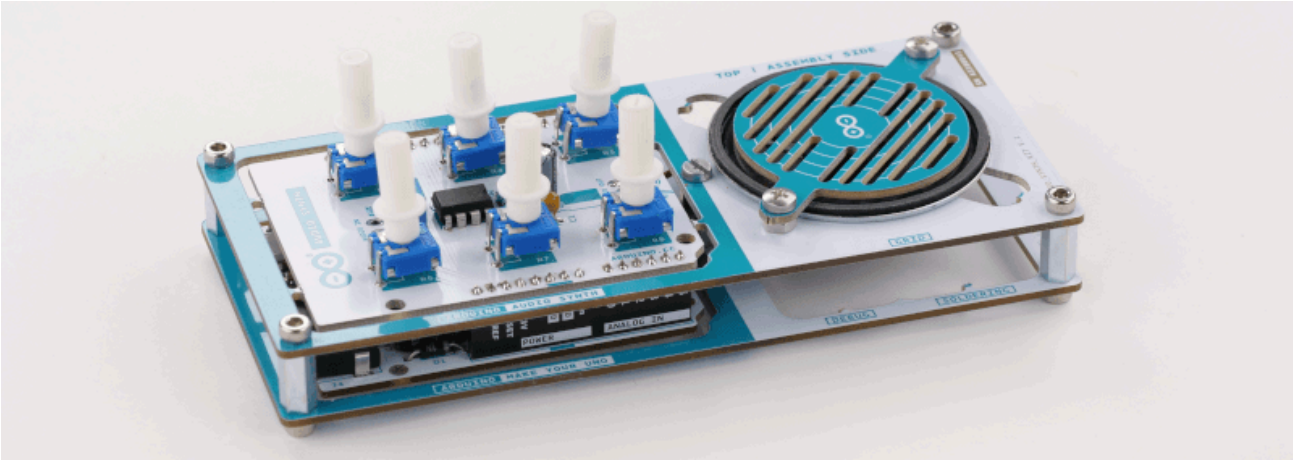
1.3 Solution Overview

The **Make Your UNO Kit** contains different boards. Besides the **UNO** board, the kit contains two additional small boards that helps the user to learn to solder its first components before starting to solder the main board. The small board with the heart shape is just for practising and it does not have any circuit or utility while the small board that contains the LED and the resistor can be powered with a 9V battery to turn on the LED.



Make Your UNO overview

Once the kit is assembled, the user can solder and assemble the **Audio Synth Shield** board and connect it on top of the **Make Your UNO** board to use the kit as an audio synthesizer.



Make Your UNO and synth audio shield mounted

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2 Ratings

2.1 Recommended Operating Conditions

Description	Min	Max
Conservative thermal limits for the whole board	-40 °C (-40 °F)	85 °C (185 °F)

NOTE: In extreme temperatures, the EEPROM, voltage regulator, and the crystal oscillator, might not work as expected due to the temperature conditions.

2.2 Power Consumption

Symbol	Description	Min	Typ	Max	Unit
VINMax	Maximum input voltage from Jack connector/VIN pad	6	-	20	V
VUSBMax	Maximum input voltage from USB connector		-	5.5	V
PMax	Maximum Power Consumption	-	-	xx	mA

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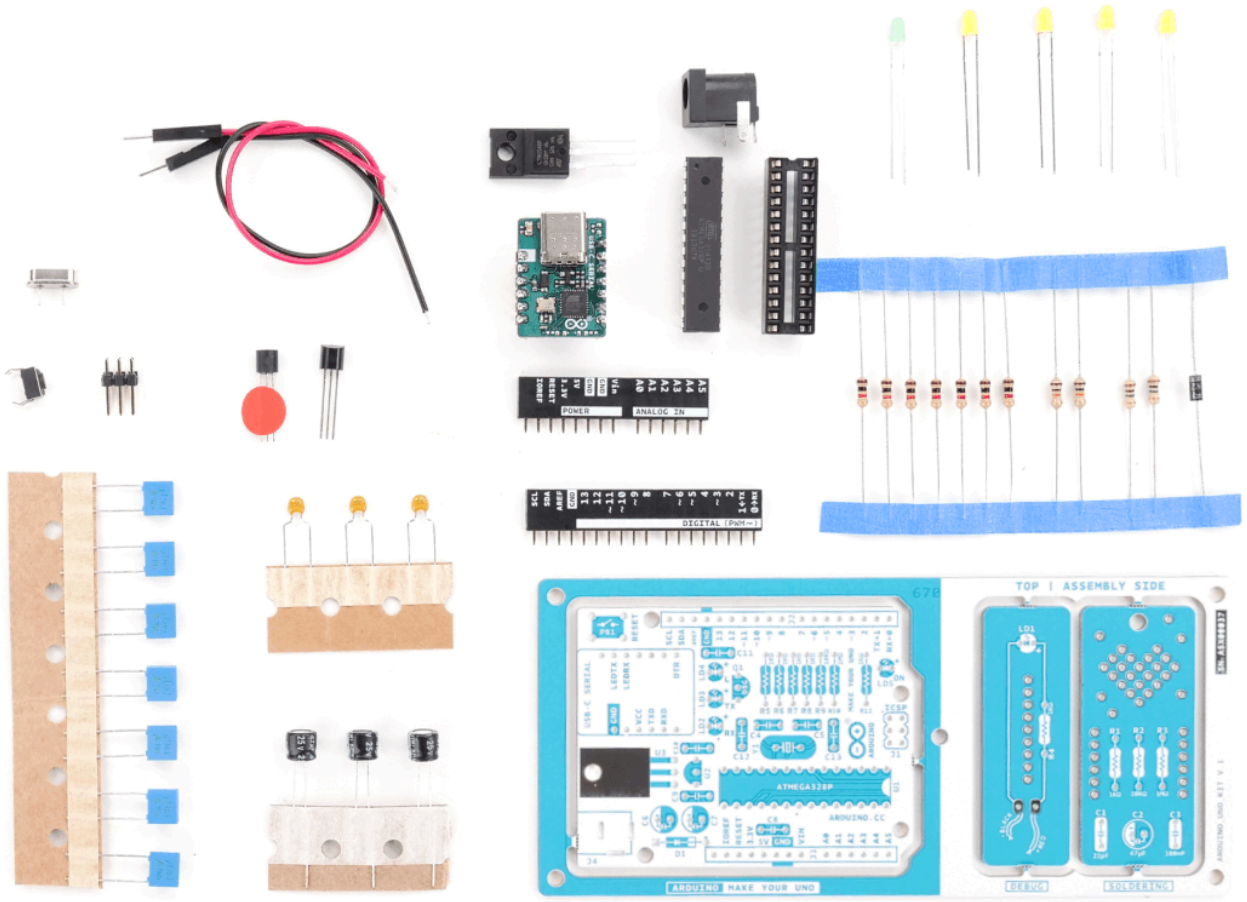
3 Make Your UNO Board

3.1 Functional Overview

3.1.1 Board Topology And Bill Of Materials



Make Your UNO components showcase

The **BOM** or **Bill Of Materials** of the **Make Your UNO Kit** is made up of common components that can be found on the market. Use this list to reference and/or replace a damaged component if necessary. The designator references can be found written on the board and inside the board source files.

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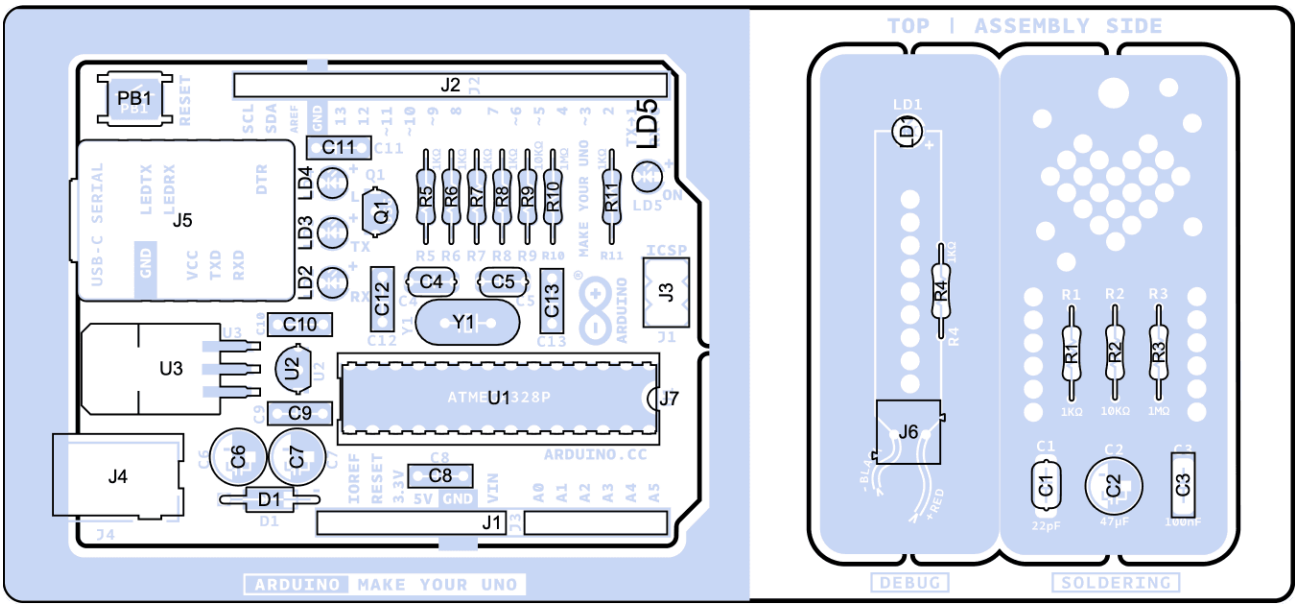

Make Your UNO board topology

Designator	Quantity	Description
C3, C8, C9, C10, C11, C12, C13	7	Capacitor THD 100nF 63V
C1, C4, C5	3	Capacitor THD 22pF 50V C0G 5%
C2, C6, C7	3	Capacitor ALUM POL THD 47µF 25V
D1	1	Rectifier diode [1N4007]
J1	1	UNO header connector - analog I/Os 14 positions
J2	1	UNO header connector - digital I/Os 18 positions
J3	1	SPI header
J4	1	Power supply jack, 6 position
J5	1	USB-C® to Serial breakout board
J7	1	IC socket connector dual in place 28 positions
LD1, LD2, LD3, LD4	4	LED Yellow diffused, 3mm
LD5	1	LED Green diffused, 3mm
PB1	1	Push-Button
Q1	1	N-Channel Mosfet Transistor 0.2A
R1, R4, R5, R6, R7, R8, R11	7	Axial resistor 1kΩ, 1/4W, 5%
R2, R9	2	Axial resistor 10kΩ, 1/4W, 5%
R3, R10	2	Axial resistor 1MΩ, 1/4w, 5%
U2	1	LDO Regulator 3.3V
Y1	1	Quartz crystal oscillator 16MHz 20pF THD
	1	PCB Arduino Make Your UNO
	1	Jumper wire Red 15cm
	1	Jumper wire Black 15cm

Some of the components listed above are available in a replacement pack on the Arduino Store.

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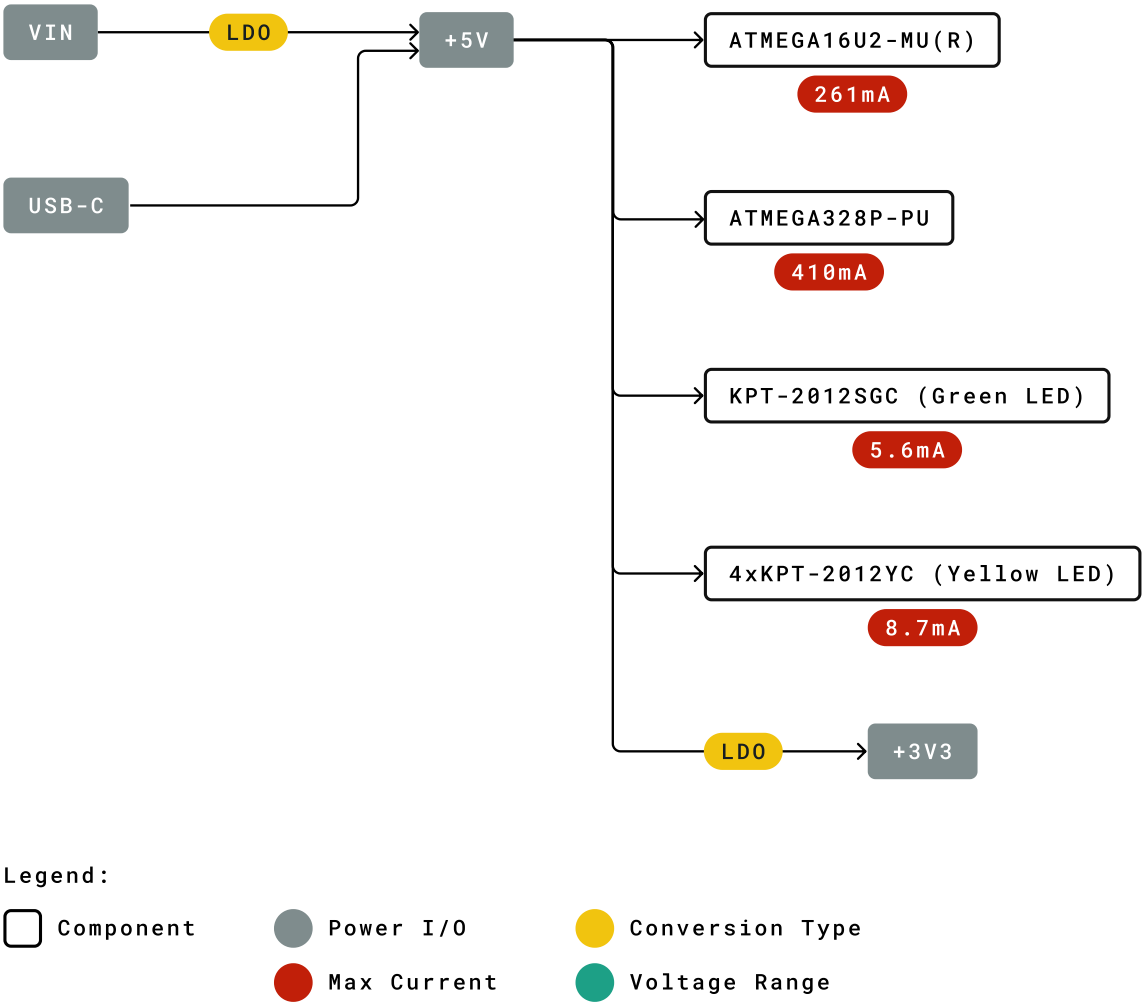
3.2 Processor

The Main Processor is an ATmega328P running at up to 20 MHz. Most of its pins are connected to the external headers, however, some are reserved for internal communication with the USB Bridge coprocessor (**ATMega16U2**) inside the **USB-C® Serial PCB Board**.

3.3 Power Tree



Make Your UNO main board power tree

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3.4 Board Operation

3.4.1 Official Instructions

The official documentation provided by Arduino to solder the entire kit is hosted at https://makeyouruno.arduino.cc

3.4.2 Getting Started - IDE

If you want to program your **UNO** while offline you need to install the Arduino Desktop IDE [1]. To connect the **UNO** to your computer, you'll need a USB-C® cable. This also provides power to the board, as indicated by the LED.

3.4.3 Getting Started - Arduino Cloud Editor

All Arduino boards, including this one, work out-of-the-box on the Arduino Cloud Editor [2] by just installing a simple plugin.

The Arduino Cloud Editor is hosted online, therefore it will always be up-to-date with the latest features and support for all boards. Follow [3] to start coding on the browser and upload your sketches onto your board.

3.4.4 Getting Started - Arduino Cloud

All Arduino IoT-enabled products are supported on Arduino Cloud which allows you to log, graph and analyze sensor data, trigger events, and automate your home or business. In the case of the **UNO** and the **Make Your UNO** boards, you will need additional hardware to connect them to the Cloud.

3.4.5 Sample Sketches

Sample sketches for the **UNO** can be found either in the "Examples" menu in the Arduino IDE.

3.4.6 Online Resources

Now that you have gone through the basics of what you can do with the board you can explore the endless possibilities it provides by checking exciting projects on Arduino Project Hub [4], the Arduino Library Reference [5] and the online store [6] where you will be able to complement your board with sensors, actuators and more.

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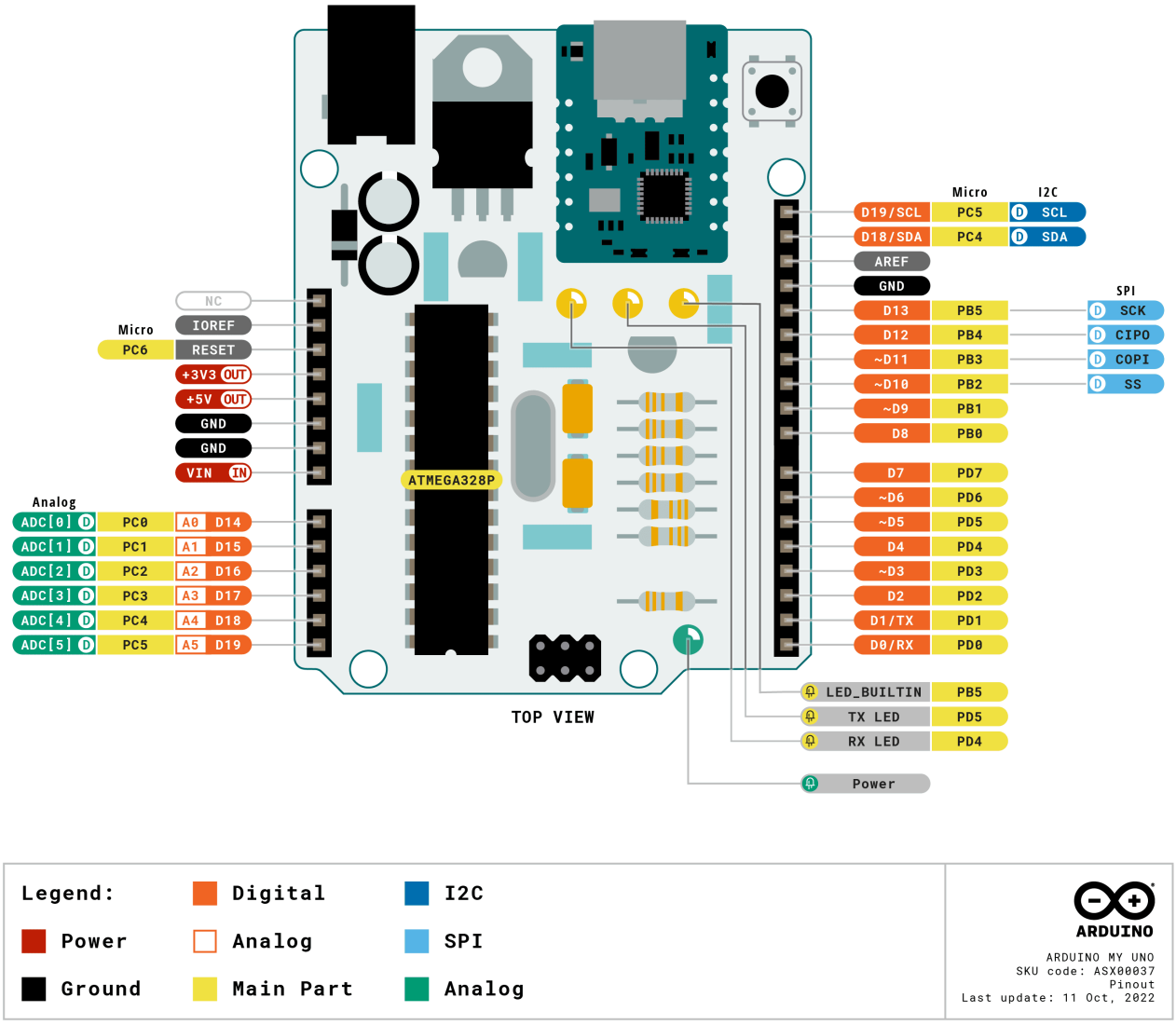
3.5 Connector Pinouts



Make Your UNO main board pinout

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3.5.1 JANALOG

Pin	Function	Type	Description
1	NC	NC	Not connected
2	IOREF	IOREF	Reference for digital logic voltage - connected to 5V
3	Reset	Reset	Reset
4	+3V3	Power	+3.3V Power Rail
5	+5V	Power	+5V Power Rail
6	GND	Power	Ground
7	GND	Power	Ground
8	VIN	Power	Voltage Input
9	A0	Analog/GPIO	Analog input 0 / GPIO
10	A1	Analog/GPIO	Analog input 1 / GPIO
11	A2	Analog/GPIO	Analog input 2 / GPIO
12	A3	Analog/GPIO	Analog input 3 / GPIO
13	A4/SDA	Analog input/I2C	Analog input 4 / I2C Data line
14	A5/SCL	Analog input/I2C	Analog input 5 /I2C Clock line

3.5.2 JDIGITAL

Pin	Function	Type	Description
1	D0	Digital/GPIO	Digital pin 0 / GPIO
2	D1	Digital/GPIO	Digital pin 1 / GPIO
3	D2	Digital/GPIO	Digital pin 2 / GPIO
4	D3	Digital/GPIO	Digital pin 3 / GPIO
5	D4	Digital/GPIO	Digital pin 4 / GPIO
6	D5	Digital/GPIO	Digital pin 5 / GPIO
7	D6	Digital/GPIO	Digital pin 6 / GPIO
8	D7	Digital/GPIO	Digital pin 7 / GPIO
9	D8	Digital/GPIO	Digital pin 8 / GPIO
10	D9	Digital/GPIO	Digital pin 9 / GPIO
11	SS	Digital	SPI Chip Select
12	COPI	Digital	SPI1 Controller Out Peripheral In
13	CIPO	Digital	SPI Controller In Controller Out
14	SCK	Digital	SPI serial clock output
15	GND	Power	Ground
16	AREF	Digital	Analog reference voltage
17	A4/SD4	Digital	Analog input 4 / I2C Data line (duplicated)
18	A5/SD5	Digital	Analog input 5 / I2C Clock line (duplicated)

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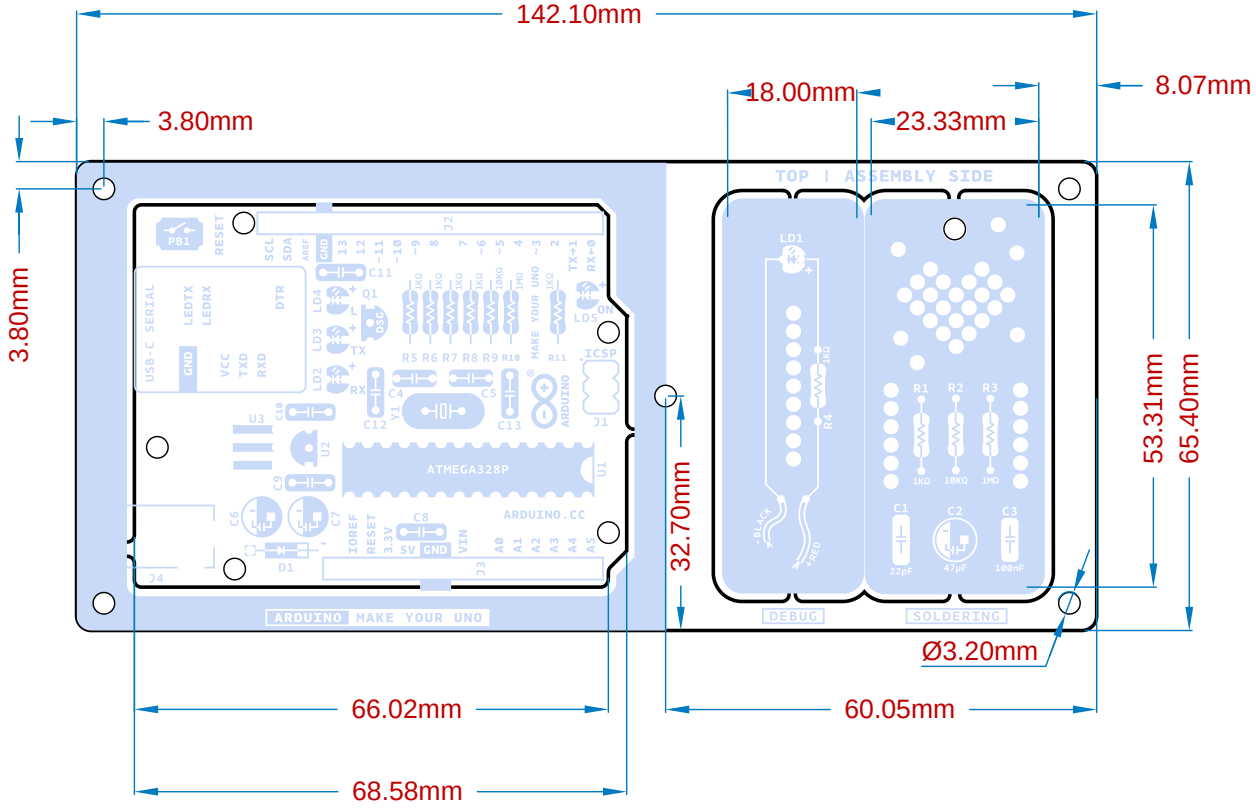
3.6 Mechanical Information

3.6.1 Board Outline & Mounting Holes

The **Make Your UNO Kit** shares with the standard **UNO** boards the same shape and external mechanical board outline. The most important difference is the new USB-C® connector instead of the classical USB Type-B one. The external shape and dimensions, pin headers, mounting holes and jack barrel connector are located in the same place as a standard **UNO** board, being compatible with most of the shields and peripheral devices done for the **UNO** board.



Make Your UNO boards outline

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4 The Audio Synth Shield

The kit comes with an **Audio Synth Shield** that can be attached to the **Make Your UNO** to learn about and experiment with audio synthesizers. The shield has six trimmers to control different audio signal parameters plus a mono amplifier that can be connected to the 8 ohm speaker that comes with the kit or to any other audio output.

Audio Synth Shield assembled

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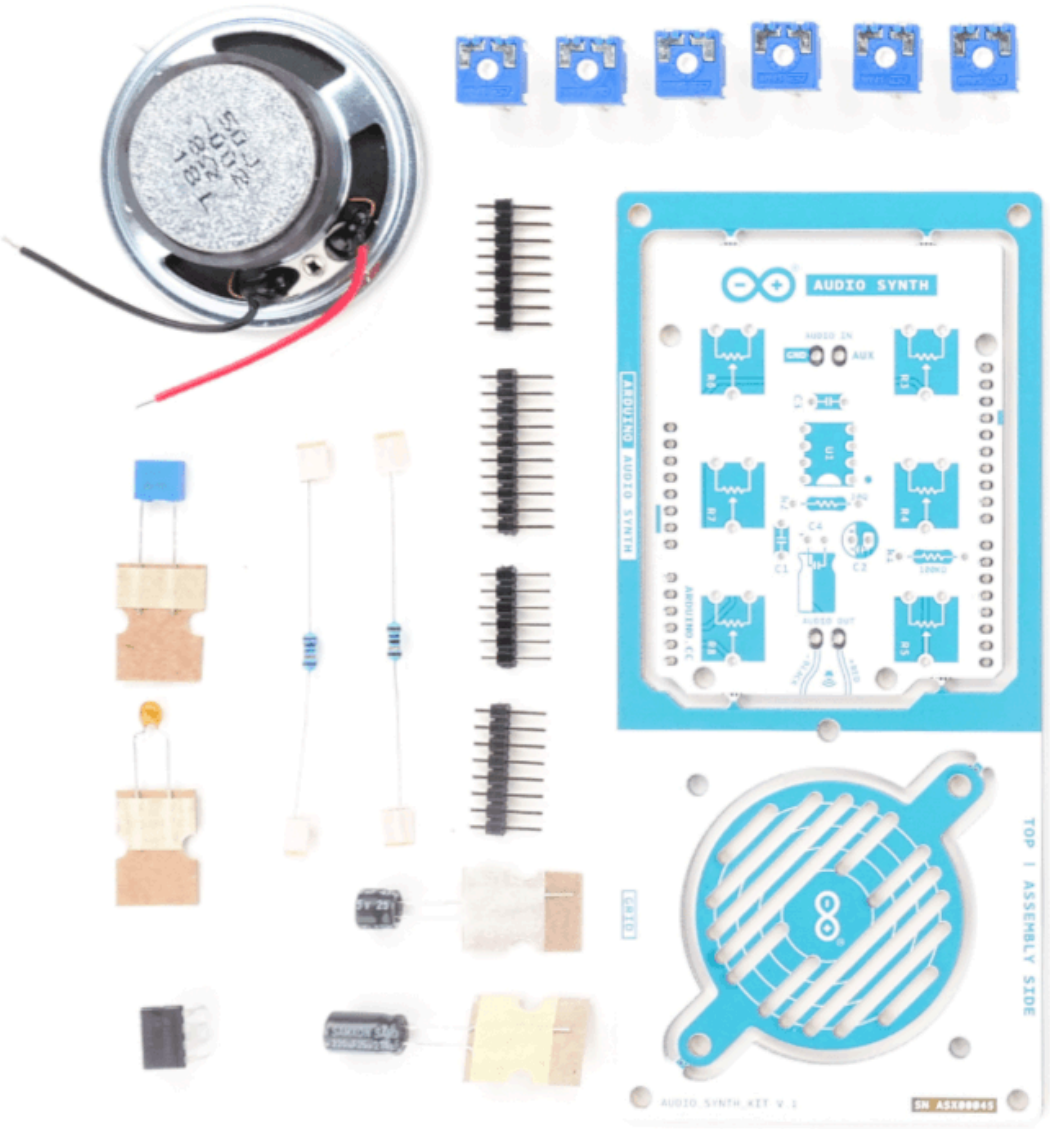
4.1 Functional Overview

4.1.1 Board Topology and Bill of Materials



Audio Synth Shield BOM

The **BOM** (Bill Of Materials) of the **Audio Synth Shield** is made up of common components that can be found on the market. Use this list to reference and/or replace a damaged component if necessary. The designator references can be found written on the board and inside the board source files.

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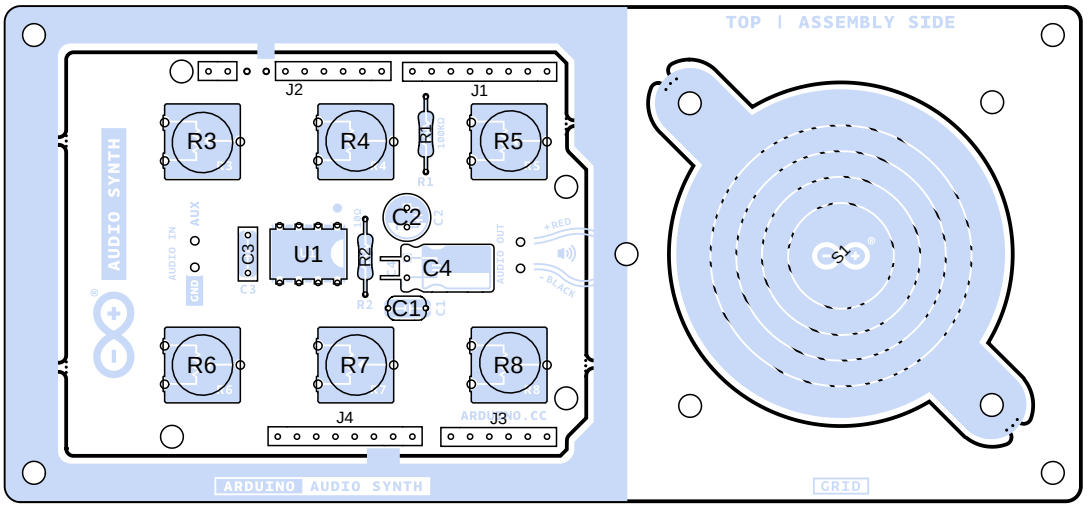

Arduino Synth Shield components topology

Designator	Quantity	Description
C1	1	Capacitor 47nF 50V 5%
C2	1	Capacitor 47µF 25V
C3	1	Capacitor 100nF 63V
C4	1	Capacitor 220µF 25V
R1	1	Axial resistor 100kΩ, 1/4W, 5%
R2	1	Axial resistor 10Ω, 1/4W, 5%
R3, R4, R5, R6, R7, R8	6	Potentiometer 10kΩ - TRIMMER
J1	1	UNO header digital connector A 8 positions
J2	1	UNO header digital connector B 10 positions
J3	1	UNO header analog connector A 6 positions
J4	1	UNO header analog connector B 8 positions
K1, K2, K3, K4, K5, K6	6	Potentiometer's KNOB D6/9mm
S1	1	Paper Speaker 8Ω 1W
U1	1	Audio Amplifier, 0.325W
	1	PCB Synth Audio shield

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4.2 Connector Pinouts

4.2.1 JANALOG

Pin	Function	Type	Description
5	+5V	Power	+5V Power Rail
9	A0	Analog Input	Analog input 0 /GPIO
10	A1	Analog Input	Analog input 1 /GPIO
11	A2	Analog Input	Analog input 2 /GPIO
12	A3	Analog Input	Analog input 3 /GPIO
13	A4/SDA	Analog Input	Analog input 4/I2C Data line

4.2.2 JDIGITAL

Pin	Function	Type	Description
10	D9	OUTPUT	Audio output to Amplifier's AUX IN
15	GND	GND	Ground

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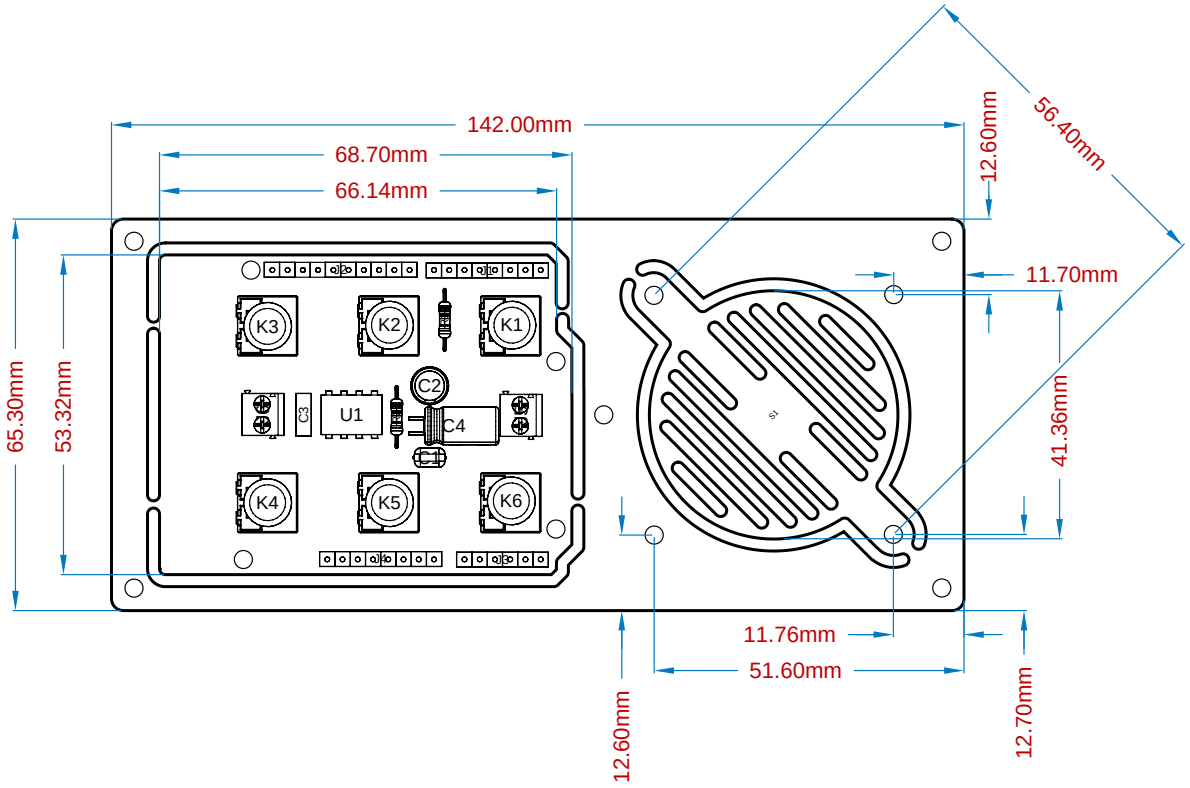
4.3 Mechanical Information

4.3.1 Board Outline & Mounting Holes

The **Make Your UNO Kit** shares with the standard **UNO** boards the same shape and external mechanical board outline. The most important difference is the new USB-C® connector instead of the classical USB Type-B one. The external shape and dimensions, pin headers, mounting holes and jack barrel connector are located in the same place as a standard **UNO** board, being compatible with most of the shields and peripheral devices done for the **UNO** board.



Arduino Synth Shield board outline measures

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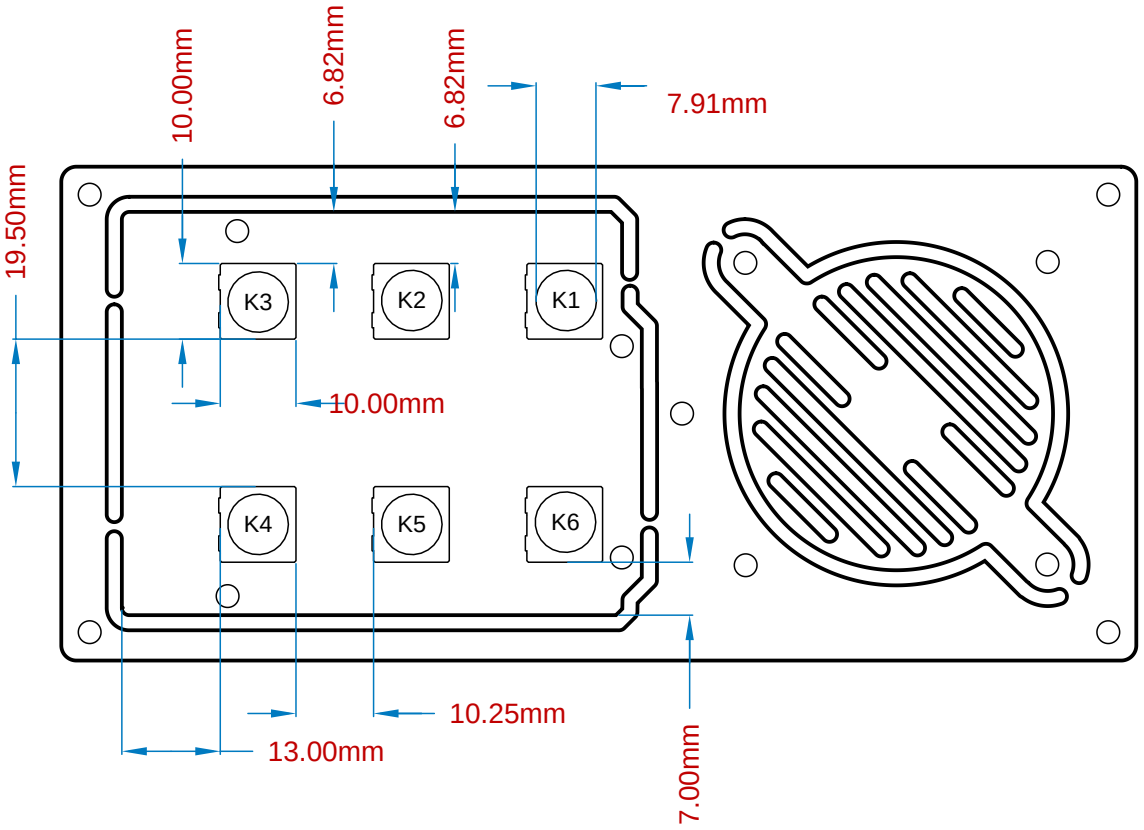
4.3.2 Potentiometers Outline



Arduino Synth Shield potentiometers measures

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5 Certifications

5.1 Declaration of Conformity CE DoC (EU)

We declare under our sole responsibility that the products above are in conformity with the essential requirements of the following EU Directives and therefore qualify for free movement within markets comprising the European Union (EU) and European Economic Area (EEA).

Directive	Conforms To
ROHS 2 Directive 2011/65/EU	EN50581:2012
Directive 2014/35/EU. (LVD)	EN 60950-1:2006/A11:2009/A1:2010/A12:2011/AC:2011
Directive 2004/40/EC & 2008/46/EC & 2013/35/EU, EMF	EN 62311:2008

5.2 Declaration of Conformity to EU RoHS & REACH 211 01/19/2021

Arduino boards are in compliance with RoHS 2 Directive 2011/65/EU of the European Parliament and RoHS 3 Directive 2015/863/EU of the Council of 4 June 2015 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Substance	Maximum limit (ppm)
Lead (Pb)	1000
Cadmium (Cd)	100
Mercury (Hg)	1000
Hexavalent Chromium (Cr6+)	1000
Poly Brominated Biphenyls (PBB)	1000
Poly Brominated Diphenyl ethers (PBDE)	1000
Bis(2-Ethylhexyl} phthalate (DEHP)	1000
Benzyl butyl phthalate (BBP)	1000
Dibutyl phthalate (DBP)	1000
Diisobutyl phthalate (DIBP)	1000

Exemptions: No exemptions are claimed.

Arduino Boards are fully compliant with the related requirements of European Union Regulation (EC) 1907 /2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). We declare none of the SVHCs (https://echa.europa.eu/web/guest/candidate-list-table), the Candidate List of Substances of Very High Concern for authorization currently released by ECHA, is present in all products (and also package) in quantities totaling in a concentration equal or above 0.1%. To the best of our knowledge, we also declare that our products do not contain any of the substances listed on the "Authorization List" (Annex XIV of the REACH regulations) and Substances of Very High Concern (SVHC) in any significant amounts as specified by the Annex XVII of Candidate list published by ECHA (European Chemical Agency) 1907 /2006/EC.

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5.3 Conflict Minerals Declaration

As a global supplier of electronic and electrical components, Arduino is aware of our obligations with regards to laws and regulations regarding Conflict Minerals, specifically the Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 1502. Arduino does not directly source or process conflict minerals such as Tin, Tantalum, Tungsten, or Gold. Conflict minerals are contained in our products in the form of solder, or as a component in metal alloys. As part of our reasonable due diligence Arduino has contacted component suppliers within our supply chain to verify their continued compliance with the regulations. Based on the information received thus far we declare that our products contain Conflict Minerals sourced from conflict-free areas.

6 FCC Caution

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference

(2) this device must accept any interference received, including interference that may cause undesired operation.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment.
3. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

English: User manuals for license-exempt radio apparatus shall contain the following or equivalent notice in a conspicuous location in the user manual or alternatively on the device or both. This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

(1) this device may not cause interference

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

French: Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l' appareil nedoit pas produire de brouillage

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC SAR Warning:

English This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

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French: Lors de l' installation et de l' exploitation de ce dispositif, la distance entre le radiateur et le corps est d 'au moins 20 cm.

Important: The operating temperature of the EUT can't exceed 85°C and shouldn't be lower than -40°C.

Hereby, Arduino S.r.l. declares that this product is in compliance with essential requirements and other relevant provisions of Directive 2014/53/EU. This product is allowed to be used in all EU member states.

7 Company Information

Company name	Arduino S.r.l
Company Address	Via Andrea Appiani 25 20900 MONZA Italy

8 Reference Documentation

Reference	Link
Arduino IDE (Desktop)	https://www.arduino.cc/en/software
Arduino Cloud Editor	https://create.arduino.cc/editor
Arduino Cloud Editor - Getting Started	https://docs.arduino.cc/arduino-cloud/guides/editor/
Arduino Project Hub	https://create.arduino.cc/projecthub?by=part&part_id=11332&sort=trending
Library Reference	https://www.arduino.cc/reference/en/
Arduino Store	https://store.arduino.cc/

9 Revision History

Date	Revision	Changes
25/04/2024	2	Updated link to new Cloud Editor
01/11/2022	1	First release

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