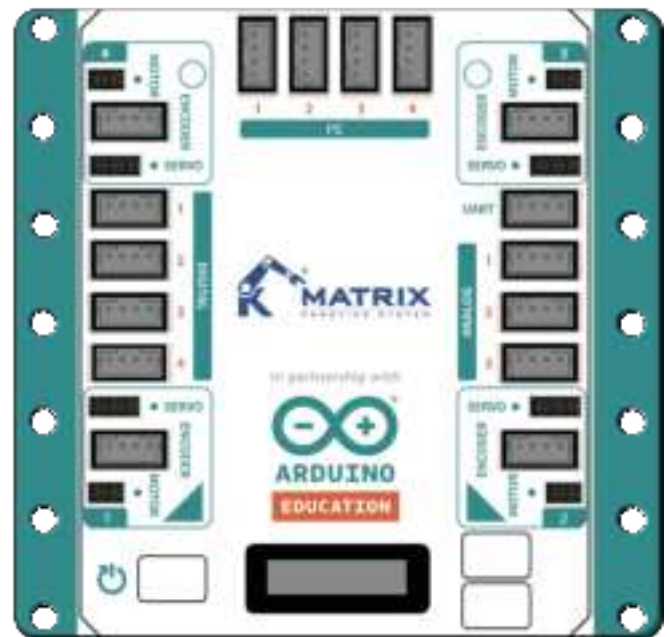# 1. Feature

· Support 4 channel RC Servo control.
· Support 4 channel DC Motor with encoder.
· Support 4 channel I2C Interface.
· Support 8 channel GPIO.
· Arduino UNO R4 WiFi built-in.
· OLED, Buttons, RGB LED, Buzzer built-in.
· Co-processor for motor control and IMU.

2. Application

· Autonomous/TelOp Robotics
· IoT Projects Gateway
· Automatic Device

3. Introduction

MATRIX R4 Controller Set is an Arduino R4 WiFi based robot controller. With the MATRIX building system, you can make tons of projects. From basic tracking car to omni-directional mobile platform, you can make any ideas comes out of your mind.

4. Pinout 4.1. MATRIX R4 Controller Set **Pinout**

1 4

Pinout-I2C			
NO.	Name	I/O	Description
1	SDA	I/O	Serial data line.
2	SCL	I	Serial clock line.
3	VCC	O	Supply voltage.
4	GND	-	Supply ground.

1 4

Pinout-UART			
NO.	Name	I/O	Description
1	TX	O	Serial transmit line.
2	RX	I	Serial receive line.
3	VCC	O	Supply voltage.
4	GND	-	Supply ground.

1 4

Pinout-Analog In			
NO.	Name	I/O	Description
1	AINA	I	Analog input A.
2	AINB	I	Analog input B.
3	A5V	O	Supply voltage.
4	GND	-	Supply ground.

1 2 3

Pinout-Servo Out			
NO.	Name	I/O	Description
1	GND	-	Supply ground.
2	5V	O	Supply voltage.
3	PWM	O	PWM out for RC servo.

1 4

Pinout-Digital I/O			
NO.	Name	I/O	Description
1	DIOA	I/O	GPIO A.
2	DIOB	I/O	GPIO B.
3	VCC	O	Supply voltage.
4	GND	-	Supply ground.

1 2

Pinout-Motor Out			
NO.	Name	I/O	Description
1	M-	O	H-bridge out M-.
2	M+	O	H-bridge out M+.

1 4

Pinout-Encoder			
NO.	Name	I/O	Description
1	CHA	I	CH input A.
2	CHB	I	CH input B.
3	M5V	O	Supply voltage.
4	GND	-	Supply ground.

4.2. MCU Pin Mapping

MATRIX R4 Controller Set		MCU	Peripheral
D1	D1A	3	-
	D1B	2	-
D2	D2A	5	-
	D2B	4	-
D3	D3A	12	-
	D3B	11	-
D4	D4A	13	-
	D4B	10	-
A1	A1A	A1	-
	A1B	A0	-
A2	A2A	A3	-
	A2B	A2	-
A3	A3A	A4	-
	A3B	A5	-
UART	TX	1	-
	RX	0	-
I2C	SDA	-	PCA9548-SDA(0-3)
	SCL	-	PCA9548-SCL(0-3)
Looks	Buzzer	6	-
	RGB LED	7	-
RC		-	Co-Processor
DC		-	Co-Processor
BTN		-	Co-Processor

5. Electrical Characteristics

Parameter	Min	Typ	Max	Units
Input Voltage	6	-	24	V
I/O Voltage	-0.3	5	6.5	V
Digital I/O Pin Current	-	-	8	mA
Analog In Pin Current	-	-	8	mA
RC Servo Output Voltage	-	5	-	V
DC Motor Output Voltage	-	5	-	V
RC Servo Output Current (each)	-	-	1	A
DC Motor Output Current (each)	-	1.5	2	A
UART Buad	300	9600	115200	bit/s
I2C operating speed	100	-	400	KHz
I2C Low-Level Input Voltage	-0.5V	-	0.33*VCC	-
I2C High-Level Input Voltage	0.7*VCC	-	VCC	-
LED R Wavelength	620	-	625	nm
LED G Wavelength	522	-	525	nm
LED B Wavelength	465	-	467	nm
Operating Temperature	-40	25	85	°C

# 6. Usage

6.1. Hardware Guide
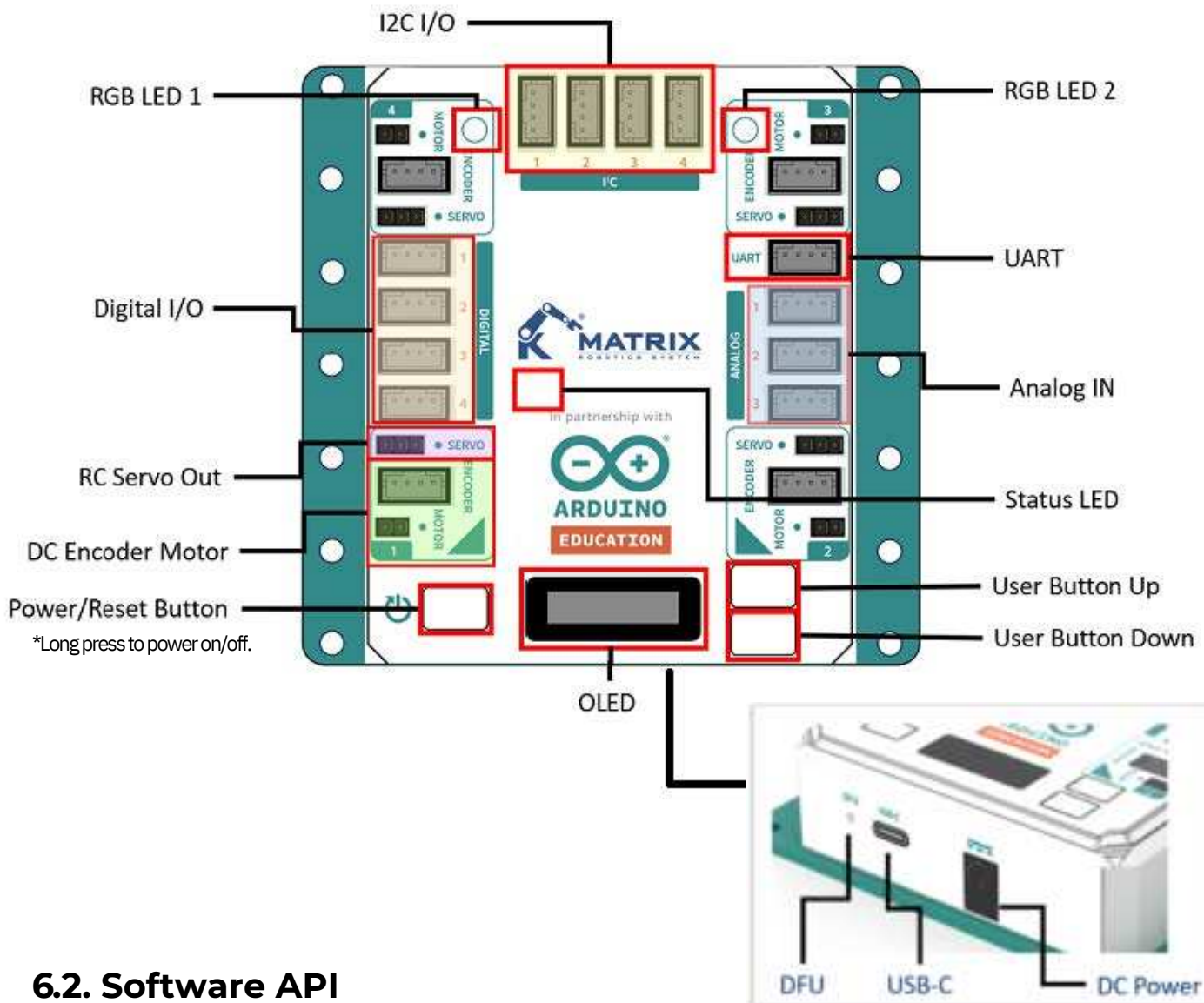
6.2. Software API

· For Scratch style programming and Firmware Updating, please download "MATRIXblock" software from our website.
· Open Arduino IDE (At least **v2.0**)
· Open the Boards Manager from the Tools -> Board menu and select "Arduino Uno R4 WiFi"
· Open the Library Manager from the Sketch-> Include Library ->
  Manage Libraries and search "MatrixMiniR4"

For further infomation and example code please checkout our github page https://github.com/Matrix-Robotics/MatrixMiniR4

7. Dimensions
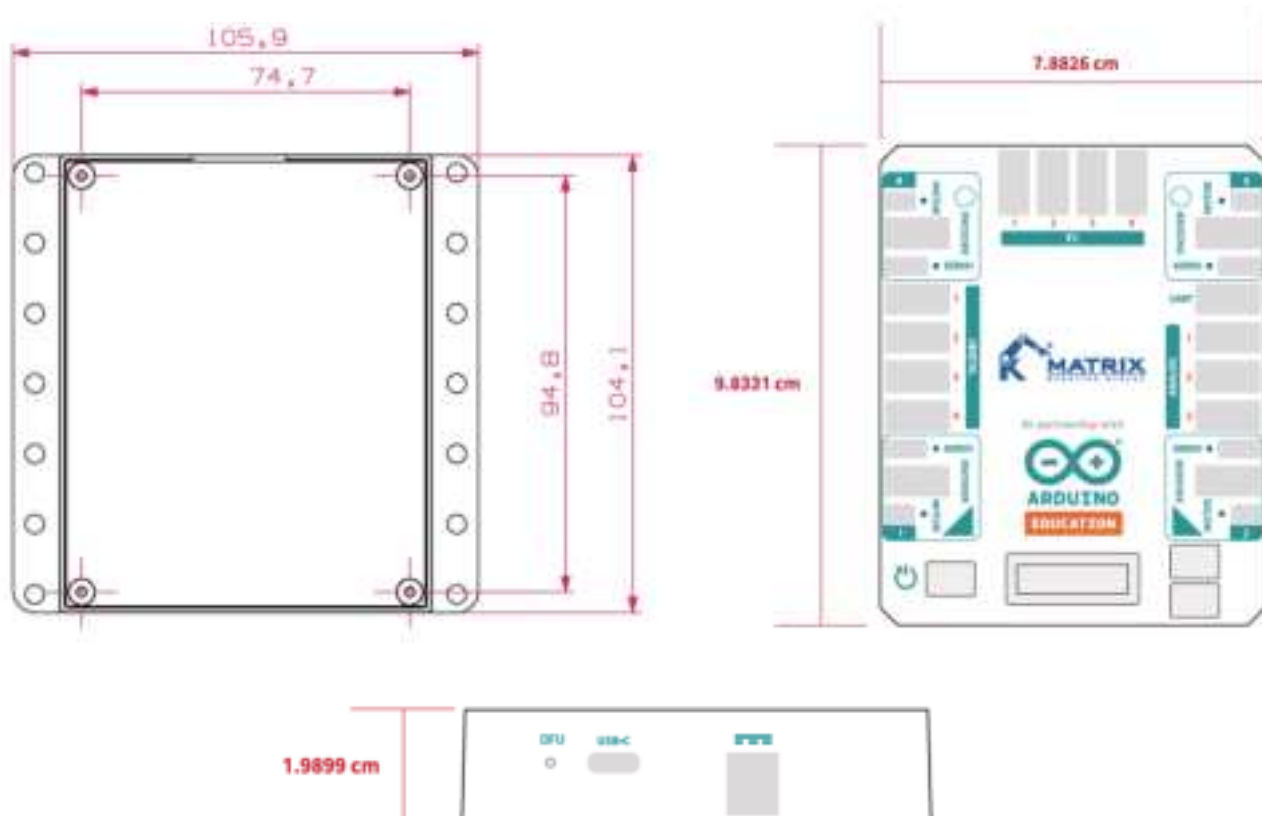
8. Disclaimer

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FCC Statement

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, and

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

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

Note : This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates,uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

ISED RSS Warning/ISED RF Exposure Statement

ISED RSS Warning:

This device complies with Innovation, Science and Economic Development Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le pr é sent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence.L'exploitation est autoris é e aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radio é lectrique subi, m ê me si le brouillage est susceptible d'en compromettre le fonctionnement.

ISED RF exposure statement:

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

Le rayonnement de la classe b repecte ISED fixaient un environnement non contrôl é s.Installation et mise en œuvre de ce mat é riel devrait avec é changeur distance minimale entre 20 cm ton corps.Lanceurs ou ne peuvent pas coexister cette antenne ou capteurs avec d'autres.