

NuMaker-Lighting-ARGB User Manual

Evaluation Board for ARGB Lighting Board

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1 OVERVIEW

The NuMaker-Lighting-ARGB is an evaluation board for ARGB lighting application. It is an independent daughter board that must be connected to the NuMaker mother board through the Arduino interface connector when being used. For the development flexibility, the NuMaker-Lighting-ARGB provides the pin definition switches for connecting with different NuMaker mother boards, such as NuMaker-NUC1262SE, NuMaker-NUC1261SG, NuMaker-M252SD, and NuMaker-M032SE. Furthermore, the NuMaker-Lighting-ARGB also includes 4 ARGB connectors and an external 5V power jack to extend more ARGB LED strips, which can meet the better scenario of a larger number of lights.

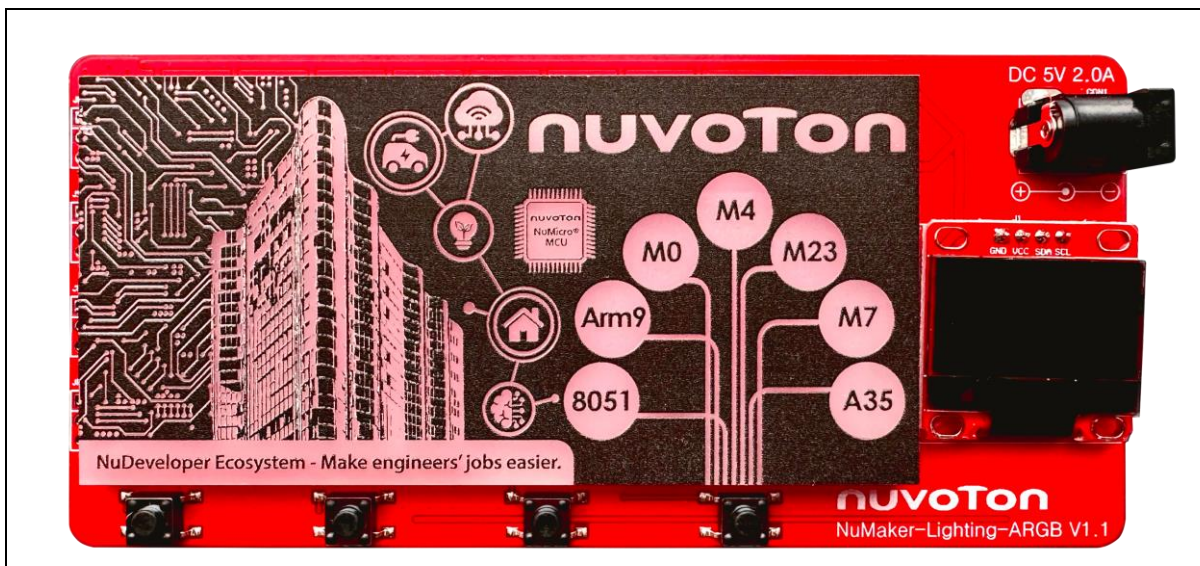


Figure 1-1 NuMaker-Lighting-ARGB Evaluation Board with Acrylic

1.1 Package List

- NuMaker-Lighting-ARGB
- Acrylic of ARGB LED

2 FEATURES

- Arduino UNO compatible connectors
- Total of 40 pieces ARGB Gen2 LEDs
 - 4 strips with 10 pieces ARGB LEDs each
- 4 sets of ARGB LED extension headers
- 5V external power jack
- An OLED panel:
 - Size: 0.96 inch
 - Resolution: 128x64 pixels
- Switches
 - Function switch of ARGB Gen1 and ARGB Gen2
 - Pin definition switch for different mother boards

3 HARDWARE CONFIGURATION

3.1 Front View

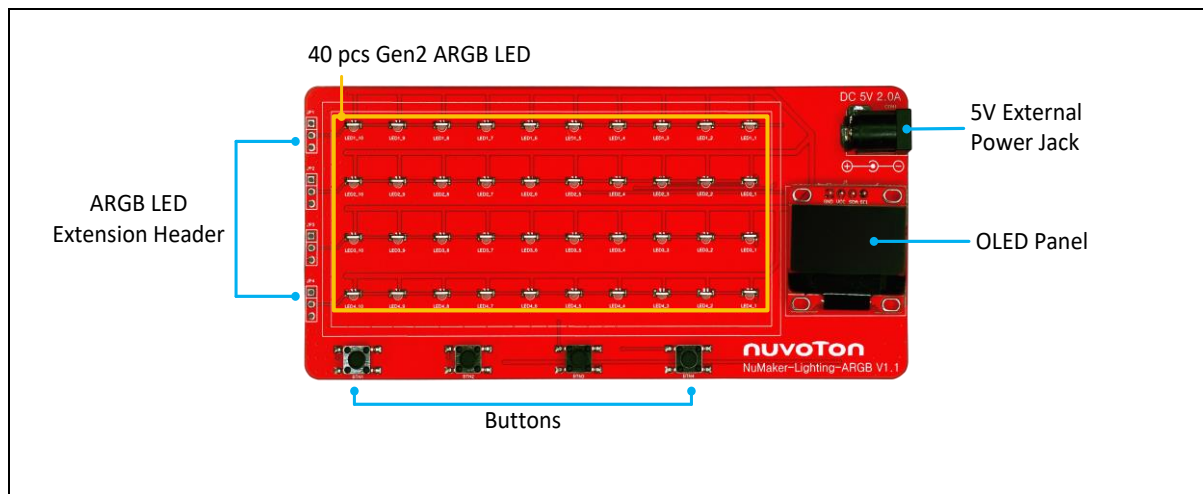


Figure 3-1 Front View of NuMaker-Lighting-ARGB

Figure 3-1 shows the main components and connectors from the front side of NuMaker-Lighting-ARGB. The following lists components and connectors from the front view:

- 40 pieces of ARGB Gen2 LED
 - Strip A: LED1_1 to LED1_10
 - Strip B: LED2_1 to LED2_10
 - Strip C: LED3_1 to LED3_10
 - Strip D: LED4_1 to LED4_10
- External 5V Power Jack (CON1)
- Buttons (BTN1, BTN2, BTN3, BTN4)
- ARGB LED Extension Headers (JP1, JP2, JP3, JP4)
 - 5V, DIN, DOUT
- OLED Panel (J1)

3.2 Rear View

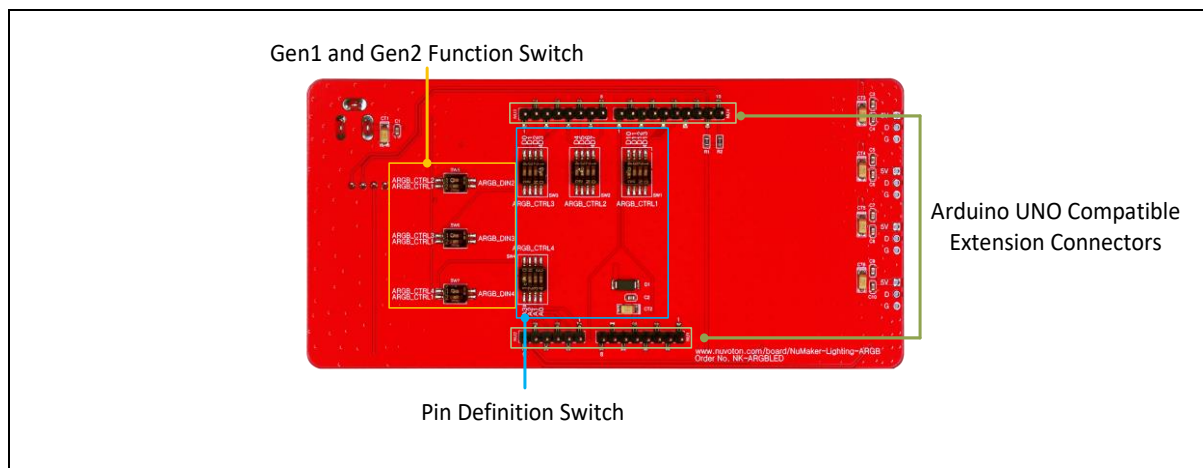


Figure 3-2 Rear View of NuMaker-Lighting-ARGB

Figure 3-2 shows the main components and connectors from the rear side of NuMaker-Lighting-ARGB.

The following lists components and connectors from the rear view:

- Arduino UNO Compatible Extension Connectors (NU1, NU2, NU3, NU4)
- Switches
 - ARGB Gen1 and ARGB Gen2 Function (SW5, SW6, SW7)
 - Pin Definition Function (SW1, SW2, SW3, SW4)

3.3 Arduino UNO Connectors

Table 3-1 presents the pin assignment of Arduino UNO extension connectors.

Header		NuMaker-Lighting-ARGB		Header		NuMaker-Lighting-ARGB		
		Compatible to Arduino UNO	Function			Compatible to Arduino UNO	Function	
NU3	NU3.1	D0	SW3 (Activate the switch for the specific pin.)	NU2	NU2.6	A5	BTN1	
	NU3.2	D1			NU2.5	A4	BTN2	
	NU3.3	D2			NU2.4	A3	SW4 (Activate the switch for the specific pin.)	
	NU3.4	D3			NU2.3	A2		
	NU3.5	D4	NU2.2		A1			
	NU3.6	D5	NU2.1		A0			
	NU3.7	D6	SW2 (Activate the switch for the specific pin.)	NU1	NU1.8	VIN	-	
	NU3.8	D7			NU1.7	VSS	GND	
NU4	NU4.1	D8	BTN4		NU1.6	VSS	GND	
	NU4.2	D9	BTN3		NU1.5	5V	5VCC	
	NU4.3	D10	SW1 (Activate the switch for the specific pin.)		NU1.4	3V	3VCC	
	NU4.4	D11			NU1.3	RST	-	
	NU4.5	D12			NU1.2	IOREF	-	
	NU4.6	D13			NU1.1	NC	-	
	NU4.7	VSS	V _{SS}					
	NU4.8	VREF	-					
	NU4.9	SDA	SCL for OLED					
	NU4.10	SCL	SDA for OLED					

Table 3-1 Pin Assignment of Arduino UNO Connectors

3.4 ARGB LEDs

The NuMaker-Lighting-ARGB has a total of 40 ARGB Gen2 LEDs, grouped into 10 sets, representing Strip A, Strip B, Strip C, and Strip D.

3.5 ARGB LED Extension Headers

When there is a demand for more than 40 pieces ARGB LEDs, additional light strips can be connected through the ARGB LED extension header. The NuMaker-Lighting-ARGB has four extension headers reserved, each providing 5V, DIN, and DOUT pins.

3.6 Power Supply

The NuMaker-Lighting-ARGB is an independent daughter board that must be connected to the NuMaker mother board through the Arduino interface connector when being used. The power is provided from NuMaker mother board.

However, if additional ARGB LED strips are connected via the ARGB LED extension header, the external 5V power jack needs to be plugged in to ensure a stable power supply.

3.6.1 5V Power Jack

Table 3-2 presents the 5V power sources.

Connector	Net Name in Schematic	Description
CON1	DC-CON	External 5V power when additional ARGB LED strips are connected.

Table 3-2 5V Power Source

3.7 Switches

On the rear side of the NuMaker-Lighting-ARGB, there are 7 switches. The connector SW1, SW2, SW3 and SW4 are used to adjust the pin definitions for different NuMaker mother boards. The connector SW5, SW6, and SW7 are used to adjust the connection method of the ARGB LEDs between the ARGB Gen1 and ARGB Gen2 function.

3.7.1 Pin Definition Function

3.7.1.1 Mother board: NuMaker-NUC1262SE

Table 3-3 presents how the mother board-NuMaker-NUC1262SE controls the 4 ARGB LED strips on NuMaker-Lighting-ARGB and their corresponding pin numbers. Figure 3-3 presents the switch status when NuMaker-NUC1262SE is in use.

Strip	Interface	Pin Number of NUC1262SE	Pin Name of Arduino Uno
A	LLSI4	PA3	D10
B	LLSI3	PC2	D5
C	LLSI0	PC5	D3
D	LLSI5	PB4	A3

Table 3-3 Pin Mapping and Interface with NuMaker-NUC1262SE

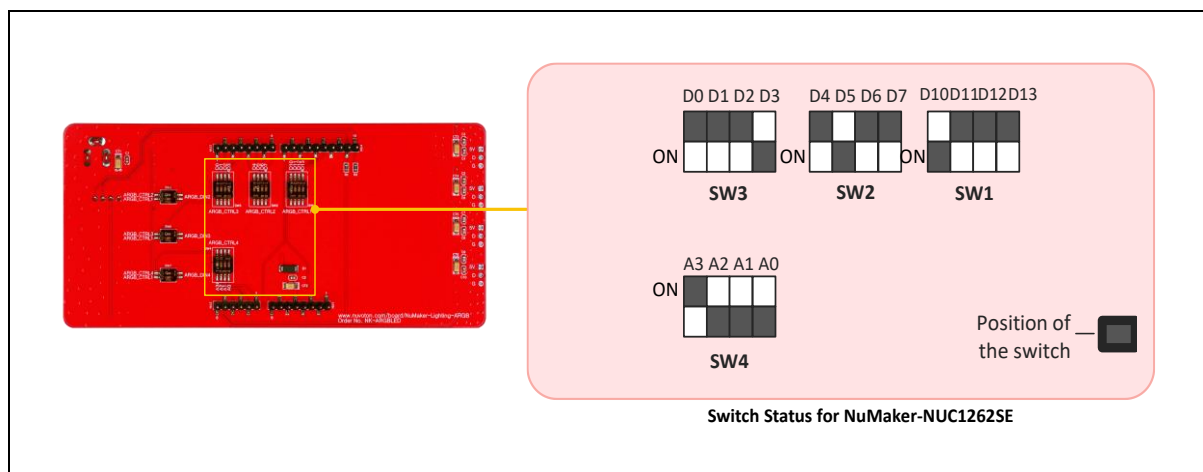


Figure 3-3 Switch Status for NuMaker-NUC1262SE

3.7.1.2 Mother Board: NuMaker-NUC1261SG

Table 3-4 presents how the mother board-NuMaker-NUC1261SG controls the 4 ARGB LED strips on NuMaker-Lighting-ARGB and their corresponding pin numbers. Figure 3-4 presents the switch status when NuMaker-NUC1261SG is in use.

Strip	Interface	Pin Number of NUC1261SG	Pin Name of Arduino Uno
A	SPI0_MOSI	PE11	D11
B	USC10_DATA0	PC0	D6

C	USCIO_DATA0	PB0	D0
D	SPI1_MOSI	PB5	A0

Table 3-4 Pin Mapping and Interface with NuMaker-NUC1261SG

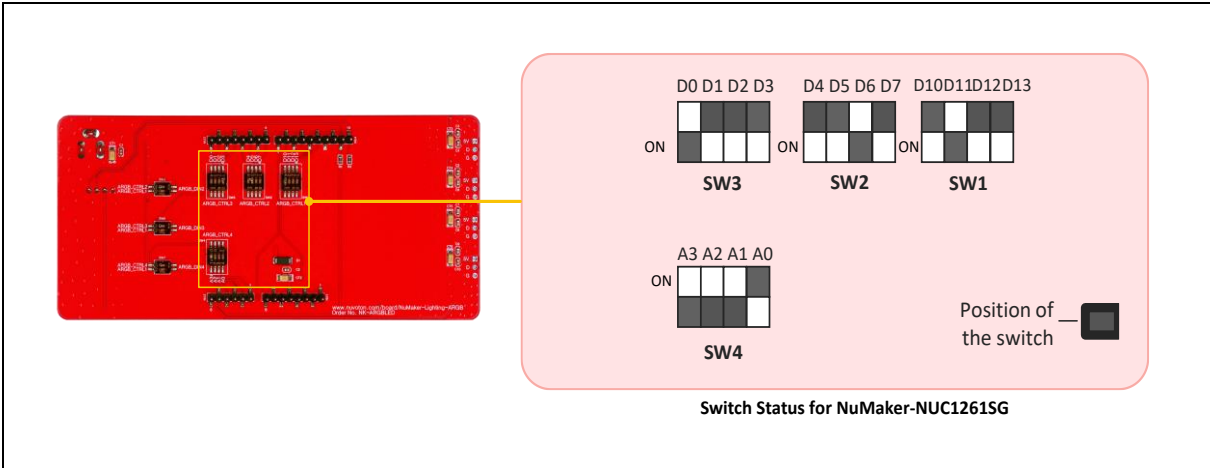


Figure 3-4 Switch Status for NuMaker-NUC1261SG

3.7.1.3 Mother Board: NuMaker-M252SD

Table 3-5 presents how the mother board-NuMaker-M252SD controls the 4 ARGB LED strips on NuMaker-Lighting-ARGB and their corresponding pin numbers. Figure 3-5 presents the switch status when NuMaker- M252SD is in use.

Strip	Interface	Pin Number of M252SD	Pin Name of Arduino Uno
A	SPI0_MOSI	PA0	D11
B	PSIO0_CH3	PC2	D5
C	PSIO0_CH0	PC5	D3
D	USCI1_DATA0	PB7	A0

Table 3-5 Pin Mapping and Interface with NuMaker-M252SD

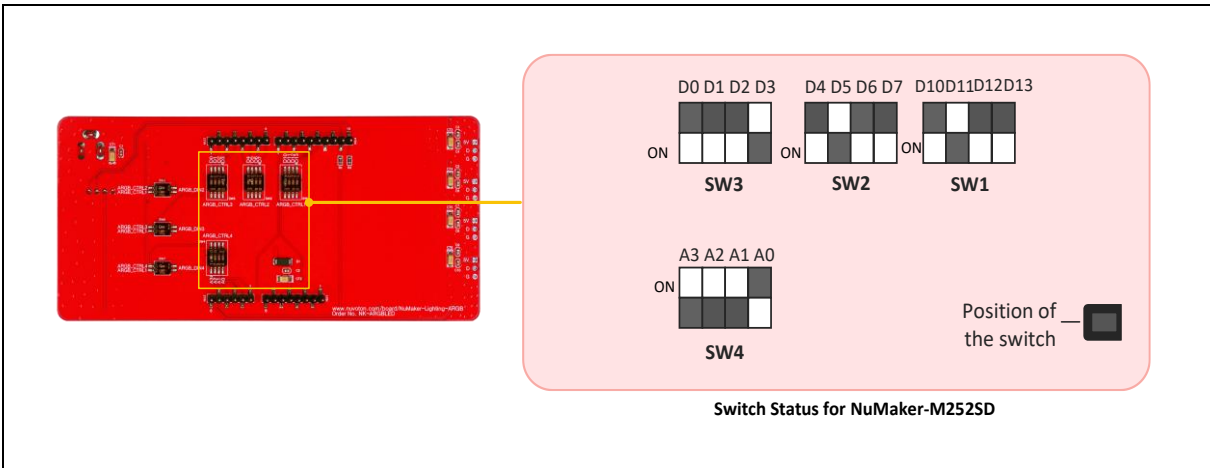


Figure 3-5 Switch Status for NuMaker-M252SD

3.7.1.4 Mother Board: NuMaker-M032SE

Table 3-6 presents how the mother board-NuMaker-M032SE controls the 4 ARGB LED strips on NuMaker-Lighting-ARGB and their corresponding pin numbers. Figure 3-6 presents the switch status when NuMaker-M032SE is in use.

Strip	Interface	Pin Number of M032SE	Pin Name of Arduino Uno
A	SPI0_MOSI	PA0	D11
B	UART0_TX	PA7	D6
C	UART1_TX	PB3	D1
D	UART2_TX	PB5	A2

Table 3-6 Pin Mapping and Interface with NuMaker-M032SE

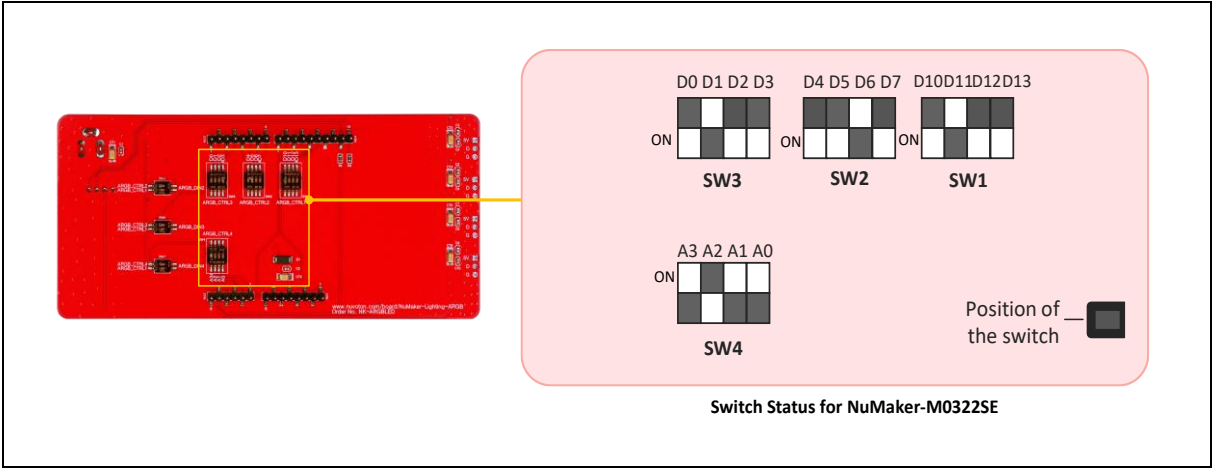


Figure 3-6 Switch Status for NuMaker-M032SE

3.7.2 ARGB Gen1 and ARGB Gen2 Function

Figure 3-7 and Figure 3-8 present the switch status for ARGB Gen1 and ARGB Gen2 connection.

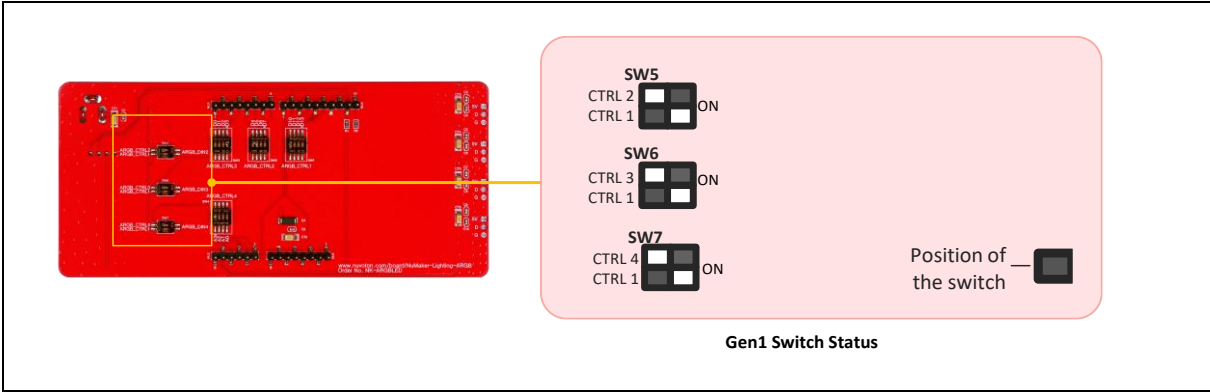


Figure 3-7 Switch Status for ARGB Gen1 Connection

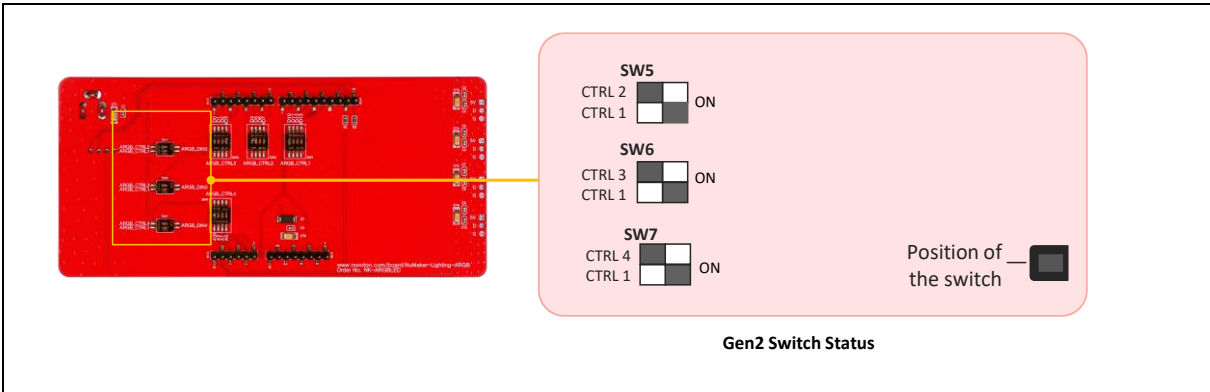


Figure 3-8 Switch Status for ARGB Gen2 Connection

4 NUMAKER-LIGHTING-ARGB SCHEMATICS

4.1 ARGB LED

Figure 4-1 shows the ARGB LED circuit.

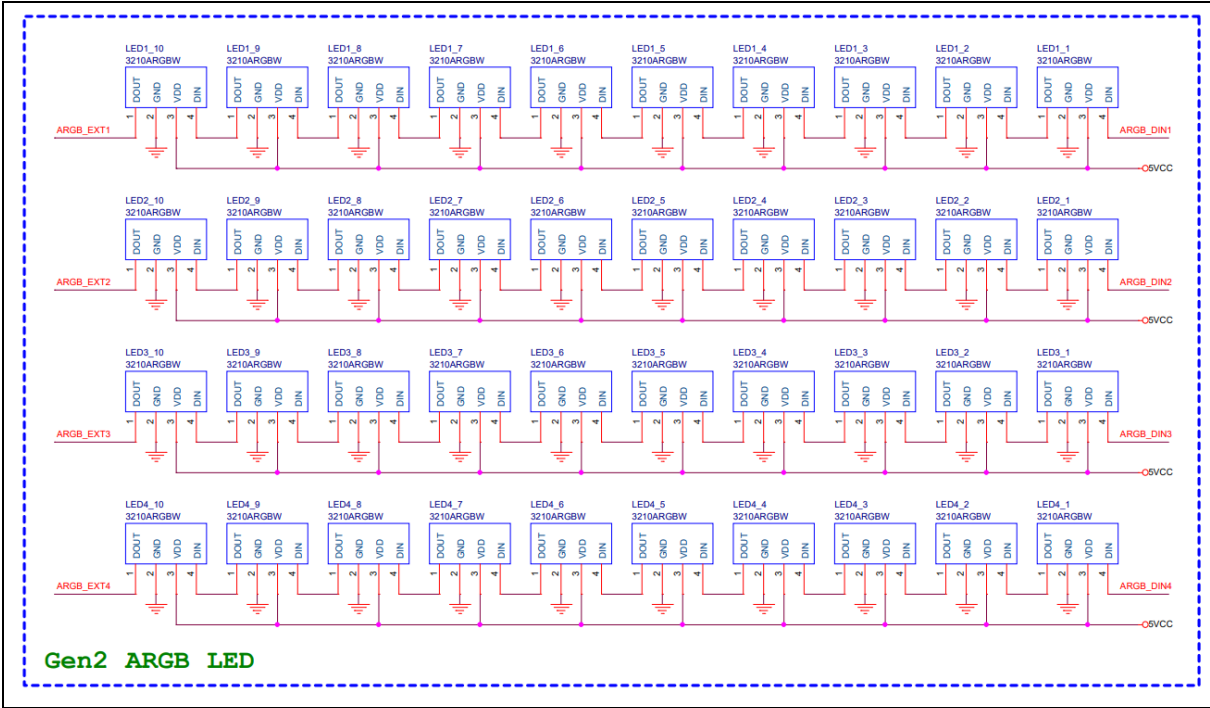


Figure 4-1 ARGB LEDs Circuit

4.2 Extension Connector and Power Jack

Figure 4-2 shows the extension connector and power jack circuit.

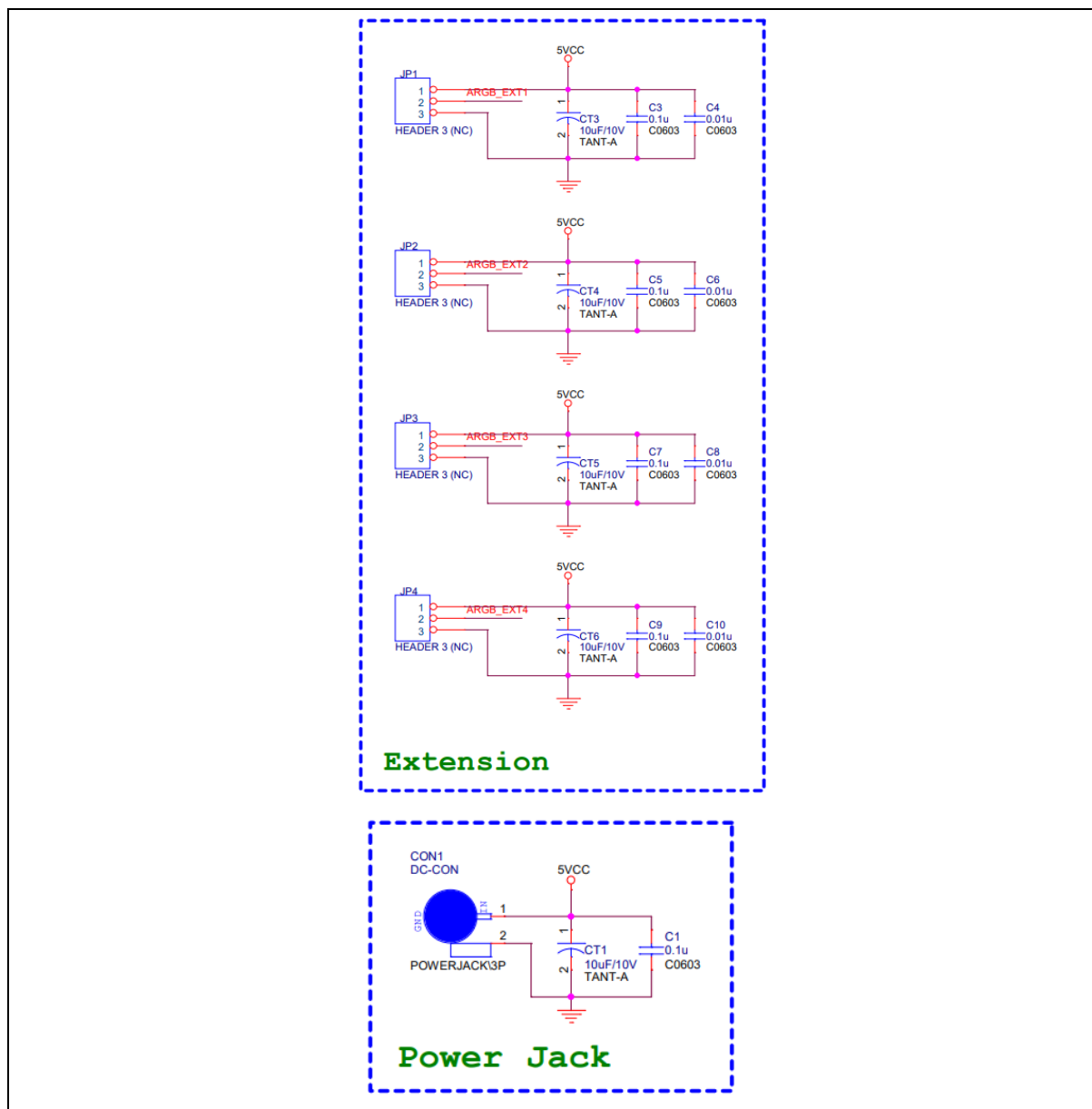


Figure 4-2 Extension Connector and Power Jack Circuit

4.3 Arduino UNO Connector

Figure 4-3 shows the Arduino UNO connector circuit.

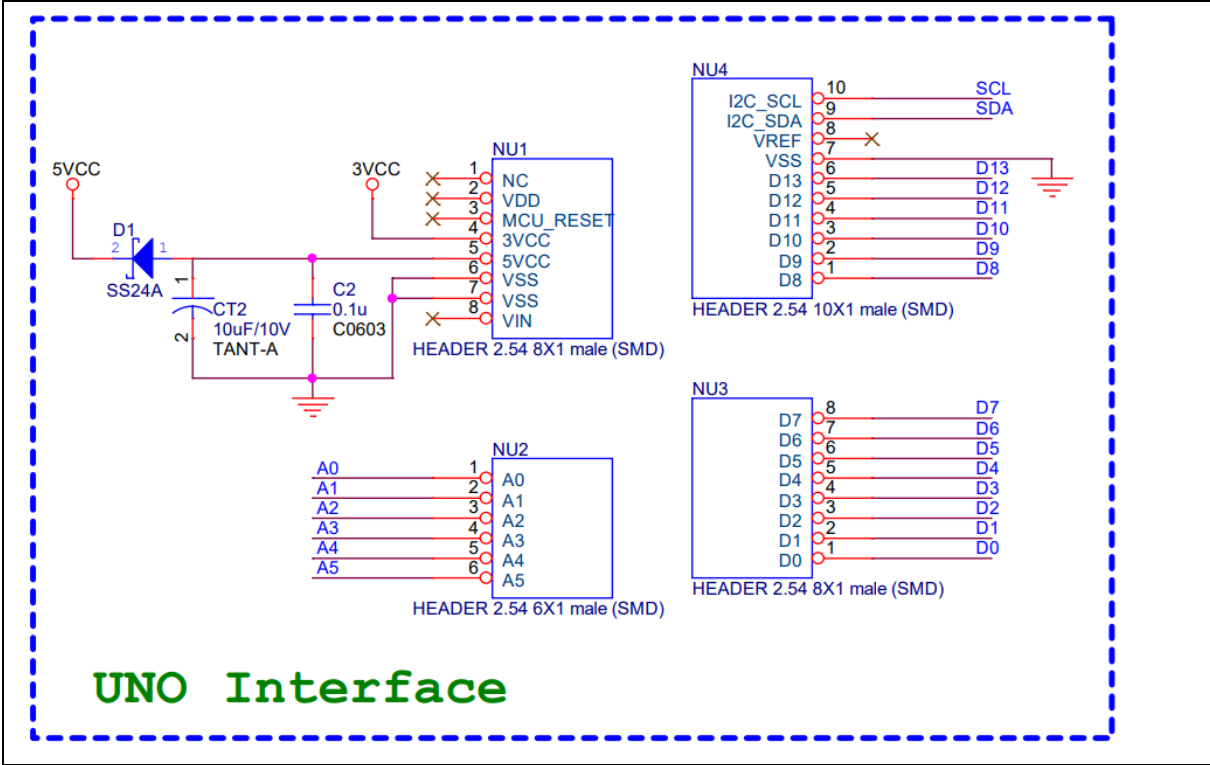


Figure 4-3 Arduino UNO Connector Circuit

4.4 Switch

Figure 4-4 shows the switch circuit.

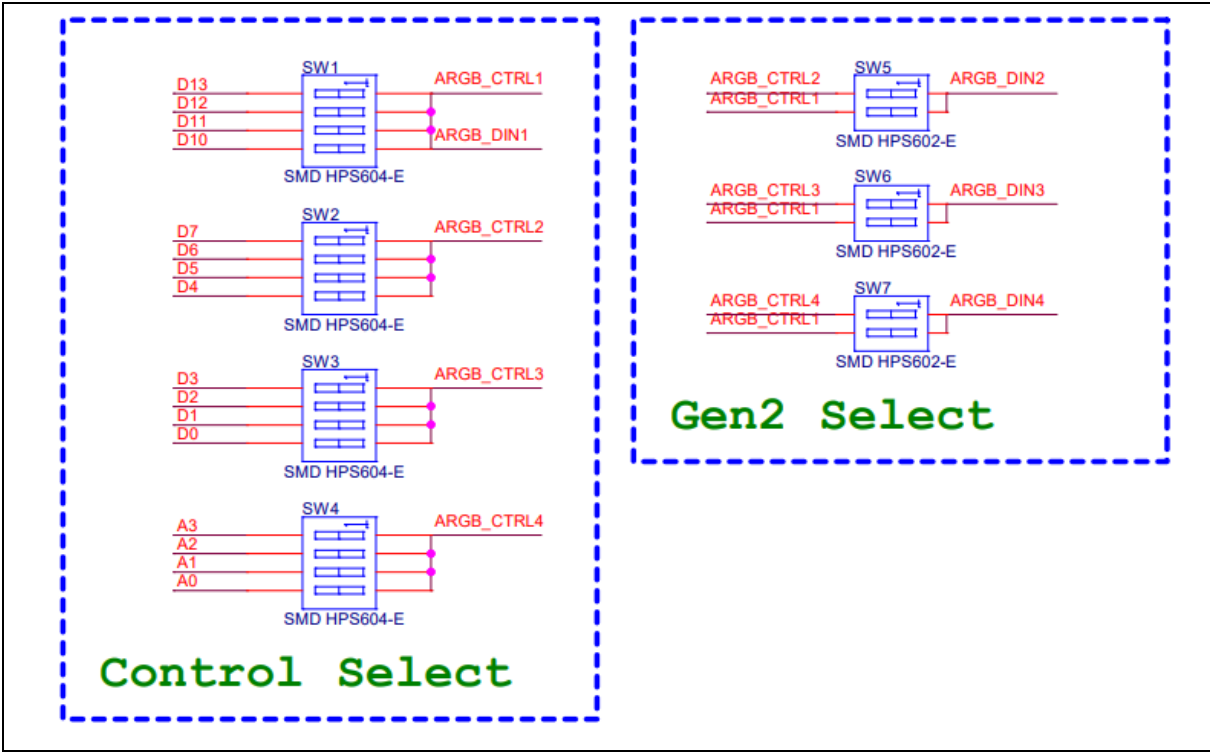


Figure 4-4 Switch Circuit

4.5 LCD and Button

Figure 4-5 shows the LCD and button circuit.

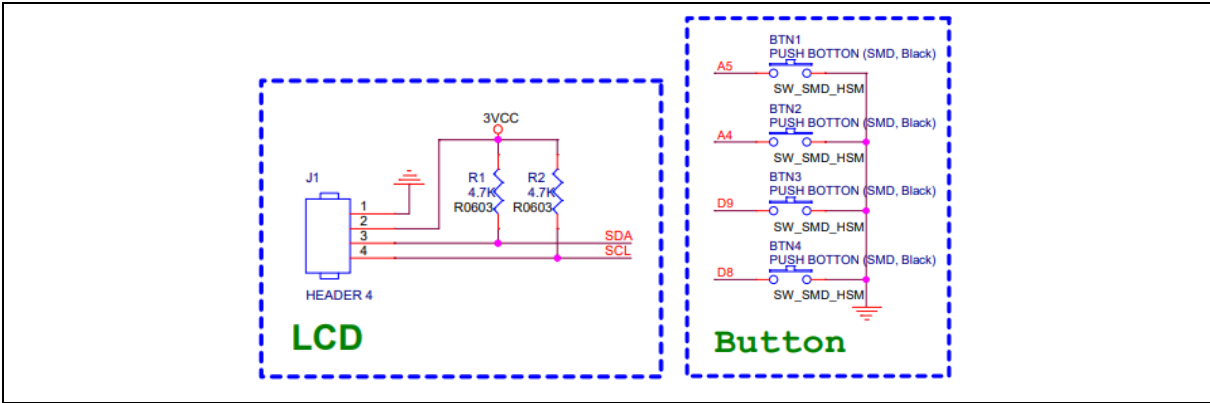


Figure 4-5 LCD and Button Circuit

5 REVISION HISTORY

Date	Revision	Description
2024.08.09	1.00	● Initial version.

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