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user's guide to

GAMING shield

Gaming shield is an extension board for your mikromedia that provides you with standard gaming buttons and audio speakers, so you can build and play your favorite arcade games.

mikromedia

MikroElektronika
DEVELOPMENT TOOLS | COMPILERS | BOOKS

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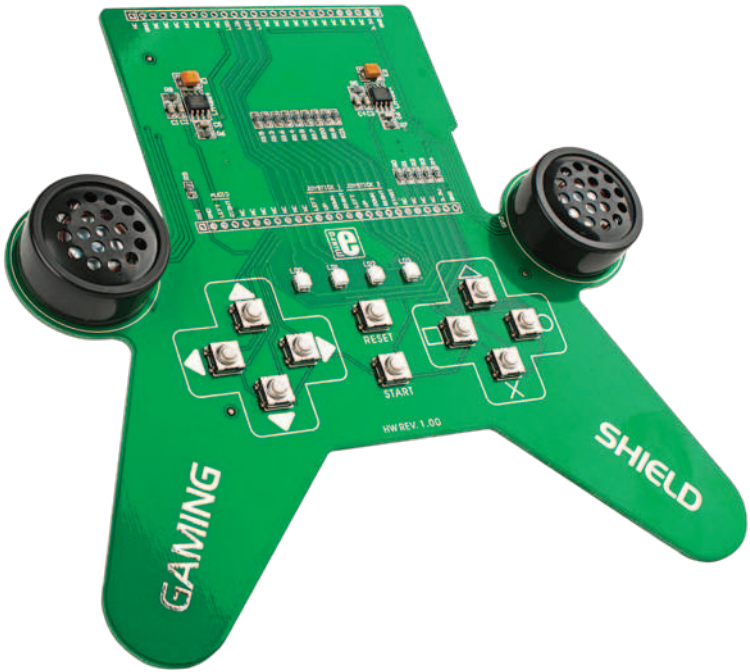
Nebojsa Matic
General Manager

Table of Contents

Introduction to mikromedia GAMING shield

mikromedia GAMING shield is an extension board pin-compatible with several mikromedia boards from mikroElektronika that enables users to provide **button controls** and **audio interface** to your base mikromedia board, which is specially suitable for creating your own gaming console. GAMING Shield comes with convenient **stacking connectors,** so you can easily connect not only mikromedia, but other shields as well, such as **Battery boost shield**. It's carefully designed to fit perfectly into anyone's hands, and it has convenient holders which provide great stability when board is connected to mikromedia.



Mikromedia compatibility

mikromedia for XMEGA

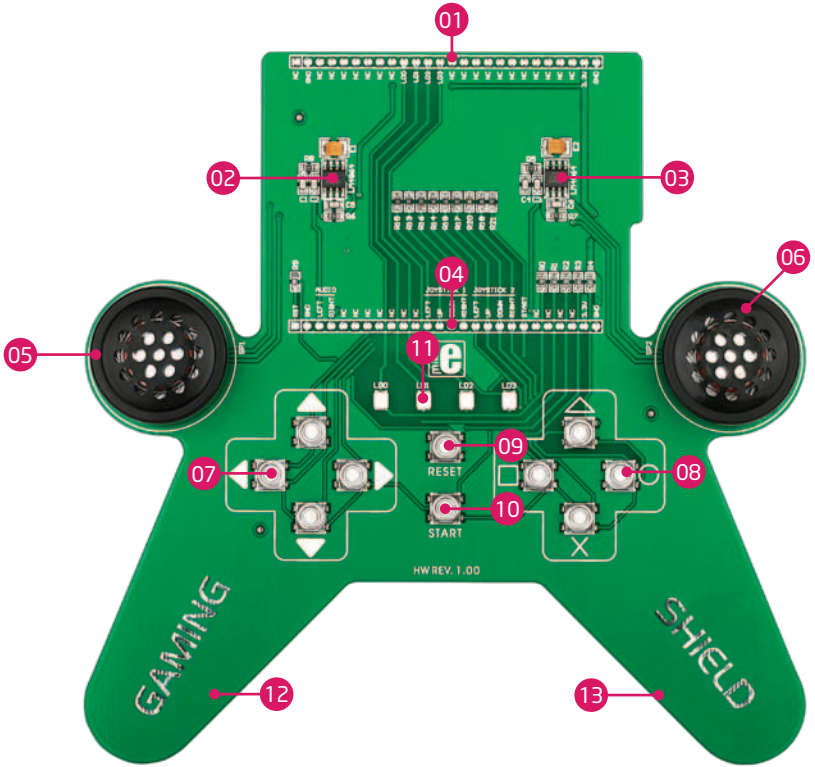
mikromedia for dsPIC33

mikromedia for PIC18FJ

Board is compatible with **mikromedia for PIC18FJ v105, mikromedia for dsPIC33 v105 & v106** and **mikromedia for XMEGA v110**. All of the mentioned boards can exploit the full potential of the Gaming Shield, including buttons, signal LEDs and audio speakers.

Key Features

01 Top connections pads
02 Left Audio Channel amplifier circuit
03 Right Audio Channel amplifier circuit
04 Bottom connections pads
05 Left Speaker
06 Right Speaker
07 Navigation Joystick
08 Action Joystick
09 Reset Button
10 Start Button
11 Indicator LEDs
12 Left hand grip
13 Right hand grip



System Specification

power supply

Over a USB cable (5V DC)

power consumption

50mA in idle state

(when on-board modules are off)

board dimensions

15.2 x 15.1cm (5.98" x 5.94")

weight

~74g (0.16 lbs)

1. Soldering stacking headers

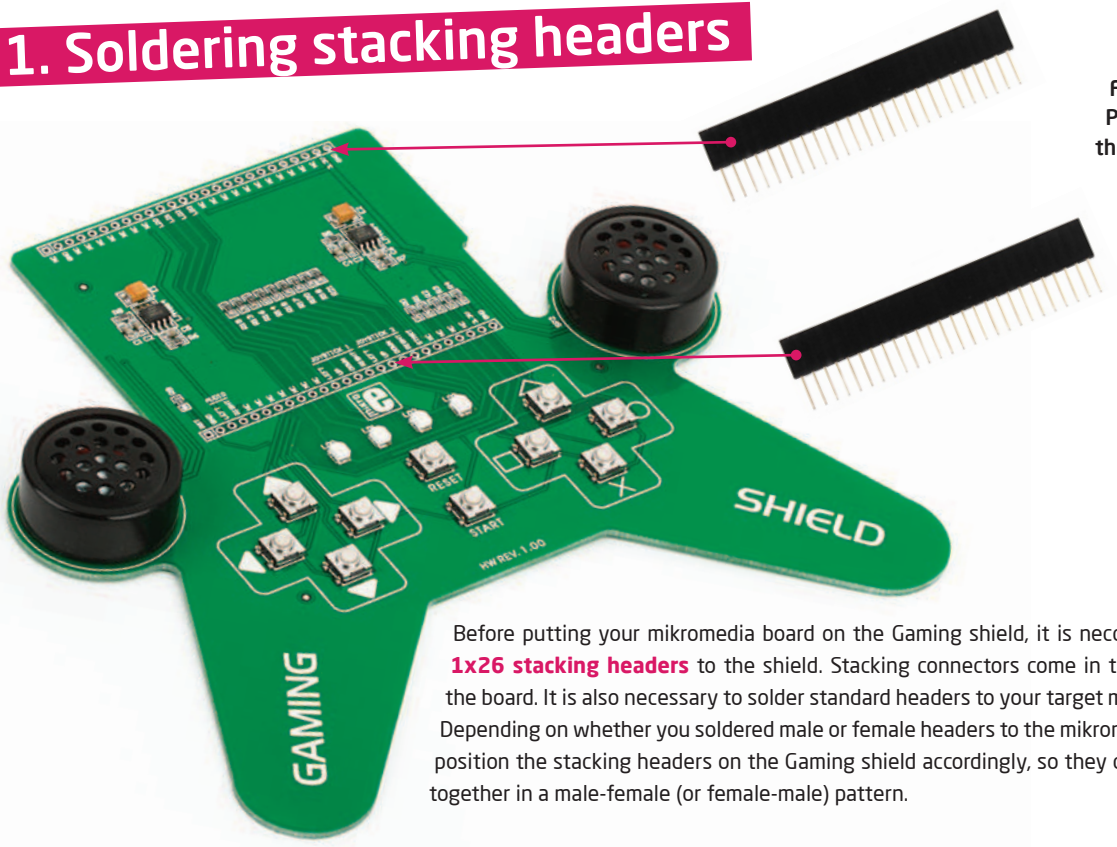


Figure 1-1: Positioning the stacking headers

Before putting your mikromedia board on the Gaming shield, it is neccessary to solder **1x26 stacking headers** to the shield. Stacking connectors come in the package with the board. It is also necessary to solder standard headers to your target mikromedia board. Depending on whether you soldered male or female headers to the mikromedia, you should position the stacking headers on the Gaming shield accordingly, so they can be connected together in a male-female (or female-male) pattern.

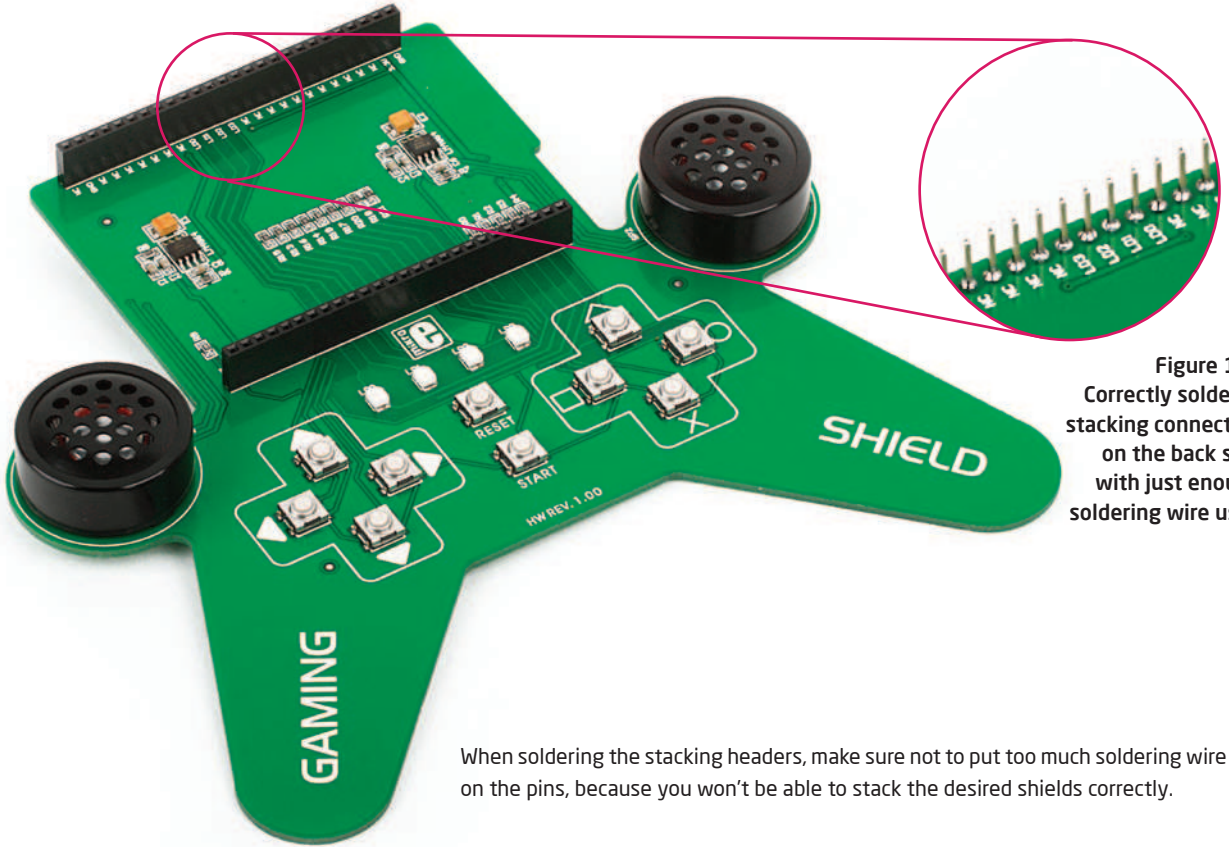


Figure 1-2: Correctly soldered stacking connectors on the back side with just enough soldering wire used

When soldering the stacking headers, make sure not to put too much soldering wire on the pins, because you won't be able to stack the desired shields correctly.

2. Connecting to mikromedias

Once you have soldered the stacking headers, you can connect your mikromedia to the gaming shield. Make sure to connect the boards so that the shapes of mikromedia and top of the gaming shields are aligned.

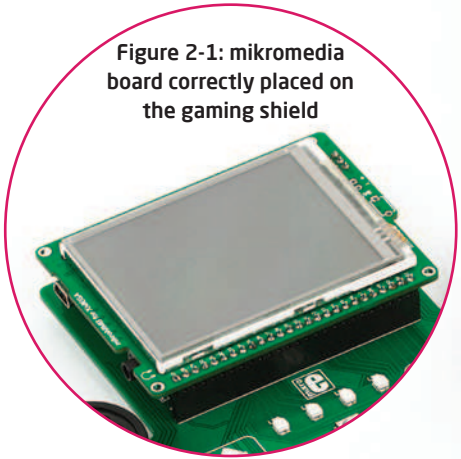


Figure 2-1: mikromedia board correctly placed on the gaming shield

3. Connecting to other shields

When front side is connected with mikromedia, the rear side of the board can be used for stacking other mikromedia shields, such as the **Battery Boost shield**. Make sure to solder the appropriate headers to this add-on shield, and make sure to match the board outlines when connecting them together.

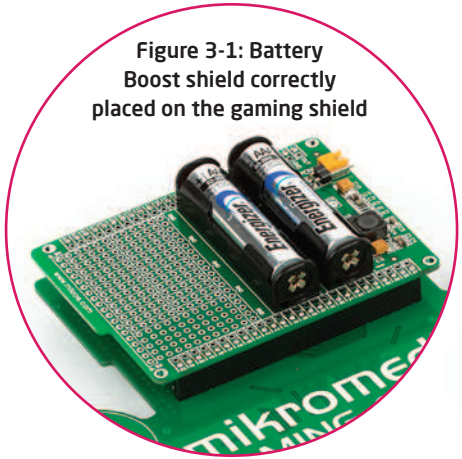


Figure 3-1: Battery Boost shield correctly placed on the gaming shield

4. Control Buttons and signal LEDs

mikromedia Gaming shield provides standard button controls required in most arcade games. There are two sections of buttons for standard gaming functions: **steering** (left, right, up, down), **actions** (triangle, square, x, and circle), but we also added **Start** and **Reset** buttons. Board features four signal LEDs which can be used as indicators of game status, or other activities.

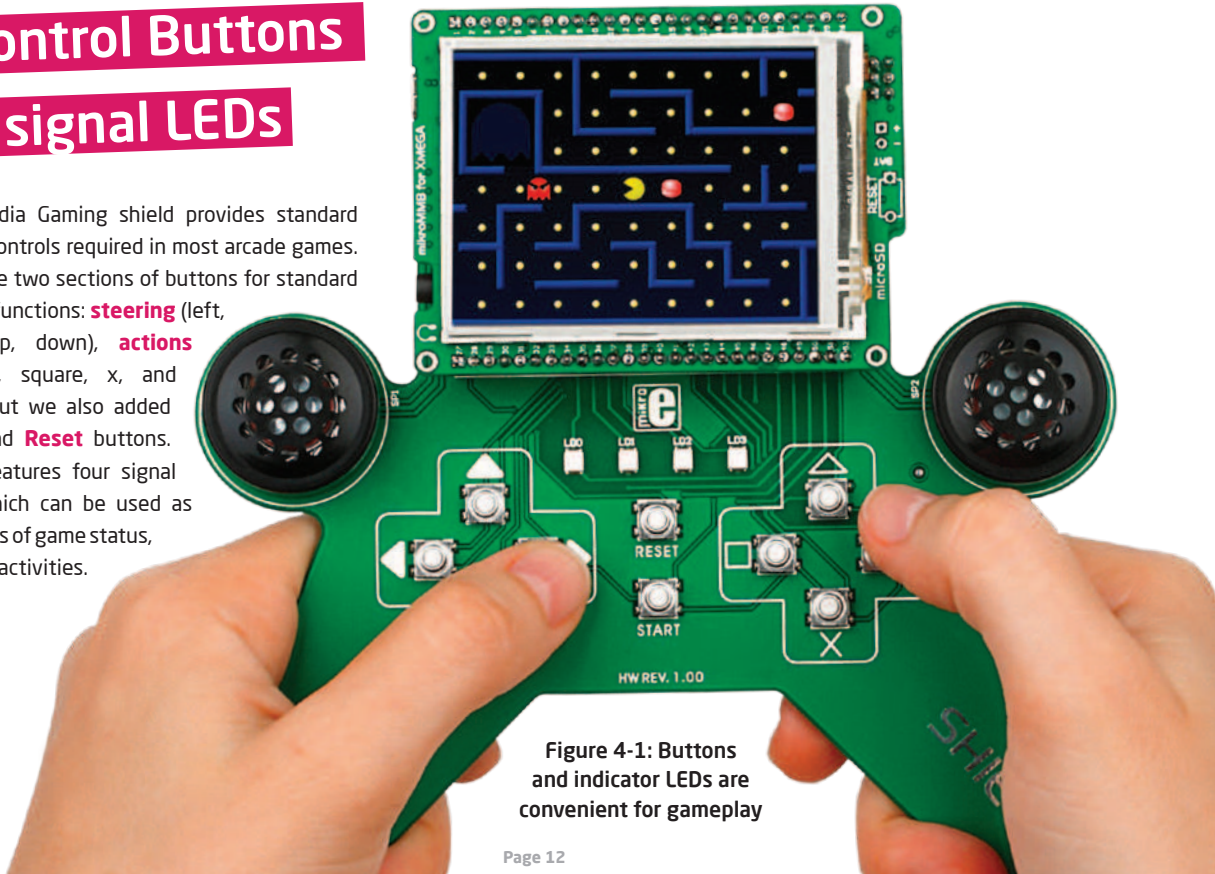


Figure 4-1: Buttons and indicator LEDs are convenient for gameplay

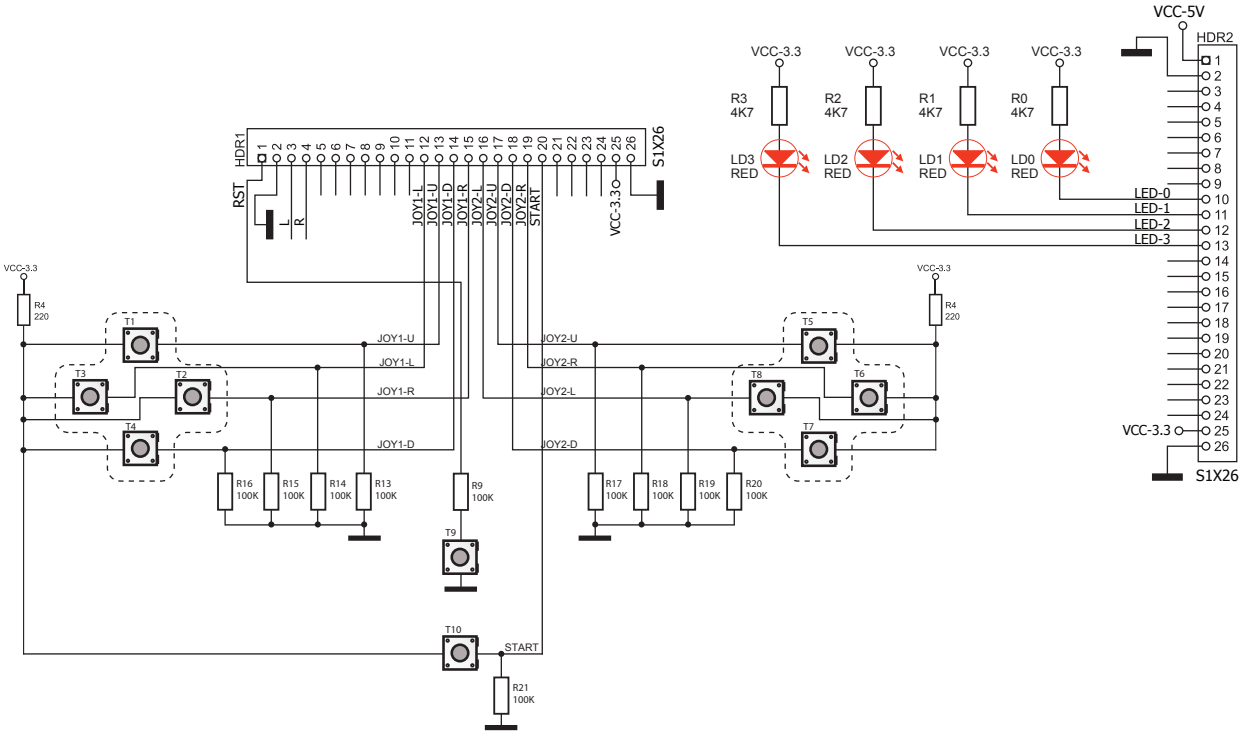


Figure 4-2: Schematics of button and LED connections

5. Audio module

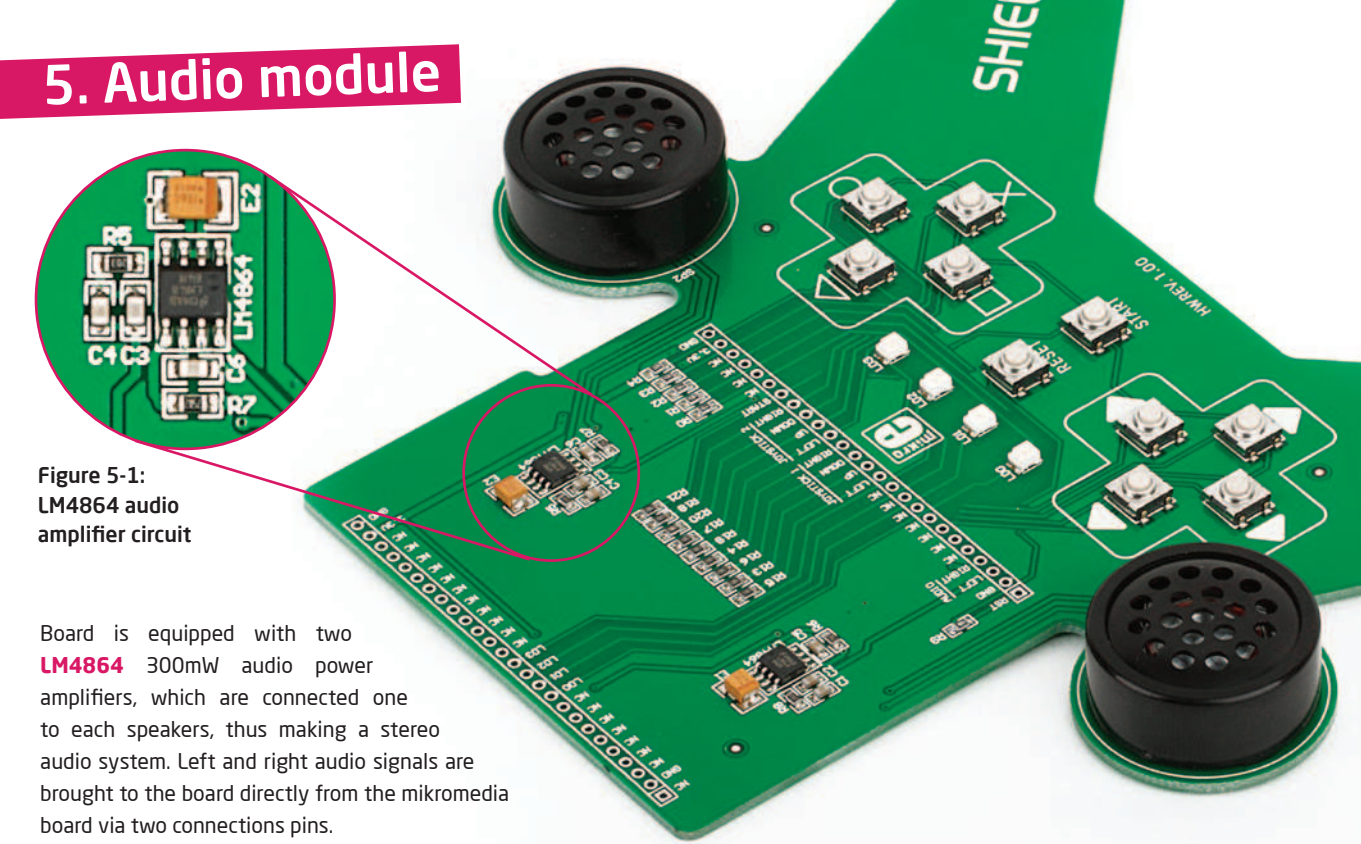


Figure 5-1: LM4864 audio amplifier circuit

Board is equipped with two **LM4864** 300mW audio power amplifiers, which are connected one to each speakers, thus making a stereo audio system. Left and right audio signals are brought to the board directly from the mikromedia board via two connections pins.

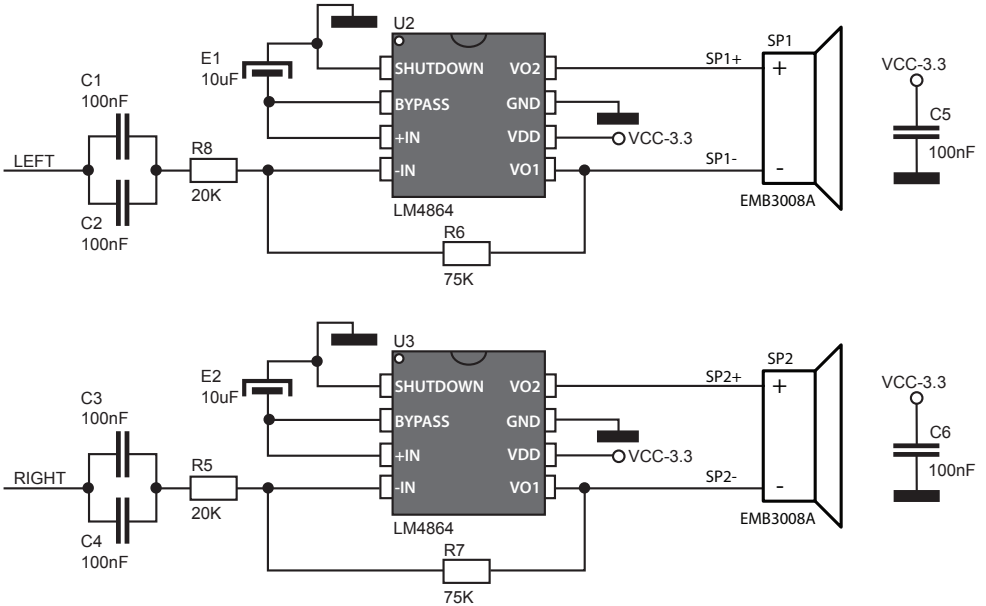
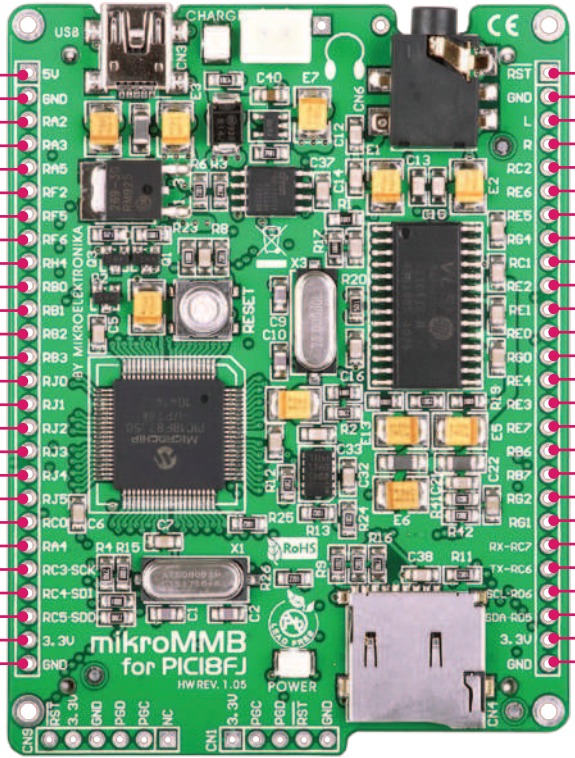


Figure 5-2: Left and right audio amplifier circuit schematics

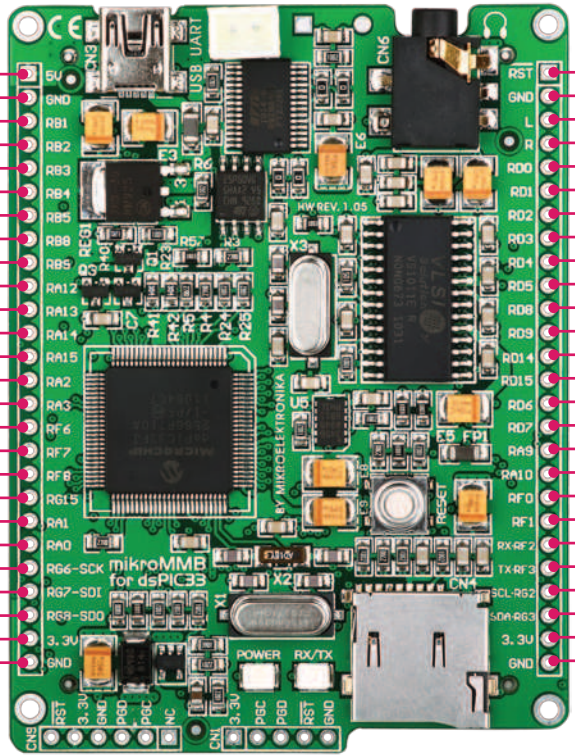
Gaming pinout on mikromedia for PIC18FJ



Gaming shield functions				Gaming shield function	
NC	5V	RST	RST	Reset pin	
GND	GND	GND	GND	GND	
NC	RA2	L	L	left ch.	audio out
NC	RA3	R	R	right ch.	audio out
NC	RA5	RC2	RC2	NC	
NC	RF2	RE6	RE6	NC	
NC	RF5	RE5	RE5	NC	
NC	RF6	RB4	RB4	NC	
NC	RH4	RC1	RC1	NC	
LED0	RB0	RE2	RE2	NC	
LED1	RB1	RE1	RE1	NC	
LED2	RB2	RE0	RE0	LEFT	JOYSTICK 1
LED3	RB3	RG0	RG0	UP	JOYSTICK 1
NC	RJ0	RE4	RE4	DOWN	JOYSTICK 1
NC	RJ1	RE3	RE3	RIGHT	JOYSTICK 1
NC	RJ2	RE7	RE7	SQUARE	JOYSTICK 2
NC	RJ3	RB6	RB6	TRIANGLE	JOYSTICK 2
NC	RJ4	RB7	RB7	X	JOYSTICK 2
NC	RJ5	RG2	RG2	CIRCLE	JOYSTICK 2
NC	RC0	RG1	RG1	START	
NC	RA4	RC7	RC7	NC	
NC	RC3	RC6	RC6	NC	
NC	RC4	RD6	RD6	NC	
NC	RC5	RD5	RD5	NC	
3.3V	3.3V	3.3V	3.3V	3.3V	
GND	GND	GND	GND	GND	

NOTE:
Pins that are not connected (NC) to the gaming shield can be used on the other side of the stacking headers with other shields

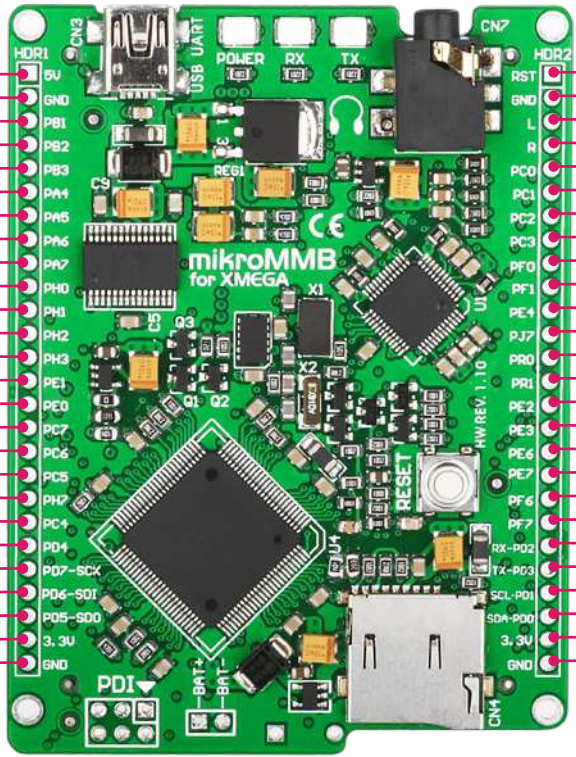
Gaming pinout on mikromedia for dsPIC33



Gaming shield functions				Gaming shield function
NC	5V	RST	RST	Reset pin
GND	GND	GND	GND	GND
NC	RB1	L	L	left ch.] audio out
NC	RB2	R	R	right ch.] audio out
NC	RB3	RD0	RD0	NC
NC	RB4	RD1	RD1	NC
NC	RB5	RD2	RD2	NC
NC	RB8	RD3	RD3	NC
NC	RB9	RD4	RD4	NC
LED0 (LEDS)	RA12	RD5	RD5	NC
LED1 (LEDS)	RA13	RD8	RD8	NC
LED2 (LEDS)	RA14	RD9	RD9	LEFT (JOYSTICK 1)
LED3 (LEDS)	RA15	RD14	RD14	UP (JOYSTICK 1)
NC	RA2	RD15	RD15	DOWN (JOYSTICK 1)
NC	RA3	RD6	RD6	RIGHT (JOYSTICK 1)
NC	RF6	RD7	RD7	SQUARE (JOYSTICK 2)
NC	RF7	RA9	RA9	TRIANGLE (JOYSTICK 2)
NC	RF8	RA10	RA10	X (JOYSTICK 2)
NC	RG15	RF0	RF0	CIRCLE (JOYSTICK 2)
NC	RA1	RF1	RF1	START
NC	RA0	RF2	RF2	NC
NC	RG6	RF3	RF3	NC
NC	RG7	RG2	RG2	NC
NC	RG8	RG3	RG3	NC
3.3V	3.3V	3.3V	3.3V	3.3V
GND	GND	GND	GND	GND

NOTE:
Pins that are not connected (NC) to the gaming shield can be used on the other side of the stacking headers with other shields

Gaming pinout on mikromedia for XMEGA

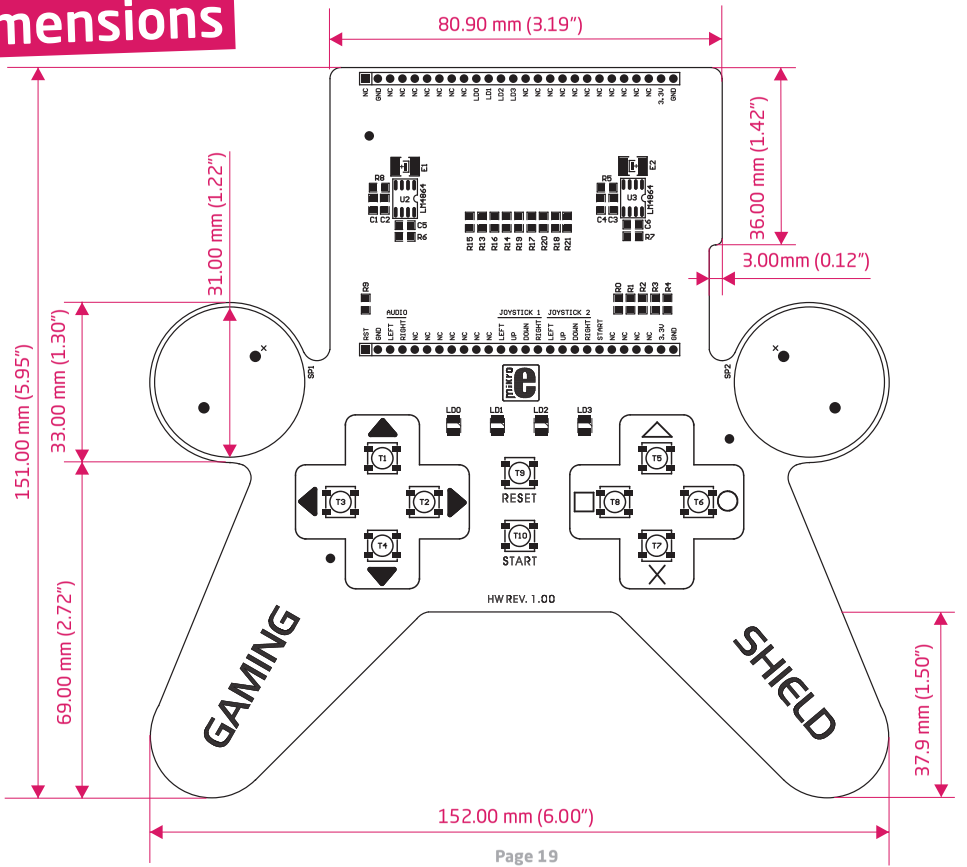


Gaming shield functions			Gaming shield function	
NC	5V	RST	Reset pin	
GND	GND	GND	GND	
NC	PB1	L	left ch.	audio out
NC	PB2	R	right ch.	audio out
NC	PB3	PC0	NC	
NC	PA4	PC1	NC	
NC	PA5	PC2	NC	
NC	PA6	PC3	NC	
NC	PA7	PF0	NC	
LED0	PH0	PF1	NC	
LED1	PH1	PE4	NC	
LED2	PH2	PJ7	LEFT	JOYSTICK 1
LED3	PH3	PR0	UP	JOYSTICK 1
NC	PE1	PR1	DOWN	JOYSTICK 1
NC	PE0	PE2	RIGHT	JOYSTICK 1
NC	PC7	PE3	SQUARE	JOYSTICK 2
NC	PC6	PE6	TRIANGLE	JOYSTICK 2
NC	PC5	PE7	X	JOYSTICK 2
NC	PH7	PF6	CIRCLE	JOYSTICK 2
NC	PC4	PF7	START	
NC	PD4	PD2	NC	
NC	PD7	PG3	NC	
NC	PD6	PD1	NC	
NC	PD5	PD0	NC	
3.3V	3.3V	3.3V	3.3V	
GND	GND	GND	GND	

LEDS

NOTE:
Pins that are not connected (NC) to the gaming shield can be used on the other side of the stacking headers with other shields

7. Dimensions



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