StereoAmp click

From MikroElektonika Documentation

StereoAmp click functions as a stereo amplifier and features two **LM48100Q-Q1** Boomer™ ICs by Texas Instruments. It is ideal for battery powered devices, automotive audio devices, hands-free kits, computers, MP3 players, etc

The LM48100Q-Q1 is a single supply, mono, 1.3W audio power amplifier with output fault detection and I2C volume control.

Contents

Features and usage notes

StereoAmp click key features:

- Input Voltage Range –0.3 V to VDD = 0.3 V
- Output Power at VDD 1.3 W (at VDD = 5 V, RL = 8 Ω, THD+N ≤ 1%)
- Low power shut down mode 0.01 μA
- I2C Volume and Mode Control
- Input Mixer and Multiplexer
- Output fault detection
- Short circuit and thermal protection
- Individual 32-step volume control
- I2C interface
- 3.5mm input audio jack
- Screw terminals for speaker output
- Runs on either 3.3V or 5V power supply

StereoAmp click

StereoAmp click

IC	LM48100Q-Q1 datasheet (http://www.ti.com/lit/ds/symlink/lm48100q-q1.pdf)
Interface	I2C
Power supply	3.3V or 5V
Product page	StereoAmp click (http://www.mikroe.com/click/stereoamp/)
Schematic	StereoAmp click schematic (http://cdn-docs.mikroe.com/images/f/f5/StereoAmp_click_schematic_v100.pdf)

Input and Output

The click has a **3.5mm** input jack next to the two pairs of screw terminals. The screw terminals are outputs intended for connecting passive speakers.

Volume control

Each LM48100Q-Q1 is used for one channel, left or right. Both input paths have their own independent, 32-step volume control. The mixer, volume control and device mode select are controlled through an I2C compatible interface.

Bridge-tied load for more voltage

BTL or a bridge-tied load is an output configuration where the speakers are connected (bridged) between two audio amplifier outputs. In a single-ended configuration one side of the load is connected to the ground. Here both channels are connected, but one has an inverted signal. Compared to a single-ended configuration BTL has two times more voltage swing across the load (speakers).

The doubled voltage swing means four times more power to the speakers. This is ideal for applications and devices where due to battery size the supply voltage is lower.

Shutdown mode

The IC has an I2C selectable low power shutdown mode that disables the device, reducing current consumption to 0.01μA.

Fault detection

The output fault detection system can sense load conditions and protect the device during short circuit events and detect open circuit conditions. The LM48100Q-Q1 output fault diagnostics are controlled through the I2C interface.

Pinout diagram

This table shows how the pinout on StereoAmp click corresponds to the pinout on the mikroBUS™ socket.

Notes	Pin	mikroBUS™				Pin	Notes
Fault detection left channel	**FAULT_L**	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	**FAULT_R**	Fault detection right channel
	NC	3	CS	TX	14	NC	
	NC	4	SCK	RX	13	NC	
	NC	5	MISO	SCL	12	**SCL**	I2C clock
	NC	6	MOSI	SDA	11	**SDA**	I2C data
+3.3V power input	**+3.3V**	7	+3.3V	+5V	10	**5V**	+5V power input
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Programming

The demo shows how to initialize amplifiers and set volume control registers on the fly. It uses joystick or potentiometer (depending on the development board) to control volume and TFT or LCD display to show gain level. Before initializing I2C module, the demo toggles SDA and SCL lines for proper initialization of amplifiers.

The following code enables amplifiers and selects input 1, sets volume to predefined value, and restores diagnostic register. Function Write_Amp_Reg writes to selected amplifier's register using I2C bus.

```
void StereoAmp_Init() {
    // Power On and Input 1 enabled.
    Write_Amp_Reg(LEFT_SPEAKER, MODE_CONTROL_REG, POWER_ON | INPUT1);
    Write_Amp_Reg(RIGHT_SPEAKER, MODE_CONTROL_REG, POWER_ON | INPUT1);
    // Set volume.
    Write_Amp_Reg(LEFT_SPEAKER, VOLUME_CONTROL1_REG, volume_control_L);
    Write_Amp_Reg(RIGHT_SPEAKER, VOLUME_CONTROL1_REG, volume_control_R);
    // Restore diagnostic.
    Write_Amp_Reg(LEFT_SPEAKER, DIAGNOSTIC_CONTROL_REG, DG_RESET );
    Write_Amp_Reg(RIGHT_SPEAKER, DIAGNOSTIC_CONTROL_REG, DG_RESET );
}
```

Resources

- IC data sheet (http://www.ti.com/lit/ds/symlink/lm48100q-q1.pdf)
- Library (https://libstock.mikroe.com/projects/view/1954/stereoamp-click)
- StereoAmp click schematic (http://cdn-docs.mikroe.com/images/f/f5/StereoAmp_click_schematic_v100.pdf)
- mikroBUS™ standard specifications (http://www.mikroe.com/mikrobus/)

Retrieved from "http://docs.mikroe.com/index.php?title=StereoAmp_click&oldid=2241"

Category: Home page

- This page was last modified on 17 November 2016, at 17:53.
- Content is available under Creative Commons Attribution unless otherwise noted.