



MAC5310 Audio Codec and Audio Power Amplifier Module User Manual

Dr Robot[®]

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I. Introduction

The MAC5310 Audio Codec and Audio Power Amplifier Module can be used as audio input/output interface in the WiRobot system by plugging into the PMB5010 Multimedia Controller board. The on-board codec provides high resolution signal conversion from digital-to-analog (D/A) and from analog-to-digital (A/D) using over-sampling sigma-delta technology. With the on-board audio output power amplifier and the microphone preamp in the codec, the external speaker and microphone can be directly connected to the MAC5310 board.

Features

- 16-bit over-sampling sigma-delta A/D, D/A converter
- Maximum output conversion rate:
 - 16 ksps with on-chip FIR filter
 - 64 ksps with FIR bypassed
- Codec built-in FIR produces 84-db SNR for ADC and 85-db SNR for DAC over 11-kHz BW
- 2s-complement data format
- Codec built-in functions including PGA, anti-aliasing analog filter, and operational amplifiers for general-purpose interface (such as MIC interface and hybrid interface)
- On-board audio output power amplifier can support up to 1.5 W power to the external speaker
- On-board oscillator
- Plug-and-play in the WiRobot system

Applications

- Audio input/output for robotic systems
- Voice and speech recognition
- Voice and audio playback

II. Operations

II.1. Theory of Operation

The MAC5310 Module is designed to run as part of WiRobot system. It can be directly plugged on to the PMB5010 Robot Multimedia Controller board. No configuration procedure is needed. Once connected, the PMB5010 on-board firmware and the audio input/output device driver will take care of the low level operations of the voice/speech capturing and audio output.

III. Connections

III.1. Board Structure

Figure III.1 shows the board structure, locations and functions of the connectors on the MAC5310 module board.

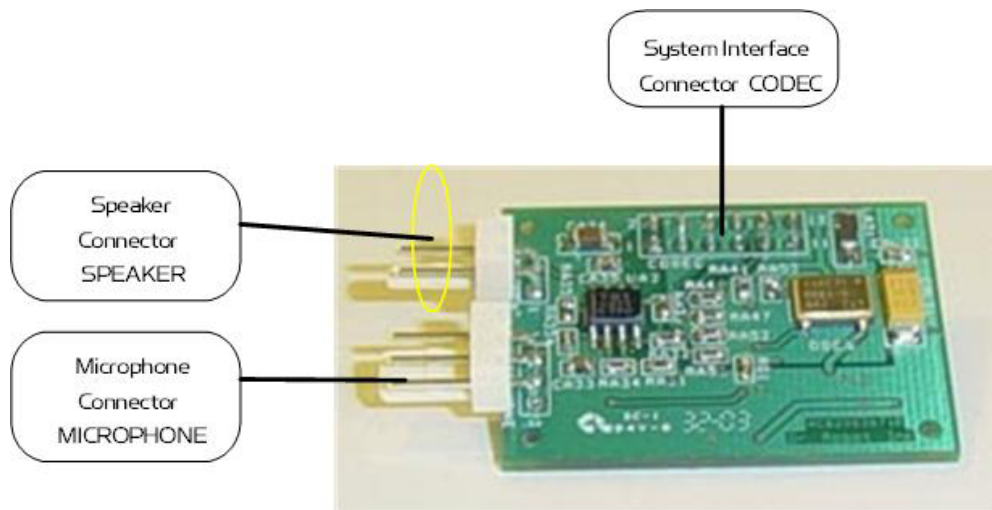


Figure III.1 MAC5310 Connector Locations

III.2. Connector Description

The definitions of the MAC5310 connector signals are listed in the following tables.

Table III.1 Speaker Connector SPEAKER

Pin	Name	Function
1	SO1	Speaker output 1
2	SO2	Speaker output 2

Table III.2 Microphone Connector MICROPHONE

Pin	Name	Function
1	NC	No connection
2	MIP	Microphone input +
3	MIM	Microphone input -

Table III.3 System Interface Connector CODEC

Pin	Name	Function
1	DOUT	Data output
2	V _{CC5}	+ 5.0V
3	FS	Frame sync
4, 6	GND	Power supply ground
5	DIN	Data input
7	SCK	Shift clock
8	MCK	NC
9	RESET	Reset input
10	PDN	Power down input
11	FC	Request input for secondary communication
12	V _{CC3}	+ 3.3V

IV. Specifications

Table IV.1 MAC5310 Specification

Parameter	Conditions	MIN	TYP	MAX	Unit
Power Supply Voltage	V_{CC5}	4.5	5.0	5.5	V
Power Supply Voltage	V_{CC3}	3.0	3.3	3.6	V
Output Power	THD = 0.5%(max), f = 1 kHz, $R_L = 8 \text{ Ohm}$		1.0		W
	THD + N = 0.5%, f = 1 kHz, $R_L = 8 \text{ Ohm}$		1.5		
Analog input voltage, peak-to-peak	$V_{CC3} = 3.3 \text{ V}$		2		V
ADC or DAC conversion rate				16	kHz
On-board oscillator			8.1920		MHz
Board Size			30 x 40		mm x mm

Note:

THD + N = Total Harmonic Distortion + Noise