EVB User's Guide

1. General Description

The W56964 EVB (EValuation Board) demonstrates the functionality of the W56964 chip in polyphonic ringtone applications and supports performance evaluation.

For demonstration purposes, the EVB can be connected to a PC through the ARM7 platform (WHS-569MP V1.0) for program and MIDI data downloads. The ARM7 platform has a simple interface for MIDI playback and volume control.

For stand-alone operation, the EVB is not connected to the WHS-569MP V1.0 main board and instead is connected to any real baseband CPU through the parallel memory bus on the EVB.

2. Board View

The WHS-5692H1 V1.1 is used for performance evaluation and product promotion (along with the ARM7 platform).

2.1 Board View

Part number of EVB: WHS-5692H1 V1.1 W or WHS-5692H1 V1.0 W

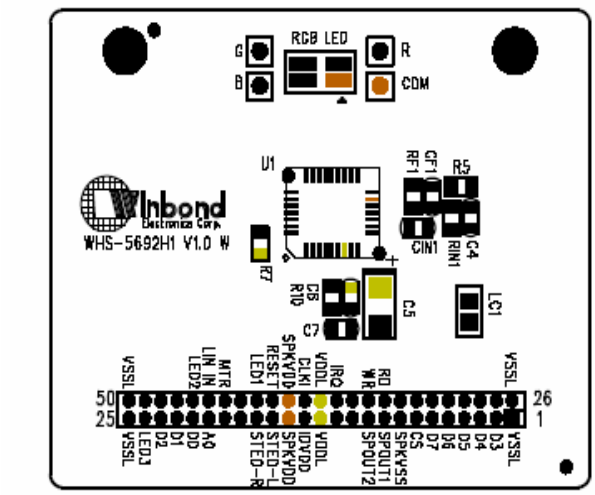

Figure 1 Top Side

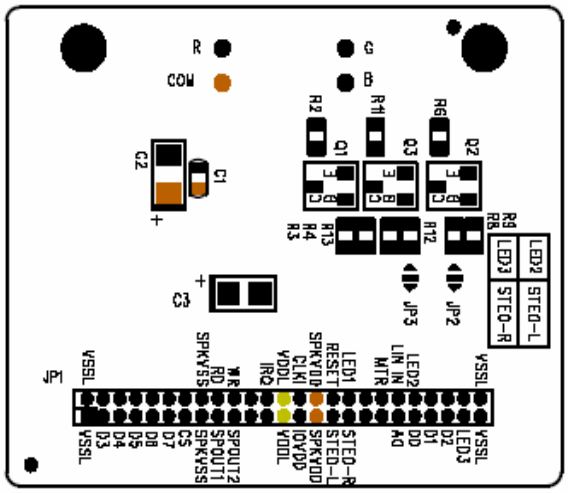

Figure 2 Bottom Side

2.2 Description

2.2.1 WHS-5692H1 V1.1 W

- JP1

This is the interface connector that is used to connect the EVB with the baseband CPU. JP1 has CPU interface, speaker, LED, motor, clock, and line-in pins to the W56964.

1) /CS, A0, /RD, /WR, /IRQ, D0~D7

Parallel memory bus interface.

2) MTR

Motor (or vibrator) connection pin. It is often connected to drive the vibrator via an external BJT (Bipolar Junction Transistor).

3) LED1(R), LED2(G), LED3(B)

LED connection pins. Users can drive 3 LED's for RGB color effect.

4) VSSL, VDDL

W56964's logic power connection pins. VSSL and VDDL are for ground and power, respectively.

5) /RESET

Active low reset pin.

6) CLKI

Clock input pin.

7) SPKVSS, SPKVDD

SPKVSS is the analog ground pin, while SPKVDD is the power supply pin for the speaker amplifier.

8) SPOUT0, SPOUT1

Connect to 8-ohm speaker.

9) Line_in#

Mix external analog signal via R/C coupling with the MIDI signal as input to the on-chip power amplifier.

10) STEO-L, STEO-R

In stereo mode, STEO-L is the left-channel headphone output, and STEO-R is the right-channel Headphone output. In mono mode, STEO-L is the headphone output.

11) IOVDD

IO peripheral power supply for 1.8 or 3.0 volt CPU interface.

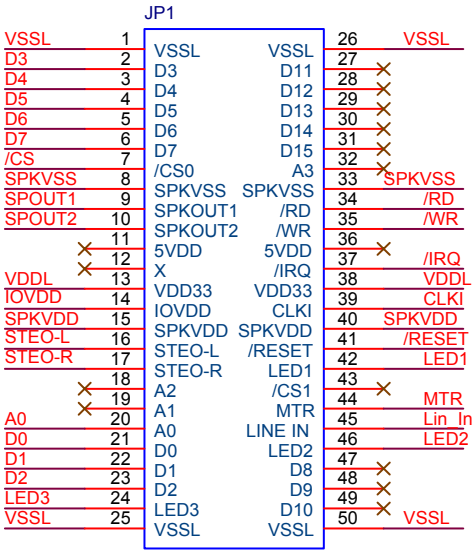

Figure 3 Connector with Baseband CPU

- JP2,JP3

  These two jumps are either stereo Headphone output or LED output. This is selected by the two switches next to JP2 and JP3.

- RIN1, CIN1, RF1, CF1, C4, R5

  Amplification and frequency band adjustment for the equalizer and power amplifier for MIDI and line-in signals. Please see Figure 4 Sound Quality Correction Circuit and Figure 5 Frequency response of equalizer for more information, and section 2.3 discusses how to adjust these values.

  - RIN1, CIN1

    These components determine the low cut-off frequency (f1) of the pass band of the equalizer for MIDI output.

  - R5, C4

    These components determine the low cut-off frequency (f3) of the pass band of the equalizer for external Line-In.

  - RF1, CF1

    These components determine the high cut-off frequency (f2) of the pass band of the equalizer for both MIDI output and external Line-In.

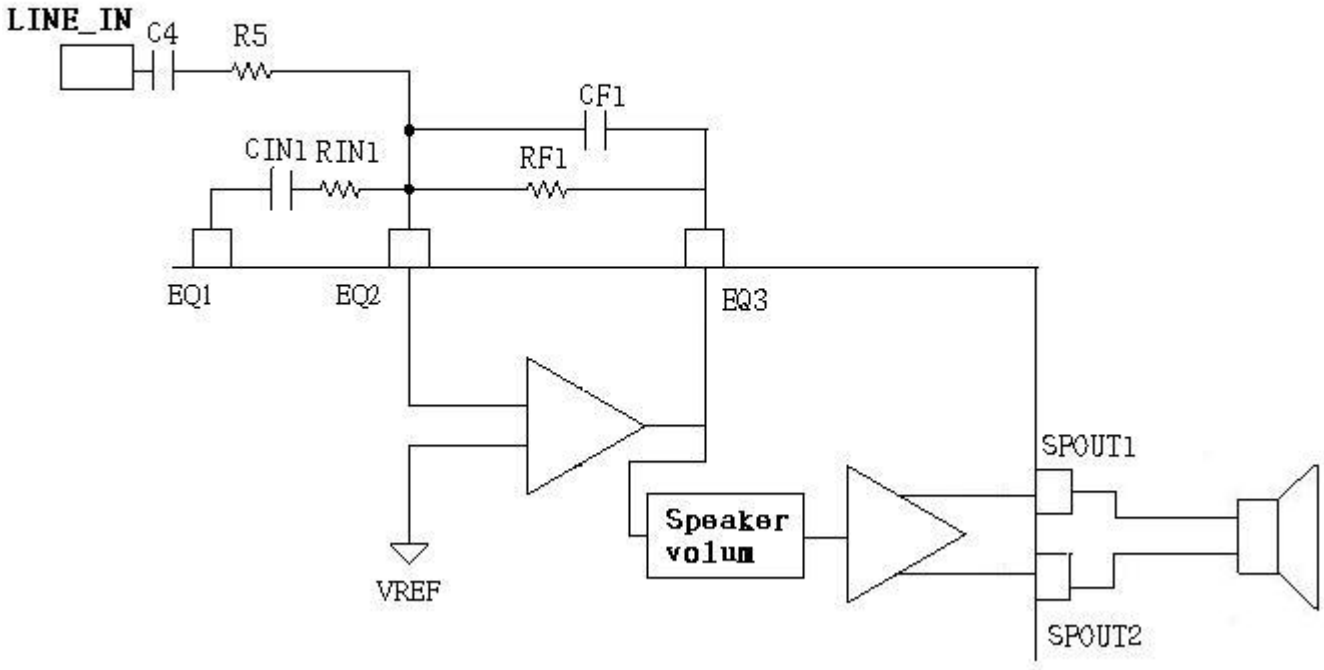

Figure 4 Sound Quality Correction Circuit

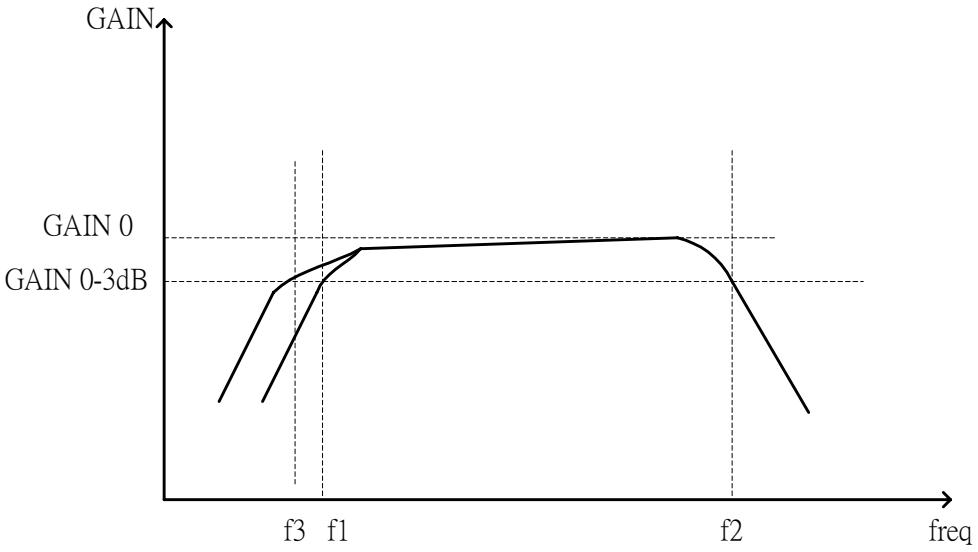

Figure 5 Frequency response of equalizer

2.3 Equalizer Tuning

The EVB can be used for performance evaluation by adjusting the values of the resistors and capacitors. The next two sections provide information about the frequency band calculation and then recommend values for a typical 8-ohm speaker with 15-mm diameter.

2.3.1 Equalizer Characteristics

As shown in Figure 4, the equalizer of the W56964 is basically an operational amplifier. The following formula can be used to calculate the amplification gain as well as the cut-off frequencies.

- MIDI output
  - Gain = Rf/Rin.
  - Cut-off frequency

    Lower: f1 = 1/(2πxRinxCin).

    Higher: f2 = 1/(2πxRfxCf).

- Line-In
  - Gain = Rf/R5.
  - Cut-off frequency

    Lower: f3 = 1/(2πxR5xC4).

    Higher: f2 = 1/(2πxRfxCf).

2.3.2 Recommended Values

Application	PHS
Speaker	0.7-watt, 8 ohm, 15 mm
Rin (Kohm)	51
Cin (pF)	3,000
F1 (Hz)	1,040
Rf (Kohm)	91
Cf (pF)	150
F2 (Hz)	1,1650
Av (Rf/Rin)	1.78

These steps can be followed to tune the R/C values:

1) Rin is fixed at 51 Kohm to optimize performance.
2) Cin is calculated according to the desired low cut-off frequency of the pass band.
3) Rf is determined based on the selected speaker and power rating.
4) Cf is calculated to give the desired high cut-off frequency of the pass band.

Tuning might require several iterations, especially steps 3 and 4, because the speaker volume is quite dependent on the amplification gain as well as the frequency response.

3. Revision History

Revision	Date	Modifications
A0	September 2004	• Initial release
A1	December 2004	• Revised grammar
A2	March 2005	• Add Disclaimer