

AKM
AKR454X Rev.D Evaluation Board for AK4544A and AK4545

General Description

AKR454x rev.D is an Audio/Modem riser with AC'97 Rev 2.1 Multimedia Audio, AK4544A or AK4545. This can be used as an evaluation board for AK4544A or AK4545. This can be used on the motherboard that has AMR slot and Intel® ICH Controller. WDM driver for Window98 and Windows2000 is ready for this board. This board has five input connectors that are microphone, line, CD, phone and AUX inputs. This has a stereo speaker output and an optical output for AK4545 DIT. Therefore, it is easy to evaluate ADC, DAC and mixer of AK4544A and AK4545.

Components

- Audio/Modem riser interface for AMR slot
- Stereo inputs
 - 1) Line input pin jack
 - 2) CD input connector
 - 3) AUX input connector
- Mono inputs
 - 1)Microphone input pin jack
 - 2)Phone input connector
- Stereo output
 - 1)Speaker output pin jack
- Digital interface
 - 1)Optical output for AK4545 DIT

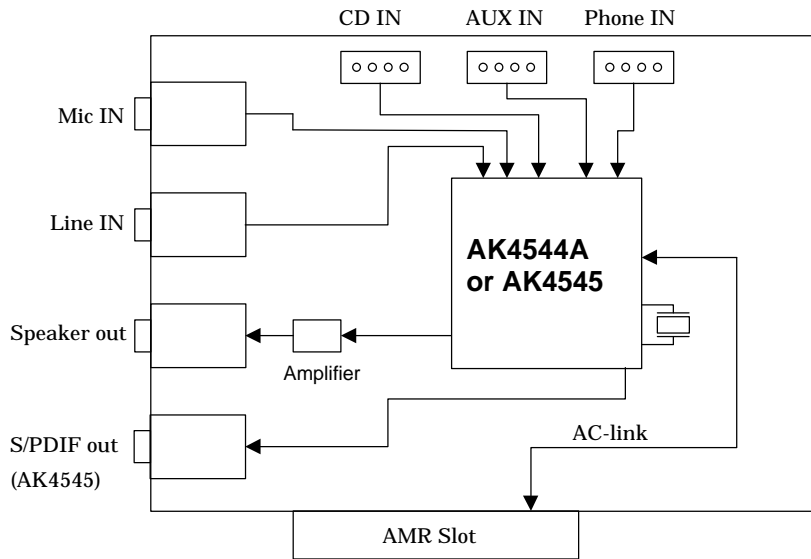
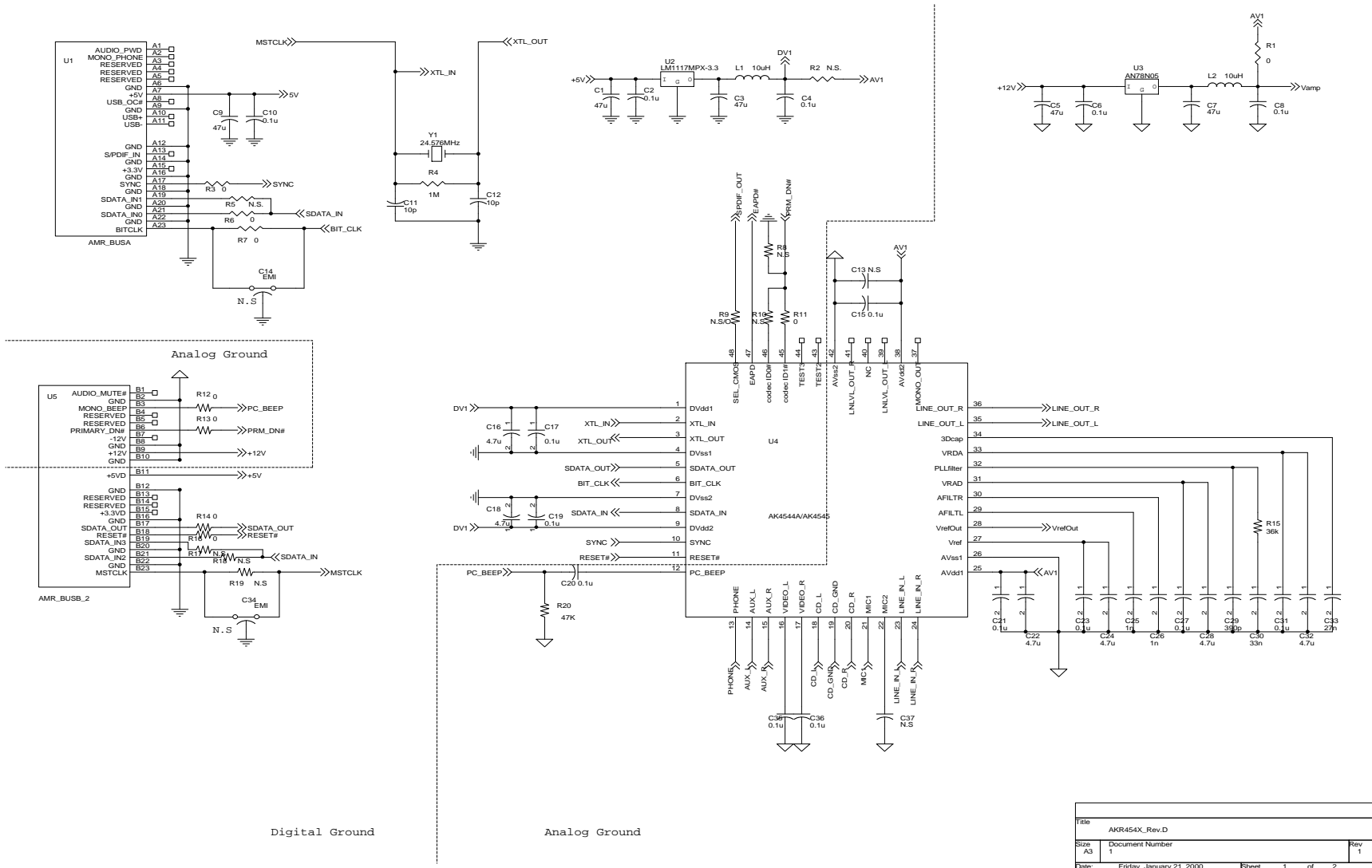
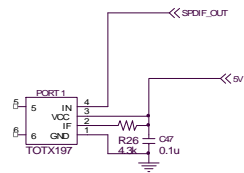


Figure.1 AKR454X Rev.D Block Diagram

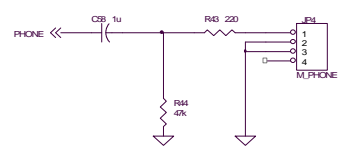
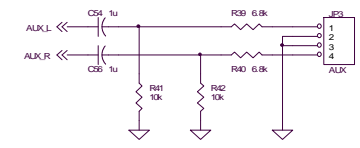
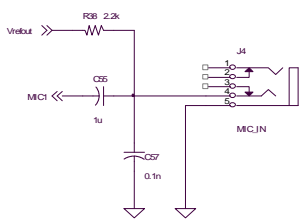
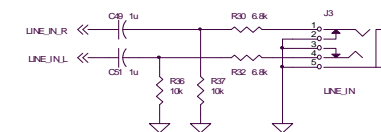
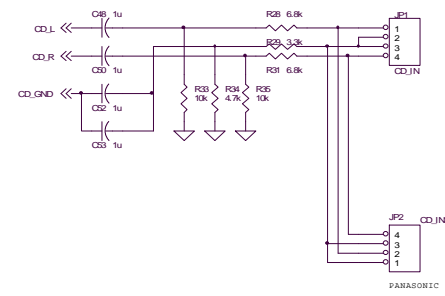
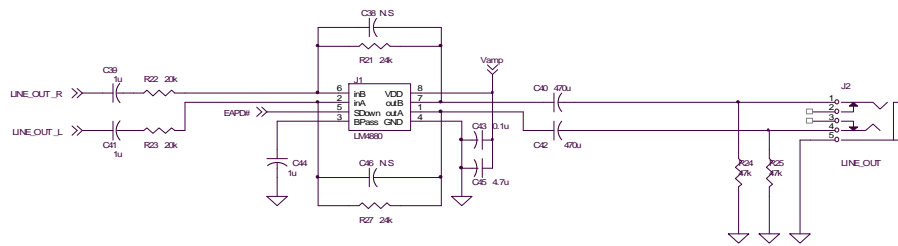


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Digital Ground

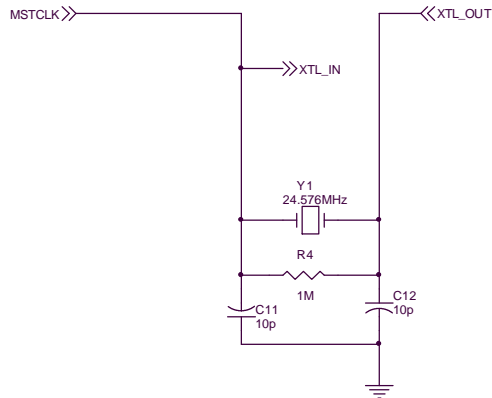
Analog Ground



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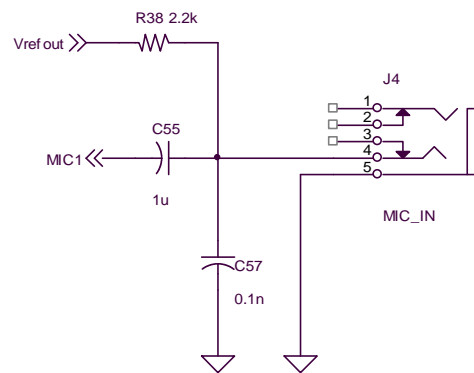
■ Master clock

AKR454X Rev.D has a crystal. If the external clock from AMR slot is used, remove Y1 crystal, R4 register, C11 and C12 capacitor and set a register of 0ohm to R19.



■ Microphone input circuit

The vrefout of AK4544A/AK4545 is used for bias for microphone as the following figure.



■ CODEC ID

R10, R11 and R8 for 45pin and 48pin set CODEC ID.

Because AK4545 don't work as secondary CODEC, this setting is valid for AK4544A only.

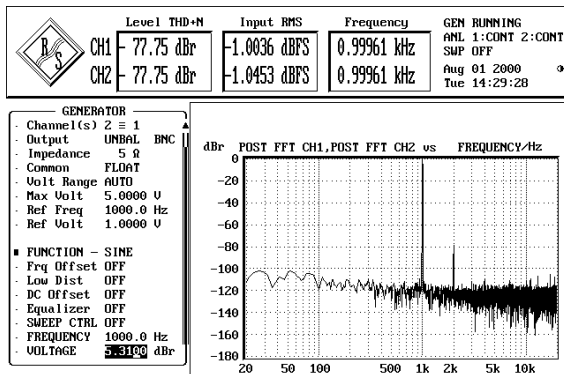
■ Audio performance

Audio analyzer: ROHDE & SCHWARZ UPD

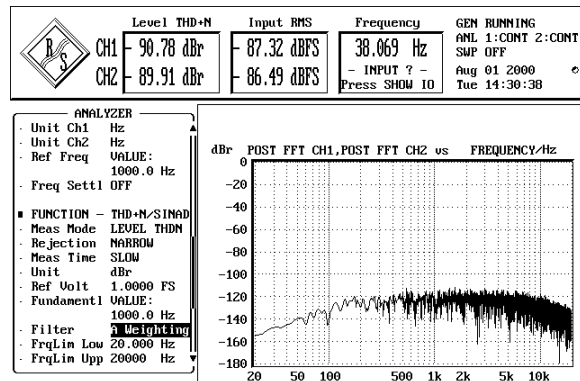
Device	Path/Sample Rate		Parameter	L	R	Units	
AK4544A	ADC	48KHz	THD+N	-77.8	-77.8	dB	
			S/N(A-Weighting)	90.8	89.9	dBA	
		44.1KHz	THD+N	-76.6	-76.8	dB	
			S/N(A-Weighting)	86.5	86.6	dBA	
	DAC	48KHz	THD+N	-83.5	-83.5	dB	
			S/N(A-Weighting)	88.2	87.9	dBA	
		44.1KHz	THD+N	-81.5	-81.3	dB	
			S/N(A-Weighting)	87.6	87.3	dBA	
A-A (Line-In to Line-Out)			THD+N	-90.5	-90.1	dB	
A-A (Line-In to Line-Out)			S/N(A-Weighting)	94.8	94.6	dBA	
AK4545	ADC	48KHz	THD+N	-82.2	-82.2	dB	
			S/N(A-Weighting)	90.9	89.9	dBA	
		44.1KHz	THD+N	-79.6	-79.5	dB	
			S/N(A-Weighting)	86.0	85.9	dBA	
	DAC	48KHz	THD+N	-83.1	-83.4	dB	
			S/N(A-Weighting)	87.9	88.3	dBA	
		44.1KHz	THD+N	-80.9	-81.0	dB	
			S/N(A-Weighting)	87.4	87.7	dBA	
	A-A (Line-In to Line-Out)			THD+N	-90.0	-89.6	dB
	A-A (Line-In to Line-Out)			S/N(A-Weighting)	94.9	95.0	dBA

Note) Because AKR454XD has an amplifier, this amplifier effects the performance of DAC and A-A.

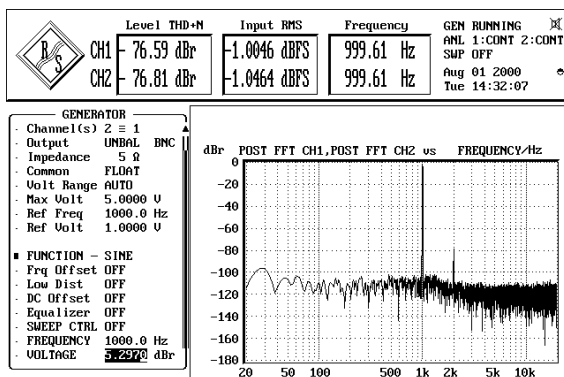
■ ADC of AK4544A



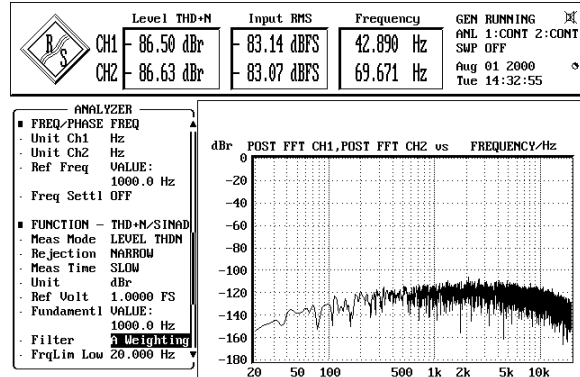
THD+N at 48KHz



S/N at 48KHz

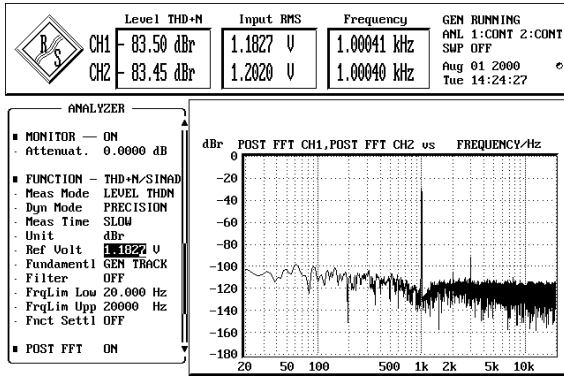


THD+N at 44.1KHz

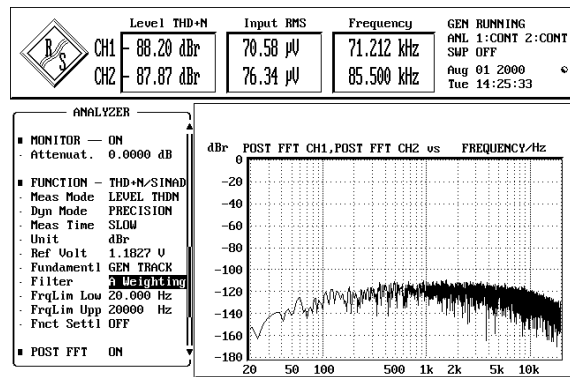


S/N at 44.1KHz

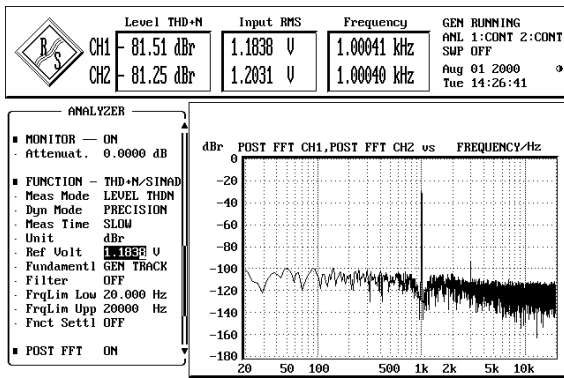
■ DAC of AK4544A



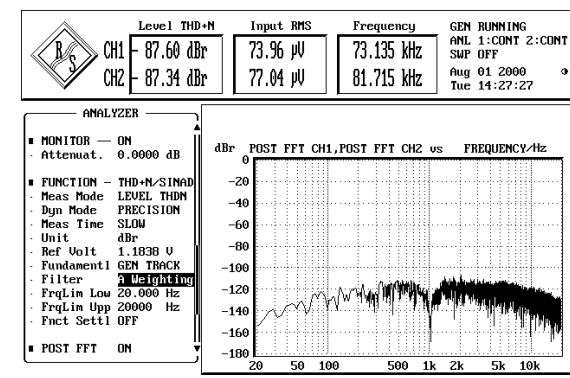
THD+N at 48KHz



S/N at 48KHz

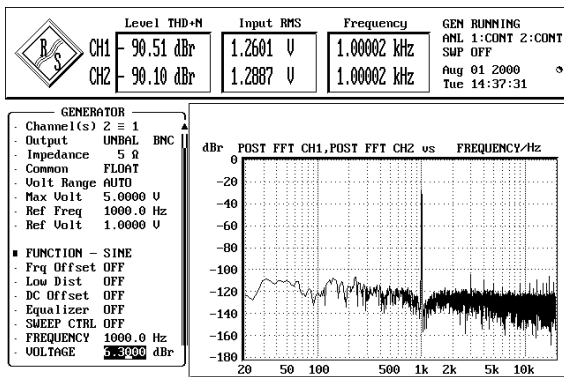


THD+N at 44.1KHz

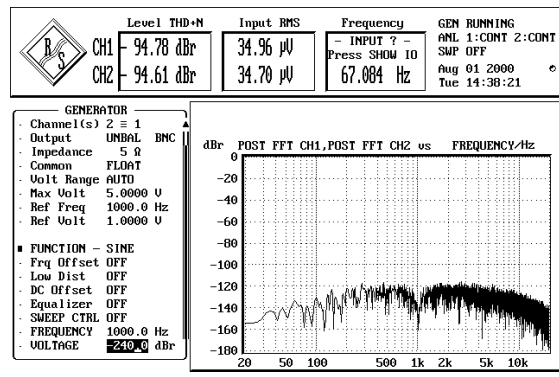


S/N at 44.1KHz

■ Line In – Out of AK4544A

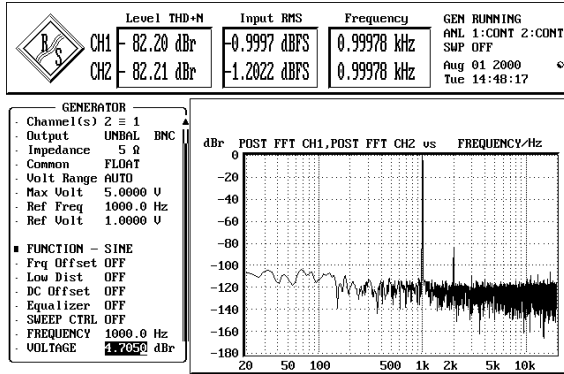


THD+N

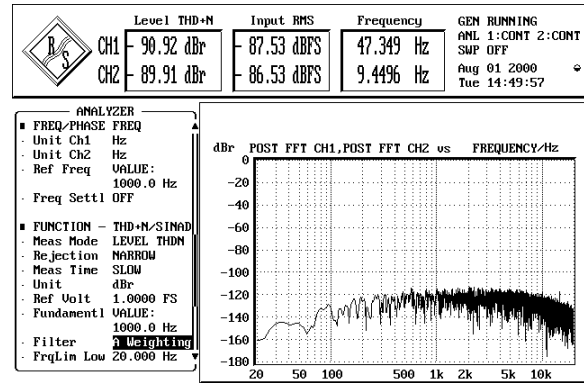


S/N

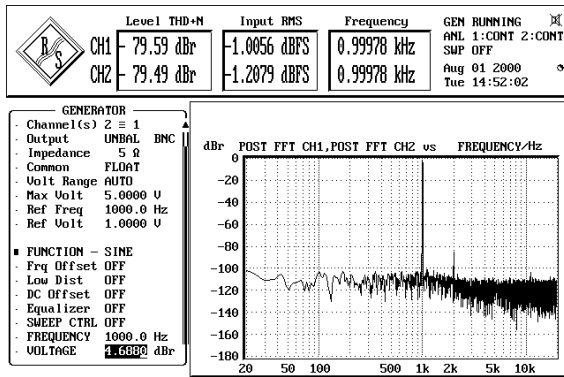
■ ADC of AK4545



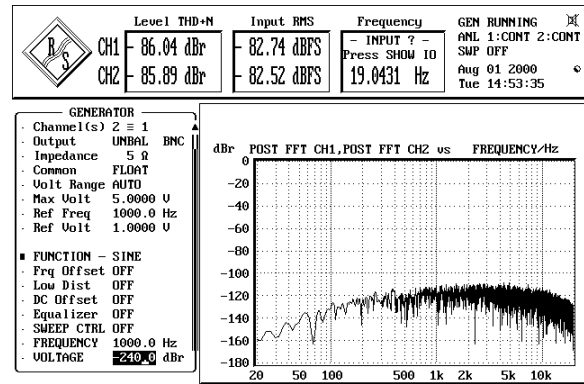
THD+N at 48KHz



S/N at 48KHz

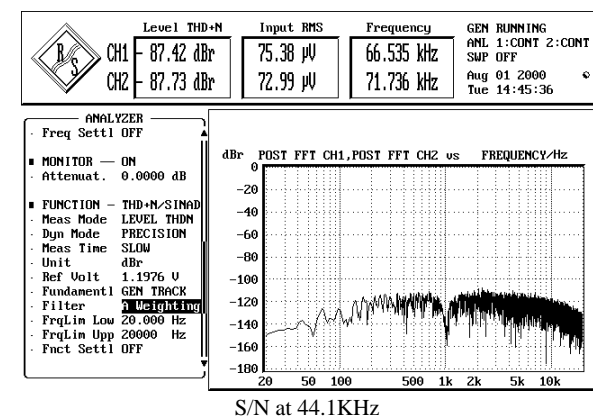
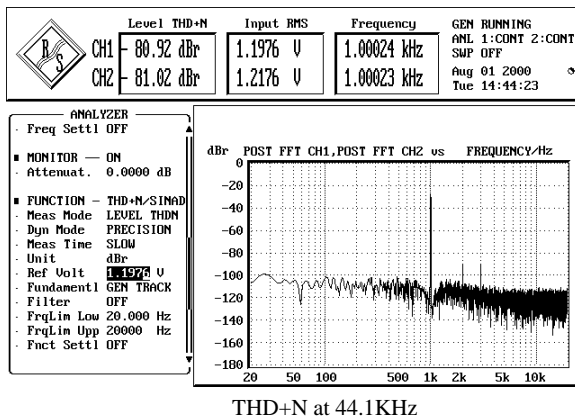
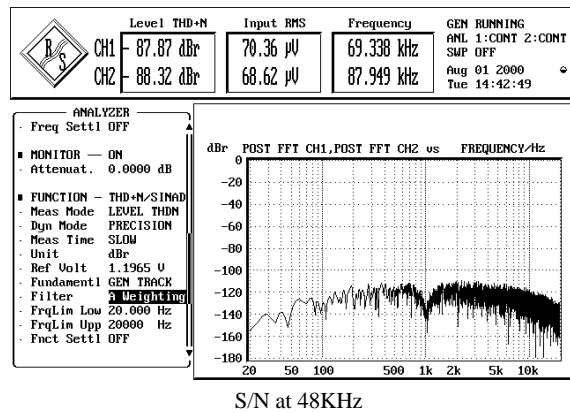
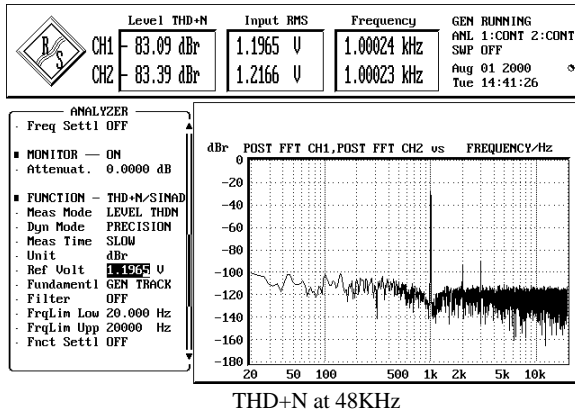


THD+N at 44.1KHz

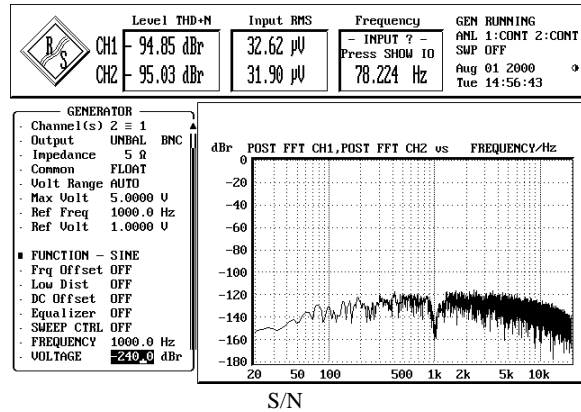
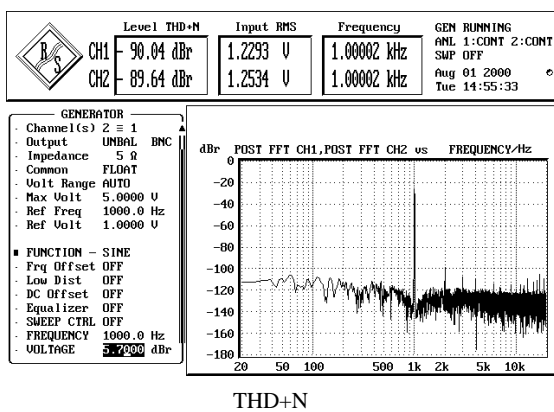


S/N at 44.1KHz

■ DAC of AK4545



■ Line In - Out of AK4545



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AKM's WDM DRIVER INSTALLATION INSTRUCTIONS

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1.Introduction

Welcome to the AKM's AC'97 and WDM driver. AKM has prepared this WDM Driver only for the combination of Intel® ICH Controller and AKM's AC'97 (AK4543,AK4541, AK4544A,AK4545).

2.System Requirements

To perform this installation, the following is required:

- AKM's AC'97: AK4545 or AK4544A or AK4543 or AK4541.
 - AKM's WDM Driver.
 - Intel® 820/815/810/440MX.
 - Windows98 or Windows2000 or Windows Millennium installed.
-

3. Files for AKM's WDM driver

There are the following files for AKM's WDM driver.

AKM_AC97.SYS : WDM driver.

AKM_AC97.INF : INF file to install in Windows98, Windows Millennium and Windows2000

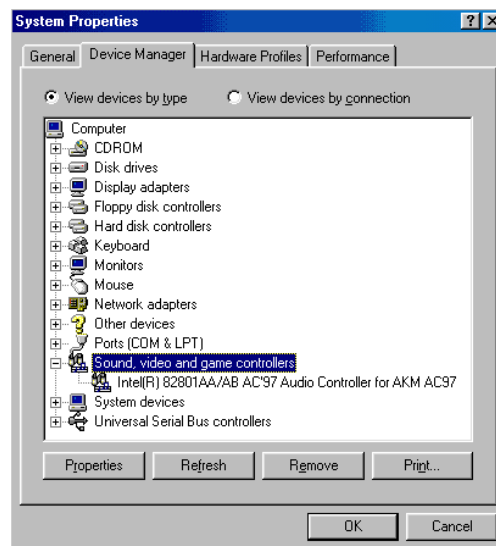
4. Install AKM's WDM driver

4.1.Installation

- (1) Copy AKM_AC97.sys and AKM_AC97.inf to FD or a directory.
- (2) Execute "Add New Hardware" in Control Panel.
- (3) On PCI Multimedia Audio Device auto-detection, direct the driver search to the AKM diskette or the directory where the driver file and INF can be found.
- (4) Follow the prompts and install the AKM AC'97 driver.

4.2.Update

- (1) Execute "System" in Control Panel.
- (2) Select AKM's WDM driver "Sound, Video and game controllers" on Device Manager.
AKM's WDM driver is displayed as
"Intel[R] 82801AA/AB AC'97 Audio Controller for AKM AC97".
- (3) Open properties windows and push "Update Driver" on Driver windows.
- (4) Follow the prompts and install the AKM AC'97 driver.
- (5) Shutdown and reboot.

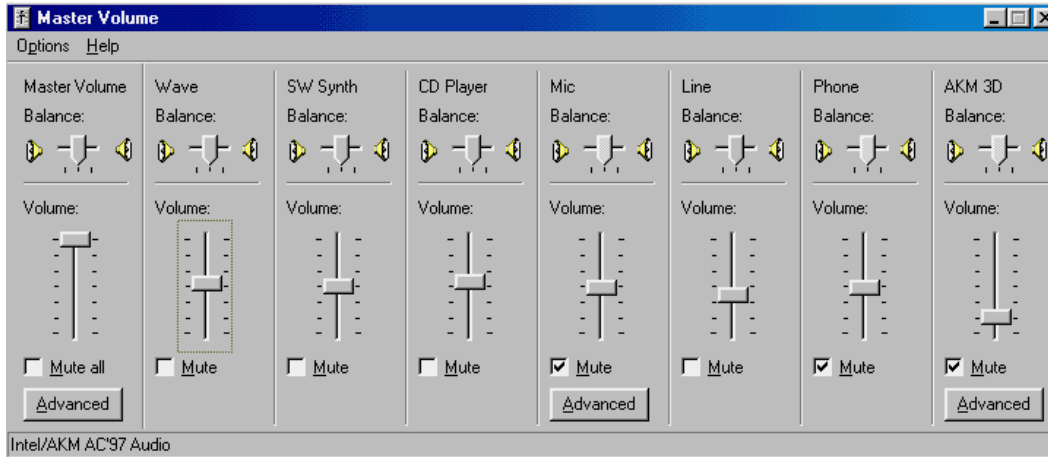


5. Control Applets

5.1. Volume control for Line-Out

(1) Volume control

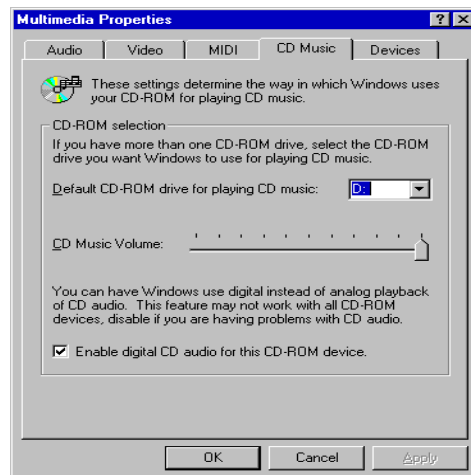
AKM AC97's Volumes are controlled by "Sound Controller" of Windows application.



(2) CD Music

AKM AC97's WDM driver can output both Analog CD and Digital CD.

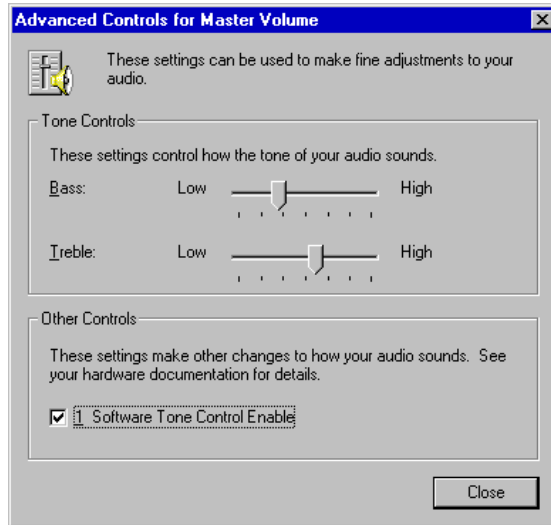
If you hope to use Digital CD, check "Enable digital CD audio" on CD Music of "Multimedia" properties.



(3) Bass and Treble

Tones that are Bass and Treble are controlled. These tones are effective for only digital sounds that are Wave, Synthe and Digital CD.

1. Push “Advanced” button under Master Volume.
2. Check “Software Tone Control Enable”
3. Control Bass and Treble.

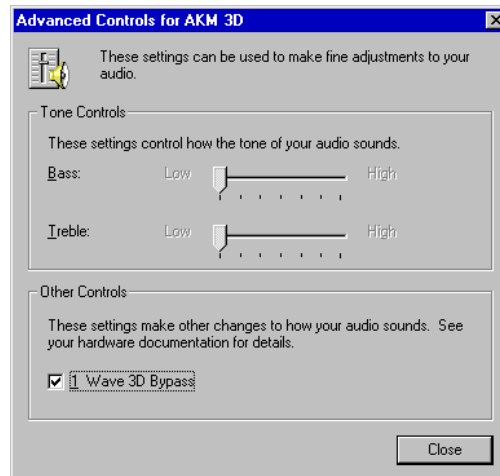


(4) AKM 3D

AKM 3D is analog 3D enhancement.

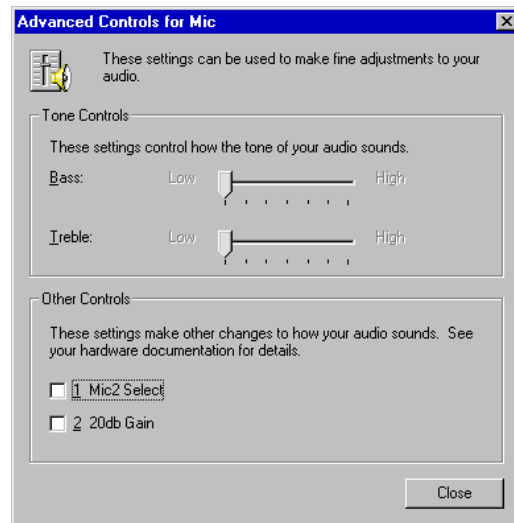
This 3D is effective for all sound that is outputted to Line-Out.

If you don't hope that digital sounds are enhanced, check “Wave 3D Bypass” on “Advanced” window under AKM 3D.



(5) Mic gain

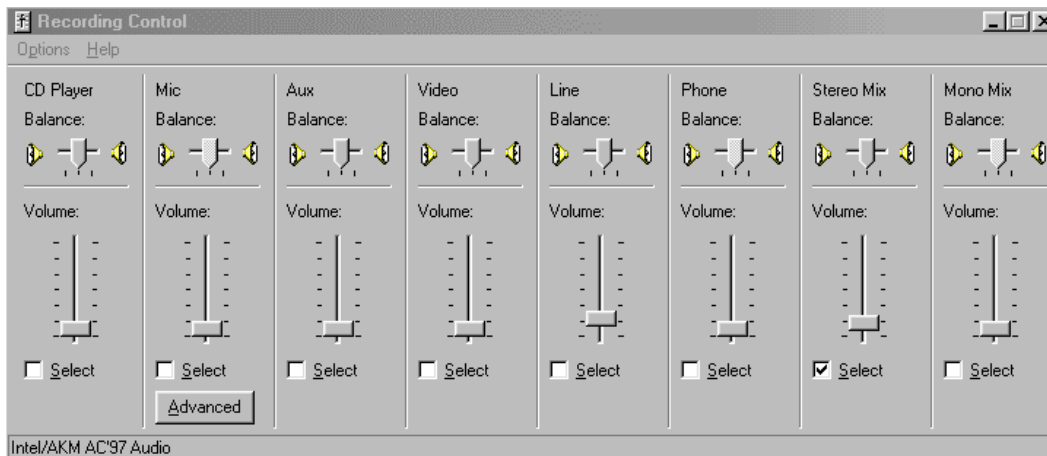
If Mic Output is small, check “20dB Gain” on “Advanced” windows under Mic.



5.2. Recoding

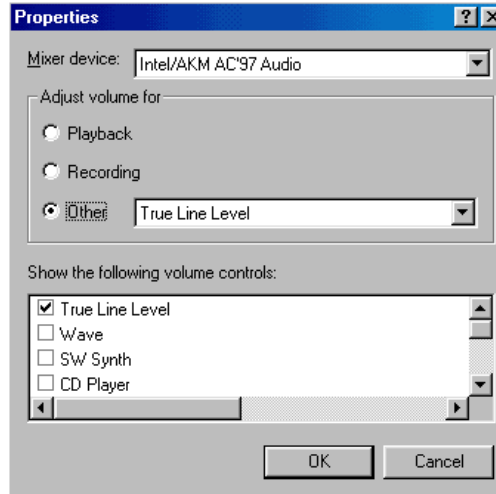
Select “Recording” on property of option in menu. Recording control panel opens.

If you want to record digital sound, select Stereo Mix.



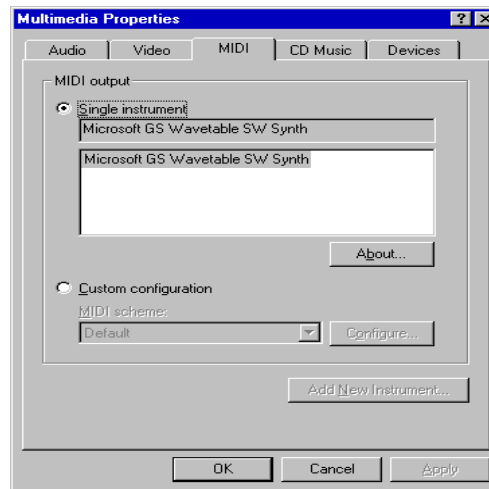
5.3. Mono Out and True Line Level Out

Mono Out Volume and True Line Level True Line Volume can be controlled too. Check “Other” on properties of option and select Mono out or True Line Level.



5.4. Midi

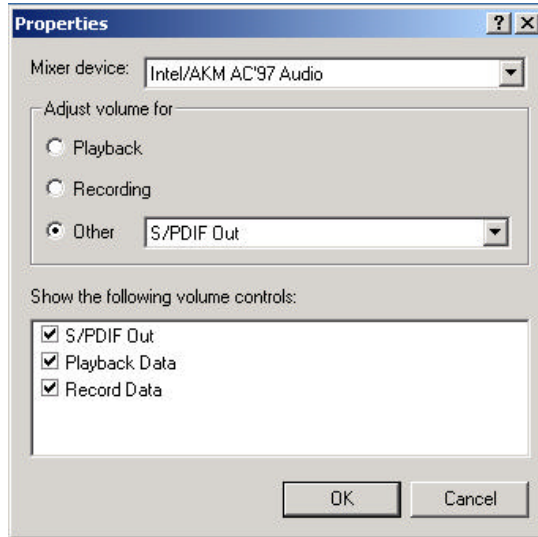
“Microsoft GS Wavetable SW Synte” can be used after installing AKM's WDM driver.



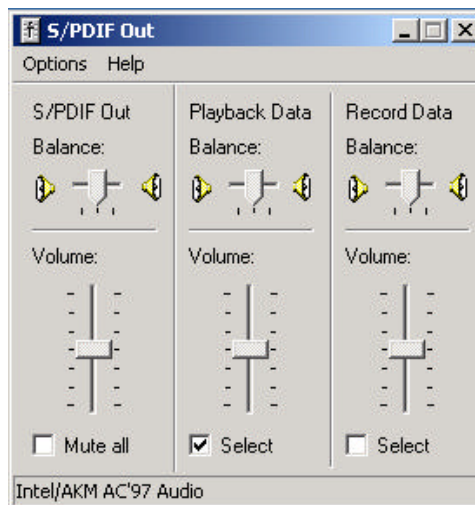
5.5. S/PDIF Out

AK4545 can output Audio data to S/PDIF out.

Check “Other” on properties of option and select S/PDIF out.



- (1) When “mute” is off and “Playback Data” is selected, Playback Data is output to S/PDIF out
- (2) When “mute” is off and “Record Data” is selected, Recording Data is output to S/PDIF out.



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October 2, 2000

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