AKD5373-A
Evaluation board Rev.0 for AK5373

GENERAL DESCRIPTION

AKD5373-A is an evaluation board for AK5373, which is a stereo A/D Converter with a USB 2.0 interface. The AK5373 can be tested easily on the AKD5373-A, as the operation of the device is compatible with USB standard audio class. The AKD5373-A has not only an external audio interface, but also an external EEP-ROM that all descriptor contents are stored and customizable.

■ **Ordering guide**

AKD5373-A --- Evaluation board for AK5373
(Cable for connecting with printer port of IBM-AT compatible PC and control software are packed with this. This control software does not operate on Windows NT.)

FUNCTION

■ **Microphone Jack**
■ **3.3 volt Regulator (LM1117-3.3V)**
■ **8k bit EEPROM(AK6506CT)**
■ **USB B-type Connector**

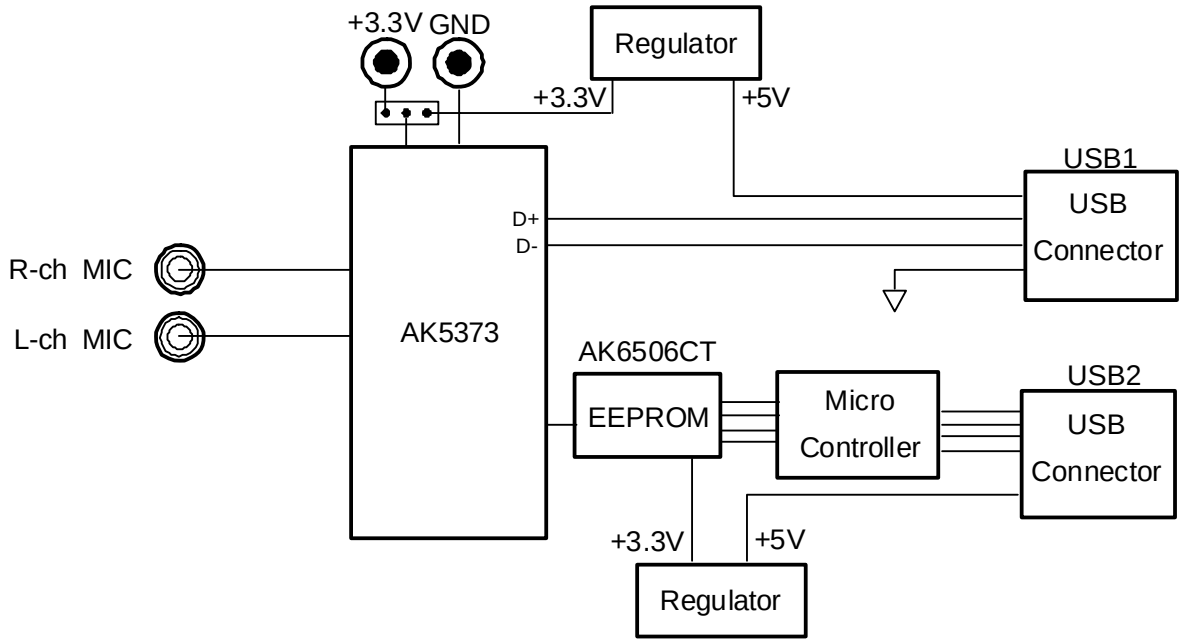


Figure 1. AKD5373-A Block Diagram

* Circuit diagram and PCB layout are attached at the end of this manual

BOARD OUTLINE CHART

■ Outline Chart

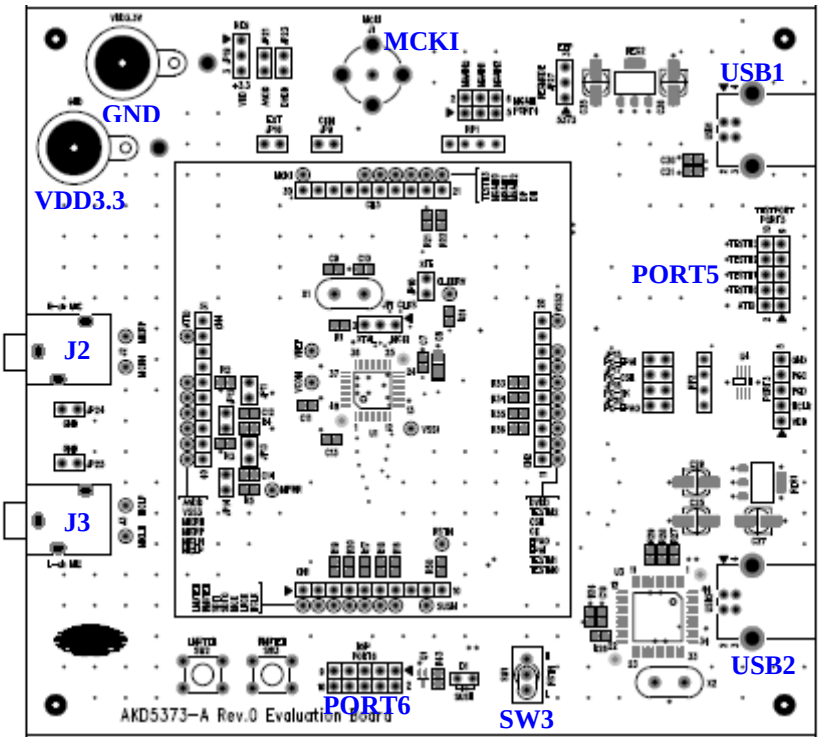


Figure 2. AKD5373-A top view

■ Comment

(1) VDD3.3V, GND
These are the power supply connectors. Connect power supply with these pins.
As for the detail comments, refer to the setup of power supply on the next page.

(2) MCKI (BNC-JACK)
This is external clock source for the MCKI/XTI pin of the AK5373.

(3) USB1 (USB Connector)
This is USB B-type connector for evaluation of the AK5373. Connect this to PC.

(4) USB2 (USB Connector)
This is USB B-type connector for EEP-ROM write operation.

(5) J2, J3 (Mini Jacks)
These are analog signal inputs.

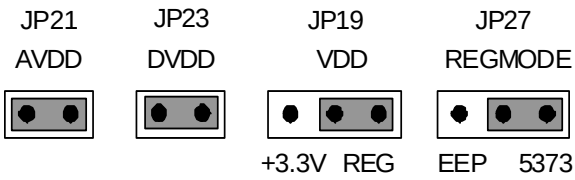
(6) PORT5, PORT6 (10 pin header)
PORT5 (TEST PORT): It is not used except test mode
PORT6 (DSP): This is External serial audio interface. A/D data output and DSP data input are possible via this port.

(7) SW3 (Switch)
SW3: Reset of AK5373. Keep "H" during normal operation.

Evaluation Board Manual

■ Operation sequence

1) Set up the jumper pins as the followings.



2) Connect USB1 port of the AKD5373-A to PC with an USB cable. Windows recognizes the AK5373 automatically, and it is not necessary to install any driver. Device manage shows "AK5373" as an USB Audio Device in "Sound, video and game controllers" if Windows recognizes the device successfully.

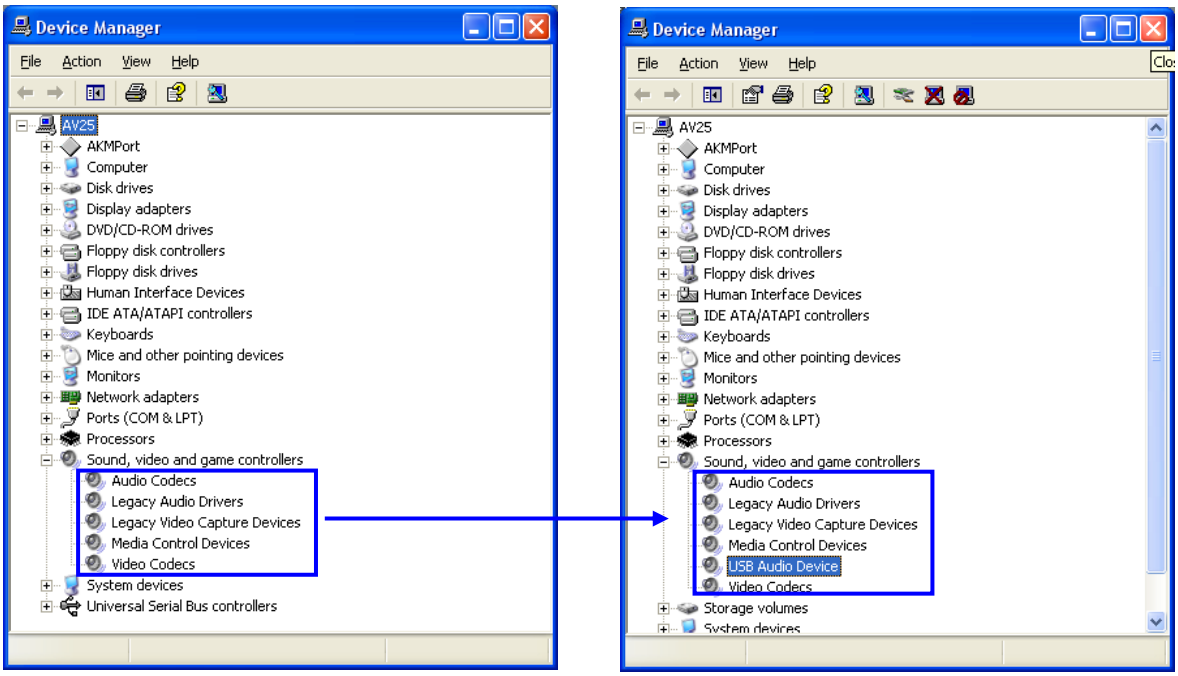


Figure 3. Device Manager "Sound, video and game controllers"

3) Double click "USB Audio Device", the window of "USB Audio Device Properties" shows the properties including device type as "Sound, video and game controllers", Manufacturer as "Generic USB Audio", and Location as "Location 0 (AK5373)".

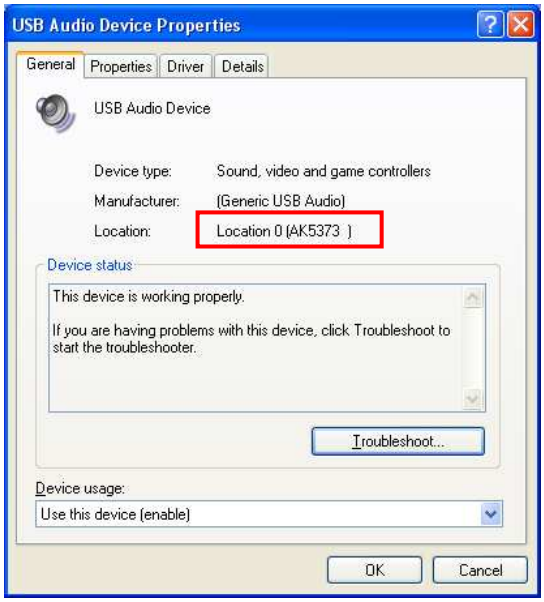


Figure 4. USB Audio Device Properties

■ Evaluation mode

(1) Internal ADC Streaming Mode

Evaluation of using internal ADC of AK5373
USB1 (USB Connector) is used. Nothing should be connected to USB2 (USB Connector) and PORT6 (DSP).

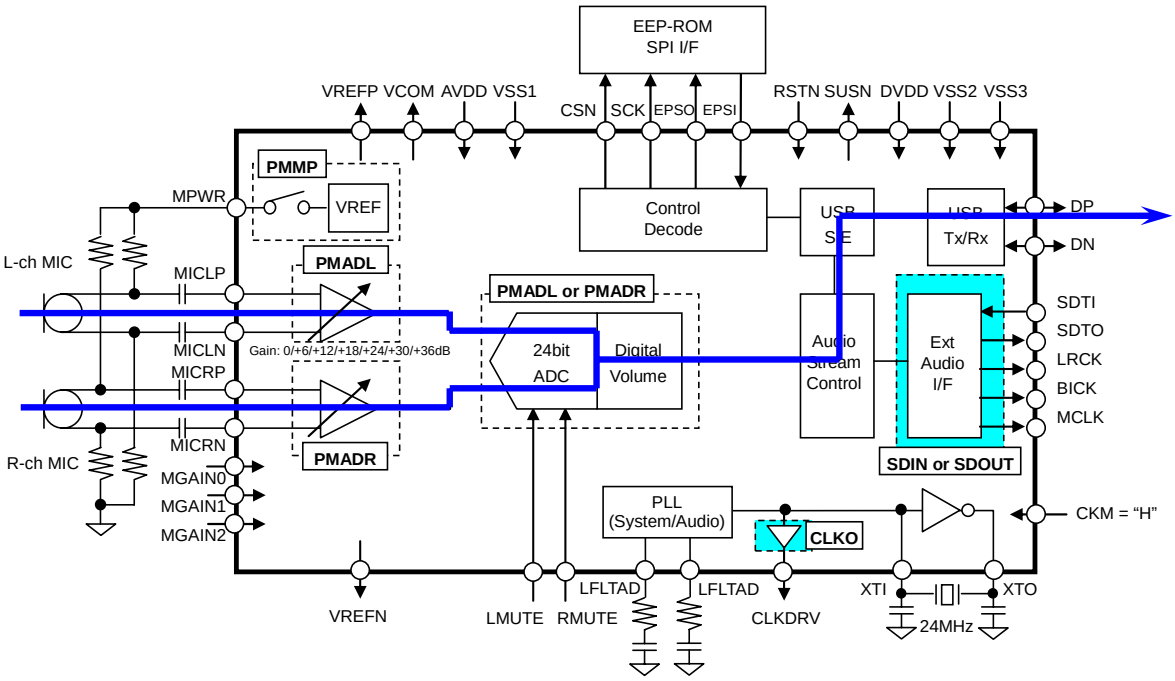


Figure 5. Internal ADC Streaming Mode

(2) External Audio Processing Mode

Evaluation of using external digital audio interface of AK5373
USB1 (USB Connector) and PORT6 (DSP) are used. Nothing should be connected to USB2 (USB Connector).

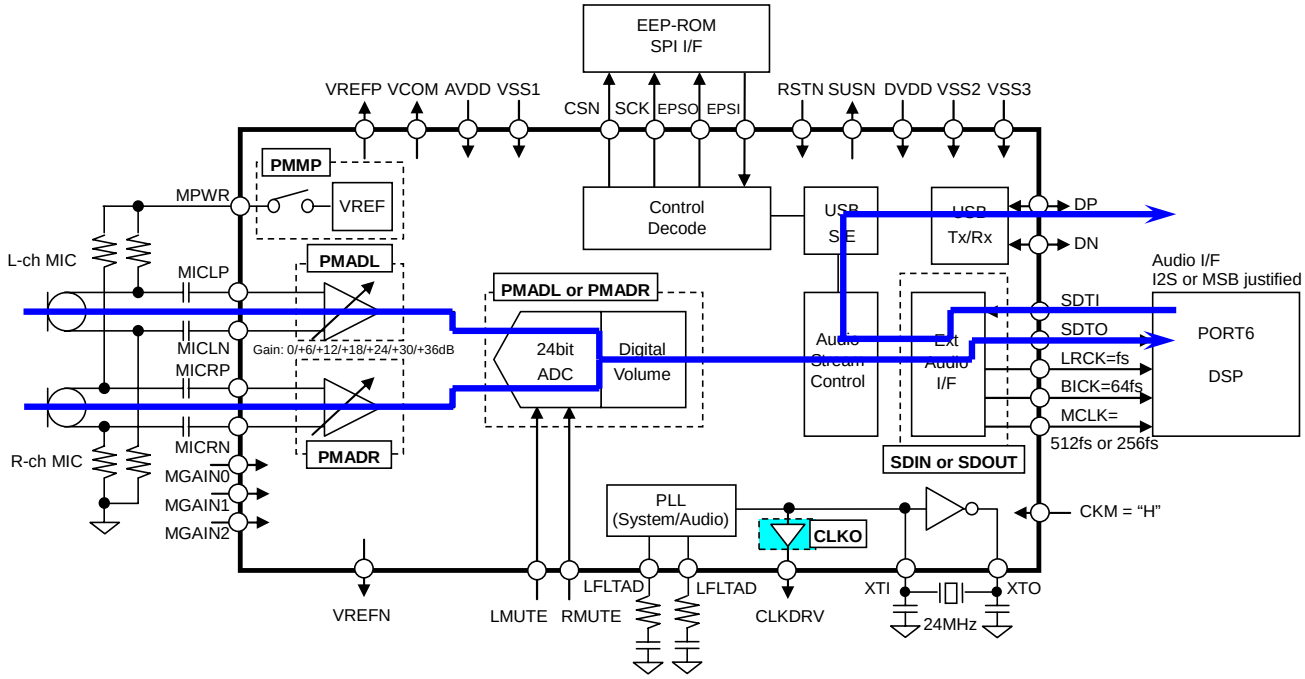


Figure 6. External Audio Processing Mode

■ Set up gain of MIC-Amp.

The AK5373 has a gain amplifier for microphone inputs. The gain of MIC-Amp can be selected by PORT4 (MGAIN).
Default input gain is 0dB

PORT4 Pin1, 2	PORT4 Pin3, 4	PORT4 Pin5, 6	MGAIN2 pin	MGAIN1 pin	MGAIN0 pin	Input Gain	
OPEN	OPEN	OPEN	L	L	L	Follow the EEPROM Setting	
OPEN	OPEN	SHORT	L	L	H	0dB	(Default)
OPEN	SHORT	OPEN	L	H	L	+6dB	
OPEN	SHORT	SHORT	L	H	H	+12dB	
SHORT	OPEN	OPEN	H	L	L	+18dB	
SHORT	OPEN	SHORT	H	L	H	+24dB	
SHORT	SHORT	OPEN	H	H	L	+30dB	
SHORT	SHORT	SHORT	H	H	H	+36dB	

Table 1 Microphone Input Gain

■ Evaluation

1) Runs “sound recorder” program in ‘accessory -> Entertainment’

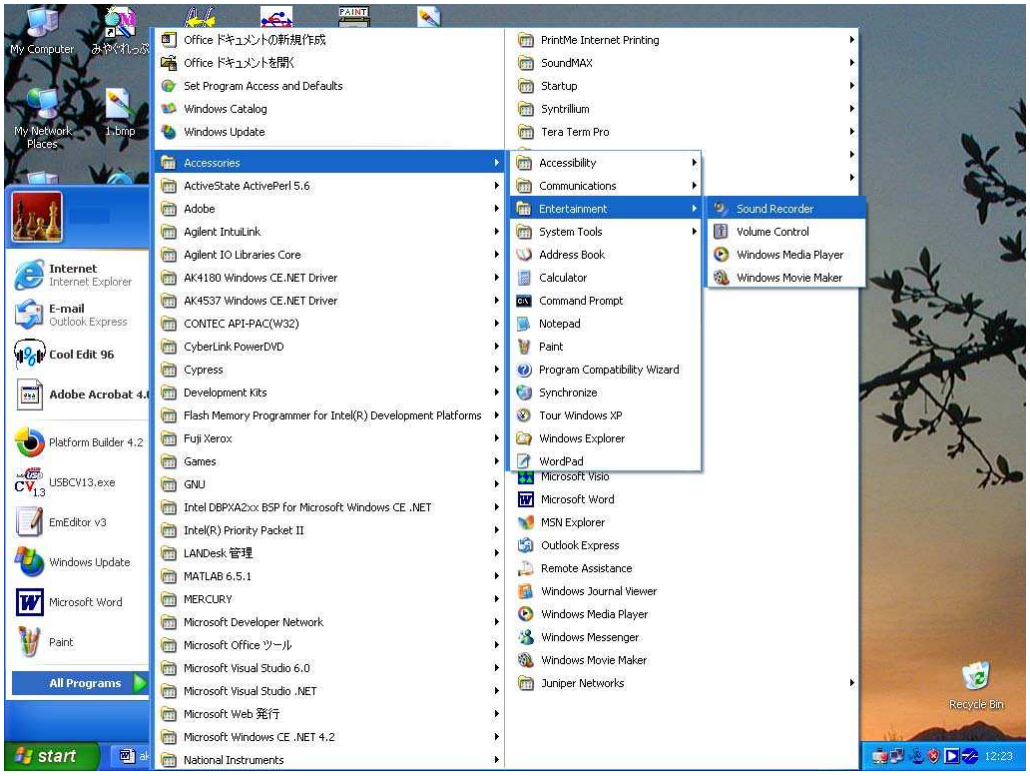


Figure 7. Sound Recorder

2) Select “Edit” -> “Property”, and then select “USB Audio Device (1)” as “Preferred Device”.

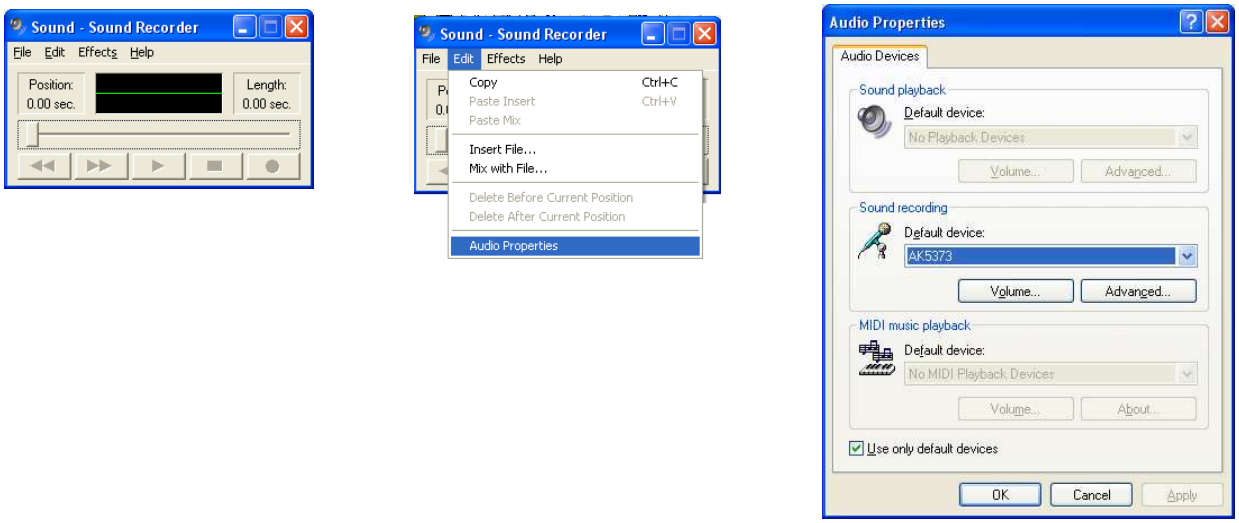


Figure 8. Audio Properties

3) When the icon or Volume in the Sound Recording block is clicked, the volume slider window appears. The top points value means the maximum value of the AK5373 under Windows. The Mute all check box is displayed.

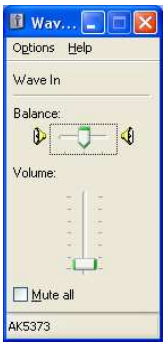


Figure 9. Volume Control

4) Select “File” -> “Property”, and then click “convert now.” button in the Property window. Then select “44100Hz 16bit Mono” or “44100Hz 16bit Stereo” as attribute on the Sound Recorder

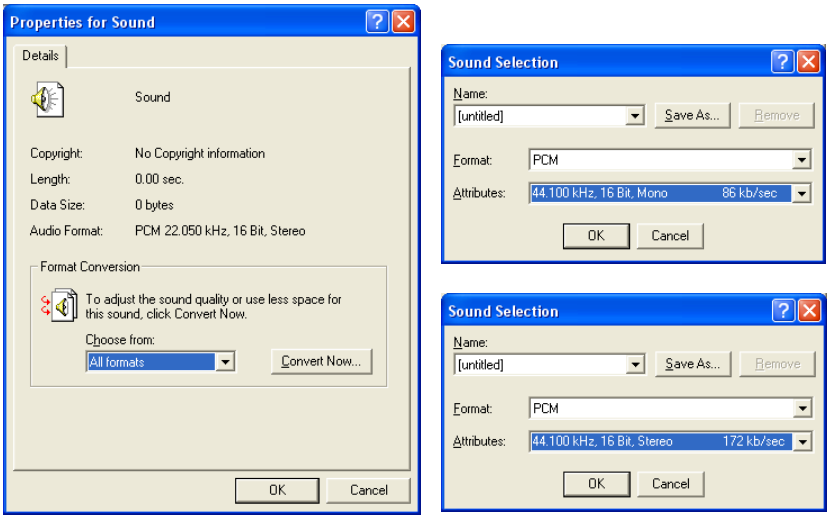


Figure 10. Sound Selecion

5) Check the microphone being plugged and volume control adjustment then you can start recording by pressing “Rec” button.

■ Other jumper pins set up

1. JP24, JP25 (GND) : These jumper pins should be OPEN on normal operation. <Default>

2. JP11 (MICRN) : Connection of microphone power.
   OPEN: Microphone power is not connected.
   SHORT : Microphone power is connected. <Default>

3. JP12 (MICRP) : Connection of microphone power.
   OPEN: Microphone power is not connected.
   SHORT : Microphone power is connected. <Default>

4. JP13 (MICLN) : Connection of microphone power.
   OPEN: Microphone power is not connected.
   SHORT : Microphone power is connected. <Default>

5. JP14 (MICLP) : Connection of microphone power.
   OPEN: Microphone power is not connected. <Default>
   SHORT : Microphone power is connected.

6. JP1 (CLKS) : Selection of external master clock input and crystal oscillator input .
   XTAL : Select crystal oscillator input . <Default>
   MCKI : Select external master clock input.

7. JP10 (XTE) : Selection of clock source for the MCKI/XTI pin.
   OPEN : Select X'tal as the clock source. (XTE pin = "H") <Default>
   SHORT : Select external clock as the clock source (XTE pin = "L")

8. JP16 (EXT) : Selection of external clock input impedance.
   OPEN : External clock input impedance is High impedance.
   SHORT : External clock input impedance is 51Ω.<Default>

9. JP9 (CKM) : Selection of reference X'tal frequency.
   OPEN : 24MHz crystal resonator can be used as the master clock (CKM pin = "H") <Default>
   SHORT : 16MHz crystal resonator can be used as the master clock (CKM pin = "L")

■ The function of the toggle SW

[SW2] (LMUTEN): Left channel mute switch. Keep pressing the button if mute is needed.
[SW3] (RMUTEN): Right channel mute switch. Keep pressing the button if mute is needed.

■ Indication for LED

[D1] (SUSN): Monitor SUSN pin of the AK5373. LED turns on when the AK5373 is on suspend state.

Software Manual

■ AK5373MAPPER.exe

1) General description

AK5373MAPPER.exe is a tool of creating a register setting file that is written to EEPROM on the AKD5373-A. The program can not only display register settings written from a register setting file, but also change the register settings directly.

2) Explanation of main window

When runs the program, the window as shown blow opens.

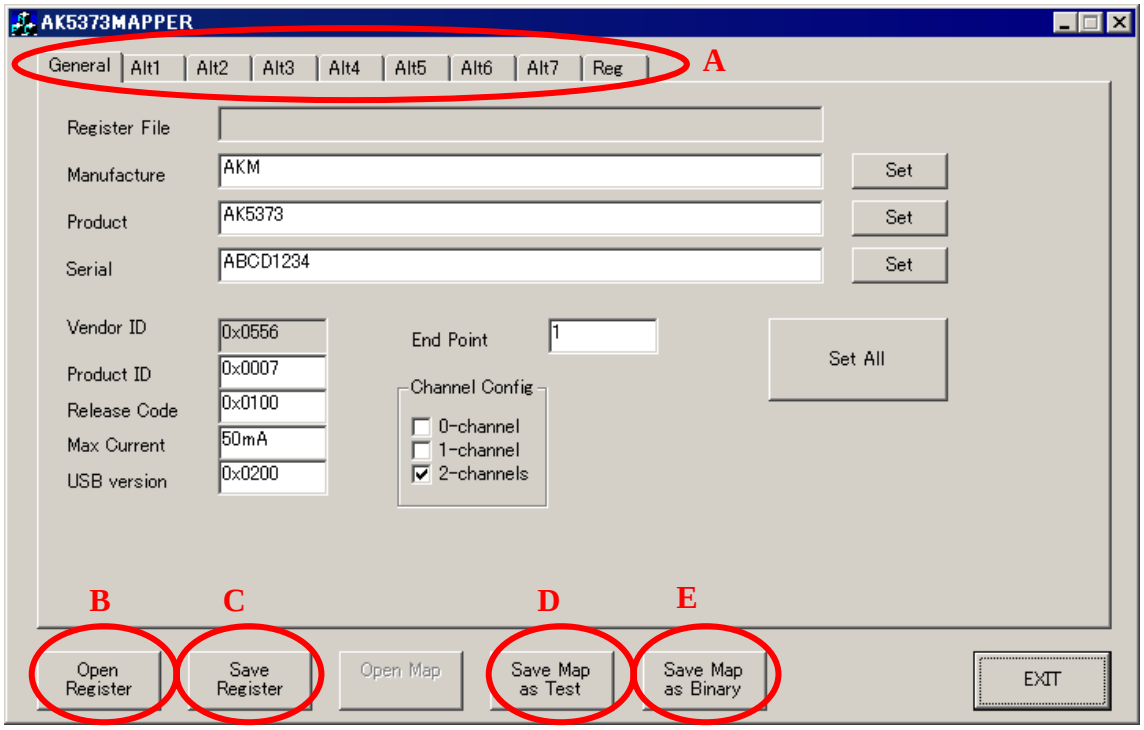


Figure 11. AK5373MAPPER General Setting

A: The top menu can be switched by “TAB” key.

B: Click this button to open a register setting file(.txt), and display will be changed after reading the file.

C: Click this button to save the current register settings as a setting file which has a fixed name “AK5373_register.txt”.

D: Click this button to output a writing EEPROM file as a text file (.txt) which has a fixed name “AK5373_eeprom.txt”.

E: Click this button to output a writing EEPROM file as a binary file (.bin) which has a fixed name “AK5373_eeprom.bin”.

3) The setting of Alternate

Set up the register about Alternate here.

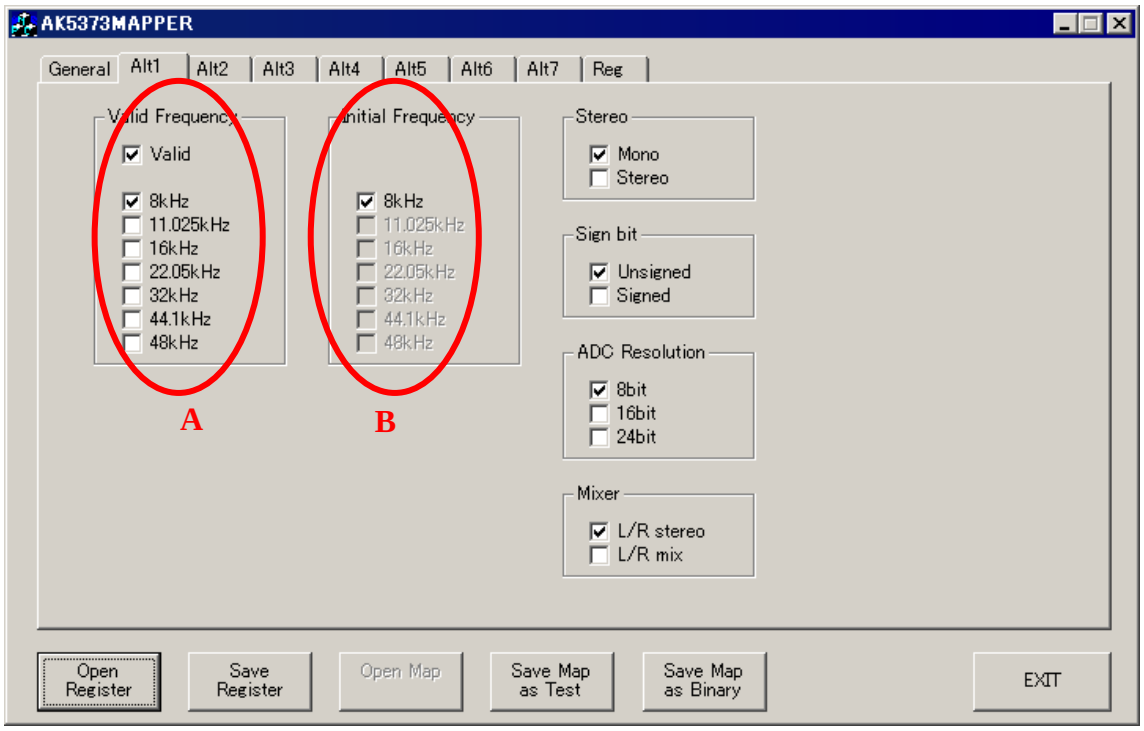


Figure 12. AK5373MAPPER Alternate Setting

A: Choose available frequencies here. If any valid frequency is chosen, valid check mark will be made.

B: Choose initial frequency. Only available frequencies can be chosen.

About the AK5373's descriptor setting, refer to datasheet of the AK5373.

4) The setting of register

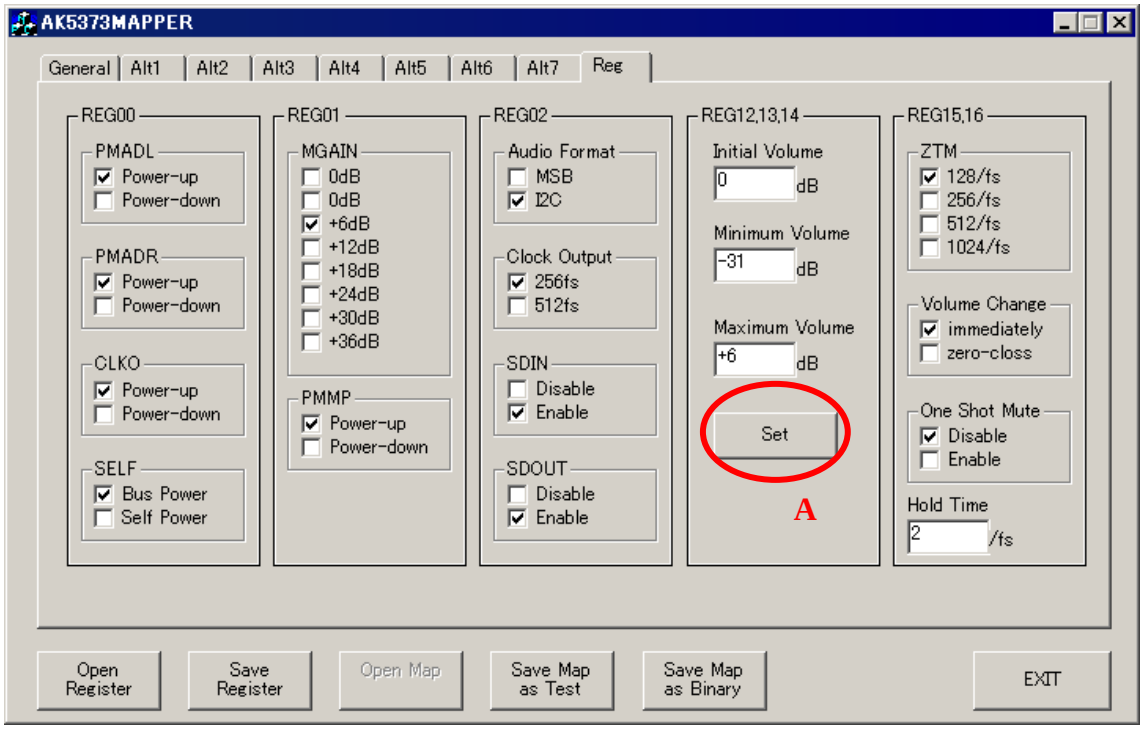


Figure 13. AK5373MAPPER Register Setting

A: Volume and hold time can be set up by clicking the “Set” button and pressing “ENTER” key after inputting numbers in edit boxes.

About the AK5373’s register setting, refer to datasheet of the AK5373.

5) Register setting file <Default>

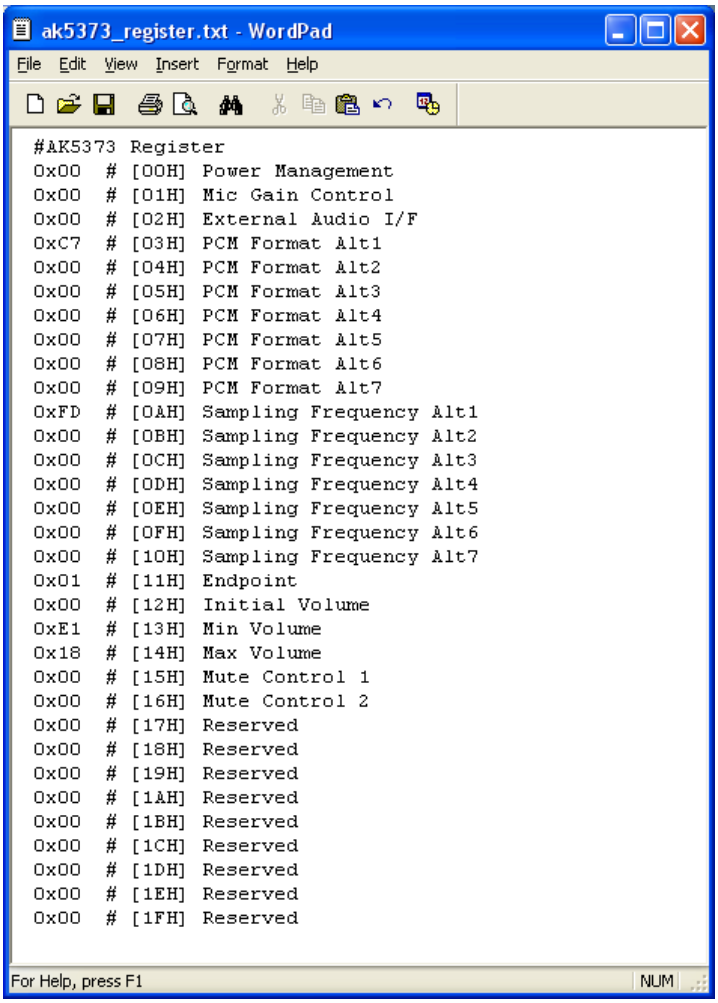


Figure 14. Register Setting File (Text)

6) EEPROM Image File (Text output) <Default>

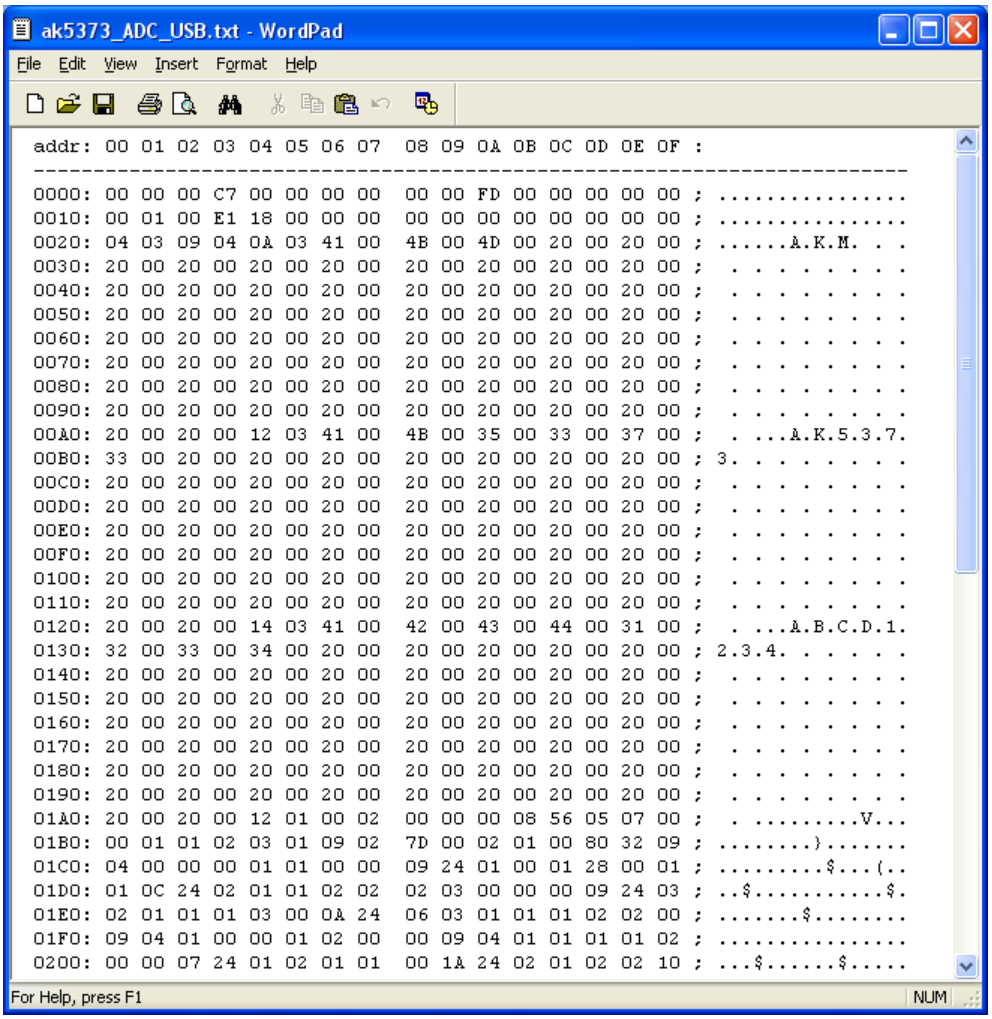


Figure 15. EEPROM Image File (Text)

■ EEPROM Write program for the AK5373: AK5373EEPROM.exe

1) Set up the jumper pins as the followings.

2) Connect USB2 Port of the AK5373-A to PC with an USB cable. Windows recognizes the mirco controller device automatically. Device manage shows "PICkit2 Microcontroller Programmer" in "Human Interface Devices" if Windows recognizes the device successfully.

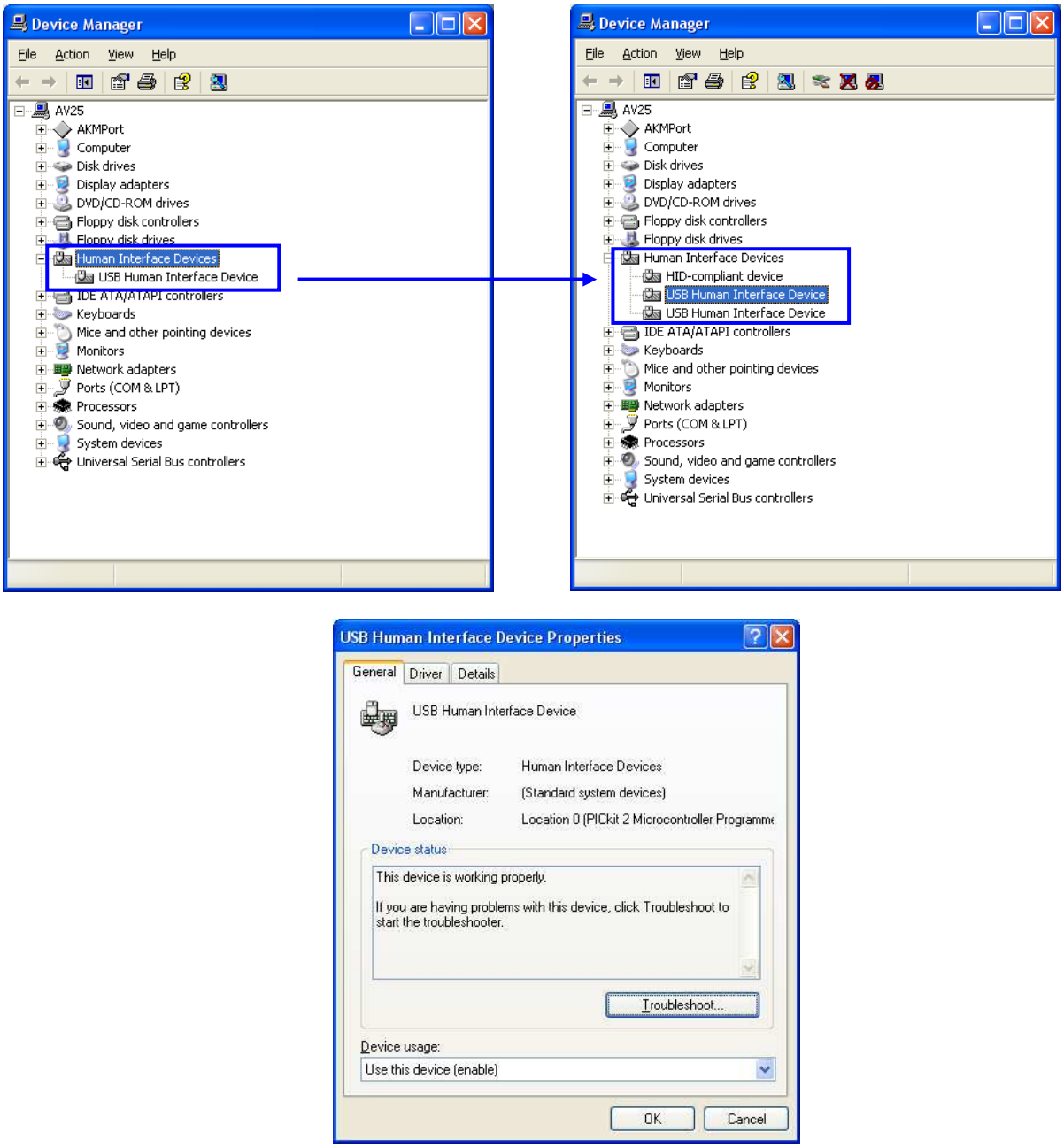


Figure 16. Device Manger "Human Interface Devices"

3) Run the program “AK5373EEPROM.exe”.

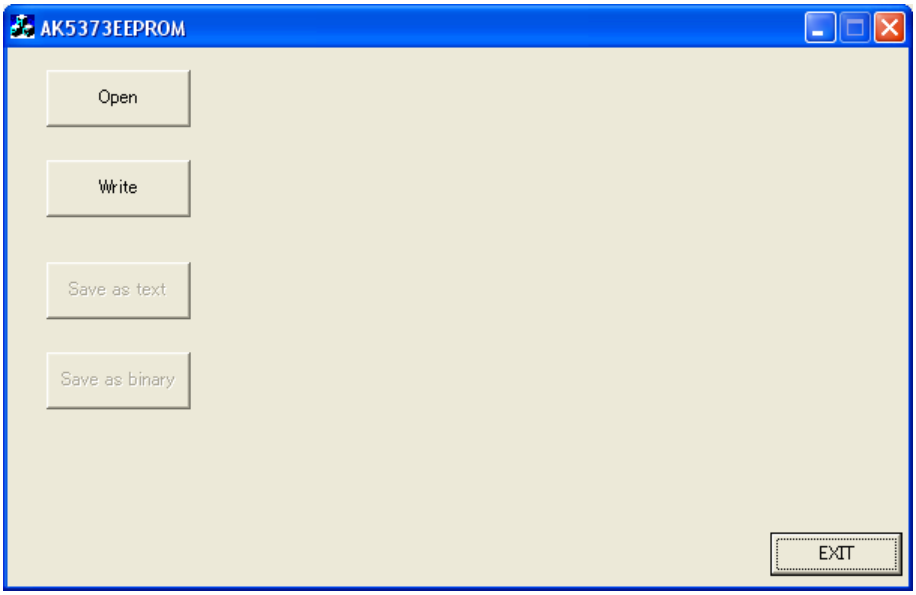


Figure 17. AK5373EEPROM.exe

[Open]: Click this button to open a test file(.txt) or a binary file(.bin, .dat) and write it.
[Write]: Click this button to verify the file Written to EEPROM.
“Write complete” is displayed if the write succeeds, while “Verify failed” if not.
It takes only one second to write a file to EEPROM.

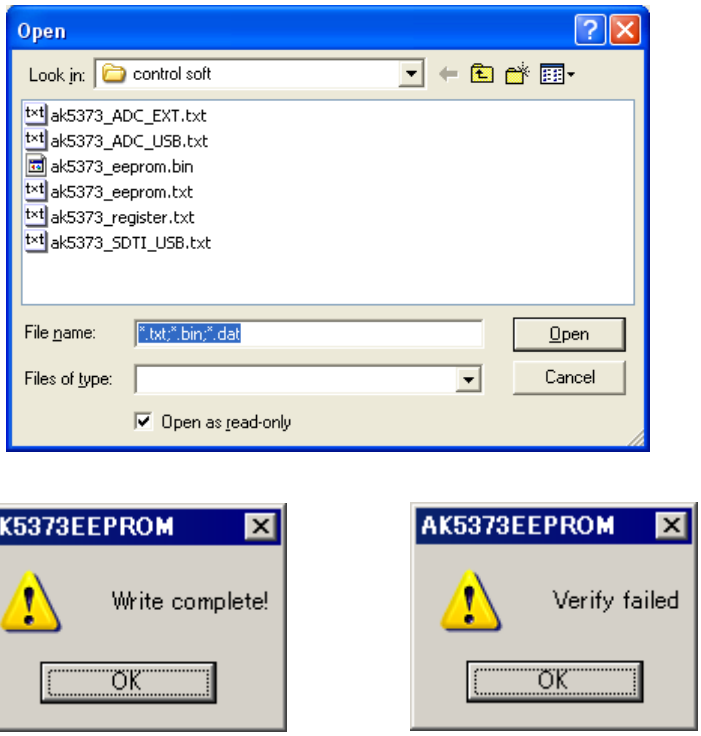
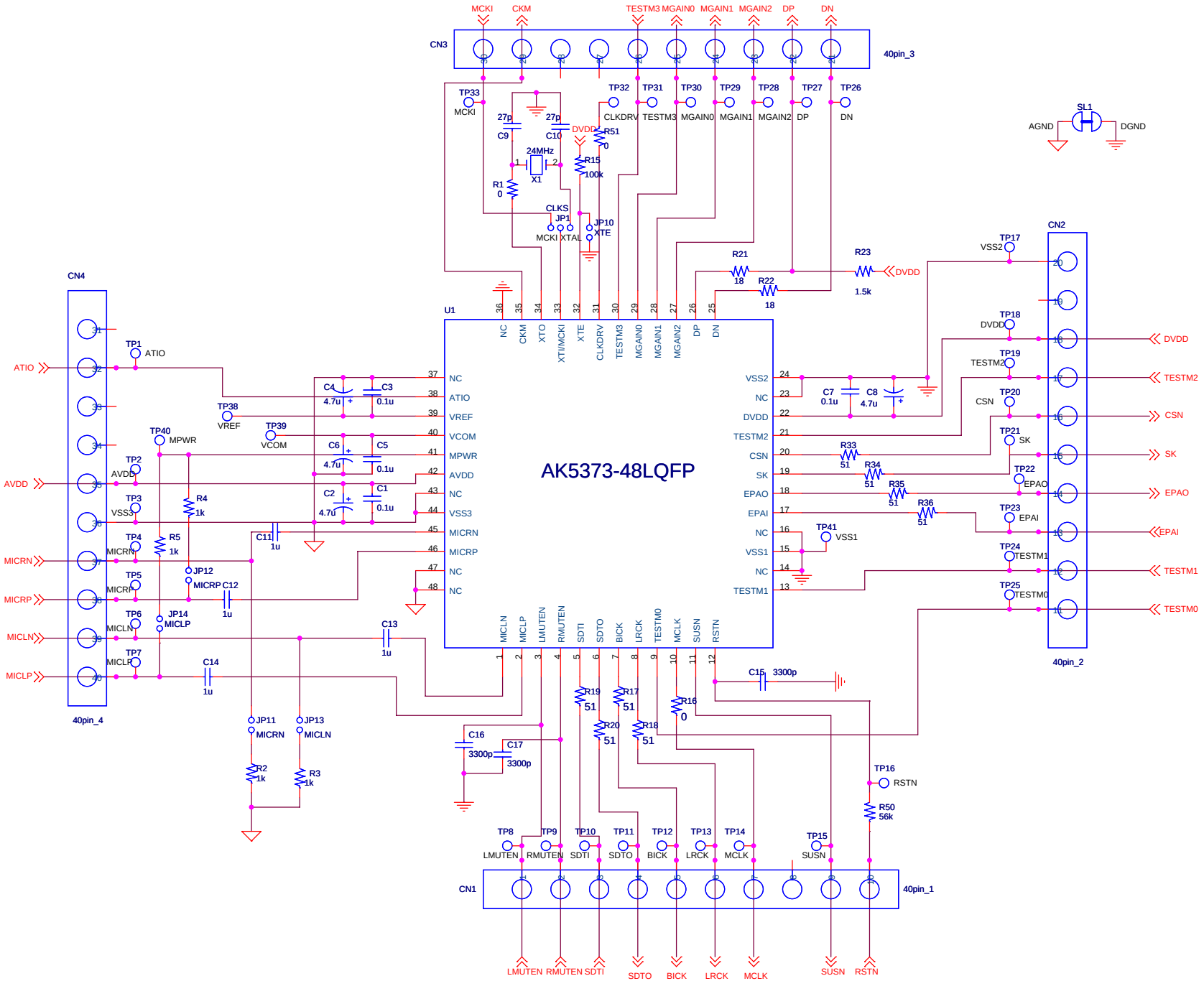


Figure 18. AK5373EEPROM Write

4) Click “OK”, and the [EXIT] button of AK5373EEPROM.exe.

Revision History

Date (yy/mm/dd)	Manual Revision	Board Revision	Reason	Page	Contents
2010/01/06	KM101500	0	First edition		



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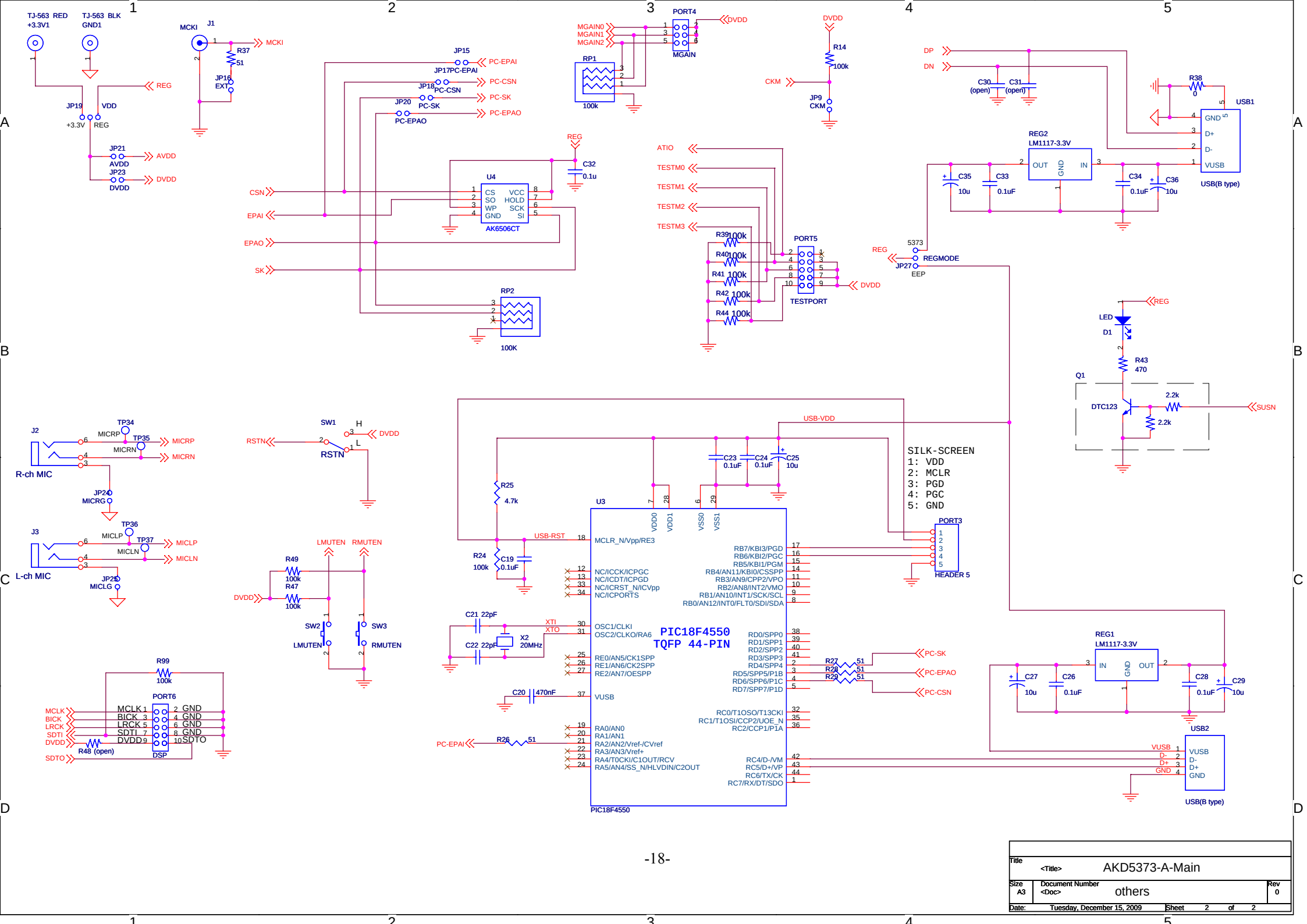
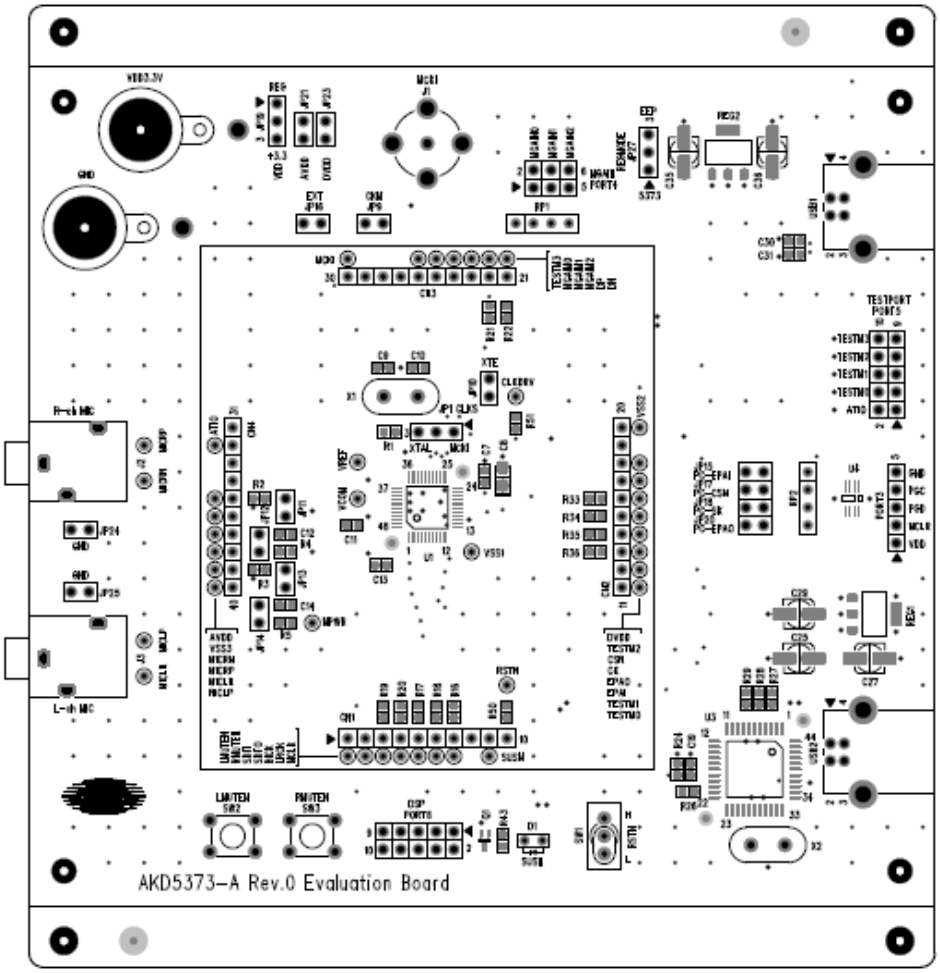
Size A3	Document Number <Doc>	AK5373	Rev 0
Date: Tuesday, November 17, 2009	Sheet 1 of 2		



Title	AKD5373-A-Main
Size	A3
Document Number	<Doc> others
Rev	0
Date:	Tuesday, December 15, 2009
Sheet	2 of 2

AKD5373/74-A Rev.0(MAIN)



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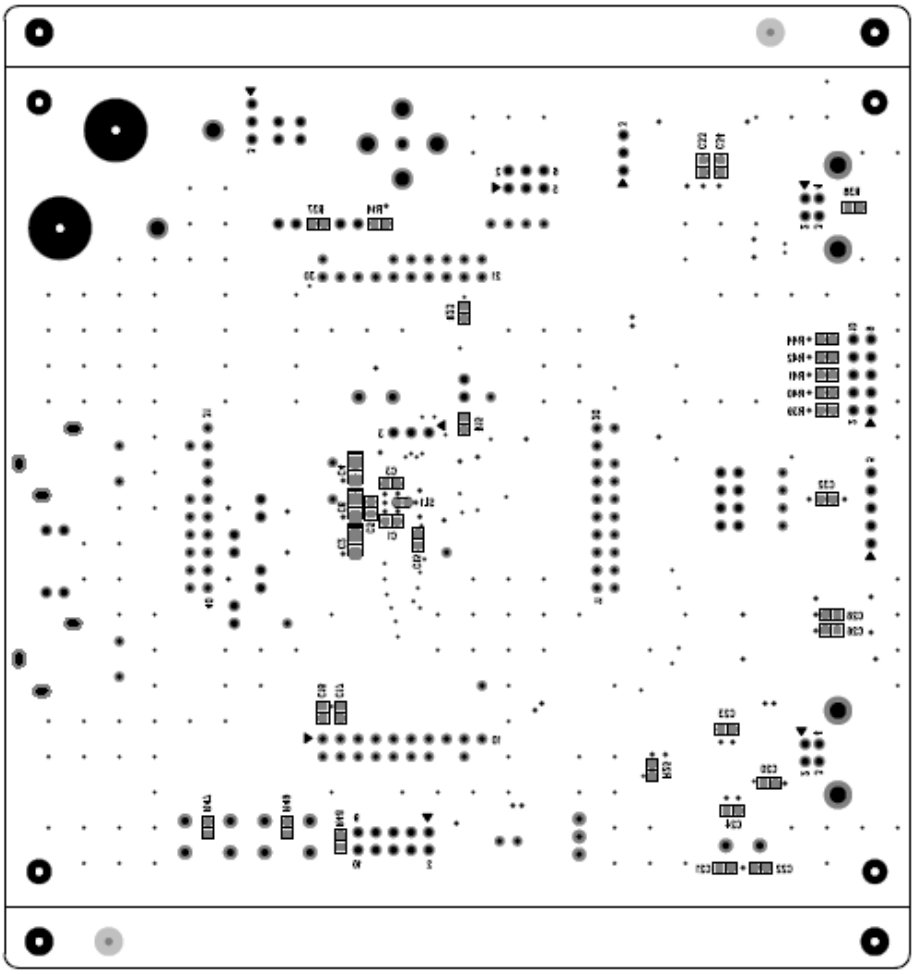

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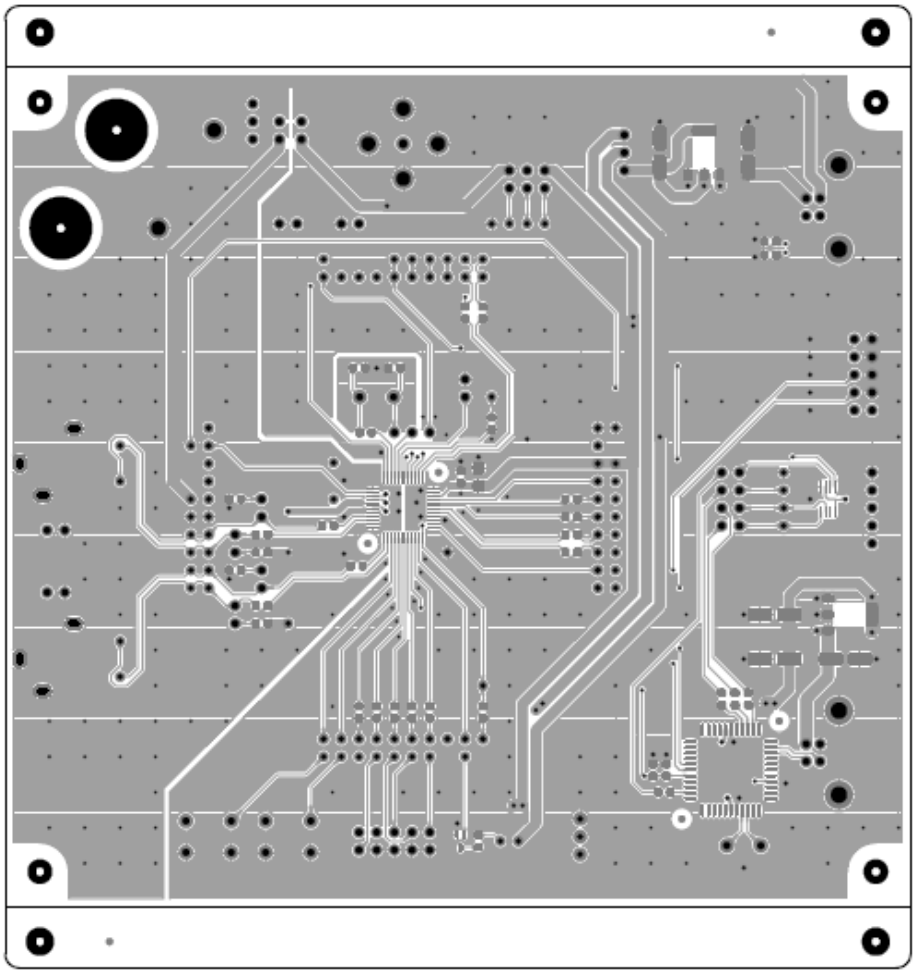

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