



# AKD4492-SB-TypeS

## AK4492 Evaluation Board Rev.2

### 1. General Description

AKD4492-SB-TypeS is the best evaluation board for audio solution to need high quality sound and area saving, such as Hi-Fi audio solution for smartphone, high end portable audio equipment and USB-DAC. The AKD4492-SB-TypeS is equipped with 32 bit DAC AK4492, audio-only PLL AK8157A and LPF visceral headphone amplifier AK4205. Therefore the board is possible to drive headphone with ultra low distortion and ultra low noise. Moreover AK1110, 5V LDO designated for the DAC, can realize good characteristics and high quality sound. The AKD4492-SB-TypeS has digital audio interfaces. They can interface to digital audio systems via optical or coaxial connector.

### ■ Ordering Guide

AKD4492-SB-TypeS -- Evaluation board composed of AK4492, AK4205, AK8157A and AK1110.  
(Control software and Power supply cable includes in this package.)

### 2. Function

- SPDIF is accepted by Digital Audio Interface (AK4118A).
- I2S data and DSD data is inputted directly through the 10-pins header for the external digital input interface.
- AK4492-SB has AK8157A(PLL for audio) for application processor of smartphone.
- Easy control is possible because of the PIC micro controller for the device control on the board.
- Only single power supply +3.7V can operate AKD4492-SB-TypeS because of LDO and DCDC on the board.

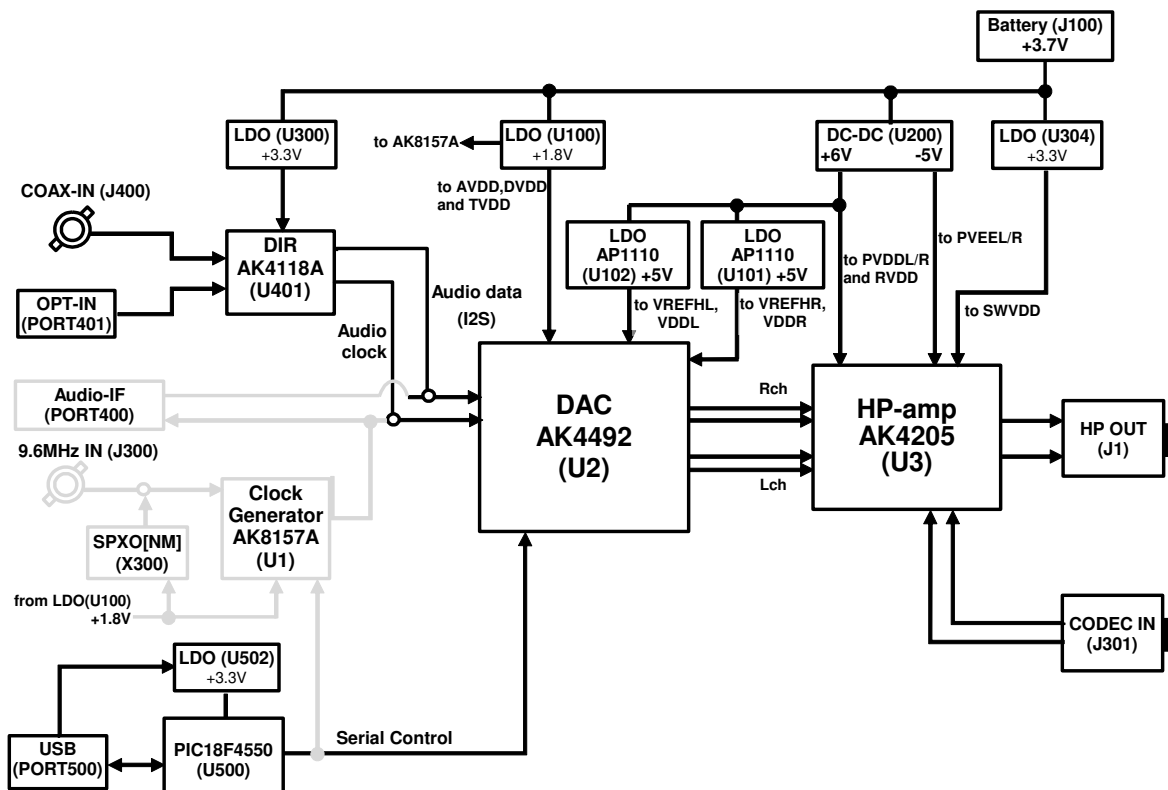


Figure 1. AKD4492-SB-TypeS Block Diagram(AK8157A isn't used, SPDIF inputs)

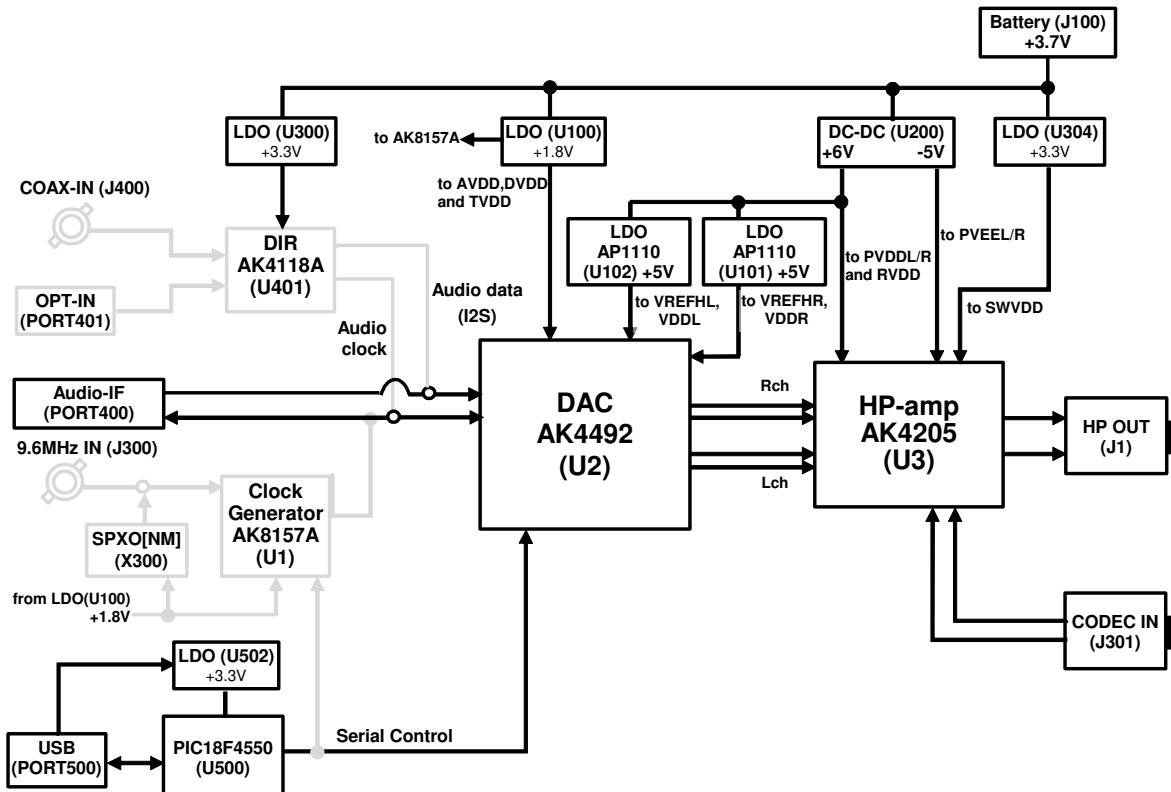


Figure 2. AKD4492-SB-TypeS Block Diagram (External PCM inputs)

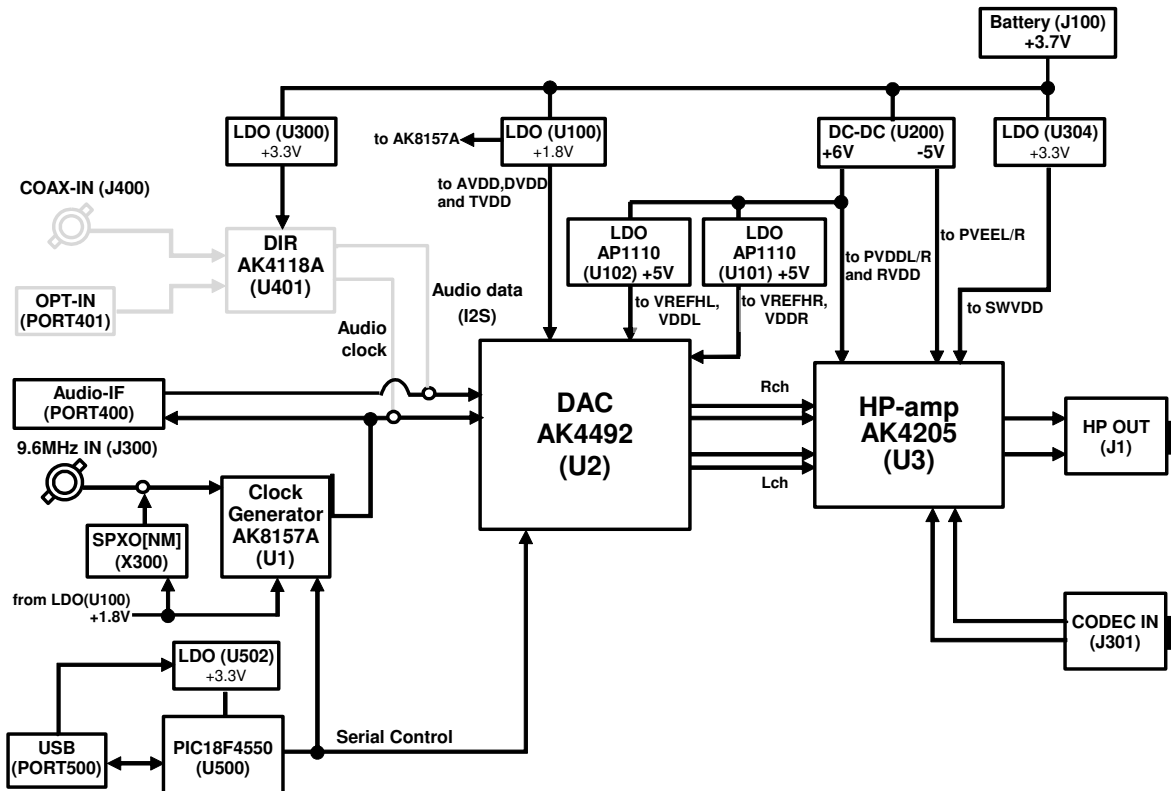


Figure 3. AKD4492-SB-TypeS Block Diagram (AK8157A is used, and external PCM inputs)

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## 4. Evaluation Board

### ■ Board Diagram

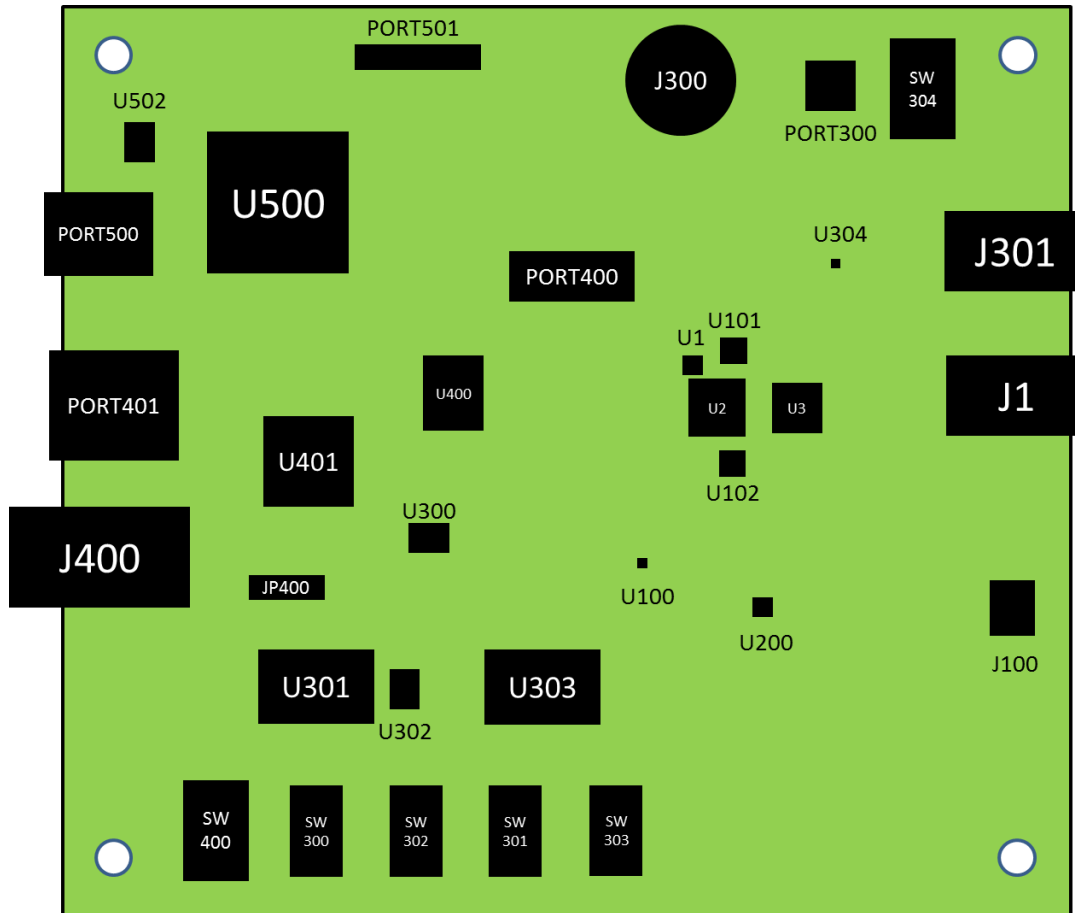


Figure 4. AKD4492-SB-TypeS Board View

### ■ Component explanation

- (1) AK4118A (U401)  
AK4118A is Digital Audio I/F Transceiver.  
When evaluating the sound quality, using AK4118A with SPDIF signal.
- (2) AK8157A(U1)  
AK8157A is Audio Clock Generator.  
When 9.6MHz clock inputs for application processor of smartphone, the device supplies MCLK, BICK and LRCK for PCM. When using this device, SDATA synchronized with BICK and LRCK from AK8157A must be inputted to AK4492 externally.
- (3) AK4492(U2)  
AK4492 is the small PKG 32 bit DAC, supporting latest digital format, and realizing ultra low distortion and ultra low noise. It is the main device on this board.
- (4) AK4205(U3)  
AK4205 is the headphone amplifier realizing ultra low distortion and ultra low noise. It includes the analog switch for Hi-Fi. Moreover including the gain setting resister and LPF, it is possible to reduce the mounting area.

- (5) AK1110(U101, U102)  
AK1110 is LDO of two outputs and low noise and high PSRR.  
It is used for an analog power supply of AK4492, it contributes to an electrical characteristic and the sound quality greatly.
- (6) LDO, DC-DC (U100, U200, U300, U302, U304, U502)  
This is the power supply IC for the AKD4492-SB-TypeS.

Table 1. Operation voltage range of J100 power supply connector

Parts No.	Device	Output Voltage	Comments
U100	LDO	1.8V	AK8157A/AK4492 Power supply
U200	DC-DC	+6V / -5V (Adjustment by control software)	AK1110/AK4205 Power supply
U300	LDO	3.3V	AK4118A Power supply
U302	LDO	1.8V	PDN control
U304	LDO	3.3V	AK4205 (SWVDD) Power supply
U502	LDO	3.3V	PIC Power supply

- (7) Power supply, GND connector (J100)  
This is the terminal for supplying the power to the entire board. Please see the table below about voltage to be applied.

Table 2. Operation voltage range of J100 power supply connector

Pin	Pin Name	Min	Typ	Max	Comments
1	+3.7V	3.4V	3.7V	5V	Must be connected
2	GND	-	GND	-	Must be connected

- (8) SPDIF input connector (J400 / BNC Connector, PORT401 / Optical connector )  
SPDIF signal inputs to the AK4118A.  
It depends on JP400 which is available J400(BNC connector) or PORT401.  
Please see the [Figure 5](#) about detail.
- (9) Analog output terminal (J1 / 3.5mm stereo mini jack)  
It is the connector for analog single end output. Connect headphone or earphone to J1.
- (10) Analog input terminal (J301 / 3.5mm stereo mini jack)  
It is the connector for analog single end input.  
AK4205 is equipped with the analog switch. Ak4205 is selecting an audio signal from Ak4492 or from J301.  
Audio signal input is usually used by less than 2Vrms.

Table 3. Ak4205 is selecting an audio signal

SW304-2 [SEL]	mode	Audio signal
ON (“H”)	Hi-Fi Path	From AK4492
OFF (“L”)	CODEC Path	From J301

- (11) 10 pin header for external digital input output (PORT400 / 2.54mm pitch 10 pin header)  
 PORT400 is external digital input output port. When evaluated by using PCM signal input or DSD signal input, using of port400.

Table 4. Pin assignment of PORT400

Pin	I/O	Function	Pin	I/O	Function
1	I	MCLK	2	P	GND
3	I/O	BICK/DCLK	4	P	GND
5	I/O	LRCK/DSDR	6	P	GND
7	I	SDATA/DSDL	8	P	GND
9	NC	-	10	P	GND

Please see the “ 5.OPERATION SEQUENCE , 2).Evaluation mode “ about detail.

- (12) USB port for device control (PORT500 / USB micro-B)  
 It is the USB port to control AK4492, AK8157A and positive and negative 2-output DC-DC.  
 Please see the “ 5.OPERATION SEQUENCE , 4). USB I/F (Serial control) “ about detail.
- (13) SPDIF input connector select jumper (JP400 )  
 It is the jumper to switch the two kinds of connector for SPDIF input to AK4118A.  
 Please see [Figure 6](#) about detail.
- (14) Function control port of AK4205 (PORT300 / 2.54mm pitch 4 pin header)  
 It is the port to input the signal for control function of AK4205.  
**※When using this port, turn off the switch1,2 of SW304.**

Table 5. Pin assignment of PORT300

Pin	I/O	Function	Pin	I/O	Function
1	I	MUTEN	2	P	GND
3	I	SEL	4	P	GND

(15) Function setting switch (SW304, SW400)

It is the switch to evaluate AK4118A and the function of AK4205.

SW304 controls the mute function of AK4205 output and switching the path if analog switch in AK4205.

SW400 selects the Master clock for AK118A when using SPDIF input.

[SW304] : AK4205 setting

Table 6. SW304 Setting

No.	Name	ON (“H”)	OFF (“L”)	Default
1	MUTEN	Normal Operation	MUTE State	H
2	SEL	Hi-Fi Path	CODEC Path	H

[SW400] : AK4118A setting

Table 7. SW400 Setting

No.	Name	ON (“H”)	OFF (“L”)	Default
1	OCKS1	Master Clock setting for AK4118A Refer to <a href="#">Table 8.</a>		H
2	OCKS0			L

Table 8. Master Clock Setting

Mode	OCKS1	OCKS0	MCKO1	fs (max)
0	L	L	256fs	96kHz
1	L	H	256fs	96kHz
2	H	L	512fs	48kHz
3	H	H	128fs	192kHz

< Default >

(16) Power down/up toggle switch (SW300, SW301, SW302, SW303)

It is the switch to power up/down the each device (AK4492, AK8157A, LDO, DC-DC).

See the table below about the each switch. About power up sequence, see the “ 5.OPERATION SEQUENCE , 3).

Power supply “ about detail.

Table 9.Toggle switch for power up

Name.	Devices	ON (“H”)	OFF (“L”)	Default
SW300	AK4118A	Power-up	Power-down	L
SW301	U100			L
SW302	AK4492, AK8157A			L
SW303	U200			L

<b>5. OPERATION SEQUENCE</b>
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## ■ OPERATION SEQUENCE

- 1). Wiring of the board
- 2). Evaluation mode
- 3). Power supply
- 4). USB I/F (Serial control)

### 1). Wiring if the board

#### ➤ Power wiring

A power supply connects a power supply cable to J100 connector and supplies it.

A connector which corresponds to a PH connector of JST (B2B-PH-K-S or S2B-PH-K-S) can connect J100.

Table 10. Power wiring

Connector Name	Pin No.	Voltage	Using	Comments	Default Setting
J100	1	+3.4V to +5V	for LDO(DC-DC) input	Must be connected	+3.7V
	2	0V	GND	Must be connected	0V

#### ➤ Output signal wiring

J1 connects to headphone, earphones or a cable of 3.5mm stereo mini plug.

#### ➤ Digital input IF wiring

Digital input signal port is J300, J400, PORT300, PORT400 and PORT401.

Please see the “ 2). Evaluation mode “ about detail.

#### ➤ USB control wiring

Connect PORT500 (USB micro- B) connector to a PC with USB cable.

This board can be controlled using software.

Please see the “ 6.CONTROL SOFTWARE MANUAL “ about control software detail.



2). Evaluation mode

There is an input method of 3 kinds of digital signal in this board.

A) Evaluation using the SPDIF signal input. <Default>

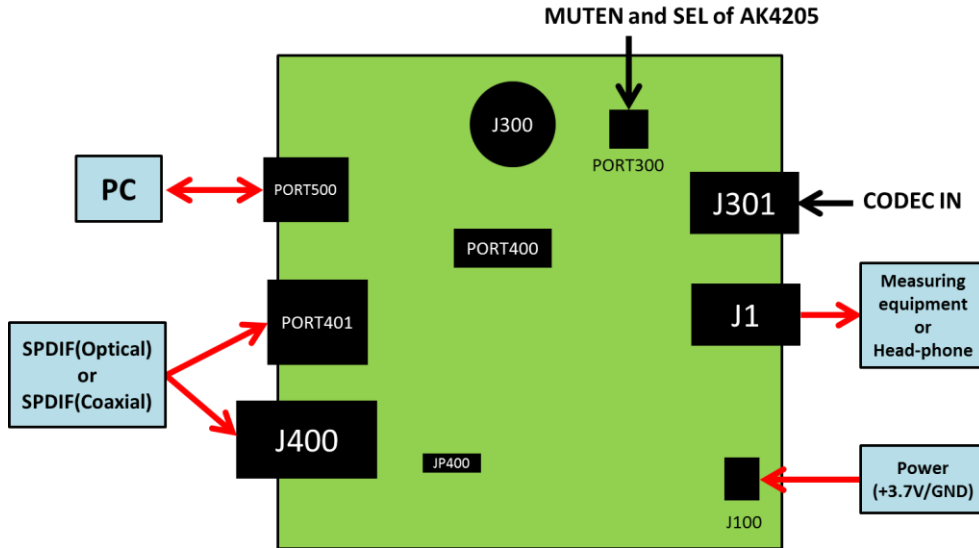


Figure 5. The connection diagram when evaluated by using SPDIF signal input.

When evaluated by using SPDIF signal input, the input must be set to J400 or PORT401.

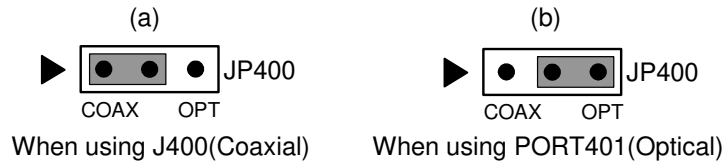


Figure 6. SPDIF input PORT select

When evaluated by using SPDIF signal input, the Soldering Jumper should be set to the following.

Table 11. Soldering Jumper Setting

Soldering Jumper	Setting	Default	Soldering Jumper	Setting	Default
CL1	open	open	CL301	open	open
CL2	short	short	CL302	short	short
CL3	open	open	CL400	short	short
CL4	open	open	CL401	short	short
CL5	short	short	CL402	short	short
CL200	short	short	CL403	short	short
CL201	short	short	CL404	open	open
CL202	short	short	CL405	open	open
CL203	short	short	CL406	open	open
CL300	open	open	CL407	open	open

**B) Evaluation using the external clock (PCM or DSD).**

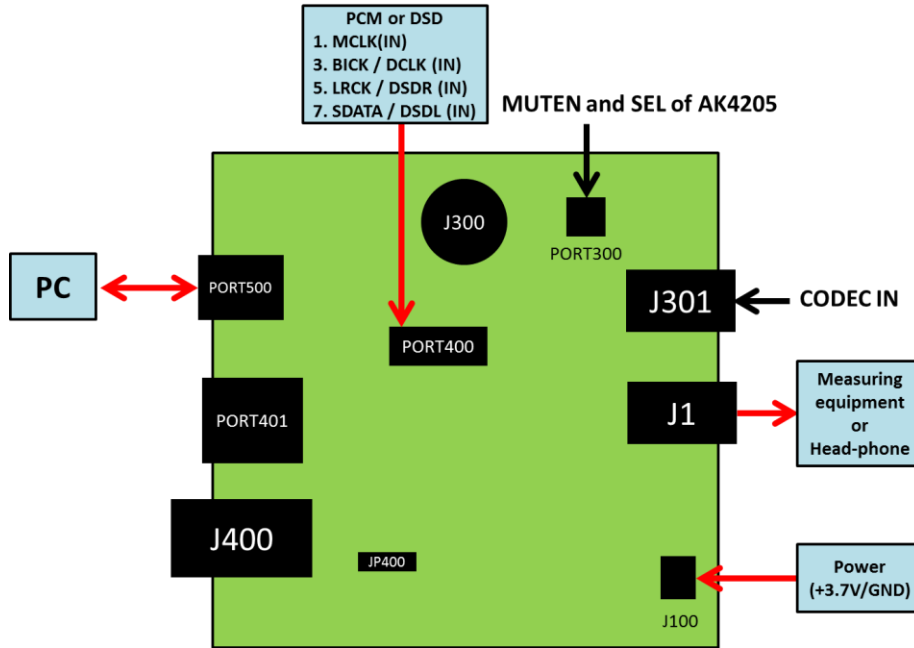


Figure 7. The connection diagram when evaluated by using PORT400.

External clock (PCM or DSD) supply from PORT400.

Table 12. Pin assignment of PORT400

Pin	I/O	Function	Pin	I/O	Function
1	I	MCLK	2	P	GND
3	I	BICK/DCLK	4	P	GND
5	I	LRCK/DSDR	6	P	GND
7	I	SDATA/DSDL	8	P	GND
9	-	NC	10	P	GND

When evaluated by using external clock input, AK4118A does not use. SW300 is setting to “L”.  
 When evaluated by using external clock input, the Soldering Jumper should be set to the following.

Table 13. Soldering Jumper Setting

Soldering Jumper	Setting	Default	Soldering Jumper	Setting	Default
CL1	open	open	CL301	open	open
CL2	short	short	CL302	short	short
CL3	open	open	CL400	open	short
CL4	open	open	CL401	open	short
CL5	short	short	CL402	open	short
CL200	short	short	CL403	open	short
CL201	short	short	CL404	short	open
CL202	short	short	CL405	short	open
CL203	short	short	CL406	short	open
CL300	open	open	CL407	short	open

C) Evaluation using the AK815A.

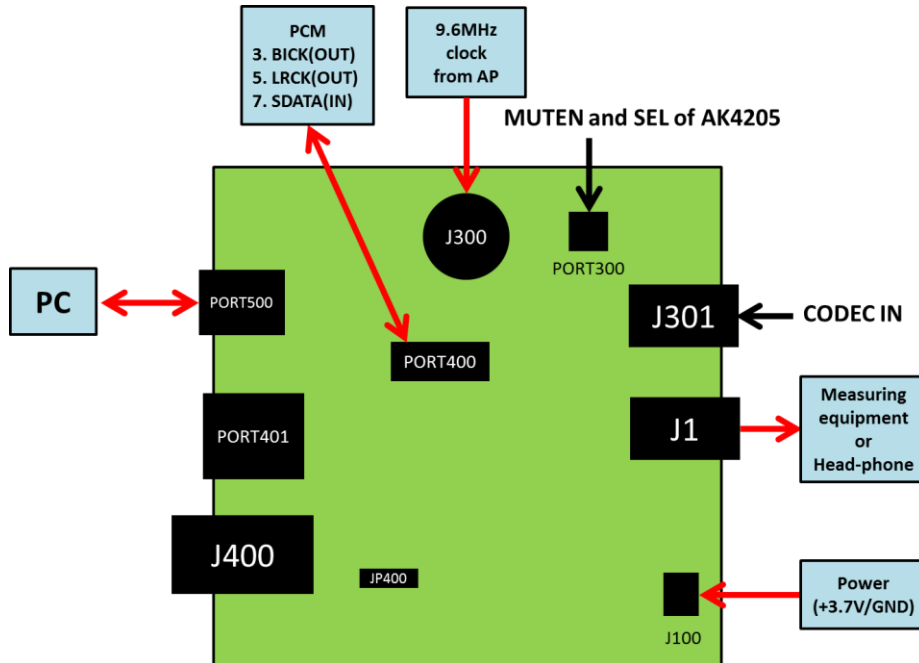


Figure 8. The connection diagram when evaluated by using PORT400.

When evaluated by using the AK8157A, the AK8157A must supply external clock(9.6MHz) from J300. BICK and LRCK are output from AK8157A. SDATA inputs must be synchronized with BICK and LRCK.

Table 14. Pin assignment of PORT400

Pin	I/O	Function	Pin	I/O	Function
1	-	Not used	2	P	GND
3	O	BICK	4	P	GND
5	O	LRCK	6	P	GND
7	I	SDATA	8	P	GND
9	-	NC	10	P	GND

When evaluated by using the AK8157A, AK4118A does not use. SW300 is setting to “L”.  
When evaluated by using the AK8157A, the Soldering Jumper should be set to the following.

Table 15. Soldering Jumper Setting

Soldering Jumper	Setting	Default	Soldering Jumper	Setting	Default
CL1	short	open	CL301	short	open
CL2	short	short	CL302	open	short
CL3	short	open	CL400	open	short
CL4	short	open	CL401	open	short
CL5	short	short	CL402	open	short
CL200	short	short	CL403	open	short
CL201	short	short	CL404	short	open
CL202	short	short	CL405	short	open
CL203	short	short	CL406	short	open
CL300	open	open	CL407	open	open

### 3). Power supply

Before supplying a power supply, SW300, SW301, SW302 and SW303 are setting to OFF(“L”).  
Please supply a power supply at first.

SW is setting by the next step.

- 1st: SW301 is setting to ON(“H”).
- 2nd: SW303 is setting to ON(“H”).
- 3rd: SW302 is setting to ON(“H”).
- 4th: SW300 is setting to ON(“H”).

[SW300] : AK4118A Reset control. It must be set to “H” during operation.

After power-up, the AK4118A must be reset once.

To reset the AK4118A, set the SW300 toggle switch to “L” and power down the AK4118A.  
Then, release the power-down by setting back the SW300 to “H”.

[SW301] : U100(1.8V LDO) Reset control. It must be set to “H” during operation.

After power-up, U100 must be reset once.

To reset the U100, set the SW301 toggle switch to “L” and power down the U100.  
Then, release the power-down by setting back the SW301 to “H”.

[SW302] : AK4492 and AK8157A Reset control. It must be set to “H” during operation.

After power-up, the AK4492 and AK8157A must be reset once.

To reset the AK4492 and AK8157A, set the SW302 toggle switch to “L” and power down the  
AK4492 and AK8157A.

Then, release the power-down by setting back the SW302 to “H”.

[SW303] : U200(DC-DC) Reset control. It must be set to “H” during operation.

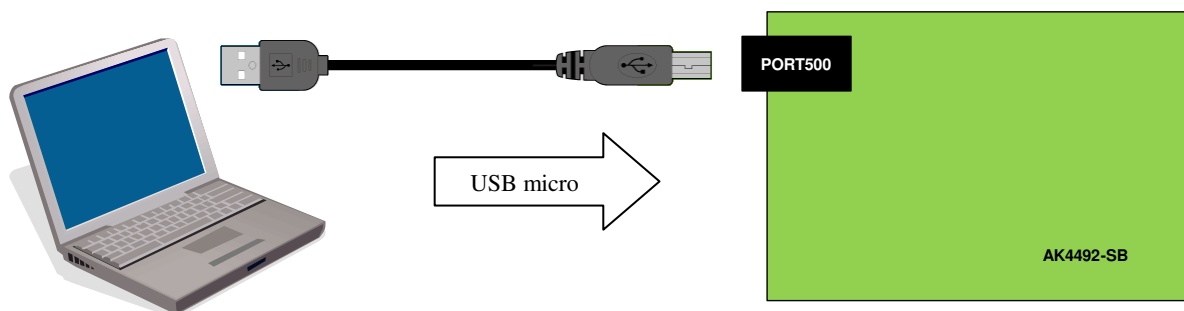
After power-up, U200 must be reset once.

To reset the U200, set the SW303 toggle switch to “L” and power down the U200.  
Then, release the power-down by setting back the SW303 to “H”.

### 4). USB I/F (Serial control)

The AKD4492-SB-TypeS should be controlled via a USB port with a PC. Connect PORT500 (USB micro- B) connector to a PC with USB cable. The control software is included in the AKD4492-SB-TypeS package.  
(Note 1)

Note 1. The board which can be connected with a PC is one board only.  
It does not operate if two or more boards are connected.



**6. CONTROL SOFTWARE MANUAL**

**■ Setup of the Evaluation Board and Control Software**

1. Set an AKD4492-SB-TypeS properly.
2. Connect AKD4492-SB-TypeS to PC with USB cable.
3. USB control recognized HID (Human Interface Device) on the PC.  
When it can't be recognized correctly, connect AKD4492-SB-TypeS to PC with USB cable.
4. Double-click the icon "akd4492-SB-1p0.exe" to open the control program.  
When the screen does not display "AKDUSBIF-B" at bottom left, reconnect the PC and the USB cable, and push the [Port Reset] button.
5. Being evaluation by following the procedure below.

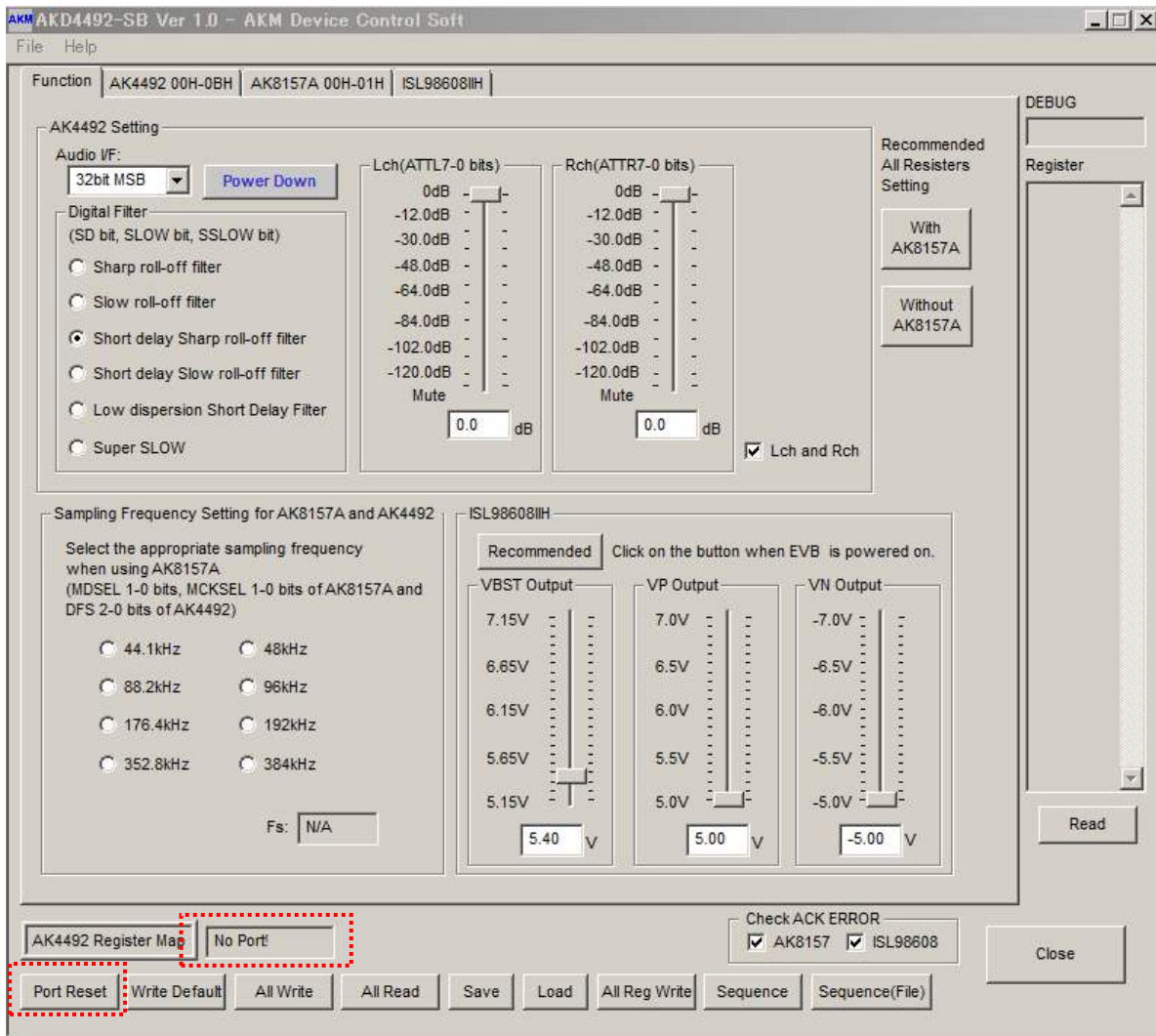


Figure 9. Control Software Window

## ■ Operation Overviews

Function and Register map are controlled by this control software. These controls may be selected by the upper tabs.

Frequently used Buttons, such as the register initializing button “Write Default”, are located outside of the switching tab window.

- 1.[Port Reset]: Resets the connection to USB port on the main board.  
Click this button when connecting USB cable after the control software set up.
- 2.[Write Default]: Register Initialization.  
When the device is reset by a hardware reset, use this button to initialize the registers.
- 3.[All Write]: Executes write commands for all registers displayed.
- 4.[All Read]: Executes read commands for all registers displayed.
- 5.[Save]: Save Address of Register” dialog box pops up.
- 6.[Load]: Executes data write from a saved file.
- 7.[All Reg Write]: “All Reg Write” dialog box pops up.
- 8.[Sequence]: “Sequence” dialog box pops up.
- 9.[Sequence (File)]: “Sequence (File)” dialog box pops up.
- 10.[Read]: Reads current register settings and displays to the register area (on the right of the main window).  
This is different from [All Read] button as it does not reflect to the register map.  
It only displays register values in hexadecimal numbers.
- 11.[Recommeded]: DC-DC output become the recommended voltage. (VBST = 6.3V, VP = 6V, VN = -5V)

■ Tab Functions

1. [Function] Tab: Function Control

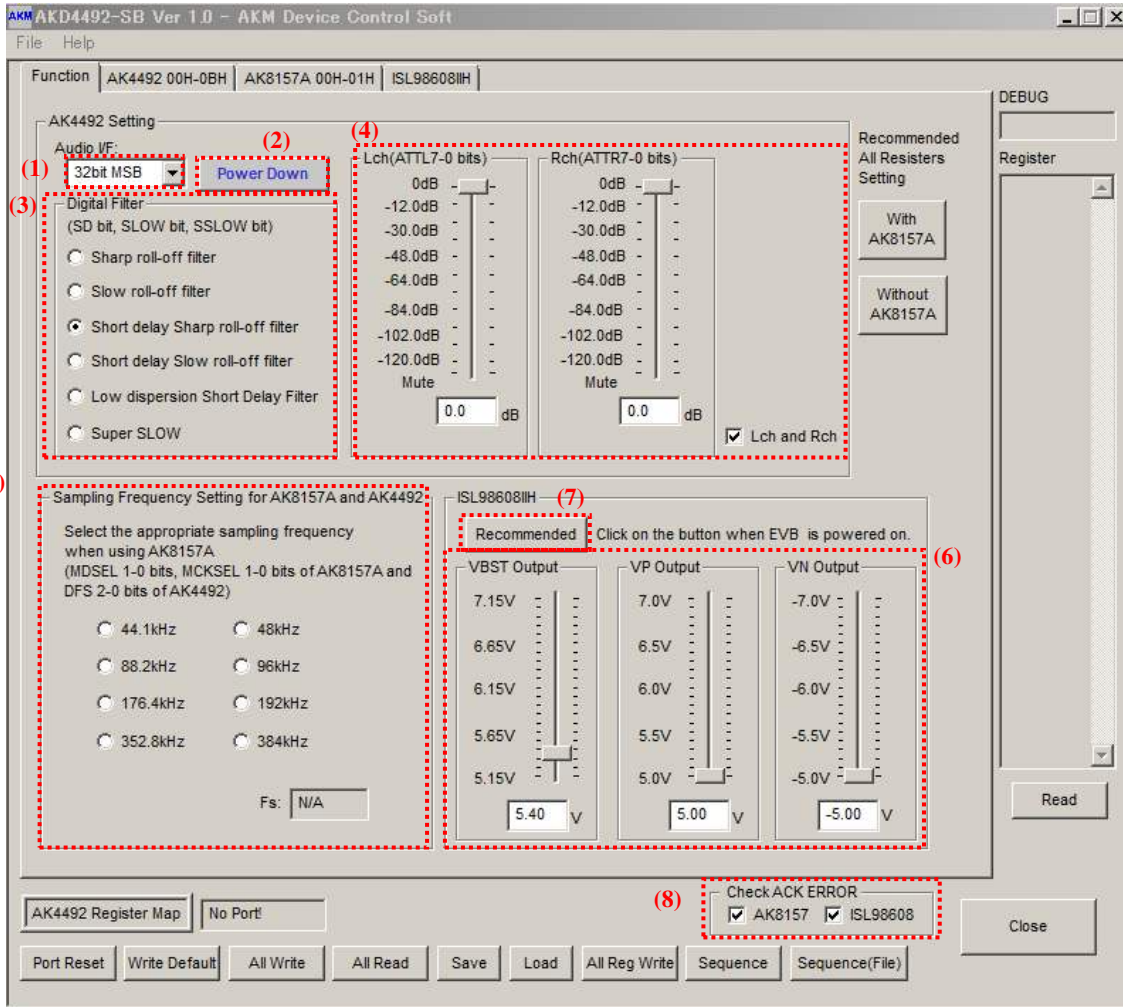


Figure 10. [Function] Window

◆ Sound control setting of AK4492

For more information refer to the datasheet of the AK4492.

(1) Audio Interface Format selected by combo box.

- 16-bit LSB justified
- 20-bit LSB justified
- 24-bit MSB justified
- 24-bit I<sup>2</sup>S Compatible
- 24-bit LSB justified
- 32-bit LSB justified
- 32-bit MSB justified
- 32-bit I<sup>2</sup>S Compatible

(2) Internal Timing Reset button

- {Power Down} All registers are not initialized.
- {Power Up} Normal Operation

(3) The sound quality can be selected by changing radio buttons of the following digital filters setting.  
For more information about the digital filter characteristics, refer to the datasheet of the AK4492.

- Sharp roll-off filter
- Slow roll-off filter
- Short delay Sharp roll-off filter
- Short delay Slow roll-off filter
- Low dispersion Short delay Filter
- Super SLOW

(4) Volume Control by Slider

The volume can also be changed by slider.

When a value is input in the edit box, the slider is moved to the value that selected by the edit box.

Use the mouse or arrow keys on the keyboard for fine tuning.

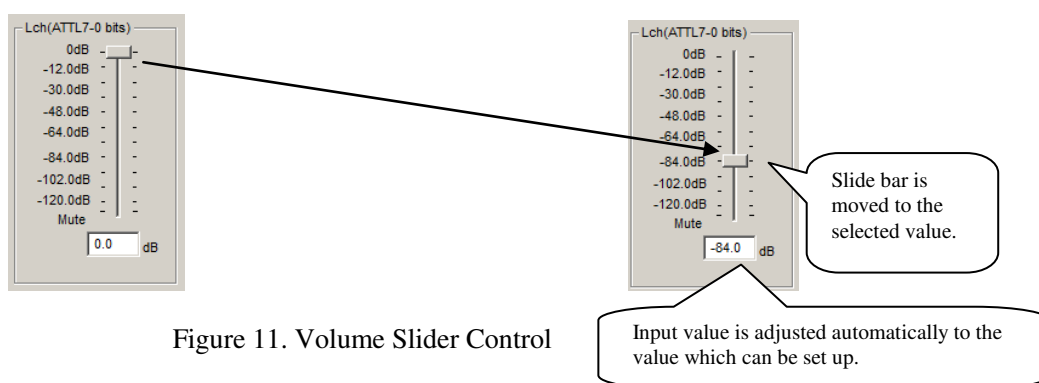


Figure 11. Volume Slider Control

#### ◆ Sampling Frequency(LRCK) setting of AK8157A and AK4492

(5) Sampling Frequency(LRCK) Setting for AK8157A and AK4492.

Sampling frequency(fs) can be selected by changing radio buttons of the following “fs” setting.

- 44.1kHz
- 48kHz
- 88.2kHz
- 96kHz
- 176.4kHz
- 192kHz
- 352.8kHz
- 384kHz

#### ◆ Power Supply setting of ISL98608IIH

(6) VBST, VP and VN Control by Slider

VBST regulator can be programmed from +5.15V to +7.15V.

VP regulator can be programmed from +5V to +7V.

VN regulator can be programmed from -7V to -5V.

**\*VBST is  $VBST > VP$  and  $VBST > |VN|$ .**



- (7) The VBST, VP and VN output are recommended setting when “Recommended” button is clicked.  
 (VBST Output = 6.3V, VP Output = 6.0V, VN Output = -5.0V)

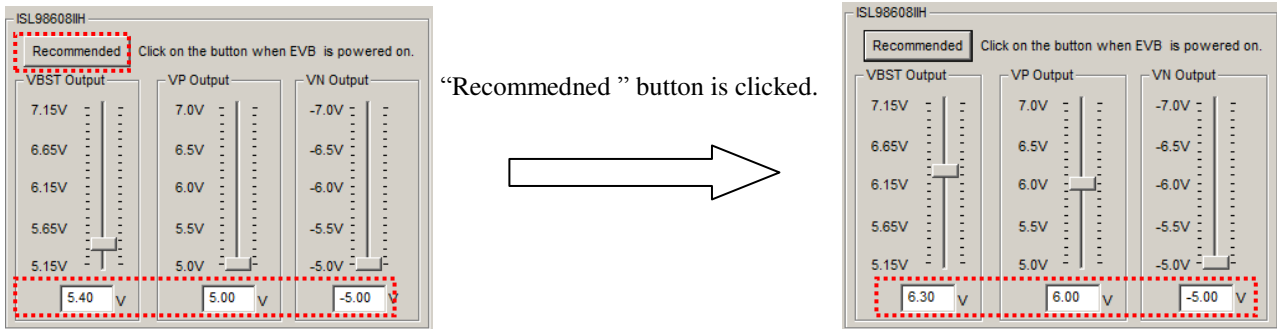
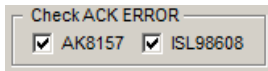


Figure 12. The VBST, VP and VN output are recommended setting

◆ Other setting

- (8) Check ACK ERROR



[Checked]: Error message will appear when AK8157/ISL98608IIH did not generate an acknowledge.  
 [No checked]: Error message will not appear when AK8157/ISL98608IIH did not generate an acknowledge.

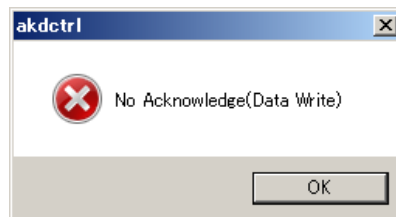


Figure 13. Error message

## 2. [AK4492], [AK8157A], [ISL98608IIH] Tab: Register Map

This tab is for register read and write.

Each bit on the register map is a push-button switch. The register is updated by mouse operation. Button Down indicates “1” and the bit name is shown in red (when read-only the name is shown in dark red). Button Up indicates “0” and the bit name is shown in blue (when read-only the name is shown in gray)

Grayed out registers are Read-Only registers. They cannot be controlled.

The registers which are not defined on the datasheet are indicated as “---”.

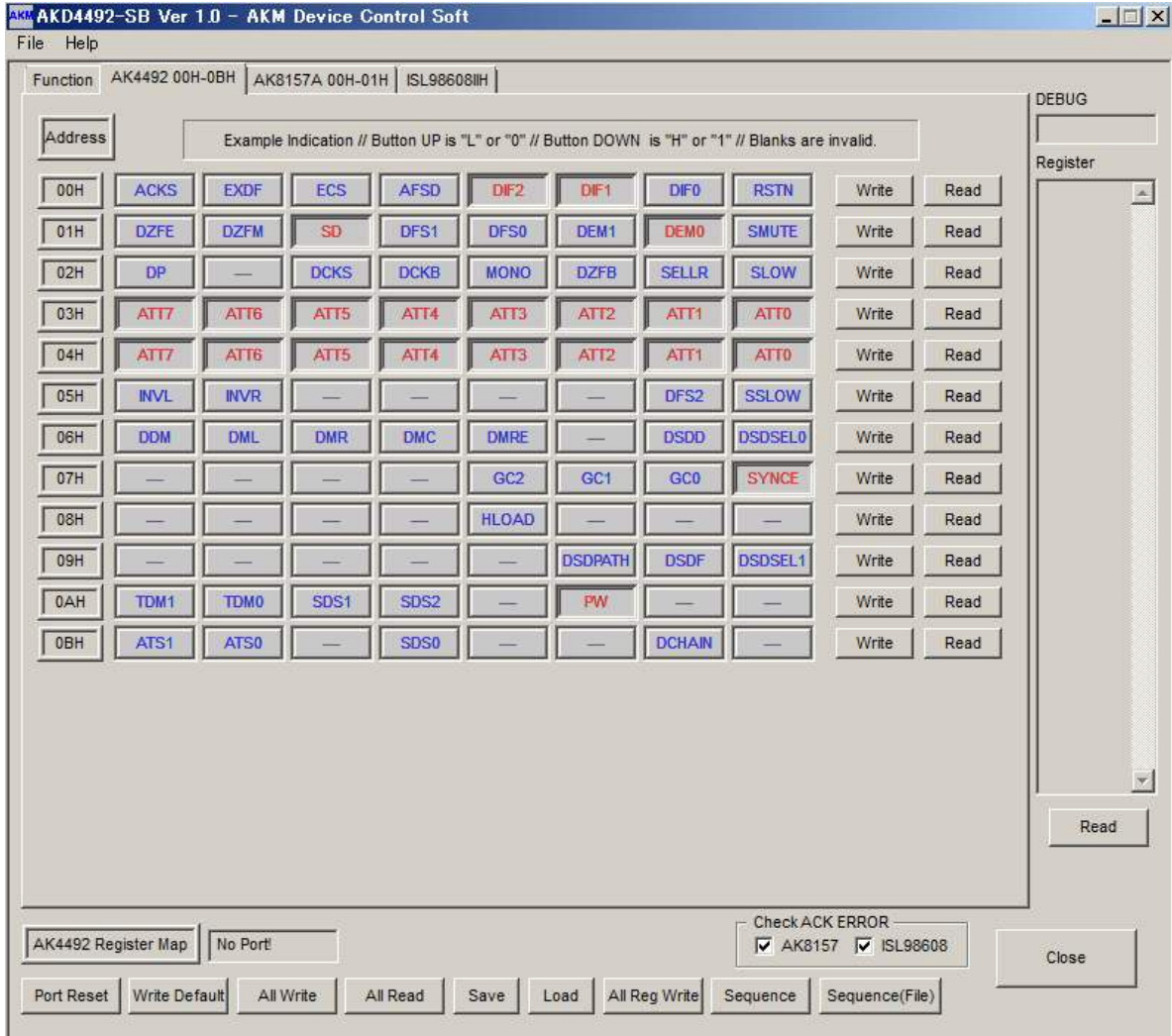


Figure 14. REG Window

## 2.1 [Write]: Data Wirte Dialog Box

Select the [Write] button located on the right of the each corresponding address when changing two or more bits on the same address simultaneously.

Click the [Write] button for the register pop-up dialog box shown below.

When the checkbox is checked (“✓” is the sign mean “checked”), the data will become “1”.

When the checkbox is not checked, the data will become “0”.

There is the dialog corresponding to each register.

Click [OK] to write the set values to the registers, or click [Cancel] to cancel this setting.

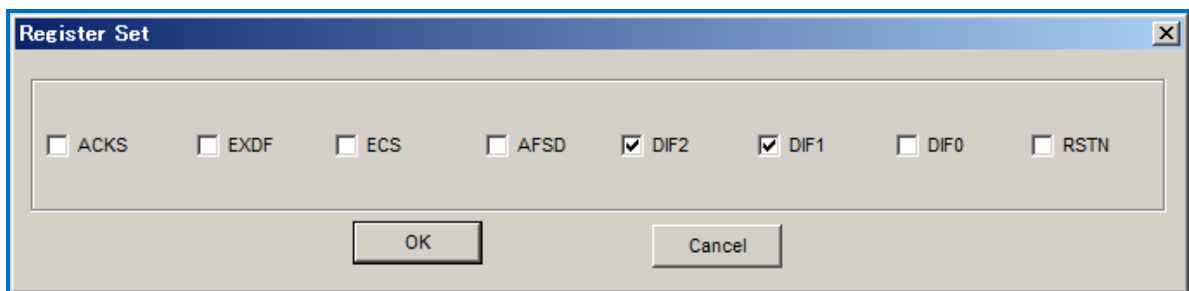


Figure 15. Register Set Window

## 2.2 [Read]: Data Read Dialog Box (I2C-bus Control Mode Only)

Click the [Read] button located on the right of the each corresponding address to execute a register read.

After finishing to read each register, the current register value will be displayed in register window.

Button Down indicates “1” and the bit name is shown in red (when read-only the name is shown in dark red).

Button Up indicates “0” and the bit name is shown in blue (when read-only the name is shown in gray).

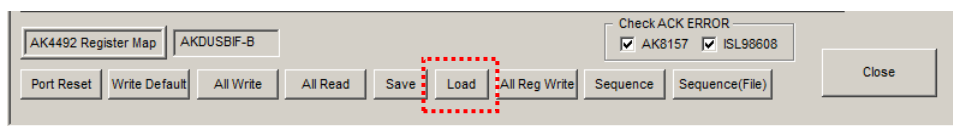
**■ Register setting of AK4492, AK8157A and ISL98608IIH**

Figure 16. Script Window of Control Soft

Push the “Load” button and select the program file (file name is “For checking sound quality.akr”).  
When program file is selected, it’s executed automatically.

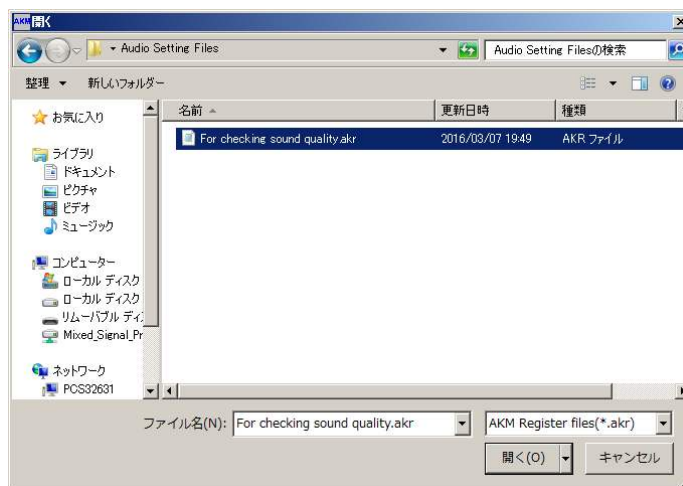


Figure 17. Program file select window (example)

## ■ Dialog Boxes

### 1. [Save]: [Save Address of Register] Dialog Box

Click the [Save] button in the main window for save address setting dialog box.

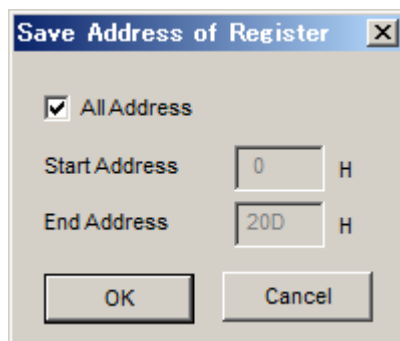


Figure 18. [Save] Window

- [All Address] check box : When the [All Address] checkbox is checked, all register settings will be saved.
- [Start Address] edit box : When the [All Address] check box is not checked, set starts register address to save.
- [End Address] edit box : When the [All Address] check box is not checked, set end register address to save.
- [OK] button : Selects a file to save and saves register settings.
- [Cancel] button : Cancel and finish this process.

Note 2. XXH address shows the address of the AK4492 . 1XXH address shows the address of the AK8157A.  
2XXH address shows the address of the ISL98608.



### 3. [Sequence]: [Sequence] Dialog Box

Click the [Sequence] button to open register sequence setting dialog box shown below.  
 Register sequence can be set in this dialog box.

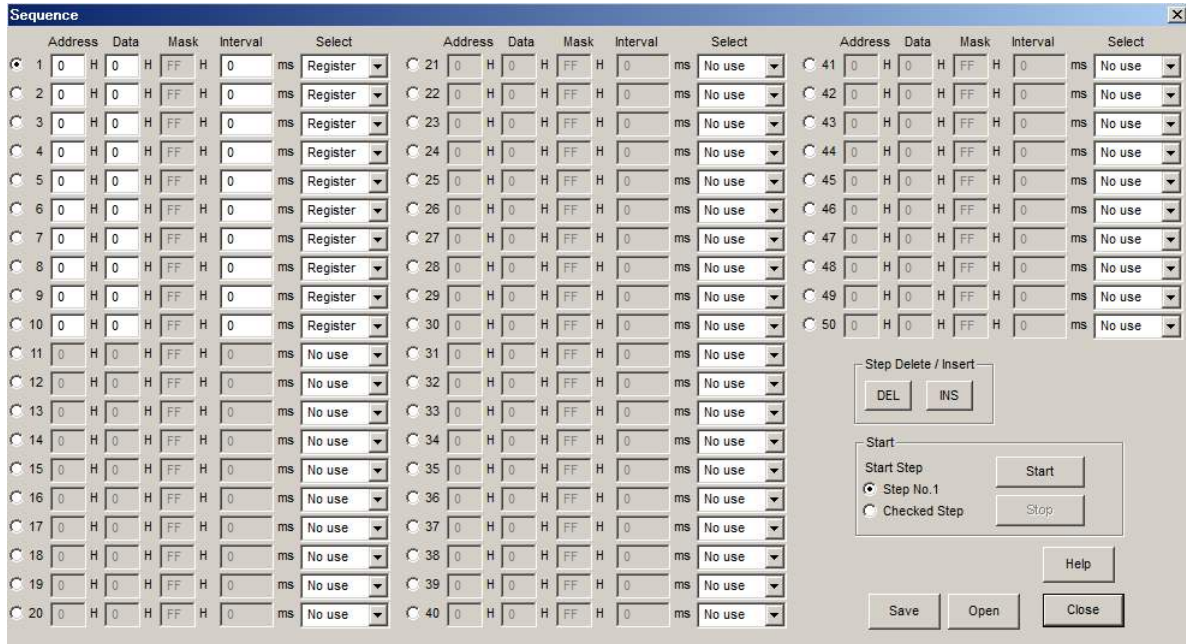


Figure 20. Sequence Window

#### ~ Sequence Setting ~

Set register sequence according to the following process.

1. Select a command

Use [Select] pull-down box to choose commands.  
 Corresponding boxes will be valid.

< Select items >

- No use : Not using this address
- Register : Register write
- Reg\_Mask : Register write (Masked)
- Interval : Takes an interval
- Stop : Pauses the sequence
- End : Ends the sequence

## 2. Input sequence

[Address] : Data address

[Data] : Write data

[Mask] : Mask

This value “ANDed” with the write data becomes the input data. The bits which corresponding Mask bit = “0” are not changed. At this time, data read is not executed, and the storage data of this software is used. “Write Default” must be executed after power up the AK4633 or when the AK4633 is reset by the PDN pin since the storage data and register values are different.

This is the actual write data.

When Mask = 0x00, current setting is hold.

When Mask = 0xFF, the 8bit data which is set in the [Data] box is written.

When Mask = 0x0F, lower 4bit data which is set in the [Data] box is written.

Upper 4bit is hold to current setting.

[Interval] : Interval time

Valid boxes for each process command are shown below.

- No use : None
- Register : [ Address ], [ Data ], [ Interval ]
- Reg\_Mask : [ Address ], [ Data ], [ Mask ], [ Interval ]
- Interval : [ Interval ]
- Stop : None
- End : None

## ~ Control Buttons ~

Functions of Control Button are shown below.

[DEL] button : Checked step is deleted.

[INS] button : The last deleted step is inserted to checked step.

[Start Step] select: Select start step.

No.1 Step : Start from No.1 step.

Checked Step: Start from checked step.

[Start] button : Executes the sequence.

[Stop] button : Stops the sequence.

[Help] button : Opens a help window.

[Save] button : Saves sequence settings as a file. The file name is “\*.aks”.

[Open] button : Opens a sequence setting file “\*.aks”.

[Close] button : Closes the dialog box and finishes the process.

## ~ Stop of the Sequence ~

When “Stop” is selected in the sequence, the process is paused at this step and restart step number is checked.

It starts again from the checked step by clicking the [Start] button. When the process at the end of sequence is finished, “Step No.1” of [start step] is selected automatically..



#### 4. [Sequence(File)]:[Sequence(File)] Dialog Box

Click the [Sequence(File)] button to open sequence setting file dialog box shown below. Files saved in the “Sequence setting dialog” can be applied in this dialog.

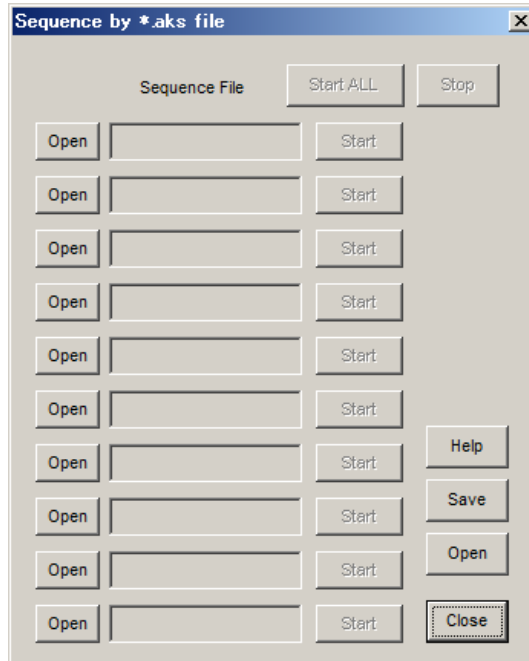


Figure 21. Sequence(File) Window

- [Open (left)] button : Opens a sequence setting file (\*.aks).
- [Start] button : Executes the sequence by the setting of selected file.
- [Start All] button : Executes all sequence settings.  
Selected files are executed in descending order.
- [Stop] button : Stops the sequence process.
- [Help] button : Opens a help window.
- [Save] button : Saves a sequence setting file assignment. The file name is “\*.mas”.
- [Open (right)] button : Opens a saved sequence setting file assignment “\*. mas”.
- [Close] button : Closes the dialog box and finishes the process.

#### ~ Operating Suggestions ~

1. Those files saved by [Save] button and opened by [Open] button on the right of the dialog “\*.mas” should be stored in the same folder.
2. When “Stop” is selected in the sequence, the process will be paused and a pop-up message will appear. Click “OK” to continue the process.

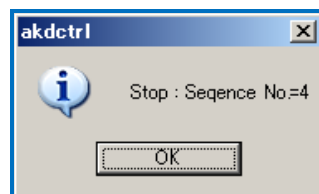


Figure 22. Sequence Pause Window

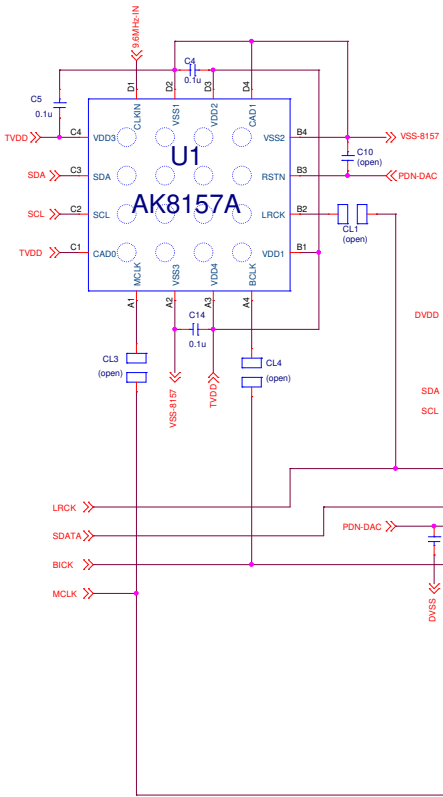
**7. REVISION HISTORY**

Date (yy/mm/dd)	Manual Revision	Board Revision	Reason	Page	Contents
16/11/09	KM125000	2	First edition	-	-

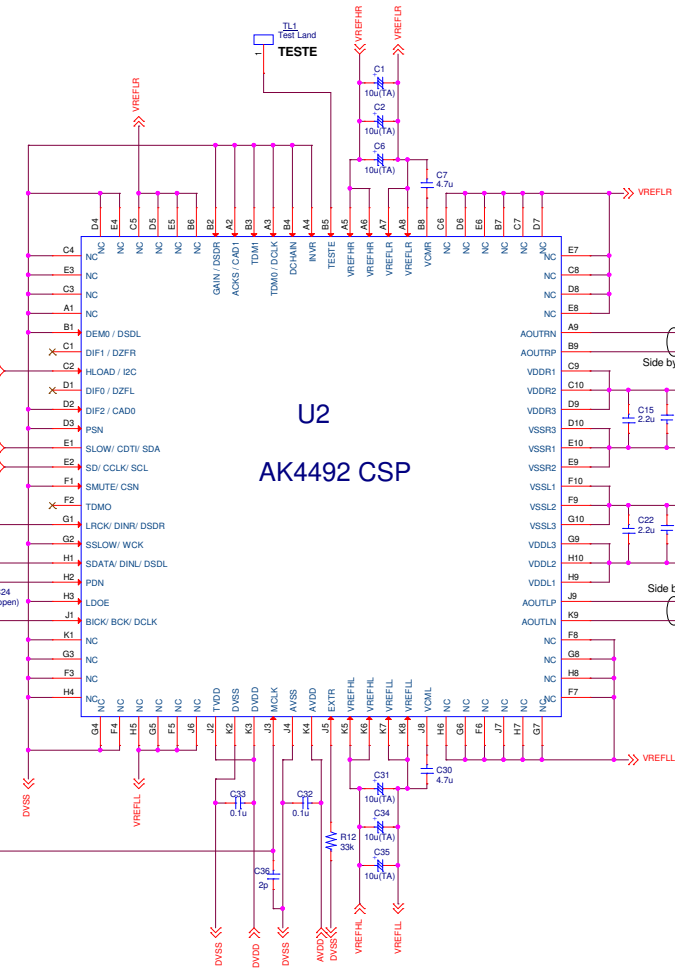
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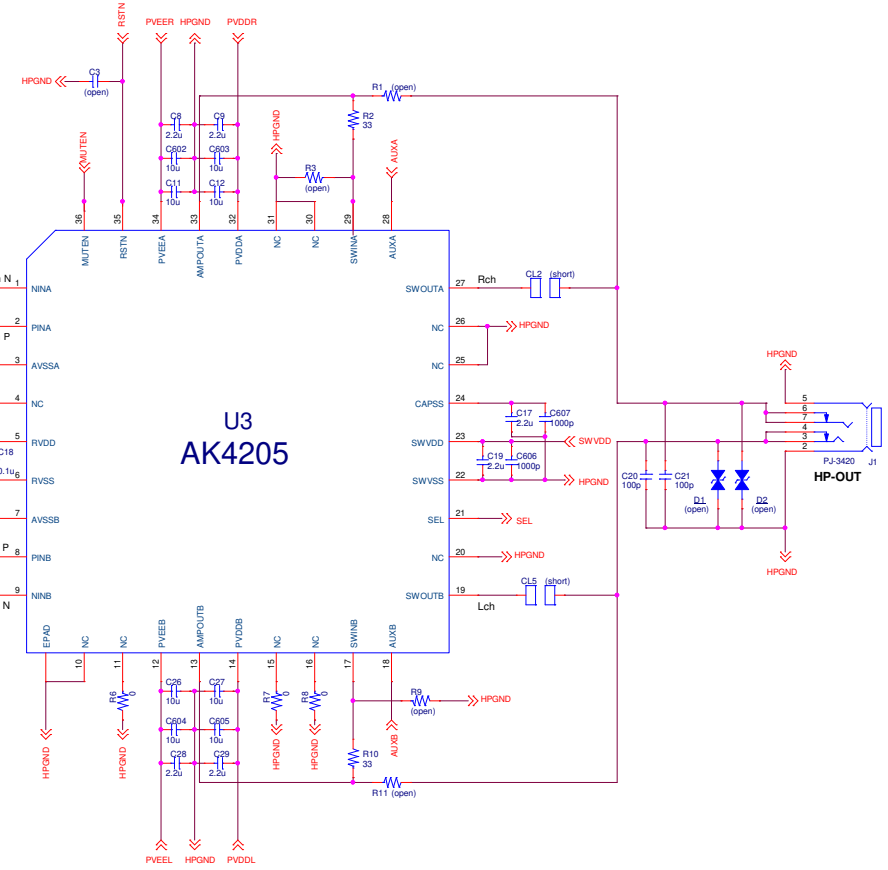
PLL for Audio Clock



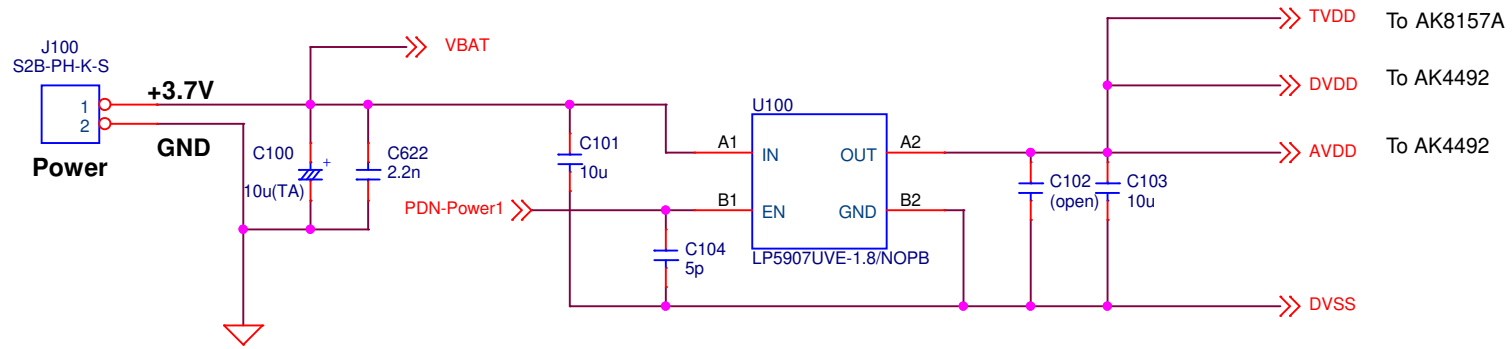
32bit DAC



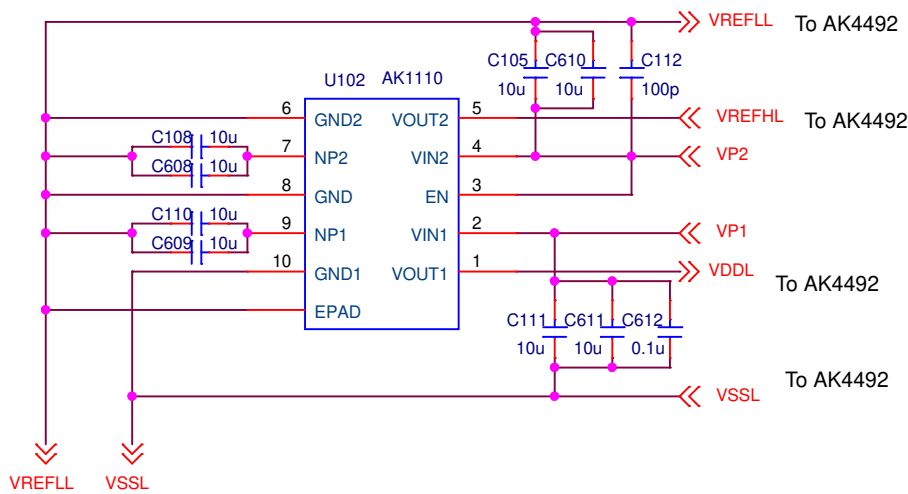
HP-Amp and Analog Switch



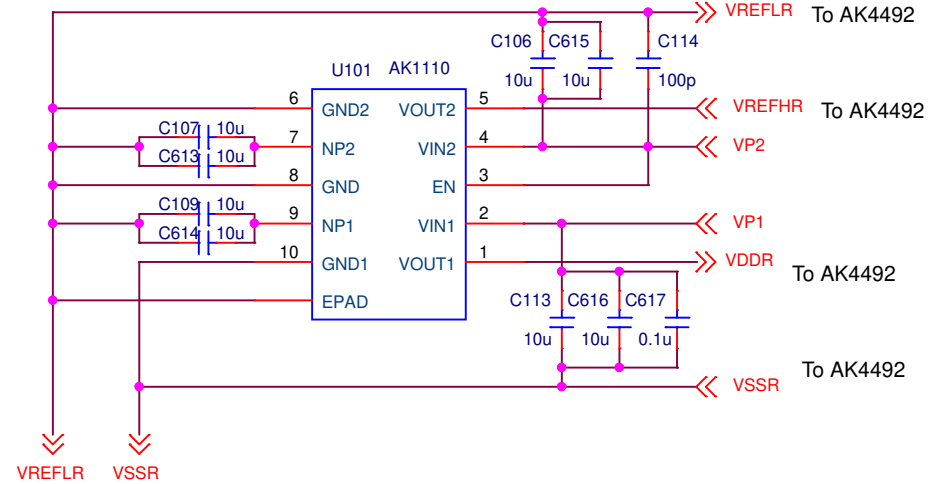
## 1.8 V for Hi-Fi Digital



## 5.0V for Hi-Fi Analog of Lch

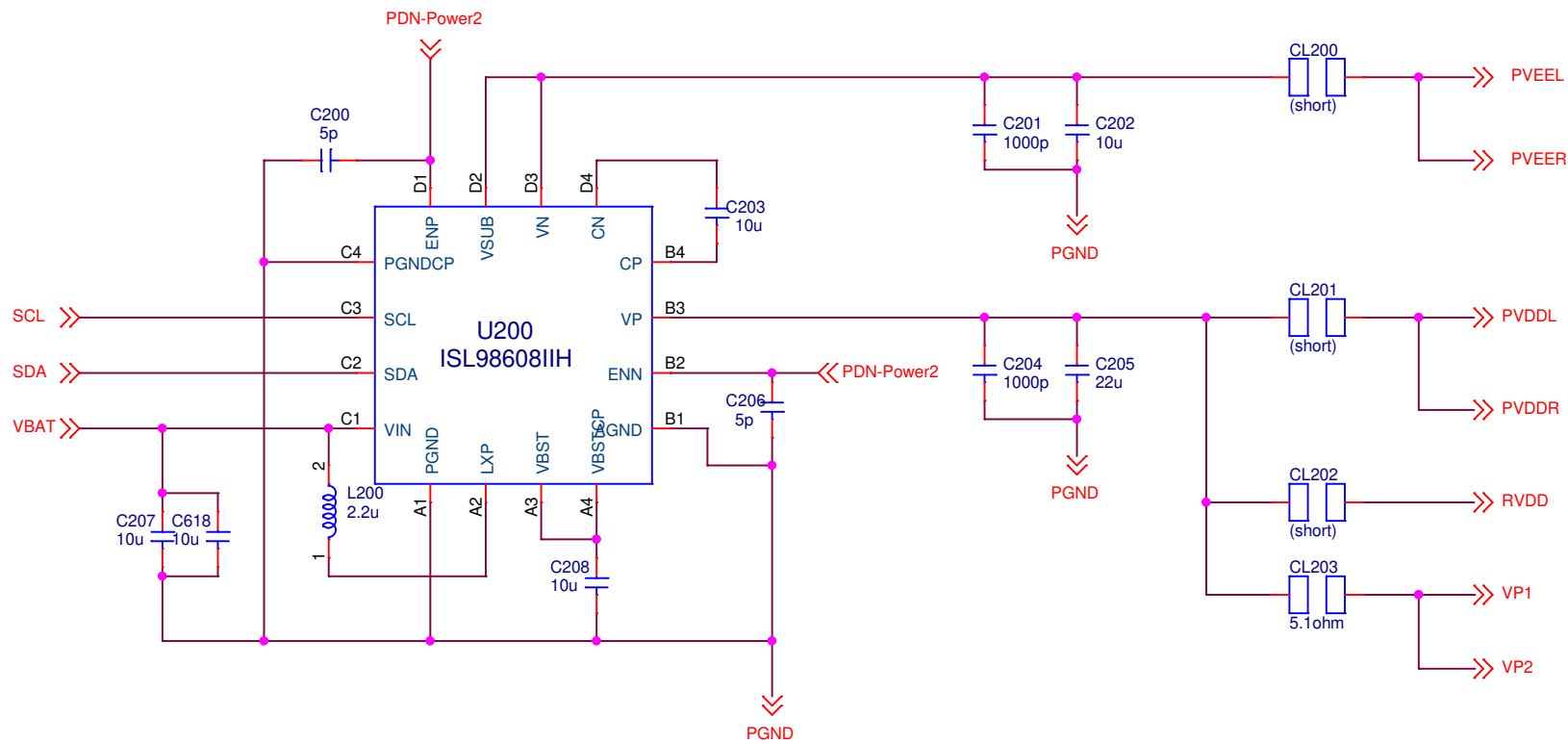


## 5.0V for Hi-Fi Analog of Rch

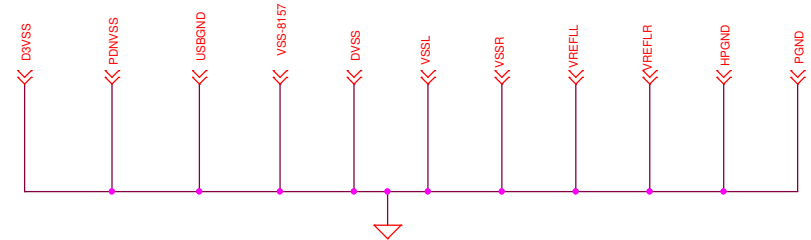
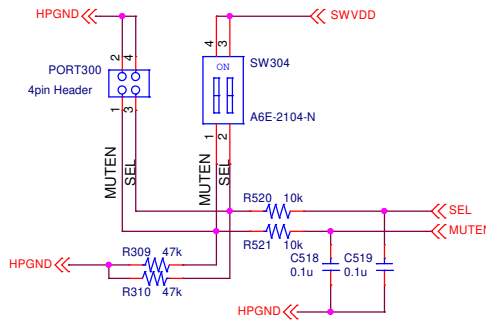
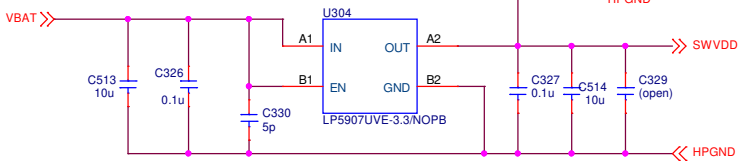
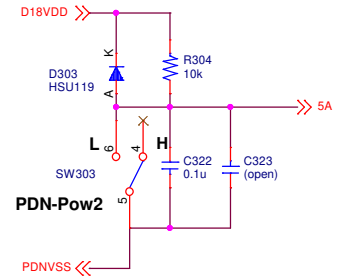
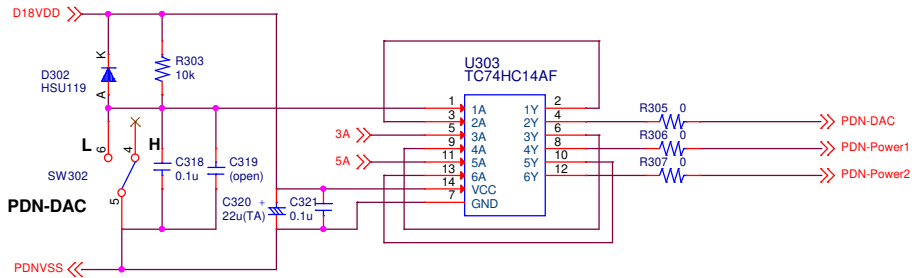
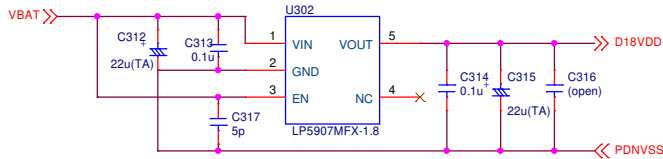
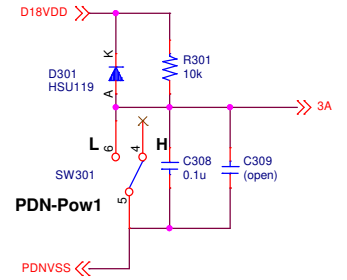
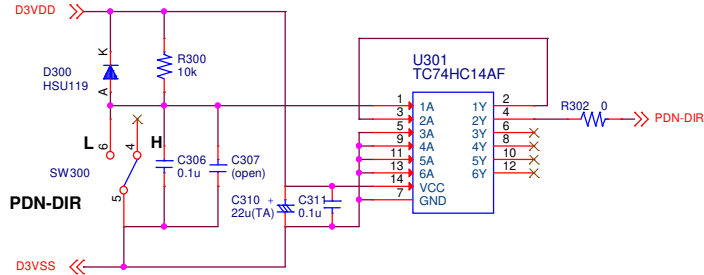
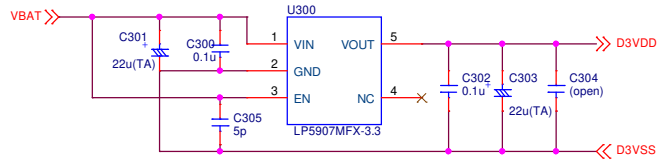


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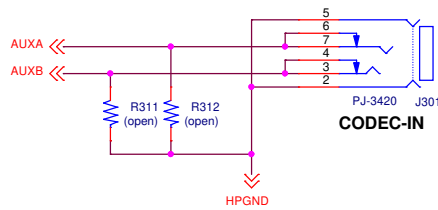
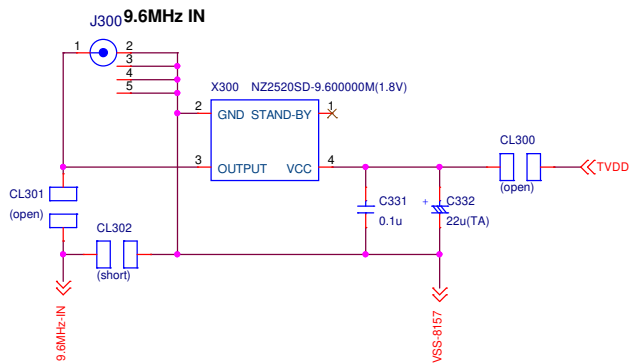
# 6.0V and -5.0V DCDC for Hi-Fi HP-Amp



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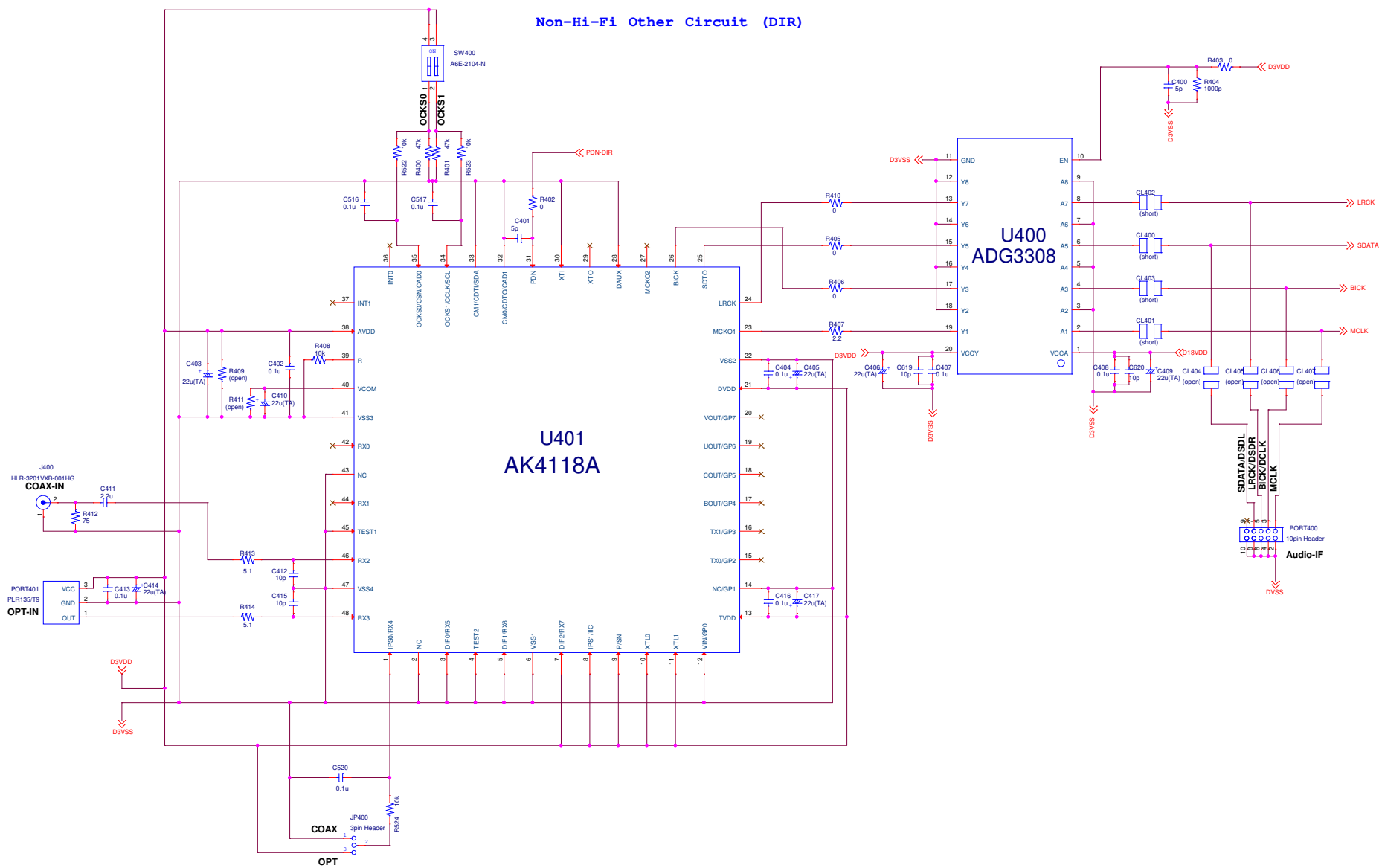
Respective GNDs should be shorted by L4 Layer.



Non-Hi-Fi Other Circuit

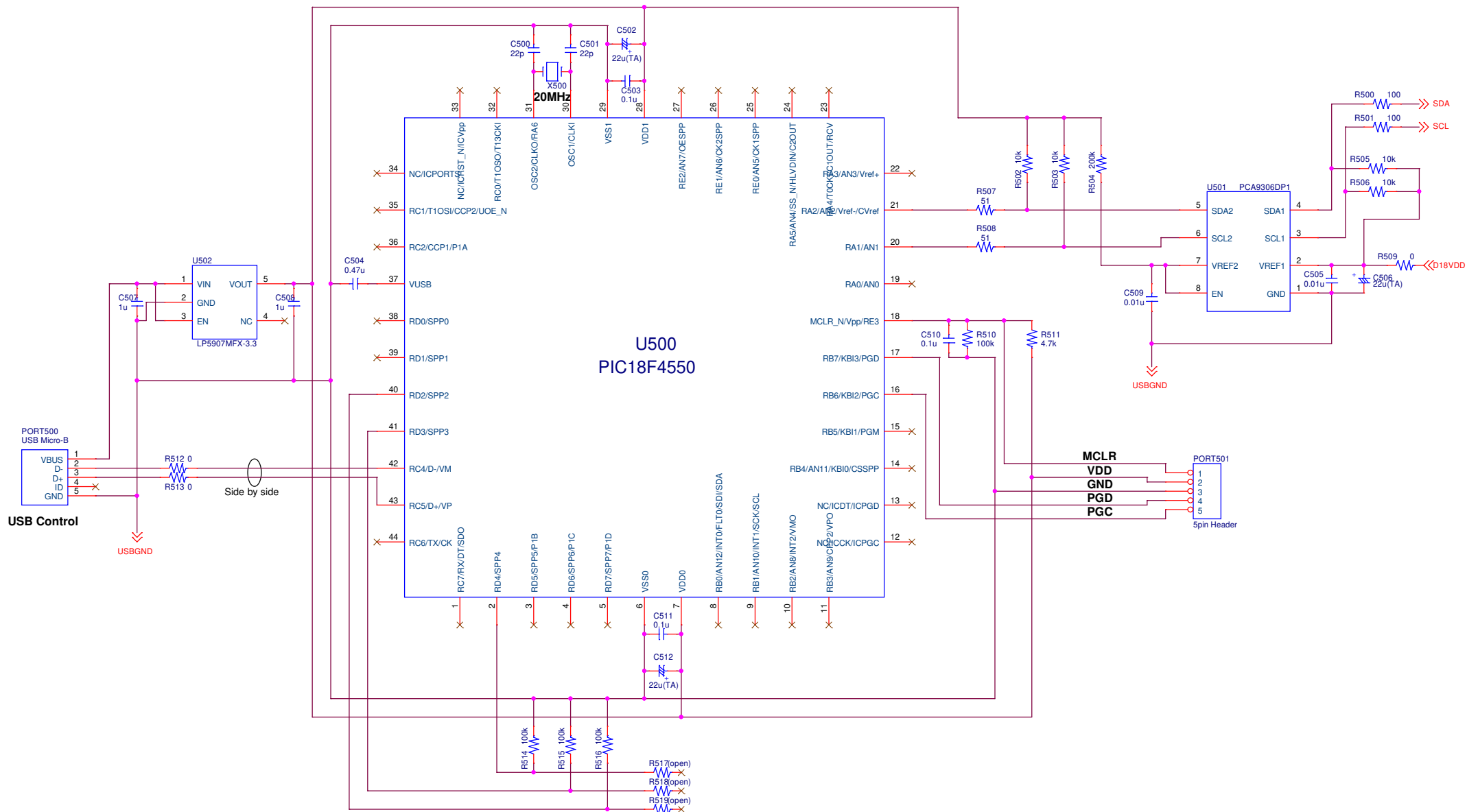
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Non-Hi-Fi Other Circuit (DIR)





# Non-Hi-Fi Other Circuit (PIC)



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