GENERAL DESCRIPTION

The AKD4695-A is an evaluation board for AK4695, low power consumption 24bit stereo CODEC with microphone/ headphone/ speaker/ line amplifier. The AKD4695-A has the Digital Audio I/F and can achieve the interface with digital audio systems via optical connector.

Ordering Guide

AKD4695-A --- AK4695 Evaluation Board
(Cable for connecting with USB Port of PC and control software are packed with this.)

FUNCTION

• DIR/DIT with optical input/output
• BNC connector for an external clock input
• 10pin Header for serial control mode

![AKD4695-A Block Diagram](Figure 1.AKD4695-A Block Diagram (Note 1).)

Note 1. Circuit diagram and PCB layout are attached at the end of this manual.
■ Operation Sequence

1) Set up the Power Supply Lines.

1-1) In case of using the regulator for AVDD and SVDD. <Default>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Jack</th>
<th>Color</th>
<th>Default Setting</th>
<th>Using</th>
</tr>
</thead>
<tbody>
<tr>
<td>REG</td>
<td>Red</td>
<td>+5.0V</td>
<td>for regulator (T1)</td>
</tr>
<tr>
<td>AVDD</td>
<td>Orange</td>
<td>Open</td>
<td>for AVDD of AK4695.</td>
</tr>
<tr>
<td>SVDD</td>
<td>Orange</td>
<td>Open</td>
<td>for SVDD of AK4695.</td>
</tr>
<tr>
<td>DVDD</td>
<td>Orange</td>
<td>+1.6V ~ +2.0V (typ:+1.8V)</td>
<td>for DVDD of AK4695.</td>
</tr>
<tr>
<td>TVDD</td>
<td>Orange</td>
<td>+1.6V ~ +3.5V (typ:+2.8V)</td>
<td>for TVDD of AK4695.</td>
</tr>
<tr>
<td>VCC</td>
<td>Orange</td>
<td>Open</td>
<td>for digital logic.</td>
</tr>
<tr>
<td>D3V</td>
<td>Orange</td>
<td>+2.7V ~ +3.6V (typ:+3.3V)</td>
<td>for AK4118A and digital logic.</td>
</tr>
<tr>
<td>AGND</td>
<td>Black</td>
<td>0V</td>
<td>for analog ground.</td>
</tr>
<tr>
<td>DGND</td>
<td>Black</td>
<td>0V</td>
<td>for digital ground.</td>
</tr>
</tbody>
</table>

Table 1. Set up the power supply lines (Note 2, Note 3)

1-2) In case of using the power supply connectors.

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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<th>Color</th>
<th>Default Setting</th>
<th>Using</th>
</tr>
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<tr>
<td>AVDD</td>
<td>Orange</td>
<td>+2.7V ~ +3.5V (typ:+2.8V)</td>
<td>for AVDD of AK4695.</td>
</tr>
<tr>
<td>SVDD</td>
<td>Orange</td>
<td>+2.7V ~ +3.5V (typ:+2.8V)</td>
<td>for SVDD of AK4695.</td>
</tr>
<tr>
<td>DVDD</td>
<td>Orange</td>
<td>+1.6V ~ +2.0V (typ:+1.8V)</td>
<td>for DVDD of AK4695.</td>
</tr>
<tr>
<td>TVDD</td>
<td>Orange</td>
<td>+1.6V ~ +3.5V (typ:+2.8V)</td>
<td>for TVDD of AK4695.</td>
</tr>
<tr>
<td>VCC</td>
<td>Orange</td>
<td>+1.6V ~ +3.5V (typ:+2.8V)</td>
<td>for digital logic.</td>
</tr>
<tr>
<td>D3V</td>
<td>Orange</td>
<td>+2.7V ~ +3.6V (typ:+3.3V)</td>
<td>for AK4118A and digital logic.</td>
</tr>
<tr>
<td>AGND</td>
<td>Black</td>
<td>0V</td>
<td>for analog ground.</td>
</tr>
<tr>
<td>DGND</td>
<td>Black</td>
<td>0V</td>
<td>for digital ground.</td>
</tr>
</tbody>
</table>

Table 2. Set up the power supply lines (Note 2, Note 3)

Note 2. Each supply line should be distributed from the power supply unit.
Note 3. TVDD and VCC must be same voltage level.

2) Setup the Evaluation mode, jumper pins and SW (See the followings).

3) Power on.
The AK4695 should be reset once bringing SW1 and SW2 “L” upon power-up.
Setup the Evaluation Mode.

In case of using the AK4118A when evaluating the AK4695, both the AK4695 and AK4118A’s audio interface formats must be matched. Refer to the datasheet for AK4695’s audio interface format, and AK4118A’s audio interface format (Table 4). The AK4118A operates at sampling frequency of 32 kHz or more. If the sampling frequency is slower than 32 kHz, please use other mode. In addition, MCLK of AK4118A supports 256fs and 512fs. When evaluating in a condition except above, please use other mode. Refer to the datasheet for register setting of the AK4695.

Applicable Evaluation Mode

1) Evaluation of A/D using DIT of AK4118A.

2) Evaluation of D/A using DIR of AK4118A. <Default>


4) Evaluation of Loop-back.
1) Evaluation of A/D using DIT of AK4118A

X1(12.288MHz) and PORT2 (DIT) are used. Nothing should be connected to PORT1 (DIR), PORT3 (DSP). MCKI, BICK and LRCK are supplied from AK4118A, and SDTO of the AK4695 is output to the AK4118A.

The jumper pins should be set as follows.

![Jumper Settings for A/D using DIT of AK4118A](image)

Figure 2. Setting of A/D using DIT of AK4118A

2) Evaluation of D/A using DIR of AK4118A <Default>

PORT1 (DIR) is used. Nothing should be connected to PORT2 (DIT), PORT3 (DSP).

The jumper pins should be set as follows.

![Jumper Settings for D/A using DIR of AK4118A](image)

Figure 3. Setting of D/A using DIR of AK4118A

PORT3 (DSP) is used. Nothing should be connected to PORT1 (DIR), PORT2 (DIT).

The jumper pins should be set as follows.

---

**Figure 5. Setting of A/D, D/A using PORT3 (DSP)**
4) Evaluation of Loop-back.

Nothing should be connected to PORT1 (DIR), PORT2 (DIT), PORT3 (DSP).

4-1) In case of using clocks from AK4118A.

X1(12.288MHz) is used.

The jumper pins should be set as follows.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MCLK</td>
<td>BICK_SEL</td>
<td>PHASE</td>
<td>LRCK_SEL</td>
<td>SDTI_SEL</td>
</tr>
<tr>
<td>DIR</td>
<td>4040</td>
<td>THR</td>
<td>INV</td>
<td>DIR</td>
</tr>
<tr>
<td>EXT</td>
<td>4040</td>
<td></td>
<td></td>
<td>ADC</td>
</tr>
</tbody>
</table>

Figure 6. Setting of Loop-back, In case of using clocks from AK4118A

4-2) In case of using the clocks divider on the board.

In case of supplying MCLK to J11 (EXT).
(MCLK=256fs, BICK=64fs)

The jumper pins should be set as follows.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EXT</td>
<td>MCLK</td>
<td>MKFS</td>
<td>BGFS</td>
</tr>
<tr>
<td></td>
<td>DIR</td>
<td>256fs</td>
<td>64fs-384</td>
</tr>
<tr>
<td></td>
<td></td>
<td>512fs</td>
<td>32fs-384</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1024fs</td>
<td>64fs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>384/768fs</td>
<td>32fs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 7. Setting of Loop-back, In case of using clocks divider on the board (Note 4)

Note 4. When a termination (51ohm) is not used, JP14 (EXT) should be open.
Setup the DIP SW.

Upper-side is “ON(H)” and lower-side is “OFF(L)”.

[S1] (SW DIP-6): Mode setting for AK4118A.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>ON (“H”)</th>
<th>OFF (“L”)</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DIF2</td>
<td>AK4118A Audio Format Setting</td>
<td>See Table 4</td>
<td>ON</td>
</tr>
<tr>
<td>2</td>
<td>DIF1</td>
<td>See Table 4</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>3</td>
<td>DIF0</td>
<td>AK4118A Master Clock Setting</td>
<td>See Table 5</td>
<td>OFF</td>
</tr>
<tr>
<td>4</td>
<td>OCKS1</td>
<td>Not to use.</td>
<td>Fix to “OFF”.</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Mode Setting for AK4118A

<table>
<thead>
<tr>
<th>Mode</th>
<th>DIF2</th>
<th>DIF1</th>
<th>DIF0</th>
<th>DAUX</th>
<th>SDTO</th>
<th>LRCK</th>
<th>BICK</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>24bit, Left justified</td>
<td>16bit, Right justified</td>
<td>H/L</td>
<td>O</td>
</tr>
<tr>
<td>1</td>
<td>L</td>
<td>L</td>
<td>H</td>
<td>24bit, Left justified</td>
<td>18bit, Right justified</td>
<td>H/L</td>
<td>O</td>
</tr>
<tr>
<td>2</td>
<td>L</td>
<td>H</td>
<td>L</td>
<td>24bit, Left justified</td>
<td>20bit, Right justified</td>
<td>H/L</td>
<td>O</td>
</tr>
<tr>
<td>3</td>
<td>L</td>
<td>H</td>
<td>H</td>
<td>24bit, Left justified</td>
<td>24bit, Right justified</td>
<td>H/L</td>
<td>O</td>
</tr>
<tr>
<td>4</td>
<td>H</td>
<td>L</td>
<td>L</td>
<td>24bit, Left justified</td>
<td>24bit, Left justified</td>
<td>H/L</td>
<td>O</td>
</tr>
<tr>
<td>5</td>
<td>H</td>
<td>L</td>
<td>H</td>
<td>24bit, I²S</td>
<td>24bit, I²S</td>
<td>L/H</td>
<td>O</td>
</tr>
<tr>
<td>6</td>
<td>H</td>
<td>H</td>
<td>L</td>
<td>24bit, Left justified</td>
<td>24bit, Left justified</td>
<td>H/L</td>
<td>I</td>
</tr>
<tr>
<td>7</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>24bit, I²S</td>
<td>24bit, I²S</td>
<td>L/H</td>
<td>I</td>
</tr>
</tbody>
</table>

Table 4. AK4118A Audio I/F Format Setting

<table>
<thead>
<tr>
<th>OCKS1</th>
<th>MCKO1</th>
<th>X'tal</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>256fs</td>
<td>256fs</td>
</tr>
<tr>
<td>H</td>
<td>512fs</td>
<td>512fs</td>
</tr>
</tbody>
</table>

Table 5. AK4118A Master Clock Setting
Setting of other jumper pins

Main Board

[JP1] (GND): Analog ground and Digital ground.
   OPEN: Separated. <Default>
   SHORT: In Common. <Default>

[JP12] (HPL): The selection of output signal from HPL pin.
   HP: Connected to J9 (HP/LINE) connector. <Default>
   RCA: Connected to J7 (HPL) connector.

[JP13] (HPR): The selection of output signal from HPR pin.
   HP: Connected to J9 (HP/LINE) connector. <Default>
   RCA: Connected to J8 (HPR) connector.

   256fs: 256fs <Default>.
   512fs: 512fs.
   1024fs: 1024fs.
   384fs: Not to use.
   MCKO: Not to use.

   64fs-384fs: Not to Use.
   32fs-384fs: Not to Use.
   64fs: 64fs (When MCLK is 256fs or 512fs or 1024fs). <Default>
   32fs: 32fs (When MCLK is 256fs or 512fs or 1024fs).

   fs: When MCLK is 256fs or 512fs or 1024fs. <Default>
   fs-384fs: Not to use.


Sub Board

[JP50] (MPWRA): The selection of Mic-power A.
   OPEN: Mic-power is not supplied. <Default>
   SHORT: Mic-power is supplied.

[JP51] (MPWRB): The selection of Mic-power B.
   OPEN: Mic-power is not supplied. <Default>
   SHORT: Mic-power is supplied.
[JP54] (SDTO-SEL): The selection of output signal from SDTO1 pin or SDTO2 pin. 
2 pin and 4 pin SHORT: In case of using digital signal from SDTO1 pin. <Default> 
4 pin and 6 pin SHORT: In case of using digital signal from SDTO2 pin.

![Diagram of JP54 SDTO-SEL]

Figure 8. Setting of SDTO-SEL

In case of using digital signal from externally, R59 should be open.

[JP57] (LRCK): External clocks input pin header. 
In case of using clocks from externally, R61 should be open.

In case of using clocks from externally, R62 should be open.

In case of using clocks from externally, R67 should be open.

**Function of the Toggle SW**

Upper-side is “H” and lower-side is “L”.

The AK4695 should be resets once bringing “L” upon power-up.

[SW2] (DIR): Resets the AK4118A. Keep “H” during normal operation.  
The AK4118A should be resets once bringing “L” upon power-up.

**Indication for LED**

[LED1] (REF): Monitor INTO pin of the AK4118A.  
LED turns on when some error has occurred to AK4118A.
■ Serial Control

Figure 9 shows a connection of a PC and an evaluation board via the AKDUSBIF-B. The AKDUSBIF-B is connected to a PC with a USB cable and to an evaluation board with the 10pin flat cable installed in the AKDUSBIF-B (Note 5, Note 6).

Note 5. Only one AKDUSBIF-B can be connected to a PC. It cannot operate when connecting more than two AKDUSBIF-B’s.

Note 6. The red line of the 10pin flat cable should be connected with the 1pin of the 10pin Header of an evaluation board.

![Diagram of connection via the AKDUSBIF-B](image)

Figure 9. Connection via the AKDUSBIF-B

![Image of AKDUSBIF-B](image)

Figure 10. AKDUSBIF-B
**Analog Input/Output Circuits**

1) Input Circuits

1-1) MICIN0L/R, MICIN1L/R, MICIN2L/R, MICIN3L/R input circuit (except for Digital Mic).

![Figure 11. MICIN0L/R, MICIN1L/R, MICIN2L/R, MICIN3L/R input circuit](image)

MICIN1L/R, MICIN2L/R and MICIN3L/R share J2/J3. JP8 (LIN_SEL) and JP9 (RIN_SEL) select each path.

1-2) AUXINL/R input circuit.

![Figure 12. AUXINL/R input circuit](image)

1-3) BEEPIN input circuit

![Figure 13. BEEPIN input circuit](image)
2) Output Circuits

2-1) LOUT/ROUT output circuit

![Diagram of LOUT/ROUT output circuit]

Figure 14. LOUT/ROUT output circuit

2-2) HPL/HPR output circuit

![Diagram of HPL/HPR output circuit]

Figure 15. HPL/HPR output circuit

2-3) Speaker/LINEB output circuit

![Diagram of Speaker/LINEB output circuit]

Figure 16. Speaker/LINEB output circuit

When you evaluate it as the Speaker output, please use R64. In addition, please use J10 (LINEB) when you evaluate it as the LINEB output.

* AKM assumes no responsibility for the trouble when using the above circuit examples.
Evaluation Board and Control Soft Settings

1. Set an evaluation board properly.
2. Connect a PC and an evaluation board.
3. The USB control is recognized as HID (Human Interface Device) on the PC.
   It is not necessary to install a new driver.
4. Start up the control program. (Note 7)

Note 7. The AK4695 should be reset by the PDN pin after the power supplies are applied.
         After that, “Dummy Command” should be executed.

5. Proceed evaluation by following the process below.

Figure 17. Window of Control Soft
**Operation Overview**

Function, register map and testing tool can be controlled by this control soft. These controls are selected by upper tabs.

Buttons which are frequently used such as register initializing button “Write Default”, are located outside of the switching tab window. Refer to the “Dialog Boxes” for details of each dialog box setting.

1. [Port Reset]: Click this button after the control soft starts up.
2. [Write Default]: Initializes Registers
   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]: Saves current register settings to a file.
6. [Load]: Executes data write from a saved file.
7. [All Req Write]: Opens “All Req Write” dialog box.
8. [Data R/W]: Opens “Data R/W” dialog box
9. [Sequence]: Opens “Sequence” dialog box.
10. [Sequence(File)]: Opens “Sequence(File)” dialog box.
11. [Read]: Reads current register settings and displays on to the register area (on the right of the main window).
    This is different from [All Read] button, it does not reflect to a register map, only displaying register settings in hexadecimal.
12. [Dummy Command]: The dummy command is written (Note 8).

Note 8. **The AK4695 should be reset by the PDN pin after the power supplies are applied. After that, “Dummy Command” should be executed.**
Tab Functions (Note 9)

1. [Function]: Function control

This tab is for function.

Note 9. The AK4695 should be reset by the PDN pin after the power supplies are applied. After that, “Dummy Command” should be executed.

![Figure 18. Window of [ Function ]](image)

- [System Clock Audio I/F]: Open the setting dialog boxes of the "System Clock" and "Audio I/F".
- [PM Recording]: Open the setting dialog boxes of the “microphone/line input”, “ADC” and “power management of VCOM”.
- [MIC Input Setting]: Open the setting dialog boxes of the “input selector”, “MIC gain control” and “sensitivity adjustment” of microphone.
- [Digital Path Setting]: Open the setting dialog boxes of the digital path.
- [Digital Filter Setting]: Open the setting dialog boxes of the “Programmable Digital Filter”.
- [BEEP Setting]: Open the setting dialog boxes of the “BEEP output”.

[AKD4695-A]

[KM110103]
[DACA Setting] : Open the setting dialog boxes of the “DACA” and “line output”.
[DACB Setting] : Open the setting dialog boxes of the “DACB”, “headphone amplifier” and “speaker amplifier”.
[DRC Setting] : Open the setting dialog boxes of the “DRC”.
[ALC Setting] : Open the setting dialog boxes of the “ALC”.
2. [REG]: Register Map

This tab is for a register writing and reading.

Each bit on the register map is a push-button switch. Button Down indicates “H” or “1” and the bit name is in red (when read only it is in deep red). Button Up indicates “L” or “0” and the bit name is in blue (when read only it is in gray).

Gray-out registers are Read only registers. They cannot be controlled.

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

Figure 19. Window of [REG]
2-1. [Write]: Data Writing Dialog

It is for when changing two or more bits on the same address at the same time. Click [Write] button located on the right of the each corresponded address for a pop-up dialog box. When the checkbox is checked, the data will be “H” or “1”. When the checkbox is not checked, the data will be “L” or “0”. Click [OK] to write setting values to the registers, or click [Cancel] to cancel this setting.

![Register Set Window](image)

Figure 20. Window of [Register Set]

2-2. [Read]: Data Read

Click [Read] button located on the right of the each corresponded address to execute a register read. After register reading, the display will be updated regarding to the register status. Button Down indicates “H” or “1” and the bit name is in red (when read only it is in deep red). Button Up indicates “L” or “0” and the bit name is in blue (when read only it is in gray). Please be aware that button statuses will be changed by a Read command.
Dialog Boxes

1. [Save]: [Save Address of Register] dialog box

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

![Save Address of Register dialog box]

- [All Address] Checkbox: When checkbox is checked, all register address setting is saved.
- [Start Address] Box: When [All Address] checkbox is not checked, start register address is inputted in hexadecimal numbers.
- [End Address] Box: When [All Address] checkbox is not checked, end register address is inputted in hexadecimal numbers.
- [OK]: Saves a register setting.
- [Cancel]: Stop the process.
2. [All Req Write]: All Reg Write dialog box

Click [All Reg Write] button in the main window to open register setting files. Register setting files saved by [SAVE] button can be applied.

![All Register Write dialog box]

- Operating Suggestions -

1. Those files saved by [Save] button and opened by [Open] button on the right of the dialog “*.mar” should be stored in the same folder.
2. When register settings are changed by [Save] button in the main window, re-read the file to reflect new register settings.
3. [Data R/W]: Data R/W Dialog Box

Click the [Data R/W] button in the main window for data read/write dialog box. Data write is available to specified address.

![Figure 23: Window of [Data R/W]](image)

- **Address Box**: Input data address in hexadecimal numbers for data writing.
- **Data Box**: Input data in hexadecimal numbers.
- **Mask Box**: Input masks data in hexadecimal numbers. This is “AND” processed input data.
- **Write**: Writes the data generated from Data and Mask values to the address specified by “Address” box (Note 10).
- **Read**: Reads data from the address specified by “Address” box (Note 10). The result will be shown in the Read Data Box in hexadecimal numbers.
- **Close**: Closes the dialog box and finishes the process. Data writing can be cancelled by this button instead of executing a write command.

Note 10. The register map will be updated after executing [Write] or [Read] commands.
4. [Sequence]: Sequence Dialog Box

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

![Sequence Dialog Box]

Figure 24. Window of [Sequence]

~ Sequence Setting ~

Set register sequence by following process bellow.

1. Select a command

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

   < Select Pull-down menu >
   - No_use : Not using this address
   - Register : Register writing
   - Reg(Mask) : Register writing (Masked)
   - Interval : Taking an interval
   - Stop : Pausing the sequence
   - End : Finishing the sequence
2. Input sequence

[Address] : Data address
[Data] : Writing data
[Mask] : Mask

[Data] box data is ANDed with [Mask] box data. This is the actual writing 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.

[Intervall] : 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~

The function of Control Button is shown below.

[DEL] : Check step is deleted.
[INS] : Insert before checked step
[Start Step]Select : The selection of start step
   No.1 Step : Executes from step No.1
   Checked Step : Executes from checked step
[Start] : Executes the sequence
[Stop] : Stop the sequence
[Help] : Opens a help window
[Save] : Saves sequence settings as a file. The file name is “*.aks”.
[Open] : Opens a sequence setting file “*.aks”.
[Close] : Closes the dialog box and finishes the process.

~ Stop of the sequence~

When “Stop” is selected in the sequence, the process is paused and it starts again when [Start] button is clicked.
Restarting step number is shown in the “Start Step” box. When finishing the process at the end of sequence,
“Start Step” will return to “1”.

The sequence can be started from any step by writing the step number to the “Start Step” box.
Write “1” to the “Start Step” box and click [Start] button, when restarting the process from the beginning.
5. [Sequence(File)]: Sequence Setting File Dialog Box

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

![Sequence by *.aks file](image)

Figure 25. Window of [Sequence(File)]

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

![akdctr1](image)

Figure 26. Window of [Sequence Pause]
6. [System Clock Audio I/F]: System clock and Audio I/F Setting Dialog Box

When [System Clock Audio I/F] button is clicked, the window as shown in Figure 27 opens. On this window can set the system clock and audio I/F.

This setting is linked with register map.

Refer to the datasheet for register settings of the AK4695.

![System Clock Audio I/F](Figure 27. Window of [System Clock Audio I/F ]
7. [PM Recording]: PM Recording Setting Dialog Box

When [PM Recording] button is clicked, the window as shown in Figure 28 opens. On this window can set the microphone/line input, ADC and power management of VCOM. This setting is linked with register map. Refer to the datasheet for register settings of the AK4695.

![Power Management (Rec)](image)

Figure 28. Window of [PM Recording]
8. [MIC Input Setting]: MIC Input Setting Dialog Box

When [MIC Input Setting] button is clicked, the window as shown in Figure 29 opens. On this window can set the input selector, MIC gain control and MIC sensitivity adjustment. This setting is linked with register map. Refer to the datasheet for register settings of the AK4695.

Figure 29. Window of [MIC Input Setting ]
Volume Control by Slider Menu

The volume can also be changed by writing a value in a dialog box. The slide bar is moved to the value that written in the dialog box. The up and down arrow keys to mouse or keyboard to adjust the settings.

Figure 30. Volume Slider
9. [Digital Path Setting]: Digital Path Setting Dialog Box

When [Digital Path Setting] button is clicked, the window as shown in Figure 31 opens. On this window can set the digital path setting. This setting is linked with register map. Refer to the datasheet for register settings of the AK4695.

<table>
<thead>
<tr>
<th>Digital Path</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Select input signal to FL0/1 (PFSEL bit)</td>
<td></td>
</tr>
<tr>
<td><strong>ADC Output</strong></td>
<td><strong>SDTI Input</strong></td>
</tr>
<tr>
<td>Select output signal from SDTOOM (PFSDO bit)</td>
<td></td>
</tr>
<tr>
<td><strong>ADC Output</strong></td>
<td><strong>Programmable Filter Output</strong></td>
</tr>
<tr>
<td>Select input signal to DAC and DRC (DASEL1-0)</td>
<td></td>
</tr>
<tr>
<td><strong>SDTI (00)</strong></td>
<td></td>
</tr>
<tr>
<td>Select input signal to DACA(DRCENA bit)</td>
<td></td>
</tr>
<tr>
<td><strong>Selected by DASEL1-0 bits</strong></td>
<td><strong>DRC Output</strong></td>
</tr>
<tr>
<td>Select input signal to DACB(DRCENB bit)</td>
<td></td>
</tr>
<tr>
<td><strong>Selected by DASEL1-0 bits</strong></td>
<td><strong>DRC Output</strong></td>
</tr>
<tr>
<td>Select input signal to DACB(DACBS1-0 bit)</td>
<td></td>
</tr>
<tr>
<td><strong>DACB Loh : Loh / DACB Rch : Rch</strong></td>
<td></td>
</tr>
</tbody>
</table>

Figure 31. Window of [Digital Path Setting]
10. [Digital Filter Setting]: Digital Filter Setting Dialog Box

When [Digital Filter Setting] button is clicked, the window as shown in Figure 32 opens. This window can set the digital filter setting. This setting is linked with register map. Refer to the datasheet for register settings of the AK4695.

![Digital Filter Setting Dialog Box](image)

**Figure 32. Window of [Filter Setting]**

- **[Register Setting]**: [Register Setting for Filter] dialog box is popped up. Executes coefficients are written.
- **[F Response]**: [Filter Plot] dialog is displayed. Executes coefficients are written.
- **[Coefficient Write]**: Executes all filter calculations, and coefficients are written.
- **[Reg Map to Fc/Plot] Checkbox**: When checkbox is checked, display each parameter after the back calculation of coefficients. HPL and LPF gain should be “1.0”. When checkbox is checked, gain of the HPF and LPF are always calculated at "1.0".
- **[Close]**: Closing the dialog box and finish the process.
10-1. Parameter Setting

Please set a parameter of each Filter.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Function</th>
<th>Setting Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling Rate</td>
<td>Sampling frequency (fs)</td>
<td>4000Hz ≤ fs ≤ 48000Hz</td>
</tr>
<tr>
<td>HPF</td>
<td>High pass filter cut off frequency</td>
<td>fs/10000 ≤ Cut Off Frequency ≤ (0.497 * fs)</td>
</tr>
<tr>
<td>LPF</td>
<td>Low pass filter cut off frequency</td>
<td>fs/20 ≤ Cut Off Frequency ≤ (0.497 * fs)</td>
</tr>
<tr>
<td>2 Band Equalizer</td>
<td>EQ1-2 Center Frequency</td>
<td>(0.0017 * fs) ≤ Center Frequency &lt; (0.497 * fs)</td>
</tr>
<tr>
<td>EQ1-2 Band Width</td>
<td>EQ1-2 Band Width (Note 11)</td>
<td>10Hz ≤ Band Width &lt; (0.497 * fs)</td>
</tr>
<tr>
<td>EQ1-2 Gain</td>
<td>EQ1-2 Gain (Note 12)</td>
<td>-1 ≤ Gain &lt; 3</td>
</tr>
</tbody>
</table>

Table 6. Parameter setting of [Filter Setting]

Note 11. A gain difference is a bandwidth of 3dB from center frequency.

Note 12. When a gain is “-1”, EQ becomes a notch filter.

Please set ON/OFF of Filter with a check button. When checked it, Filter becomes ON.

![Filter ON/OFF Control](image)

Figure 33. Filter ON/OFF Control

When PMPFILx bit and PMDSP bit want to "0", please do in [Digital Filter Setting] dialog box.
10-2. [Register Setting]: Register Setting for Filter Dialog Box

When [Register Setting] button is clicked, the window as shown in Figure 34 opens. When a value out of a setting range is set, error message is displayed, and a calculation of register setting is not carried out.

![Register Setting for Filter](image)

Figure 34. Window of [Register Setting for Filter]

Followings are the cases when a register set value is updated.

1. When [Coefficient Write] button was pushed.
2. When [Register Setting] button was pushed.
3. When [Frequency Response] button was pushed.
4. When [UpDate] button was pushed on a frequency characteristic indication window.
10-3. [F Response]: Filter Plot Dialog Box

A frequency characteristic is displayed when push a [F Response] button. Then, a register set point is also updated.
Change Frequency Range, and indication of a frequency characteristic is updated when push a [UpDate] button.

Figure 35. Window of [F Response]

- [Channel]: The channel of frequency display is specified.
- [Frequency Range]: The width of the frequency display is specified.
- [Update]: It draws in the graph again.
- [Gain/Phase]: Switch of “Gain/Phase” display.
- [Log View]: Switch of “Linear/Log” display.
- [Close]: Closing the dialog box and finish the process.

~ Adjustment of vertical range ~

- [Y-axis Ref]: Display setting of center value.
- [Vertical slider]: Movement of vertical display.
- [Horizontal slider]: Adjustment of the horizontal display.
  (The left side reduces, and the right side expands.)
10-4. 2-BandEQ operation on Filter Plot screen

When EQ is turning on, a green number is displayed on the Filter Plot dialog box. This number shows the setting of the center frequency and the gain of each EQ. The number under the display is operated with the mouse, and it is possible to set the filter characteristic on this screen. The center frequency and the gain setting are changed by moving the mouse while left-clicking. The setting of the bandwidth is changed by moving the mouse while right-clicking.

After operating the mouse, the value of the center frequency and the gain is updated.

Figure 36. Filter Setting (Left-clicking operation)

After operating the mouse, the value of the bandwidth is updated.

Figure 37. Filter Setting (Right-clicking operation)
11. [BEEP Setting]: BEEP Setting Dialog Box

When [BEEP Setting] button is clicked, the window as shown in Figure 38 opens. On this window can set the beep output setting. This setting is linked with register map. Refer to the datasheet for register settings of the AK4695.

![BEEP Setting](image)

Figure 38. Window of [BEEP Setting]
12. [DACA Setting]: DACA Setting Dialog Box

When [DACA Setting] button is clicked, the window as shown in Figure 39 opens. On this window can set the DACA and line output setting. This setting is linked with register map. Refer to the datasheet for register settings of the AK4695.

![DACA Setting Dialog Box](image)

Figure 39. Window of [DACA Setting]
13. **[DACB Setting]: DACB Setting Dialog Box**

When [DACB Setting] button is clicked, the window as shown in Figure 40 opens. On this window can set the DACB and headphone/speaker amplifier output setting. This setting is linked with register map. Refer to the datasheet for register settings of the AK4695.

![Figure 40. Window of [DACB Setting]](image)

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[AKD4695-A]
14. **[DRC Setting]**: DRC Function Dialog Box

When [DRC Setting] button is clicked, the window as shown in Figure 41 opens.

On this window can set the DRC setting.

Refer to the datasheet for register settings of the AK4695.

![DRC Function Dialog Box](image)

**Figure 41. Window of [DRC Setting]**

- **[F Response]**: [DRC Filter Plot] dialog is displayed. Executes all filter calculations, but filter coefficients are not written.
- **[DRC Curve]**: [DRC Curve] dialog is displayed.
- **[Write]**: Executes all filter calculations, and coefficients are written.
- **[Close]**: Closes the dialog box and ends process.
14-1. Parameter Setting

Please set a parameter of each Filter.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Function</th>
<th>Setting Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling Rate</td>
<td>Sampling frequency (fs)</td>
<td>8000Hz ≤ fs ≤ 48000Hz</td>
</tr>
<tr>
<td><strong>Noise Suppression</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPF</td>
<td>Low pass filter cut off frequency</td>
<td>fs/10000 ≤ Cut Off Frequency ≤ (0.497 * fs)</td>
</tr>
<tr>
<td>HPF</td>
<td>High pass filter cut off frequency</td>
<td>fs/10000 ≤ Cut Off Frequency ≤ (0.497 * fs)</td>
</tr>
<tr>
<td><strong>Dynamic Volume Control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Frequency Range</td>
<td>Low pass filter cut off frequency</td>
<td>fs/10000 ≤ Cut Off Frequency ≤ (0.497 * fs)</td>
</tr>
<tr>
<td>Middle Frequency Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPF</td>
<td>Low pass filter cut off frequency</td>
<td>fs/10000 ≤ Cut Off Frequency ≤ (0.497 * fs)</td>
</tr>
<tr>
<td>HPF</td>
<td>High pass filter cut off frequency</td>
<td>fs/10000 ≤ Cut Off Frequency ≤ (0.497 * fs)</td>
</tr>
<tr>
<td>High Frequency Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPF</td>
<td>High pass filter cut off frequency</td>
<td>fs/10000 ≤ Cut Off Frequency ≤ (0.497 * fs)</td>
</tr>
</tbody>
</table>

Table 7. Parameter setting of [DRC Function]

Please set ON/OFF of Filter with “NSLPF” and “NSHPF” check button. When checked it, Filter becomes ON.

Please set ON/OFF of Dynamic Volume with a check button. When checked it, Dynamic Volume function becomes ON.

![Filter ON/OFF setting button](image)

Figure 42. Filter ON/OFF setting button
14-2. [F Response]: Filter Plot Dialog Box

A frequency characteristic is displayed when push a [F Response] button. Then, a register set point is also updated.
Change indication of a frequency characteristic is updated when push a [UpDate] button.

![Filter Plot Dialog Box](image)

**Figure 43. A frequency characteristic indication result**

- **[Frequency Range]**: The width of the frequency display is specified.
- **[Update]**: It draws in the graph again.
- **[Gain/Phase]**: Switch of “Gain/Phase” display.
- **[Close]**: Closing the dialog box and finish the process.
14-3. Filter Setting

The filter setting can be executed by checking the “NSLPF”, “NSHPF” or “DVLC Enable” button. Band width can be adjusted in the operation of Center Frequency in the operation of the left-click and Filter selecting in the [DRC Setting] window.

After operating the mouse, the value of the cut-off frequency is updated.

Figure 44. Filter Setting (Left-clicking operation)
14-4. Noise Suppression

Noise Suppression Control is displayed when “NS” button is checked after [DRV Curve] button is pushed. Then, a register set point is also updated.

Noise Suppression Threshold Low Level and Reference Value can be adjusted by the left-click.

Figure 45. Noise Suppression Setting
14-5. Dynamic Volume Control

Dynamic Volume is displayed when “LOW”, “MIDDLE” or “HIGH” buttons in “DVLC” is checked after [DRV Curve] button is pushed. Then, a register set point is also updated.

Dynamic Volume Control Points can be adjusted by the left-click.

Figure 46. DVLC Curve Setting
14-6. Dynamic Range Control

Dynamic Range Control is displayed when “DRC” button is checked after [DRV Curve] button is pushed. Then, a register set point is also updated.

Dynamic Range Compression Level can be adjusted by the left-click.

Figure 47. Dynamic Range Control Setting
15. [ALC Setting]: ALC Setting Dialog Box

When [ALC Setting] button is clicked, the window as shown in Figure 48 opens. On this window can set the Auto Level Control setting. This setting is linked with register map. Refer to the datasheet for register settings of the AK4695.

![ALC Setting Dialog Box]

When PMPFILx bit and PMDSP bit want to "0", please do in [Digital Filter Setting] dialog box.
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