

AUDIO PROCESSOR with Subwoofer Output

■ GENERAL DESCRIPTION

The **NJW1136** is a sound processor with subwoofer output includes all of functions processing audio signal for TV, such as tone control, balance, volume, mute, and AGC functions.

Also the **NJW1136** includes the LPF for subwoofer output and bass boost function.

The original surround system reproduces natural surround sound and clear vocal orientation.

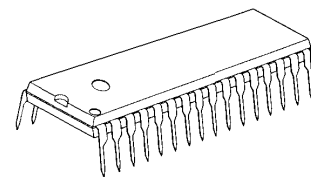
All of internal status and variables are controlled by I²C BUS interface.

■ PACKAGE OUTLINE



NJW1136GL1

NJW1136L

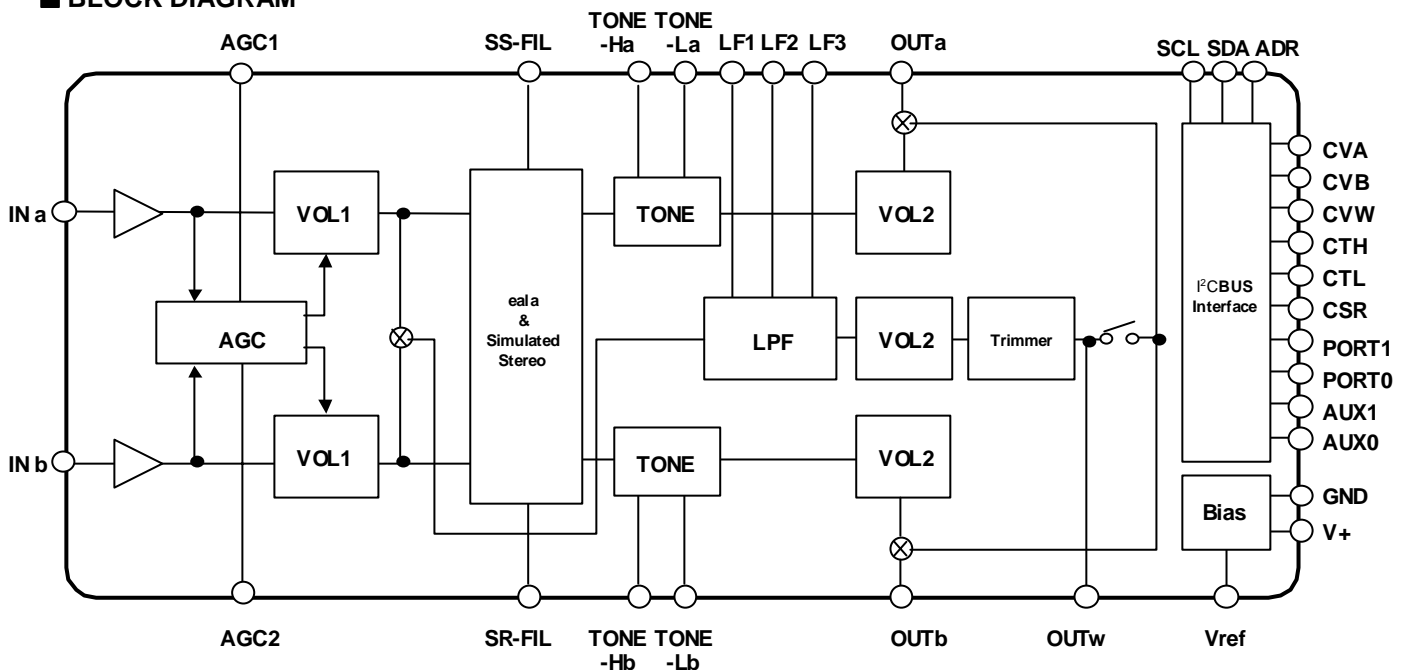


NJW1136D

■ FEATURES

- Operating Voltage 8 to 13V
- 3ch Output(Lch, Rch, Subwoofer ch) / 2ch Output(Lch, Rch)
- LPF Filter (Adjustable cut off frequency by external parts)
- AGC Circuit (It reduces volume difference among input sources.)
Adjustable AGC boost level by external parts and AGC compression level by I²C BUS
- eala(NJRC Original Surround System)
- Simulated Stereo
- I²C BUS Interface
- Bi-CMOS Technology
- Package Outline SOP32, DIP32

■ BLOCK DIAGRAM



■PIN CONFIGURATION



| No. | Symbol | Function | No. | Symbol | Function |
|-----|---------------------|---|-----|---------|--|
| 1 | INa | Ach input terminal | 17 | V+ | Supply voltage terminal |
| 2 | SR-FIL | Surround filter terminal | 18 | Vref | Reference voltage terminal |
| 3 | SS-FIL | Simulated stereo filter terminal | 19 | CSR | DAC output terminal for surround control |
| 4 | TONE-Ha | Ach tone control (treble) filter terminal | 20 | CTL | DAC output terminal for tone control (bass) |
| 5 | TONE-La | Ach tone control (bass) filter terminal | 21 | CTH | DAC output terminal for tone control (treble) |
| 6 | OUTw | Subwoofer output terminal | 22 | CVW | Bch DAC output terminal for LPF trimmer |
| 7 | OUTa | Ach output terminal | 23 | CVB | Bch DAC output terminal for volume and balance |
| 8 | AGC1 | AGC attack and recovery time setting terminal | 24 | CVA | Ach DAC output terminal for volume and balance |
| 9 | AUX0 ^(*) | Auxiliary 3 values voltage output terminal (0.0V, 2.5V, 5V) | 25 | AGC2 | AGC boost level setting terminal |
| 10 | AUX1 | Auxiliary 2 values voltage output terminal (0.0V, V+) | 26 | OUTb | Bch output terminal |
| 11 | PORT0 | Logic input terminal | 27 | TONE-Lb | Bch tone control (bass) filter terminal |
| 12 | PORT1 | Logic input terminal | 28 | TONE-Hb | Bch tone control (treble) filter terminal |
| 13 | ADR | Slave address setting terminal | 29 | LF3 | LPF filter3 terminal |
| 14 | SDA | I ² C data terminal | 30 | LF2 | LPF filter2 terminal |
| 15 | SCL | I ² C clock terminal | 31 | LF1 | LPF filter1 terminal |
| 16 | GND | Ground terminal | 32 | INb | Bch input terminal |

^(*) The AUX0 terminal should be connected via the protection resistance to 5V device.

■ ABSOLUTE MAXIMUM RATING (Ta=25°C)

| PARAMETER | SYMBOL | RATING | UNIT |
|-----------------------------|----------------|-------------|------|
| Supply Voltage | V ⁺ | 15 | V |
| Power Dissipation | P _D | 700 | mW |
| Operating Temperature Range | Topr | -20 to +75 | °C |
| Storage Temperature Range | Tstg | -40 to +125 | °C |

■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, V+=9V, Rg=600Ω, RL=47kΩ, Vin=100mVrms/1kHz unless otherwise specified)

| PARAMETER | SYMBOL | Condition | Input | | | Output | MIN. | TYP. | MAX. | UNIT |
|---------------------------|-------------------|--------------------------------------|-----------------|-----------------|------|--------|---------------|---------------|----------------|------|
| | | | INa | INb | | | | | | |
| | | | | | | | | | | |
| Operating Voltage | V ⁺ | | - | - | - | 8.0 | 9.0 | 13.0 | V | |
| Supply Current1 | I _{CC1} | No Signal | - | - | - | - | 13 | 25 | mA | |
| Supply Current2 | I _{CC2} | No Signal, V+=12V | - | - | - | - | - | - | - | |
| Reference Voltage | V _{REF} | No Signal | - | - | - | 4.0 | 4.5 | 5.0 | V | |
| Maximum Input Voltage1 | V _{IM1} | VOL=-20dB, THD=1% | V _{in} | - | OUTa | 2.8 | 3.0 | - | Vrms | |
| | | | - | V _{in} | OUTb | | | | | |
| Maximum Input Voltage2 | V _{IM2} | VOL=-20dB, THD=1% V+=12V | V _{in} | - | OUTa | - | 4.0 | - | Vrms | |
| | | | - | V _{in} | OUTb | | | | | |
| Maximum Output Voltage1 | V _{OM1} | VOL=0dB, THD=1% | V _{in} | - | OUTa | - | 2.5 | - | Vrms | |
| | | | - | V _{in} | OUTb | | | | | |
| Maximum Output Voltage2 | V _{OM2} | VOL=0dB, THD=1% V+=12V | V _{in} | - | OUTa | - | 3.5 | - | Vrms | |
| | | | - | V _{in} | OUTb | | | | | |
| Channel Balance | G _{CB} | VOL=0dB | - | - | - | -1.5 | 0.0 | 1.5 | dB | |
| Balance Boost A | BA _{BST} | CHS="0", BAL="111111" | V _{in} | V _{in} | OUTa | -2.0 | 0.0 | 2.0 | dB | |
| Balance Cut A | BA _{CUT} | CHS="1", BAL="111111" Vin = 1Vrms | V _{in} | V _{in} | OUTa | - | - | -70 | dB | |
| Balance Boost B | BB _{BST} | CHS="1", BAL="111111" | V _{in} | V _{in} | OUTb | -2.0 | 0.0 | 2.0 | dB | |
| Balance Cut B | BB _{CUT} | CHS="0", BAL="111111" Vin = 1Vrms | V _{in} | V _{in} | OUTb | - | - | -70 | dB | |
| Trimmer Boost | TR _{BST} | VOL=0dB TRIM = +18dB | V _{in} | V _{in} | OUTw | 16.0 | 18.0 | 20.0 | dB | |
| Trimmer Cut | TR _{CUT} | VOL=0dB TRIM = -44dB | V _{in} | V _{in} | OUTw | -49.0 | -44.0 | -39.0 | dB | |
| Total Harmonic Distortion | THD | Vo=0.5Vrms, BW=400Hz to 30kHz | V _{in} | - | OUTa | - | - | 0.5 | % | |
| | | | - | V _{in} | OUTb | | | | | |
| Maximum Gain | G _{VMAX} | VOL=0dB | V _{in} | - | OUTa | -2.0 | 0.0 | 2.0 | dB | |
| | | | - | V _{in} | OUTb | | | | | |
| Minimum Gain | G _{VMIN} | VOL=MUTE Vin=1Vrms | V _{in} | - | OUTa | - | - | -70 | dB | |
| | | | - | V _{in} | OUTb | | | | | |
| Channel Separation | CS | Vin=1Vrms BW=400Hz to 30kHz | V _{in} | - | OUTb | - | - | -70 | dB | |
| | | | - | V _{in} | OUTa | | | | | |
| Output Noise 1 | V _{NO1} | VOL=0dB BW=400Hz to 30kHz | - | - | - | - | -90 (31.6) | -85 (56.2) | dBV (μVrms) | |
| Output Noise 2 | V _{NO2} | VOL=MUTE BW=400Hz to 30kHz | - | - | - | - | -106 (5.0) | -96 (15.8) | dBV (μVrms) | |

BW : Band Width

■ ELECTRICAL CHARACTERISTICS

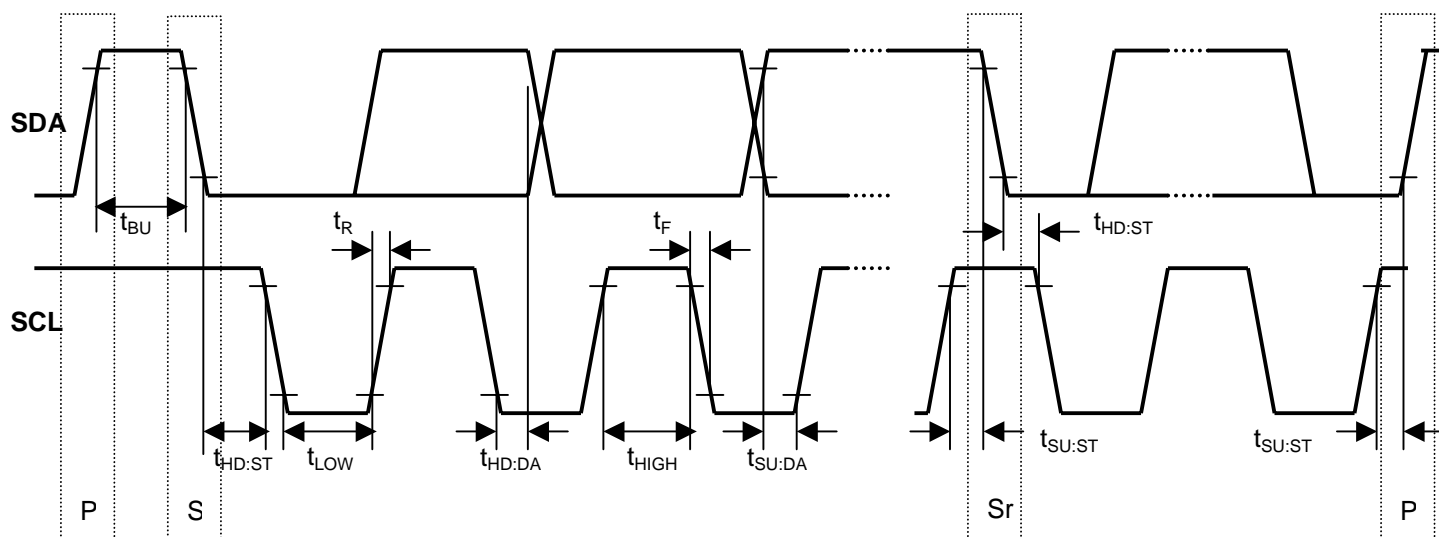
(Ta=25°C, V+=9V, Rg=600Ω, RL=47kΩ, Vin=100mVrms/1kHz unless otherwise specified)

| PARAMETER | SYMBOL | Condition | Input | | | Output | MIN. | TYP. | MAX. | UNIT |
|-----------------------|----------------------|--|-----------------|-----------------|--------|--------|-------|-------|------|------|
| | | | Input | | Output | | | | | |
| | | | INa | INb | | | | | | |
| ◆TONE | | | | | | | | | | |
| High Frequency Boost | HF _{BST} | BCT="1" TREB=+15dB, f=10kHz | V _{in} | - | OUTa | 12.5 | 15.0 | 17.5 | dB | |
| | | | - | V _{in} | OUTb | | | | | |
| High Frequency Flat | HF _{FLT} | TREB=0, f=10kHz | V _{in} | - | OUTa | -2.0 | 0.0 | 2.0 | dB | |
| | | | - | V _{in} | OUTb | | | | | |
| High Frequency Cut | HF _{CUT} | BCT="0" TREB=-15dB, f=10kHz | V _{in} | - | OUTa | -17.5 | -15.0 | -12.5 | dB | |
| | | | - | V _{in} | OUTb | | | | | |
| Low Frequency Boost | LF _{BST} | BCB="1" BASS=+15dB, f=100Hz | V _{in} | - | OUTa | 12.5 | 15.0 | 17.5 | dB | |
| | | | - | V _{in} | OUTb | | | | | |
| Low Frequency Flat | LF _{FLT} | BASS=0, f=100Hz | V _{in} | - | OUTa | -2.0 | 0.0 | 2.0 | dB | |
| | | | - | V _{in} | OUTb | | | | | |
| Low Frequency Cut | LF _{CUT} | BCB="0" BASS=-15dB, f=100Hz | V _{in} | - | OUTa | -17.5 | -15.0 | -12.5 | dB | |
| | | | - | V _{in} | OUTb | | | | | |
| ◆AGC | | | | | | | | | | |
| AGC Boost | AGC _{BST} | Vin=50mVrms, f=1kHz AGC="1" | V _{in} | - | OUTa | 1.5 | 3.5 | 5.5 | dB | |
| | | | V _{in} | V _{in} | OUTb | | | | | |
| AGC Flat1 | AGC _{FLT1} | Vin=100mVrms, f=1kHz AGC="1", AGCL="00" | V _{in} | V _{in} | OUTa | -2.5 | 0.0 | 2.5 | dB | |
| | | | V _{in} | V _{in} | OUTb | | | | | |
| AGC Flat2 | AGC _{FLT2} | Vin=200mVrms, f=1kHz AGC="1", AGCL="01" | V _{in} | V _{in} | OUTa | -2.5 | 0.0 | 2.5 | dB | |
| | | | V _{in} | V _{in} | OUTb | | | | | |
| AGC Flat3 | AGC _{FLT3} | Vin=300mVrms, f=1kHz AGC="1", AGCL="10" | V _{in} | V _{in} | OUTa | -2.5 | 0.0 | 2.5 | dB | |
| | | | V _{in} | V _{in} | OUTb | | | | | |
| AGC Flat4 | AGC _{FLT4} | Vin=400mVrms, f=1kHz AGC="1", AGCL="11" | V _{in} | V _{in} | OUTa | -2.5 | 0.0 | 2.5 | dB | |
| | | | V _{in} | V _{in} | OUTb | | | | | |
| AGC Cut | AGC _{CUT} | Vin=2Vrms, f=1kHz AGC="1" | V _{in} | V _{in} | OUTa | -14 | -10 | -6.0 | dB | |
| | | | V _{in} | V _{in} | OUTb | | | | | |
| ◆SURROUND | | | | | | | | | | |
| Surround Gain1 | SR _{GAIN1} | f=100Hz Surround Effect1 | V _{in} | - | OUTa | 6.3 | 8.3 | 10.3 | dB | |
| | | | - | V _{in} | OUTb | | | | | |
| Surround Gain2 | SR _{GAIN2} | f=100Hz Surround Effect1 | V _{in} | - | OUTb | 2.1 | 4.1 | 6.1 | dB | |
| | | | - | V _{in} | OUTa | | | | | |
| Surround Gain3 | SR _{GAIN3} | f=100 Hz Surround Effect2 | V _{in} | - | OUTa | 10.7 | 12.7 | 14.7 | dB | |
| | | | - | V _{in} | OUTb | | | | | |
| Surround Gain4 | SR _{GAIN 4} | f=100Hz Surround Effect2 | V _{in} | - | OUTb | 8.4 | 10.4 | 12.4 | dB | |
| | | | - | V _{in} | OUTa | | | | | |
| Simulated Stereo1 | SR _{SIM1} | f=1kHz, Simulated Stereo | V _{in} | V _{in} | OUTa | 1.0 | 3.0 | 5.0 | dB | |
| Simulated Stereo2 | SR _{SIM2} | f=1kHz, Simulated Stereo | V _{in} | V _{in} | OUTb | 1.0 | 3.0 | 5.0 | dB | |
| ◆PORT, AUX | | | | | | | | | | |
| PORT0,1 Input Voltage | V _{PTIN} | Input : High | - | - | - | 3.5 | - | - | V | |
| | | Input : Low | - | - | - | - | - | 1.0 | | |
| AUX0 Output Voltage | V _{AUX0} | Logic Output : High | - | - | - | 4.5 | - | 5.5 | V | |
| | | Logic Output : Mid | - | - | - | 2.0 | - | 3.0 | | |
| | | Logic Output : Low | - | - | - | 0 | - | 0.5 | | |
| AUX1 Output Voltage | V _{AUX1} | Logic Output : High | - | - | - | 3.5 | - | V+ | V | |
| | | Logic Output : Low | - | - | - | 0 | - | 0.5 | | |
| ADR Input Voltage | V _{ADR} | Input : High | - | - | - | 3.5 | - | - | V | |
| | | Input : Low | - | - | - | - | - | 1.0 | | |

■ I²C BUS BLOCK CHARACTERISTICS (SDA,SCL)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---------------------|------|------|------|------|
| High Level Input Voltage | V _{IH} | 3.0 | - | 5.0 | V |
| Low Level Input Voltage | V _{IL} | 0 | - | 1.5 | V |
| High Level Input Current | I _{IH} | - | - | 10 | μA |
| Low Level Input Current | I _{IL} | - | - | 10 | μA |
| Low Level Output Voltage (3mA at SDA pin) | V _{OL} | 0 | - | 0.4 | V |
| Maximum Output Current | I _{OL} | -3.0 | - | - | mA |
| Maximum Clock Frequency | f _{SCL} | 0 | - | 100 | kHz |
| Data Change Minimum Waiting Time | t _{BUF} | 4.7 | - | - | μs |
| Data Transfer Start Minimum Waiting Time | t _{HD:STA} | 4.0 | - | - | μs |
| Low Level Clock Pulse Width | t _{LOW} | 4.7 | - | - | μs |
| High Level Clock Pulse Width | T _{HIGH} | 4.0 | - | - | μs |
| Minimum Start Preparation Waiting Time | t _{SU:STA} | 4.7 | - | - | μs |
| Minimum Data Hold Time | t _{HD:DAT} | 5.0 | - | - | μs |
| Minimum Data Preparation Time | t _{SU:DAT} | 250 | - | - | ns |
| Rise Time | t _R | - | - | 1.0 | μs |
| Fall Time | t _F | - | - | 300 | ns |
| Minimum Stop Preparation Waiting Time | t _{SU:STO} | 4.7 | - | - | μs |

I²C BUS Load Condition: Pull up resistance 4kΩ (Connected to +5V)
Load capacitance 200pF (Connected to GND)



■TERMINAL DESCRIPTION

| No. | SYMBOL | FUNCTION | EQUIVALENT CIRCUIT | VOLTAGE |
|--------------|----------------------|---|--------------------|---------|
| 1 32 | INa INb | Ach input terminal Bch input terminal | | $V+/2$ |
| 6 7 26 | OUTw OUTa OUTb | Subwoofer output terminal Ach output terminal Bch output terminal | | $V+/2$ |
| 2 | SRFIL | Surround filter terminal | | $V+/2$ |
| 3 | SSFIL | Simulated stereo filter terminal | | $V+/2$ |
| 4 28 | TONE-Ha TONE-Hb | Treble(tone control) filter terminal | | $V+/2$ |

■TERMINAL DESCRIPTION

| No. | SYMBOL | FUNCTION | EQUIVALENT CIRCUIT | VOLTAGE |
|----------------|-----------------------|--|--------------------|-------------------|
| 5 27 | TONE-La TONE-Lb | Bass(tone control) filter terminal | | V+/2 |
| 8 | AGC1 | Capacitor connection terminal for AGC attack and recovery time setting | | 1.4V |
| 9 | AUX0 | Auxiliary 3 values voltage output terminal | | 0V, 2.5V, 5.0V |
| 10 | AUX1 | Auxiliary 2 values voltage output terminal (Open collector type output) | | 0V 3.5 to V+ |
| 11 12 13 | PORT0 PORT1 ADR | Logic input terminal Logic input terminal Slave address setting terminal (Don't apply over 5V to these terminals) | | - |

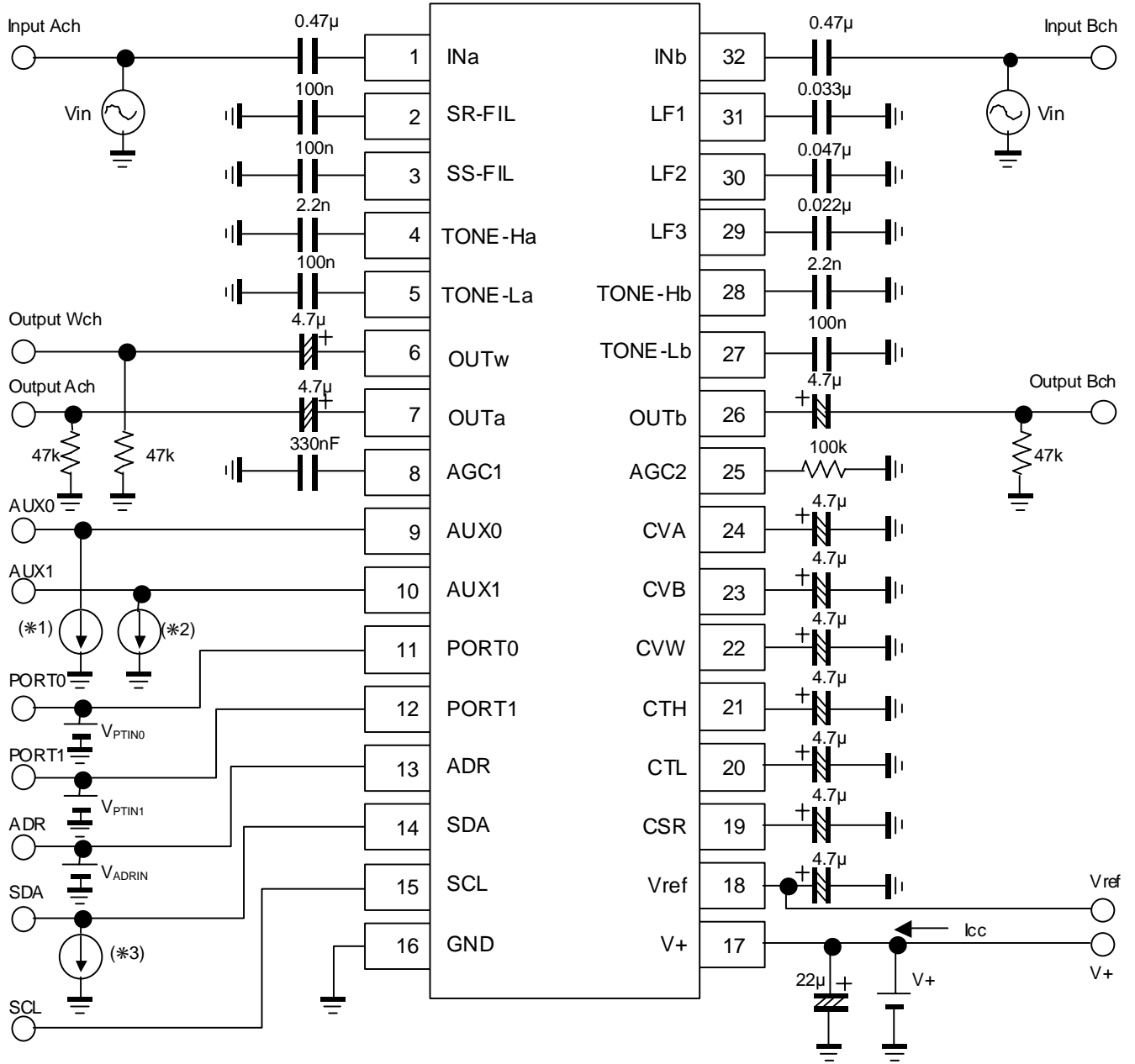
■TERMINAL DESCRIPTION

| No. | SYMBOL | FUNCTION | EQUIVALENT CIRCUIT | VOLTAGE |
|----------|-----------|--|--------------------|---------|
| 14 | SDA | I ² C data terminal | | - |
| 15 | SCL | I ² C clock terminal | | - |
| 16 17 | GND V+ | Ground terminal Supply voltage terminal | - | V+/2 |
| 18 | Vref | Reference voltage terminal | | V+/2 |
| 19 | CSR | DAC output for surround control terminal | | 0V |

■TERMINAL DESCRIPTION

| No. | SYMBOL | FUNCTION | EQUIVALENT CIRCUIT | VOLTAGE |
|----------------|-------------------|---|--------------------|-------------|
| 20 21 | CTL CTH | DAC output for tone control terminal | | $V+/2$ |
| 22 23 24 | CVW CVB CVA | DAC output terminal for trimmer control DAC output terminal for Bch volume control DAC output terminal for Ach volume control | | $V+/2$ |
| 25 | AGC2 | Resistance connection terminal for AGC boost level setting | | 0V |
| 29 30 | LF3 LF2 | LPF filter terminal | | $V+/2+0.7V$ |
| 31 | LF1 | LPF filter terminal | | $V+/2$ |

MEASUREMENT CIRCUIT



(*1)

| | |
|-------------|------------|
| V_{AUX0} | I_{AUX0} |
| Output High | +2mA |
| Output Low | -120μA |

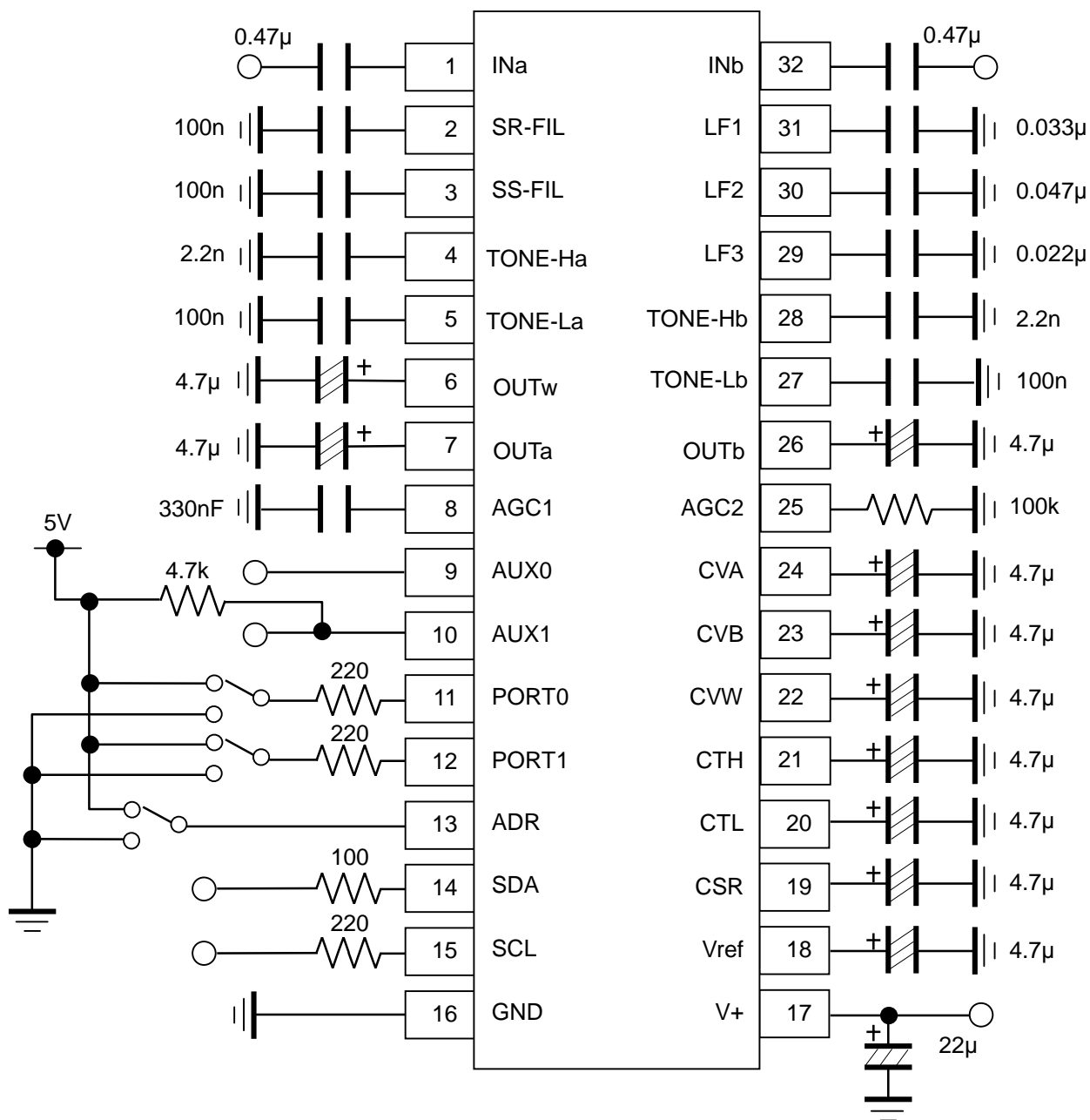
(*2)

| | |
|------------|------------|
| V_{AUX1} | I_{AUX1} |
| Output Low | -3mA |

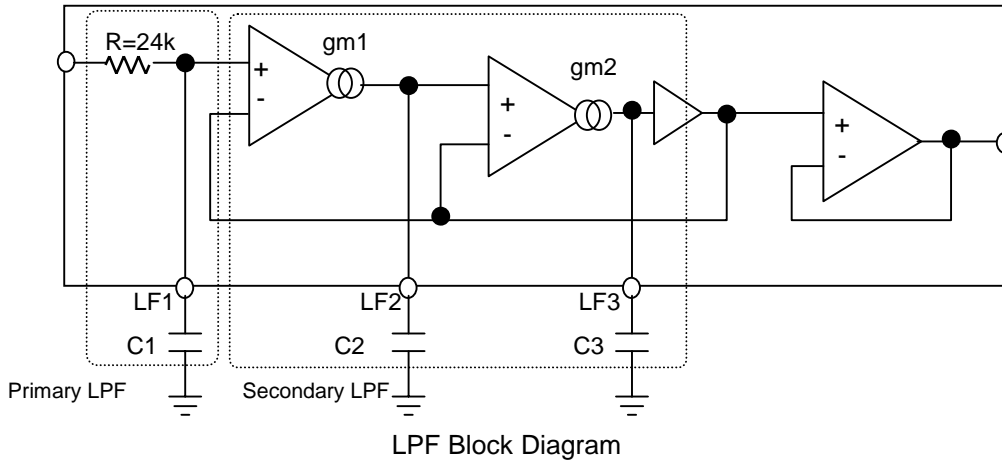
(*3)

| | |
|------------|----------|
| V_{OL} | I_{OL} |
| Output Low | -3mA |

APPLICATION CIRCUIT



LPF Characteristics



The **NJW1136** includes the LPF for subwoofer output and bass boost function. The LPF consists of primary and secondary LPF and it is enable to adjust “cut off frequency”, “Q” and “Roll off”. The expression of LPF characteristics is as follows.

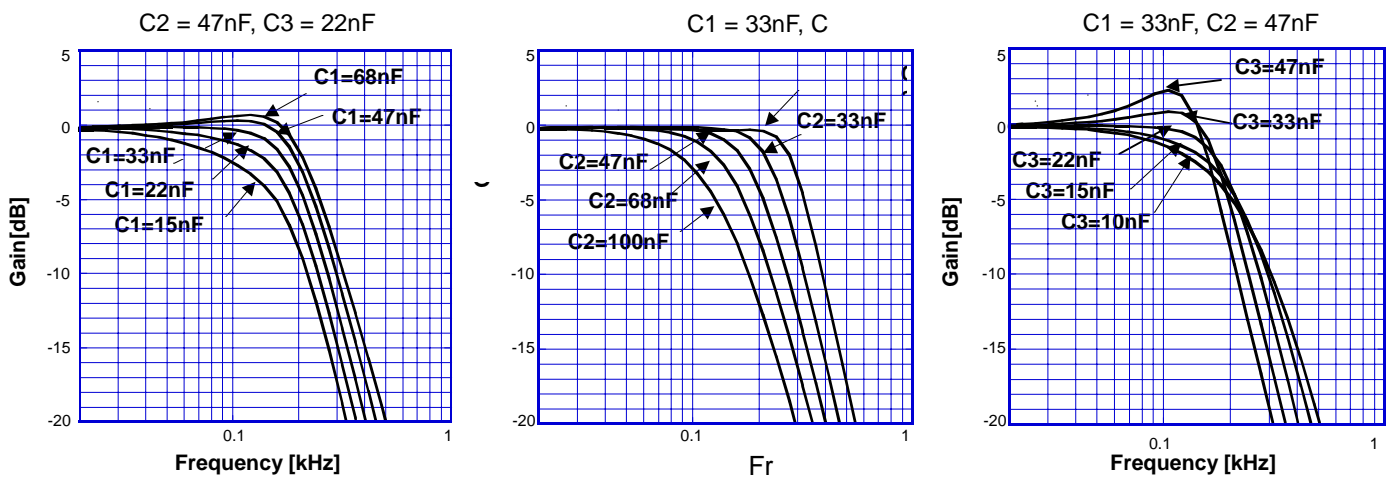
<Primary LPF>

$$f_{c1} = \frac{1}{2\pi * R * C1} = \frac{1}{2\pi * 24 * 10^3 * C1} \quad Q_1 = 0.5$$

<Secondary LPF>

$$f_{c2} = \frac{42.9 * 10^{-6}}{2\pi * \sqrt{C2 * C3}} \quad Q_2 = 1.46 * \sqrt{\frac{C3}{C2}}$$

<LPF Frequency Response>



■ DEFINITION OF I²C REGISTER

◆ I²C BUS FORMAT



S: Starting Term
A: Acknowledge Bit
P: Ending Term

◆ SLAVE ADDRESS

R/W : Set the Write Mode or Read Mode.

ADR : Set the Slave Address by "ADR" terminal.

| Slave Address | | | | | | | | Hex |
|-----------------------------------|---|---|---|---|---|-----|-----|-------|
| MSB | | | | | | | LSB | |
| 1 | 0 | 0 | 0 | 0 | 0 | ADR | R/W | - |
| ◆ R/W = 0 : Write Mode, ADR = 0/1 | | | | | | | | - |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80(h) |
| 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 82(h) |
| ◆ R/W = 1 : Read Mode, ADR = 0/1 | | | | | | | | - |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 81(h) |
| 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 83(h) |

◆ CONTROL REGISTER TABLE

The select address sets each function (Volume, Balance, Bass Boost Select, AGC, Surround, Tone Control, AUX).

The auto increment function cycles the select address as follows.

00H→01H→02H→03H→04H→05H→00H

<Write Mode>

| Select Address | BIT | | | | | | | |
|----------------|------|------|------|------|----|------|-----|------|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 00H | VOL | | | | | | | |
| 01H | CHS | BAL | | | | | | BBSW |
| 02H | TRIM | | | | | | | * |
| 03H | BCB | BASS | | | | | * | |
| 04H | BCT | TREB | | | | | * | |
| 05H | SUR | | AUX1 | AUX0 | | AGCL | AGC | |

* : Don't Care

<Read Mode>

| BIT | | | | | | | |
|-----|----|----|----|----|----|-------|-------|
| D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 1 | 1 | 1 | 1 | 1 | 1 | PORT1 | PORT0 |

•PORT1, PORT0 terminal setting

| D1/D0 | Remarks |
|-------|---|
| 0 | D1/D0 output "0" at PORT1/PORT0 terminal receive High signal "1" (more than 3.5V) |
| 1 | D1/D0 output "1" at PORT1/PORT0 terminal receive Low signal "0" (less than 1.0V) |

◆ CONTROL REGISTER DEFAULT VALUE

Control register default value is all "0".

| Select Address | BIT | | | | | | | |
|----------------|-----|----|----|----|----|----|----|----|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 00H | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01H | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02H | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03H | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04H | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05H | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

■ INSTRUCTION CODE

a) MASTER VOLUME SETTING

| Select Address | BIT | | | | | | | |
|----------------|-----|----|----|----|----|----|----|----|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 00H | VOL | | | | | | | |

•VOL Attenuation level : 0 to -80dB(0.33dB/step) , MUTE

The attenuator is consisted of both the VOL1(0.165dB/step)and VOL2(0.165dB/step) and is enable to adjust 0.33dB/step. The attenuation for both the VOL1and VOL2 are always synchronized to have the same attenuation levels for each other, and are not controllable independently for each other.

ex) VOL(-30dB) = VOL1(-15dB) + VOL2(-15dB)

b) BALANCE AND BASS BOOST FUNCTION SETTING

| Select Address | BIT | | | | | | | |
|----------------|-----|-----|----|----|----|----|----|------|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 01H | CHS | BAL | | | | | | BBSW |

•CHS : Channel select for balance control

“0” : Ach “Bch is attenuated”

“1” : Bch “Ach is attenuated”

•BAL : Balance control for both Ach and Bch

Balance Level : 0 to -60dB (1dB/Step) , MUTE

•BBSW : Bass Boost ON/OFF Switch

“0” = Bass Boost OFF

“1” = Bass Boost ON

c) TRIMMER LEVEL SETTING

| Select Address | BIT | | | | | | | |
|----------------|------|----|----|----|----|----|----|------------|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 02H | TRIM | | | | | | | Don't Care |

•TRIM : Trimmer Level

Trimmer Level : +18 to -44dB (0.5dB/Step) , MUTE

d) TONE CONTROL BASS SETTING

| Select Address | BIT | | | | | | | |
|----------------|-----|------|----|----|----|----|------------|----|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 03H | BCB | BASS | | | | | Don't Care | |

•BCB : Boost cut select for Bass control

“0” : Cut

“1” : Boost

•BASS : BASS Level Setting

Cut Level : -15 to 0dB(0.5dB/Step)

Boost Level : 0 to +15dB(0.5dB/Step)

d) TONE CONTROL TREBLE SETTING

| Select Address | BIT | | | | | | | |
|----------------|-----|------|----|----|----|----|------------|----|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 04H | BCT | TREB | | | | | Don't Care | |

•BCT : Boost cut select for Treble control

“0” : Cut

“1” : Boost

•TREB : TREBLE Level Setting

Cut Level : -15 to 0dB(0.5dB/Step)

Boost Level : 0 to +15dB(0.5dB/Step)

d) SURROUND, AUXILIARY, AGC LEVEL SETTING

| Select Address | BIT | | | | | | | |
|----------------|-----|----|------|------|----|------|----|-----|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 05H | SUR | | AUX1 | AUX0 | | AGCL | | AGC |

<SUR : Surround Level Setting>

| Surround Setting | D7 | D6 | Remarks |
|------------------|----|----|-----------------------------------|
| Surround Off | 0 | 0 | Surround Off |
| Simulated Stereo | 0 | 1 | Simulated Stereo |
| Surround Effect1 | 1 | 0 | Surround Effect Low(8.3dB typ.) |
| Surround Effect2 | 1 | 1 | Surround Effect High(12.7dB typ.) |

<AUX1 : AUX1 Terminal Setting>

| Auxiliary Setting | D5 |
|-------------------|----|
| Low (0.0V) | 0 |
| High (5.0V) | 1 |

<AUX0 : AUX0 Terminal Setting>

| Auxiliary Setting | D4 | D3 |
|-------------------|----|----|
| Low (0.0V) | - | 0 |
| Mid (2.5V) | 0 | 1 |
| High (5.0V) | 1 | 1 |

<AUXL : AGC Level Setting>

| AGC Level Setting | D2 | D1 |
|-------------------|----|----|
| 100mVrms | 0 | 0 |
| 200mVrms | 0 | 1 |
| 300mVrms | 1 | 0 |
| 400mVrms | 1 | 1 |

<AGC : AGC Setting>

| AGC Setting | D0 |
|-------------|----|
| OFF | 0 |
| ON | 1 |

■Master Volume (Select Address : 00H)

| | | VOL | | | | | | | |
|----------|-----|-----|----|----|----|----|----|----|----|
| Gain(dB) | HEX | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 0 | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| -1 | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| -2 | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| -3 | F6 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| -4 | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| -5 | F0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| -6 | ED | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| -7 | EA | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| -8 | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| -9 | E4 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| -10 | E1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| -11 | DE | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| -12 | DB | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| -13 | D8 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| -14 | D5 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| -15 | D2 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| -16 | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| -17 | CC | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| -18 | C9 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| -19 | C6 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| -20 | C3 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| -21 | C0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| -22 | BD | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| -23 | BA | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| -24 | B7 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| -25 | B4 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| -26 | B1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| -27 | AE | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| -28 | AB | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| -29 | A8 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| -30 | A5 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| -31 | A2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| -32 | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| -33 | 9C | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| -34 | 99 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| -35 | 96 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| -36 | 93 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| -37 | 90 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| -38 | 8D | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| -39 | 8A | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| -40 | 87 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| -41 | 84 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| -42 | 81 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

| | | VOL | | | | | | | |
|----------|-----|-----|----|----|----|----|----|----|----|
| | | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| Gain(dB) | HEX | | | | | | | | |
| -43 | 7E | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| -44 | 7B | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| -45 | 78 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| -46 | 75 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| -47 | 72 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 |
| -48 | 6F | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| -49 | 6C | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| -50 | 69 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 |
| -51 | 66 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |
| -52 | 63 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| -53 | 60 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| -54 | 5D | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| -55 | 5A | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| -56 | 57 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| -57 | 54 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| -58 | 51 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| -59 | 4E | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 |
| -60 | 4B | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 |
| -61 | 48 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| -62 | 45 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| -63 | 42 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| -64 | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| -65 | 3C | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| -66 | 39 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| -67 | 36 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| -68 | 33 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| -69 | 30 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| -70 | 2D | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| -71 | 2A | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| -72 | 27 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| -73 | 24 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| -74 | 21 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| -75 | 1E | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| -76 | 1B | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 |
| -77 | 18 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| -78 | 15 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| -79 | 12 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| -80 | 0F | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| MUTE* | 00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

* : Default Value

■Balance, Bass Boost Setting (Select Address : 01H)

| Channel Setting (CHS) | D7 |
|-----------------------|----|
| Decrease Bch Gain | 0 |
| Decrease Ach Gain | 1 |

| Gain(dB) | BAL | | | | | |
|----------|-----|----|----|----|----|----|
| | D6 | D5 | D4 | D3 | D2 | D1 |
| 0* | 0 | 0 | 0 | 0 | 0 | 0 |
| -1 | 0 | 0 | 0 | 0 | 0 | 1 |
| -2 | 0 | 0 | 0 | 0 | 1 | 0 |
| -3 | 0 | 0 | 0 | 0 | 1 | 1 |
| -4 | 0 | 0 | 0 | 1 | 0 | 0 |
| -5 | 0 | 0 | 0 | 1 | 0 | 1 |
| -6 | 0 | 0 | 0 | 1 | 1 | 0 |
| -7 | 0 | 0 | 0 | 1 | 1 | 1 |
| -8 | 0 | 0 | 1 | 0 | 0 | 0 |
| -9 | 0 | 0 | 1 | 0 | 0 | 1 |
| -10 | 0 | 0 | 1 | 0 | 1 | 0 |
| -11 | 0 | 0 | 1 | 0 | 1 | 1 |
| -12 | 0 | 0 | 1 | 1 | 0 | 0 |
| -13 | 0 | 0 | 1 | 1 | 0 | 1 |
| -14 | 0 | 0 | 1 | 1 | 1 | 0 |
| -15 | 0 | 0 | 1 | 1 | 1 | 1 |
| -16 | 0 | 1 | 0 | 0 | 0 | 0 |
| -17 | 0 | 1 | 0 | 0 | 0 | 1 |
| -18 | 0 | 1 | 0 | 0 | 1 | 0 |
| -19 | 0 | 1 | 0 | 0 | 1 | 1 |
| -20 | 0 | 1 | 0 | 1 | 0 | 0 |
| -21 | 0 | 1 | 0 | 1 | 0 | 1 |
| -22 | 0 | 1 | 0 | 1 | 1 | 0 |
| -23 | 0 | 1 | 0 | 1 | 1 | 1 |
| -24 | 0 | 1 | 1 | 0 | 0 | 0 |
| -25 | 0 | 1 | 1 | 0 | 0 | 1 |
| -26 | 0 | 1 | 1 | 0 | 1 | 0 |
| -27 | 0 | 1 | 1 | 0 | 1 | 1 |
| -28 | 0 | 1 | 1 | 1 | 0 | 0 |
| -29 | 0 | 1 | 1 | 1 | 0 | 1 |
| -30 | 0 | 1 | 1 | 1 | 1 | 0 |

* : Default Value

| Gain(dB) | BAL | | | | | |
|----------|-----|----|----|----|----|----|
| | D6 | D5 | D4 | D3 | D2 | D1 |
| -31 | 0 | 1 | 1 | 1 | 1 | 1 |
| -32 | 1 | 0 | 0 | 0 | 0 | 0 |
| -33 | 1 | 0 | 0 | 0 | 0 | 1 |
| -34 | 1 | 0 | 0 | 0 | 1 | 0 |
| -35 | 1 | 0 | 0 | 0 | 1 | 1 |
| -36 | 1 | 0 | 0 | 1 | 0 | 0 |
| -37 | 1 | 0 | 0 | 1 | 0 | 1 |
| -38 | 1 | 0 | 0 | 1 | 1 | 0 |
| -39 | 1 | 0 | 0 | 1 | 1 | 1 |
| -40 | 1 | 0 | 1 | 0 | 0 | 0 |
| -41 | 1 | 0 | 1 | 0 | 0 | 1 |
| -42 | 1 | 0 | 1 | 0 | 1 | 0 |
| -43 | 1 | 0 | 1 | 0 | 1 | 1 |
| -44 | 1 | 0 | 1 | 1 | 0 | 0 |
| -45 | 1 | 0 | 1 | 1 | 0 | 1 |
| -46 | 1 | 0 | 1 | 1 | 1 | 0 |
| -47 | 1 | 0 | 1 | 1 | 1 | 1 |
| -48 | 1 | 1 | 0 | 0 | 0 | 0 |
| -49 | 1 | 1 | 0 | 0 | 0 | 1 |
| -50 | 1 | 1 | 0 | 0 | 1 | 0 |
| -51 | 1 | 1 | 0 | 0 | 1 | 1 |
| -52 | 1 | 1 | 0 | 1 | 0 | 0 |
| -53 | 1 | 1 | 0 | 1 | 0 | 1 |
| -54 | 1 | 1 | 0 | 1 | 1 | 0 |
| -55 | 1 | 1 | 0 | 1 | 1 | 1 |
| -56 | 1 | 1 | 1 | 0 | 0 | 0 |
| -57 | 1 | 1 | 1 | 0 | 0 | 1 |
| -58 | 1 | 1 | 1 | 0 | 1 | 0 |
| -59 | 1 | 1 | 1 | 0 | 1 | 1 |
| -60 | 1 | 1 | 1 | 1 | 0 | 0 |
| MUTE | 1 | 1 | 1 | 1 | 1 | 1 |

| Bass Boost Setting (BBSW) | D0 |
|---------------------------|----|
| Bass Boost Off* | 0 |
| Bass Boost On | 1 |

* : Default Value

■Trimmer Setting (Select Address: 02H)

| Gain(dB) | TRIM | | | | | | |
|----------|------|----|----|----|----|----|----|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 |
| +18.0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| +17.5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| +17.0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| +16.5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| +16.0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| +15.5 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| +15.0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| +14.5 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| +14.0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| +13.5 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| +13.0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| +12.5 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| +12.0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| +11.5 | 1 | 1 | 1 | 0 | 0 | 1 | 0 |
| +11.0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| +10.5 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| +10.0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| +9.5 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| +9.0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| +8.5 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| +8.0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| +7.5 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| +7.0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 |
| +6.5 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| +6.0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| +5.5 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |
| +5.0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| +4.5 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| +4.0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| +3.5 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| +3.0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| +2.5 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| +2.0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| +1.5 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| +1.0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| +0.5 | 1 | 0 | 1 | 1 | 1 | 0 | 0 |
| 0.0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| -0.5 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| -1.0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 |
| -1.5 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| -2.0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| -2.5 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| -3.0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| -3.5 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| -4.0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| -4.5 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| -5.0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| -5.5 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| -6.0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |

| Gain(dB) | TRIM | | | | | | |
|----------|------|----|----|----|----|----|----|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 |
| -6.5 | 1 | 0 | 0 | 1 | 1 | 1 | 0 |
| -7.0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| -7.5 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| -8.0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 |
| -8.5 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| -9.0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| -9.5 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| -10.0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| -10.5 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| -11.0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| -11.5 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| -12.0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| -12.5 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| -13.0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| -13.5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| -14.0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| -14.5 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| -15.0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| -15.5 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| -16.0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| -16.5 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| -17.0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| -17.5 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| -18.0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| -18.5 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| -19.0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 |
| -19.5 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| -20.0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| -20.5 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| -21.0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| -21.5 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| -22.0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| -22.5 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| -23.0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| -23.5 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| -24.0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| -24.5 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| -25.0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| -25.5 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| -26.0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| -26.5 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| -27.0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| -27.5 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| -28.0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| -28.5 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| -29.0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| -29.5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| -30.0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| -30.5 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| -31.0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 |

| Gain (dB) | TRIM | | | | | | |
|-----------|------|----|----|----|----|----|----|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 |
| -31.5 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| -32.0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 |
| -32.5 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| -33.0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| -33.5 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| -34.0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| -34.5 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| -35.0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| -35.5 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| -36.0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| -36.5 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| -37.0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| -37.5 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| -38.0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| -38.5 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| -39.0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| -39.5 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| -40.0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| -40.5 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| -41.0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| -41.5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| -42.0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| -42.5 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| -43.0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| -43.5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| -44.0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| MUTE* | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

* : Default value

■Tone Control(Bass Setting) (Select Address : 03H)

| | |
|------------------------------|------------|
| Bass Cut or Boost | BCB |
| | D7 |
| Cut | 0 |
| Boost | 1 |

| Cut Gain(dB) / Boost Gain(dB) | | BASS | | | | |
|-------------------------------|----------------|------|----|----|----|----|
| Cut Gain(dB) | Boost Gain(dB) | D6 | D5 | D4 | D3 | D2 |
| -15.0 | 15.0 | 1 | 1 | 1 | 1 | 0 |
| -14.5 | 14.5 | 1 | 1 | 1 | 0 | 1 |
| -14.0 | 14.0 | 1 | 1 | 1 | 0 | 0 |
| -13.5 | 13.5 | 1 | 1 | 0 | 1 | 1 |
| -13.0 | 13.0 | 1 | 1 | 0 | 1 | 0 |
| -12.5 | 12.5 | 1 | 1 | 0 | 0 | 1 |
| -12.0 | 12.0 | 1 | 1 | 0 | 0 | 0 |
| -11.5 | 11.5 | 1 | 0 | 1 | 1 | 1 |
| -11.0 | 11.0 | 1 | 0 | 1 | 1 | 0 |
| -10.5 | 10.5 | 1 | 0 | 1 | 0 | 1 |
| -10.0 | 10.0 | 1 | 0 | 1 | 0 | 0 |
| -9.5 | 9.5 | 1 | 0 | 0 | 1 | 1 |
| -9.0 | 9.0 | 1 | 0 | 0 | 1 | 0 |
| -8.5 | 8.5 | 1 | 0 | 0 | 0 | 1 |
| -8.0 | 8.0 | 1 | 0 | 0 | 0 | 0 |
| -7.5 | 7.5 | 0 | 1 | 1 | 1 | 1 |
| -7.0 | 7.0 | 0 | 1 | 1 | 1 | 0 |
| -6.5 | 6.5 | 0 | 1 | 1 | 0 | 1 |
| -6.0 | 6.0 | 0 | 1 | 1 | 0 | 0 |
| -5.5 | 5.5 | 0 | 1 | 0 | 1 | 1 |
| -5.0 | 5.0 | 0 | 1 | 0 | 1 | 0 |
| -4.5 | 4.5 | 0 | 1 | 0 | 0 | 1 |
| -4.0 | 4.0 | 0 | 1 | 0 | 0 | 0 |
| -3.5 | 3.5 | 0 | 0 | 1 | 1 | 1 |
| -3.0 | 3.0 | 0 | 0 | 1 | 1 | 0 |
| -2.5 | 2.5 | 0 | 0 | 1 | 0 | 1 |
| -2.0 | 2.0 | 0 | 0 | 1 | 0 | 0 |
| -1.5 | 1.5 | 0 | 0 | 0 | 1 | 1 |
| -1.0 | 1.0 | 0 | 0 | 0 | 1 | 0 |
| -0.5 | 0.5 | 0 | 0 | 0 | 0 | 1 |
| 0.0* | 0.0* | 0 | 0 | 0 | 0 | 0 |

* : Default value

■Tone Control(Treble Setting) (Select Address : 04H)

| | |
|------------------------|-----|
| Treble Cut or Boost | BCT |
| | D7 |
| Cut | 0 |
| Boost | 1 |

| | | TREB | | | | |
|--------------|----------------|------|----|----|----|----|
| Cut Gain(dB) | Boost Gain(dB) | D6 | D5 | D4 | D3 | D2 |
| -15.0 | 15.0 | 1 | 1 | 1 | 1 | 0 |
| -14.5 | 14.5 | 1 | 1 | 1 | 0 | 1 |
| -14.0 | 14.0 | 1 | 1 | 1 | 0 | 0 |
| -13.5 | 13.5 | 1 | 1 | 0 | 1 | 1 |
| -13.0 | 13.0 | 1 | 1 | 0 | 1 | 0 |
| -12.5 | 12.5 | 1 | 1 | 0 | 0 | 1 |
| -12.0 | 12.0 | 1 | 1 | 0 | 0 | 0 |
| -11.5 | 11.5 | 1 | 0 | 1 | 1 | 1 |
| -11.0 | 11.0 | 1 | 0 | 1 | 1 | 0 |
| -10.5 | 10.5 | 1 | 0 | 1 | 0 | 1 |
| -10.0 | 10.0 | 1 | 0 | 1 | 0 | 0 |
| -9.5 | 9.5 | 1 | 0 | 0 | 1 | 1 |
| -9.0 | 9.0 | 1 | 0 | 0 | 1 | 0 |
| -8.5 | 8.5 | 1 | 0 | 0 | 0 | 1 |
| -8.0 | 8.0 | 1 | 0 | 0 | 0 | 0 |
| -7.5 | 7.5 | 0 | 1 | 1 | 1 | 1 |
| -7.0 | 7.0 | 0 | 1 | 1 | 1 | 0 |
| -6.5 | 6.5 | 0 | 1 | 1 | 0 | 1 |
| -6.0 | 6.0 | 0 | 1 | 1 | 0 | 0 |
| -5.5 | 5.5 | 0 | 1 | 0 | 1 | 1 |
| -5.0 | 5.0 | 0 | 1 | 0 | 1 | 0 |
| -4.5 | 4.5 | 0 | 1 | 0 | 0 | 1 |
| -4.0 | 4.0 | 0 | 1 | 0 | 0 | 0 |
| -3.5 | 3.5 | 0 | 0 | 1 | 1 | 1 |
| -3.0 | 3.0 | 0 | 0 | 1 | 1 | 0 |
| -2.5 | 2.5 | 0 | 0 | 1 | 0 | 1 |
| -2.0 | 2.0 | 0 | 0 | 1 | 0 | 0 |
| -1.5 | 1.5 | 0 | 0 | 0 | 1 | 1 |
| -1.0 | 1.0 | 0 | 0 | 0 | 1 | 0 |
| -0.5 | 0.5 | 0 | 0 | 0 | 0 | 1 |
| 0.0* | 0.0* | 0 | 0 | 0 | 0 | 0 |

* : Default value

■NOTE

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