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PRODUCT DATA SHEET AUDIO LINE COMBINATION ALC1000-1300

SCOPE

These technical specifications describes the functionalities and features of the Anaview Audio Line Combination ALC1000-1300, an integrated audio solution combining high-end amplifier and power supply technology, capable of delivering 1x1000W into 4Ω bridged @ 1%THD or 1x630W into 8Ω bridged @ 1%THD. Instantaneous peak power 2000W. Typical applications are subwoofers and mono amplifiers.

Disclaimer

The data sheet contains specifications that may be subject to change without prior notice. Responsibility for verifying the performance, safety, reliability and compliance with legal standards of end products using this subassembly falls to the manufacturer of said end product.

ANAVIEW products are not authorized for use as critical components in life support devices or life support systems without the express written approval of the president of ETAL Group AB. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labelling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ABBREVIATIONS

BTL Bridged Tied Load
SE Single Ended

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GENERAL

Environmental conditions

Humidity	5 – 85% RH non condensing
Operating Temperature Ambient	0°C to +55°C
Normal operation ambient temperature	0°C to +45°C
Storage Temperature	-40°C to +85°C

Regulations and compliances

EMC	Emission	<p>Designed to meet</p> <p>Conducted Emission FCC 15V, Sec. 107 Class "B"</p> <p>Radiated Emission FCC 15V, Sec. 109 Class "B"</p> <p>Conducted Emission EN 55022 (2010) Class "B"</p> <p>Telecom Conducted Emission EN 55022 (2010) Class "B"</p> <p>Radiated Emission EN 55022 (2010) Class "B"</p> <p>Power Line Harmonics EN 61000-3-2 (2006) + A1 (2009) + A2 (2009)</p> <p>Power Line Flicker EN 61000-3-3 (2008)</p> <p>Tested at a level of 1/8 of the max output power.</p>
	Immunity	<p>Designed to meet</p> <p>ESD Immunity IEC 61000-4-2 (2008)</p> <p>Radio Frequency Immunity IEC 61000-4-3 (2006) + A1 (2007) + A2 (2010)</p> <p>Electrical Fast Transient Immunity IEC 61000-4-4 (2004) + A1 (2010)</p> <p>Surge Immunity IEC 61000-4-5 (2005)</p> <p>RF Common Mode Immunity IEC 61000-4-6 (2008)</p> <p>Power Frequency Magnetic Field IEC 61000-4-8 (2009)</p> <p>Voltage Dips and Short Interruptions IEC 61000-4-11 (2004)</p>
Safety	LVD	IEC 60065:2001+A1:2005
Power Loss	EuP Energy Star	<p>Designed to enable system compliance with:</p> <p>2005/32/EC - 1275/2008: Standby/Off Mode Loss, Annex II Point 1</p> <p>Energy Star - Consumer Audio Products, Phase II</p>

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EMC inductor

Inductor Mfg: **ETAL** P/N: **IND152_1/15777** was added to AC MAINS INPUT during all EMC tests. ALC1000-1300 will not pass power line harmonics or conducted emission without the inductor.

Miscellaneous product specifications

Cooling	Convection cooling
Mounting of the unit	See Figure 1 Board outline, dimensions, page 5
IEC Protection Class	Class I
Efficiency	85% typ. at 230Vac, 1KHz 1x1000W into 4Ω
Idle power consumption	17W typ at 230VAC
Standby mode power consumption	0.6W typ. when remote shut down by DISABLE input.
Manufacturing according to workmanship standard	IPC-A-610, Revision D, February 2005

ELECTRICAL SPECIFICATIONS

Input specifications:

Mains input voltage and current (*1)	Nominal rating: 115 / 230 VAC, 12.5/10.0 A Absolute min/max: 90-132 / 180-264 VAC
Mains input freq.	45-63 Hz
DISABLE	Discrete input signal. Active high. Disable voltage: 4VDC (min) < +8VDC (typ.) <15VDC (abs max) Max sourcing current needed : 200uA Inhibit disable : Leave pin unterminated or put to GND <3VDC (max)
IN+/-	0 - 1.35Vrms max (*2) Balanced audio input channel.

(*1) Mains AC input voltage range selectable with jumper.
See Installation Manual for the ALC1000-1300, doc. no. 15117 bundled with shipping units.
Minimum startup voltage is 100VAC / 200VAC

(*2) At 230VAC mains input voltage. Maximum signal input voltage is given by output power rating factor, as described in the *Output Specifications*.

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Output specifications:

Audio outputs (*1)	Max output voltage	Typ. cont. output power 45°C ambient	Typ. output power FTC cond. (*2)	Max output power RMS	Instantaneous peak output power	THD
OUT+ OUT-	BTL mode					
	0- 63.3Vrms	90W 4Ω 130W 6Ω 160W 8Ω	400W 4Ω 600W 6Ω 630W 8Ω	1000W 4Ω 750W 6Ω 630W 8Ω	2000W 4Ω 1500W 6Ω 1260W 8Ω	1%

(*1) Mains input voltage 115/230VAC. Output power of RMS load current. Due to the non-regulated nature of the internal PSU, the output power depends on the mains input voltage. Hence the power rating follows the equation: % Power change = (% voltage change)²

(*2) 1 hour pre heating with 1/8 of specified load and subsequently 5 min. with specified load at 120/230Vac, 1kHz input, T amb 25°C still air. Board mounted vertically.

Power precautions:

Exceeding rated max. output power	Full power output until shut down (1000W/4 Ω) is not a problem for the thermal protection of the amp. Exceeding that power output is not recommended. When the power output is >1100W/4Ω the thermal protection is not quick enough to shut down the amp before failure. Playing music signal with clipping is for most applications not a problem, but prolonged test signals with >1100W output can make the amp overheat and fail.
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AUX outputs (*1)	Nom. voltage	Voltage fluctuation		I Max cont.	Comments
		Min	Max		
AUX output supply voltage V1 : (STB_DC)	+8VDC	+7.0VDC	+10.5VDC	20mA	
AUX output supply voltage V2: (VA+)	+18VDC	+9.5VDC	+18.5VDC	300mA	Max capacitive load 330uF
AUX output supply voltage V3: (VA-)	-18VDC	-9.5VDC	-18.5VDC	300mA	Max capacitive load 330uF
STATUS	+4.7VDC	+4.5VDC	+4.9VDC	Discrete output signal < 5mA	Active high

(*1) For 230VAC. The ALC1000-1300 AUX outputs are unregulated and vary with load and AC input voltage. The AUX output supply voltage V1 (STBY_DC) is 10VDC while the unit is running and approximately 7.4VDC when in standby mode. VA+/VA- may reach up +20V/-20V at high mains (250VAC).

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Protections and functions:

Mains input fuse	T5AL (time lag) at 230VAC (upper AC voltage range) T8AL (time lag) at 115VAC (lower AC voltage range)
Over temperature protection	Power shut down by over temperature. Threshold temperature : 90(min) - 95(typ) - 100(max)'C Sensor connected to drain tab of high side power FET
Over voltage protection	Power shut down by over voltage on output voltage rail.
Over current protection	Power shut down by over current Treshold current : 30A (0.33Ω load, 1kHz burst)
Protection output status	Status output: CON1 pin 6 "STATUS" Goes high during: 1. Over temperature shutdown 2. Over voltage shutdown
Remote shut down to standby mode	Shut down input: CON1 pin 5 "DISABLE" Shut down by: Apply +8VDC (+4<V<+15VDC) on DISABLE input Normal operation : Leave pin floating or put to GND (V<+3VDC)
Offset voltage (open inputs)	5mV typ. (<50mV max)
Switching frequency (idle)	380kHz typ. (365-405kHz min-max)
Switching recidual	700mVpk Typ.
Recommended load	4Ω (Max output power 1000W), alternatively 8Ω (max 630W)
Gain (f =1kHz)	33.5dB
Idle noise	20uV Typ. (A-weighted 20Hz < f < 20kHz)
Upper BW limit (-3dB)	47kHz
Lower BW limit (-3dB)	1Hz
Output impedance (100Hz)	3 mΩ Typ. (< 20mΩ)
Recidual noise	< 40uVrms unweighted
Crosstalk	80dB @1KHz and 1W
THD vs PWR	See figures 3-5 page 8 to 9
THD vs freq	< 0.02% @ 1 KHz
Freq response	See figure 6 page 9

CONNECTIONS

Mains connector	3x Flat straight tabs 4.75x0.8 mm (Tyco 1-0726388-2) Suggested mating connectors : 4.75x0.8 Female blade crimp or similar	
	<u>Pinning:</u>	<u>Description:</u>
	Tab 1 : AC_N	Neutral
	Tab 2 : AC_L	Live
	Tab 3 : PE	Protective Earth

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Signal connector	CON1 : 12pin 0.100" (2.54mm) header (Molex 2227-2121) Suggested mating connector : Molex KK series 2695-12 or similar																									
	<table border="0"> <tr> <td><u>Pinning:</u></td> <td><u>Description:</u></td> </tr> <tr> <td>Pin 1 : STBY_DC</td> <td>AUX output voltage V1. (Standby voltage, +8V)</td> </tr> <tr> <td>Pin 2 : VA+</td> <td>AUX output voltage V2 (+18V)</td> </tr> <tr> <td>Pin 3 : GND</td> <td>Secondary side ground.</td> </tr> <tr> <td>Pin 4 : VA-</td> <td>AUX output voltage V3 (-18V)</td> </tr> <tr> <td>Pin 5 : DISABLE</td> <td>Standby input signal.</td> </tr> <tr> <td>Pin 6 : STATUS</td> <td>Status output signal.</td> </tr> <tr> <td>Pin 7 : GND</td> <td>Secondary side ground.</td> </tr> <tr> <td>Pin 8 : GND</td> <td>Secondary side ground.</td> </tr> <tr> <td>Pin 9 : IN+</td> <td>Audio channel positive input</td> </tr> <tr> <td>Pin 10 : IN-</td> <td>Audio channel negative input</td> </tr> <tr> <td>Pin 11 :</td> <td></td> </tr> <tr> <td>Pin 12 :</td> <td></td> </tr> </table>	<u>Pinning:</u>	<u>Description:</u>	Pin 1 : STBY_DC	AUX output voltage V1. (Standby voltage, +8V)	Pin 2 : VA+	AUX output voltage V2 (+18V)	Pin 3 : GND	Secondary side ground.	Pin 4 : VA-	AUX output voltage V3 (-18V)	Pin 5 : DISABLE	Standby input signal.	Pin 6 : STATUS	Status output signal.	Pin 7 : GND	Secondary side ground.	Pin 8 : GND	Secondary side ground.	Pin 9 : IN+	Audio channel positive input	Pin 10 : IN-	Audio channel negative input	Pin 11 :		Pin 12 :
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Loadspeaker connectors	2x Flat straight tabs 4.75x0.8 mm (Tyco 1-0726388-2) Suggested mating connectors : 4.75x0.8 Female blade crimp or similar					
	<table border="0"> <tr> <td><u>Pinning:</u></td> <td><u>Description:</u></td> </tr> <tr> <td>Tab 1 : OUT+</td> <td>Audio channel positive output</td> </tr> <tr> <td>Tab 2 : OUT-</td> <td>Audio channel negative output</td> </tr> </table>	<u>Pinning:</u>	<u>Description:</u>	Tab 1 : OUT+	Audio channel positive output	Tab 2 : OUT-
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Tab 1 : OUT+	Audio channel positive output					
Tab 2 : OUT-	Audio channel negative output					

MECHANICAL OUTLINE

Size (l x w x h)	180x166x63mm, see Figure 1. Board outline, dimensions, page 7.
Mounting hole dia.	4.3mm ± 0.3mm
IP figures, encapsulation IP XY (X=Solids, Y=Liquids)	Open frame
Coloring, design and branding	ALC1000-1300, black heat sink, blue PCB

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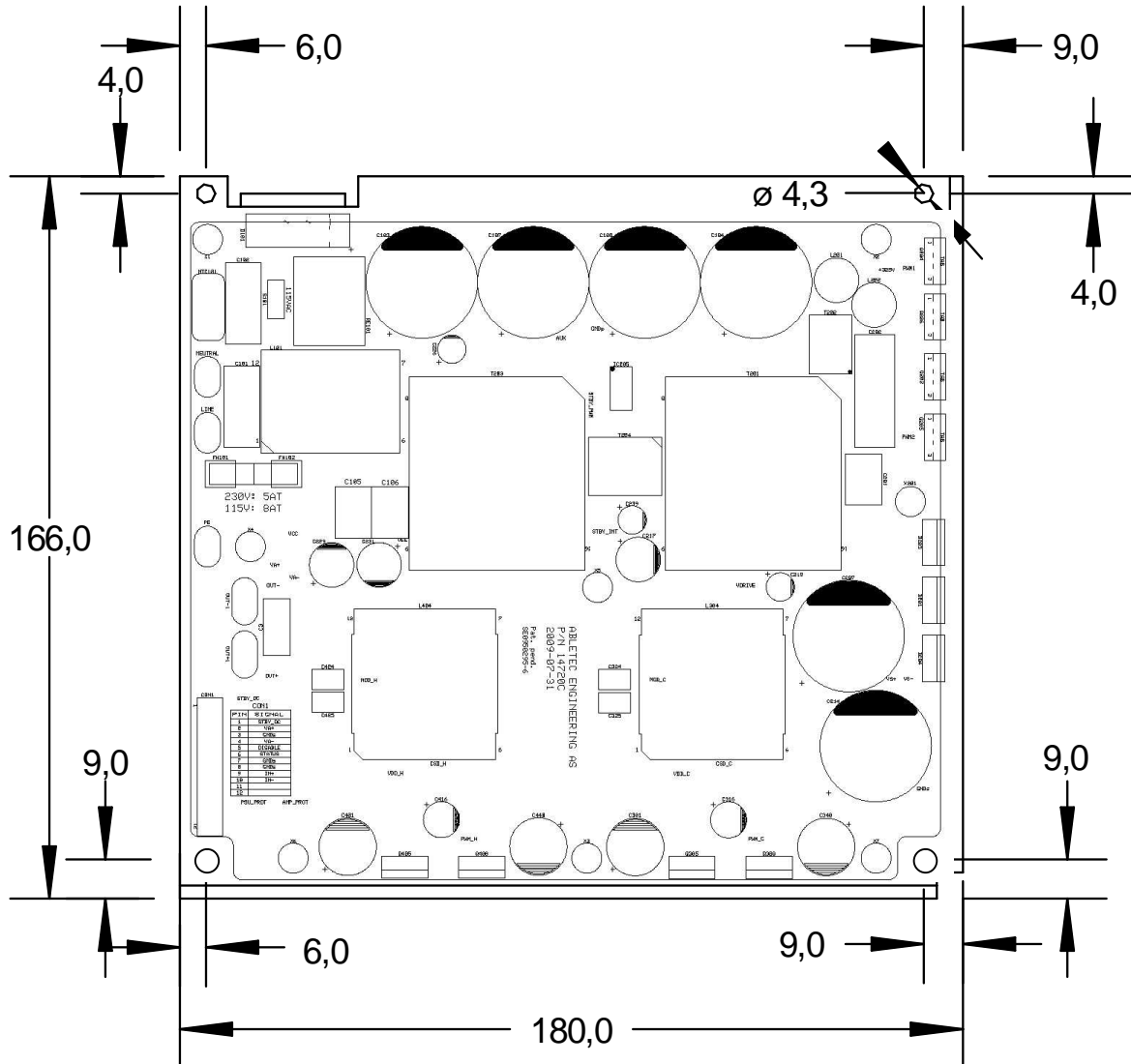


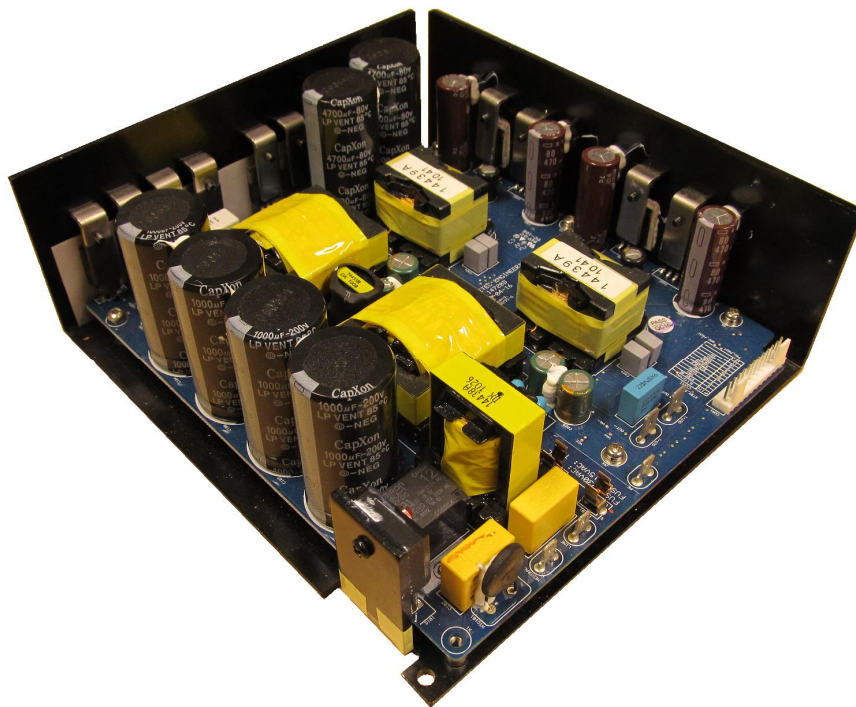
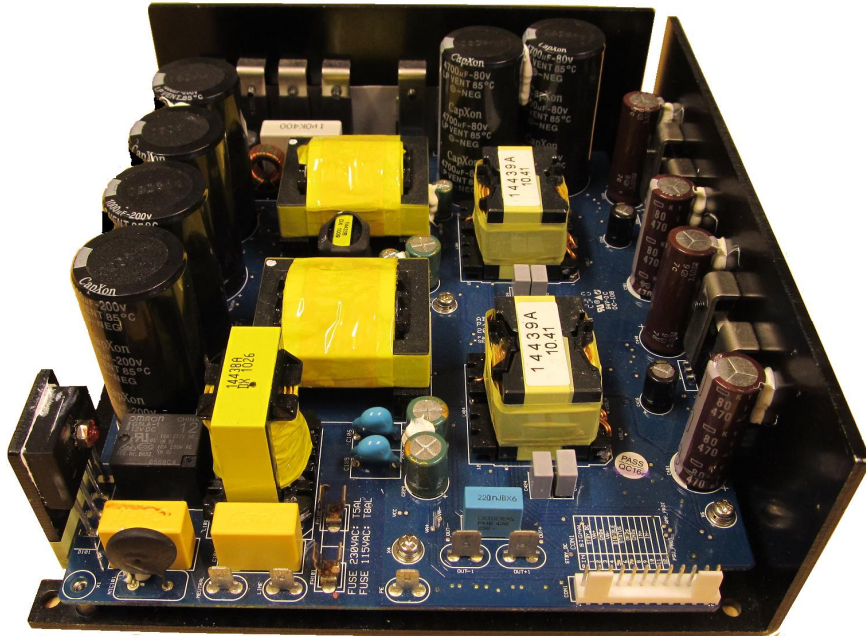
Figure 1. Board outline, dimensions and mounting holes.

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Product Pictures



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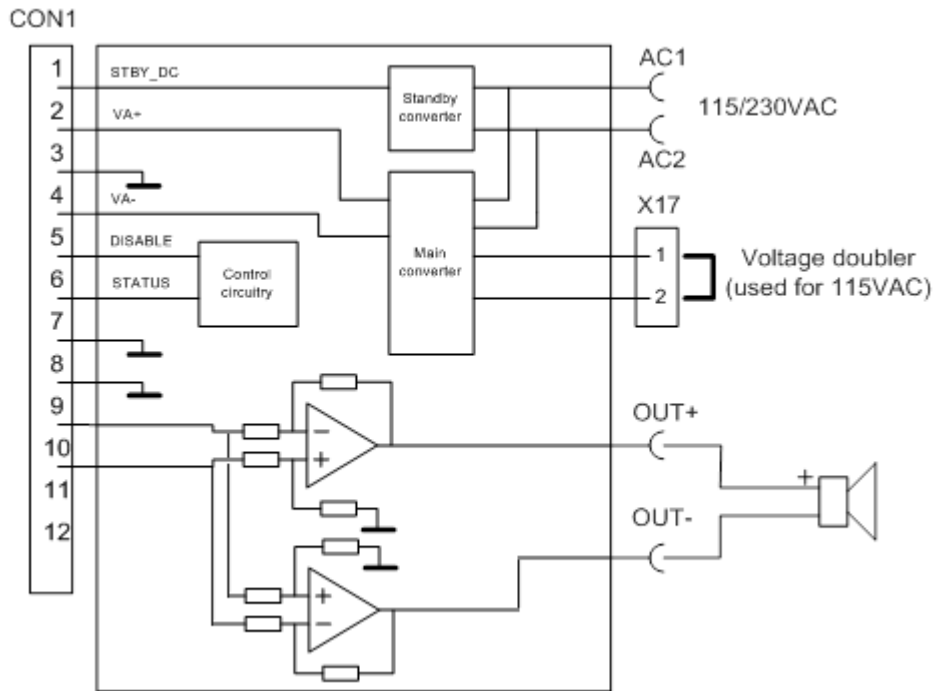


Figure 2. Supply and amplifier block diagram

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Audio Precision

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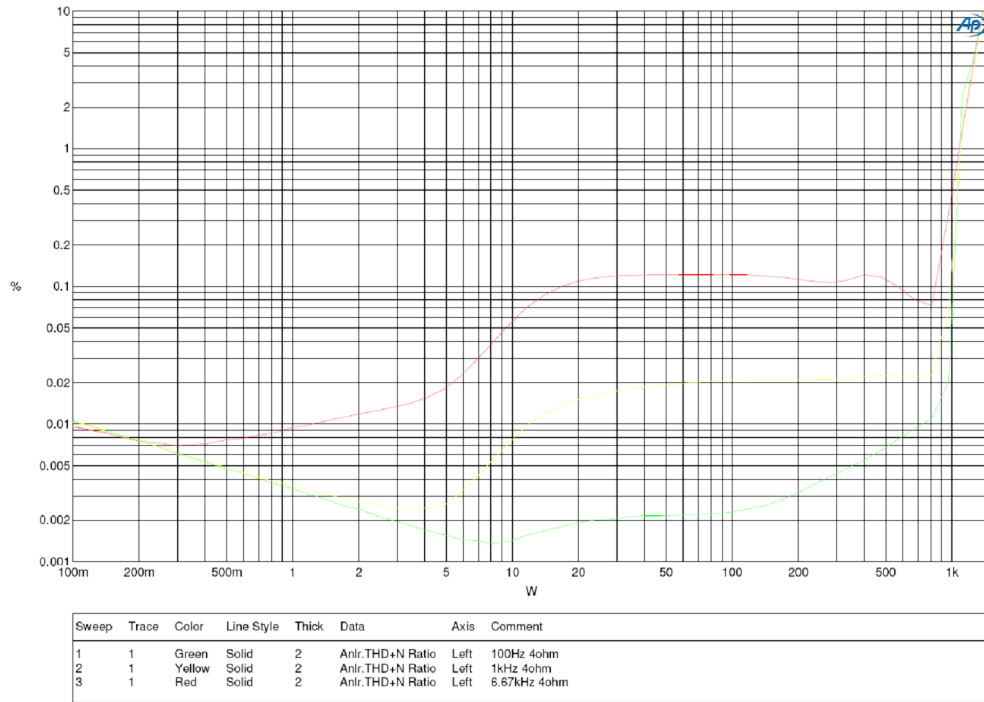


Figure 3. THD vs power, 4Ω 230VAC, BTL

Audio Precision

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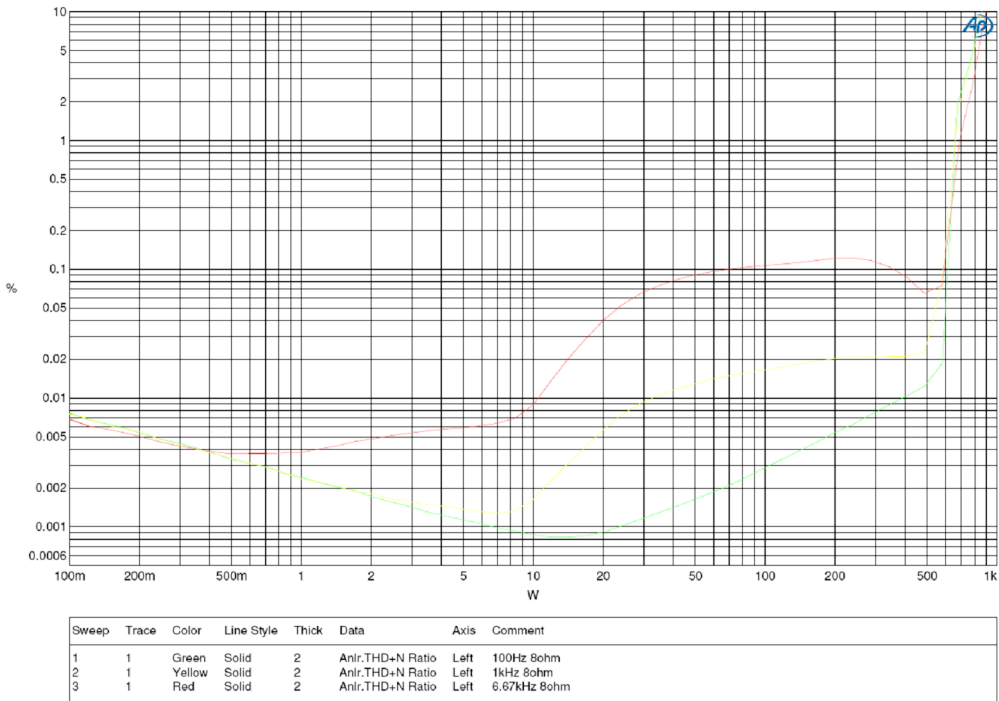


Figure 4. THD vs power, 8Ω 230VAC, BTL

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Audio Precision

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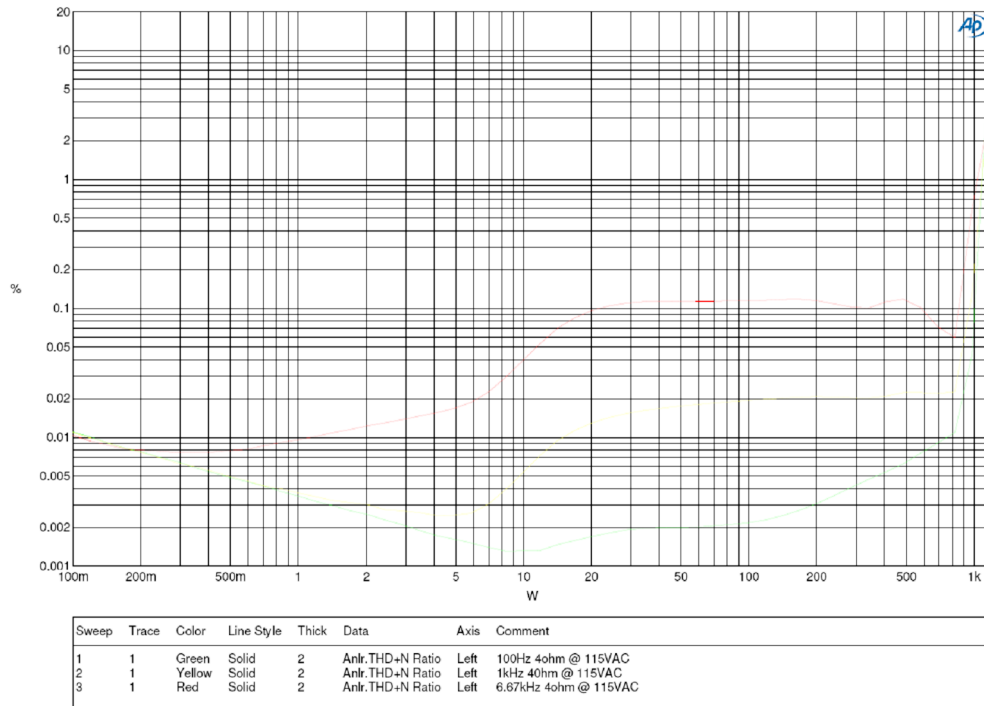


Figure 5. THD vs power, 4Ω 115VAC, BTL

Audio Precision

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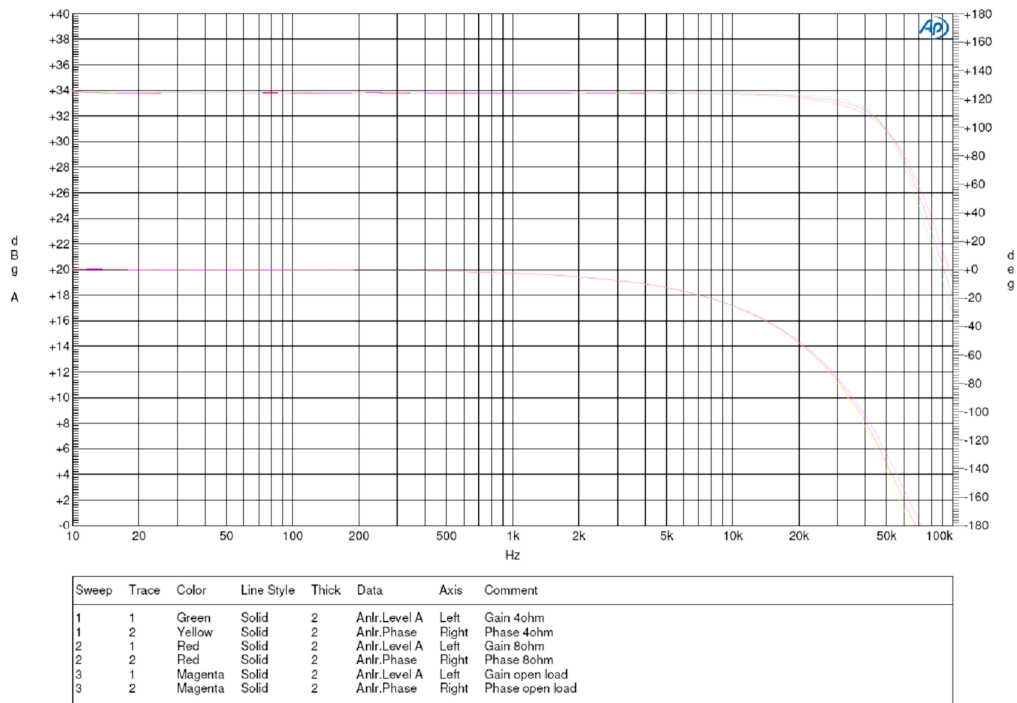


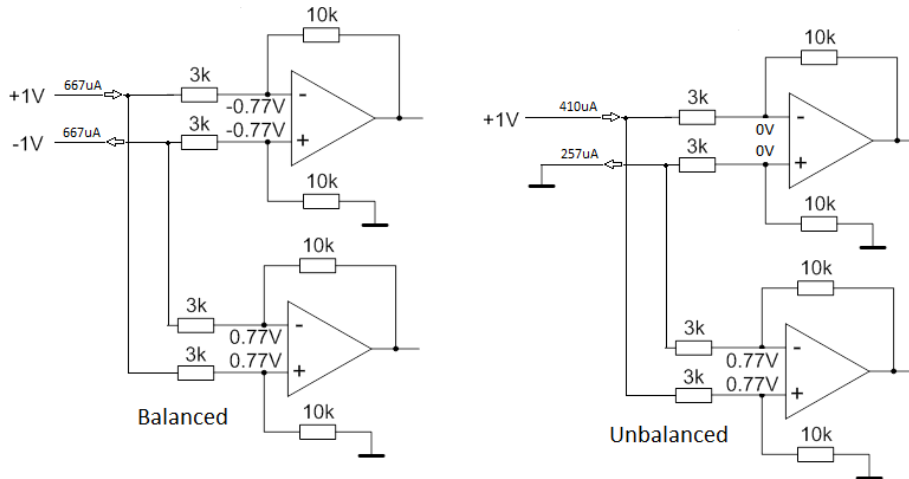
Figure 6. Frequency response, Gain vs Freq.

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APPLICATION NOTES

Optimizing input stage CMRR

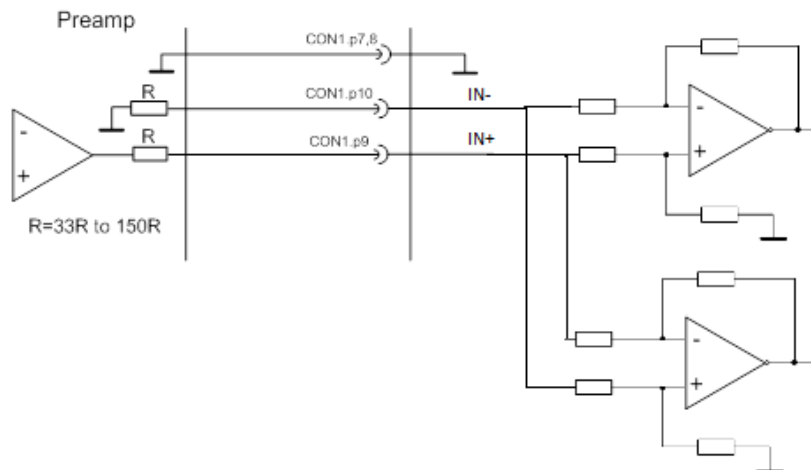
The inputs of ALC1000 are two separate channels connected together. As can be seen the input impedance is not the same on both inputs and depending on which type of signal is applied (single ended or balanced) the input impedance changes.



This is however not a problem as long as a few precautions are made. Common mode rejection CMRR will be significantly improved by having the same source resistance on both the inputs.

Impedance balancing with single ended signal

Below is shown a setup with an impedance balanced single ended source. This requires a balanced cable.

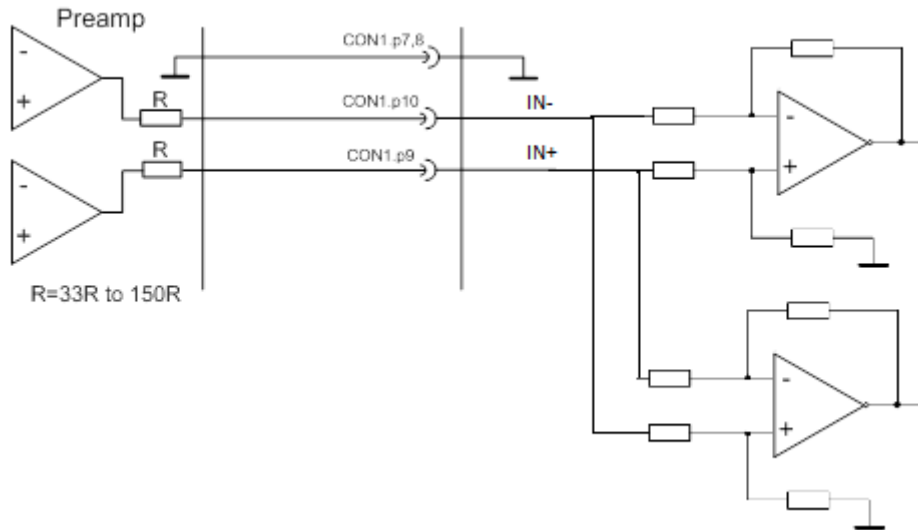


It is quite common to have a series resistance of 50ohm or more on the signal output so if the same resistance is placed in the opposite side of the signal of either sending or receiving side of the cable the CMRR rejection is intact.

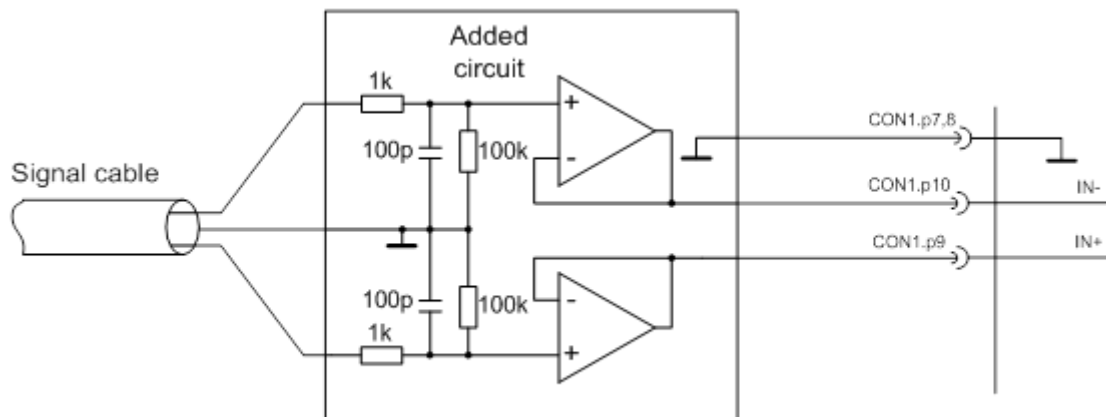
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Balanced input signal

If a balanced signal source is used the following setup applies.



If long cables are used the cable impedance itself can contribute in a non insignificant way to the series impedance and since that impedance is not very well defined (symmetrically) it can be an advantage to increase both the diff mode and common mode input impedance. In such a case an additional circuit as below can be added before the ALC module.



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REVISION LOG

Rev.	Date	Item	Sign
A	N/A	- First draft	KS
B	2010-04-26	- Revised nominal input voltage rating to 115/230Vac - Revised input fuse description to T5AL/T8AL - Revised temperature protection thresholds - Revised upper BW limit to 47KHz - Added IEC protection class and heat sink/PCB color - Added EuP and Energy Star to Compliance Table	KS
C	2011-01-24	- Adjusted miscellaneous parameters according to statistical data from pilot production; switch freq, efficiency, idle and stby pwr consumption - Added note about installation manual for 115/230Vac selection	KS
D	2015-04-10	- Added application notes - Adjusted output specifications and added power precaution note - Changed layout to ANAVIEW standards - Added ANAVIEW contact information and Disclaimer - Added comment to VA+/- outputs maximum capacitive load - Added information about external inductor required to pass EMC	JN

ANAVIEW CONTACT INFORMATION

For further information about Anaview's products and technology please contact:

Email: info@anaview.com

Website: www.anaview.com

Anaview (Europe, APAC)

Södergatan 4
25225 Helsingborg
Sweden

Anaview (North America)

3031 Lucerne Place
Riverside, CA 92506
California
USA

Part of

ETAL Group AB
Fagerstagatan 3
SE-163 53 SPÅNGA
SWEDEN

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