Benchmark *AHB2*
Instruction Manual

Reference Stereo Power Amplifier
100W/channel into 8-Ohms
380W bridged mono into 8-Ohms

Benchmark
...the measure of excellence!™

Contents

Introduction

Thank you for purchasing the Benchmark ***AHB2*** audio power amplifier. To take full advantage of the extraordinary performance of this amplifier, and to enjoy long and trouble-free use, please read this manual carefully.

Product Overview

True HRA Performance

The ***AHB2*** is a reference-grade audio power amplifier that is specifically designed to complement the performance delivered by the finest High Resolution Audio (HRA) recording and playback systems. The SNR and THD performance of the ***AHB2*** put this amplifier in a class by itself.

Virtually Noise Free

The ***AHB2*** delivers a SNR that exceeds 132 dB A-weighted. This makes the ***AHB2*** 15 to 30 dB quieter than most top-quality power amplifiers. 132 dB is approximately equivalent to the noise performance of a perfect 22-bit digital system.

Virtually Distortion Free

A THX-patented feed-forward error correction system virtually eliminates all traces of distortion at all signal level and loading conditions. The ***AHB2*** shows no traces of the crossover distortion that can occur when push-pull outputs stages switch between output devices. Without crossover distortion, low-level details are resolved with precision. At high output levels, the ***AHB2*** remains virtually distortion free while driving heavy loads.

Patent Information

The ***AHB2*** incorporates patented **THX® Achromatic™ Audio Amplifier Technology (THX AAA™**) which is licensed from THX Limited.

Licensed THX Patents

- U.S. Patent No. 8,004,355
- U.S. Patent No. 8,421,531
- Mexico Pat. No. 312399
- Mexico Pat. No. 317696
- Canada Pat. No. 2753575
- S. Korea Pat. No. 10-1429804
- Additional Patents Pending

A complete list of applicable patents is available at: http://patents.thx.com/abc/

Important Safety Instructions

Safety Symbols

 This symbol alerts the user that there are important operating and maintenance instructions in the literature accompanying this appliance.

 This symbol alerts the user to the presence of uninsulated voltages within the unit that can cause dangerous electric shocks.

 This symbol alerts the user to the presence of voltages at the output connectors that can cause dangerous electric shocks.

This symbol alerts the user that the product can only be used safely at altitudes lower than 2,000 meters.

 This symbol alerts the user that the product can only be used safely in non-tropical climates.

Safety Precautions

Important Operating and Maintenance Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Do not use this apparatus near water.
5. Do not spray any liquid onto any surface, as this may cause a dangerous condition. Clean only with a damp cloth.
6. This apparatus produces heat when operated normally. Operate in a well-ventilated area. Do not block the heat-sink fins located on either side of the unit. These emit heat and must be well ventilated.
7. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus that produce heat.
8. Use only with attachments and accessories specified by the manufacturer.
9. Use only with a stand, rack, or table designed to support the weight of this apparatus. Make sure that injury or damage will not result from cables pulling on the apparatus or its mounting.

Speaker Output Voltage Warning

10. The speaker outputs are capable of producing dangerous voltages. Use insulated speaker connections. Unplug the apparatus before making changes to the speaker output connections.

Hazardous Internal Voltage Warnings

11. Refer all servicing to qualified service personnel. There are no user-serviceable parts inside the unit. There are exposed high voltages inside the unit and these may persist after the unit is unplugged. Do not attempt to open any of the covers, and do not remove any fasteners. Opening the unit will void the warranty.
12. Certain parts are safety related, or are required to meet certain regulations. All parts must be replaced with exact replacements unless written approval is granted by Benchmark. Unauthorized substitutions and modifications can create unsafe or non-compliant operating conditions and will void the warranty. Unauthorized modifications may cause fire and shock hazards. Unauthorized modification may cause the unit to emit excessive radio and magnetic interference. Modifications may reduce the immunity to external interference. Do not refer servicing to personnel who offer product modification services.

Line Cord and Fuse Warnings

13. The AC line cord is removable. Use a grounded 3-prong line cord that is appropriate for your region. Your dealer can provide you with the correct line cord.
14. Do not defeat the purpose of the grounded power plug. The ground prong is provided for your safety. When a 3-prong outlet is not available, please consult an electrician for replacement of the obsolete outlet. Do not use 2-prong to 3-prong adapters. Do not attempt to solve AC hum problems by lifting the AC safety ground!
15. Unplug this apparatus during lightning storms or when unused for long periods of time.
16. This apparatus is equipped with an auto-ranging power supply. There is no internal voltage selection switch - do not attempt to open the unit. Operating voltage ranges are 100 to 120 Vac +/- 10%, and 220 to 240 Vac +/- 10%. Operating frequency is 50 to 60 Hz. All operating voltages use the same fuse size.
17. For continued fire and shock protection always replace the fuses with the correct size and type (T 8A H 250V, 5x20mm), (T = time lag, 8A = eight Amps, H = high breaking capacity, 250V = voltage rating, 5x20mm = cartridge size). High-breaking fuses use a ceramic body. Use Bel Fuse 5HT 8-R, or Schurter 0001.2513, or an exact equivalent. The fuse drawer includes two fuses. Always replace both fuses at the same time.

Operating Environment Warnings

18. This product can only be used safely at altitudes lower than 2,000 meters.

19. This product can only be used safely in non-tropical climates.

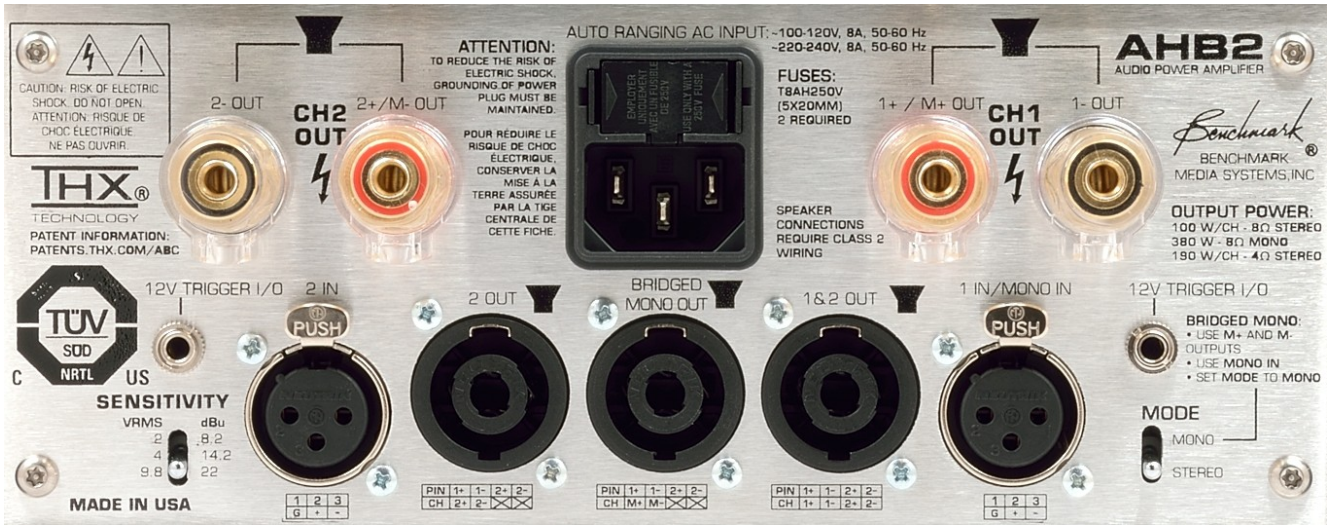
Front Panel

Front Panel Layout

Left to Right:

- Power Switch
- Power Indicator
- Channel 1 Clip Indicator
- Channel 1 Temperature and High-Current Indicator
- Channel 1 Mute Indicator
- Channel 2 Mute Indicator
- Channel 2 Temperature and High-Current Indicator
- Channel 2 Clip Indicator

Rear Panel



Rear Panel Layout

Top Row, Left to Right:

- Channel 2 Speaker Binding Posts
- AC Power Entry with Fuse Drawer
- Channel 1 Speaker Binding Posts

Bottom Row, Left to Right:

- 12 Volt Trigger Input / Output Connector
- 3-Position Sensitivity Switch - Sets Gain
- Balanced XLR Input for Channel 2
- NL4 Speaker Output for Channel 2
- NL4 Speaker Output for Bridged Mono Operation
- NL4 Speaker Output for Channel 1, or Channels 1 and 2
- Balanced XLR Input for Channel 1, or for Bridged Mono
- 2-Position Mode Switch - Enables Bridged Mono Mode
- 12 Volt Trigger Input / Output Connector

Quick Start Guide

Overview

- Connect all cables before turning the unit on.
- Check the settings of the **MODE** and **SENSITIVITY** switches before turning the unit on.
- Turn down the audio source before turning the unit on for the first time.

1. Set the MODE Switch

The **MODE** switch is very important, make sure it is set correctly for your application. An incorrect setting will not cause damage, but it may cause low output levels, a missing channel, or a polarity inversion.

The ***AHB2*** power amplifier can be run in two modes:

- **STEREO** mode - Two output channels
- **MONO** mode - One output channel in bridged mono

The bridged **MONO** mode will deliver almost 4 times as much power into an 8-Ohm speaker, and will do so without any increase in distortion. The **MONO** mode is an excellent choice for high-power applications. In **MONO** mode, two amplifiers will be required for stereo operation.

- Set this switch to **STEREO** if the ***AHB2*** is driving a stereo pair of speakers.
- Set this switch to **STEREO** if the ***AHB2*** is driving two channels of a multi-channel system.
- Set this switch to **STEREO** if the ***AHB2*** is driving a biamped two-way speaker.
- Set this switch to **MONO** if the ***AHB2*** is driving one speaker.

2. Set the SENSITIVITY Switch

The **SENSITIVITY** switch must be set properly in order to maximize the signal to noise ratio of your audio system. If this switch is set too low, you will not be able to drive the amplifier to its rated output. If this switch is set too high, the noise produced by your preamplifier will be amplified more than is necessary.

- If you are using an unbalanced input, you must use one of the top two switch positions.
- If you are using a balanced input, you will usually need to use one of the bottom two switch positions.
- Set this switch all the way down if you are using professional balanced sources.
- Raise the switch to increase the output level.
- Lower the switch to decrease the output level.

When set properly, you should be able to drive the amplifier to the onset of clipping when your volume control is set near maximum.

3. Connect the Audio Inputs

There are two balanced XLR audio inputs on the ***AHB2***:

- **1 IN/MONO IN**
- **2 IN**

Special adapter cables are required if balanced sources are not available. The adapter cables extend a three-wire balanced connection back to an unbalanced RCA output. The adapter cables are available from Benchmark.

- Use **1 IN/MONO IN** for the left channel of a stereo system.
- Use **2 IN** for the right channel of a stereo system.
- Use **1 IN/MONO IN** for all **MONO** mode applications.

Please note that unbalanced sources will limit the overall performance of the playback system. This is not due to any limitations in the ***AHB2***. It is due to the noise limitations of unbalanced output drive stages. High-level balanced interconnects are required in low-noise systems. ***We highly recommend balanced interconnects.***

4. Connect the Speaker Outputs

The ***AHB2*** has twist-lock NL4 SpeakON connectors that provide very high-quality speaker connections. These connectors outperform most binding posts, have very low resistance, and are designed to reliably carry high current. These jacks are compatible with two-pole NL2 plugs or four pole NL4 plugs. For best performance, make all speaker connections using twist-lock SpeakON connectors. Binding posts are included to provide compatibility with existing speaker cables.

- Use **1+** and **1-** for the channel 1 output in **STEREO** mode.
- Use **2+** and **2-** for the channel 2 output in **STEREO** mode.
- Use **M+** and **M-** for the output in **MONO** mode.

The **1&2 OUT** NL4 jack provides access to channels 1 and 2. If an NL2 plug is inserted into this jack, it will have access to channel 1 only. ***Use this jack with a two-pole cable to connect the channel 1 output to the left speaker in a stereo system.***

The **2 OUT** NL4 jack provides access to channel 2 only. ***Use this jack with a two-pole cable to connect the channel 2 output to the right speaker in a stereo system.***

The **BRIDGED MONO OUT** NL4 jack provides a dedicated output for bridged mono applications. ***Use this jack with a two-pole cable to connect the bridged output to a single speaker.***

The **1&2 OUT** NL4 jack can also be used for biamp applications. ***Use this jack with a four-pole cable to connect both output channels to the high and low drivers in a biamped 2-way speaker.***

5. Connect the AC Power Cord

The AC input connector accepts standard IEC input cables. Use a grounded cable that is appropriate for your location. The AC input is auto ranging and may be used internationally without changing any settings or fuse sizes. Fuses are located in a drawer at the top of the AC input connector.

6. Turn on the Power

- Turn down the audio source before turning the unit on for the first time.
- Press the POWER button to turn the unit on or off.

Note: Audio will automatically mute on startup and shutdown to protect the speakers and eliminate unwanted transients.

7. Check the Status Indicators

The amplifier has the following status indicators:

- **POWER** - Power-status indicator, On = Normal, Flashing = Fault
- **CLIP** (one per channel) - Audio-clip indicator, Flash = Clip, Off = Normal, On = Fault
- **TEMP** (one per channel) - Over-temperature/current indicator, Off = Normal, On = Fault
- **MUTE** (one per channel) - Channel-mute indicator, Off = Normal, On = **PROTECT** or **MUTE**

POWER - Power Status Indicator

- Off = Power is Off
- On = Normal Operation
- Flash = Fault Condition, Power Supply has Shut Down, **PROTECT**

CLIP - Audio Clipping Indicators

- Off = Normal
- Left or Right Flashing = Some Clipping is Occurring
- On = Fault Condition, Excessive Clipping has Occurred, **PROTECT**

TEMP - Over-Temperature Indicators

- Off = Normal
- Left or Right Flashing = Peak-Current Warning
- Left or Right On and POWER On = Over-Current Fault, **PROTECT**
- Left or Right On and POWER Flashing = Over-Temperature Fault, **PROTECT**
- Both On = Other Fault Conditions, **PROTECT**

MUTE - Audio Mute Indicators

- Off = Normal
- Both On During Start Up or Shut Down = Normal, Audio is Muted
- Both On = **PROTECT** or **MUTE** Mode, Audio is Muted

Bidirectional 12 Volt Trigger

Benchmark has reinvented the 12 volt trigger by adding bidirectional signaling. The trigger connection on the ***AHB2*** can be used as an input, an output, or both. It is compatible with any common 12 volt trigger input or output. The **12V TRIGGER** can be used to turn the ***AHB2*** power amplifier on or off automatically in sequence with other audio system components. The ***AHB2*** can also turn other connected components on and off.

Linking Multiple Audio Components

Two or more ***AHB2*** power amplifiers can be linked together with **12V TRIGGER CABLES**, so that all units power up and down together. This group of amplifiers can be linked to a group of Benchmark ***DAC2*** D/A converters. In such a system, any power button can be used to turn the system on or off.

Trigger Wiring

The ***AHB2*** has two bi-directional **12V TRIGGER I/O** jacks. These jacks are 1/8" (3.5 mm) TRS connectors. The tip is wired to the **12V TRIGGER I/O** bus. The sleeve is wired to chassis ground. There is no connection to the ring.

Trigger Cables

The ***AHB2*** includes one 3-foot (1 m) **12V TRIGGER CABLE**. This cable has a 1/8" (3.5 mm) TRS connector at each end.

Automatic Power-Down Feature

40 Minute Timer

The ***AHB2*** has an audio signal presence detector on each input channel. If no audio is detected on either input for a period of 40 minutes, the ***AHB2*** will automatically shut down to save energy. This feature is required by law in many countries, and can contribute to significant energy savings.

This auto-off feature is programmable. Starting with the unit on, press and hold the POWER button for 7 seconds to toggle this feature (press and hold the POWER button until the MUTE lights turn off). This setting is stored in memory and is recalled when the unit is turned on.

Press and hold the power button for 1 second to view the status of this feature. If the timer is enabled, the TEMP lights will turn on while the POWER button is pressed.

Timer Deactivates the 12V TRIGGER

When the ***AHB2*** executes an automatic power down, it will pull the **12V TRIGGER** low to shut down any equipment attached to the trigger bus. The timer is only active when the system is started using the POWER button on the front of the ***AHB2***.

No Warm-Up Required

Unlike most power amplifiers, the ***AHB2*** reaches its full rated performance very quickly. Full rated performance is reached in less than one minute. For this reason, there is absolutely no reason to keep the ***AHB2*** powered on when not in use. The feed-forward error correction circuits in the ***AHB2*** keep it very stable over a wide range of operating temperatures.

AUTO-ON Feature

The ***AHB2*** has a programmable AUTO-ON feature. When this feature is enabled, the ***AHB2*** will automatically turn on whenever AC power is applied. The 40-minute timer is automatically disabled when this feature is activated. The POWER button will act as a MUTE button when this feature is enabled. When AUTO-ON is enabled, the POWER button will toggle MUTE on and off. In **MUTE MODE**, the POWER light and MUTE lights are on, and all other lights are off.

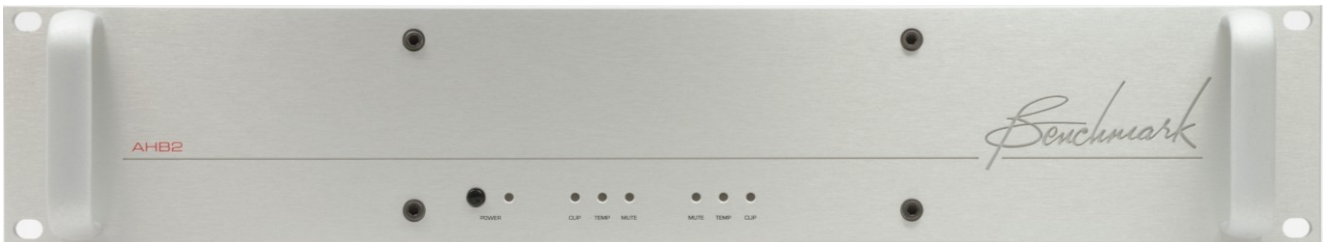
To enable the AUTO-ON feature, start with the unit off. Then press and hold the POWER button for 3 seconds. The CLIP lights will turn on at the end of 3 seconds. Release the POWER button as soon as the CLIP lights turn on. Press the POWER button to verify that the AUTO-ON mode is enabled. If it is enabled, the POWER button will toggle MUTE on and off.

To disable the AUTO-ON feature, start with the unit on. Then press and hold the POWER button for 3 seconds. The clip lights will turn off at the end of 3 seconds. Release the Power button as soon as the CLIP lights turn off. The unit should now turn off (verifying that the feature has been disabled).

Rack Mounting

The ***AHB2*** is available in a rack-mount version. The ***AHB2*** is magnetically shielded, and will not interfere with sensitive equipment mounted above or below the ***AHB2***.

Rack Mount Option



Rack Mounting Instructions

The ***AHB2*** runs very cool when idle and runs very cool under most load conditions. However, it can produce significant heat when heavily loaded. Make sure the rack is adequately ventilated. Make sure the side heat sinks have an unobstructed air flow.

Some power amplifiers can emit very strong magnetic fields. These amplifiers should be kept at least two rack units above or below the ***AHB2***. Magnetic interference can produce hum problems.

If the ***AHB2*** is mounted directly above another piece of equipment, it may be necessary to remove the feet from the ***AHB2***. Save the feet for future needs. Replacement feet may be purchased directly from Benchmark or through most authorized Benchmark dealers.

Fault Protection Circuitry

The ***AHB2*** is designed to detect overloads, short circuits, clipping, excessive temperatures, high DC offsets, and low AC input voltages. When a potentially-damaging fault occurs, the amplifier enters a special "**PROTECT**" mode to prevent damage.

The amplifier has a comprehensive set of fault-detection circuits that will activate the **PROTECT** mode to protect against damage to the amplifier or speakers.

Fault-Detection Circuits

- Temperature sensor on each output channel
- Temperature sensor on main power supply
- Current sensor on each output channel
- Voltage clip detector on each output channel
- DC offset detector on each output channel
- SOA (safe operating area) detector on each output channel
- Load sensor on main power supply
- Fault sensors on all power supplies
- AC line under-voltage fault sensor on AC input

PROTECT Mode (Both MUTE Lights On)

In PROTECT mode, both MUTE lights are on. The CLIP, TEMP, and POWER lights identify the cause of the fault.

The **PROTECT** mode is only activated when a potentially damaging fault condition has occurred. To protect against damage, both audio outputs are muted. In some fault conditions, all high-power circuits are shut off. A small auxiliary power supply remains active so that the error condition can be displayed on the front panel.

If the **POWER** light is flashing, all high-power circuits have been shut down as an additional precaution.

If a fault has triggered the PROTECT mode, the amplifier must be turned off before normal operation can resume. Identify and correct the cause of the fault before restarting the amplifier.

PROTECT Mode - Fault Codes

The following table provides a summary of all possible status display conditions. The **MUTE** lights will turn on and stay on whenever a fault condition has triggered the **PROTECT** mode.

If a fault has occurred, power must be turned off before normal operation can resume. Identify and correct the cause of the fault before restarting the amplifier.

POWER		CLIP	TEMP	MUTE		MUTE	TEMP	CLIP		Status
OFF		OFF	OFF	OFF		OFF	OFF	OFF		Power off, or no AC input
ON		ON	ON	ON		ON	ON	ON		AC Startup - lamp test
ON		OFF	OFF	ON		ON	OFF	OFF		Mute on - startup or shutdown
ON		OFF	OFF	OFF		OFF	OFF	OFF		Normal operation, no errors
ON		FLASH	OFF	OFF		OFF	OFF	OFF		Channel 1 - Clipping
ON		OFF	OFF	OFF		OFF	OFF	FLASH		Channel 2 - Clipping
ON		OFF	FLASH	OFF		OFF	OFF	OFF		Channel 1 - Current warning
ON		OFF	OFF	OFF		OFF	FLASH	OFF		Channel 2 - Current warning
FLASH		ON	OFF	ON		ON	OFF	OFF		Channel 1 - Clipping Fault
FLASH		OFF	OFF	ON		ON	OFF	ON		Channel 2 - Clipping Fault
FLASH		ON	OFF	ON		ON	OFF	ON		Chan 1&2 - Clipping Fault
ON		OFF	ON	ON		ON	OFF	OFF		Channel 1 - Over-Current Fault
ON		OFF	OFF	ON		ON	ON	OFF		Channel 2 - Over-Current Fault
ON		OFF	ON	ON		ON	ON	OFF		Chan 1&2 - Over-Current Fault
FLASH		OFF	ON	ON		ON	OFF	OFF		Channel 1 - Over Temperature
FLASH		OFF	OFF	ON		ON	ON	OFF		Channel 2 - Over Temperature
FLASH		ON	ON	ON		ON	ON	ON		Power Supply Fault, Loss of AC
ON		ON	ON	ON		ON	ON	ON		SOA Fault

Clipping Fault

The input and output audio signals are compared to determine when clipping is occurring. Occasional clipping will cause the **CLIP** lights to flash and will not trigger this fault. However, if a severe overdrive condition occurs, this fault is triggered to prevent damage to speakers. This fault indicates that the amplifier has been driven very hard into voltage clipping. Both channels are muted to protect the amplifier and speakers. A power reset will be required.

Fault Display:

- **POWER** light is Flashing
- Both **MUTE** lights are On
- One or both **CLIP** lights are On
- Both **TEMP** lights are Off

Typical Causes:

- The sensitivity switch may be set too high
- Output of preamplifier or DAC is too high

Required Actions:

- Check the position of the **SENSITIVITY** switch
- Move the sensitivity switch down one or two positions if necessary
- Turn down the audio source
- Restart the amplifier

Over-Current Fault

The output current of each channel is constantly monitored. If either channel exceeds a safe output current, this fault is triggered and both channels are muted to protect the amplifier and speakers. A power reset will be required.

Fault Display:

- **POWER** light is On
- Both **MUTE** lights are On
- Both **CLIP** lights are Off
- One or both **TEMP** lights are On

Typical Causes:

- The load impedance of the speakers may be too low
- Speaker cables may be shorted

Required Actions:

- Check for shorted speaker cables
- Make sure the nominal Stereo load impedance is 3 Ohms or higher
- Make sure the nominal Bridged Mono load impedance is 6 Ohms or higher
- Turn down the audio source
- Restart the amplifier

Speaker impedance always varies with frequency. Speaker impedance may be much lower than the rated "nominal" impedance at certain frequencies. The over-current fault detection circuits prevent potential damage that can be caused by driving very high signal levels into very low impedances. In **STEREO** mode, at full output, the current limit can be reached if the load impedance dips below about 1.3 Ohms. In **MONO** mode, at full output, the current limit can be reached if the load impedance dips below about 2.6 Ohms.

SOA Fault

The SOA (Safe Operating Area) of the output power devices is constantly monitored. If this safe operating area is violated, both channels are muted to protect the amplifier and speakers. A power reset will be required.

Fault Display:

- **POWER** light is On
- Both **MUTE** lights are On
- Both **CLIP** lights are On
- Both **TEMP** lights are On

Typical Causes:

- The load impedance of the speakers may be too low
- Speaker cables may be shorted
- Amplifier has been overloaded with a high-amplitude test tone

Required Actions:

- Check for shorted speaker cables
- Make sure the nominal **STEREO** load impedance is 3 Ohms or higher
- Make sure the nominal Bridged **MONO** load impedance is 6 Ohms or higher
- Turn down the audio source
- Restart the amplifier

Over-Temperature Fault

The temperature of the left and right heat sinks are constantly monitored. If either heat sink reaches the maximum allowable temperature, both channels are muted to protect the amplifier and speakers. All high-power subsystems are shut down to accelerate the cooling process. One or both heat sinks will be very hot. After the unit cools, a power reset will be required.

Fault Display:

- **POWER** light is Flashing
- Both **MUTE** lights are On
- Both **CLIP** lights are Off
- One **TEMP** light is On

Typical Causes:

- The load impedance of the speakers may be too low
- Heat sinks may be obstructed
- Amplifier has been overloaded with a high-amplitude test tone

Required Actions:

- Make sure the nominal **STEREO** load impedance is 3 Ohms or higher
- Make sure the nominal Bridged **MONO** load impedance is 6 Ohms or higher
- Maintain adequate clearance around heat sinks
- Allow time for the amplifier to cool
- Turn down the audio source
- Restart the amplifier

Power Supply Fault

The power supply has a number of sensors that monitor voltage, current, and temperature. If any parameter exceeds safe limits, both channels are muted to protect the amplifier and speakers. This fault may indicate that the AC power has been interrupted. It may also indicate that the power supply has overheated. It may also indicate the detection of an overload on one of the power supply rails. It may also indicate a fault condition in the power supply system. All high-power subsystems are shut down. A power reset will be required.

Fault Display:

- **POWER** light is Flashing
- Both **MUTE** lights are On
- Both **CLIP** lights are On
- Both **TEMP** lights are On

This fault display will only persist if AC is present.

In the event of a total loss of AC power, this error display will stay on for about 15-30 seconds and then all lights will turn off.

Typical Causes:

- The AC line voltage may have dropped below allowable limits for a few seconds
- AC power has been lost (if all lights turn off after about 15-30 seconds)
- The load impedance of the speakers may be too low
- Heat sinks may be obstructed
- Amplifier has been overloaded with a high-amplitude test tone

Required Actions:

- Check the AC power source
- Make sure the nominal **STEREO** load impedance is 3 Ohms or higher
- Make sure the nominal Bridged **MONO** load impedance is 6 Ohms or higher
- Maintain adequate clearance around heat sinks
- If unit is hot, allow time to cool
- Turn down the audio source
- Restart the amplifier

Specifications

Rated Output Power

1 kHz, < 0.00015% THD

- 100 W/channel into 8 Ohms, both channels driven
- 130 W/channel into 6 Ohms, both channels driven
- 190 W/channel into 4 Ohms, both channels driven
- 240 W/channel into 3 Ohms, both channels driven
- 200 W Bridged Mono into 16 Ohms
- 380 W Bridged Mono into 8 Ohms
- 480 W Bridged Mono into 6 Ohms

Output Current

- 29 A peak into 1 Ohm, both channels driven

Output Voltage

- > 80 Vpp into any rated load

Frequency Response

- Better than 0.1 Hz to 200 kHz, +0/-3 dB
- -0.01 dB at 20 Hz, -0.17 dB at 20 kHz, 8-Ohm Load
- -0.23 dB at 20 Hz, -0.32 dB at 20 kHz, 4-Ohm Load

Signal to Noise Ratio

- 132 dB A-Weighted, Stereo Mode
- 135 dB A-Weighted, Bridged Mono
- 130 dB Unweighted, 20 Hz to 20 kHz, Stereo Mode
- 133 dB Unweighted, 20 Hz to 20 kHz, Stereo Mode

Distortion

THD+N

- 1 kHz, 80 kHz LPF, at full rated output into any rated load
- < -118 dB (< 0.00013%) - Stereo Mode
- < -118 dB (< 0.00013%) - Mono Mode

THD

1 kHz, 20 kHz LPF, at full rated output into any rated load

- < -119 dB (< 0.00011%) - Stereo Mode
- < -120 dB (< 0.00010%) - Mono Mode

Crosstalk

- Better than -115 dB at 1 kHz
- Better than -92 dB at 20 kHz

Input Sensitivity

- Low-Gain = 22 dBu (9.8 Vrms)
- Mid-Gain = 14.2 dBu (4 Vrms)
- High-Gain = 8.2 dBu (2 Vrms)
- Use Mid-Gain or High-Gain settings for unbalanced inputs
- Unbalanced inputs require RCA to XLRM adapter cables

Input Impedance

- 50 k Ohms, normal mode
- 1 M Ohm, common mode

Input CMRR

- 80 dB at 20 Hz, typical
- 80 dB at 1 kHz, typical
- 65 dB at 20 kHz, typical

Trigger I/O

- 12 VDC 200 mA current-limited output to trigger turn-on of remote devices
- DC input for slaving to remote devices
- Input responds to 3.3 V logic and higher, VIL = 1.26 V, VIH = 2.7 V
- Absolute maximum input voltage = 30 Vdc
- Absolute minimum input voltage = -0.3 Vdc
- Input Impedance = 20 k Ohms
- Two 1/8" (3.5 mm) TRS jacks
- Tip = 12 Volt Trigger I/O, Ring = no connection, Sleeve = chassis ground

Damping Factor

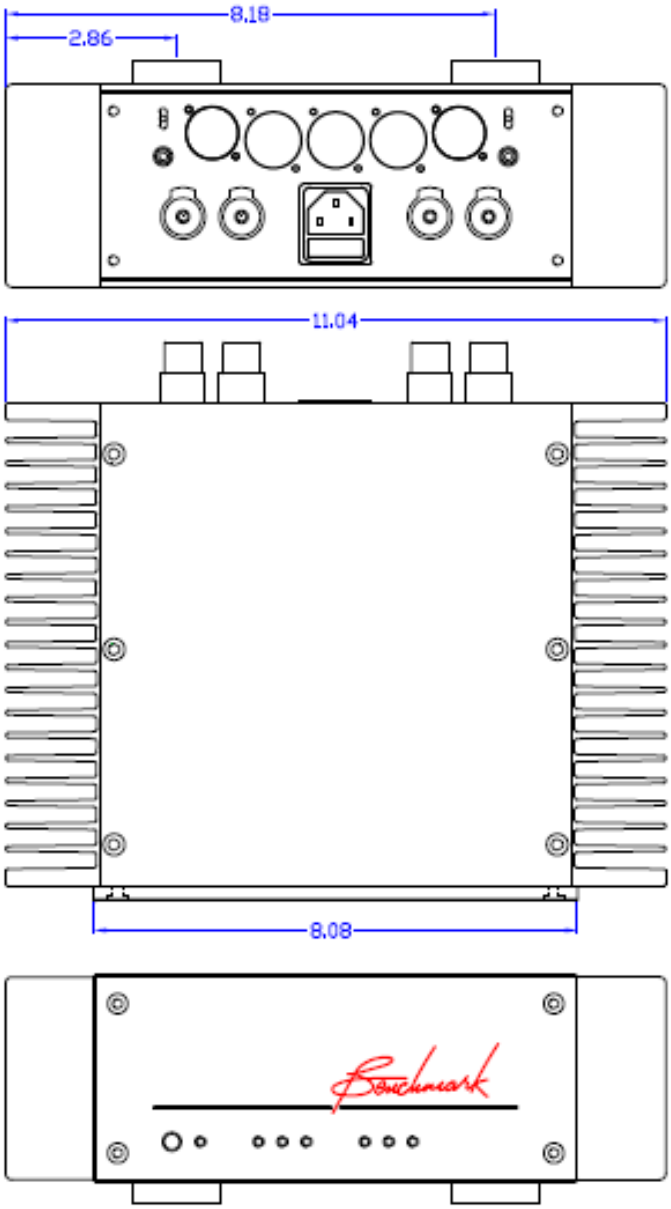
- 350 at 20 Hz, 8-Ohms
- 254 at 1 kHz, 8-Ohms
- 34 at 20 kHz, 8-Ohms
- 7 at 200 kHz, 8-Ohms

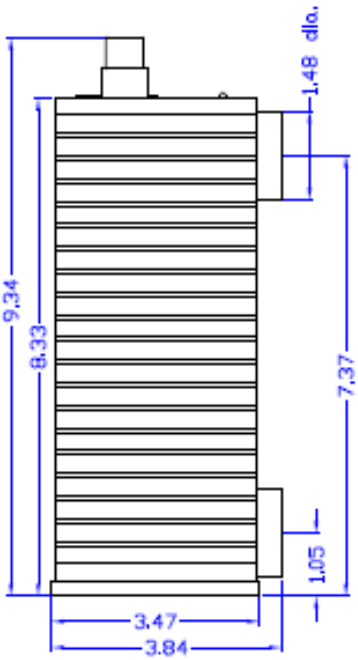
Environmental

- 0° C to 50° C (32° F to 122° F) Ambient Temperature
- Up to 80% Humidity - Non-condensing

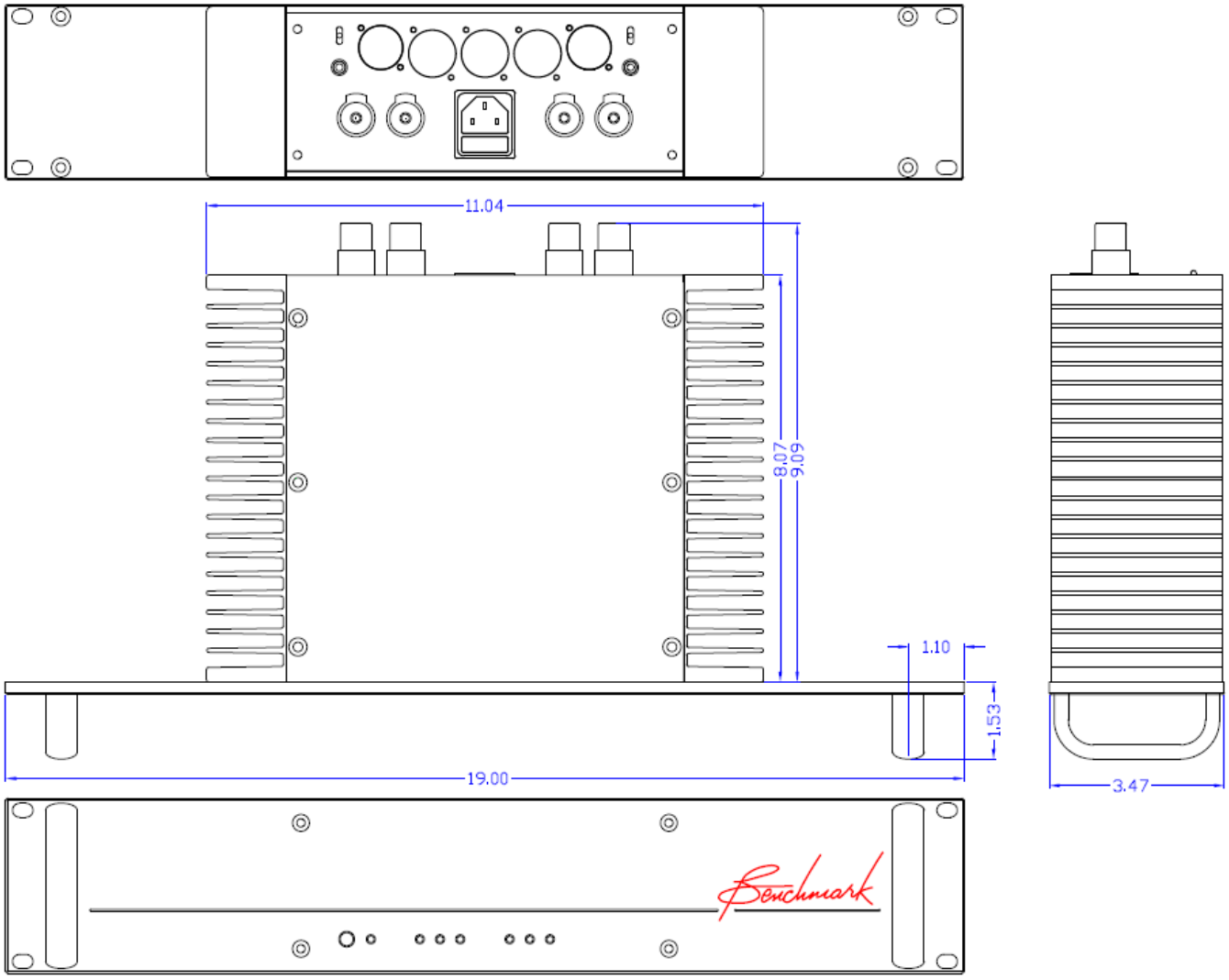
Mechanical Drawings

Dimensions

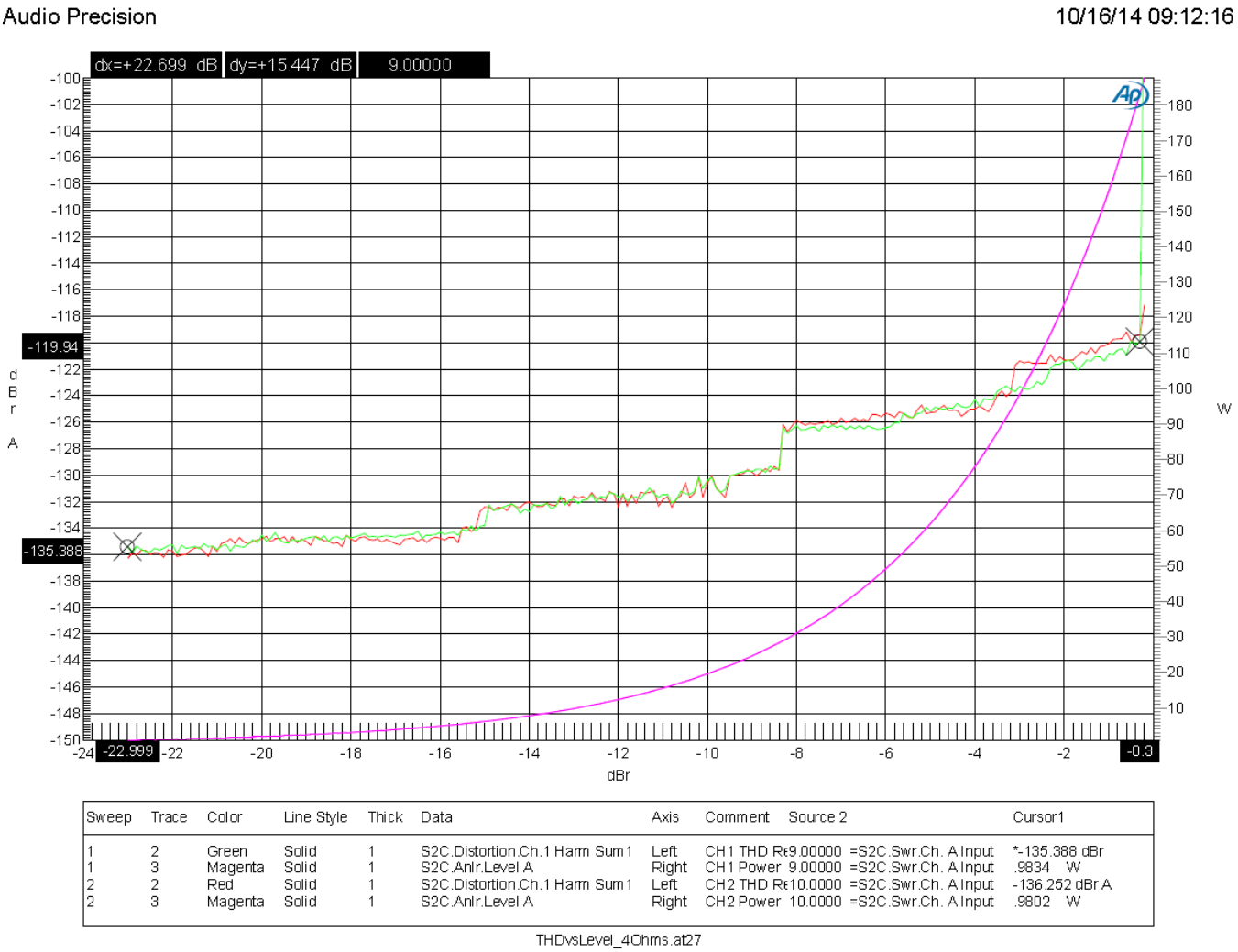




Rack-Mount Dimensions



Performance Plots



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment	Source 2	Cursor1
1	2	Green	Solid	1	S2C.Distortion.Ch.1 Harm Sum1	Left	CH1 THD R	9.00000 =S2C.Swr.Ch. A Input	*-135.388 dBr
1	3	Magenta	Solid	1	S2C.Anlr.Level A	Right	CH1 Power	9.00000 =S2C.Swr.Ch. A Input	.9834 W
2	2	Red	Solid	1	S2C.Distortion.Ch.1 Harm Sum1	Left	CH2 THD R	10.0000 =S2C.Swr.Ch. A Input	-136.252 dBr A
2	3	Magenta	Solid	1	S2C.Anlr.Level A	Right	CH2 Power	10.0000 =S2C.Swr.Ch. A Input	.9802 W

THDvsLevel_4Ohms.at27

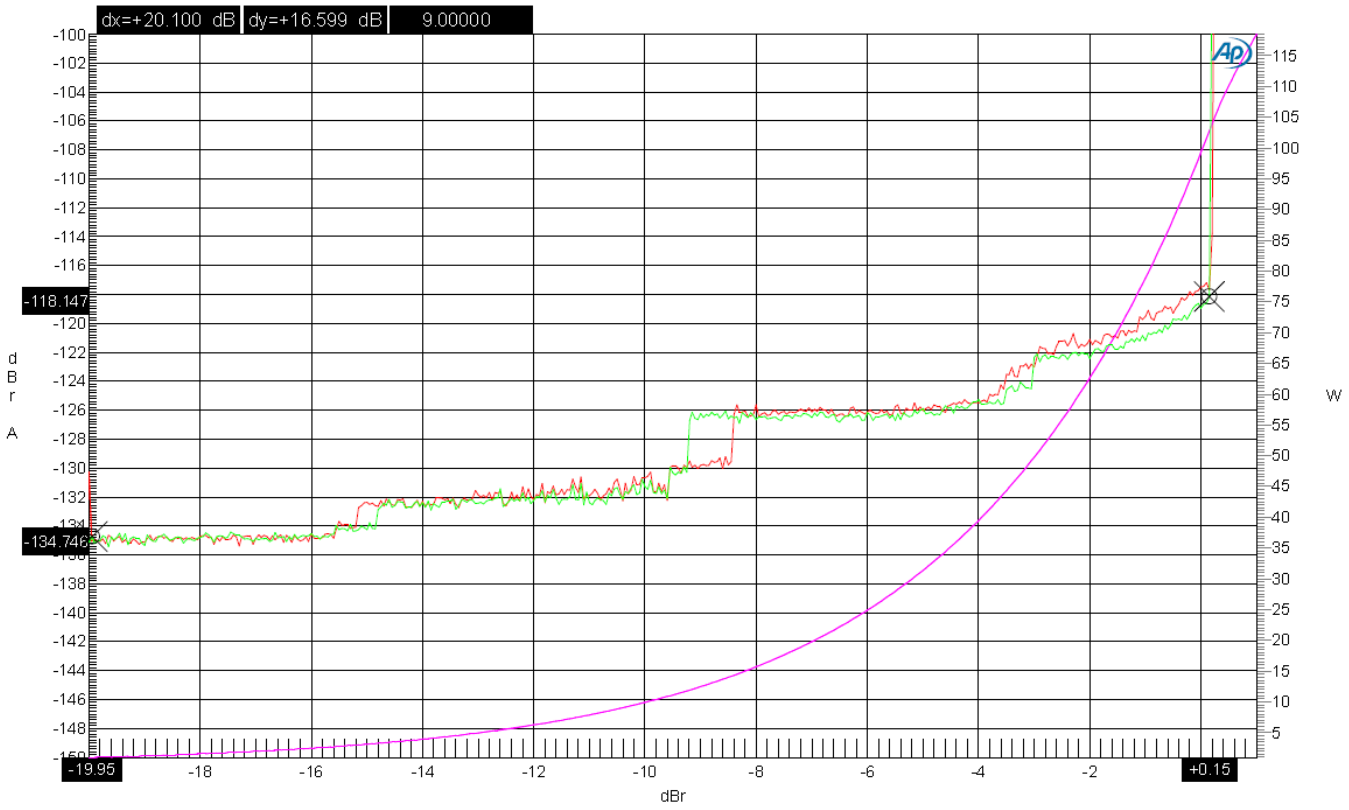
Figure 1 – THD vs. Output Power - 4-Ohm Load

This plot shows the extraordinary THD performance of the ***AHB2***. The feed-forward error correction circuits keep the output nearly distortion free.

The magenta curve is the output power. Power is shown on the right-hand vertical scale.

The green trace is the THD measured at the output of the left channel when loaded with 4-Ohms. The red trace is the THD measured at the output of the right channel when loaded with 4-Ohms. THD is shown on the left-hand scale.

The stair steps are caused by the THD within the AP2722. This stair stepping demonstrates that the ***AHB2*** is at or below the measurement limits of the AP2722 test set, even when the ***AHB2*** is driving a heavy load.

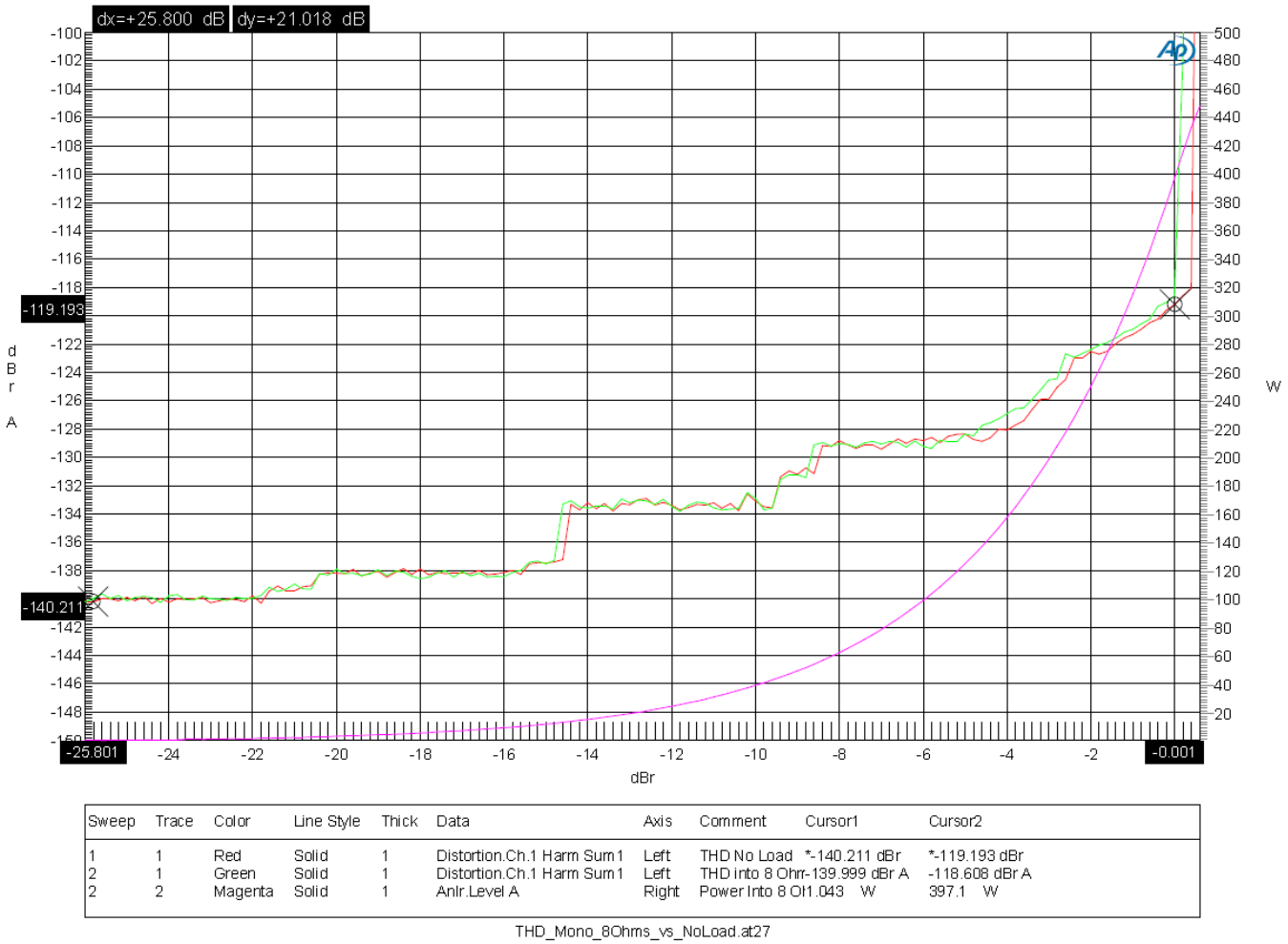


Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment	Source 2	Cursor1
1	2	Green	Solid	1	S2C.Distortion.Ch.1 Harm Sum1	Left	CH1 THD R€9.00000	=S2C.Swr.Ch. A Input	*-134.746 dBr
1	3	Magenta	Solid	1	S2C.Anlr.Level A	Right	CH1 Power 9.00000	=S2C.Swr.Ch. A Input	1.006 W
2	2	Red	Solid	1	S2C.Distortion.Ch.1 Harm Sum1	Left	CH2 THD R€10.0000	=S2C.Swr.Ch. A Input	-135.050 dBr A
2	3	Magenta	Solid	1	S2C.Anlr.Level A	Right	CH2 Power 10.0000	=S2C.Swr.Ch. A Input	1.004 W

THDvsLevel_8Ohms.at27

Figure 2 – THD vs. Output Power - 8-Ohm Load

This plot shows the THD of the ***AHB2*** with an 8-Ohm load. Note that the results are almost identical to those shown in Figure 1 (with a 4-Ohm load). Together, these two plots demonstrate that the THD performance of the ***AHB2*** does not change with load.

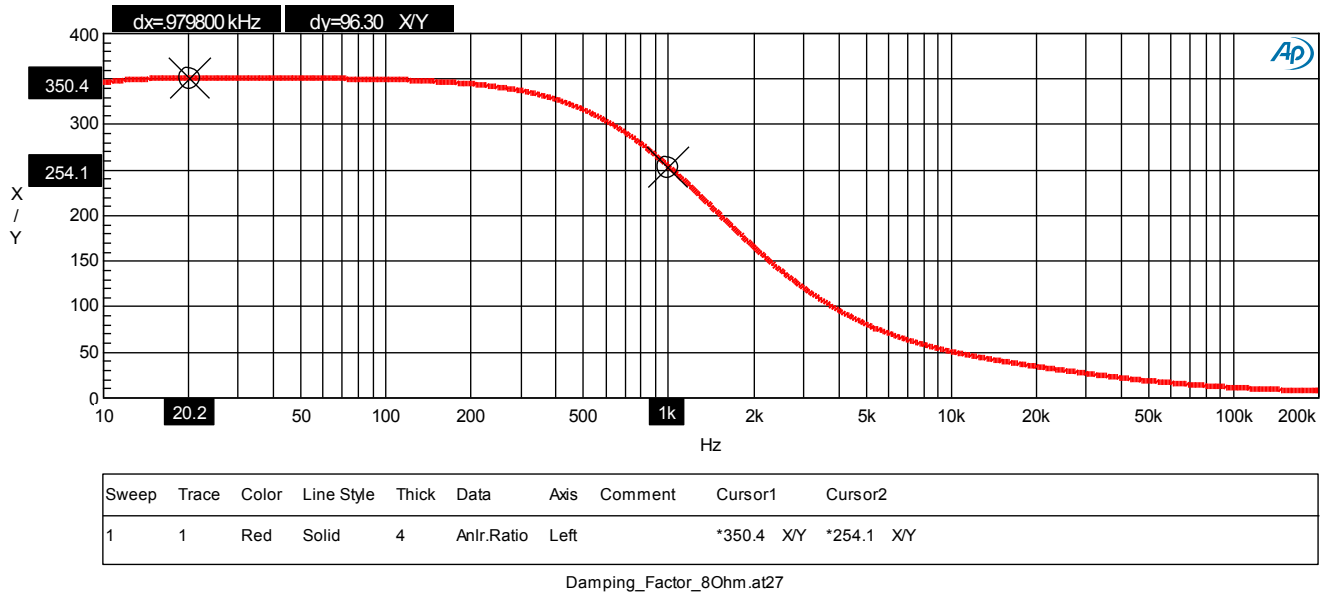


Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment	Cursor1	Cursor2
1	1	Red	Solid	1	Distortion.Ch.1 Harm Sum1	Left	THD No Load	*-140.211 dBr	*-119.193 dBr
2	1	Green	Solid	1	Distortion.Ch.1 Harm Sum1	Left	THD into 8 Ohm	-139.999 dBr A	-118.608 dBr A
2	2	Magenta	Solid	1	Anlr.Level A	Right	Power Into 8 Ol	1.043 W	397.1 W

THD_Mono_8Ohms_vs_NoLoad.at27

Figure 3 – THD vs. Output Power, Bridged Mono - 8-Ohm Load compared to No-Load

This plot also shows that the THD produced by the ***AHB2*** does not increase with loading. The red trace is the no-load THD performance in bridged mono mode. The green trace is the THD performance while driving an 8-Ohm load in bridged mono mode. Note that the ***AHB2*** shows no signs of increased distortion while delivering 397 W into 8-Ohms bridged mono.



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment	Cursor1	Cursor2
1	1	Red	Solid	4	Anlr.Ratio	Left		*350.4 X/Y	*254.1 X/Y

Damping_Factor_8Ohm.at27

Figure 4 – Damping Factor - 8-Ohm Load

This plot shows that the ***AHB2*** provides excellent damping to keep speakers tightly controlled.

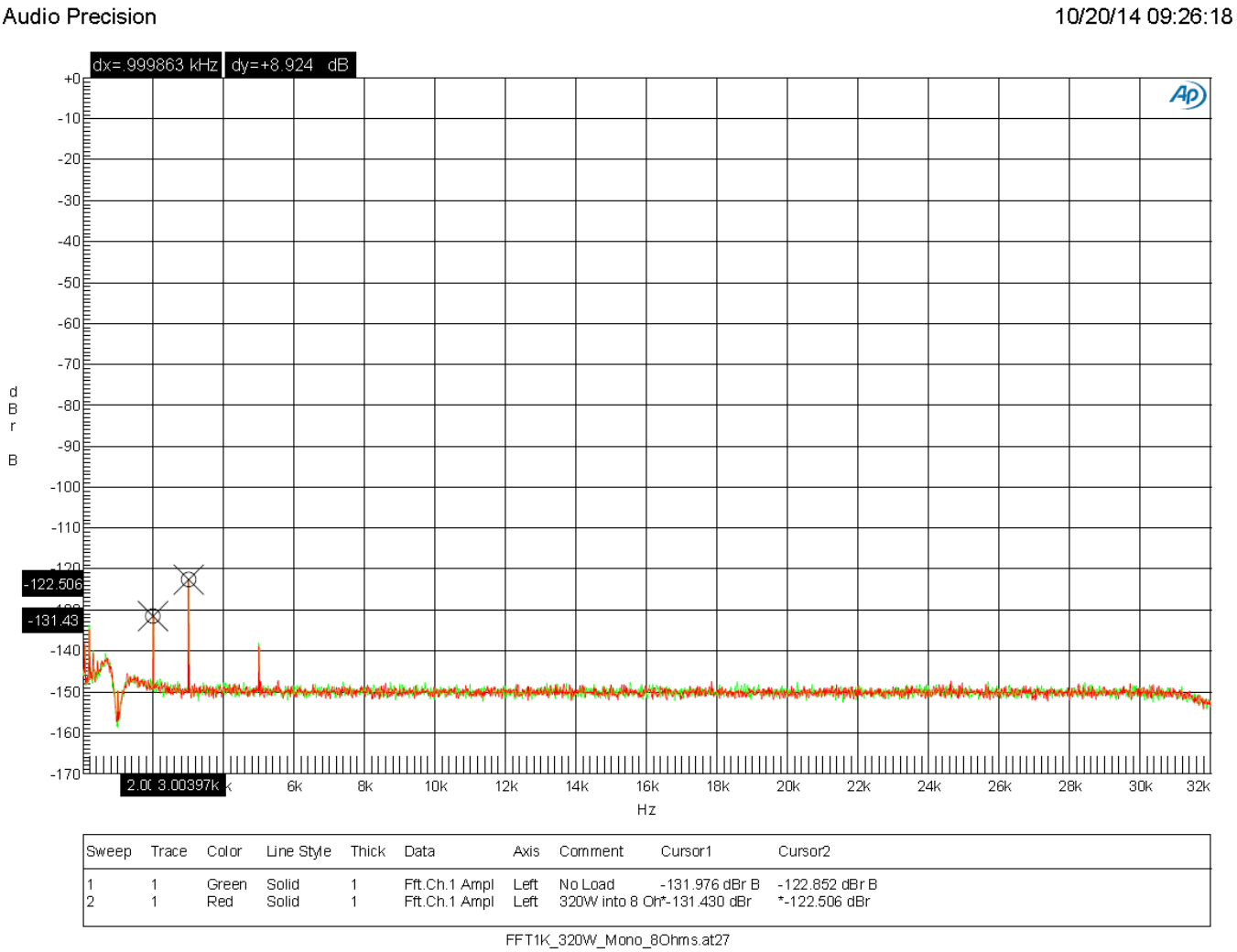


Figure 5 – FFT at 320W, 1 kHz, 8-Ohms Bridged Mono

This FFT plot shows the spectral purity of the ***AHB2***. The green trace is the no-load performance. The red trace is the performance at 320 W. Both are nearly identical. The 1 kHz fundamental has been removed with a notch filter to improve the resolution of the AP2722 test set. The 2nd harmonic measures -131.5 dB relative to the 1 kHz fundamental. The 3rd harmonic measures -122.5 dB relative to the 1 kHz fundamental. The only other harmonic visible is the 5th and this measures about -139 dB relative to the fundamental.

Regulatory Compliance

FCC and RoHS Compliance Statements

FCC Notice (U.S. Only)

NOTICE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received including interference that may cause undesired operation.

Instructions to Users: This equipment complies with the requirements of FCC (Federal Communication Commission) equipment provided that following conditions are met:

- RCA Digital Connections: Shielded 75-Ohm coaxial cable must be used.

NOTICE: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RoHS Compliant Information

This statement clarifies Benchmark Media Systems, Inc. product compliance with the *EU*'s (European Union) directive 2002/95/EC, or, *RoHS* (Restrictions of Hazardous Substances).

As of July 01, 2006, All Benchmark Media Systems, Inc. products placed on the European Union market are *compliant* (containing quantity limit weight less than or equal to 0.1% (1000 ppm) of any homogeneous Lead (Pb), Mercury (Hg), Hexavalent Chromium (Cr VI), and flame retardant Polybrominated Biphenyls (PBB) or Polybrominated Diphenyl Ethers (PBDE)).

CE Certificate of Conformity

Certificate of Conformity

Diversified T.E.S.T. Technologies, Inc. has tested the product to the current appropriate standards and finds that the product is in compliance with those requirements.

EMC Directive:	**2004/108/EC**	
Generic Emissions Standard:	EN 61000-6-3: 2007+A1:2011	EN 61000-6-4:2007+A1:2011
Product Specific Emissions:	EN55022/EN55103-1	
Generic Immunity Standard:	EN 61326-1:2006	EN 61000-6-1: 2007 EN 61000-6-2: 2005
Immunity:	EN 61000-4-2:2009	Electrostatic Discharge
	EN 61000-4-3:2006+A2:2010	Radiated Susceptibility
	EN 61000-4-4:2004+A1:2010	Electrical Fast Transient/Burst
	EN 61000-4-5:2006	Surge
	EN 61000-4-6:2009	Conducted Susceptibility
	EN 61000-4-8:2010	Magnetics
	EN 61000-4-11:2004	Voltage Dips & Interruptions
	EN 61000-3-2:2006+A2:2009	Harmonic Current
	EN 61000-3-3:2008	Voltage Fluctuations & Flicker
Low Voltage Directive:	**2006/95/EC**	
Standard:	EN 60950:2005+A1:2009	Safety of Information Technology Equipment
	EN 61010:2010	Equipment for Measurement, Control, & Laboratory Use
Machinery Directive:	**2006/42/EC**	
Standard:	EN 60204:2006+A1:2009	Safety of Machinery
Medical Directive:	**2001/104/EC**	
Standard:	EN 60601	Medical Electrical Equipment

Manufacturer's Name:	**Benchmark Media Systems**
Manufacturer's Address:	203 E Hampton Pl, Ste 2 Syracuse, NY 13206
Product:	AHB2 - High Resolution Amplifier
Model Number:	AHB2

This Certificate of Compliance issued June 9, 2014 is valid for the test sample of the product specified above and that it conforms to the Directive(s) and Standard(s).

Signature: _____

Annelle Frierson
Vice President
Diversified T.E.S.T. Technologies, Inc.

DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. CORPORATE SEAL 1991 NEW YORK

Safety

Product: Audio Amplifier, Audio Equipment, Stereo Audio Amplifier

Model: AHB2

Part Number: 500-18000-xx0

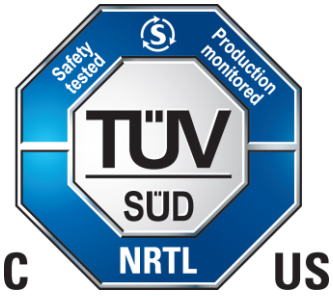
Parameters:

- Rated Input Voltage: 100-120 Vac; 220-240 Vac
- Rated Frequency: 50/60 Hz
- Rated Input Current: 8A
- Protection Class: I

Tested according to:

- CAN/CSA C22.2 60065/A1:2006
- UL 60065:2007
- EN60065/A12:2011

Certification Mark:



Warranty Information

Benchmark 1-Year Warranty

The Benchmark 1-Year Warranty

Benchmark Media Systems, Inc. warrants its products to be free from defects in material and workmanship under normal use and service for a period **of one year from the date of delivery.**

This warranty extends only to the original purchaser. This warranty does not apply to fuses, lamps, batteries, or any products or parts that have been subjected to misuse, neglect, accident, modification, or abnormal operating conditions.

In the event of failure of a product under this warranty, Benchmark Media Systems, Inc. will repair, at no charge, the product returned to its factory. Benchmark Media Systems, Inc. may, at its option, replace the product in lieu of repair. If the failure has been caused by misuse, neglect, accident, or, abnormal operating conditions, repairs will be billed at the normal shop rate. In such cases, an estimate will be submitted before work is started, if requested by the customer.

Attempts to deliberately deface, mutilate, or remove the product's label will render this warranty void. Benchmark will not honor warranties for any products disingenuously purchased on the US or Canadian markets for export.

The foregoing warranty is in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability, fitness or adequacy for any particular purpose or use. Benchmark Media Systems, Inc. shall not be liable for any special, incidental, or consequential damages, and reserves the right to change this information without notice. This limited warranty gives the consumer-owner specific legal rights, and there may also be other rights that vary from state to state.

Benchmark Extended Warranty Options

The Benchmark Extended 5-Year Warranty *

Benchmark Media Systems, Inc. optionally extends the standard 1-year warranty to a period of **five years from the date of delivery.**

*For the extended warranty to become effective, the original purchaser must register the product at the time of purchase either by way of the enclosed registration card or through the product registration section of the Benchmark Media Systems, Inc. website. This optional warranty applies only to products purchased within the US and Canada and is extended only to the original purchaser.

Attempts to deliberately deface, mutilate, or remove the product's label will render this warranty void. Benchmark will not honor warranties for any products disingenuously purchased on the US or Canadian markets for export. The terms of the extended warranty are subject to change without notice. For products purchased outside the US and Canada, please refer to the Extended Two 2-Year International Warranty.

The Benchmark Extended 2-Year International Warranty **

Benchmark Media Systems, Inc. optionally extends the standard 1-year warranty to a period of **two years from the date of delivery.**

**For the extended warranty to become effective, the original purchaser must register the product at the time of purchase either by way of the enclosed registration card or through the product registration section of the Benchmark Media Systems, Inc. website. This optional warranty applies only to products purchased outside the US and Canada and is extended only to the original purchaser.

Attempts to deliberately deface, mutilate, or remove the product's label will render this warranty void. Benchmark will not honor warranties for any products disingenuously purchased on the US or Canadian markets for export. The terms of the extended warranty are subject to change without notice. For products purchased in within the US and Canada, please refer to the Extended Five 5-Year Warranty.

Notes on Warranty Repairs

An RMA (return merchandise authorization) number, issued by our Customer Service Department, is required when sending products for repair.

They must be shipped to Benchmark Media Systems prepaid and preferably in their original shipping carton with the RMA number clearly visible on the exterior of the packaging. A letter should be included giving full details of the difficulty.

Consignes de Sécurité Importantes (French)

Symboles de Sécurité

 Ce symbole avertit l'utilisateur d'importantes instructions de fonctionnement et d'entretien dans la documentation accompagnant cet appareil.

 Ce symbole avertit l'utilisateur de la présence de tensions isolées à l'intérieur de l'unité qui peuvent provoquer des chocs électriques dangereux.

 Ce symbole avertit l'utilisateur de la présence de tensions sur les connecteurs de sortie qui peuvent causer des chocs électriques dangereux.

Ce symbole avertit l' utilisateur que le produit ne peut être utilisé en toute sécurité à des altitudes inférieures à 2000 mètres.

 Ce symbole avertit l' utilisateur que le produit ne peut être utilisé en toute sécurité dans les climats non tropicaux.

Mesures de Sécurité

1. Lisez ces instructions.
2. Conservez ces instructions.
3. Respectez tous les avertissements.
4. N'utilisez-pas cet appareil près de l'eau.
5. Ne pulvérisez-pas un liquide sur une surface quelconque, car cela pourrait provoquer une situation dangereuse. Nettoyez-le uniquement avec un chiffon humide.
6. Ce dispositif génère de la chaleur lorsqu'il fonctionne normalement. Opérez dans un endroit bien ventilé. Ne bloquez-pas les ailettes du dissipateur de chaleur situées de chaque côté de l'appareil. Celles-ci émettent de la chaleur et doivent être bien ventilées.
7. N'installez-pas l'appareil à proximité de sources de chaleur telles que des radiateurs, registres de chaleur, poêles ou autres appareils produisant de la chaleur.
8. Utilisez uniquement avec des pièces jointes et des accessoires spécifiés par le fabricant.
9. Utilisez seulement avec un stand, support ou une table conçue pour supporter le poids de l'appareil. Assurez-vous que des blessures ou des dommages ne se traduiront pas par des câbles tirés sur l'appareil ou son montage.

10. Les sorties haut-parleurs sont capables de produire des tensions dangereuses. Utilisez des connexions de haut-parleurs isolées. Débranchez l'appareil avant de modifier les connexions de sortie de haut-parleur.

11. Confiez toute réparation à un personnel qualifié. Il n'y a pas de pièce réparable par l'utilisateur à l'intérieur de l'appareil. Il y a des tensions élevées exposées à l'intérieur de l'unité et celles-ci peuvent persister après que l'appareil est débranché. Ne tentez pas d'ouvrir l'un des couvercles, et ne retirez-pas les attaches. L'ouverture de l'unité annulera la garantie.
12. Certaines pièces sont liées à la sécurité, ou sont tenues de respecter certaines règles. Toutes les pièces doivent être remplacées par des remplacements exacts sauf autorisation écrite accordée par référence. Les substitutions et modifications non autorisées peuvent créer des conditions de fonctionnement dangereuses ou non conformes qui annuleront la garantie. Les modifications non autorisées peuvent entraîner des risques d'incendie et d'électrocution. Toute modification non autorisée peut entraîner l'appareil à émettre des ondes excessive et les interférences magnétiques. Des modifications peuvent réduire l'immunité aux perturbations extérieures. Ne faites appel un personnel qui offrent des services de modification de produit.

13. Le cordon du CA est amovible. Utilisez un cordon 3 broches mis à la terre approprié à votre région. Votre revendeur peut vous fournir le cordon correct.
14. Ne pas oublier le but de la prise de courant mise à la terre. La prise de terre est fournie pour votre sécurité. Quand une prise 3 broches n'est pas disponible, veuillez consulter un électricien pour remplacer la prise obsolète. Ne pas utiliser d'adaptateurs 2 broches vers 3 broches. Ne pas tenter de résoudre les problèmes de bruissement en soulevant sécurité terre du CA !
15. Débranchez cet appareil pendant les orages ou si vous le laissez inutilisé pendant de longues périodes de temps.
16. Cet appareil est équipé d'une alimentation intégrée auto-adaptable. Il n'y a pas de commutateur de sélection de tension interne - ne tentez pas d'ouvrir l'appareil. Les gammes de tension de fonctionnement vont de 100 à 120 Vac +/- 10%, et de 220 à 240 Vac +/- 10%. La fréquence de fonctionnement est de 50 à 60 Hz. Toutes les tensions d'exploitation utilisent le même type de fusible.
17. Pour une protection anti-feu et anti-chocs continue remplacez toujours les fusibles avec la bonne taille et le bon type (T 8A H 250V, 5x20mm), (T = temps de retard, 8A = huit ampères, H = haut pouvoir de coupure, 250V = tension nominale, 5x20mm = taille de la cartouche). . Les fusibles ultrarupture utilisent un corps en céramique. Utilisez Bel Fuse 5HT 8-R, ou Schurter 0001.2513, ou un modèle exactement équivalent. Le porte-fusible comprend deux fusibles. Toujours remplacer les deux fusibles en même temps.

18. Ce produit ne peut être utilisé en toute sécurité à des altitudes inférieures à 2000 mètres.

19. Ce produit ne peut être utilisé en toute sécurité dans les climats non tropicaux.

Appendix

A Radical Approach to Power Amplification

The performance of the ***AHB2*** would not have been achievable without taking a radical approach to power amplification. In many ways, the ***AHB2*** is a complete 180 degree departure from traditional high-end amplifier designs.

- ***AHB™ Amplifier –*** This unique amplifier uses THX-patented AAA(TM) (Achromatic Audio Amplifier) technology to achieve high efficiency and vanishingly low distortion. The AHB2 combines class-H, and class-AB amplifier technologies with feed-forward error correction.
- ***Feed-Forward Error Correction -*** Each channel of the ***AHB2*** is equipped with a main amplifier and an ultra-clean low-power auxiliary error-correction amplifier. The main class-AB amplifier provides the bulk of the power while the auxiliary amplifier provides a low-power error-correction signal. These amplifiers are combined to create a near-perfect null of all distortion components. The ***AHB2's*** patented feed-forward error-correction system is much more effective than traditional feedback error-correction systems. Distortion does not change with loading, and does not rise near maximum output. Difficult loads are driven with near-perfect clarity. Low-level musical details are delivered without the masking effects of crossover distortion. The ***AHB2*** is virtually distortion free at low levels, at maximum output, and everywhere in between. Overall, the distortion produced by the ***AHB2*** is so low, that it approaches or exceeds the measurement limits of some of the finest audio test systems.
- ***Error-Correction Amplifier -*** The error-correction amplifier is a small ultra-clean amplifier that feeds a correction signal forward to the main output. The correction amplifier actively drives the output while the main output devices are transitioning between push and pull states. The correction amplifier actively suppresses distortion products that would normally occur in a class-AB output stage. This feed-forward system is much more effective than traditional feedback networks. Feedback systems attempt to correct errors after they happen. In contrast, feed-forward systems can prevent errors from occurring.
- ***Low-Bias Class-AB Main Amplifier -*** Class-AB output stages always produce "crossover distortion" whenever the push-pull output drivers change state. Precise bias control is usually required to minimize this crossover distortion. Traditional feedback networks have difficulty correcting the transients caused by push-pull crossover transitions. However, the THX patented feed-forward error-correction system has the speed and precision necessary to virtually eliminate all traces of crossover distortion. With this feed-forward system, bias currents have no significant impact on the distortion at the output of the amplifier. This topology provides the freedom to conserve power by setting unusually low bias currents. The ***AHB2*** uses very low bias currents but achieves vanishingly low distortion - even under heavy loading.
- ***Class-H Tracking Rails -*** Multiple power supply rails (class-G), and tracking power supply rails (class-H), can improve the efficiency of a class-AB amplifier. The ***AHB2*** uses a lower fixed rail and an upper class-H tracking rail. The improved efficiency provided by this topology usually comes at the cost of increased distortion. For this reason, there are very few amplifiers that use multiple supply rails. In a traditional feedback design, every rail switch point adds another layer of crossover distortion. In contrast, the feed-forward error correction used in the ***AHB2*** is so effective that multiple rails can be added without incurring any distortion penalty.

- ***Low Gain –*** The ***AHB2*** has a low gain setting that optimizes the gain structure of professional monitoring systems. Maximum rated output is reached at an input signal level of 22 dBu. This places the upstream equipment in an ideal operating range to maximize the SNR of the monitoring chain. Most power amplifiers have far too much gain, and this degrades noise performance of the overall system. To provide compatibility with lower input signal levels, the ***AHB2*** has an ultra low-noise input amplifier with a 3-prosition gain switch. The upper two settings boost the gain to allow direct interfacing with Hi-Fi components that typically operate at lower signal levels than those produced by professional components.
- ***Passive Cooling –*** The sonic performance of the ***AHB2*** would be impossible to appreciate if it had a motor-driven fan. There are no noise-generating fans to detract from the total silence of the ***AHB2***. Experience every detail of your favorite recordings without the masking effects of fan noise.
- ***Resonant Switch-Mode Power Supply –*** Most high-end power amplifiers use unregulated linear power supplies. The conventional wisdom is that linear supplies are electrically quieter than switching supplies. Benchmark's research shows that this is a myth. Linear supplies have transformers that operate at the AC mains frequency. The problem with these 50 to 60 Hz transformers is that they must be very large in order to supply the required power. These large low-frequency transformers generate large stray magnetic fields that can interfere with other nearby devices, and with the amplifier itself. The noise performance of many traditional power amplifiers is limited by the amplitude of the AC line-related hum. This hum is often magnetically induced and is very hard to eliminate. To solve these problems, Benchmark now uses switching power supplies in all of its newer products. Switching frequencies are set well above the audio band. More importantly, the high switching frequency greatly reduces the size of the magnetic components and the magnitude of the stray magnetic fields. Resonant switching is used in the ***AHB2*** to minimize switching noise. Resonant supplies switch at low voltage and low current and are much quieter than traditional switching supplies.
- ***Regulated Power Supply -*** Audio amplifiers usually use unregulated supplies. The theory is that the amplifier can produce higher peak output power for a given power supply size. Linear regulation would throw away power that could be delivered to the output devices. Benchmark's move to switching supplies changes the efficiency equations. Switching supplies can produce a regulated output without wasting power and without creating unwanted heat. A further advantage of regulation is that the output voltage is not a function of AC line voltage, prior audio content, or speaker loading. The switching supply in the ***AHB2*** responds to bass frequencies, maintains a constant low-ripple output voltage, and delivers very predictable output power.
- ***Low Stored Energy -*** Most audio power amplifiers rely on a bank of large capacitors for energy storage. These capacitors remove some of the ripple produced by an unregulated linear supply, and help reduce supply sag in order to maintain a high output level immediately following musical peaks. Unfortunately, these capacitors also slow down the recovery from voltage sag due to peak loading. Benchmark's approach is to nearly eliminate all storage after the power supply. The power supply regulation takes the place of energy storage, responds quickly to peak loading, maintains very low ripple voltage, and provides immunity to AC line-voltage fluctuations.
- ***Digital Protection Systems -*** The ***AHB2*** has a digital control system that monitors all of the critical functions in order to provide comprehensive protection from overload and fault conditions. Many of these systems do not exist in traditional designs.

- ***NL4 SpeakON Output Jacks -*** SpeakON connectors are well-accepted in high-power pro-audio applications, but are nearly unknown in high-end Hi-Fi applications. Our tests show that these robust connectors provide a much more reliable connection than the binding posts, spade lugs, pins, and banana plugs used with traditional Hi-Fi amplifiers. Distortion is measurably lower when using NL4 connectors. These connectors provide a very reliable, low-impedance connection. Furthermore, they are polarized and fully insulated to protect against short circuits, polarity reversals, and shock hazards. Benchmark recognizes that the Hi-Fi industry is slow to embrace new ideas, so we have provided traditional binding posts wired in parallel to the NL4 jacks. But, for the highest performance, we recommend using the NL4 jacks. The jacks accept NL4 or NL2 plugs.

In summary, Benchmark has taken a radical approach to audio amplification, has leveraged patented technologies (licensed from THX Ltd.), and has reversed many common practices. The result is an amplifier that is significantly quieter, cleaner, smaller, and more efficient than any traditional design. There is nothing ordinary about the Benchmark ***AHB2***.

Benchmark Media Systems, Inc.
203 East Hampton Place, STE 2
Syracuse, NY 13206-1633
USA

PHONE: +1-315-437-6300
FAX: +1-315-437-8119
www.benchmarkmedia.com