...the measure of excellence!™

Benchmark *LA4*
Instruction Manual

Reference Stereo
Line Amplifier
with
Relay Gain and Input Control

Safety Information

Fuses

CAUTION: FOR CONTINUED FIRE HAZARD PROTECTION ALWAYS REPLACE THE FUSES WITH THE CORRECT SIZE AND TYPE (T 0.5A 250V 5 X 20 MM – LITTELFUSE® SLO-BLO® HXP218.500 OR EQUIVALENT). THE FUSE DRAWER INCLUDES TWO FUSES. ALWAYS REPLACE BOTH FUSES AT THE SAME TIME.

AC Input Voltage Range

NOTE: THE *LA4* IS EQUIPPED WITH A UNIVERSAL POWER SUPPLY. THERE IS NO VOLTAGE SELECTION SWITCH. AC VOLTAGE RANGE IS 88-264 VAC, 50-60 HZ. THE PRODUCT MAY ALSO BE OPERATED FROM DC POWER OVER A VOLTAGE RANGE OF 125-373 VDC.

Power Cord

CAUTION: ALWAYS USE A GROUNDED POWER CORD. THE PRODUCT IS EQUIPPED WITH A STANDARD IEC POWER ENTRY MODULE. USE AN IEC POWER CORD THAT IS EQUIPPED WITH THE APPROPRIATE CONNECTOR FOR YOUR LOCATION. CORDS ARE AVAILABLE FROM YOUR DEALER.

Modifications

CAUTION: DO NOT SUBSTITUTE PARTS OR MAKE ANY MODIFICATIONS WITHOUT THE WRITTEN APPROVAL OF BENCHMARK MEDIA SYSTEMS, INC. MODIFICATION MAY CREATE SAFETY HAZARDS AND VOID THE WARRANTY.

CAUTION: CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY BENCHMARK MEDIA SYSTEMS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT UNDER FCC REGULATIONS.

Repairs

CAUTION: DO NOT SERVICE OR REPAIR THIS PRODUCT UNLESS PROPERLY QUALIFIED. ONLY A QUALIFIED TECHNICIAN SHOULD PERFORM REPAIRS.

Contents

Front Panel

Rear Panel

Features

- 256-Step Fully-Balanced **Relay Gain Control**, 0.5 dB Steps
- Precision **Timed Relay Closures**
- Precision **Metal Film Resistors**
- **Gold-Contact Relays**
- Balanced and Unbalanced I/O
- **0.1 Hz to 500 kHz** frequency response
- **SNR > 135 dB**
- **THD < 125 dB** (0.00006%)
- Full-Color 3.5" **Capacitive Touch Screen**
- **IR Remote Control** (handset optional)
- **2 Balanced Stereo Line Inputs**
- **2 Unbalanced Stereo Line Inputs**
- **Balanced Stereo Line Output**
- **Unbalanced Stereo Line Output**
- **Balanced Mono Sum Output**
- **12V Trigger I/O** – two bi-directional 12V trigger ports
- **AUTO-ON Function** - can be programmed to turn on when AC is applied
- **Power Switch** – very low standby power , <0.5 W at 120 VAC
- **High-Efficiency Low-Noise Power Supplies** – 100-240 VAC, 50-60 Hz
- Meets **FCC Class B** and **CE** emissions requirements
- **Tested for immunity** to radiated and conducted RF interference

Quick Start Guide

Main Screen

BRIGHTNESS button. Use this button to dim the screen. When the screen is dimmed, touch anywhere to restore to full brightness. A DIM timer is available in the DISPLAY settings menu.

INPUT SELECTION. Use the left/right arrows to change inputs. Disabled inputs will be skipped. The input type is displayed between the arrows (XLR, RCA…).

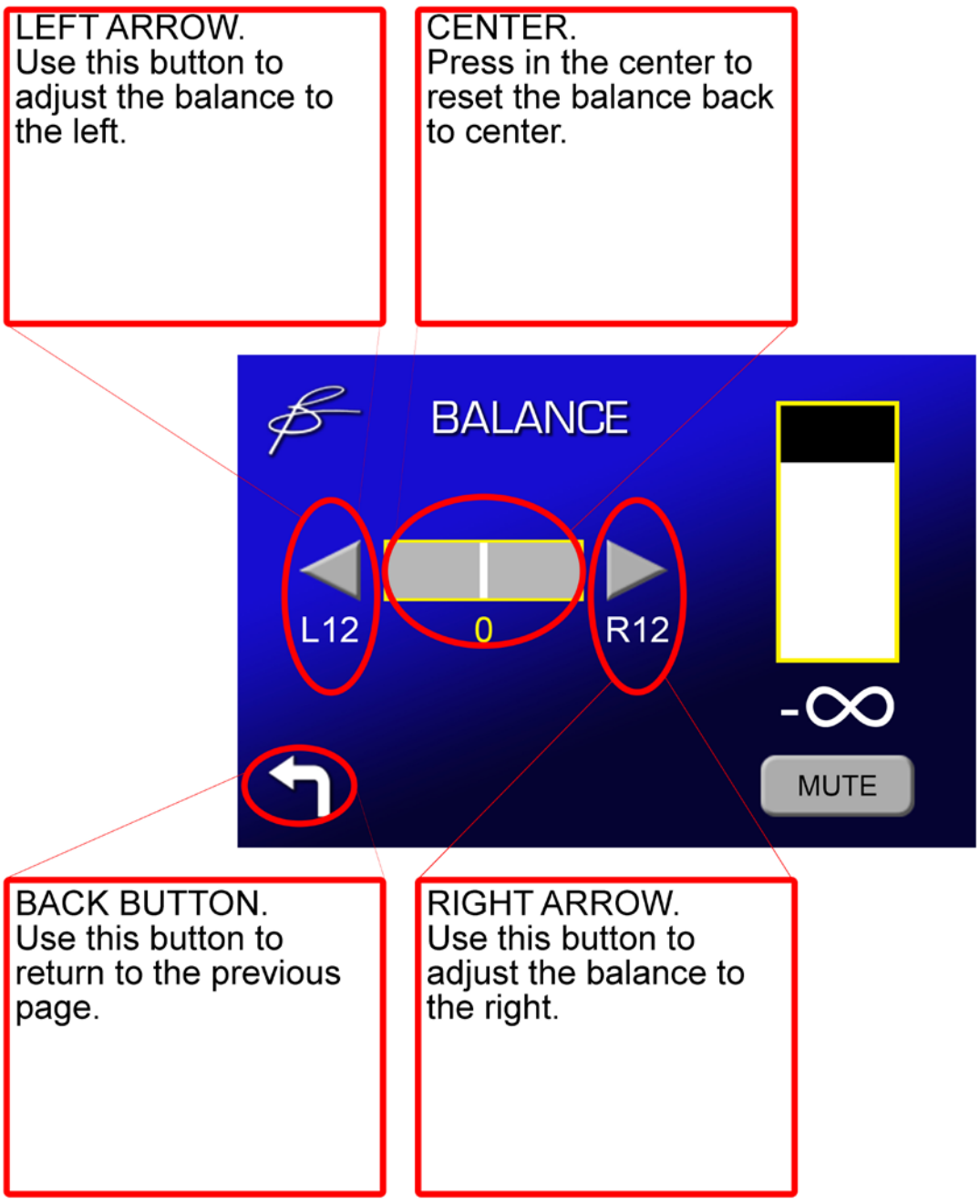
INPUT NAME. The input name can be changed to anything 8 characters or less.

SETTINGS button. Use this button to access the SETTINGS menu.

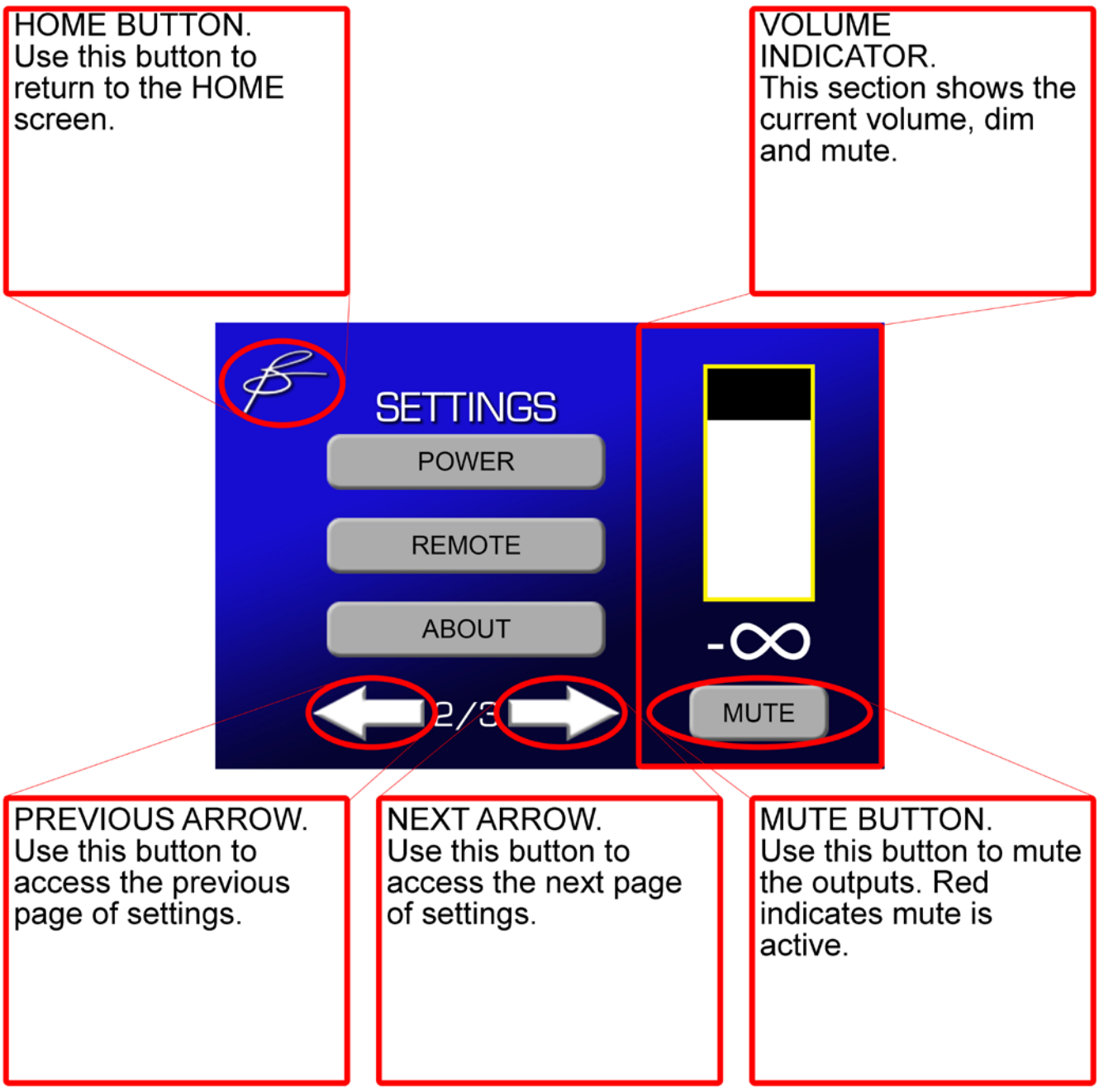
BALANCE button. Use this button to adjust the balance.

-20 dB Button. Use this button to reduce the volume of the outputs by 20dB. Press again to return to the previous volume setting.

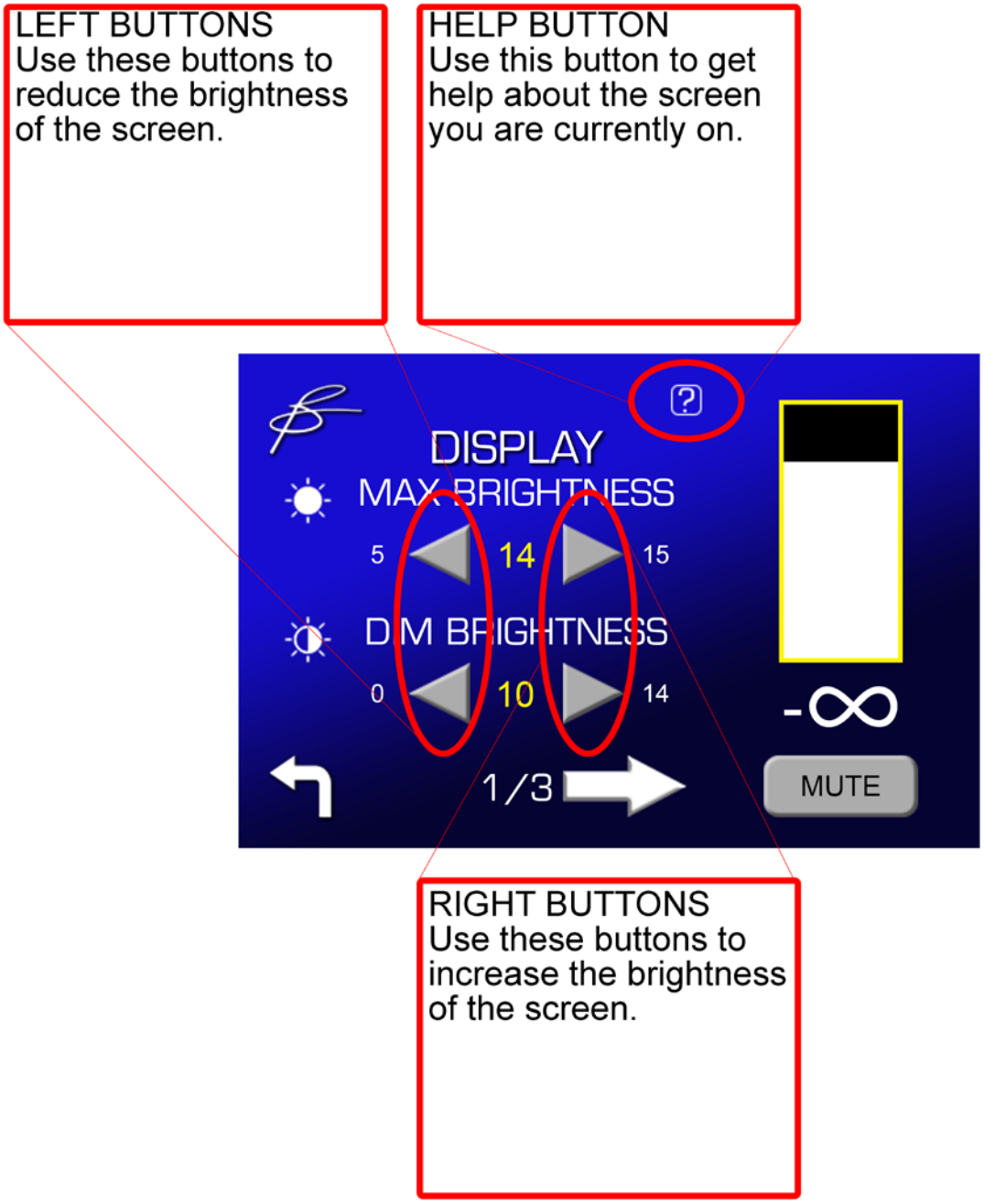
Balance Controls



Screen Navigation



Display Settings



Remote Control

The remote control is designed to control the ***LA4*** and any Benchmark D/A converter that supports remote control.

The bottom six input selection buttons select the DAC inputs if the **DAC MODE** is enabled (on the **REMOTE** setup screen).

The ***LA4*** inputs are controlled with the **INPUT ARROWS**.

The chart at the right summarizes the functions of the IR remote control.

ON	Turns the ***LA4*** on. Any devices slaved to the **12V TRIGGER** will also turn on in a controlled sequence.
OFF	Turns the unit off. Any devices slaved to the **12V TRIGGER** will turn off in a controlled sequence.
VOLUME ARROWS	Turns the volume up or down. Volume up cancels **MUTE** and **DIM**.
-20 dB DIM	Toggles the -20 dB audio **DIM** function.
MUTE	Toggles the **MUTE** function.
INPUT ARROWS	Scrolls through the enabled inputs on the ***LA4***.
D1	Selects input **D1** on Benchmark DAC if connected.
D2	Selects input **D2** on Benchmark DAC if connected.
D3	Selects input **D3** on Benchmark DAC if connected.
D4	Selects input **D4** on Benchmark DAC if connected.
USB	Selects **USB** input on Benchmark DAC if connected.
Analog	Selects analog input(s) on Benchmark DAC if connected.

Front Panel Controls

The front panel features a color touch screen, a power switch and a volume knob.

The volume knob includes a push switch that can be used to wake the screen if the screen dim and/or sleep timers are enabled.

Tip: The IR remote sensor is located just to the right of the power switch. Keep this sensor unobstructed if you will be using the optional remote control.

Tip: When **AUTO-ON** is enabled, a switched AC outlet can be used to turn your system on and off. The **12V TRIGGER I/O** can be used as a trigger output to control the power state of additional components.

The chart at the right summarizes the functions of the power button and volume knob.

POWER (button)	Turns the unit on or off. Any devices slaved to the **12V TRIGGER** will also turn on or off in a controlled sequence. If **AUTO-ON** is enabled, the **POWER** button will toggle **MUTE** on and off (the unit will remain on at all times).
VOLUME (knob)	Adjusts the volume in 0.5 dB steps. The knob features an acceleration function. Rotate the knob quickly and the volume will change in larger steps. Volume up automatically cancels audio **DIM** and **MUTE**.

Connecting Other Audio Components

Use Balanced Interfaces When Possible

When possible, use balanced interfaces to connect the primary devices in your system. Balanced interfaces offer significant performance advantages due to the differential signals and higher voltage levels. In most cases, balanced interfaces will reduce noise in your system.

Balanced XLR Signal Levels

The *LA4* Supports Professional Signal Levels

The XLR line inputs and outputs on the ***LA4*** support very high +28 dBu signal levels. These high levels are used in professional studio environments because of the high performance that comes with using higher voltages. All Benchmark products support professional signal levels. Benchmark DACs and power amplifiers will interface to the ***LA4*** using peak signal levels between +22 dBu and +24 dBu.

The *LA4* Also Supports Consumer Signal Levels

The stepped gain controls in the ***LA4*** have excellent noise performance and provide a wide dynamic range. This allows the simultaneous use of consumer-level and professional-level balanced interfaces. Professional XLR interfaces are usually 10 dB hotter than consumer-level XLR interfaces. The stepped gain control in the ***LA4*** can easily provide a 10 dB boost or cut without sacrificing performance.

Selecting Components for Your System

Select devices with balanced XLR inputs and outputs. Balanced interfaces are vastly superior to unbalanced RCA interfaces.

When possible, select devices that have professional-level XLR interfaces. These will usually have better SNR specifications than devices with consumer-level XLR interfaces. This difference in SNR is often about 10 dB. Look for high signal levels when purchasing audio components and check the SNR specifications.

Use the 12V Trigger Connections

Trigger ports can be used to sequence the power-up and power-down operations so that all of your components turn on and off with a single switch. The trigger ports can also eliminate the loud pops that can occur when devices are turned on or off in the wrong sequence.

The trigger ports on the ***LA4*** are bi-directional and can be connected to inputs or outputs on other devices. All Benchmark trigger ports are bi-directional. Most other products will have dedicated trigger inputs or outputs.

If you want the ***LA4*** to control your system, connect the ***LA4*** trigger ports to the trigger inputs on the other devices. When the ***LA4*** turns on, the other devices will follow.

If you want to use another device as a trigger master, connect its trigger output to one of the trigger ports on the ***LA4***. When this other device turns on or off, the ***LA4*** will follow.

In an all-Benchmark system, just connect the trigger ports in a star or daisy chain. The system can be turned on or off using the power switch on any Benchmark device. This is one of the advantages provided by Benchmark's bi-directional trigger ports.

Connecting Benchmark Components

Benchmark *AHB2* Power Amp

1. Set the **SENSITIVITY** switch on the ***AHB2*** to 22 dBu (switch in the down position).
2. Connect either trigger port on the ***AHB2*** to either trigger port on the ***LA4***. If you are using two ***AHB2*** amplifiers in bridged mono, the second amplifier can be connected to an unused trigger port on the ***LA4*** or the other amplifier.
3. Connect the left and right XLR outputs on the ***LA4*** to the left and right XLR inputs on the amplifier. If you are using two amplifiers in bridged mono mode, connect the cables to the **MONO** input on each amplifier.
4. If you are using a single ***AHB2***, set the **MODE** switch on the back of the amplifier to **STEREO**. If you are using two ***AHB2*** amplifiers, set the **MODE** on each to **MONO**.

Tip: If you turn the system on or off using the ***LA4*** or the remote control, the amplifiers will follow.

Tip: If you want to shut down the entire system using the **POWER** switch on an amplifier, you will need to press and hold the switch for 3 seconds.

Benchmark DAC

1. Set the XLR output attenuators in the DAC to **0 dB**. You will need to open the cover on the DAC if these jumpers need to be changed.
2. If your DAC has a trigger port, connect it to either port on the ***LA4***. This trigger connection provides a control link so that the remote, DAC or ***LA4*** can be used to turn the entire system on or off in a sequenced fashion.
3. Use XLR cables to connect the DAC to **INPUT 1** on the ***LA4***. This input supports a special DAC compatibility mode.
4. If your Benchmark DAC has a '**DAC-ONLY MODE**', enable this mode. This will bypass the **VOLUME**, **MUTE** and **DIM** controls on the DAC.
5. If your Benchmark DAC does not have a '**DAC-ONLY MODE**', set every input on the DAC to '**HT**' mode, or '**CALIBRATED**' mode. This will bypass the volume control on the DAC, but IR remote **MUTE** and **DIM** controls may still be active on some DAC models.
6. If you are using a Benchmark DAC3 B, leave the **CONTROL LOCK** off unless you only have one digital source.

If you have a Benchmark DAC with remote control, the ***LA4*** has a special mode of operation that allows both devices to be controlled from a single remote. If your Benchmark DAC has remote control, follow this additional step:

7. Go to the **REMOTE** settings screen on the ***LA4*** and select '**BENCHMARK DAC ON XLR1**'. The Benchmark IR remote control will now control both devices. The ***LA4*** will provide volume control and switching between analog inputs. The DAC will provide switching between digital inputs.

Tip: Use the dedicated digital input select buttons (**USB**, **D1**, **D2**, **D3** and **D4**) to select digital inputs on the DAC. Use the **INPUT** scroll buttons on the remote to select analog inputs on the ***LA4***. Use the dedicated **ANALOG** button on the remote to select the analog inputs on the DAC (if any).

Tip: We recommend using the direct analog inputs on the ***LA4*** before using the analog inputs on the back of the DAC. The direct connections on the back of the ***LA4*** will provide better performance.

Tip: Use the **VOLUME UP** key on the remote if you wish to release the **MUTE** and **DIM** on all devices.

Basic Features

Input Selection

Use the input selection arrows to scroll through the enabled inputs. These arrows are displayed on the **HOME** screen and are also available on the **REMOTE**.

Volume Control

The volume bar graphs shows the current gain between the line input and line output. 0 dB is unity gain. At 0 dB, the voltage at the balanced input will match the voltage at the balanced output. Likewise, there will be unity gain between the unbalanced inputs and the unbalanced outputs. The XLR outputs are always 15.8 dB hotter than the RCA outputs. 15.8 dB is the standard difference between professional balanced XLR outputs and consumer unbalanced RCA outputs.

Tip: If an upstream device has consumer-grade balanced XLR outputs, set the ***LA4*** input **BOOST** to 10 dB on that XLR input. The **BOOST** function makes it easy to mix consumer and professional components in a single system. It also compensates for the level differences between balanced and unbalanced inputs.

Balance Adjust

Press the **BAL** button on the **HOME** screen to change the L/R balance of the line outputs.

MUTE Function

When **MUTE** is toggled on, the audio is immediately muted. When **MUTE** is toggled off, the volume will fade back up to the original level.

Note: The ultra-fine 0.5 dB resolution of the 256-step relay gain control and the precision timing of the relay closures give the Benchmark system the ability to execute a volume fade. This is a unique feature of this system.

Tip: Turn the **VOLUME** up to release **MUTE** and return to the prior volume setting.

-20 dB Audio DIM Function

The audio **DIM** function reduces the output level by 20 dB. When **DIM** is toggled on, the volume fades down by exactly 20 dB. When **DIM** is toggled off, the volume fades back up to the original level.

The volume bar graph will be displayed in yellow when **DIM** is on.

Tip: Turn the **VOLUME** up to release **DIM** and return to the prior volume setting.

Advanced Features (Settings Screens)

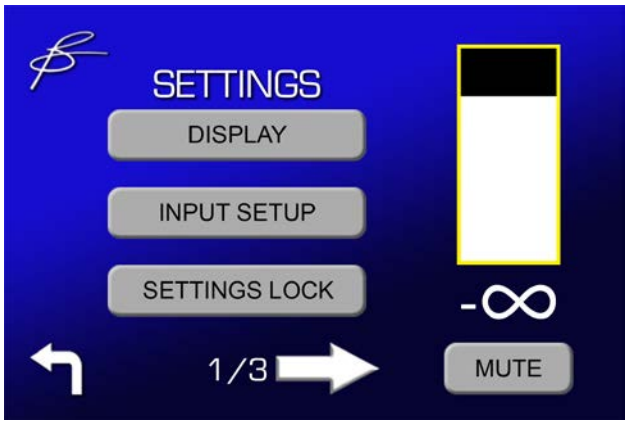
Press the gear icon on the HOME screen to access the advanced features.

If the advanced features have been locked, a locked gear icon will be displayed on the HOME screen. Press and hold the locked gear icon for 3 seconds to access the advanced features.

Settings Menu Screens

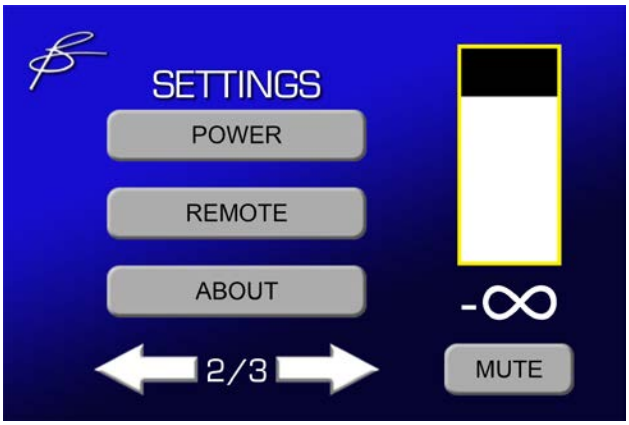
Settings 1

- Display Settings
- Input Setup
- Lock/Unlock Advanced Settings



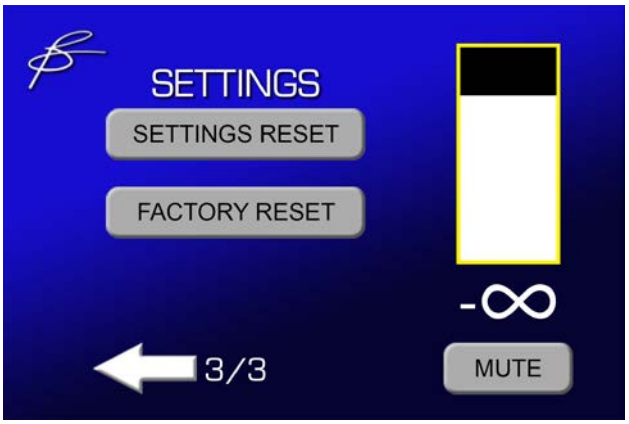
Settings 2

- Power (Auto-On, Trigger)
- Remote (IR Enable, DAC Mode)
- About (System Information)



Settings 3

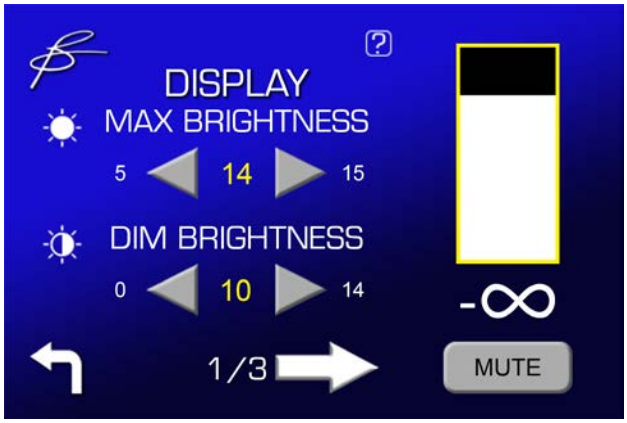
- Reset Advanced Settings
- Full Factory Reset

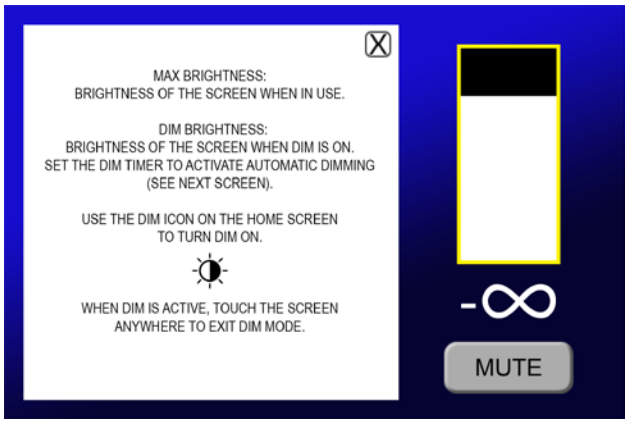


DISPLAY Settings

Display Settings 1

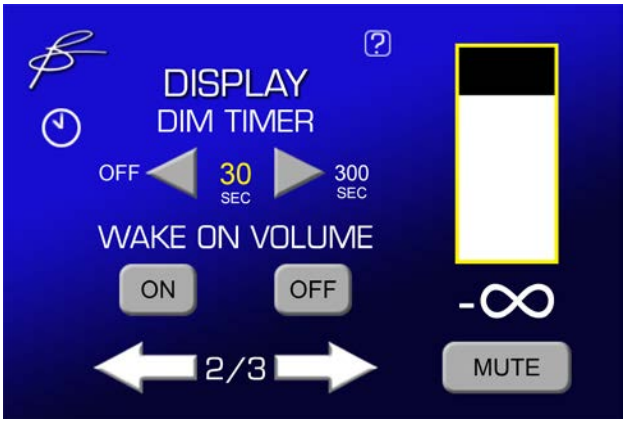
- Maximum Screen Brightness
- Screen Brightness when Dimmed

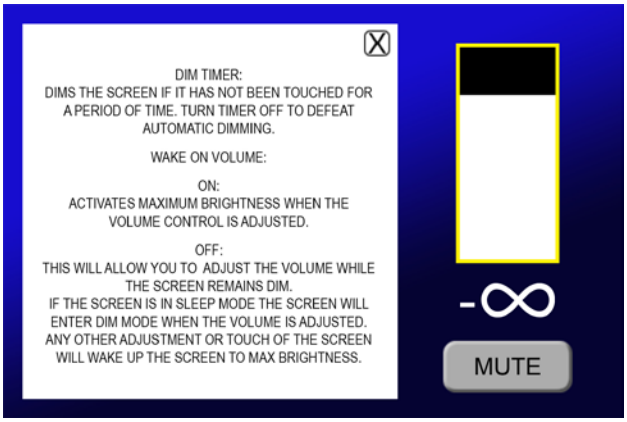




DISPLAY Settings 2

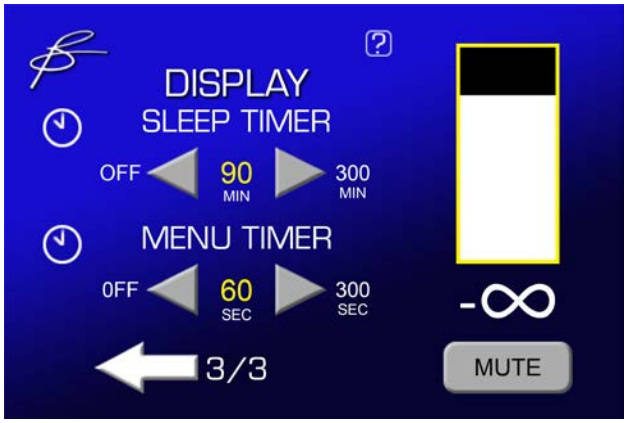
- Screen Dim Timer
- '**WAKE ON VOLUME**' Function

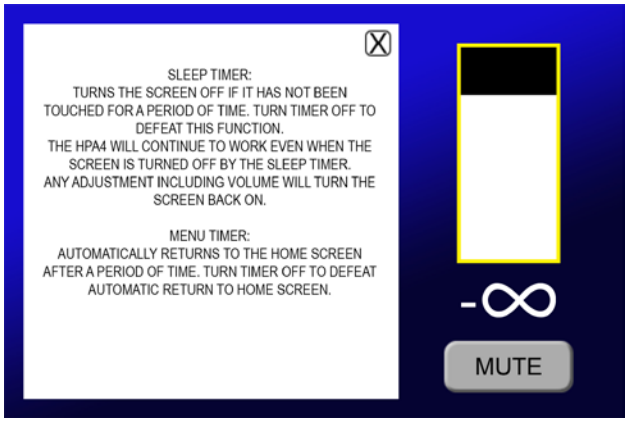




DISPLAY Settings 3

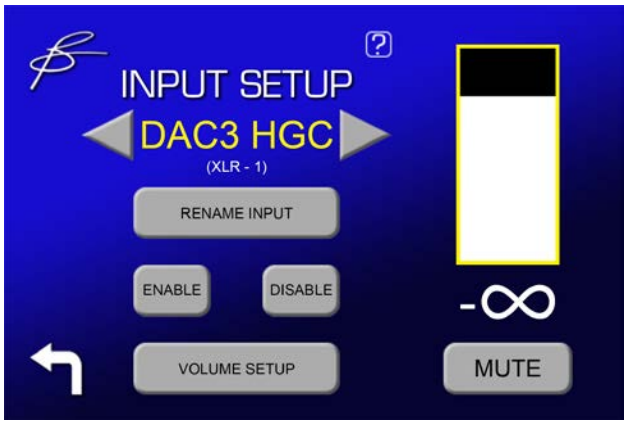
- Display Sleep Timer (screen off)
- Menu Timer (return to home page)

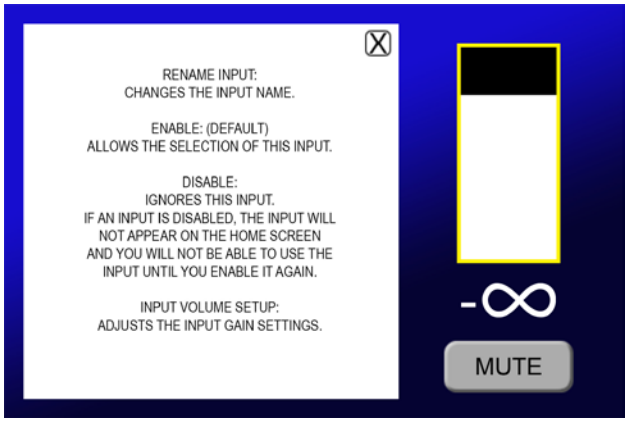




INPUT SETUP

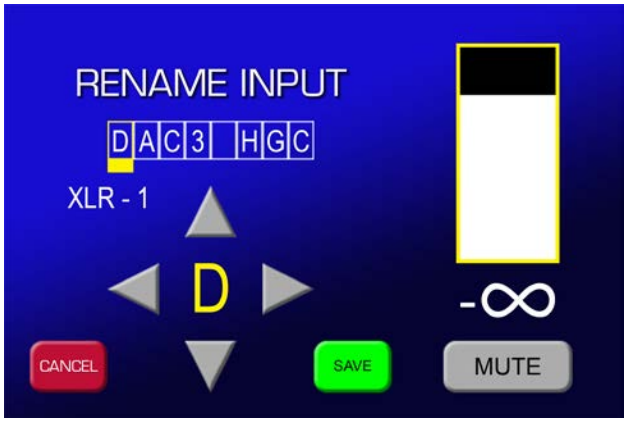
- Rename Inputs
- Disable/Enable Inputs
- Volume Setup for Each Input





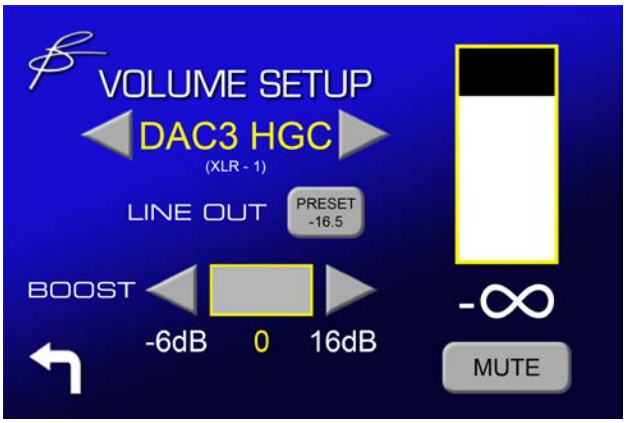
RENAME INPUT

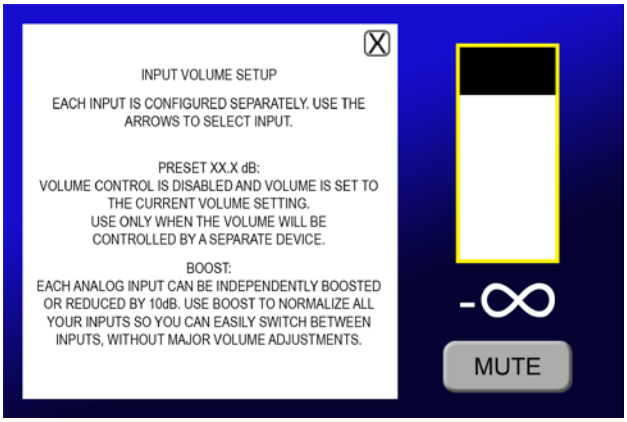
- Input Name Edit



VOLUME SETUP

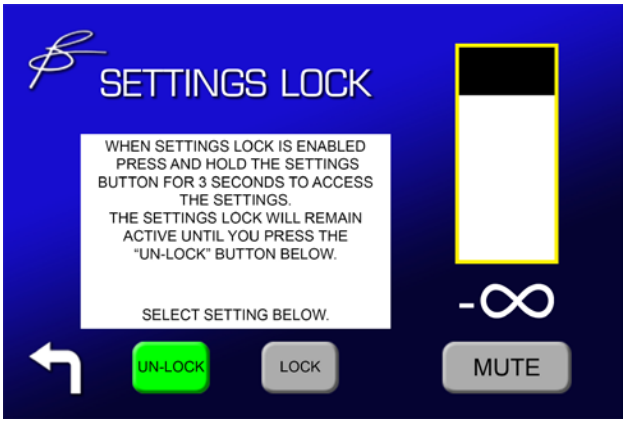
- Volume Preset - Enable/Disable
- Boost Adjust (input volume offset)





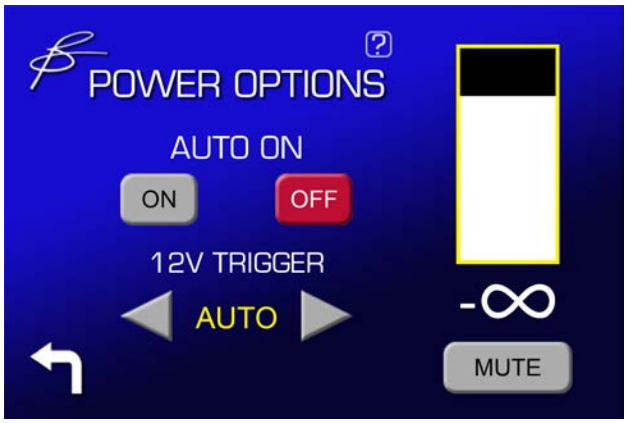
SETTINGS LOCK

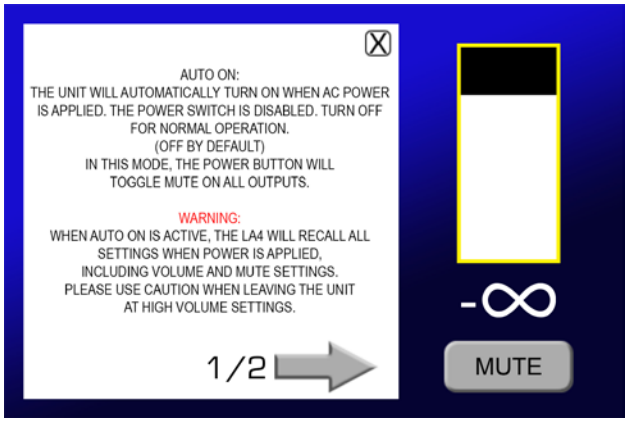
- Lock/Unlock Advanced Settings

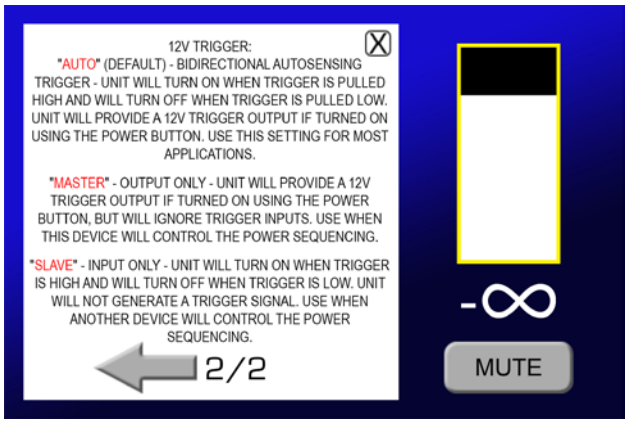


POWER Settings

- Auto-On - Enable/Disable
- 12V Trigger Mode

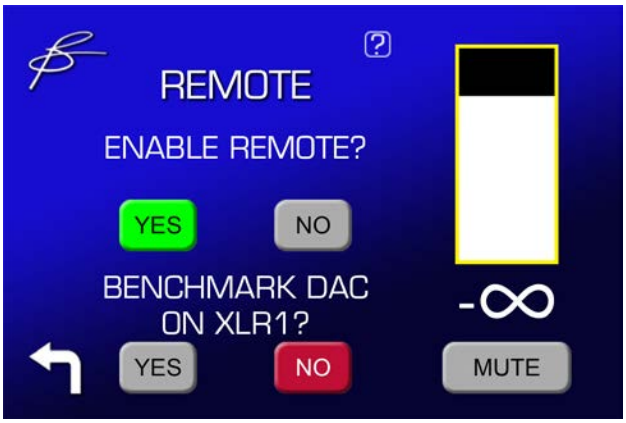


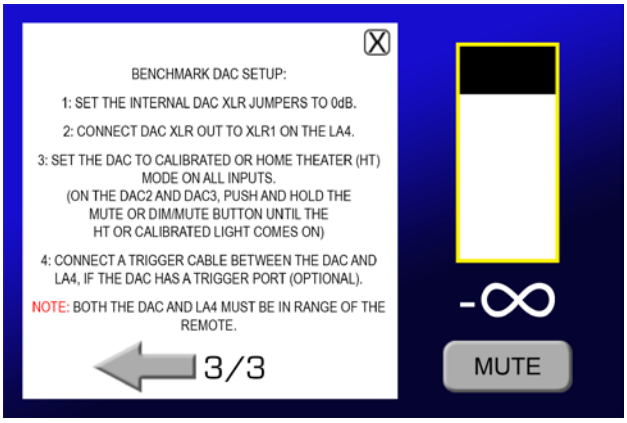


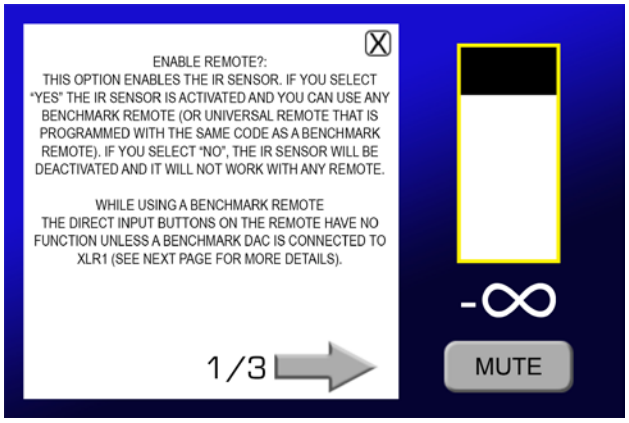


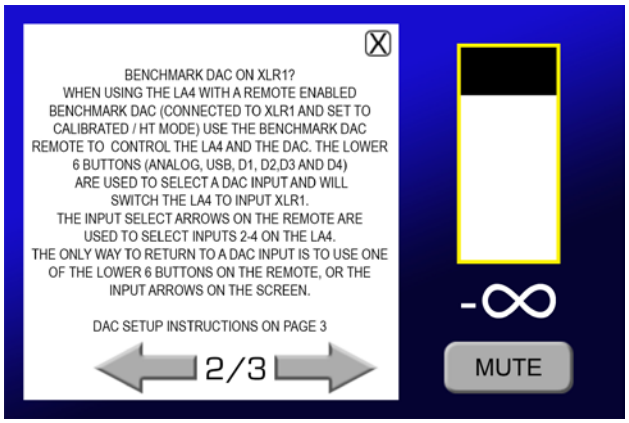
REMOTE Settings

- Enable IR Remote Control
- Integrate with Benchmark DAC





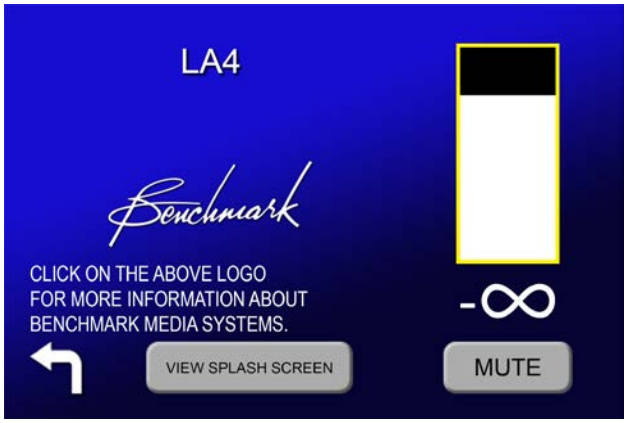




ABOUT Screens

ABOUT

- Firmware Version (hardware drivers)
- Software Version (touch screen)



ABOUT BENCHMARK

- Benchmark Contact Information

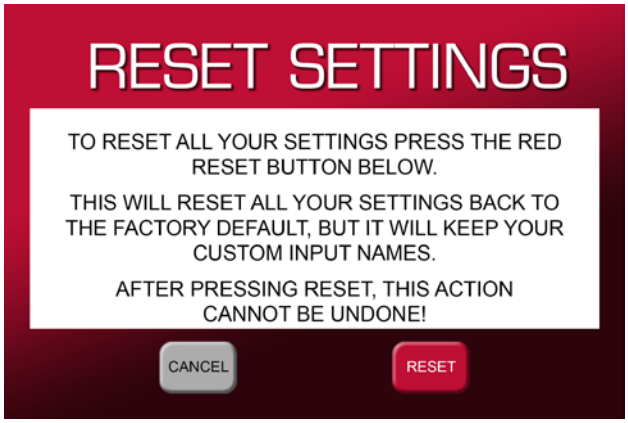
SPLASH SCREEN

- Unit is Turning On or Off, Audio is Muted
- May be manually enabled from ABOUT screen (this does not mute the audio, touch the screen to exit).

RESET Screens

RESET SETTINGS

- Reset all Advanced Settings Except Input Names



FACTORY RESET

- Reset all Advanced Settings Including Input Names

LA4 System Overview

The Ultimate Line Amplifier

The ***LA4*** delivers audio fidelity, speed and accuracy over an utterly silent background.

Input selection, input **MUTE** and output volume are 100% relay controlled. Gold-contact relays provide a clean and transparent path through the entire ***LA4***. It is designed to deliver the lowest possible distortion and noise over a wide range of volume settings. We believe that the ***LA4*** line amplifier is the finest line available at any price.

Relay-Controlled Gain Stage

The relay-controlled gain stage provides 256 volume steps in precise 0.5 dB increments. This gain stage features the finest gold-contact relays available.

Relay closures are precisely timed to deliver silky-smooth volume changes. No other relay-controlled gain stage offers this level of precision or performance.

The ***LA4*** includes 2 independent fully-balanced 256-step volume controls: one for the left output, and one for the right output. To make this all happen, the ***LA4*** includes a total of 40 precision relays.

Balance Controls

The line outputs feature balance controls that are adjustable over a +/- 12 dB range.

100% Analog Signal Path

The ***LA4*** is 100% analog. It is designed to be driven from external D/A converters and external analog sources. The ***LA4*** is designed to provide the ultimate analog signal path between inputs and outputs. The ***LA4*** eclipses the performance of typical high-end preamplifiers by achieving much lower noise and distortion.

Fully-Balanced Signal Paths

The internal signal paths are fully balanced. The inputs are routed to a balanced pair of precision differential amplifiers. These drive two sets of fully-balanced 256-step volume controls. These balanced outputs from the volume controls drive the line output drivers. Each output connector has dedicated buffers.

Differential Amplifiers

The ***LA4*** features precision differential amplifiers on all inputs. These reject common-mode noise, common-mode distortion and common-mode interference. This feature is especially important when using D/A converters that lack their own differential amplifiers.

Benchmark D/A converters include differential amplifiers, but many competing converters lack these stages which remove the common-mode distortion produced by D/A chips.

Ultra-Wide Bandwidth

The frequency response of the ***LA4*** extends from 0.1 Hz to 500 kHz. This extended range keeps the phase response extremely accurate over the entire audio band. The entire audio spectrum is delivered with the proper timing.

Bass is delivered with the correct timing relative to other frequencies. Most audio products deliver the bass slightly late. Bass that arrives late tends to mask high-frequency details. In contrast, bass that arrives with the correct timing will sound deep, full and well damped. For this reason, all Benchmark products feature low-frequency extension to 0.1 Hz.

The extreme 500 kHz high-frequency extension delivered virtually perfect timing at the high end of the audio spectrum. High frequencies are delivered with precise timing relative to low and mid frequencies. In addition, the left-right differential phase is virtually perfect at 20 kHz. These timing characteristics preserve the precise placement

of voices within a well-defined 3D stereo image.

Rotary Encoder

The volume control knob features a high-quality optical encoder that is rated for heavy use. An acceleration feature makes it easy to move through the 256 volume steps while maintaining 0.5 dB/step resolution. A press of the control knob will wake up the screen if the screen timers are in use.

Convenience Features

The ***LA4*** includes an on-screen mute button. The outputs can also be muted with the volume knob or with the optional remote control.

The ***LA4*** includes an on-screen **-20 dB** button that fades the level down by 20 dB. This function provides a temporary volume reduction and an easy return to the previous listening level. This control makes it easy to transition between a normal listening level and a background level. The -20 dB **DIM** function is also accessible from the optional remote control.

Inputs may be renamed and unused inputs may be disabled. Input levels can be trimmed to provide input-to-input level matching.

Screen brightness is adjustable and timers can be set to dim or shut off the display. The setup screen can be locked to prevent access to advanced features.

12V Trigger

The ***LA4*** has two trigger ports. These can be connected to other audio components so that the entire audio system can turn on and off in a sequenced fashion. The ***LA4*** will pull the trigger I/O to 12 volts DC while the ***LA4*** is on. If the ***LA4*** is off and an external device pulls the trigger I/O to 12 volts, the ***LA4*** will turn on.

The trigger ports are bi-directional by default, but they can be configured as inputs or outputs.

Auto-On Function

The ***LA4*** can be programmed to automatically turn on when AC power is applied.

Casework

The ***LA4*** is available with a black or silver faceplate and is designed to match the Benchmark ***AHB2*** power amplifier. It occupies the same footprint as the Benchmark ***DAC1***, ***DAC2*** and ***DAC3*** converters. The case features a milled faceplate and milled sides. Top, bottom, and rear panels are made from thick aluminum and feature a brushed texture. The ***LA4*** is built to last and will be a fine addition to your listening space.

Equipment Placement

Locate the ***LA4*** where the side panels are exposed to air. These panels help dissipate heat and should not be obstructed.

The IR sensor for the remote control is located to the right of the power switch on the front panel. Make sure this is visible from your listening position.

The ***LA4*** does not emit strong magnetic fields and for this reason, it will not create interference with audio devices that are placed above or below the ***LA4***.

Please note that most power amplifiers emit strong magnetic fields. In most cases, the ***LA4*** should not be stacked directly above or below a power amplifier. Allow at least a few inches of space above or below a power amplifier. The magnetic fields produced by the power amplifier may interfere with the ***LA4***. One exception is the Benchmark ***AHB2*** power amplifier. The ***LA4*** can be stacked directly above or below an ***AHB2*** without any risk of magnetic interference from the power amplifier.

The ***LA4*** can also be stacked directly above or below Benchmark ***DAC2*** or ***DAC3*** converters. The older ***DAC1*** series converters emit stronger magnetic fields and should not be stacked directly above or below the ***LA4***.

Auto-Ranging Power Supply

The internal power supply automatically senses the AC line voltage. There are no settings or fuses to change for international operation. Select a grounded IEC power cord that matches the AC outlets in your country.

Audio Line Inputs

The ***LA4*** features two stereo balanced XLR analog inputs and two stereo unbalanced RCA analog inputs.

Balanced XLR Interfaces

Balanced interfaces use higher signal levels and for this reason, they provide better signal to noise ratios. Balanced interfaces also provide immunity from ground loop induced hum and buzz. In general, balanced interfaces are vastly superior to unbalanced. Select products with balanced interfaces and avoid the use of unbalanced interfaces whenever possible.

Unbalanced RCA Interfaces

Given the widespread consumer use of unbalanced RCA interconnects, we have made every effort to extract the highest possible performance from these antiquated consumer audio interconnects.

The unbalanced RCA inputs on the ***LA4*** are connected to balanced receivers. These balanced receivers provide significant immunity to ground loop induced hum and buzz. This topology provides the RCA inputs with some of the advantages of fully-balanced interfaces. Nevertheless, unbalanced interfaces can never match the full performance of professional-grade balanced interfaces.

If your D/A converter and/or power amplifier lack balanced interfaces, it is a good indication that these devices are not true high-resolution audio products. Look for professional-grade balanced interfaces that support 24 dBu signal levels.

Input Level Matching

By default, the unbalanced inputs on the ***LA4*** are automatically boosted by 15.8 dB so that they will match the level of the professional-grade balanced inputs. If the 15.8 dB default boost doesn't work in your system, individual inputs can be trimmed by +/- 10 dB in 0.5 dB steps using the **BOOST** function. The boost value does not impact the audio performance. It is equivalent to automatically rotating the volume control when the input is changed. The boost value changes the way the volume is numerically displayed.

Tip: We recommend using professional-grade balanced XLR interconnects that provide +24 dBu at 0 dBFS. Consumer-grade balanced XLR interconnects operate at levels that are about 10 dB lower (4 Vrms or +14.2 dBu at 0 dBFS). Consumer RCA interconnects operate at levels that are about 16 dB lower (2 Vrms or 8.2 dBu at 0 dBFS). High signal levels and differential signaling are essential in high-resolution audio systems. RCA interconnects will limit system performance.

Audio Line Outputs

The ***LA4*** features a stereo pair of balanced XLR outputs and a stereo pair of unbalanced RCA outputs. It also includes a balanced mono sum output. The mono sum can be used to drive a powered subwoofer.

The balanced outputs are designed to operate at professional levels (+24 dBu at 0 dBFS).

The unbalanced outputs are designed to operate at consumer levels (2 Vrms at 0 dBFS).

Unity Gain at 0 dB

If the volume control is set to 0 dB, the XLR output levels will be identical to the XLR input levels feeding the system. Likewise, the RCA output levels will be identical to the RCA input levels feeding the system.

15.8 dB Offset Balanced vs. Unbalanced

Balanced outputs are 15.8 dB hotter than the unbalanced outputs. Balanced inputs are assumed to be 15.8 dB hotter than unbalanced.

Advanced Feature Details

PRESET Mode

The **PRESET** mode sets the output level to a fixed level. There are separate presets enables for each input. Each can be set to a different level if desired. These can be set on the **VOLUME SETUP** screen which is accessed from the **INPUT SETUP** screen.

Auto-On Function

The ***LA4*** can be programmed to automatically turn on whenever AC power is applied. This function allows automation using switched AC outlets. When **AUTO-ON** is enabled, the ***LA4*** cannot be turned off without removing AC power.

The **AUTO-ON** function is programmed on the **POWER** screen.

If **AUTO-ON** is enabled, the power switch will mute all of the outputs, but will not turn the unit off. Likewise, the **OFF** button on the remote will mute all of the outputs.

Tip: Turn the **VOLUME** up to release **MUTE** and return to the prior volume setting.

Bi-directional 12V Trigger

Benchmark has reinvented the 12 volt trigger by adding bi-directional signaling. The trigger connection on the ***LA4*** 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** I/O can be used to turn other audio components on when the ***LA4*** turns on. The ***LA4*** can also turn on and off in response to other connected components. The Benchmark bi-directional **12V Trigger** is compatible with virtually all trigger systems.

The **12V TRIGGER** I/O can be connected to the trigger input or output ports on a D/A converter, power amplifier, or both.

The ***LA4*** can send a 12 Volt DC trigger signal to start other components in the system, or it can wake up in response to an externally generated trigger signal.

The trigger modes can be set using the **POWER** screen.

Auto Trigger Mode

By default, the trigger ports are set to **AUTO TRIGGER** mode. In this mode, the ***LA4*** automatically configures its trigger I/O ports as inputs (slave) or outputs (master) as needed. This mode is recommended for most applications. In **AUTO TRIGGER** mode, the ***LA4*** will always turn other devices on and off. It will also respond when other devices force the trigger line high or low.

Master Trigger Mode - (Output Only)

In **MASTER TRIGGER** mode, the ***LA4*** will ignore external inputs to the trigger ports. The ***LA4*** will force the trigger ports to 12 volts DC when the unit is **ON**, and will force the ports to 0 volts while the unit is turning **OFF**.

Slave Trigger Mode - (Input Only)

In **SLAVE TRIGGER** mode, the ***LA4*** will not drive the trigger ports. The ports will be configured for input only. The ***LA4*** will turn on and off in response to the trigger signal supplied by other system devices.

Typical Trigger Applications

Typical trigger applications:

- ***LA4*** → Amplifier
- ***LA4*** → Amplifier → Amplifier
- ***LA4*** → DAC & ***LA4*** → Amplifier

Bi-Directional Trigger Applications

Benchmark products support bi-directional communications over the trigger bus. Any Benchmark product connected to the bus can turn the entire system on or off. Because of the bi-directional design, any power button on a Benchmark ***LA4***, ***AHB2***, or ***DAC*** can be used to start or stop the system.

The Benchmark device that starts the system will become the trigger master. If the trigger master is turned off, all slave devices will follow. If a slave device is turned off, all other devices will stay on.

If the ***LA4*** is used to turn the system on, any connected ***AHB2*** amplifiers will become slave devices and they can be turned off without shutting down the ***LA4***.

Slave devices can force the entire trigger bus to shut down if the **POWER** button or **OFF** button is pressed and held for 3 seconds.

Tip: Press and hold the **POWER** button on any Benchmark device for 3 seconds to force a shutdown of the entire trigger-connected system.

Trigger Specifications

The Benchmark **12V TRIGGER** I/O has a wide operating range to allow interfacing with most other DC trigger systems. It should only be used with trigger inputs that are designed to tolerate 12 VDC.

- 12 VDC 200 mA current-limited output
- Input responds to 3.3 V logic and higher
- Maximum input voltage = 30 VDC
- Maximum reverse input voltage = -0.3 VDC
- Input Impedance = 20 k Ohms
- 1/8" (3.5 mm) TRS jack
- Tip = 12 Volt Trigger I/O
- Ring = no connection
- Sleeve = chassis ground

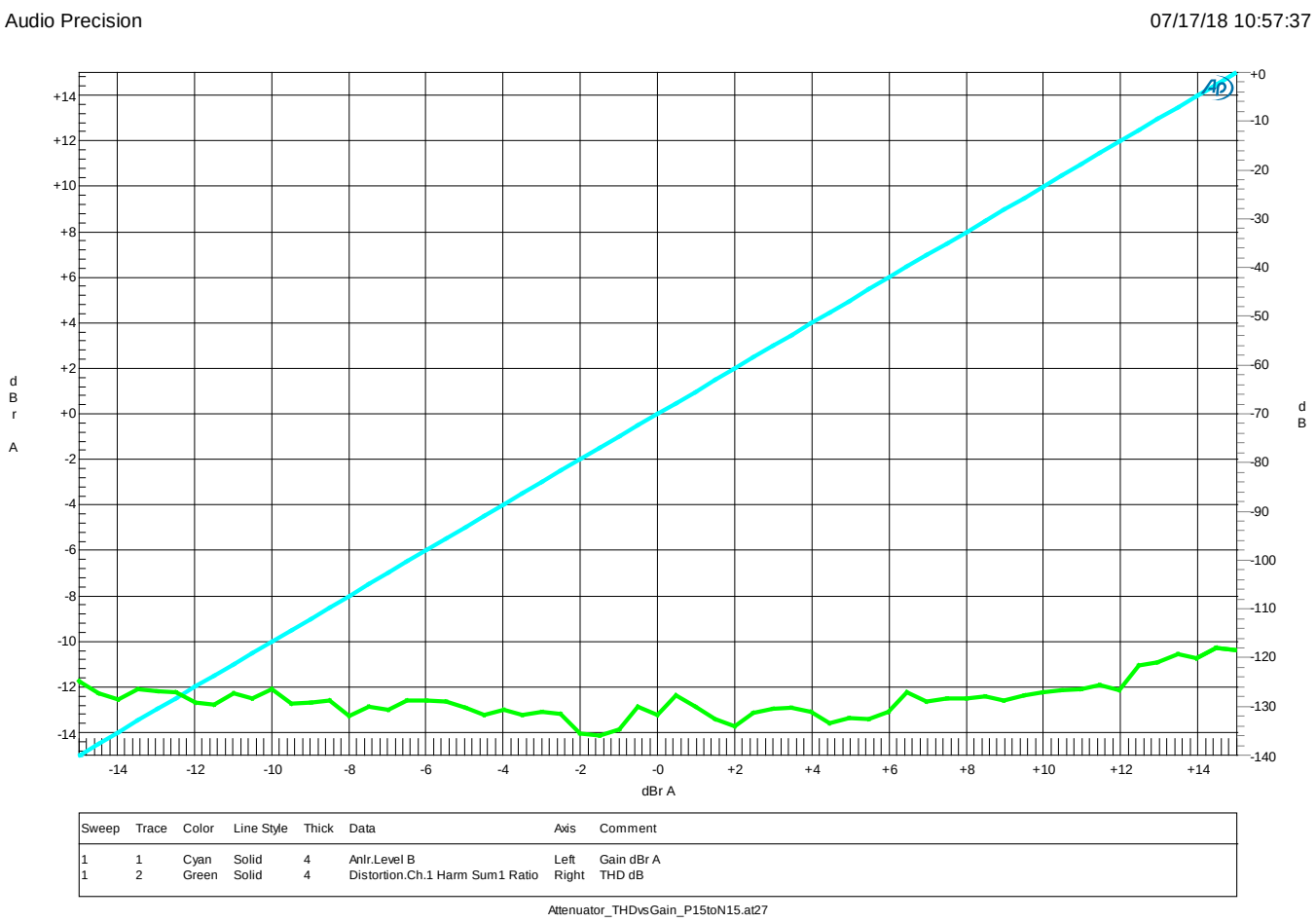
Caution: The **12V TRIGGER** I/O is not an audio connection! This is a 12V DC connection for synchronizing the on and off sequencing of an entire audio system.

Tip: The trigger ports can be connected with 2-conductor or 3-conductor 1/8" (3.5 mm) cables. The 3rd conductor is not used. Benchmark products are supplied with 3-conductor cables, but any mix of 2 and 3 conductor cables can be used.

Software Version Identification

The software and firmware versions are displayed on the **ABOUT** screen. The software drives the touch screen and the firmware programs the Xilinx FPGA hardware control system. The FPGA controls the power supplies, trigger ports, rotary volume knob, remote control and relays. The FPGA has the speed and precision required to execute precise timing of the make-before-break relay closures in the stepped volume control.

Performance Graphs



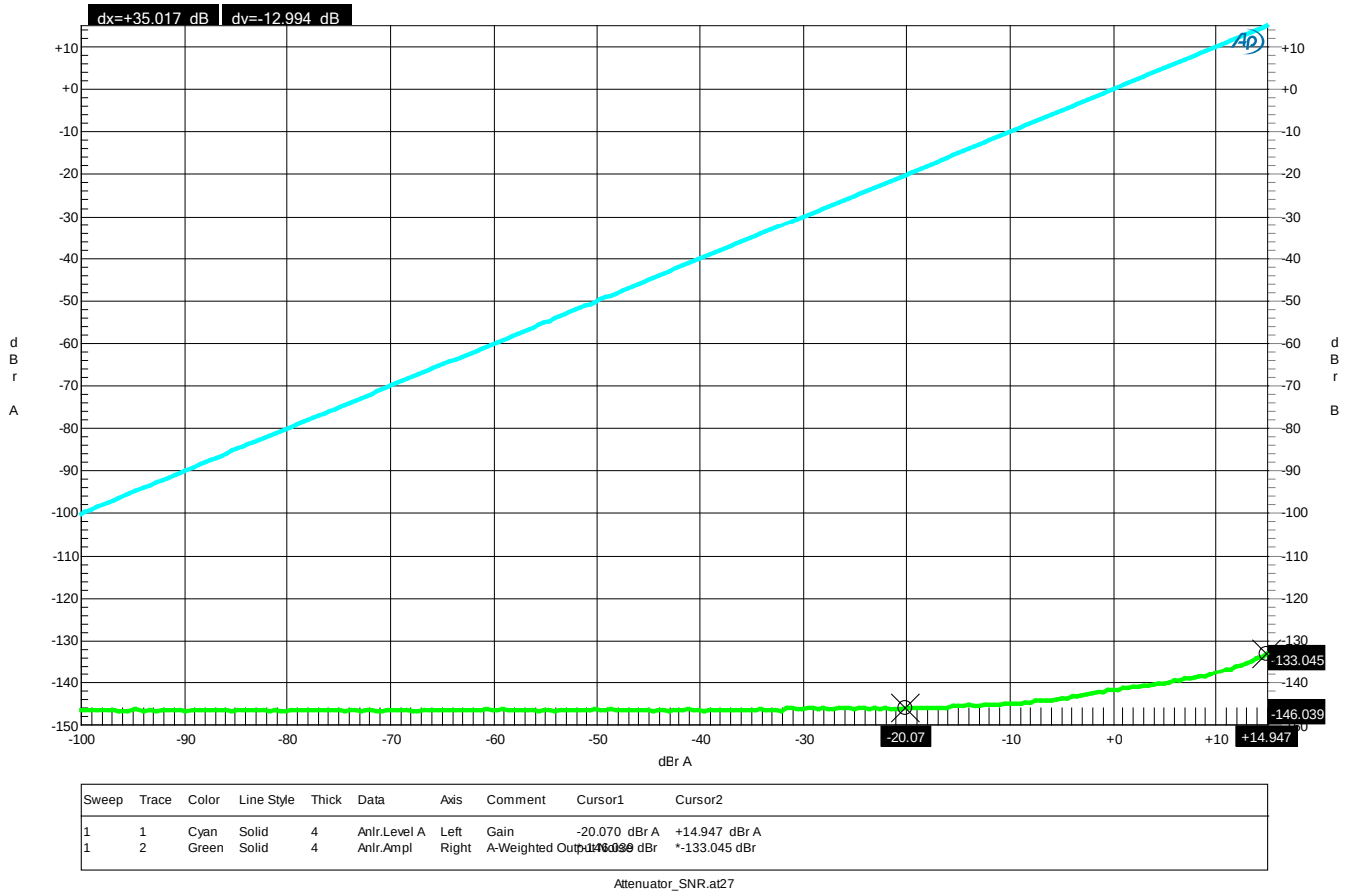
Graph 1 - Stepped Gain Control - THD vs. Gain (-15 dB to +15 dB)

The relay-controlled stepped gain controls are a key feature of the ***LA4***. The stepped gain control is designed to provide volume control over a wide operating range without adding any significant noise or distortion.

This plot shows that the stepped gain control produces almost no measureable THD. Over a range of -15 dB to +15 dB, the THD is between -120 dB (0.0001%) and -140 dB (0.00001%) and is near the measurement limits of the AP2722 test system! This measurement includes the balanced input and output buffers. The ***LA4*** provides a virtually distortion-free signal path with gain control.

Notes:

- The cyan curve shows the gain and uses the left-hand (dBr A) scale to show the gain in dB. This scale is dB relative to the input level. The input level was 10 dBu throughout the test.
- The green curve shows the THD using a 1 kHz test tone. The THD is plotted in dB relative to the output level and uses the right-hand (dB) scale. The output level was adjusted from -5 dB to +25 dBu using the stepped attenuator.
- Balanced inputs to balanced outputs.



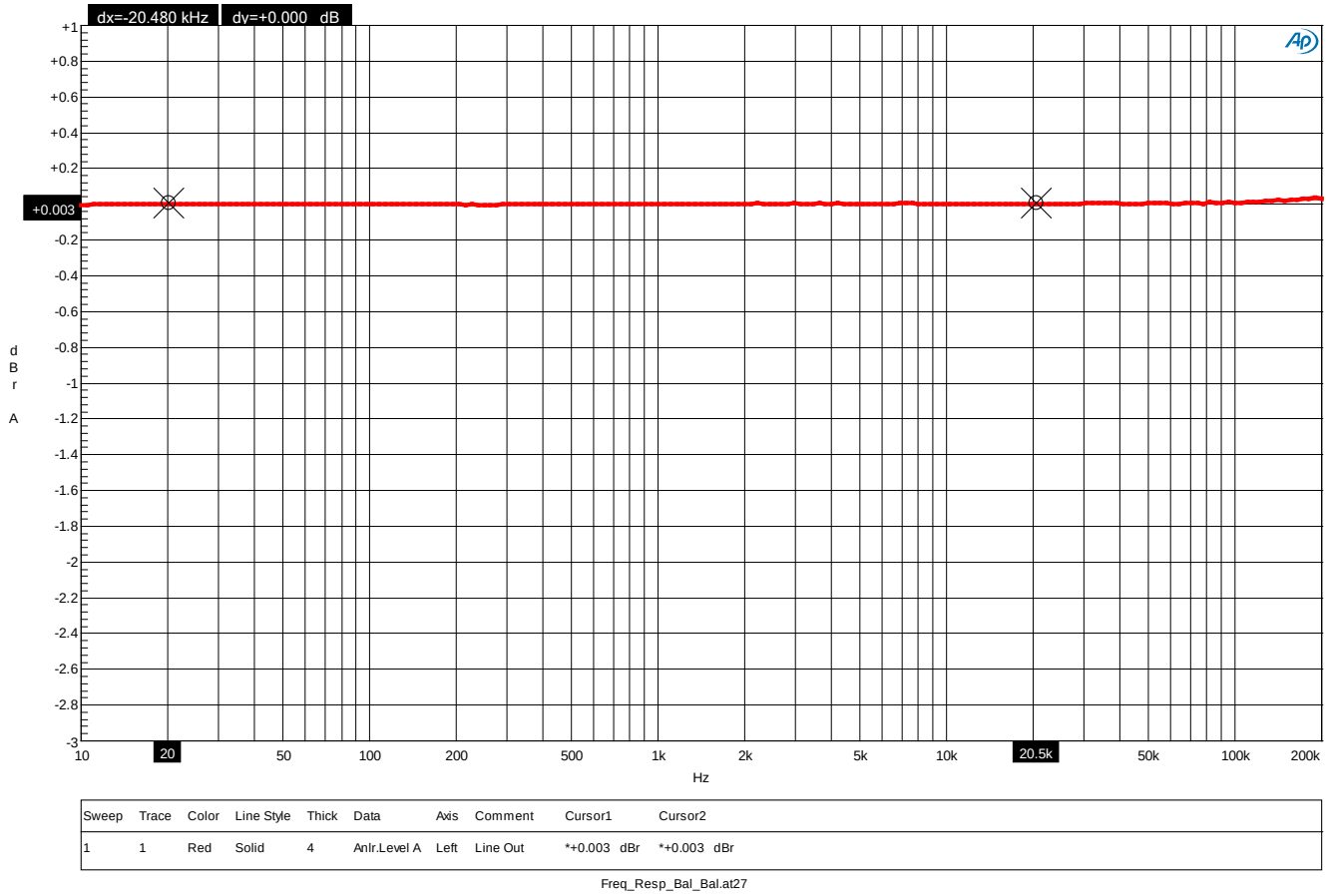
Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment	Cursor1	Cursor2
1	1	Cyan	Solid	4	Anlr.Level A	Left	Gain	-20.070 dBr A	+14.947 dBr A
1	2	Green	Solid	4	Anlr.Ampl	Right	A-Weighted Output Noise	-146.039 dBr	*-133.045 dBr

Attenuator_SNR.at27

Graph 2 - Stepped Gain Control - Output Noise vs. Gain Setting

The stepped gain control has a gain range of -112.5 to +15 dB in 0.5 dB steps. This plot shows the A-weighted output noise over a gain range of -100 dB to + 15 dB. The A-weighted output noise is plotted relative to the maximum balanced output level of 28 dBu. The signal to noise ratio at any gain setting is the difference between the two curves. At maximum gain, the SNR is 15 dB - (-133 db) = 148 dB. At a gain of -20 dB, the SNR is -20 dB - (-146 dB) = 126 dB. This test demonstrates the wide operating range of the fully-balanced low-impedance stepped gain controls.

Below a gain of -20 dB, the noise is determined by the thermal noise (Johnson noise) produced by the resistors in the stepped attenuator. Each side of the balanced attenuator has an impedance of just 1210 Ohms. This means that the balanced output impedance of the attenuator is 2420 Ohms. This resistance determines the output noise of the balanced attenuators. At any gain less than -20 dB, the A-weighted noise floor of the stepped gain control in combination with the balanced output buffers is -146.5 dB relative to +28 dBu. In other words, the A-weighted output noise is -118.5 dBu. This is approximately equivalent to the thermal noise produced by a single 2.5 kOhm resistor. This shows that the active balanced output buffers do not add any significant noise to the stepped gain control. The active output buffers are important because they provide low impedance drive to downstream devices (such as power amplifiers).



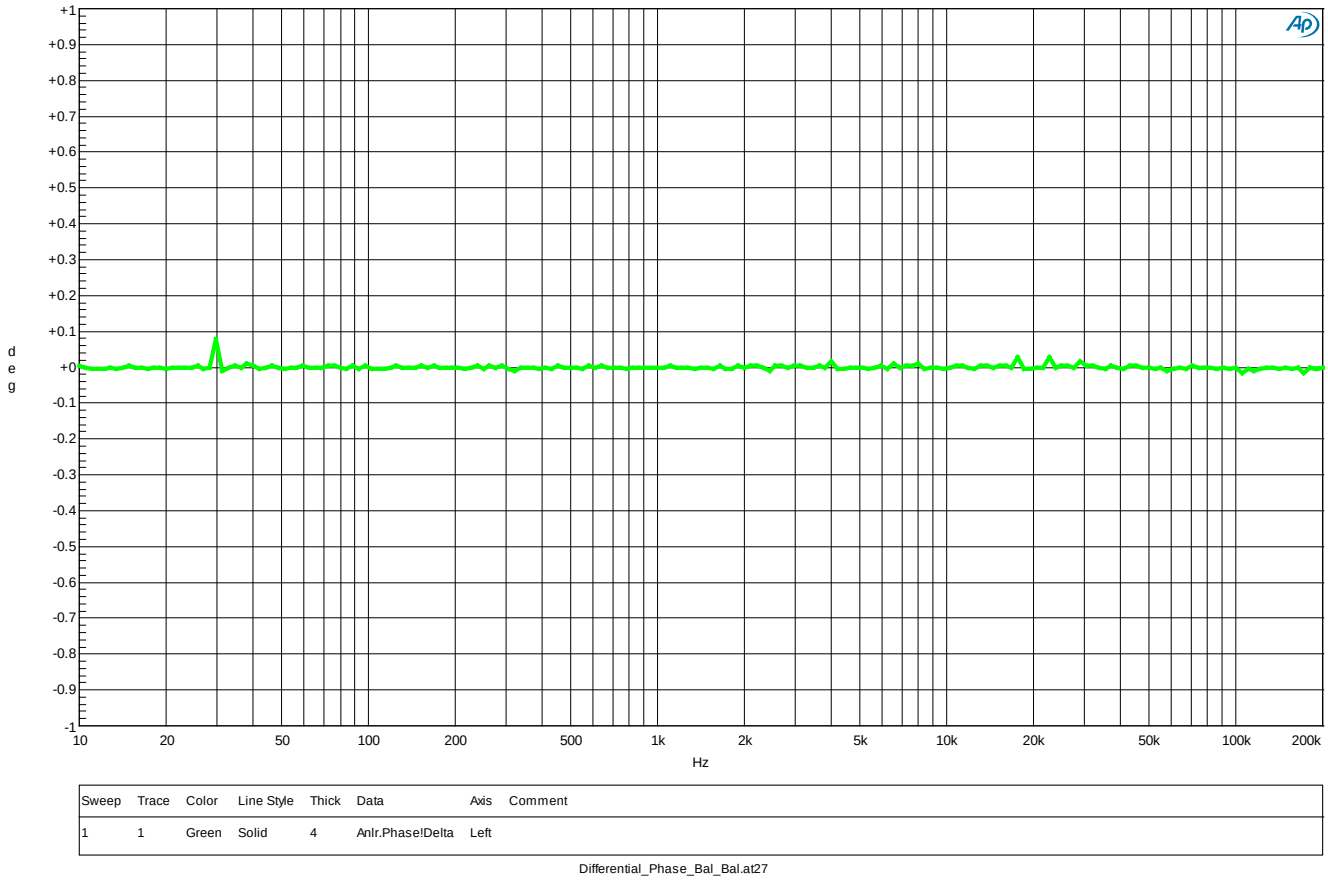
Graph 3 - Frequency Response

The -3 dB frequency response of the line amplifier extends from about 0.1 Hz to 500 kHz. This is well beyond the 10 Hz to 200 kHz range of our AP2722 measurement system. Over our 10 Hz to 200 kHz measurement range, the frequency response is perfectly flat.

The primary advantage of this wide frequency response is that it delivers a very precise phase response. Low bass is delivered with precise timing relative to the highest audible frequencies (and everything in between). Furthermore, the extreme bandwidth keeps the L/R differential phase nearly perfect. The result is an unrivaled stereo image with accurate placement of musical voices within a 3D sound stage.

Notes:

- The scale on the left (dBr A) is dB relative to the output level at 1 kHz. The test used a 0-dBu test tone. The small +/- 0.003 dB random variations shown are due to the measurement limitations of the AP2722.
- Balanced inputs to balanced line outputs, volume control set at 0 dB.

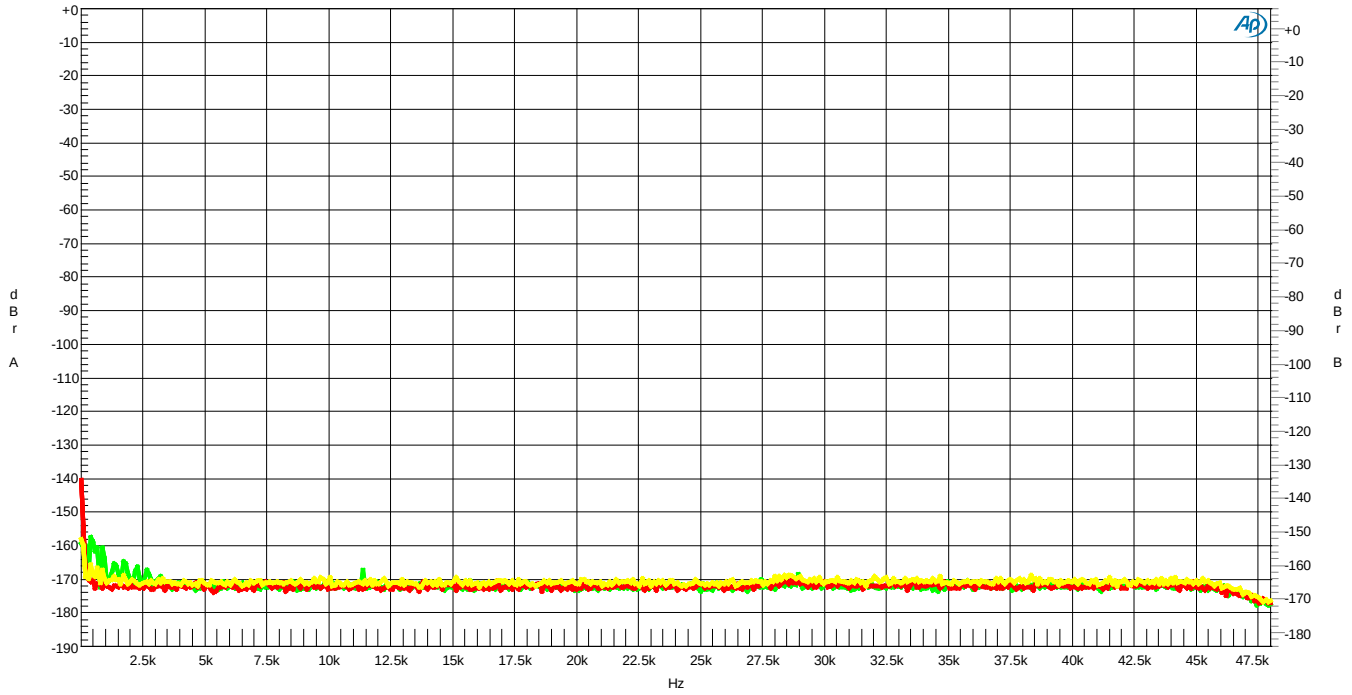


Graph 4 - Differential Phase

This plot shows the differential phase between the left and right channels. The extended 0.1 Hz to 500 kHz frequency response keeps the phase response of the two channels well matched over the audio band. This plot shows that the differential phase is virtually perfect! Notice that the scale is highly expanded (+/- 1 degree). The slight bumps in the curve are due to the measurement limits of the AP2722 test station. This L/R phase matching is much better than the L/R phase matching in the AP2722 test station. To make this measurement, we had to create a correction curve for the AP2722. The correction curve removes the phase errors produced by the test equipment, allowing measurement of the line amplifier.

Notes:

- The vertical scale is the phase difference between the left and right channels.
- Balanced inputs to balanced outputs, volume control set at 0 dB.



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment	Source 2
1	2	Green	Solid	4	Fft.Ch.1 Ampl	Left	Left Line Output	1.00000 =Swr.Ch. A Input
1	3	Green	Solid	4	Fft.Ch.1 Ampl	Right		: 1.00000 =Swr.Ch. A Input
2	2	Red	Solid	4	Fft.Ch.1 Ampl	Left	Right Line Output	2.00000 =Swr.Ch. A Input
2	3	Red	Solid	4	Fft.Ch.1 Ampl	Right		: 2.00000 =Swr.Ch. A Input
3	2	Yellow	Solid	4	Fft.Ch.1 Ampl	Left	Mono Line Output	3.00000 =Swr.Ch. A Input
3	3	Yellow	Solid	4	Fft.Ch.1 Ampl	Right		: 3.00000 =Swr.Ch. A Input

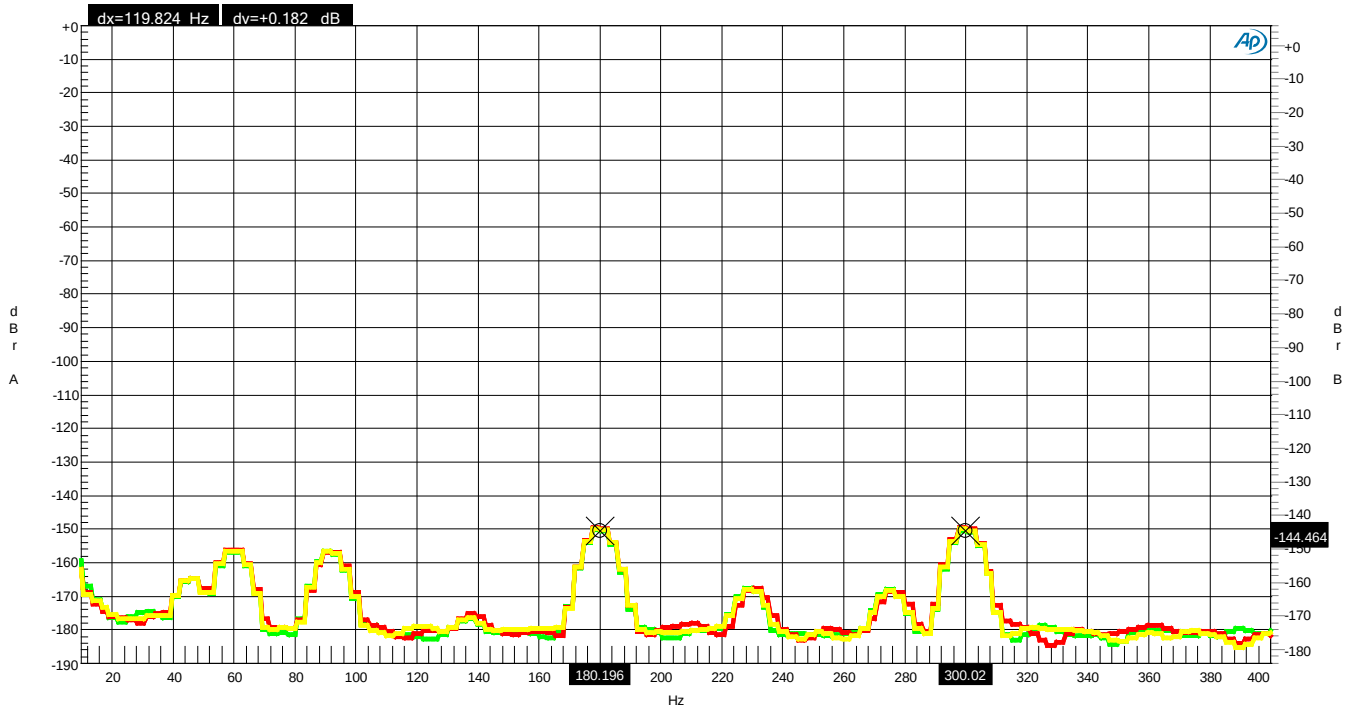
FFT_Idle_Unity_Gain_Bal_Bal.at27

Graph 5 - FFT Idle Channel Noise - Balanced In to Balanced Out

The ***LA4*** is an exceptionally quiet line amplifier. This allows it to be inserted between a Benchmark ***DAC3*** and an ***AHB2*** power amplifier without degrading the noise performance of the system.

Notes:

- The scale on the left (dBr A) is dB relative to +28 dBu. This is the maximum input and output level supported by the ***LA4*** line stage.
- The scale on the right (dBr B) is dB relative to +22 dBu. This is the input level required to drive an external ***AHB2*** power amplifier to full output power.
- Balanced inputs to balanced line outputs, volume control set at 0 dB.



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment	Source 2	Cursor1	Cursor2
1	2	Green	Solid	4	Fft.Ch.1 Ampl	Left	Left Line Out	: 1.00000 =Swr.Ch. A Input	-150.645 dBr A	-150.464 dBr A
1	3	Green	Solid	4	Fft.Ch.1 Ampl	Right		: 1.00000 =Swr.Ch. A Input	*-144.645 dBr	*-144.464 dBr
2	2	Red	Solid	4	Fft.Ch.1 Ampl	Left	Right Line Out	2.00000 =Swr.Ch. A Input	-149.889 dBr A	-149.685 dBr A
2	3	Red	Solid	4	Fft.Ch.1 Ampl	Right		: 2.00000 =Swr.Ch. A Input	-143.889 dBr B	-143.685 dBr B
3	2	Yellow	Solid	4	Fft.Ch.1 Ampl	Left	Mono Line Out	3.00000 =Swr.Ch. A Input	-150.113 dBr A	-150.050 dBr A
3	3	Yellow	Solid	4	Fft.Ch.1 Ampl	Right		: 3.00000 =Swr.Ch. A Input	-144.113 dBr B	-144.050 dBr B

FFT_Idle_Unity_Gain_Bal_Bal_Low_Freq.at27

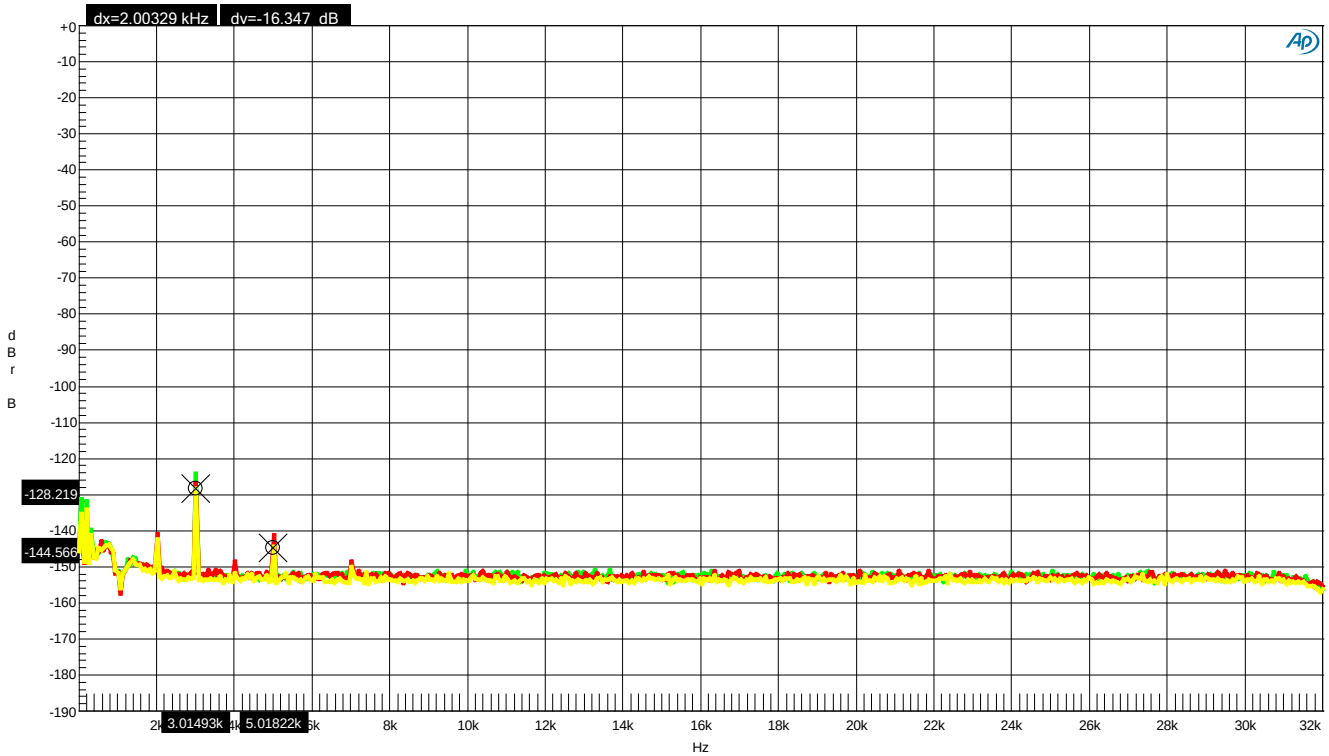
Graph 6 - AC Line-Related Hum - Line Amplifier

This FFT plot shows that AC line-related hum is 150 dB below the maximum output level of +28 dBu (use the left-hand dBr A scale)! The AC line frequency was 60 Hz in this test.

This plot also shows that AC line-related hum is 144 dB below the maximum input level of an ***AHB2*** power amplifier. These levels are so low that they will not impact the system SNR through an external ***AHB2***.

Notes:

- The scale on the left (dBr A) is dB relative to +28 dBu. This is the maximum input and output level supported by the ***LA4*** line stage.
- The scale on the right (dBr B) is dB relative to +22 dBu. This is the input level required to drive an external ***AHB2*** power amplifier to full output power.
- Balanced inputs to balanced line outputs, volume control set at 0 dB.



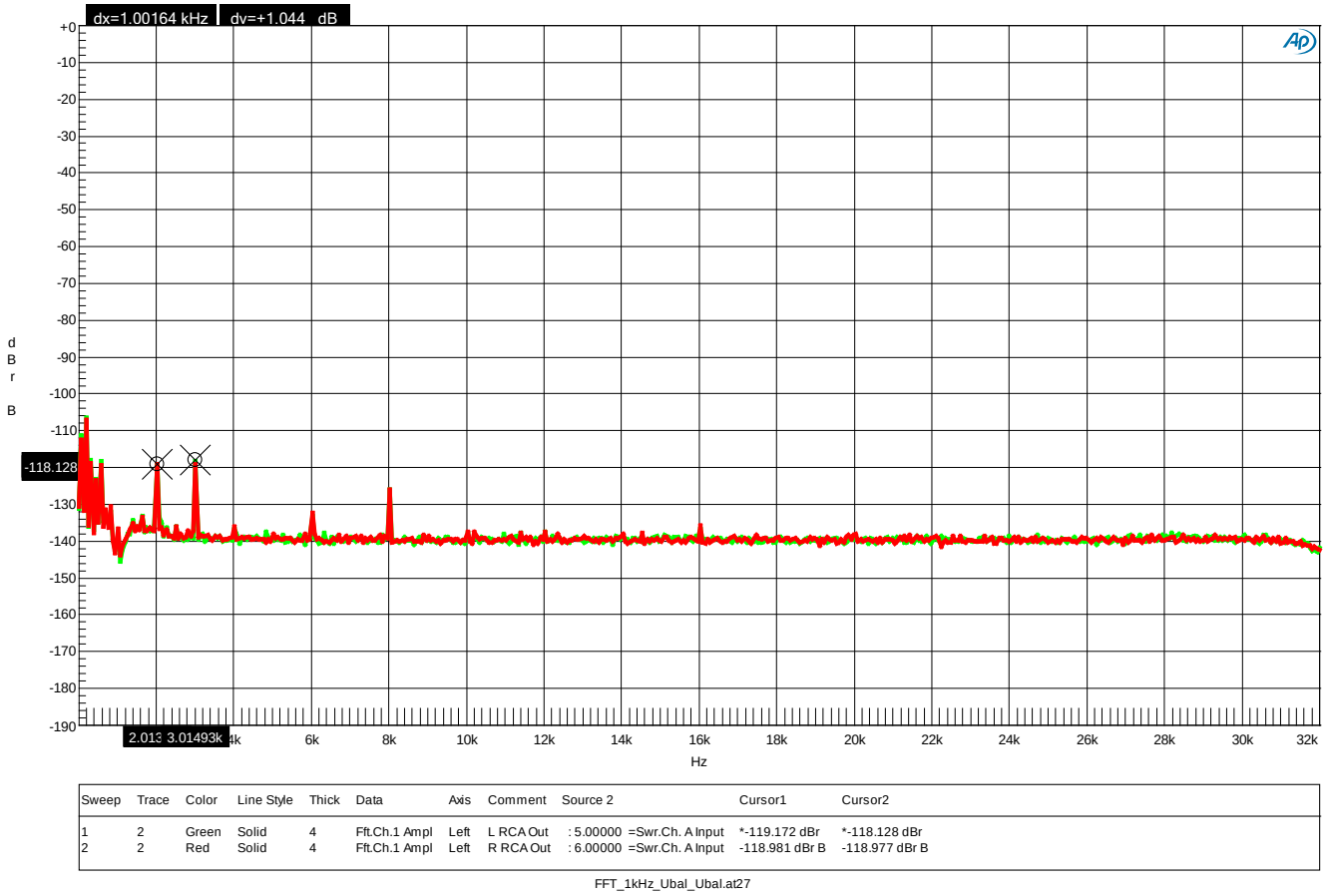
Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment	Source 2	Cursor1	Cursor2
1	2	Green	Solid	4	Fft.Ch.1 Ampl	Left	Left Line Out : 1.00000	=Swr.Ch. A Input	-124.094 dBr B	-146.609 dBr B
2	2	Red	Solid	4	Fft.Ch.1 Ampl	Left	Right Line Out 2.00000	=Swr.Ch. A Input	-126.729 dBr B	-141.285 dBr B
3	2	Yellow	Solid	4	Fft.Ch.1 Ampl	Left	Mono Line Out 3.00000	=Swr.Ch. A Input	*-128.219 dBr	*-144.566 dBr

Graph 7 - FFT 1 kHz Tone at 22 dBu - Line Amplifier - Balanced to Balanced

This plot shows that the THD produced by the line amplifier is extremely low, even when delivering a very high 22 dBu output. The third harmonic measures better than -124 dB (0.00006%) on all balanced outputs! The 5th harmonic measures better than -141 dB (0.000009%) on all balanced outputs!

Notes:

- The scale on the left (dBr B) is dB relative to +22 dBu. This is the signal level required to drive an external ***AHB2*** power amplifier to full output power.
- Balanced inputs to balanced line outputs, volume control set at 0 dB.
- The 1 kHz fundamental has been removed using a notch filter. This filter increases the resolution of the AP2722 test system.



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment	Source 2	Cursor1	Cursor2
1	2	Green	Solid	4	Fft.Ch.1 Ampl	Left	L RCA Out	: 5.00000 =Swr.Ch. A Input	*-119.172 dBr	*-118.128 dBr
2	2	Red	Solid	4	Fft.Ch.1 Ampl	Left	R RCA Out	: 6.00000 =Swr.Ch. A Input	-118.981 dBr B	-118.977 dBr B

FFT_1kHz_Ubal_Ubal.at27

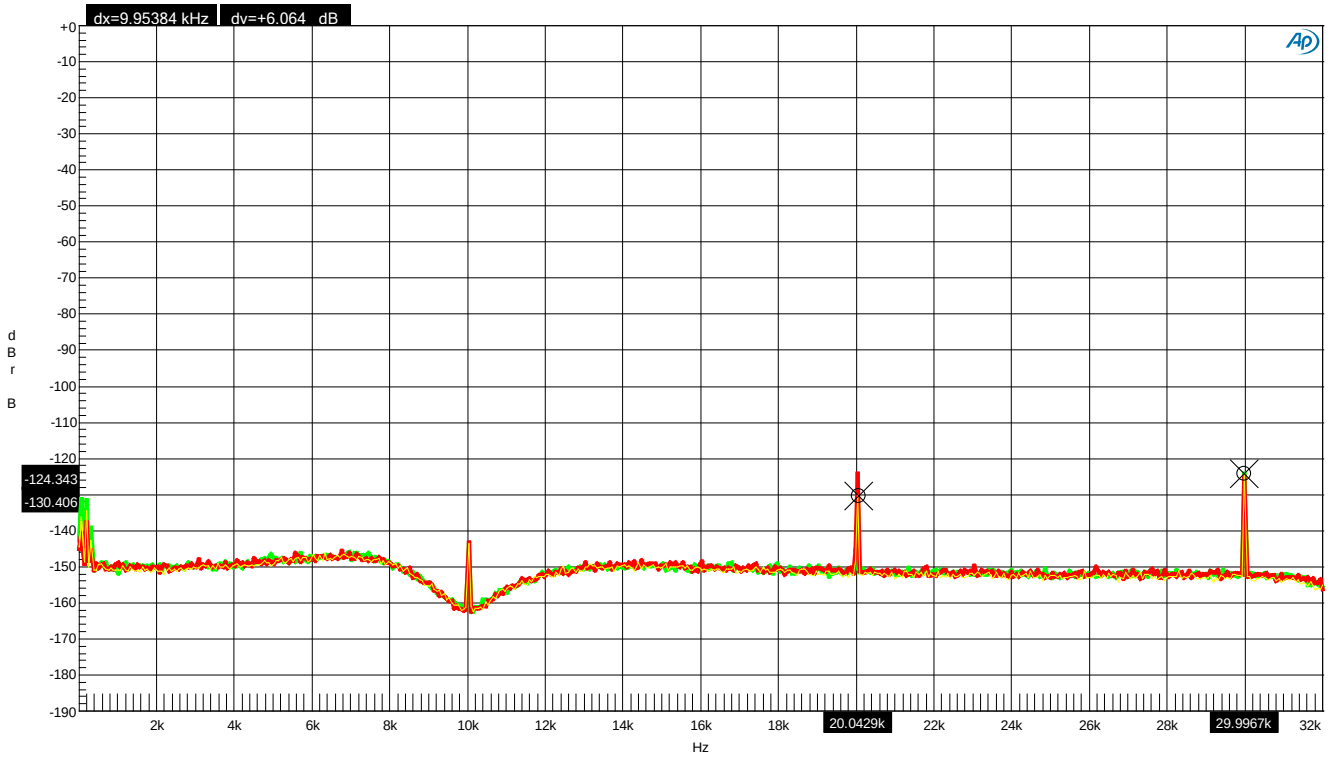
Graph 8 - FFT 1 kHz Tone at 1.6 Vrms - Line Amplifier - Unbalanced to Unbalanced

This plot shows the performance of the unbalanced inputs and outputs. The input level is 1.6 Vrms which is the level required to produce 22 dBu on the balanced outputs. This level was selected to match the operating point used in **Graph 7**.

If you compare **Graph 8** (unbalanced) to **Graph 7** (balanced) you can see that the unbalanced inputs and outputs perform very well in terms of THD. However, the SNR is slightly reduced due to the much lower signal levels used with unbalanced interconnects.

Notes:

- The scale on the left (dBr B) is dB relative to 1.6 Vrms. It is also the level of the test tone.
- Unbalanced inputs to unbalanced line outputs, volume control set at 0 dB.
- The 1 kHz fundamental has been removed using a notch filter. This filter increases the resolution of the AP2722 test system.



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment	Source 2	Cursor1	Cursor2
1	2	Green	Solid	4	Fft.Ch.1 Ampl	Left	Left Line Out : 1.00000	=Swr.Ch. A Input	*-130.406 dBr	*-124.343 dBr
2	2	Red	Solid	4	Fft.Ch.1 Ampl	Left	Right Line Out 2.00000	=Swr.Ch. A Input	-124.132 dBr B	-125.049 dBr B
3	2	Yellow	Solid	1	Fft.Ch.1 Ampl	Left	Mono Line Out 3.00000	=Swr.Ch. A Input	-130.115 dBr B	-124.568 dBr B

FFT_10kHz_Bal_Bal.at27

Graph 9 - FFT 10 kHz Tone at 22 dBu - Line Amplifier - Balanced to Balanced

This plot shows that the THD produced by the line amplifier is extremely low, even when delivering a very high 22 dBu output. The 2nd and 3rd harmonics each measure better than -124 dB (0.00006%)! This test shows that THD does not increase when reproducing high frequencies.

Notes:

- The scale on the left (dBr B) is dB relative to +22 dBu. This is the signal level required to drive an external ***AHB2*** power amplifier to full output power. It is also the level of the test tone.
- Balanced inputs to balanced line outputs, volume control set at 0 dB.
- The 10 kHz fundamental has been removed using a notch filter. This filter increases the resolution of the AP2722 test system.

Specifications

Balanced Analog Outputs	
Test conditions: 1 kHz test tone, Output Level = +24 dBu, Unity Gain (unless noted)	
Number of Balanced Analog Outputs	3 (left, right, mono sum)
Output Connectors	Gold-Pin Neutrik™ XLR - male
SNR	137 dB, A-Weighted 135 dB, 20 Hz to 20 kHz
Output Noise	< 2.1 uV, 20 Hz to 20 kHz
Frequency Response	-0.005 dB at 10 Hz -0.001 dB at 20 kHz -3 dB at 0.1 Hz and 500 kHz
Output Impedance	60 Ohms
Maximum Output Level	+28 dBu, 19.5 Vrms
THD	-126 dB, 0.00005%
THD+N, 20 kHz BW	-115 dB, 0.00018%
Volume Control Range (with 0 dBFS digital input)	Mute, -112 dB to +15 dB in 0.5 dB steps
Balance Control Range	+/- 6 dB in 0.5 dB steps

Unbalanced Analog Outputs	
Test conditions: 1 kHz test tone, Input Level = 2 Vrms, Unity Gain (unless noted)	
Number of Unbalanced Analog Outputs	2 (left, right)
Output Connectors	Gold RCA - female
SNR	116 dB, A-Weighted 108 dB, 20 Hz to 20 kHz
Output Noise	< 8 uV, 20 Hz to 20 kHz
Frequency Response	-0.008 dB at 10 Hz -0.005 dB at 20 kHz -3 dB at 0.1 Hz and 500 kHz
Output Impedance	30 Ohms
Maximum Output Level	+12.2 dBu, 3.2 Vrms
Volume Control Range (with 0 dBFS digital input)	Mute, -112 dB to +15 dB in 0.5 dB steps
Balance Control Range	+/- 6 dB in 0.5 dB steps

Balanced Analog Inputs	
Number of Unbalanced Analog Inputs	4 (2 stereo pairs)
Input Connectors	Gold-Pin Neutrik™ XLR - female
Input Impedance	>50 k Ohms
Maximum Input Level	+28 dBu, , 19.5 Vrms
Input Selection and Muting	Gold-Contact Relays
Input State when Power is Off	Inputs are Disconnected using Relays

Unbalanced Analog Inputs	
Number of Unbalanced Analog Inputs	4 (2 stereo pairs)
Input Connectors	Gold RCA - female
Input Impedance	>50 k Ohms
Maximum Input Level	+12.2 dBu, 3.2 Vrms
Input Selection and Muting	Gold-Contact Relays
Input State when Power is Off	Inputs are Disconnected using Relays

Status Display	
Type	3.5" Color TFT with Capacitive Touch
Volume Indication	Bar Graph and dB Gain
MUTE Indicator	On screen
-20 dB DIM Indicator	On screen
Input Name	8-Character, User Programmable
Input Connector Display	Input Number, Connector Type

AC Power Requirements	
Nominal Operating Range	100 – 240 VAC, 50 - 60 Hz
Min/Max Operating range	90 – 260 VAC, 47 - 63 Hz
Power	< 0.5 Watts Standby 12 Watts Typical Program 17 Watts Maximum
Fuses (2 required)	5x20 mm, 0.5 A 250 V Slo-Blo® Type

Dimensions	
Form Factor	½ Rack Wide, 2 RU High
Depth - excluding knob and connectors	8.33” (220 mm)
Overall Depth - including knob and connectors	9.33” (237 mm)
Width	8.65” (220 mm)
Height - excluding feet	3.47" (88 mm)
Height - including feet	3.88” (99 mm)

Weight	
LA4 only	8 lb.
LA4 with remote, power cord and manual	9 lb.
Shipping weight	12 lb.

Model Numbers	
The ***LA4*** model number is 450-17100-XXX	XXX is a code for color options
The boxed product with manual is 500-17100-XXX	XXX is a code for color options

AC Power-Entry and Fuse Module

Input Voltage Range

Note: The ***LA4*** is equipped with a universal power supply. There is no voltage selection switch. AC voltage range is 100 to 240 VAC, 50 to 60 Hz.

Power Cord

Note: The AC power input uses a standard IEC type connector. One USA-compatible power cord is included with the ***LA4***. IEC style power cords in country-specific configurations are available in your locality.

Caution: Always use a grounded power cord. The *LA4* is equipped with a standard IEC power entry module. Use an IEC power cord that is equipped with the appropriate connector for your location. Cords are available from your dealer.

Fuses

Caution: For continued fire hazard protection always replace the fuses with the correct size and type (T 0.5A 250V, 5 x 20 mm – Littelfuse® Slo-Blo® HXP218.500 or equivalent). The fuse drawer includes two fuses. Always replace both fuses at the same time.

Regulatory Compliance

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.

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

RoHS 3 Compliance Information

This product meets the RoHS guidelines for electronic components and hardware.

This product complies with the requirements of the Directive (EU) 2015/863 on the *Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment* (RoHS) directive for banned substances. This Directive restricts the use of the following 10 substances by setting the following limits in part per million (ppm) by weight for each individual component:

1. Lead (Pb), < 1000 ppm
2. Mercury (Hg), < 100 ppm
3. Cadmium (Cd), <100 ppm
4. Hexavalent chromium (Cr^{6+}), < 1000 ppm
5. Polybrominated biphenyls (PBB), < 1000 ppm
6. Polybrominated diphenyl ether (PBDE), < 1000 ppm
7. Bis(2-ethylhexyl) phthalate (DEHP), < 1000 ppm
8. Butyl benzyl phthalate (BBP), < 1000 ppm
9. Dibutyl phthalate (DBP), < 1000 ppm
10. Diisobutyl phthalate (DIBP), < 1000 ppm

California Proposition 65 Statement

Proposition 65, officially known as the Safe Drinking Water and Toxic Enforcement Act of 1986, was enacted as a ballot initiative in November 1986. The proposition protects the state's drinking water sources from being contaminated with chemicals known to cause cancer, birth defects or other reproductive harm, and requires businesses to inform Californians about exposures to such chemicals.

More information about California Proposition 65 is available at:

www.p65warnings.ca.gov

Proposition 65 requires the state to maintain and update a list of chemicals known to the state to cause cancer or reproductive toxicity.

This list is much more extensive than the 10 substances regulated by RoHS 3. It is quite likely that some Prop 65 substances exist in products that fully comply with the RoHS directives.

Furthermore, RoHS 3 regulates the concentration of 10 substances but does not attempt to regulate exposure levels of these 10 substances. In general, lower concentrations will result in lower exposure levels. RoHS 3 minimizes exposure by reducing these 10 substances to very low levels. In contrast, Prop 65 sets exposure limits for how much of these and other toxins will be absorbed, ingested, or inhaled when the product is used. Unfortunately, actual exposure is a function of how the product is used, misused and disposed.

Due to the large number of components in electronic devices and the fact that these are supplied from many different manufacturers, we must assume that one or more components contain levels of Prop 65 substances that the State of California deems harmful even though these components meet requirements of the RoHS directives.

California Proposition 65 Warnings

WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

WARNING: The wires of this product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

WARNING: The internal components of this product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling. Refer servicing to qualified persons.

WARNING: Hazardous substances may be released or produced if this product is shredded, incinerated, or placed in a landfill. Recycle all electronic devices using a reputable electronics recycler.

CE Certificate of Compliance

Note: The ***LA4*** model number is 450-17100-XXX where XXX is a code for the chassis color.

RF Solutions
801 Hiawatha Blvd East
Syracuse NY 13208
Phone 315-457-0245 | Fax 315-457-0428

Certificate of Compliance

RF Solutions, LLC has tested the product to the current appropriate standards and finds that the product is in compliance with those requirements.

EMC Directive:	**2014/30/EU**	
Generic Emissions Standard:	EN 61000-6-3:2007+A1:2010	
Product Specific Emissions:	55032:2015 Class B	
Generic Immunity Standard:	EN 55103-2:2010	
Immunity:	EN 61000-4-2:2009	Electrostatic Discharge
	EN 61000-4-3:2016	Radiated Susceptibility
	EN 61000-4-4:2012	Electrical Fast Transient/Burst
	EN 61000-4-5:2014	Surge
	EN 61000-4-6:2014	Conducted Susceptibility
	EN 61000-4-8:2010	Magnetics
	EN 61000-4-11:2004	Voltage Dips & Interruptions
	EN 61000-3-2:2014	Harmonic Current
	EN 61000-3-3:2013	Voltage Fluctuations & Flicker

Manufacturer's Name:	Benchmark Media Systems
Manufacturer's Address:	203 E Hampton Pl, Ste 2 Syracuse, NY 13206
Product:	HPA4 Headphone / Line Amplifier
Model Number:	450-17200-xxx

This Certificate of Compliance issued July 11, 2018 is valid for the test sample of the product specified above and that it complies with the Directive(s) and Standard(s).

Signature: Annelle Frierson

Annelle Frierson, Managing Partner
RF Solutions, LLC
801 Hiawatha Blvd. East
Syracuse, NY 13208
Phone: 315-457-0245 / Fax: 315-457-0428

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.

Revision A - 10/2/2018

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