

Benchmark MPA1 Instruction Manual

2-Channel Microphone Preamplifier



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Safety Information

Voltage Selection

CAUTION: THE FUSE DRAWER INCLUDES A VOLTAGE SELECTION SWITCH WITH TWO SETTINGS: "110" AND "220". CHECK TO SEE THAT IT IS PROPERLY CONFIGURED FOR YOUR LOCATION BEFORE CONNECTING AC POWER.

Incorrect configuration may blow fuses or cause erratic operation.

Repairs

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

Fuses

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

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.

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

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Overview



The MPA1 is a 2-channel microphone preamplifier that is designed to achieve the highest performance available in a microphone preamplifier. The MPA1 is designed for maximum transparency, wide bandwidth, low-noise, low-distortion, and superior EMI immunity. It is well suited for the most demanding applications in studios and live venues.

The MPA1 is the next evolution of Benchmark's legendary microphone preamplifier systems. In all respects, the MPA1 meets or exceeds the performance of Benchmark's current and legacy mic preamps.

The MPA1 achieves outstanding performance over a wide range of input levels. Gain is controlled by precision matched switched resistor networks and is adjustable over a range of 0 dB to 74 dB without using a pad.

Each channel of the MPA1 has an XLR direct output. These outputs feature low-distortion, high-current drivers that easily handle long cables and other less-than-ideal loads.

Each of the MPA1's two channels includes a switch for +48V Phantom power, polarity inversion, and a 40Hz high-pass filter.

The entire MPA1 has a 500 kHz bandwidth. Wide bandwidth demands exceptional RF filtering and shielding: The multi-layer printed circuit board uses a special construction technique that creates a 3-dimensional shield surrounding all signal traces. Each microphone input features Benchmark's exclusive precision-tuned, two-stage RF input

filter. This circuit removes RF interference without affecting the microphone input signal. RF filters have always been a key component in Benchmark preamps, and has resulted in a proven track record for exceptional performance in difficult high-RF venues.

Microphone pre-amplifier circuits usually suffer from non-linear performance at ultra-sonic frequencies. This non-linearity causes inter-modulation distortion (IMD) components that fold down to audible frequencies. Unlike harmonic distortion (THD), IMD produces distortion tones that are very un-natural and non-musical. IMD also masks and alters the subtle details of delicate high-frequency transients such as those produced by bells. Benchmark preamps have always had outstanding high-frequency performance as well as freedom from IMD. The MPA1 takes the Benchmark design one step further, and achieves the lowest IMD that we have ever measured in a microphone preamplifier.

The MPA1 includes the HPA2™ - Benchmark's signature high-current, 0-Ohm headphone amplifier. The HPA2™ is capable of delivering the full performance of the MPA1 into the difficult load presented by most headphones.

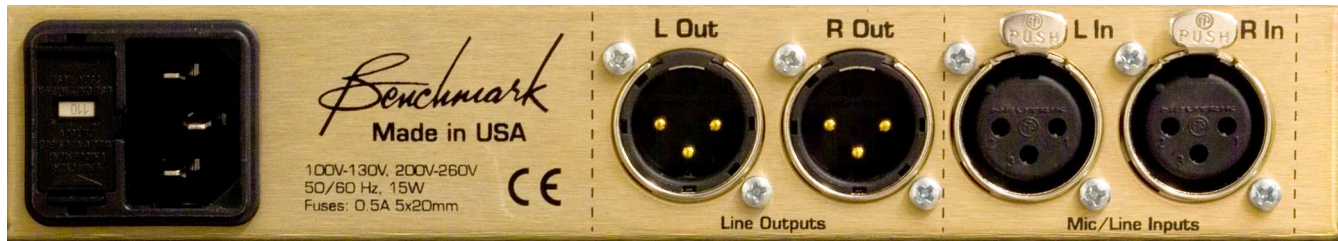
A rugged half-rack (1/2 RU) enclosure includes an internal power supply that supports all international voltages and has generous margins for over-voltage and under-voltage conditions. It features a core-banded toroidal transformer in a shielded enclosure.

We believe that you will enjoy the performance and features of the MPA1.

Features

- Two Transformerless Microphone Inputs
- Two Balanced Direct Outputs (XLR)
- Monolithic Low-Noise Transistor Quads on Each Microphone Input
- Precision-Tuned, Two-Stage RF Filter on Each Microphone Input
- Precision-Matched Resistor Gain Control Switches on Every Microphone Input
- 2-dB per Switch Step; Maximum Gain - 74 dB; Maximum Gain - 0 dB (Unity)
- 'Virtual' 38-position Gain Control Switch for Continuous Gain Control
- Four Segment Gain Range Indicator
- +27.5 dBu Maximum Input Level
- +27.5 dBu Maximum Output Level on Balanced Outputs
- Actively Balanced Transformerless Outputs
- High-Current High-Speed Low-Capacitance Phantom Protection Circuits
- Fully Protected Against Phantom Hot-Plug and Cable-Shorting Scenarios
- Phantom-Disable Feature for Dedicated Ribbon Microphone Application
- +48v Phantom Power Switch on Every Microphone Input
- 40 Hz High-Pass Filter Switch on Every Microphone Input (12 dB/octave)
- Polarity Switch on Every Microphone Input
- Four-Segment LED Output Level Meter (-20 dBu, +4 dBu, +24 dBu, +29 dBu)
- HPA2™ "0-Ohm" 1/4" TRS Headphone Output
- +23.5 dBu Maximum Headphone Output Level
- 41-Detent Headphone Level Control
- Ultra-Quiet Linear Power Supply with Rear-Panel Input Voltage Selector
- Complies with FCC and CE Regulations
- RoHS Compliant

Connections



Microphone Inputs (L and R)

The balanced transformerless microphone inputs use locking Neutrik™ gold-pin female XLR jacks with both pin 1 (Ground) and the XLR shell directly bonded to the chassis. This direct bonding is important for maximum RF shielding and for immunity to hum due to shield currents. Each input includes Benchmark's precision-tuned, two-stage RF filter for outstanding RF immunity.

- XLR pin 2 = + Audio In
- XLR pin 3 = - Audio In
- XLR pin 1 = Cable Shield – bonded to chassis
- XLR shell – bonded to chassis

The microphone inputs have a wide operating range. The maximum input level before clipping is +29 dBu.

Each channel is equipped with a switch for +48V phantom power. Under certain circumstances, phantom power can cause large voltage transients. The MPA1 is equipped with high-current input protection circuits that protect the sensitive low-noise input transistors from the worst-case phantom-induced transients. Large transients are produced when a microphone is connected or disconnected while phantom power is on. The worst possible transients occur when a microphone cable has an intermittent short to ground from either pin 2 or pin 3. The MPA1 is very well protected against both of the above. For the protection of your equipment (and your ears), we strongly recommend shutting off phantom

power several seconds before connecting or disconnecting a microphone.

The MPA1 is designed to work with balanced microphones, balanced line-level inputs, and unbalanced sources as well. The MPA1 maintains rock-solid performance even in difficult RF environments.

Common-mode signals in the audio band are removed with a precisely trimmed differential amplifier. The MPA1 even includes a subsonic common-mode trim adjustment on each microphone input that eliminates sensitivity to +48V ripple caused by power supply noise and/or the loading of microphone electronics.

Balanced XLR Outputs

The MPA1 has two balanced direct outputs. These outputs use gold-pin Neutrik™ male XLR connectors with direct chassis bonding of both pin 1 and the connector shell. This direct bonding is important for maximum RF shielding and for immunity to hum due to shield currents.

All outputs are transformerless and have an impedance of 60 Ohms balanced or 30 Ohms unbalanced. All outputs are equipped with high-performance drivers that can drive high signal levels into load impedances as low as 300 Ohms without an increase in distortion. These outputs are well suited for driving long lines.

- XLR pin 2 = + Audio Out
- XLR pin 3 = - Audio Out
- XLR pin 1 = Cable Shield – bonded to chassis
- XLR shell – bonded to chassis

Output Signal Levels

The maximum output level on the balanced outputs is +27.5 dBu. Each channel's output can be monitored with the four-segment LED output level meter.

Driving Unbalanced Loads

CAUTION: ALWAYS LEAVE XLR PIN 3 FLOATING WHEN DRIVING UNBALANCED LOADS.

XLR to RCA Wiring:

1. Connect XLR pin 2 (+) to RCA center pin.
2. Connect XLR pin 1 (GND) to RCA shield.
3. Make no connection to XLR pin 3 (-).

XLR to ¼" TS Wiring:

1. Connect XLR pin 2 (+) to Tip.
2. Connect XLR pin 1 (GND) to Sleeve.
3. Make no connection to XLR pin 3 (-).

AC Power Entry Connector

The AC power input uses a standard IEC type connector and includes a power switch. Factory-configured 110V units ship with a power cord. 220V units ship without a power cord. Location-specific IEC style power cords may be purchased from a local source (including any local Benchmark dealer).

Fuse Holder

The fuse holder is built into a drawer next to the IEC power connector. The drawer requires two 5 x 20 mm 250 V Slo-Blo[®] Type fuses. The drawer includes a voltage selection switch with two settings: "110" and "220". Both settings use a 0.5 Amp fuse.

The AC input has a very wide input voltage range and can operate over a frequency range of 50 to 60 Hz. At the "110" setting, the MPA1 will operate normally over a range of 105 to 140 VAC. At the "220" setting, the MPA1 will operate normally over a range of 200 to 285 VAC.

CAUTION: FOR CONTINUED FIRE HAZARD PROTECTION ALWAYS REPLACE THE FUSES WITH THE CORRECT SIZE AND TYPE (0.5A 250 V SLO-BLO[®] 5 X 20 MM – LITTELFUSE[®] HXP218.500 OR EQUIVALENT).

Preamp Section



Preamp Overview

Each preamp channel includes switches for phantom power, polarity, and 40 Hz high-pass filter. Each channel also has a 38-position gain control switch and a 4-segment output level meter. Inputs are fully protected against overloads and phantom power transients.

Microphone Gain Controls

The gain controls are a unique approach to the popular switched-resistor network topology. Each gain switch of the MPA1 can sweep the entire 74 dB gain range with continuous rotation. This is achieved with a 'virtual 38-position' switch – a 13-position switch that triggers automatic adjustment of the gain-range.

These resistor networks are precision-matched for inter-channel gain matching within +/- 0.03 dB. This precision provides precise control of stereo microphone pairs.

Maximum gain is calibrated for exactly 74 dB. Minimum gain is 0 dB (unity). The MPA1 does not attenuate the signal with pads or otherwise. When the gain is set at 0 dB, the MPA1 can accept a signal at +27.5 dBu without clipping.

Input Topology

The first gain stage on each microphone input is built around precision-matched, monolithic, low-noise transistor quads. Bandwidth is 500 kHz, IMD and THD are virtually non-existent. The MPA1 is designed to achieve faithful and transparent microphone amplification.

Two-Stage RF Filter and CMRR

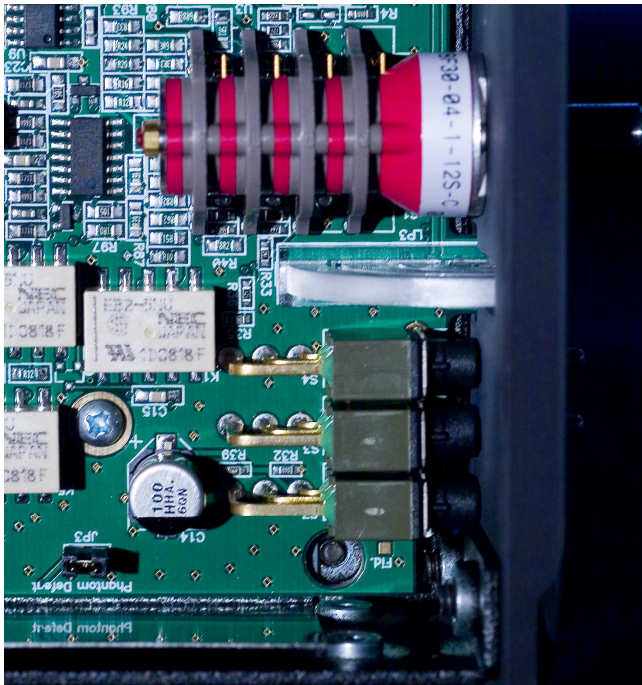
Each microphone input is precision-trimmed at 3 frequencies for common-mode rejection. High-frequency RF interference is blocked by Benchmark's two-stage RF filter. This filter maintains the MPA1's outstanding performance in very difficult RF environments.

Phantom Power Switches

Up = Phantom On
Down = Phantom Off

CAUTION: ALWAYS TURN OFF PHANTOM POWER AND WAIT SEVERAL SECONDS BEFORE CONNECTING OR DISCONNECTING MICROPHONES.

The MPA1 has an internal 'Phantom Defeat' jumper. When this jumper is removed, phantom power cannot be applied to the respective microphone input. This feature should be used when the MPA1 is dedicated to ribbon microphone. The purpose is to protect the ribbon element in case the +48V switch is thrown. The internal 'Phantom Defeat' jumper is located behind the left channel's +48V switch (bottom-left in the following picture).



CAUTION: ALWAYS DISCONNECT POWER FROM THE MPA1 FOR FIVE MINUTES BEFORE ADJUSTING THE PHANTOM DEFEAT JUMPER.

Input Protection

Under certain circumstances, phantom power can cause large voltage transients. The MPA1 is equipped with high-speed, high-current, low-capacitance protection circuits that protect the sensitive input-transistors from the worst-case phantom-induced transients.

Large transients are produced when a microphone is connected or disconnected while phantom power is on. The worst possible transients occur when a microphone cable has an intermittent short to ground from either pin 2 or pin 3. The MPA1 is very well protected against both of the above. For the protection of your microphones (and your ears), we strongly recommend shutting off phantom power several seconds before connecting or disconnecting a microphone.

Polarity Switch

Up = Polarity is Inverted
Down = Polarity is Normal

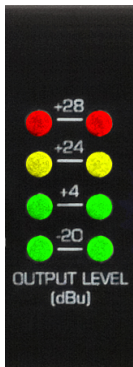
The polarity switch allows the polarity of the input signal as to be easily reversed. Typical applications that require polarity inversion include using the back-side of a figure-8 microphone (such as a ribbon), having two microphones on one instrument but facing opposite directions, or when a microphone or cable is constructed with inverted polarity.

40 Hz High-Pass Filters

Up = Filter Enabled
Down = Filter Off

The 40 Hz high-pass filter is a second-order filter with a slope of 12 dB per octave. This filter is intended to remove unwanted subsonic noise and rumble caused by sources such as HVAC, air currents, and vibration.

LED Output Level Meters



Each preamp channel is equipped with a four-segment LED output level meter.

The LED's are driven by a peak detection and stretching circuit so that very short transients can be observed.

The first green LED (-20 dBu) illuminates when the output signal has an amplitude of at least -20 dBu.

The second green LED (+4 dBu) illuminates at an output level of at least +4 dBu.

The yellow LED (+24 dBu) illuminates at an output level of at least +24 dBu.

The red LED (+28 dBu) illuminates at an output level of at least +27.5 dBu. The red LED indicates a clip has occurred.

HPA2™ Headphone Output



The output of each channel's preamp is directed to the headphone amplifier, Benchmark's signature HPA2™ headphone amplifier. This high-current, high-output amplifier has an output impedance of 0-Ohms. It is designed to drive loads as low as 30-Ohms without any increase in distortion. It also has sufficient amplitude to drive low-sensitivity 600-Ohm headphones.

The HPA2™ includes current-limiting circuits that fully protect against damage from short circuits. This is important because the right channel of a headphone amplifier will experience a short whenever a mono phone plug is inserted into the stereo headphone jack. Shorts may also occur when a plug is partially inserted.

“0-Ohm” Output Impedance

Most headphone amplifiers use series resistors to maintain stability and protect against short-circuit conditions. These resistors are usually at least 30-Ohms, and have a negative impact on performance. A headphone amplifier with series resistors may measure very well when driving resistive loads. However, the same amplifier will measure very poorly when driving a headphone load. Unfortunately most manufacturers do not specify headphone amplifier performance with anything other than ideal resistive loads. Our measurements show that headphones do not behave like resistive loads.

Headphone Performance

In our tests we have measured substantial distortion across resistors that are wired in series with headphones. We conducted measurements with a variety of headphones. In general, distortion increases as headphone impedance decreases. This distortion can be eliminated with a properly designed 0-Ohm headphone amplifier.

The performance of the HPA2™ does not change when headphones are driven. THD+N measurements for no-load, 30-Ohm resistive load, and 30-Ohm headphone load, and 600-Ohm headphone load are virtually identical. The HPA2™ will substantially improve the sound of 30 and 60-Ohm headphones. It will make very noticeable improvements with 600-Ohm headphones.

Rack Mounting

There are multiple solutions for rack-mounting the MPA1. An optional **Rack-Mount Coupler** allows the mounting of any two Benchmark **System1™** products in a single rack space. A **Blank Rack Panel** can be added when only one unit is being racked. The **System1™ Universal Rack Adapter** is a tray solution.

These rack-mount solutions are available from Benchmark. Call us, visit our website (<http://www.BenchmarkMedia.com>), or contact your dealer to purchase these accessories.

System1™ Universal Rack Adapter

The **Universal Rack Mount Adapter** is a tray that mounts up to two **System1™** products in a single rack space. The tray accepts any combination of **System1™** products (with or without rack-mount type faceplates).

Blank Rack Panel



The **Blank Rack Panel** is a 1/2-wide 1-RU black-anodized aluminum panel for covering an unused slot in a **System1™ Universal Rack Adapter**.

Mounting Near Other Equipment

CAUTION: STRAY MAGNETIC FIELDS FROM ADJACENT EQUIPMENT MAY CAUSE MAGNETICALLY INDUCED HUM IN THE SENSITIVE HIGH-GAIN PREAMP CIRCUITS.

The MPA1 is shielded in 3-dimensions with mu-metal panels, which drastically reduces susceptibility to stray magnetic fields. The MPA1 may be mounted directly above or below any other equipment, but we cannot guarantee that the MPA1 will be impervious to interference from all equipment mounted too close to the MPA1. It is recommended that the user apply caution by using the following procedure when mounting near other equipment:

TIP: TO CHECK FOR MAGNETIC INTERFERENCE FROM ADJACENT EQUIPMENT:

1. Disconnect all microphones
2. Back-terminate microphone inputs
3. Set all preamp gain controls at maximum
4. Listen to headphone output
5. Unplug adjacent equipment to determine if there is any magnetic interference

TIP: IN MANY CASES, POWER SWITCHES DO NOT TURN OFF ALL OF THE MAGNETIC COMPONENTS IN AN ELECTRONIC DEVICE. THEREFORE, WHEN PERFORMING MAGNETIC INTERFERENCE TESTS, IT IS IMPORTANT TO UNPLUG THE ADJACENT EQUIPMENT TO INSURE THAT THESE DEVICES ARE TRULY OFF.

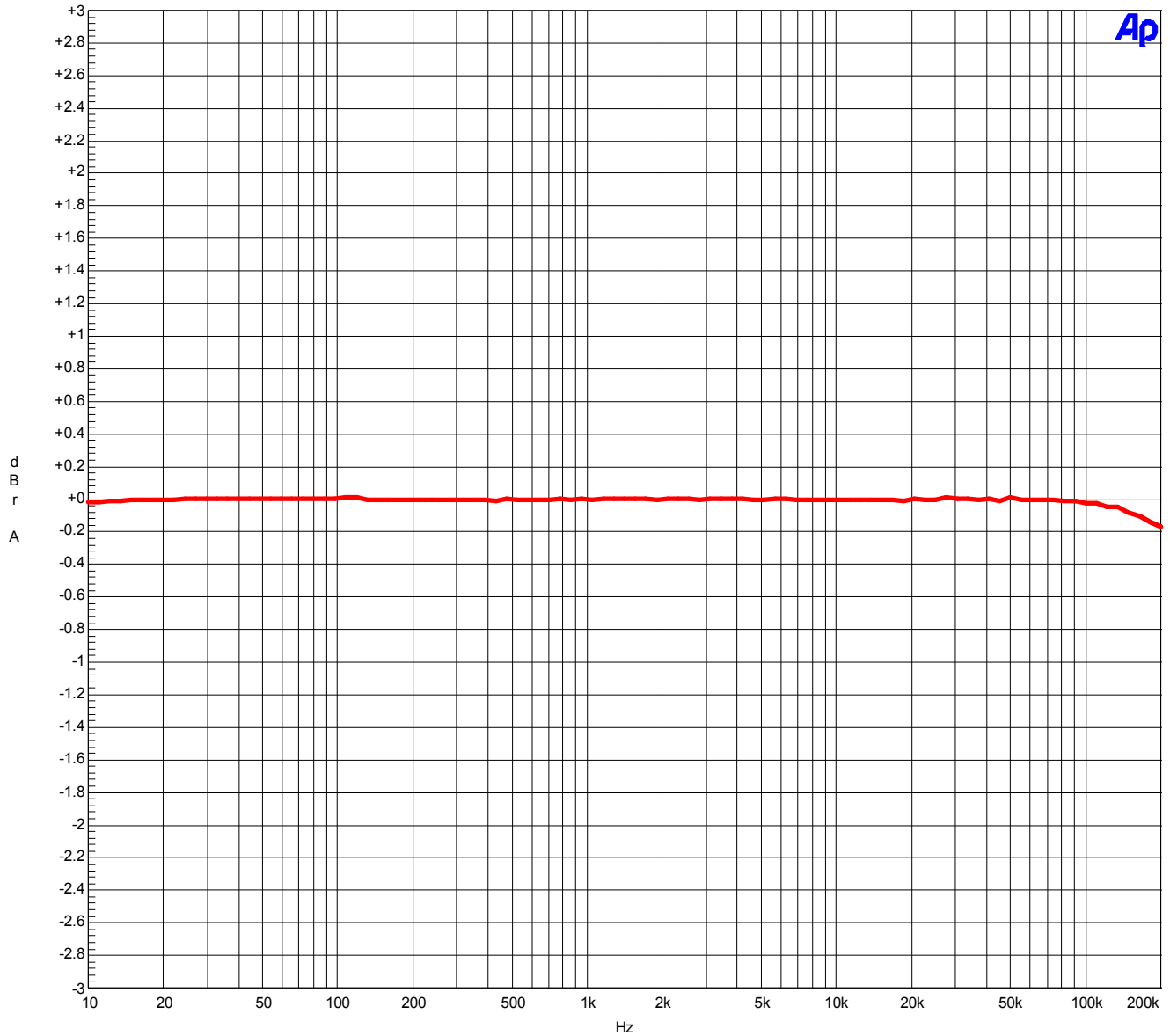
Performance Graphs

Frequency Response

Audio Precision

PRE420 - Frequency Response

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Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	Anlr.Level A	Left	HP Filter Off

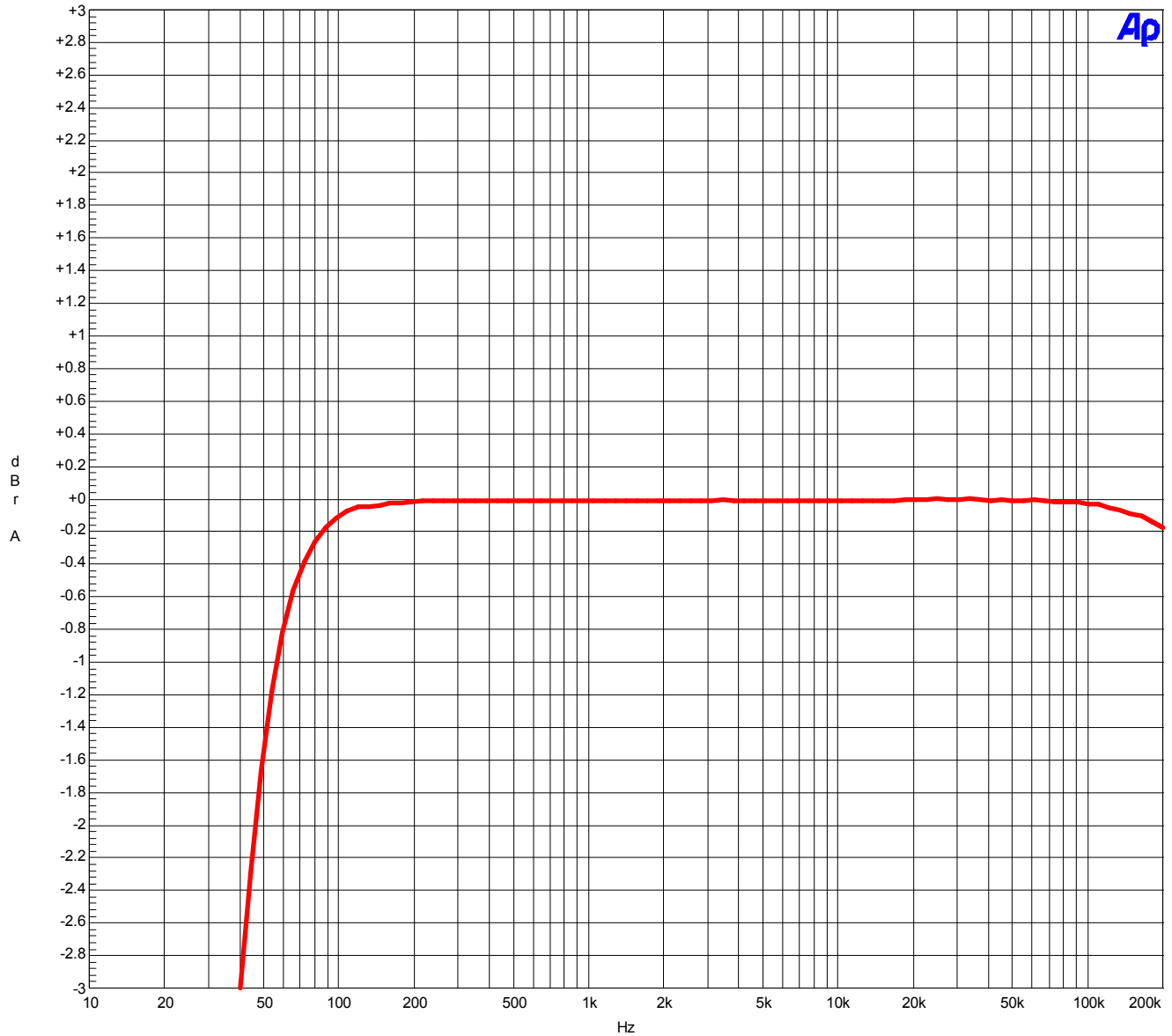
The above graph shows the frequency response of the MPA1 with the 40 Hz high-pass filter off. The amplitude response measures -0.020 dB at 10 Hz and -0.165 dB at 200 kHz. The bass response extends well below the 10-Hz limitation of the test equipment, and the high-frequency response extends well above the 200 kHz limit of the test equipment.

High-Pass Filter - Frequency Response

Audio Precision

PRE420 - Frequency Response

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Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
2	1	Red	Solid	4	Anlr.Level A	Left	HP Filter On

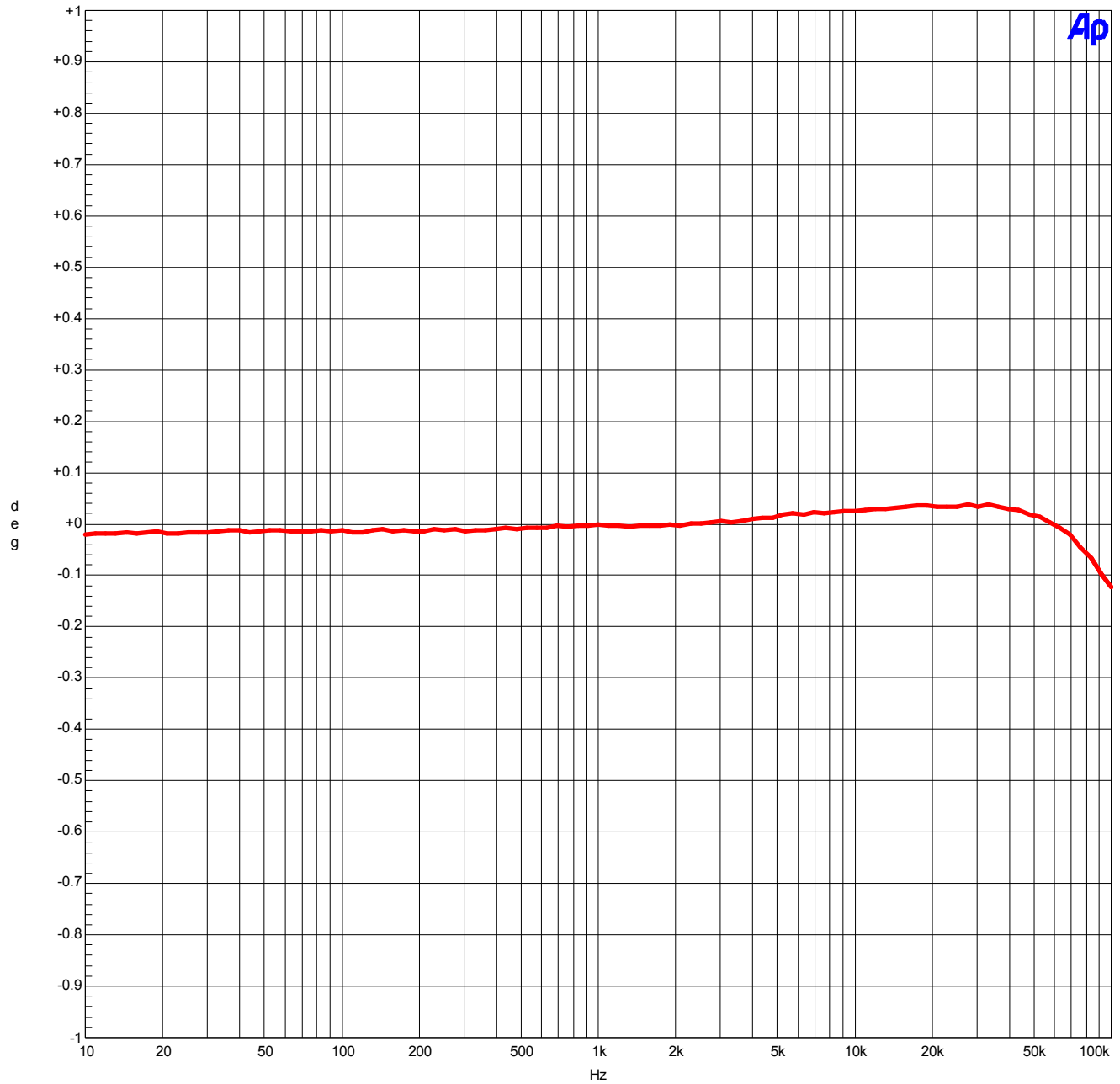
The above graph shows the response of the 40 Hz high-pass filter. Response is -3 dB at 40 Hz with a slope of 12 dB/octave.

Inter-Channel Phase Response

Audio Precision

PRE420 - Inter-Channel Phase Response

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This graph shows that the differential phase is significantly better than ± 0.05 degrees from 10 Hz to 20 kHz.

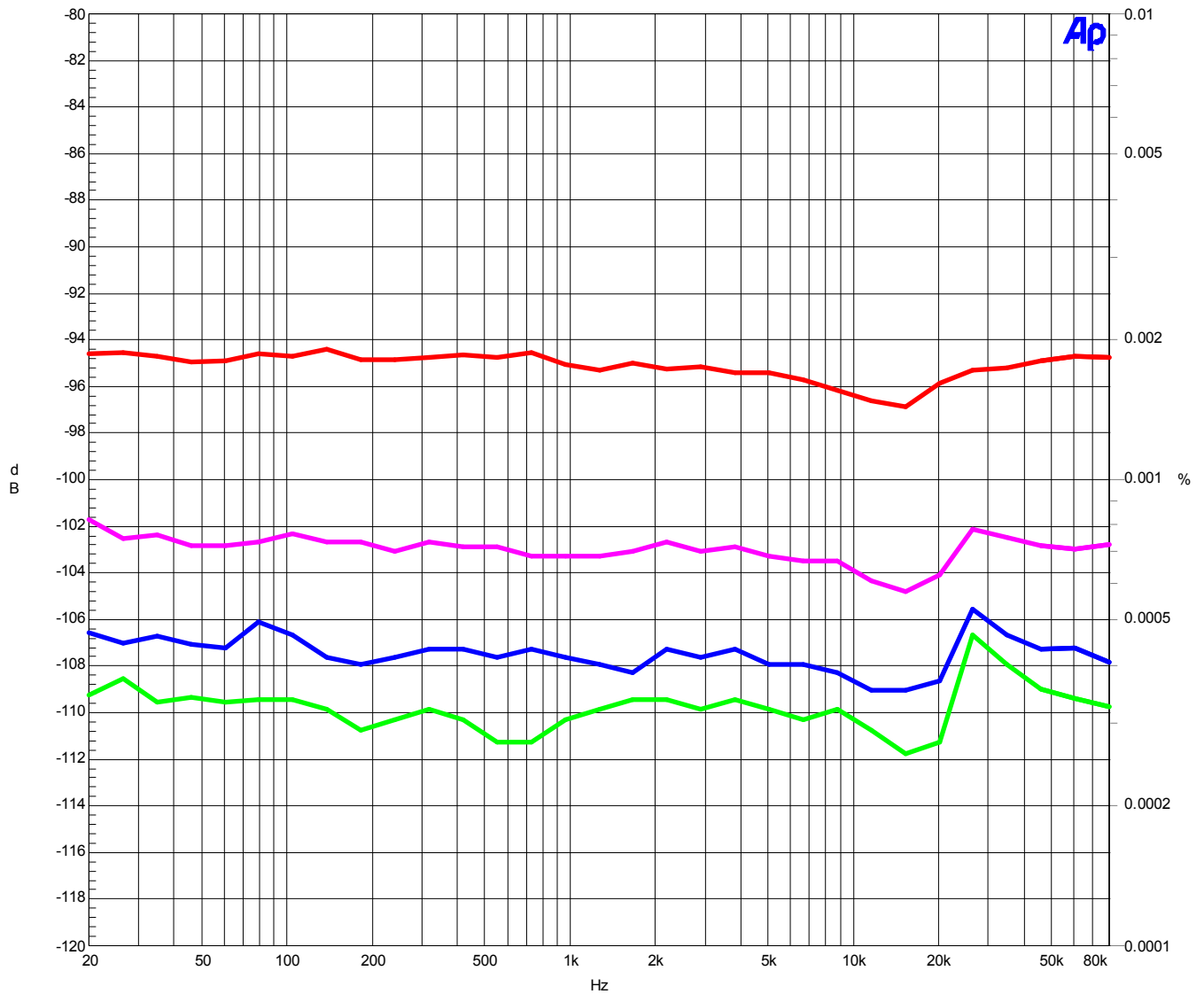
THD+N vs. Frequency

Measurement Bandwidth = 10Hz to 80 kHz, Gain = 30 to 60 dB, Output Level = +4 dBu

Audio Precision

PRE420 - THD+N vs Frequency at 60 dB Gain, BW=80 kHz

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Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	Anlr.THd+N Ratio	Left	60 dB Gain (top trace)
2	1	Magenta	Solid	4	Anlr.THd+N Ratio	Left	50 dB Gain
3	1	Blue	Solid	4	Anlr.THd+N Ratio	Left	40 dB Gain
4	1	Green	Solid	4	Anlr.THd+N Ratio	Left	30 dB Gain (bottom trace)

This graph shows that THD+N does not rise with frequency – even at maximum gain.

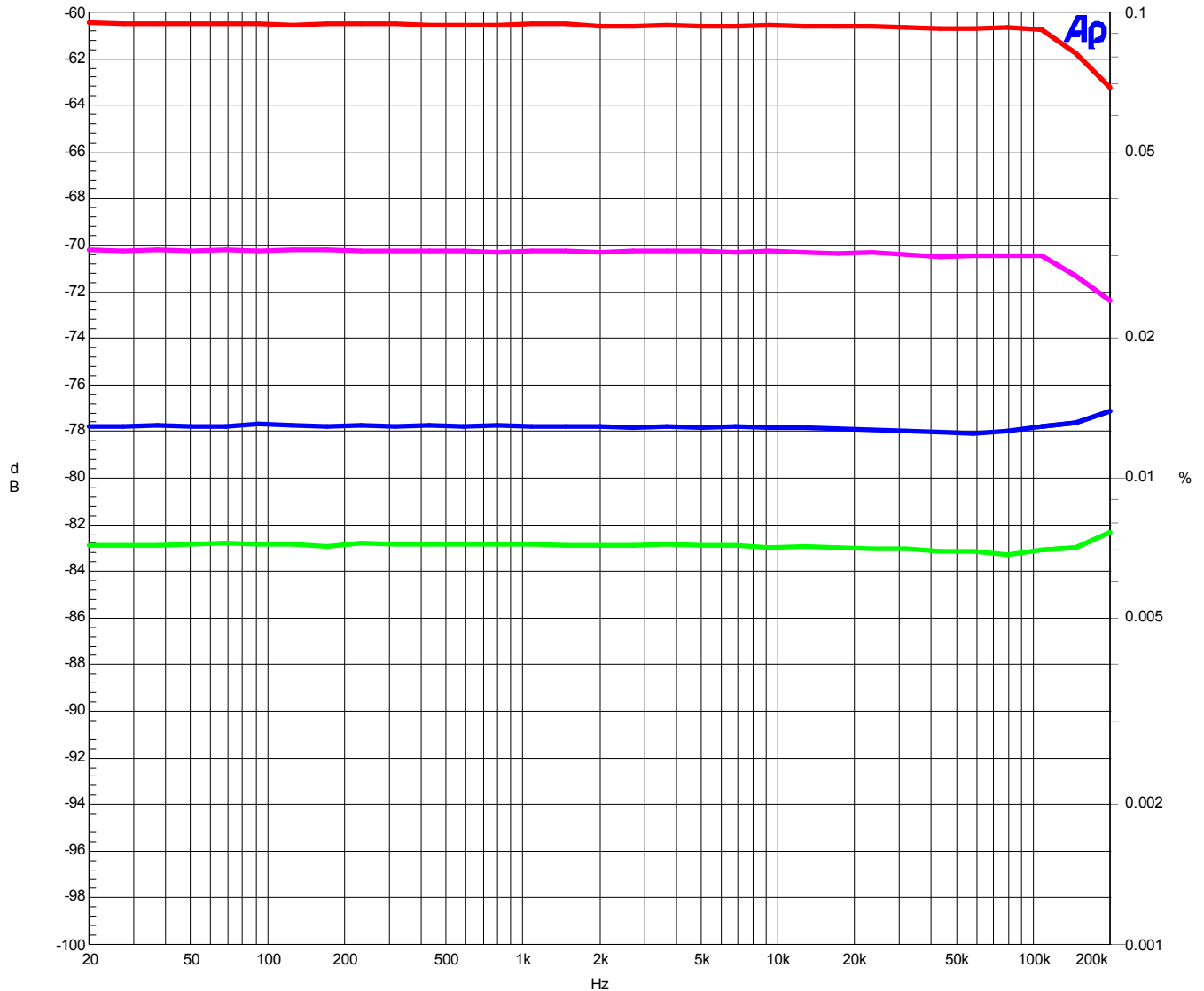
Wideband THD+N vs. Frequency

Measurement Bandwidth = 10 Hz to 500 kHz, Gain = 30 to 60 dB, Output Level = +4 dBu

Audio Precision

PRE420 - Wideband THD+N vs Frequency, BW=500 kHz

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Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	Anlr.THd+N Ratio	Left	60 dB Gain (top trace)
2	1	Magenta	Solid	4	Anlr.THd+N Ratio	Left	50 dB Gain
3	1	Blue	Solid	4	Anlr.THd+N Ratio	Left	40 dB Gain
4	1	Green	Solid	4	Anlr.THd+N Ratio	Left	30 dB Gain (bottom trace)

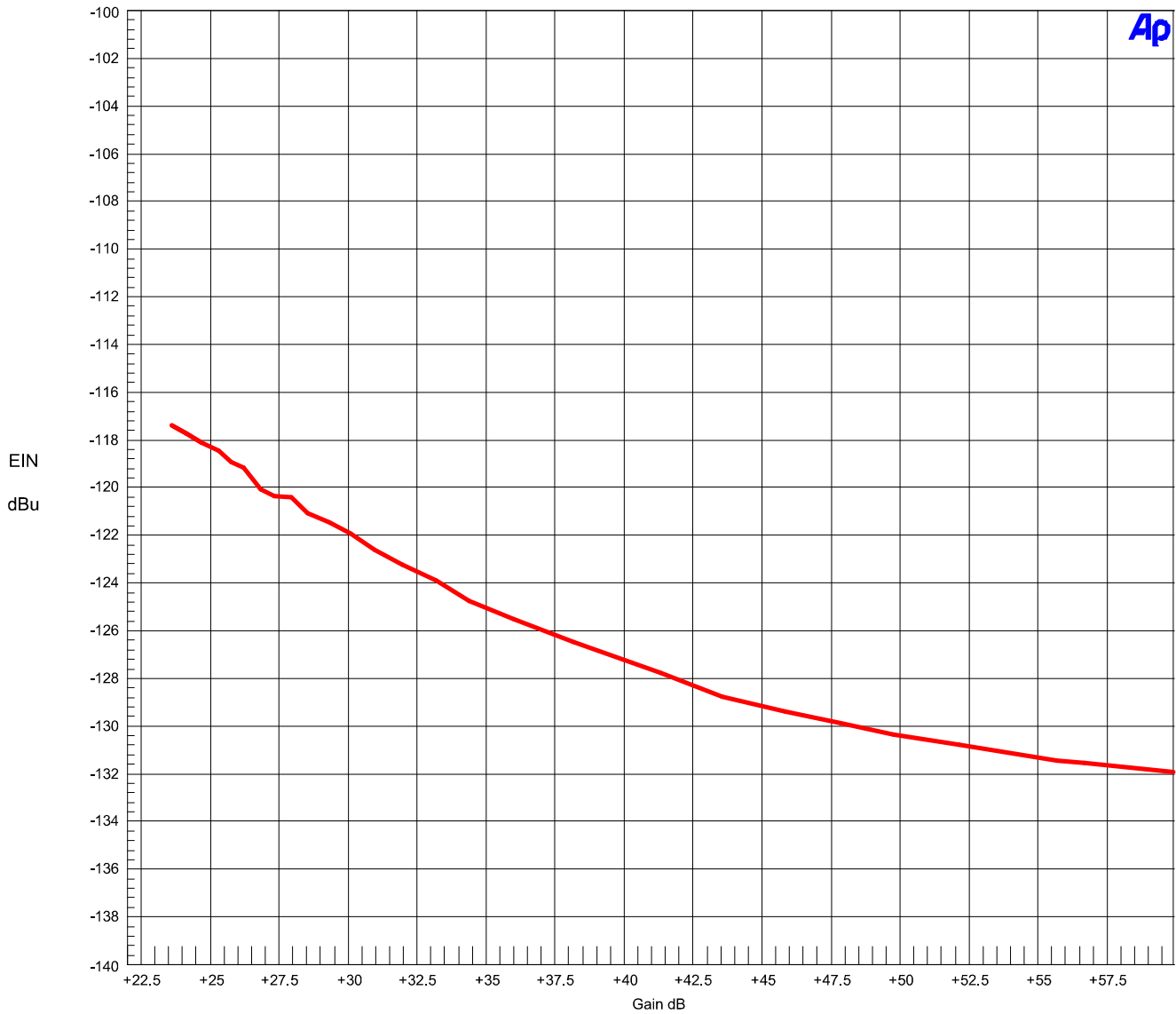
This graph shows that THD+N does not rise above noise – even at very high frequencies. The 500 kHz measurement bandwidth elevates the noise by 28 dB relative to a 20 kHz measurement bandwidth.

Equivalent Input Noise vs. Gain

Audio Precision

EIN vs Gain, Rin = 150 Ohms, BW = 20kHz

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Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	AnI _r .THD+N Ratio	Left	

EIN.at27

The above plot shows the Equivalent Input Noise (EIN) of the MPA1 as a function of gain. Measurement bandwidth is 20 Hz to 20 kHz. Input termination is 150 Ohms.

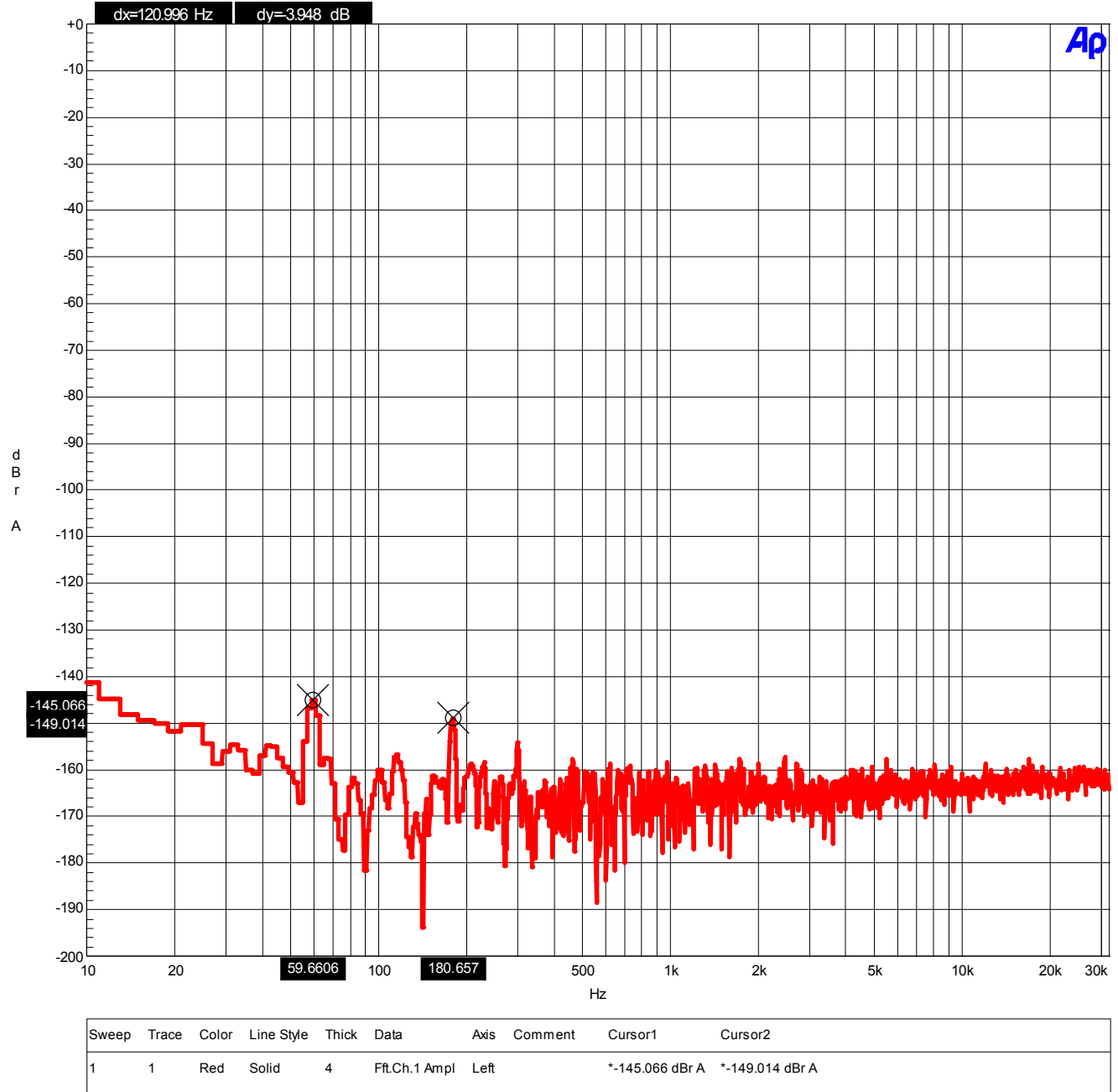
Noise Spectrum

32k B-H FFT, Gain = 60 dB, 0 dBr = 0 dBu at input

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Noise Spectrum, Gain = 60 dB, 0 dBr = 0 dBu at Input

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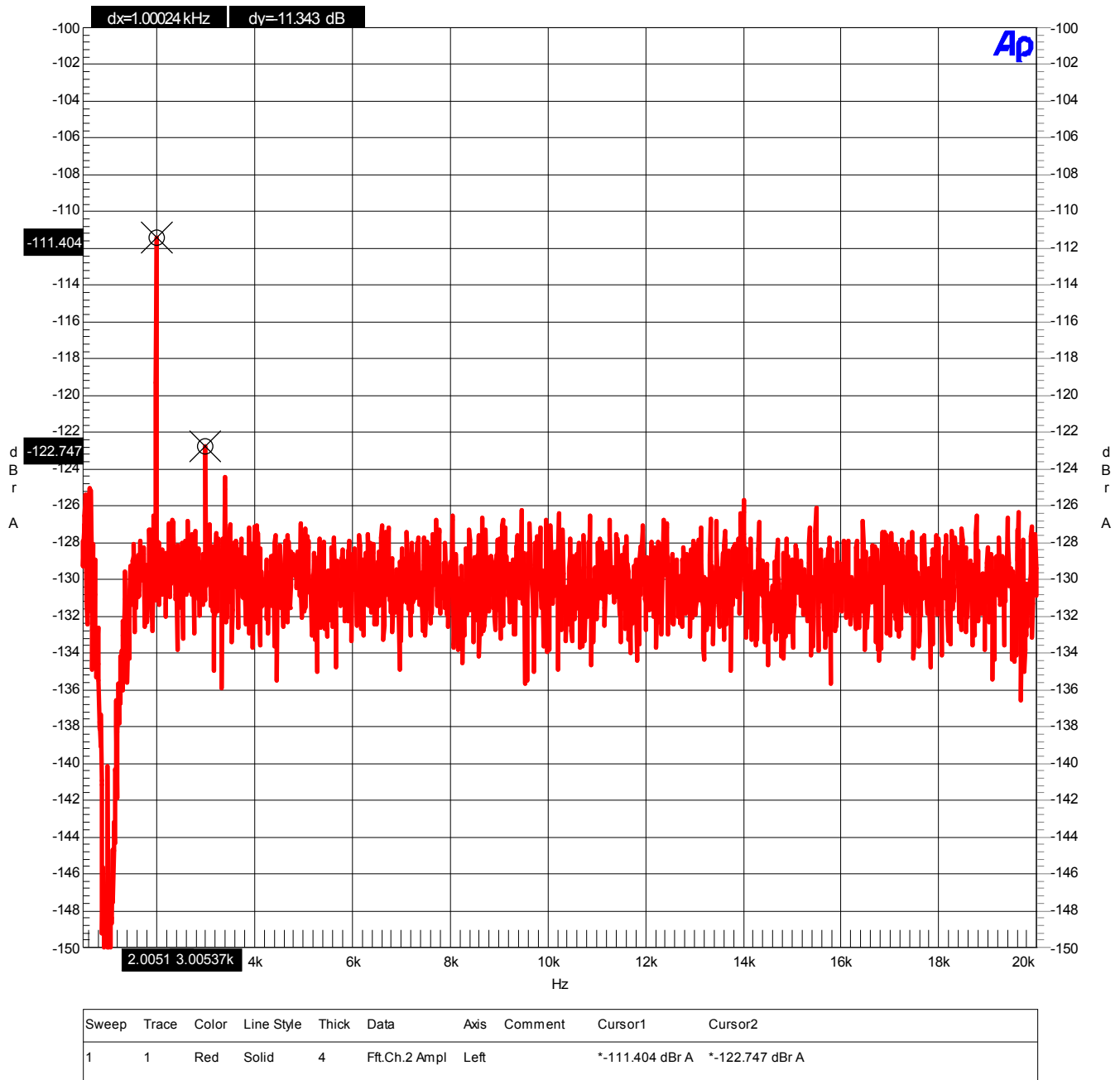


The above graph demonstrates that the MPA1 is free of hum and noise. The highest tone is 60-Hz line-related hum and is at a level equivalent to an input level of -145 dBu. 180-Hz hum is at an equivalent input level of -149 dBu.

THD Spectrum at 1 KHz

Audio Precision 1 kHz FFT at 60 dB Gain, Output Level = +24 dBu, 0 dBr = +24 dBu

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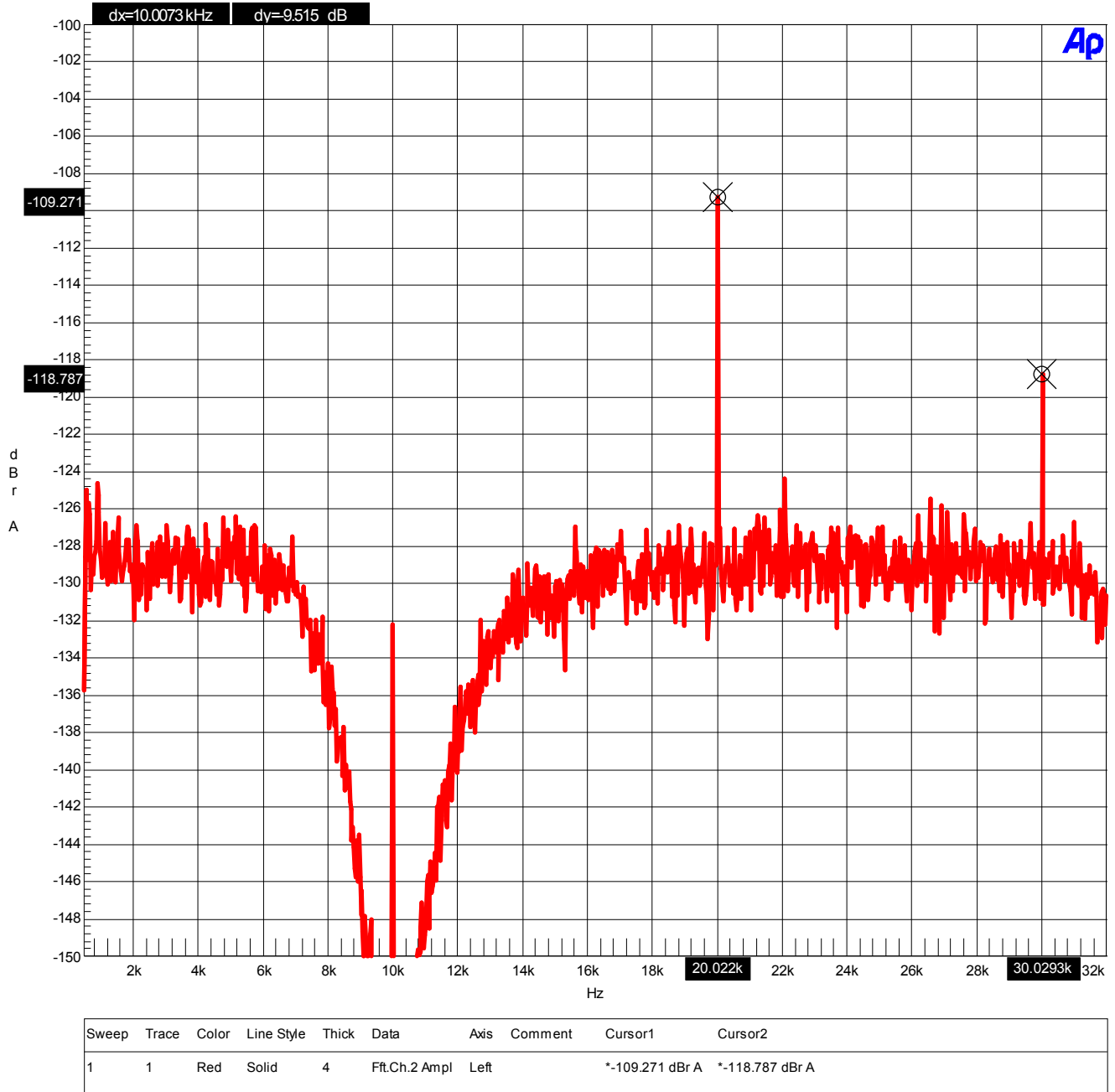


The above FFT plot shows that the MPA1 has very little harmonic distortion. The 1 kHz test tone is notched out with a THD analyzer to improve the resolution of the test. Distortion is exceptionally low. 2nd-harmonic distortion measures better than -111 dB. 3rd-harmonic distortion measures better than -122 dB. Note the absence of higher-order harmonics.

THD Spectrum at 10 KHz

Audio Precision 10 kHz FFT at 60 dB Gain, Output Level = +24 dBu, 0 dBr = +24 dBu

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The above FFT plot shows that the MPA1 has very little harmonic distortion at high frequencies. The 10 kHz test tone is notched out with a THD analyzer to improve the resolution of the test. The 20-kHz 2nd-harmonic distortion measures better than -109 dB. The 30-kHz 3rd-harmonic distortion measures better than -118 dB.

Specifications

Microphone Preamps	
Number of Preamps	2
Connectors	Gold-Pin Neutrik™ female XLR with direct ground feature
Grounding	Direct bonding of pin 1 to chassis
Input Impedance	8.1k Ohms
Gain Range	0 dB to 74 dB
Maximum Input Level @ Rated THD+N	+27.5 dBu (+25.3dBV, 18.4 Vrms)
Phantom Power	+48V w/individual switches
High-Pass (rumble filter)	40 Hz second-order 12-dB/octave
RF Protection	Dual-stage
Preamp Bandwidth	-0.02 dB at 10 Hz -0.17 dB at 200 kHz - 3 dB at 500 kHz
EIN at 60 dB Gain (20 Hz to 20 kHz) – to any output	-128 dBu at 150 Ohms -131 dBu at 40 Ohms -133 dBu at 0 Ohms
THD+N (1 kHz, BW=20 kHz, to any output at +27 dBu)	-112 dB, 0.00024% at 22 dB Gain -110 dB, 0.0003% at 35 dB Gain -108 dB, 0.00038% at 40 dB Gain -101 dB, 0.00085% at 55 dB Gain
IMD (50Hz and 7 kHz, to any output at +24 dBu)	-104 dB, 0.0006% at 35 dB Gain -104 dB, 0.0006% at 40 dB Gain

Direct Outputs

Number of Outputs	2
Connectors	Gold-Pin Neutrik™ male XLR with direct ground feature
Output Impedance	60 Ohms Balanced 30 Ohms Unbalanced (pin 3 floating)
Maximum Output Level at Rated Spec	+27.5 dBu
Drive capability at rated THD+N	300 Ohms
Output Type	Transformerless Voltage and Impedance Balanced

HPA2™ Headphone Amplifier

Number of Outputs	1
Connector	¼" TRS with switch contacts
Output Impedance	< 0.11 Ohms, 10 Hz to 200 kHz
Maximum Output Level at 0.001% THD+N	+23.5 dBu into 600 Ohms (0.24 W) +19.5 dBu into 30 Ohms (1.78 W)
Maximum Output Current	250 mA
Drive capability at rated THD+N	30 Ohms
Overload Protection (independent per channel)	Current limited at 300 mA Thermal Shutdown
Bandwidth	> 500 kHz -0.014 dB at 10 Hz -0.013 dB at 200 kHz
THD+N	-106 dB, 0.0005% into 30 Ohms at +18 dBu (1.26 W)

LED Output Meters and Gain Indicators

Output Meters	4-LED Meter (per channel)
Output Level Indicators	+28 dBu (red) +24 dBu (orange) +4 dBu (green) -20 dBu (green)
Gain Indicators	<p>"Max 74 dB" RED LED: Total Gain = +74 dB (Maximum preamp gain)</p> <p>"+48 dB" GREEN LED: Total Gain = Dial + 48 dB</p> <p>"+24 dB" GREEN LED: Total Gain = Dial + 24 dB</p> <p>NO LED: Total Gain = Dial + 0 dB</p> <p>"Min 0dB" RED LED: Total Gain = Unity Gain (Minimum preamp gain)</p>

AC Power Requirements

Input Operating Voltage Range (VAC RMS)	120 V setting: 105 V min, 140 V max 220 V setting : 200 V min, 285 V max
Frequency	50-60 Hz
Power	27 Watts Idle 27 Watts Typical Program 35 Watts Maximum
Fuses	5 x 20 mm (2 required) 0.5 A 250 V Slo-Blo® Littelfuse® HXP218.500 or Equivalent

Dimensions

Form Factor	½ Rack Wide, 1 RU High
Depth behind front panel	8.5" (216 mm)
Overall depth including knobs and connectors but without power cord	9.33" (237 mm)
Width excluding 19" rack ears	9.5" (249 mm)
Height excluding removable feet	1.725" (44.5 mm)

Weight

MPA1 only	3.5 lb.
MPA1 with power cord, extra fuses, and manual	4.5 lb.
Shipping weight	7 lb.

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.

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

1. XLR Digital Input: Shielded 110-Ohm AES/EBU digital audio cable with connector shell bonded to shield must be used.
2. BNC 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: 2001 EN 61000-6-4:2001
Product Specific Emissions:	EN 55022A
Generic Immunity Standard:	EN 61000-6-1: 2001
Immunity:	EN 61000-4-2 Electrostatic Discharge
	EN 61000-4-3 Radiated Susceptibility
	EN 61000-4-6 Conducted Susceptibility

Manufacturer's Name:	Benchmark Media
Manufacturer's Address:	5925 Court Street Rd Syracusr, ny 13206
Product:	MPA1

This Certificate of Compliance issued December 20, 2008 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* _____
Annelle Frierson
Vice President
Diversified T.E.S.T. Technologies, Inc.
PO Box 8, 556 Route 222
Groton, NY 13073
Phone: 607-898-4218
Fax: 607-898-4830



Warranty Information

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 (1) 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 submitting 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. Any MPA1 returned from the European Union for warranty repair must have the required RoHS logo on the product label; otherwise, repairs will be billed at the normal shop rate. Benchmark will not honor warranties for any products disingenuously purchased on the US or Canadian markets for sale outside the US or Canada.

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 charge this information without notice. This limited warranty gives the consumer-owner specific legal rights, and there may also be other rights that vary form state to state.

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.

Benchmark Extended Warranty

The Benchmark Extended 5* Year Warranty

Benchmark Media Systems, Inc. optionally extends the standard one (1) year warranty to a period of **five (5)* 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 prepaid 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's Extended 2* * Year International Warranty

Benchmark Media Systems, Inc. optionally extends the standard one (1) year warranty to a period of **two (2)** 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 prepaid 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.

Calibration

CAUTION: ROUTINE CALIBRATION SHOULD NOT BE REQUIRED. THE FOLLOWING PROCEDURE SHOULD ONLY BE USED BY A QUALIFIED TECHNICIAN.

This procedure will restore the MPA1 to factory calibration if controls have been moved from factory settings.

+48V Adjustment

1. Using a DC voltmeter, measure the voltage across D23 and adjust "+48V Adjust" (**R107**) until the meter reads 48V.

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The logo for Benchmark Media Systems, Inc. features the word "Benchmark" in a large, elegant, cursive script. Below it, the tagline "...the measure of excellence!™" is written in a smaller, clean, sans-serif font.