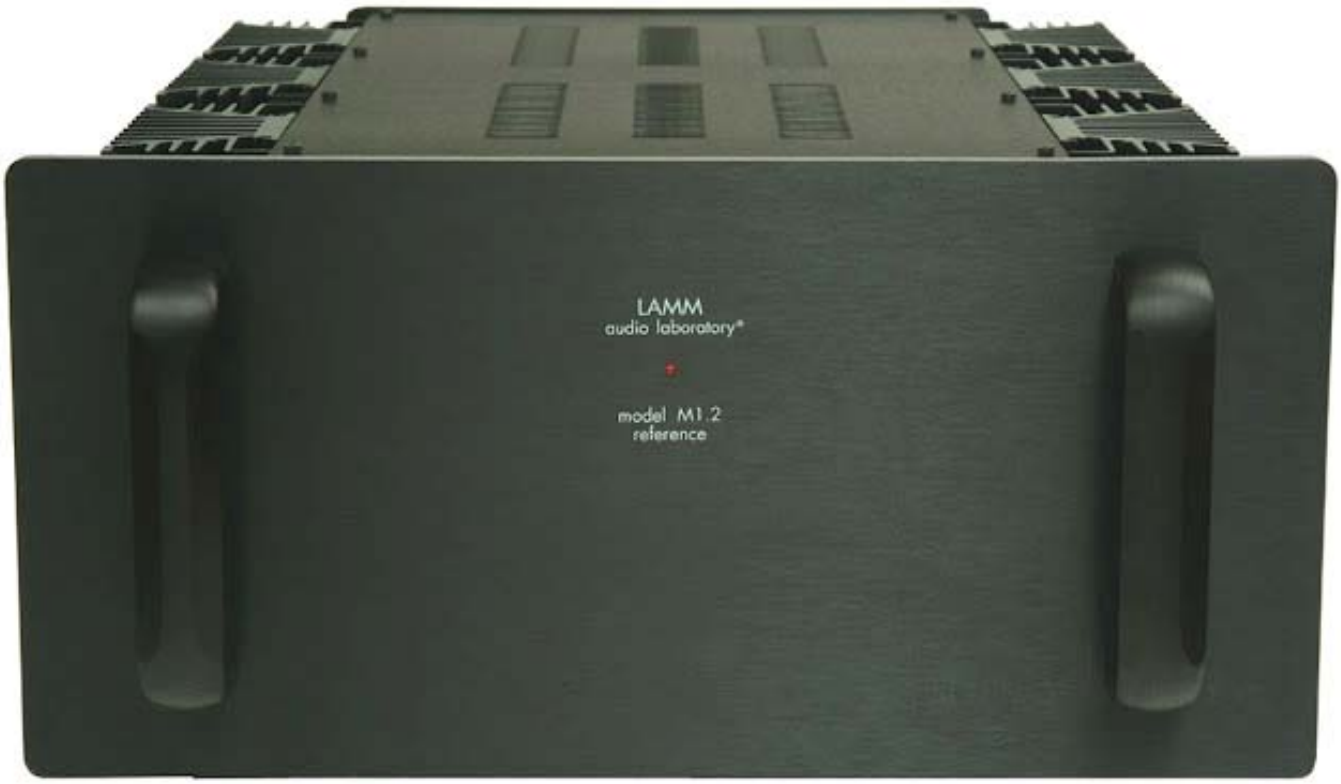
MONO STEREO

REVIEWING THE WORLD'S FINEST AUDIO PRODUCTS

# Lamm Industries
# M1.2 Reference hybrid power amplifier

by **Matej Isak**
**June 2017**
**MonoandStereo.com**




So, how does one enter into the review of something as celebrated and renowned as the iconic Lamm M1.2 hybrid power amplifier? The amp had been introduced in 2003 to mark Lamm Industries' 20th anniversary, but it basically has been in production for almost 25 years.

The 2003 revision and upgrade hadn't changed anything at the fundamental level, but rather introduced an upgraded front-end power supply section, pc-boards of much higher quality along with better and finer electronic parts -- and this is the exact version that is being reviewed here at the Mono and Stereo.

M1.2 surely represents something very special in our industry, and all the awards it received have most certainly been bestowed for something other than ordinary.

## MEET THE M1.2 REFERENCE

Lamm Industries writes: "Each amplifier is carefully constructed and hand-crafted with the finest materials and parts currently available, some of which include military grade low noise DALE/VISHAY metal film resistors, PRC wirewound resistors, BOURNS multi-turn potentiometers; ELECTROCUBE, ROEDERSTEIN/VISHAY, and KEMET/RIFA film capacitors; high frequency switching grade CORNELL DUBILIER and VISHAY electrolytic capacitors; HAMMOND filter chokes; military grade low noise long life vacuum tubes; high quality heavy duty gold-plated binding posts and RCA jacks; gold-plated NEUTRIC XLR connectors, and CAMAC-type coaxial connectors from FISCHER. Special attention was given to designing the toroidal power transformer, which has no mechanical contact with either the transformer cover or the chassis and is suspended in a special encapsulant that almost completely absorbs even the residual mechanical vibrations. This plays a significant role in assuring the absolutely unique clarity and micro-resolution during sound reproduction."

## CLASS A?

I'm more than sure that any serious audiophile and high-ender has his own opinion about Class A operation and sound.

Well, any preconceptions have no solid ground with Lamm M1.2 Reference power amplifiers. I've been around and actively exploring this vast universe of high-end and ultra high-end for the past 25+ years, and have had the luxury of close encounters with many of pure Class A solid-state and hybrid amplifiers. I would say my mileage brings something to the table of objectivity.

Generally, there is a certain sonic trait that connects all Class A designs. Usually, one would expect the presence of a certain tint of warmness and roundness as a recognizable quality of the high-end audio system featuring such designs, but the Lamm M1.2 Reference comes with quite a different set of rules.

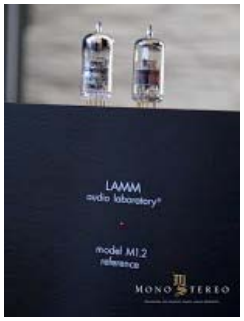
Yes, it carries the Class A renowned purity and immediacy. Yet… There is no "hard mark" or typical sonic imprint that even some of the most renowned Class A power amplifiers cannot escape. Vladimir managed to encapsulate the spirit of music with very different audio mechanics in action.

There is a certain “weight” associated with Class A mode of operation – the one that usually embraces all the right attributes of music and generally resonates very intimately with timbre, tone and color. However, we can’t escape a somewhat significant “but” that manifests itself when the weighing down of the musical signal is present – the one that might somehow slow down the speed and articulation. With at least a few state-of-the-art tube amplifiers this is not evident, but most of them carry this “imprint” and sonic signature of the solid-state and hybrid amps. Well, NOT so with Lamm creations.

Forget about any typical preconceptions about solid-state amplifiers as the M1.2 Reference cuts through the layers of mind impressions and never-ending elaborations. The M1.2 Reference is among the very few monoblock power amplifiers that operates directly with the inner core of the music and it does so intimately and straightforwardly. However, more on this subject later.

# OPERATION

Amplifiers are turned on via a special “on/off” switch that needs to be pulled out and moved into the “on” position. I haven’t seen anything similar as of yet. It’s a neat principle, the one that avoids any incidental switching. The same procedure applies to turning it off.




When amps are turned on, the main red LED diode starts flashing marking the beginning of the soft-start process, and it takes about 60 sec for the tubes to warm up and have everything stabilized. During this period, the outputs are fully muted, at the end of a warm-up cycle an LED’s steady glow and a loud click from the engaged speaker relay will signal the amp’s readiness to play music. My listening notes have provided credible reminders about the sound “stabilization”. Somehow, after 40-50 minutes the Lamms seemed to be running at the optimum and, as I’ve found out later, Vladimir Lamm himself recommends the warm-up time of about 45 minutes.

The rear panel sports both RCA or XLR inputs (pin 2 = hot). RCA connectors are wired in parallel with pins 2 and 3, so only one of these inputs has to be connected. When one of the RCA inputs is used, the other has to be shorted with a supplied shorting plug for proper operation. The Lamm M1.2 delivers the same power at both 4 and 8 ohms. It's up to the user to choose the preferred impedance via a switch ("1-6" and "8 – 16" ohms) -- the red LED diode lights up in a selected position. I do recommend trying both versions if one's speakers are at the threshold between the two impedance ranges.


The rest of the rear panel is reserved for the speaker binding posts (four connectors allowing for bi-amping), standard IEC connector and fuse.

Surprisingly, there is also a grounding post which might come especially handy with the latest trend of grounding boxes. As it seems, Vladimir gave a thought to this a long time ago.

*"The M1.2 Reference blends potency of the high-speed MOS-FET transistors in the output stage with no overall feedback and special switch-selectable bias/voltage settings for 8- or 4-Ohm operation.*
*The bias setting switch assures the pure class A operation of the M1.2 Reference when matched with a speaker load of either 4 or 8 Ohms, whereas conventional class A designs double the power into 4 Ohms resulting in one fourth of the doubled power in class A and the rest in class AB (learn more about this in FAQ section of our website at www.lammindustries.com/faq/switch.html). The M1.2 Reference is a hybrid design with one specially selected 6922 vacuum triode in the second stage.The M1.2 Reference is conservatively rated to deliver 110 Watts into 8 and 4 Ohms in pure class A operation (high and low impedance settings, respectively); 220 Watts into 2 Ohms, and 400 Watts into 1 Ohm (low impedance setting), continuous. The M1.2 Reference can drive any known speaker. The harmonic structure remains intact regardless of the speaker load, while the extreme clarity is maintained at all power levels."*


Yes! The Lamm M1.2 Reference opens up the endless world of tube rolling. The wide variety of tubes in the 6DJ8 family allows to “tune” the sound to anyone’s liking. For the sake of this review I’ve listened only with the supplied JJ 6922 tubes, but will follow up in due time with more exotic equivalents.

## THE MUSIC

Well, one can be quickly drawn to the esoteric side of both electronics and sound, but there is always a sober reality of the music. As much as we all love to contemplate certain aspects of the high-end audio, the one and only merit stays the same and unchanged. THE MUSIC!

***Shelly Manne & Jack Marshall –Sounds Unheard of! | Analogue Productions Label –3009 APR***

Sounds Unheard Of! is one of the best examples of analog recordings done right. I’ve melted even the most hard coded digital minds and hearts with this album on numerous occasions.

It might not carry the weight of the masterfully written classical score, but still… there’s enough musical reserve to follow the superbly recorded sound.

This record demands every single element of high-end audio system to be in sync and of proper balance. Even more importantly, Sounds Unheard Of! strives to combine the elements of the “lion heart” (continuous power) and “mocking bird feather” (harmonic lyricism). As far fetched as this might read, in order for the music to become alive and offer the needed solidity, it is crucial to convey the grand sonic illusion – and there is no place for mediocrity.

The Lamm M1.2 Reference’s inner core has swayed along with Shelly Manne & Jack Marshall’s slow paced rhythmical changes or sudden lightning attacks. Nothing was taken away with Lamm’s and nothing was added to mask what makes this album such a sonic marvel. The M1.2 Reference followed closely the very best of both worlds. This was the first, major stand-out for this particular hybrid amp.

***Saint-Saëns /Liszt - Michele Campanella, Monte Carlo Opera Orchestra, Aldo Ceccato – Piano Concerto No. 4 / Totentanz | Hungarian Fantasy Label - No. 6500 095***

Defining the top-notch orchestra and piano reproduction is never an easy task, as there are many overlaying attributes that create a complete and dramatic illusion of the real event. Still, this particular album contains enough drama to challenge any amplifier. The underlying subtleness of perplexing notes represents a challenge of the highest degree for any power amplifier. Reproducing the sound of an orchestra and piano with a sense of the real world drama calls for more than just a very powerful amp. As much as we all love to read and decipher technical specifications of the high-end audio power amplifiers, the real challenge lies on the sonic "battlefield". There is no second- guessing or backing off when the orchestral momentum calls for the minute dynamic shifts, embraced by the multitude of harmonies and notes floating in the virtual air.


The full-scale dynamic and spirit of the drama need to be experienced, understood and then implemented within the circuit design. This is where the maestro and novice audio designer differ considerably. No matter how -- or where -- we move in the future (technology-wise) the sound of the live orchestra will always remain an utmost challenge for any amplifier and high-end audio system.

Lamm M1.2 Reference conveyed the Michele Campanella and Monte Carlo Opera Orchestra with the exuberant verdure. One of the hardest things for any power amplifier is not to step into the realm of exaggeration. Keeping the balance of micro and macro details under the objective scope is no slouch even for most cherished first rate amps. The Lamm M1.2 managed to deliver the piano notes with collective density and without stepping into the strident detailing. Campanella's piano was projected with a full scale that vividly gravitated towards the real world energy enlaced with proper harmonic structure and captivating transient response.

Lamm M1.2 Reference monoblocks operate beyond the sphere of ambivalent traits that are too often associated even with many state-of-the-art power amplifiers. The M1.2 Reference sails directly into core of the music while staying elaborative and varied when needed -- an accomplishment worthy of praise alone.

***Prokofiev, Cleveland Orchestra, Maazel – Romeo & Juliet (Complete Ballet) | Decca Label – SXL 6620-2***


If one does not get fully immersed into this 1973 recording [while listening], it means that the system in general and, in this case, power amplifiers in particular have failed to dive deeper into the most diverse sonic *momenta*.

Again, with all of the complementary high-end audio amplifier virtues, this album calls specifically for the essence of dramatic impact. The fully detailed reconstruction of Romeo & Juliet goes beyond dazzling recognition of the usual audiophile attributes. It's neither esoteric nor exotic -- just a plain, down to earth fact.

Expecting the amp to deliver the needed sonic density without the employing proper topology that can support it is a failure waiting to happen. The sense of drama will be instantly and abruptly stripped away and morph into the aural chaos, rather than form a jarring sonic complexity that can embrace both musical serenity and expansive transient response.

The Lamm M1.2's diverse nature has managed to project millefiori-like sonic sculptural ability with immersive spectral shading.

Maazel's excitement on this particular recording is extended across the entire Prokofiev masterpiece and I dare say it even rivals Previn's conducting. One of the things that Maazel managed to bring so well to this performance is timing which is intimately connected with intensity. This is where the subtle dramatic paces make all the difference. The Lamm M1.2 Reference excelled with tempi changes that might surprise even the Prokofiev's hardcore fans. Tempi is always a subject of interpretation, even among the conductors. Nevertheless, the Lamm M1.2 Reference monoblock power amplifiers acted way beyond expectation by embracing emotional and dynamic twists of the score with the fullest scope and impact, and by following the tempi changes profoundly.

# CONCLUSION

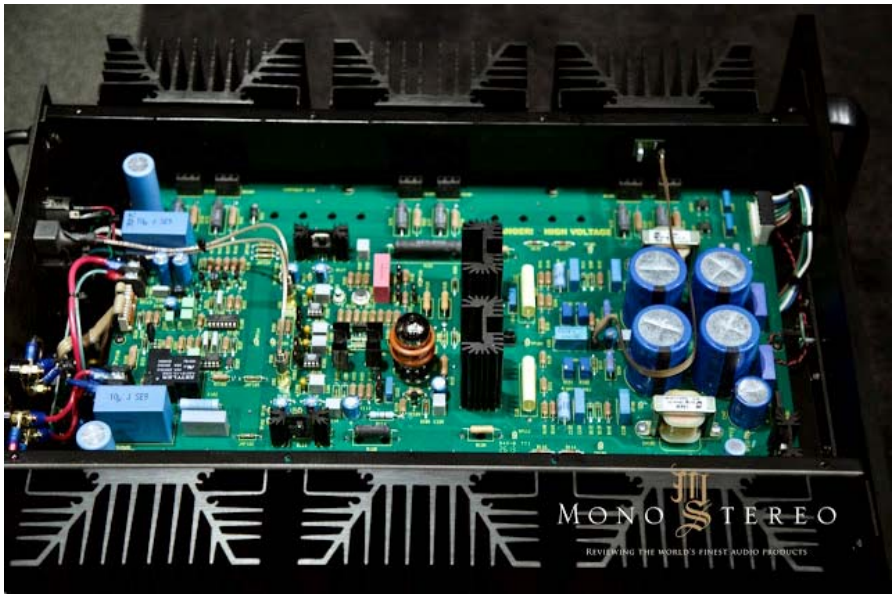
In recent years, the attention and sonic focus started to shift towards transparency. I do believe that both terms were overused and that the trend is pointing in the wrong direction. The real transparency embraces complete frequency spectrum and offers a linear projection of the sound. The newly adopted direction acts more as an equalizer or a frequency booster in the upper mid and high frequencies rather than the linear whole. While this might be pleasant to some ears, it really has nothing to do with the way real music sounds. Music by nature is slightly on the dark side, but is transparent at its core and carries the lightning speed attacks and fine detailing. Once you start to take too much out of the certain frequency range or boost it, the wholesome harmonic sense of music simply collapses.

This is why many modern power amplifiers, speakers, and systems in general might offer over-enthusiastic "nirvana" during the initial encounter, but fail to bring coherent and complete musical message in the prolonged and more critical listening.

For any electronic designer the balancing act between electronics and music is the ultimate challenge. In that respect, Vladimir Lamm's experience and mileage are hard to match. Try imagining the unlimited funds for R & D and having an actual orchestra on hand for day-to-day A/B evaluations when trying different circuits. Well, that's one part. The other is Vladimir's research and discovery of the human hearing mechanism. He's very secretive about it, but as far as I can understand, this is somehow implemented in all of his products throughout the simple passive circuits which can be hidden anywhere on the PCB. I don't think anyone has discovered it so far as and same goes for the intended "blank" parts installed in some of the high-end audio designs, that prevents lurking minds from copying them.

The utmost listening involvement runs as a leitmotif with all of the Lamm products. This might be closely connected with the "phenomena" described above. Nonetheless, it has also a lot to do with the properly executed electronic design.

In the middle of the M1.2 Reference photo shoot my friend came over for a visit. He's an out-of-the-box electronic engineer who handles, services and repairs complex medical equipment. At the same time, he's also a highly skilled and original audio designer/engineer. I've never heard him comment in such a way about any other power amplifier as when he saw the Lamm M1.2 Reference's innards. His comments were not only positive, but highly respectful towards the way the M1.2 was designed and logically build. Usually, he would offer critical comments on some particular thing, but with the M1.2 Reference it was the first time I saw him in the mood of complete respect and appreciation of the design. It was quite an inspiring experience!




I'm sure that the most important question that pops up is how the Lamm M1.2 Reference stands in a face of time and how it compares to the existing first-rate monoblock power amplifiers?

For an amplifier that's been around twenty plus years -- with a mid, 10-year anniversary upgrade -- I can attest how the Lamm M1.2 Reference monoblocks haven't lost their impact. Just looking at all the awards over the past two + decades makes you think. Yes, Vladimir has done something very right from the ground up. M1.2 Reference belies its age and molds the music seamlessly, without showing any traces of aging…

So… the Lamm M1.2 Reference power amps clearly do not fit into any classifications or audiophile camps. They're (luckily) not following the trend of fake transparency and they avoid any archaic sonic traits. As a rare example, the M1.2 Reference power amplifiers are "voiced" (as much as some engineers hate the word) to play music as closest to reality as possible.

I always emphasize how any high-end audio product carries its designer's DNA. This is intimately connected even down to the selection of tiniest parts like resistors, etc. Any and every decision in the amplifier design and circuit will affect the final outcome. Proper voicing and design take time and is a painstaking process not everyone is willing to go through.

The utmost challenge for any high end audio product is to convey transparency and act as via medium of the purest and unaltered music delivery. This might sounds simple, but in reality such a pursuit is a highly complex one. Especially when it comes to power amplifiers where one cannot avoid some of the structural modules and electronic parts.

Even when different speakers' loading is chosen, the M1.2 Reference doesn't cut the power and is capable of delivering 110-150 W of pure class A at both 4 and 8 ohms impedance, which is very different from similar designs.


These amplifiers masterfully embrace both tube and solid state technology in quite a unique and -- most importantly -- mesmerizing way. They were designed for pure music listening pleasure by the person whose life was fully immersed in music, but even more importantly Vladimir is an electronic designer who actually loves music.

The end result is an out-of-the-box sound. The Lamm M1.2 Reference encapsulates the VERY pulse of the music and manages to bring the musical message throughout the electronic path with the core music's DNA. Among the abundance of amplifiers on the market, M1.2 Reference is a rare example of seamless integration of solid-state and tube worlds. Vladimir has managed to blend both technologies with the right balance that serves the music, rather than technology.

In the world of high-end audio where clinical dissection of the sound is becoming a forte, the Lamm M1.2 -- after almost three decades -- still sets the standard of how ultra high-end audio power amplifier should sound and behave.

The ultimate reference choice for me will always be the live, orchestral music and this is something that


the Lamm M1.2 reproduces with the most important attributes at forte. Anyone attending the multiple live classical orchestra concerts can recall the sense of music coming towards the audience. The orchestra is perceived as a harmonic whole -- sort of a giant bubble that still integrates each and every part of the orchestra into a sole entity. While many top-tier amplifiers can offer more virtual power on paper (and their designers pride themselves on technical specs), in real life they too often fail to deliver elicit power and proper spatial sense -- and those are among most important attributes of the believable orchestral music reproduction.

Unlike the current trends that clearly mimic the luxury goods from other industries, the M1.2 Reference's appearance is all about bold, understated and serene aesthetics. To put it briefly, it reminds more of a MAN machine, than a chic shiny box seeking to attract the attention of a different kind. And as seen with the Audio Research, DarTZeel and some others, the massive handles on the front and back are not obsolete at all.

Many modern amplifiers claim to fully operate in pure class A, but in reality switch to the AB mode at lower impedances. The Lamms, on the contrary, are maintaining consistent class A operation and harmonic structure of the audio signal at both 4- and 8-Ohm loads -- and one can hear this without deeper aural contemplations. In the current trend for exotic power amplifiers, the Lamm M1.2 Reference is still more than esoteric to keep with a current pace and technologically profound to draw the attention of the demanding engineering camp…

It is a fact that not everyone will be able to go for the ML2.2 or ML3 Signature – due either to their price or because they are full tube designs. These masterpieces need a bit of a different modus operandi and frequent handling of the tubes (requiring partial – and sometimes complete -- replacement every couple of years). And these easily fall into the realms of luxury sport cars tires where you know the cost of maintenance once you've bought into it. But tube maintenance is a breeze for the M1. 2 Reference with its one tube per amplifier. At least you're still left with a possibility of tube swapping and with quality of the tube. One tube seems almost mandatory within the canvas of a system where digital front-end takes on the predominant role in delivering the music.

Yes, the Lamm M 1.2 Reference mono blocks runs hot. Yes, they carry a hefty wattage draw. Yes, they surely add a hefty chunk of expense to the electric bill. Yes, judging by the present "standard" of Class D heat efficiency, the M1.2s take a non simpatico place… And yes, they do come with THE price! But! The Lamm M1.2 Reference power amplifiers are the most engaging hybrid amplifiers I've ever had the luxury of evaluating. Earthly-ethereal nature; unique sense of space combined with timbre, tone and color closely matching the musical instruments with real world instrument weight; and scalable three-dimensional portrayal presented by these amps eschew the ostentation on all fronts.

MONO STEREO

EDITORS Choice

MATEJ ISAK'S

REVIEW OF THE WORLD'S FINEST AUDIO PRODUCTS

The "heart" of the M1.2 Reference beats in unison with the music that flows through it, drawing the listener into the prolonged and fatigue-free aural moments. That is one of the amazing qualities of this amp. Even for me, as a reviewer, the instantaneous involvement factor was something I didn't expect and something I couldn't avoid. I was literary drawn into the music, looking forward to hearing the next track, and the next, and the next…

I've tried the Lamm M1.2 Reference with various speakers and in few different settings, and they've acted universally by delivering the above mentioned attributes across the entire frequency range. They were designed from ground up as ultimate and flexible power amplifiers and that was evident in all the different situations.

After few years of absence, I'm returning to the Lamm Industries family :). The M1.2 Reference power amplifiers are not going anywhere and they're entering the abode of a few selected components forming my reference system.

Yes, that means that I'm giving this amplifier a very rare Mono & Stereo Editor's Choice Award. And yes, it means they are THAT good.

# SPECIFICATIONS

- **RATED OUTPUT POWER**

**HIGH IMPEDANCE SETTING**

minimum continuous sine-wave power,
from 20Hz-20KHz with no more than:

| | |
|---|---|
| 0.3% THD (FTC) @ rated line voltage | 110 Watts into 8 Ohms (Class A operation). |
| 0.3% THD (FTC) @ rated line voltage | 220 Watts into 4 Ohms (55 Watts Class A operation). |
| 0.5% THD (FTC) @ rated line voltage | 400 Watts into 2 Ohms (27.5 Watts Class A operation). |
| 1% THD (FTC) @ rated line voltage | 600 Watts into 1 Ohm (13.75 Watts Class A operation). |

**LOW IMPEDANCE SETTING**

minimum continuous sine-wave power,
from 20Hz-20KHz with no more than:

| | |
|---|---|
| 0.3% THD (FTC) @ rated line voltage | 110 Watts into 4 Ohms (Class A operation). |
| 0.5% THD (FTC) @ rated line voltage | 220 Watts into 2 Ohms (55 Watts Class A operation). |
| 1% THD (FTC) @ rated line voltage | 400 Watts into 1 Ohm (27.5 Watts Class A operation). |

- **MAXIMUM (CLIPPING) OUTPUT POWER**

**HIGH IMPEDANCE SETTING**

continuous 1 KHz sine-wave power,
with no more than:

| | |
|---|---|
| 1% THD (FTC) @ rated line voltage | 150 Watts into 8 Ohms. |
| 1% THD (FTC) @ rated line voltage | 300 Watts into 4 Ohms. |
| 1% THD (FTC) @ rated line voltage | 500 Watts into 2 Ohms. |
| 1% THD (FTC) @ rated line voltage | 700 Watts into 1 Ohm. |

**LOW IMPEDANCE SETTING**

continuous 1 KHz sine-wave power,
with no more than:

| | |
|---|---|
| 1% THD (FTC) @ rated line voltage | 150 Watts into 4 Ohms. |
| 1% THD (FTC) @ rated line voltage | 300 Watts into 2 Ohms. |
| 1% THD (FTC) @ rated line voltage | 450 Watts into 1 Ohm. |

- **SMALL SIGNAL FREQUENCY RESPONSE**

**HIGH IMPEDANCE SETTING**
at 1 Watt into 8 Ohms @ rated line voltage: (+0; -3dB) 4 Hz - 155 KHz.

**LOW IMPEDANCE SETTING**
at 1 Watt into 4 Ohms @ rated line voltage: (+0; -3dB) 4 Hz - 155 KHz.

- ## FREQUENCY RESPONSE

**HIGH IMPEDANCE SETTING**
at 110 Watts into 8 Ohms @ rated line voltage: (+0; -3dB) 4 Hz - 155 KHz.

**LOW IMPEDANCE SETTING**
at 110 Watts into 4 Ohms @ rated line voltage: (+0; -3dB) 4 Hz -155 KHz.

- **SLEW RATE**

Vout=83.9 Volts peak-to-peak of square-wave signal into 8 Ohms, F=10KHz @ rated line voltage: 33.5 Volts per microsecond.

- **RISE TIME**

Vout=83.9 Volts peak-to-peak of square-wave signal into 8 Ohms, F=10KHz @ rated line voltage: 2 microseconds.

- ## IM DISTORTION

**HIGH IMPEDANCE SETTING**

(60Hz:7KHz 4:1) SMPTE:

from 0.1-110 Watts into 8 Ohms @ rated line voltage: no more than 1%.

from 0.1-220 Watts into 4 Ohms @ rated line voltage: no more than 1%.

from 0.1-400 Watts into 2 Ohms @ rated line voltage: no more than 1.5%.

from 0.1-600 Watts into 1 Ohm @ rated line voltage: no more than 1.5%.

**LOW IMPEDANCE SETTING**

(60Hz:7KHz 4:1) SMPTE:

from 0.1-110 Watts into 4 Ohms @ rated line voltage: no more than 1%.

from 0.1-220 Watts into 2 Ohms @ rated line voltage: no more than 1.5%.

from 0.1-400 Watts into 1 Ohm @ rated line voltage: no more than 2%.

- ## VOLTAGE GAIN 39 ± 2% or 31.8 ± 0.2dB.

- **INPUTS**

| | |
|---|---|
| Balanced: | 3-pin gold-plated XLR connector.<br>Pin assignment:<br>pin 1 = signal ground;<br>pin 2 = non-inverting input (+);<br>pin 3 = inverting input (-). |
| Non-inverting (+): | brass, gold plated, single-ended RCA connector<br>(connected in parallel with pin 2 of XLR connector). |
| Inverting (-): | brass, gold plated, single-ended RCA connector<br>(connected in parallel with pin 3 of XLR connector). |

- **INPUT SENSITIVITY**

| | |
|---|---|
| **HIGH IMPEDANCE SETTING** | 0.761 Volts RMS ± 2% for 110 Watts into 8 Ohms. |
| **LOW IMPEDANCE SETTING** | 0.538 Volts RMS ± 2% for 110 Watts into 4 Ohms. |
| | 0.538 Volts RMS ± 2% for 220 Watts into 2 Ohms. |
| | 0.513 Volts RMS ± 2% for 400 Watts into 1 Ohm. |

- **INPUT IMPEDANCE** — 41 KOhms shunted by 470pF.

- **OUTPUTS** — Two sets of brass, gold plated binding posts.

- **OUTPUT IMPEDANCE**

| | |
|---|---|
| at 1 KHz: | typically 0.082 Ohm. |
| from 20 Hz – 20 KHz: | typically $0.082\ ^{+\ 0.007}_{-\ 0.002}$ Ohm. |

- **DAMPING FACTOR**

| | |
|---|---|
| at 1 KHz: | typically 98, re: 8 Ohms. |
| from 20 Hz – 20 KHz: | typically $98\ ^{+2}_{-\ 8}$, re: 8 Ohms. |

- **GROUNDING** — Separated ground and earth.<br>Floating chassis connected to mains earthing.

- **POWER SUPPLY ENERGY STORAGE** — Approximately 220 joules.

- **POWER CONSUMPTION**

  nominal: Typically 330 Watts @ rated output @ 8(4) Ohms (class A operation) and at idle.

  maximum: Typically 750 Watts @ rated output @ 1 Ohm (low impedance setting).

- **BURN-IN TIME AT FACTORY** Minimum 72 hours.

- **RECOMMENDED BURN-IN TIME IN END-USER'S SYSTEM** Minimum 200 hours.

- **WARM-UP TIME** Minimum 45 minutes.

- **WEIGHT, UNIT ONLY** 68.5 Lbs (31 Kg).

- **SHIPPING WEIGHT** 94 Lbs (42.7 Kg).

- **TUBE COMPLEMENT** V101 - 6922 (second amplification stage)

- **SUBSTITUTE TUBE TYPES**

  **6922:**

  6DJ8, ECC88, E88CC, E188CC, 7308, 6N23P/6H23П (cyrillic), 6N23P-V/6H23П–B (cyrillic), 6N23P-E/6H23П–E (cyrillic), 6N23P-EV/6H23П–EB (cyrillic)

# PRICE

US $27,590/pair.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