

AM Audio PA-60X

If there was an Audio world championship, this amplifier could well represent Italy and aspire to be the winner of the Integrated Power Amplifiers World Championship.



AM AUDIO PA-60X Integrated power amplifier

Manufacturer and Italian distributor:

A.M. AUDIO, C.so Milano 102, 27029
Vigevano (PV), Italy. Tel.: +39 0381
347161 Fax: +39 0381 348753

Price: 19,100.00 euro

FEATURES DECLARED BY THE MANUFACTURER

Continuous power output per channel: 100 W on 8 ohm, 190 W on 4 ohm, 320 W on 2 ohm. **Total harmonic distortion:** <0.75% (1 kHz/100 W). **Total feedback factor:** absent. **Frequency response:** 2 Hz-180 kHz. **A-weighted S/N ratio:** 105 dB. **Sensitivity:** 0.35 V. **Input impedance:** 12 kohm. **Crosstalk (1 W, 10 kHz):** -90 dB. **CMRR at 1 kHz:** 105 dB. **Size (LxHxD):** 440x220x520 mm. **Weight:** 58 kg (net weight), 85 kg with packaging. **Guarantee:** 10 years.

Writing reviews of Hi-Fi components is often an enjoyable activity, if you are an audiophile, but it can become very boring in the end. It would not be so strange to compare it to commenting football matches every week: even the best reporter, after some years, would be obliged to repeat always the same words, or maybe to use neologisms and force the syntax in order not to keep employing the same linguistic repertoire again and again. Sometimes, then – even if not very often in his career – that reporter might have to comment a World Championship's final, where players like Lionel Messi or Cristiano Ronaldo, in a state of grace, perform like the legendary Pelè and Maradona. At that point, that reporter will know for sure what to say and how to describe properly what he sees, because he will have to report amazing actions, which are absolutely extraordinary compared to his daily experience. The comparison between the author and the hypothetical Sandro Ciotti above might not persuade everyone, but whoever opposed the parallelism between the AM

Audio PA-60X and Messi or Ronaldo at their best, would have to provide very convincing explanations.

External housing and functions

Like the other devices belonging to the Excellence range, the PA-60X only uses balanced inputs and, like all the amplifier in the AM Audio catalogue, features a really minimal design, which not only avoids any auxiliary controls for adjusting volume and selecting inputs, but also does without auxiliary outputs such as the fixed-level line output (“tape”) and the preamplifier section’s output. After all, with a power amplifier section like this, who would ever need to use the preamplifier section only? The minimal design is also confirmed by the power outputs, since there is only one couple of terminals per channel, excluding any bi/multi-wiring configuration. This choice indicates the professionalism of the manufacturer: with an internal impedance of approximately 0.7 ohms, a bi-wiring configuration would offer minimum advantages, even in theoretical terms.

It would be quite useless to talk about aesthetics, not only because it is a subjective concept, but also because the photos shown in these pages as well as the ones available on the manufacturer’s web site should already give the idea. The author can only think about adjectives which have always been used and maybe even abused, such as “elegant”, “imposing”, “impressive”, or “amazing”: in fact, how could a 5 cm-thick solid aluminium front panel not impress? A front panel which, alone, requires a whole working day to be processed with a CNC, high precision, diamond spherical head rotating at extremely high speed?

There are two rotating controls, aligned with the profile of the panel, and their ergonomics could well be criticised. However, practice makes perfect, and you quickly get used to this configuration without problems. Anyway, the volume is also adjustable from the remote control, which only for its mechanics could cost like a small power amplifier made in the Far East. One could also criticise the fact that the device does not store the latest volume adjustment: when it is switched on, while warming up, a little motor brings the potentiometer back to zero, avoiding “sound explosions” (which could be unhealthy for your ears) in case the volume has been risen to a very high level the last time. In the end, however, if we had to look for this kind of defects, it seems obvious that serious ones are completely absent.

Finishes – it goes without saying – are very precise and accurate, and all the areas the audio signal goes through are made of gold, both inside and outside the device.

Mechanics

In order to manufacture an amplifier featuring the PA-60X’s total mass, it is necessary to deal with some crucial mechanical issues. Generally, weights up to about 30 kg allow for the use of the conventional construction, consisting of a sheet metal supporting frame, lateral heat sinks (which, when installed externally in a monoblock configuration, help reinforcing the whole structure), and a front panel. Here, however, the weight is over twice the limit, and the heat sinks do not feature a monoblock configuration, since each channel is adjacent to other two channels: it was an unavoidable choice, because this design (besides being much more attractive from an aesthetic point of view – we must not forget that an amplifier, as a furnishing element, cannot resemble a stove) is stronger and more efficient than any other featuring the traditional “comb” configuration. In order to make sure of this, it is sufficient to view the catalogues on the websites of some Italian leading cooling systems manufacturer, such as LDS or PADA, and compare the characteristics of this device with other technically comparable solutions (less than 10 in total).



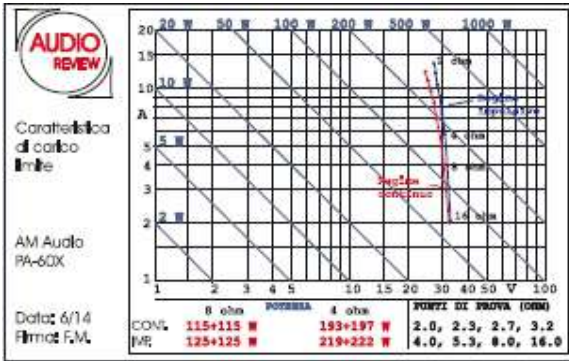
According to the manufacturer, the PA-60X is the AM Audio system featuring the highest electric density and, at the same time, an extremely tidy and linear design also in the positioning of components and sections. A glance is sufficient to see its main strengths: the 64 power MOSFETs, the encapsulated toroidal transformers, supplying a total power of 1 kW, and the main levelling capacity, exceeding the "legendary" threshold of 1 farad. The heat sinks, with a weight just under 13 kg and covering a radiating area of almost 2 square meters, maybe represent the best choice in a still relatively compact device.

AM Audio PA-60X integrated power amplifier.

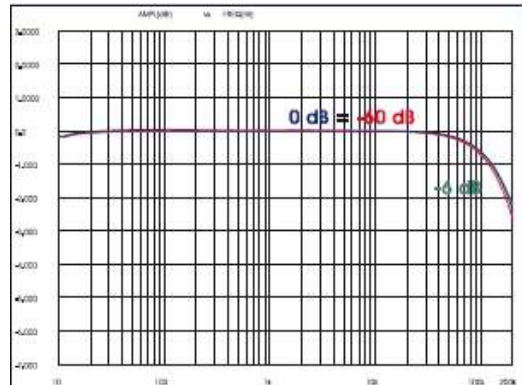
REGISTERED FEATURES Measurements performed with biasing at 100% unless otherwise specified

POWER OUTPUT

LIMIT LOAD CHARACTERISTIC



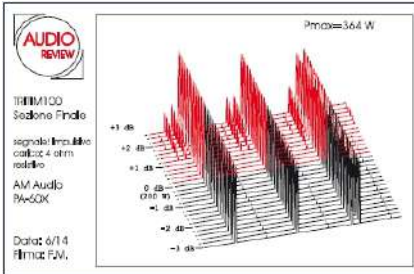
FREQUENCY RESPONSE (at 2,83 V into 8 ohm)



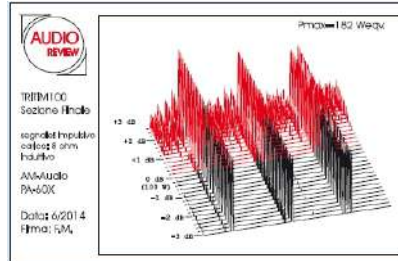
Damping factor into 8 ohm: from 11.7 to 100 Hz; from 11.6 to 1 kHz; from 11.4 to 10 kHz
Slew rate into 8 ohm: increase 34 V/μs, decrease 29 V/μs

Caratteristica di carico limite	Limit load characteristic
Data	Date
Firma	Signature
Regime continuo	Continuous mode
Regime impulsivo	Pulsed mode
POTENZA	POWER
CONT.	CONT.
IMP.	PULSED
PUNTI DI PROVA	TEST POINTS

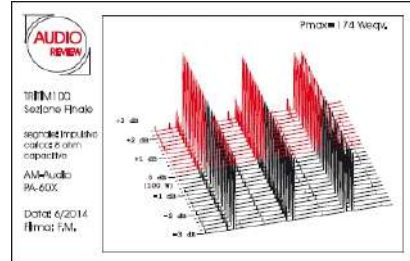
RESISTIVE LOAD 4 OHM



INDUCTIVE LOAD 8 OHM/+60 DEGREES



CAPACITIVE LOAD 8 OHM/-60 DEGREES

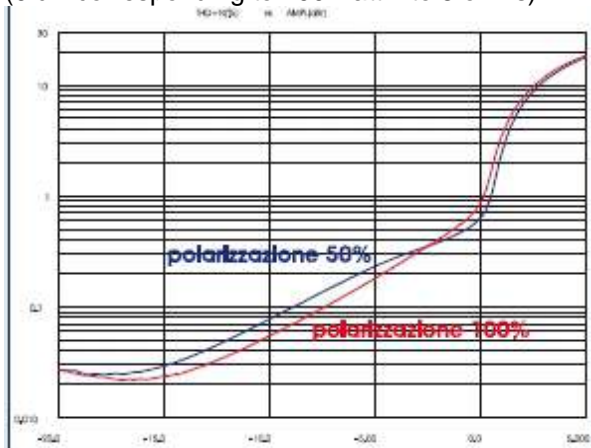


Sezione finale	Final section
segnale: impulsivo	Signal: pulsed
carico resistivo	Resistive load
carico induttivo	Inductive load
carico capacitivo	Capacitive load

INPUT 1

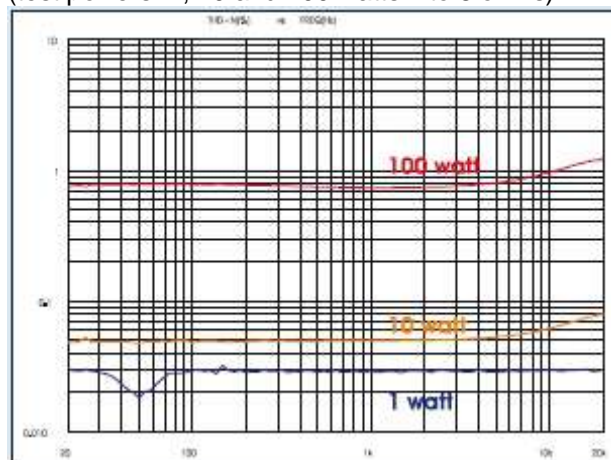
Impedance: 9.5 kohms. **Sensitivity:** 333 mV. **A-weighted noise voltage recorded at the input:** terminated into 600 ohms, 2.6 μV (100% biasing), 2.3 μV (50% biasing). **A-weighted signal/noise ratio:** terminated into 600 ohms, 102 dB (100% biasing), 103 dB (50% biasing).

DISTORTION AS A FUNCTION OF POWER
(0 dB corresponding to 100 watt into 8 ohms)



polarizzazione 50%	50% biasing
polarizzazione 100%	100% biasing

DISTORTION AS A FUNCTION OF FREQUENCY
(test powers: 1, 10 and 100 watts into 8 ohms)



The measures section has always been, for AM Audio's amplifiers, something similar to the celebration of the triumphs in Ancient Rome, and if this comparison applies to the "lower" end products (relatively speaking, since none of AM Audio's device could be considered as an actual low-end product), let alone the flagship segment of the portfolio. Beyond quantity requirements, always widely met by each product of the Manufacturer's portfolio, it will be good to focus, for once, on quality and on the philosophy on which this kind of projects is based, in particular for the benefit of less expert readers.

The damping

Recently we heard some enthusiasts express their surprise at the low damping values typical of this Manufacturer's power amplifiers. It goes without saying that an ideal voltage amplifier should feature a zero internal impedance, meaning an infinite damping factor. It is not a difficult goal to achieve, especially if one accepts the idea to apply a very high feedback factor. This choice, however, can have some downsides, such as:

- the occurrence of very high order harmonics, non existent in themselves in the circuit's basic transfer function;
- the establishment of a considerable saturation;
- the increase in the dependency of the performance levels on the type of the loudspeakers load, with the risk of possible self-oscillations with highly capacitive loads (this being the case of electrostatic loudspeakers, but not only);
- the loss of coherence in the audio frequencies performance, i.e. the increase in the imbalance between the low-frequency performance (considerably enhanced) and the high-frequency performance (which are enhanced slightly or not at all, when they are not deteriorated).

And this is only the beginning of a digression on which many experts, over decades spent developing the amplification technology, have based entire essays. In the case of the AM Audio's products, obtaining very low internal impedance values becomes even more difficult because of the choice to use MosFets on the output. If bipolar transistors were used, it would be sufficient to connect at least two of them in cascade and position a grounded resistor before them, featuring a value low enough to offer an already low

intrinsic output impedance from the beginning: for example, if the product of the gains of the cascade BJTs is 10,000, 10,000 ohms on the final stage's input are sufficient to obtain (as an initial approximation) an output impedance of just one ohm, dropping to 0.1 ohm with a feedback of just 20 dB. With MosFets, the situation is completely different, since their transconductance is much lower and, in a configuration like that, it would not allow for such low values. On the other hand, MosFets do not have a second breakdown and, for the same reason (absence of minority carriers), they cannot suffer from accumulations of charges, this meaning that their behaviour at high frequencies is generally much "cleaner" than with bipolar transistors (as can be demonstrated by comparing, with the help of an oscilloscope, the two rivals with very high frequency signals). These are all excellent reasons to prefer them over BJTs in the majority of the possible configurations. That is why this amplifier features an average internal impedance of 690 milliohms, corresponding to a damping factor of 11.6, that is virtually constant at all the frequencies of the audible bandwidth, thanks to its fundamentally resistive nature. Anyone who expected a low dumping at low frequencies would be wrong because, with these values, the electric component of a dynamic loudspeaker's figure of merit does not change so much, and the possible negligible effect would disappear among the resonances characterising any listening environment. More significant - as already stressed - can be the effects on the frequency response, but here too they would be hardly audible except in extreme cases: for example, with an impedance ranging from 3 to 30 ohms, the alteration could reach a maximum of 1.6 dB.

The linearity

Of course, in this AM Audio device, the entirely "audiophile" profile of the project is confirmed not only by the damping factor, but also by all the linearity tests carried out. The increase of the distortion with the growth of the power supplied is gradual and, most importantly, saturation is as mitigated as possible (whether considering a solid state or a tube system). The comparison between the curves obtained with a biasing corresponding to 50% and 100% demonstrates - if needed - that, in a well designed project, an increase in biasing however enhances the linearity and, obviously, slightly lowers the maximum power of the device, since the power-supply section is more exploited. The distortion/frequency curves - which the author of this article has always taken into great consideration - show a very mild growth at the top end, that is likely to be the best result which can be obtained by using the MosFets, and even a flat trend at low power values; here, the above-mentioned coherence is absolutely evident.

Power supply

The typical TRITIM diagrams are excellent as well, showing that minimum spectrum "non-cleanness" which characterises all the low (or, in this case, zero) feedback systems, always present in each amplifier manufactured by the Vigevano-based company and featuring the "usual" wide extension into the "red" zone. Here, moreover, the rated values are less exceeded than in other Manufacturer's products tested previously, and the reason is quite obvious. We are talking about one of the few existing 100 watt integrated power amplifiers actually operating in Class A, an almost miraculously space-saving device, if we consider its characteristics. If the power supplied had exceeded the rated value by 50-60%, the power to be dissipated would have been much more, and it would not have been possible to design it with such a compact size. Nevertheless, we are talking about final stages which, at full biasing, reach the saturation point at 120 watts per channel into 8 ohms and at almost 300 watts into 2 ohms (pulsed power supply: 125/220/360 watts into 8/4/2 ohms).

Noise and the other parameters

Noise is remarkably limited. There are not so many integrated power amplifiers featuring a weighted signal/noise ratio exceeding 100 dB, but in this case there were four further handicaps:

- the Class-A biasing and the very low internal impedance power supply, requiring huge charging spikes on the massive levelling electrolytic capacitors, with highly marked conducted and induced effects;
- the “strategic” choice not to reduce them by means of inductances;
- the zero-feedback final stages, lacking the capacity to reject power-supply residuals;
- the high number of final stages, i.e. the relatively high coupling capacity between power supply and output.

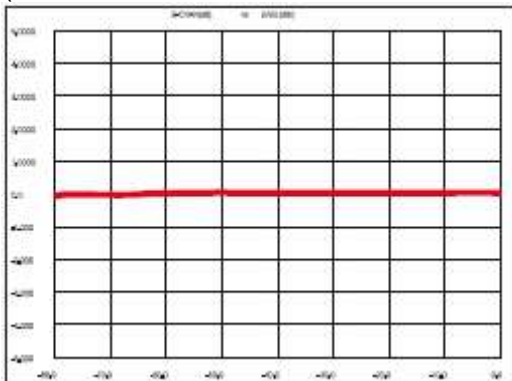
As a result, the 102 dB measured (103 dB at a 50% biasing) confirm, on the one hand, the absolute effectiveness of the layout (given the currents to be handled, the grounding paths must be designed and manufactured with extreme accuracy) while, on the other hand, represent a sort of benchmark for any similar project.

The last notes regard the frequency response, which is wider than the rated value (the point at -3 dB widely exceeds the 200 kHz level), and the channel balancing, that is simply perfect.

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CHANNEL UNBALANCE

(as a function of volume attenuation, from 0 to -80 dB)





Although 6 balanced inputs are provided, the circuit structure allows for the use of conventional RCA/XLR connectors: 4 of them are supplied by the Manufacturer together with the device. Each internal or external mechanical element the signal goes through, be it an input or an output signal, features a gold-plated surface. Noteworthy is the typical AM Audio switch for reducing the quiescent current to 50%, which however is unlikely to be used by who will buy this device.

Using a conventional construction would have led, in this case, to the risk of torsions already during positioning, but we must not forget that these devices must be able to be shipped around the world, and the safety measures adopted by the various carriers require that the packages as well as the object they contain can survive falls on their edges from a height of 1 meter. This is not a law requirement, but it is the only way to make sure that the goods can reach their destinations safe and sound.

This is why the PA-60X, as well as all the other AM Audio top products tested so far, feature a mechanical design which vaguely recall a military armouring. This solution consists of a 3 mm-thick stainless steel frame on which the container/power-supply transformers shield, made of 2 mm-thick, chrome-plated, mirror polished stainless steel, is installed by using rubber decouplers; 12x15 mm aluminium bars make the base even more sturdy. The sides, supporting the heavy weight of the heat sinks, are made of aluminium, and their thickness reaches up to 14 mm. The use of stainless steel and high thicknesses made it possible to avoid painting and to utilize fasteners, made of stainless steel as well, which can be tightened to very high torques, thus obtaining a “virtual” thermal monoblock facilitating the transmission and dissipation of the obviously high amount of heat generated. To this end, both the top and the bottom panels also feature adequate louvers.



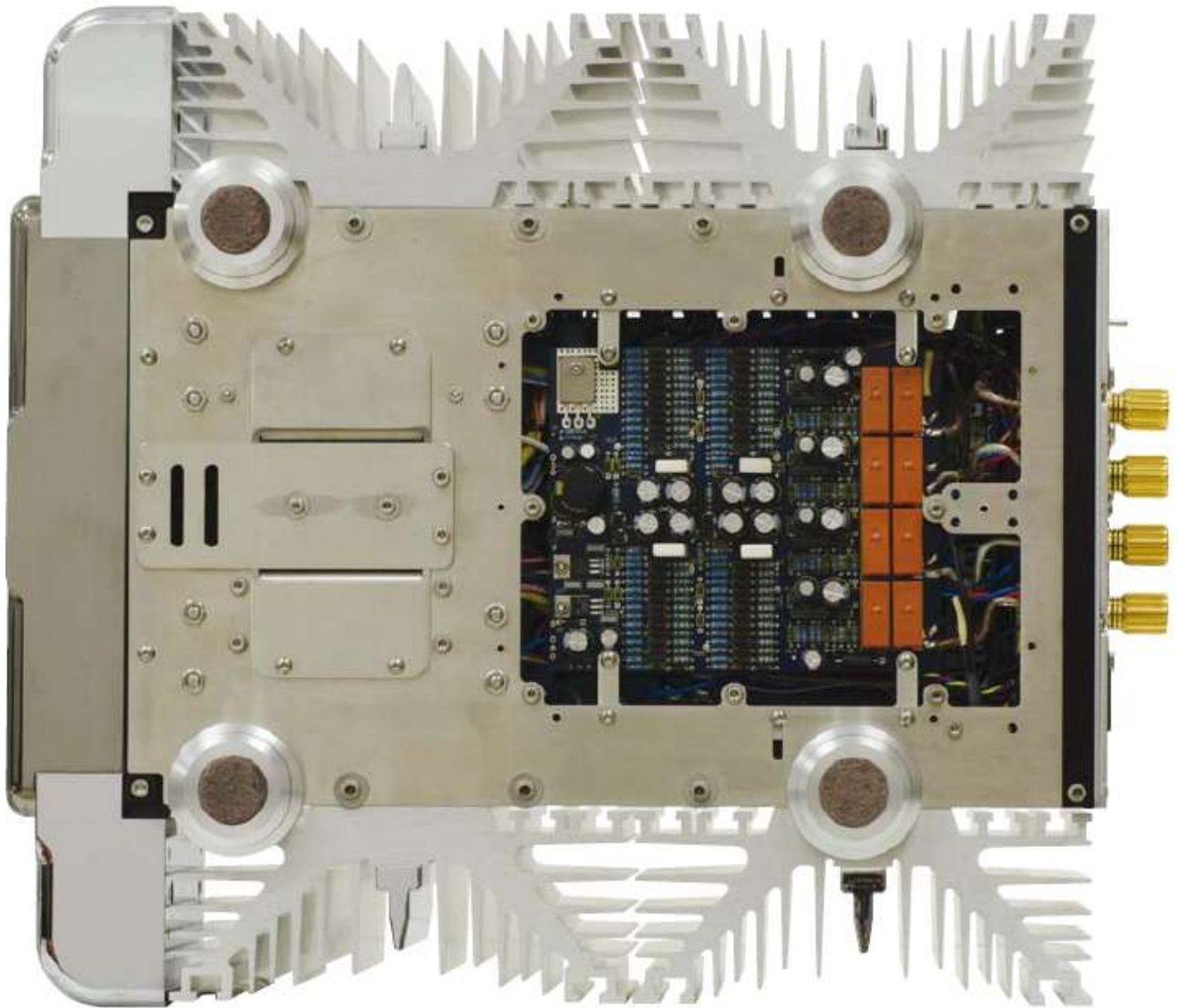
The volume control board, the only component which the Manufacturer wants to keep top secret.

Electronics

Here a general description of the electronics will be provided, while further details are given in a specific box. The PA-60X is a dual mono integrated power amplifier and can be identified as the result of a combination between an A-60X power amplifier and a P-1X pre-amplifier, meaning it is fully balanced, from the input to the output (so do not touch the negative output terminal with a grounding prong). The power supply unit could feed about ten “normal” power amplifiers. It is based on two 500 watt, resin-coated toroidal transformers inserted into a shielding armour; their main secondary transformers are rectified by 36 ampere bridges from International Rectifier and then levelled by decidedly extraordinary electrolytic capacitors, which stand out for both their quality (see the related box) and their strength, since they exceed the threshold of 1 farad. Of course, this is only the “massive” part of the levelling: in fact, like in any well-planned project, the local circuits widely use peripheral bypasses, which mainly serve to eliminate the inductive eddy currents in the connections. Moreover, for some years now, AM Audio has been taking the “levelling” concept to the extremes: all the signal supply units are not only fed by oversized capacitors, but also filtered by several levels of series resistors, which – together with the active and in this case also discretised stabilizers – make any alternating residues on power supply branches virtually undetectable.

Wanting to look for highlights among the solutions implemented by the Manufacturer as regards electronics and mechanics, we are spoilt of choice. However, two of them should be underlined, or they could be overlooked as too evident. The first one is its Class-A operation.

We have always verified the truthfulness of this statement since, among the few devices which are said to operate in this mode, this information turns out to be quite “approximate”. More precisely, we saw “Class-A” power amplifiers reaching up to 100 watts and more while featuring quiescent currents of less than half ampere (when 100 watts would require theoretically 2.5 and practically at least 2 amperes). However, with AM Audio there is no need for any verification: their devices always passed each test successfully, and sometimes with a good current surplus. Any doubt, anyway, can be settled by checking the Limit Load Characteristic (LLC) in the measures box: even with a very low internal resistance power supply, identical continuous and impulsive power supply values into 8 ohms can only be obtained when, under both conditions, the current absorption does not change, that is in the presence of a “Class-A” biasing.



The inside of the PA-60X can be accessed also from the bottom side. In the foreground we can see the board housing the pre-amplifier power supply connectors, featuring discrete circuitry stabilizers implemented with a very high parallelization of fast bipolar transistors. Each device uses several series resistors, reducing its energy efficiency but considerably “cleaning” the continuous signal, making it almost instrumentally indistinguishable from a battery signal.

Circuit analysis

The PA-60X circuitry is virtually identical, as regards the power stage, to that of the A-60X power amplifier (AUDIOREVIEW 347), and therefore derives directly from the excellent A-300X (AUDIOREVIEW 336), with proper adjustments in terms of number of final stages and voltage values. At the same time, the preamplifier section is similar to that of the P-1X pre-amplifier (AUDIOREVIEW 336). For this reason, here follows a description of these devices, for the benefit of those who have not read those issues.

Figure 1 shows the power amplifier’s input stage. The signal coming from the balanced socket is applied to both sides of an unusual differential stage (K170BL) featuring 4 Fets connected in parallel couples, probably for reasons of noise and current dynamics. The presence of a current sink supplying power to this stage ensure that all signals are handled in the same way, regardless of whether they are symmetrical (as those usually present on XLR connectors), asymmetrical (actually used for some laboratory tests with virtually identical results to symmetrical ones) or even lifted (in the rare event that signal

transformers are introduced into the transmission path) in respect to the grounding circuit. The 99% of the other amplifiers on the market features an input differential stage, which in balanced inputs is used to receive both positive and negative currents; here, though, there is not any feedback line, not even for bringing the continuous current back to the input and clearing the offset, so both sides are actually identical in terms of input impedance. This stage also processes the majority of the voltage amplification, and reaches the next stage with an output impedance of about 1 kohm, thanks to the DC coupling (featuring, of course, polymer capacitors with values split at a rate of 22 to 1, in order to eliminate the extremely high resonance of the larger one), thus creating a remarkable analogy with the first stages of tube systems. Since both the differential stage's outputs are employed, from this point on, the signal is split, and reunites only on the load.

In **Figure 2** the two identical sides of the next stage are shown, once again standing out for their extreme simplicity: an N-type MosFet (2SK214), for an even higher voltage amplification, and a P-type one (2SJ77) to considerably lower the output impedance and manage in the most effective way the final stages, these too separated by the continuous current by means of a network similar to the previous one. The final stages are obviously preceded by their biasing network, using a relay, which makes it possible to switch between the two biasing levels available, and two trimmers, enabling the biasing levels to be fine tuned.

The final stages (**Fig. 3**) are an "old acquaintance" of AM Audio customers', since they feature the "GVA" configuration, that has always been dear to the Manufacturer and which, thanks to a small voltage gain and to the drain output, eliminates the need for an increased power-supply level. The central trimmer, too, which makes it possible to maximise the high-frequency signal symmetry, has always been implemented by AM Audio since its first projects.

In the A-300X device, each side of the bank features 20 parallel MosFets (the well-known J62/K1058), while here "only" 8 of them are equipped, for a total of 64 power MosFets. The resulting current-carrying capacity corresponds to ± 56 continuous amperes: this means that even the most challenging loudspeakers system could at most tickle them, while the fuses on the power-supply branches and the "extremophile" shunt resistor, consisting of a 10.6 volts zener diodes between the gate and the source, ensure that the worst "nightmare" of a power amplifier - an output short-circuit - never comes true.

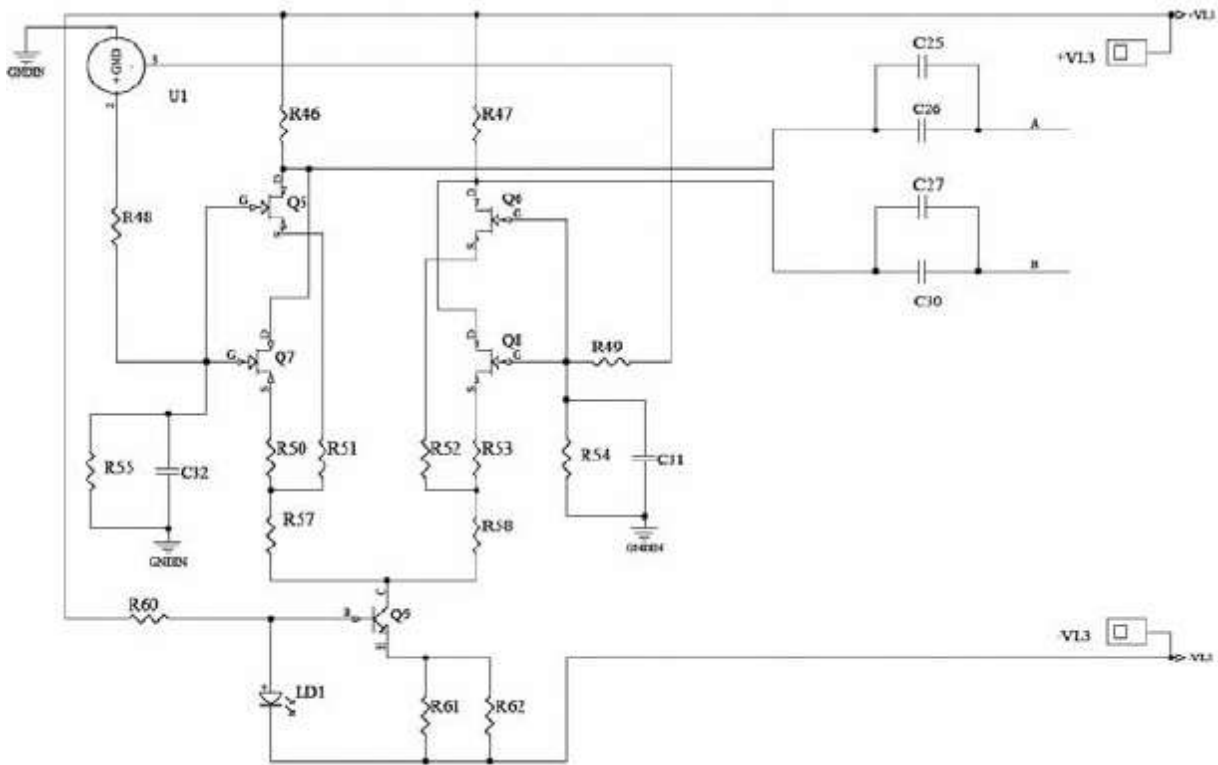


Figure 1 - Circuit diagram of the final section input stage.

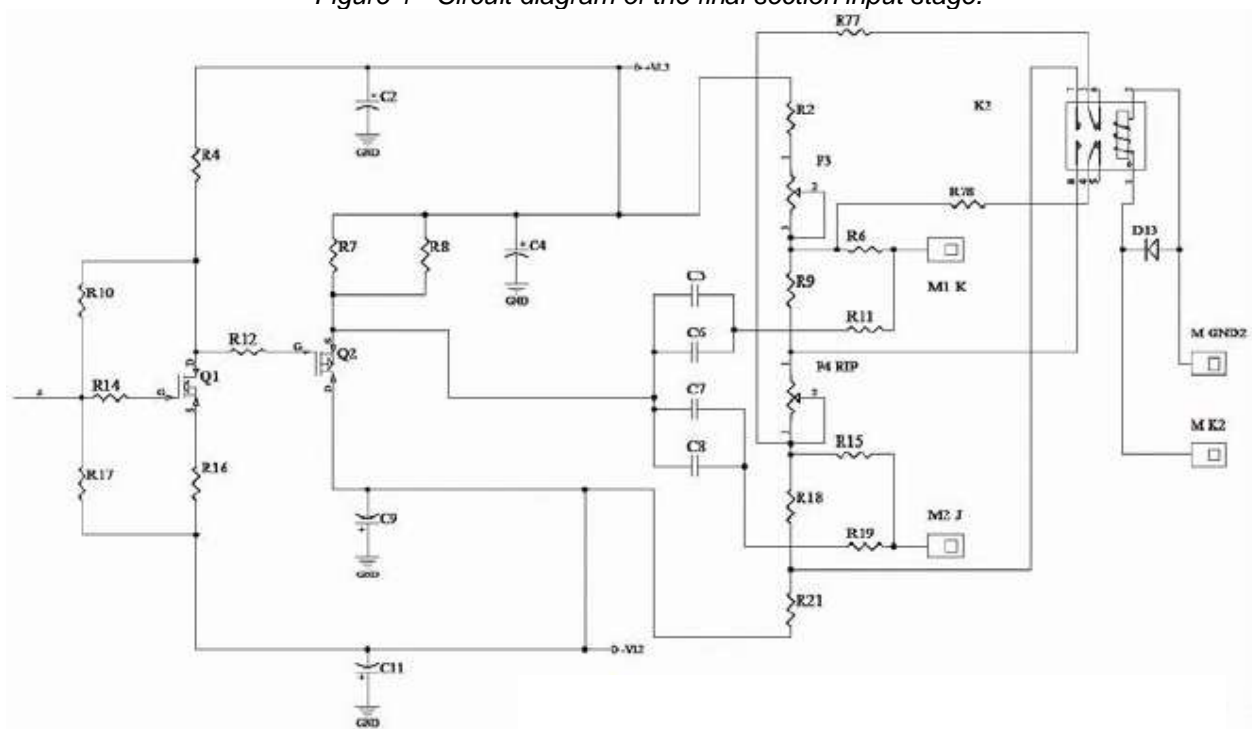


Figure 2 - Final section: intermediate and bias stages (one side of two).

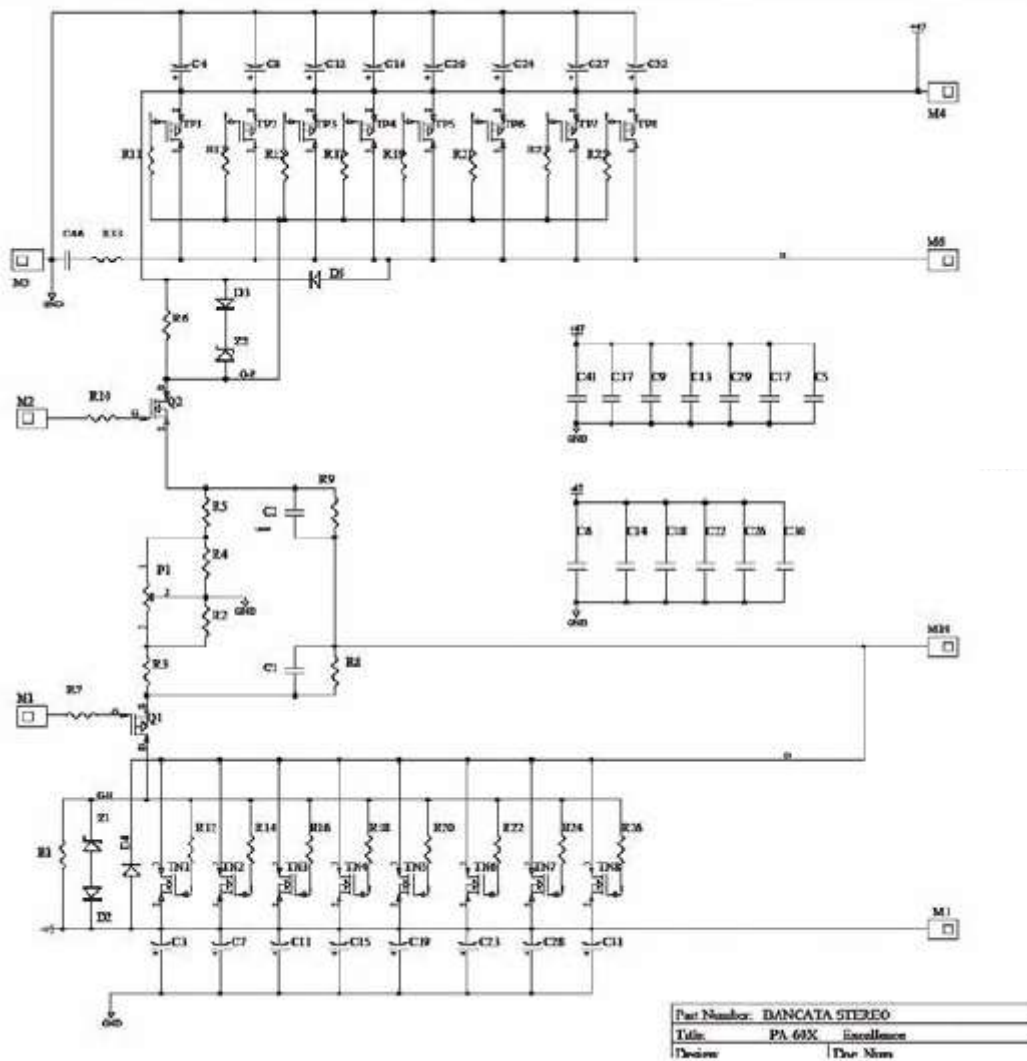


Figure 3 - Final section: final stages (one side of two).

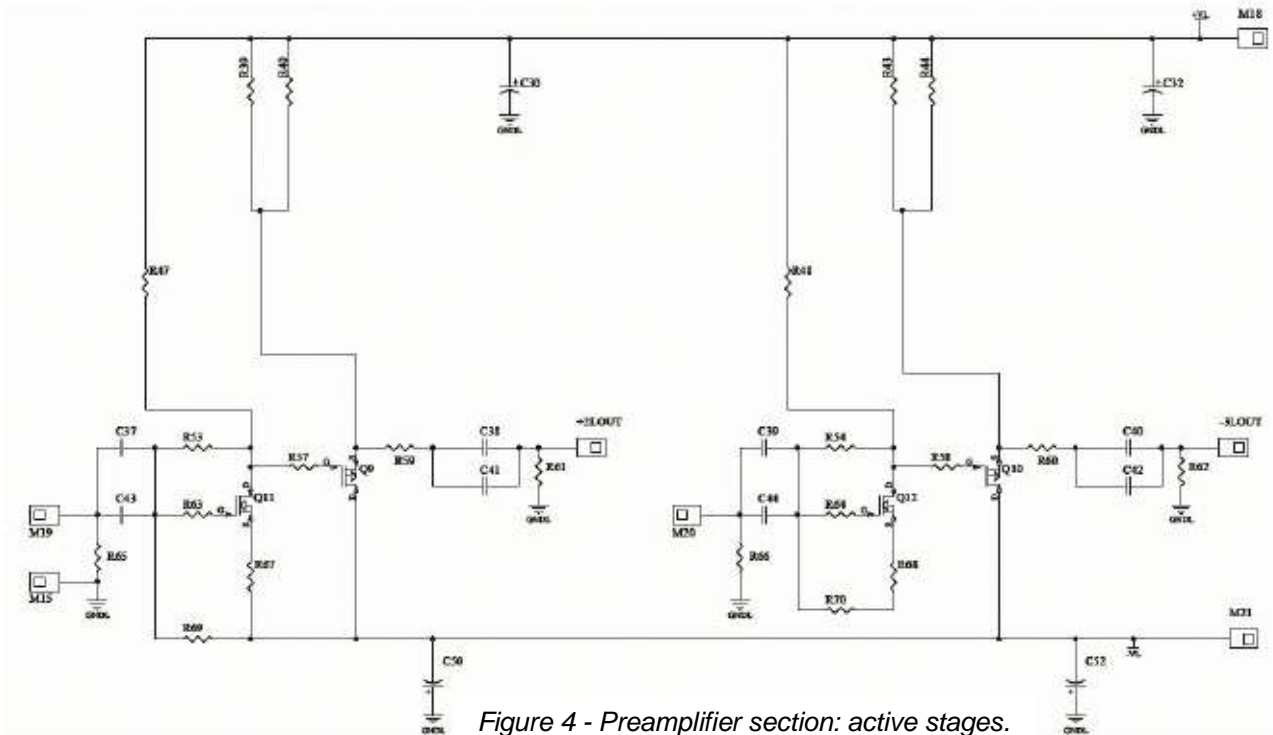


Figure 4 - Pre-amplifier section: active stages.

Figure 4 shows the active part of the pre-amplifier, this too featuring an extremely simple design and topologically similar to the second stage of the power amplifier. Its task consists in slightly boosting the existing signal and producing a low-impedance symmetrical signal. Nevertheless, it should be pointed out how the entire “X” range is equipped with stand-alone stages, and how, in contrast with the previous projects, it does not even exploit partial feedback loops: here loops are completely absent, and even local feedback (on a single stage) is used sparingly.

So far, we described circuitry facts which are interesting but already well-known from the previous tests. The PA-60X, though, features something completely new compared to the other AM Audio integrated power amplifiers: of course, we are talking about the discrete volume stage (the same used in the P-1X). It is a top-secret topic at the Vigevano-based company, and it is quite obvious: when you create something really innovative, even a brief description could ring a bell in the head of a properly skilled rival engineer. As we speculated for the P-1X, the potentiometer connected the right control must act as an encoder for a system which reads and subsequently encodes the orders given by an attenuators ladder network. In the past, we already analysed systems of that kind (such as the beautiful Theshold T2, at the end of the 1990s), but in this case, the Manufacturer chose to maintain the normal angular range of a potentiometer without leaving any free travel to the volume control; nevertheless, this control turns out to be easy to use and stable on an extremely wide dynamic range.

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If we do some simple math (multiplying the supply voltage, corresponding to about 50 V on each side, by a half of the peak current at the nominal load, i.e. 2.4 amperes, by the correction (reduction) factor depending on the total asymmetry between the current excursions, which is approximately 0.9, by the number of sides, that is 2), it is easy to see that each channel, at rest, has to dissipate about 220 watts. That is why not only huge but also efficient heat sinks are required. Those used here feature a characteristic thermal resistance of about 0.42 degrees per watt, so we can expect an operating thermal delta of

approximately 45 degrees, that is high but absolutely acceptable (the effective value is a little lower thanks to the contribution provided by the whole structure). Of course, in particular when listening at a low level, the user can decide to utilize the biasing switch setting it at 50%. It can be done, and the device will still give its best, but the maximum linearity condition involves a 100% biasing, and we doubt that the customer buying a device like this would want to renounce some of its features.

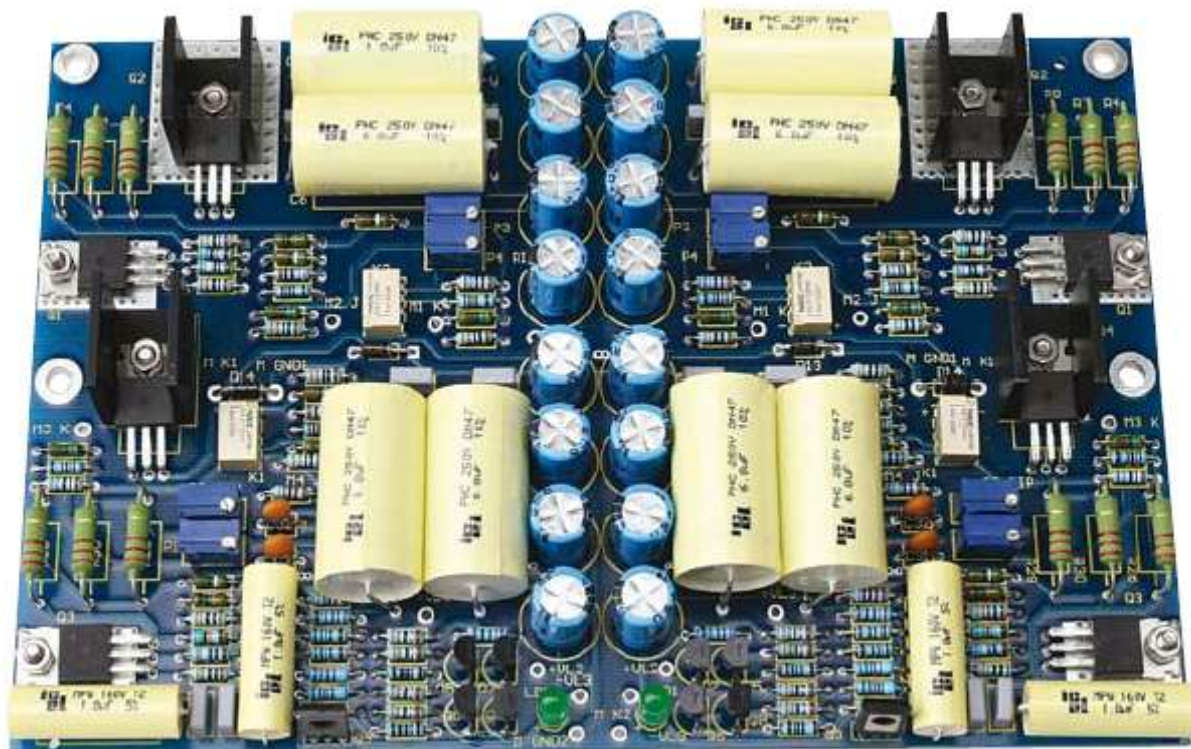
The other element which should be highlighted is the volume control. Summarising discussions already held in the past, an engineer can choose among three main volume control solutions:

- **potentiometer**: a typical choice, traditionally adopted by AM Audio for its products before the launch of the "X" generation. Besides their lifetime - which can however be very long in high-quality components - they pose some problems in particular in the balancing, which can be reduced by high attenuations and a variable output impedance, "modulating" the cut-off frequency according to the capacitive component of the output load. Moreover, based on the position of a movable cursor, potentiometers could also produce some microphonic effects.

- **integrated attenuator**: today, excellent integrated attenuators are available, but there still are some doubts about the internal switching dynamics. In addition, many attenuators are subject to small capacitive couplings, leading to response variations at the top end in case of too high attenuations.

- **discrete attenuator**: a system of logic controlled relays switches the attenuation levels of a partitive network. When well built, it probably represents the best solution: consistent input and output impedance, negligible stray capacitances, no semiconductors connected in series or placed "near" the signal.

The PA-60X, of course, features the latter, integrating relays with golden contacts and described, to the extent allowed by the Manufacturer, in the Circuit Analysis box. A possible limitation of this solution which we immediately think of when we rotate the control for the first time (hearing a quick sequence of ticking sounds while the relays are switching) is the likely short life of the relays. However, they are designed to have (as we said when describing the P-1X pre-amplifier) an operating life of 50 million switches: even using them intensively, a whole human lifetime would not be enough, and only several generations over time could be able to use them up.



The input stage board of the power amplifier. The image clearly shows the excellent polypropylene capacitors ensuring the AC interstage coupling.

Conclusion

Is there anyone who remembers how Audio was, I'm not saying 30 or 40 years ago, but only in the mid-1990s? Try reviewing the yearbooks and the leaflets of that period, if you still keep them on your bookshelf, and when reading about amplifiers, focus on one single detail: the number of power amplifiers with a finning not featuring the typical "comb" design with parallel, more or less concentrated fins. You'll find that, in the past, this kind of devices were produced in great quantity and with various designs.

Then, try to perform the same research among the products currently on the market: the leading manufacturers using comb-shaped heat sinks are just a handful, even in the flagship areas of their product ranges.

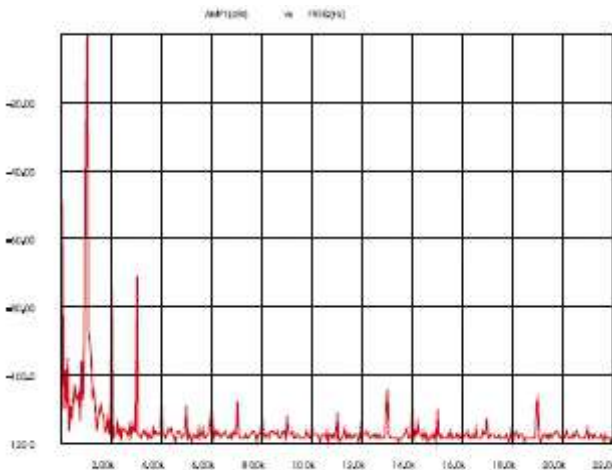
Why is this consideration so important? Because the heat sinks on the market have been manufactured for over 40 years based on more or less the same projects, and almost all those available today could have been integrated in amplifiers belonging to the old generations. In addition, during the last decades, the cost differential between shaped and parallel fins heat sinks has always been very high, obviously to the detriment of the former, which make it possible to create more efficient and space-saving as well as aesthetically more attractive structures. However, while in the past the production cost did not represent a problem, at least for those who manufactured high-end systems, today even brands boasting a great tradition tend to save money wherever they can, in order not only to minimise the final cost, but also to maintain an adequate margin under the new market conditions.

That is why AM Audio represents a successful exception. Over the years, we saw its products grow, not only in terms of size and performance, but also as regards the detailed construction and the wide variety of components used, and we saw it go decisively ahead even during today's economic downturn. The fact that Attilio Conti, founder and owner of AM Audio, is a man with clear and long-term ideas is also confirmed by other element, first

of all his peculiar approach to the Italian market, where his company is present without stores: in the light of recent events, we believe that many will have by now recognised his reasons. The case of an Italian company which works, gives work to its Italian suppliers, and exports to China when all economic indicators seem to advise against such a behaviour, should probably be studied in depth by those government agencies which are committed to promote the Italian products around the world.

By the way, we did not forget the PA-60X, but is it really necessary to conclude by pointing out that it is an extraordinary amplifier?

Fabrizio Montanucci



The spectrum of a tone at 1 kHz, with a power of 10 watts into 8 ohms. In a fully symmetric amplifier, only the odd order harmonics should be detectable, and in fact the third one is the most powerful, although the second one turns out to be only slightly weaker. The most significant aspect, however, is the actual absence of any higher order, corresponding to a power output of some dozens of watts.

The listening

When we deal with AM Audio, we are used to expecting massive and solid music machines, but once again Attilio Conti managed to surprise us creating an integrated power amplifier which is really over the top. With this Reference series, the Vigevano-based company made a successful debut in the international context of the Monaco High End fair. Bravo!

As already pointed out several times, the engineer's pencil alone is not enough to make a product that is also convincing from a musical point of view. Besides implementing a reliable technology, it is also necessary to know how to develop, verify (and revise, when required) the technical results in accordance with the outcome of listening tests based on musical criteria.

Writing for a magazine like Audioreview offers sometimes the privilege of listening to some top products before they are launched on the market. It was the case of the PA-60X, an excellent amplifier in all respects, as extensively described by Fabrizio Montanucci (who is not prone to superlatives). For an integrated power amplifier, a weight of 60 kg is a unique feature. The mechanical construction (from the structure of the cooling system to the volume potentiometer), far from purely being a complex stylistic exercise, serves the ultimate aim of a product which proves to be a wonderful music machine under all points of view. I already had the opportunity to listen to this integrated power amplifier a couple of months ago, in the AM Audio's listening room, a well structured environment which allows listening at realistic levels. Several loudspeakers are implemented, all manufactured by AM Audio, including a new pair of floor units equipped with next-generation Morel drivers, which many of you will have seen at the High End fair in May.

Power is an important element, but it alone cannot qualify as "musical" the correct reproduction of a track by power electronics. However, it is an ingredient, in the overall performance picture, that allows obtaining sound levels that can be defined as reliable, or

even better, exciting. If the loudspeakers from the Vigevano-based Manufacturer are quite efficient, the same cannot be said of other systems, many of which (even among those offering excellent performance) require an abundant power supply in order to modulate the dynamic sense of the musical phrase in various ranges, even when the impedance modulus is unwieldy or even insidious. This game has become a pride for AM Audio, and this solid integrated power amplifier is able to handle demanding loads, piloting and "marking tightly" the loudspeaker. In this sense, the results of the tests carried out by the editor match with the listening impressions, composing a sound picture which is large in size and rich in the reproduction of the score's details. As always, I chose a large music programme, differentiated in terms of genre, sound complexity and (as it always should be done) diversity of the incisions, so as not to stick to the particular sound of this or that possibly audiophile or "fashionable" record. The presence of an SACD player also allowed for the use of material offering extremely fine dynamic contrasts, especially at low signal levels. Contrary to what one would think, it is in the most delicate weaves of acoustic music that the reproduction chain plays its best cards, providing even in these moments that sense of completeness, presence, definition and natural sense of environment which is typical of the live listening. Only the best are then allowed to penetrate the innermost structure of an apparently simple score such as the pleasant "Largo" taken from Bach's Concerto for piano and strings (1056).

In this Sony recording on original DSD, not only the listener can hear the expressive touch of Murray Perahia, where each note is a separate entity in terms of micro-dynamics, but the supporting role of the usually evanescent theorbo emerges evidently. The symphonic overview of my reference selection bluntly revealed excellent introspection and analysis capabilities, while identifying, at the same time, the gentle completeness in offering the highest-order harmonics. The result is a rewarding listening at high volume too, which never fatigues the ear, even when listening to the brass sections of the greatest orchestras. Or better still: there is a sound vocation which knows how not only to express Mozart's music in a complete and airy way, but also to reproduce Mahler's climaxes, where the musical fresco reaches its highest expression, without losing control and (to put it in the hi-fi jargon) making them "harsh".

A music machine like this makes the rest - if I may say so - child's play.

Now, I wish that not only the many fans of this brand, but especially those who have so far expressed doubts about the Vigevano-based company's electronics, had the pleasure of listening to this device. They will have the time and the opportunity to change their mind, always in the name of great music.

Enjoy your listening!

M. Cicogna