

## Apex Audio ALBEDO

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They exist commonplaces in the world of high-fidelity enthusiasts surviving to themselves even when they have no more foundations. There exist also concepts or, better, myths that, as such, are handed on from generation to generation. It happens sometime that the two things meet as in the case of the Big Bass and the transmission line: audiophile mythology sustains that a way to reach the Big Bass, entity dispenser of subliminal sensations, is the transmission line. But, alas, it is a very difficult path as being constituted of indescribable long labyrinths, surely filled with selected pure lamb wool.

Therefore the transmission line, the Path towards the Big Bass, has remained one of the audiophile dreams, always cherished, often recalled but seldom followed, both because industry has always preferred simpler solutions, for efficiency, dimensions and costs end also because it is difficult to find a wife ready to accept in her living room two speakers almost large as a fine wardrobe (actually a much more useful [for the wife] object to put back linen).

However, since some time, matters are changing: on the market have appeared transmission line loudspeakers of reasonable dimensions and that do not even use any kind of absorbing materials in their interiors!

An example, moreover original, of this new way to envisage the transmission line comes just by a young Italian company: APEX Audio from Civitavecchia, with the Albedo loudspeakers.

### Construction

The shape of Albedo is non-conventional: in the past there have been examples of pyramidal loudspeakers, but quite few have their minor basis touching the floor and the symmetry axis of the pyramid tilted with respect to the vertical. Actually the choice of this particular shape is all in the requirements of the project: the cross-section of the transmission line gradually shrinks from the inlet to the outlet and the front panel is bent so that the emission centers of the two drivers are located on the vertical plane. Certainly an unusual shape but that results so charming to surely pass also the most severe aesthetic wife test.

The size is quite small and, as a matter of fact, comparable to that of a small bookshelf (very small) on its stand. The cabinet is made of 1.9 cm thick MDF and is externally finished in solid paduk wood and internally covered with a bituminous sheet with the task of further damping cabinet vibrations. The front panel is backward tilted in such a way that the emission centers of the mid woofer and of the tweeter are on the vertical plane. The cross-section of the transmission line shrinks from the upside to the lower side and the port is located on the back of the speaker at the level of the floor. The length of the line coincides, up to the thickness of the cabinet, with the height of the loudspeaker that is about 97 cm!

As pointed out above, it is not present any kind of fibrous absorbing material inside the line; the filling is limited to a 1.5 cm stratus of open-cells expanded polyurethane glued to the internal walls. The right working of "such an empty" line is insured by two acoustic resonators placed behind the woofer: the line tends to resonate at frequencies whose wave-length is comparable to its largest dimension (and their higher harmonics) so the resonators are tuned at the first two resonances and, since they work in opposition of phase, erase them. This trick, combined with the wall lining and the conical decreasing of the cross-section, allow an optimal control of the port emission at the lower end of the frequency spectrum. The drivers, a 10 cm mid-woofer and a 26 mm tweeter, are of Morel production and both utilize neodymium magnets. This technique allows to get, from very

small ferromagnetic blocks, the same performances of traditional magnets: in the case of the mid-woofer this permits to mount the magnet inside the moving coil, of a good 50 mm diameter (a record for a nominal 10 cm driver), limiting the size without any decreasing in the performances. Moreover, since all the magnetic circuit is contained inside the weight-bearing (steel alloy) structure, the magnetic flux is fully screened so that the driver can work nearby TV-monitors without generating any image distortion.

Analogously the tweeter, still in force of the neodymium magnet, has very small external dimensions, although the coil is of “normal” size (26 mm). The presence of the magnet, located inside the moving coil, did not prevented Morel from endowing the transducer with a conical chamber back to the dome in order to lower the resonance frequency of the driver. The crossover is placed on a plate immediately back to the binding posts, which are present in two pairs for bi-wiring, and utilizes high quality components: polypropylene capacitors and air wound inductances.

### **The Crossover Filter**

The crossover of Albedo has only apparently a simple lay-out (see figure). Actually, the designers had in mind the goal of a maximal linearization of the acoustic phase of the system, in the largest range of frequency attainable: a linear phase-response system correctly reproduces an impulse, that can be seen as composed by an infinite series of sinusoidal signals. In view of the transient nature of the musical signal, it is clear the relevance of this specification for an acoustic loudspeaker.

To reach this goal it is essential a deep study of the crossover network and a careful choice of the transducers and of their position on the baffle. Albedo’s designers have looked for a first-order acoustic network with a pretty high crossover frequency (about 4.5 kHz). For this aim, a resistor has been placed in parallel to the mid-woofer series inductance, in such a way to correct the low-pass acoustic slope of the driver in its upper frequency range: the inductance alone would have determined a quite different slope (steeper than the ideal 6 dB/oct) due to the intrinsic frequency response of the transducer that, in the crossover range, begins to drop and to the rising trend of the modulus of the transducer impedance. The tweeter is filtered only by the 2.2 mmF capacitor, since, in the crossing frequency range, its response is quite linear. The parallel RCL cell in series with the tweeter equalizes the system response around 9 kHz.

### **Measurements**

It is not at all easy to test a transmission line because the distance between the woofer and the port usually has a length comparable with the wavelength of the mid-bass frequency range. Moreover, when the port radiates at the floor level, we get an increase and a redistribution of the acoustic energy that cannot be evaluated starting from the responses detected in anechoic regime and that, rather, may convey misleading clues. In the present case, more than in other circumstances, one must inspect the ambience response plots to understand the “character” of these loudspeakers.

The ambience sensitivity is not very high but, in any case, more than adequate. The frequency response results pretty regular, especially if it is considered that we are testing an “empty” transmission line system. The waviness appearing from 200 to 1000 Hz (minima at 250, 500 and 750 Hz) are the residues of the main resonance of the line that, seeing their limited amount and that in the ambience response they in practice disappear, do not rouse any care. Really good the 2<sup>nd</sup> and 3<sup>rd</sup> harmonic distortion, so that for difference of frequencies. Maximum Input Level and Maximum Output Level would be praiseworthy for systems with much larger woofer! The modulus of the impedance promises easy interfacing with every amplifier on sale.

### **Listening Test**

Useless to hide to oneself. Everytime one is faced with a transmission line, he is tempted to test its attitude to recall the Big Bass. It is no good to perform wise considerations on the size of the tiny

woofer, or the small dimensions of the cabinet... In short, the test is made even more compelling from the listener's expectations.

It happens therefore to start the listening session with the recording of a Japanese drum of 1.7 meter of diameter. Test past with full marks by the Albedo: the great surface of braced skin is smashed in different points to get various dynamical and tonal effects. The bass is not only fast and detailed, but succeeds in reproducing the hugeness of the big drum rendering almost the feeling of the tension of the skin. Obviously the physical limitations of the system, due to the small diameter of the woofer, comes out at a certain point, but at a really unthinkable high level. Great.

Satisfied with the start, the session goes on with surely more "musical" pieces to better focus the peculiarities of this system. The stage reproduced is endowed of a wide depth and is well placed between the speakers. The timbre is quite neutral, even if characterized by an upper edge in slight evidence, a shade that is reduced almost to disappearing with the Mesa Baron tube power amplifier (fully triode configured) instead of the monolithic AM Audio mosfet amplifiers, which sweeten the mid-upper range. The mid-bass range is very good and its joining with the deepest basses is smooth, namely without variations in the rising and damping of the transient response, a really uncommon behaviour.

### **Conclusions**

Albedo is an original and bold project, able to set a new reference for the low frequency reproduction with a mere 10 cm driver. It is not possible to fully describe this product in a few words, as many are its technical and sonic peculiarities. We recommend to listen them at a qualified dealer. You will surely be pleasantly struck.