

The art of Sound the Pleasure of Music



Various Roundffusor1 industrial paintings



more than a material

an active gain and clean sound diffuser (180 - 250Hz to 20.000 Hz)

&

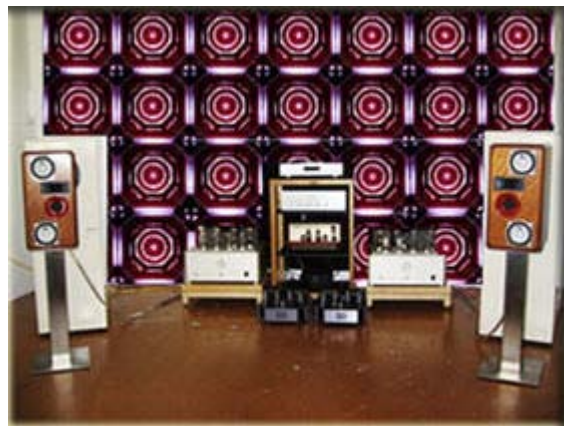
adaptable low frequency absorber (5 Hz to 250 Hz)

DETAILED MOUNTING INSTRUCTIONS OF OUR UNIQUE DEVICE

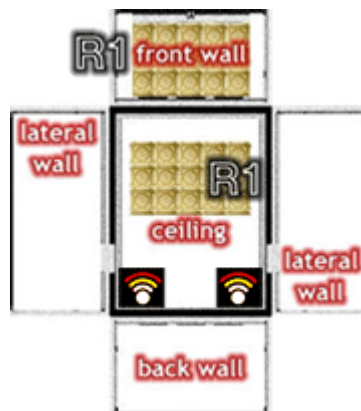
In this typical room diagram, the empty / white parts, are the lateral walls without any other materials



a.



b.



Ex. 1 - The typical R1's solution, with or without ceiling's covering

The loudspeakers are facing the sound engineer chair (a.) or not - in a High-End system (b.) the R1's surface

■ The basic advice practically for all situations: fully cover with R1 the wall behind your loudspeakers or behind the listening place. Divide the wall height by 0,58 m or 58 cm (R1 dimension) and take care to have some 10 cm free upper and lower of the mounted columns of R1. When audio system's higher energy or complicated room resonances appears, then a part of the ceiling must be R1's covered.

■ In all situations, after you finished or even during the R1 mounting search an optimum loudspeakers positions, always in small steps. Take notes on any moves made. If is possible do that alone repeating same song at same levels in order to keep yourself in focus & not be influenced.

■ The Roundffusor1 behaves much better when the "front wall" wood drivers are mounted perpendicular to the ground, symmetrically towards the loudspeakers middle axis. In case you mount the R1 on the ceiling, the ceiling's wood supports "T" are following the front wall's direction.

■ The "running" eigenfrequencies or standing waves or room resonances (name them as you wish) are everywhere not just at the places you believe or "calculate". Stereophonic music is a dynamic phenomenon being something "more" than simple tones or sweeping signals even from the most complex measurements procedures. Without indeed good room acoustics you cannot enjoy even the most expensive audio system.

■ Absorption and clear music are never good friends...



Ex.2 - The solution for cube like rooms or real booming problems

R1's corner mountings emulating a huge like "bass trap" solution. You cover two adjacent or all 4 corners

■ This is a better idea, with or without ceiling coverings. The red arrow represents the main speakers axis direction. You may use this solution for recording, control or mixdown rooms. A proper carpet on the whole floor surface is required.

■ This kind of towards corner mounting emulates a huge "like bass trap" just 11.5 cm deep. Using only Roundffusors you obtain the real adaptable low and very low frequency absorber from 5 Hz to around 250 Hz and a very clean diffused mid and treble field - from around 180-250Hz to 20.000 Hz. We have a symmetrical mounting of R1 columns covering parts of two adjacent corners facing the speakers. The corners are covered differently. Depending on room dimensions, the speakers are facing 2-3 or 4 grouped columns on each side of the wall and on the each lateral corner 1-2 but not more than 3 grouped R1 columns.

■ In case you encounter sever bass problems in your room and the room tends to or is really of square geometry or even a real cube, then use this solution for all 4 corners and position the speakers at will because the room is now homogenously R1's diffused and bass controlled.

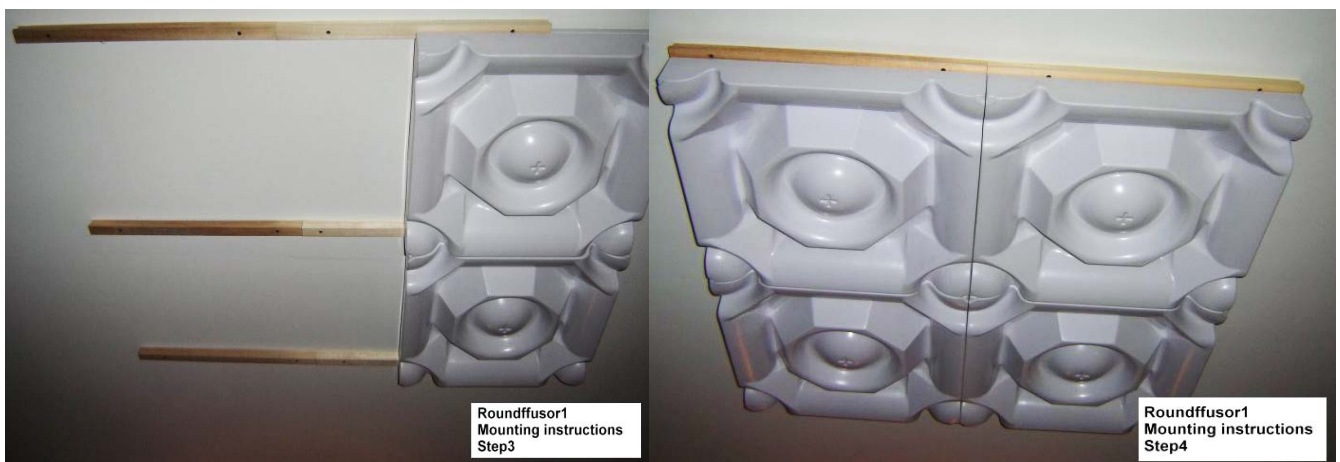
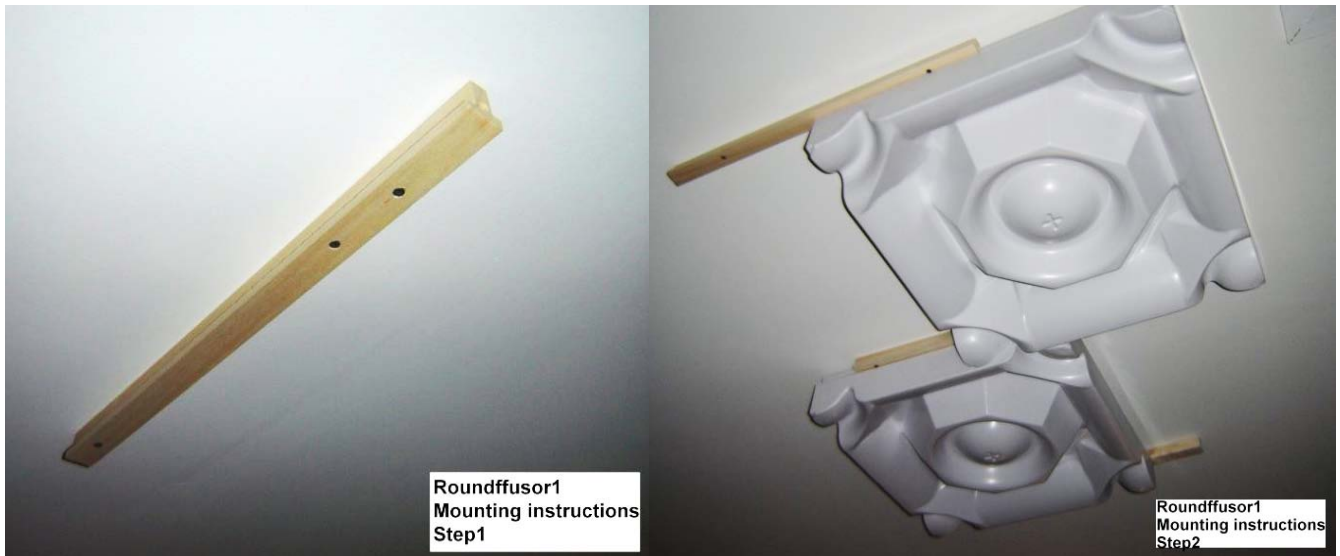
■ Verify if your walls are made from 12,5 mm thick gypsum plate. If yes, the gypsum must be backed and have glued from behind of some 3 or 5 or even 10 cm of absorptive material with the density between 60 and 80 Kg/m³ - this material being between the gypsum plate and the wall surface. Such "sandwich" will not let the gypsum plate to resonate. Will be better if you are able to use two gypsum plates (total thickness of 25 mm) glued together and backed by the same absorptive material. In case if are not careful about this detail and the gypsum plate is / are empty from behind, a kind of ringing or dissonant sound will result even at relatively low levels. We refer to rooms / halls for music not industrial ones or offices.

■ The big advantage is that the same R1's grouped surface dissipates in the same time the long-running low frequencies, the middle and treble just diffused resulting in a very solid sound, a musically and stiff bass. In any way of mounting, R1 works perfectly, creating the impression that you are in big, tidy sound space. The air is abundant, the extinction of each note length and a delightful texture, but the colors / reflections absent. The result is a beneficial calm space, with significantly lower noise level. Bodies are no longer fighting each other, developing comfort with the wealth of harmonic formations emerge much better, and while talks of a group / listeners are easily understood, even at very high levels.

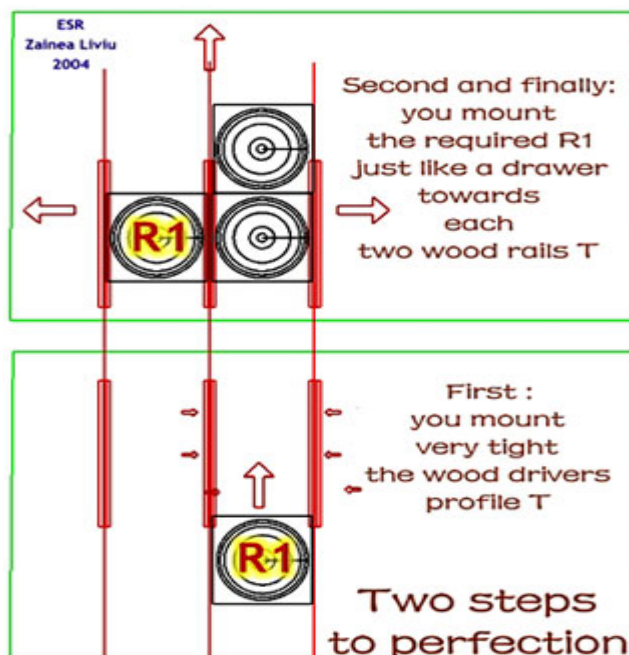
The R1 is a unique sound device, effectively working at all sound levels, from whispering to more than 130 dB SPL without being saturated

It was successfully tested to real helicopter sound !!!

■ From the above examples (Ex1 & Ex2) results that generally, only a maximum of 10-20 % of the total room's surface needs the unique R1, the rest of the room's rests as initially finished or as you please. Being taken just as sound diffusers, there is a (Heinrich Kuttruff) limit of ~35% of total room surface (walls ceiling and floor) which might be covered with R1. Using R1, inside this relatively small area, you are fully covered for low and very low frequency surplus.



Each Roundffusor1 is 58 x 58 x 11.5 cm and of course each wood section "T" support is 58 cm



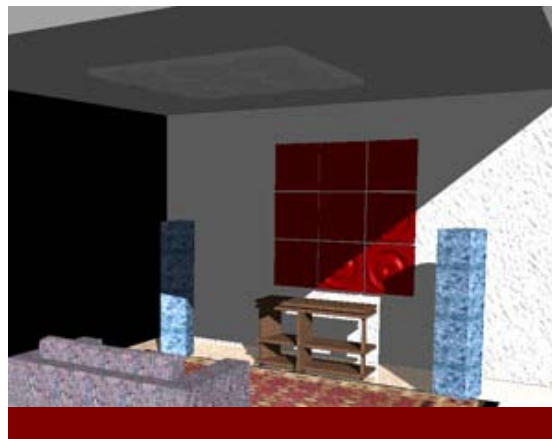
The "Profile T" is a piece in wood, section "T" which must be mounted very tight upon the wall surface using UPAT.

Where, why and how to mount the Roundffusor1

YOUR SITUATION IS SURELY ONE BETWEEN SOME JUST DESCRIBED BELOW

■ For normal rooms - dedicated to music listening or control rooms in recording studios of about 15-24 square meters, 9 to 24 R1 are enough, to be mounted grouped behind the loudspeakers, or on the wall behind the listening place or just on the ceiling, always symmetrically towards the sound sources median axis.

■ At least 1 to 1,5 meter must be let between the R1's surface and the loudspeakers.



Details

■ About 10-15 cm must be let between the ceiling surface and R1's columns, the same towards the floor (if no power outlets are there). R1's corner mountings emulating a huge like "bass trap" solution. I repeat, this kind of "bass trap" is adaptable to the signal, in a dynamic way. You cover two adjacent or all four corners.

■ B. Similar situation as above (A). The low frequency resonances are running everywhere towards corners from floor to ceiling. Don't let uncovered part of the wall towards ceiling. Is better to let some 80-90 cm between the R1 lower column's edge and floor. Like that you have the possibility to use the power outlets. Sometimes helps to position the loudspeakers facing the R1's surface.

■ From detail "D" the you may see that the wood mobile panels sits on some nice metallic legs. Be sure you put some 5 mm latex between the metal part and floor. Even if the wood panels plus the 4 R1 are relatively heavy there is always the mechanical impedance interface. At resonance frequencies, the mechanical impedance will be lower, so less force is needed to cause a structure to move at a given velocity, so the panel will tends to "jump" creating turbulence inside the R1's column. Being satisfied with the place and sound from the mobile panels, better is to screw the wood panels above the wall surface for full R1's low frequency control. The final solution will be always to mount very tight the R1 directly upon the wall's surface or glued upon a 10 mm plate plexiglas.



A.



B.



detail "D"

■ In relatively small rooms, in case you have even more severe room bass problems (booming, resonances, excessive masking phenomena from the low frequencies) and you don't like the "corner emulating a huge like bass trap" solution, then fully cover the wall behind the speakers or the wall behind the listening place. Here is a 5x4 R1 solution.

■ In all such difficult situations, just send me by email few pictures of your room or better, along with them a small video having along with the image some clapping hands around the room and one sample from exactly room's center. You make the movie another person making the specific sound. It will be a pleasure for me to help you.

■ For wide rooms, acoustically considered a special / severe situation (the loudspeakers facing the wide room's dimension), mount the wood "T" pieces horizontally relative to the floor.

■ Like that you will obtain longer horizontal R1's columns , of 4, 5 or 6 or even 7 R1. A resulted matrix of 4, 5, 6 or 7 R1 horizontally by 3 or 4 R1 vertically will solve all your bass / low frequency resonances problems. Is easy to mount this grouped R1's surface above the power outlets level.

■ Mounting the R1's wood supports horizontally is not the solution for square / cube like rooms but for wide listening rooms with the stereo speakers facing the wide dimension.

■ In the right picture we have a 7x3 R1 surface for wide rooms solution, having the wood "T" mounted horizontally.

■ A very nice sound systems and a lot of shining black painted R1 in a very wide listening room. In such situations, is better to put the loudspeakers facing the R1 grouped surface. Or change the wood supports direction relative to the floor.

■ Keep the loudspeaker at more than 2 meters away from the R1 surface. Even with the loudspeakers in the mid distance between walls, you won't be able to "see" them in the dark, with music.

■ From the situations 1,2,3 , the nr 3 might be the example where either you use much bigger loudspeakers or you reduce the R1's surface.

■ World's BEST sound application, a Hyper High-End audio system, something around 4000 Kg (there are two 12 meters long double horn drivers for 1 Hz to 100 Hz and a 4 way "inside the room" system) using no more than 69 R1 for room acoustics.

■ There are 45 R1 on the back wall and 24 on the ceiling. We were very careful to the tiniest detail and we obtained a measured +/- 0.25 dB and we also sensed a full range +/- 0.25 dB from 5 Hz to beyond 20.000 Hz.

1



2



3

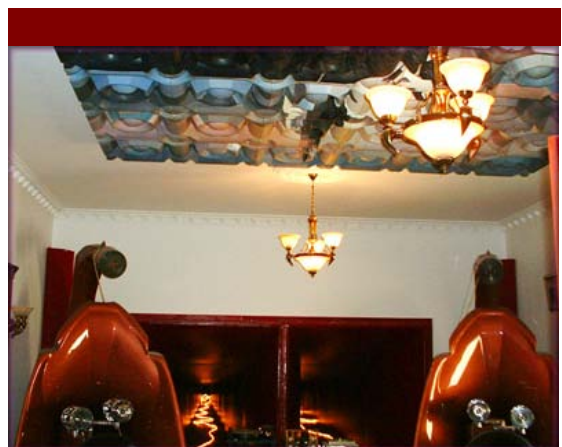


B

E

S

T



■ Equal front and back radiation speakers needs careful R1's positioning - only behind the speakers. Seems that such a combination brings the sound to realistic timbre and dynamics , you know...musicality . Despite the fact that in this situation (to be seen and from [here](#)) we have less than only half back wall covered with R1, here we have an evidence that using the R1 the acoustic field is "forced" to symmetry, or ...the "expected" wrong stereo image becomes a wide natural well defined stereo. The traditional boring sweet spot becomes obsolete.

You can sense the natural stereo image everywhere in the room or even in the coupled adjacent rooms...

Why? Because we have R1 there...

■ The one who put absorptive materials behind such type of loudspeakers (Rubanoïde and all kind of electrostatics) will absorbs mid and mid/high frequencies - part of music. If you don't treat the back wall properly, you will have echoes. The Rubanoïde and all kind of electrostatics needs careful R1's positioning - only behind the speakers which must be at 1 - 1,5 meter away from the R1 depending on room dimensions. Don't forget the paradox: diffusion will reduce the room reverberation without harmful absorptions results...

■ For recording studios rooms, or live music rooms of any dimensions meaning bigger rooms or music halls, generally, the number representing the floor area in square meters is the maximum number of necessary R1, both for ceiling and one wall treatment and even then following the Kuttruff's "diffusion surface percentage" of maximum of 30% R1's coverings from the total room's surface (walls, ceiling and floor).

■ A 280 square meters conference room. They understand perfectly each other without microphones. Why? Because the R1 are there...

■ On the right picture - taken from the City Town Conference hall - Resita / Romania was held from 21 to 24 October 2009 an International Conference „Acoustic , Vibrations”. For a 280 square meters conference hall, we successfully used JUST 100 R1, almost 1/3 of the floor surface, meaning 3 times less than the 30% "rule".

■ Inside this "rule", the R1's periodical mounted surfaces provide AND the unique adaptable low and very low frequency attenuation. At the time when the "rule" was written, this AND, it wasn't predicted theoretically. Why ? Because almost never an invention , a very bright idea doesn't fit into a rigid theoretical frame book. An invention, is evolution, is future...



The Non Conventional Asymmetrical Solution



■ The solution for the specific recording rooms, Music Halls or TV plateau situations, rooms for live music of any dimensions is: many patches of at least 8 (in a 2x4 matrix) or 9 (in a 3x3 matrix) grouped R1 must be periodically / symmetrically mounted , if possible on all lateral walls and sometimes on ceiling.

■ The R1's matrix dimensions, locations and distances between them are dictated by the architectural rhythm for each situation. The repetitive mounted patches of R1 are reducing dramatically the RT60 or "echoes", to a "R1 constant" 0,5 - 0.4 sec. or less , no matter how big is the room.

■ The sound field will be very homogenous and musically clear. The intelligibility will tend to a natural one. The obtained "3 times less than the 30% rule" is not just a very economical solution, but a clear proof, evidence of R1's efficiency. The Conference's Chairman said: "why to make acoustical measurements to such a perfect Hall ?

To...prove that it sounds so good ? "

■ Why I insist so much about symmetry in the room? Like that we have a field "ready" for the original field of the recording, there will be minimal interferences between them.

■ This symmetry is not only a geometrical one. The R1's surface will produce a consonant environment for your recording and room. This consonance or unison of the musical fundamentals / octaves or their harmonics details (exact or even approximate) are continued in our brain as neural-firing coincidence. This is the ideal continuum interface - recording / room / hearing and is the way a musician perceive the music. With the help from the R1's diffused field, your CDs or LPs or movies will sound like the original ones, with their perfection (meaning the reality at the recording's moments and space) or imperfections.

■ A blend of music lovers dreams with the real high fidelity.

■ And all this, is done practically simultaneously with the incident sound, because our hearing system cannot perceive...when. This "when", in my opinion is the human perception's / sensorial delay. So the said... real time, is not quite real time, even for sound neither for vision... Just be happy that the R1 is... in time. More reading about "when", [here](#).

■ You can see [here](#) a small movie about the sound in a room treated with the symmetrical R1's corner mountings. The windows are fully open and some birds are outside...



The R1 brings in musical harmony

your recordings with your room and your brain

Hearing is believing

Mounting details

Explanations

■ 1. The R1's will be grouped mounted in a minimum 3x3 matrix format (thus, creating a surface of 174 x 174 cm), in rows of at least 3 R1, perpendicular or parallel to the ground (depending on wood "T" support direction relative to the floor). The grouped Roundffusors must be symmetrically positioned towards the sound sources, on their axis. When there are bigger, voluminous loudspeakers or higher listening levels, then the number of required R1's must be increased.

■ 2. The loudspeakers positions are in such a way chosen that on their left and right, again on their axis, as much as possible, do not exist opening like doors or windows. Statistically, if the room is not symmetrical, using the Roundffusors, the listeners ears will not perceive any difference, is just a matter of careful positioning. Generally, the loudspeakers must be located as seen along the bigger room dimension.

The Roundffusors must be mounted behind the loudspeakers or on the wall behind the listening place, at not less than 1,5 – 2 meters from them, because turbulence may appear from the very powerful diffusion field produced by the Roundffusors if the distances are not respected.

■ 3. Say that we want to use 9 grouped R1's. We choose the surface where the R1 will be mounted and this surface must be enough planes and free of protuberances. We measure this surface and exactly in the middle must be positioned the central Roundffusor1. The cross situated at the center hemisphere of this Roundffusor1, is the center of the 9 R1 and so the wall's center.

■ 4. For the central Roundffusor1 position's height and location, please look at NOTICE 1.

■ 5. Having positioned the first R1 upon the wall surface, you may begin mounting the first wood driver profile "T" upon the wall's surface, with the "T" long tail touching the wall. This driver must be mounted at the left or right of the named central diffuser. You will use the UPAT and screws for concrete or brick made wall and specific gypsum screws for a gypsum board surface.

This wood "T" support will sustain the first diffuser. Pushing the R1 against this first mounted wood "T"- say the left, we approach also in tighter pressure the second wood driver with the lateral part of R1. With your hand you push the R1's plastic body against this second wood driver in order to find the second wood driver's location.

■ 6. With a pencil make a trace along the wood driver's exterior tail side in order to see where to mount it exactly. For a moment remove the R1 and using the UPAT and screws mount the second wood driver. Is easier to do than to describe it. So, with the two parallel mounted wood drivers we will sustain our first diffuser. From above or below just like a drawer, draw the first R1 towards the two wood drivers and let it there.

If you measured correctly, the R1 will drag needing some power. If in difficulty soap up slightly the wood drivers lateral sides. This force stretching inwards the lateral R1's parts makes him structurally inert and so free of said second order generated harmonics. The air behind the R1 is doing the necessary.

■ 7. The second wood driver mounted serves as a common driver for the next to be mounted diffuser R1. You must repeat the same procedure as for the first diffuser. Use just two screws for each 58 cm long wood driver, or better three to be sure, at equal distances. If there are small imperfection in their alignment don't despair, the wood is soft and the lateral diffuser plastic drivers are elastically enough to permit their relative mounting.

■ 8. Now we have a horizontal raw of 3 mounted R1, with a total length of 174 cm (58x3). Upper and lower to this ready mounted raw of R1 you have to repeat all the above simple operations and a surface of 3x3 Roundffusors, as much as possible centered and in tight touching will be obtained. Don't forget to unify the 58 cm wood drivers between them using the small, F8 mm, wood dowels of dried beech also provided.

■ The wood dowels helps to keep aligned the wood "T". If you don't have them, use a tool to have each wood "T" strictly perpendicularly towards the floor. Of course the wood "T" are touching each other at the two edges. That's all have to done and one person will succeed it in about one hour or much quicker with some help.

Notices

■ 1.The geometrical center of the mounted 9 R1's or of any chosen formation (2x4, 2x5, 3x4, 3x5, etc.) it is also the center of the 3D diffused field. If you wish, you may locate this point at the ears heights, at least in a statistical way, optimizing for you the diffusion flow. The dedicated room for music may be "naked" empty (only the audio system and some chairs) but then, a carpet on the whole floor surface is absolutely necessary in order to avoid floor's possible floor / ceiling mirror like reflections. This carpet is strictly necessary only for truly naked rooms meaning rooms with hard walls and ceiling uncovered with some materials. There is no need for any other acoustical material on the lateral walls so your room decoration will be your personal taste and decorative pleasure. The Roundffusors may be mounted on the ceiling, grouped and symmetrically orientated towards the loudspeakers plane, nearer to them if the speakers are smaller or above the listening position for a more perceptive diffusion flow.

■ 2.The R1's behaves much better when the wood drivers are mounted perpendicular to the ground and along the loudspeakers middle axis. Then the axial modes are immediately smoothed, and it is known that those modes are the principal "enemies" in the build up and further listening processes. You will be amazed that the room is silenced and "the surrounded walls will disappear", a thrilling experience.

How to integrate the Roundffusor1 into a typical false ceiling

There is "air" inside and around the grouped Roundffusor1

R1 must be very steady mounted in order to deal successfully with low and very low frequencies



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