Manual
KSdigital
active Reference Monitor
with
FIRTEC(TM) control

ADM22

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Safety Instructions

1. Important, read all instructions – You should read all information concerning safety and operation before you use these speakers.

2.Please keep this manual – You may need it in the future.

3. Important, observe the warnings – All warnings on these speakers and in this manual should be observed by you in the interests of your own safety.

4. Please follow these instructions – All of the tips and instructions in this manual serve to optimize the operation of these speakers and enhance your listening experience.

5. Water and moisture–These speakers must not be used in wet environments, e.g. in bathrooms or next to a swimming pool, otherwise the danger of electric shock will exist.

6. Ventilation – This product must be installed in such a way,that the necessary ventilation is not impeded. For example, the equipment must not be operated on a bed, sofa, carpet or similar surface where the Black cooling fins can be covered. The equipment must not be placed in shelving or other locations that prevent acirculation of air at the rear of these speakers.

7. Heat- Please do not install these speakers near a radiator or other,similar source of heat.

8. These speakers are designed for use with an AC voltage of 115V / 60 Hz or AC230V- / 50 Hz, depending in which country you have purchased these speakers. Never attempt to operate these speakers with another power supply.

9.Power cable – Please lay your power cable in such a way that it is not a hazardfor tripping over or can be damaged. In particular, be careful where cable connections and sockets are located.

10. Ensure that neither foreign objects nor liquids come into contact with or penetrate these speakers.

11. Properly qualified service personnel may only service these speakers.

12. Repairs – Never attempt to open these speakers or otherwise try and service or repair this equipment yourself unless this is described in this manual. Please leave this to properly qualified service personnel.

13. In order to avoid electric shock, never use this equipment with a power extension cable wherethe electrical contacts arenot completely protected.
14. Ground – Please ensurethat the ground and other connections to the equipment are not impeded.

15. These speakers are designed to reproduce analog audio signals. If the equipment is not operated according to these instructions, the warranty will not be applicable and the user will be exposed to danger of electric shock.

Warning
To prevent electric shock, these speakers must not be exposed to rain or moisture.

Thank you for deciding to purchase a KS-digital monitor.

For more than 30 years, KS has been creating top-class sound transmitters with a single target: Natural and undistorted sound playback. KS products are used by the most famous opera houses, by top producers in sound studios and in different radio stations and mastering studios. The innovative ADM and C family monitors have gained a very good reputation with many producers in renowned studios and with popular artists. Designed according to prerequisites resulting from the idea of sound neutrality, the ADM and C series monitors are honest tools for assessing work.

ADM25 – The Concept:

KSdigital FIRTEC™ Filter Technology

The usual way of signal processing in a speaker deals with correction of the phase of frequency response. Lows and excess heights of the frequency transfer curve originating by the physical prerequisites of the speakers are electronically corrected using several filters. The phase of frequency response is smoothed out with analogous filters. However, this may considerably deteriorate impulse behaviour. Work with KSdigital FIRTEC™' technology is based on the insight that the human ear does not hear phase or magnitude, but only continuous information over time. Fluctuations of air pressure reaching both eardrums in a temporal sequence are all of the information we get about our acoustic ambience. This includes volume, direction and spatial information.

The usual description of the time signal by transformation in magnitude and phase response only visualises the sound event and makes a visual statement on the spectral composition, i.e. the ratio of the volume of the differently high sounds to each other. In analogous signal processing, we are now able to linearise the transfer characteristics of a sound converter by a filter and to influence them (this is also possible to a slight degree for phase response by frequency-selective all-pass filters). However, such corrections have a positive effect mainly in the amplitude frequency response, while impulse transfer is not necessarily improved and often even deteriorates. Therefore, this type of sound correction improves the frequency range transferred at the cost of impulse trueness. Temporal impulse distortion, however, means destruction of the correct temporal interrelations in the played-back time signal.

Spatial Hearing and Virtual Concert Hall

However, these temporal interrelations are exactly where the spatial information, the depth of the concert hall, the virtual stage, is conveyed. In short: They create depth levels. It is clear that pure intensity differences between the left and right stereo signal can only suggest depth levels. Essential information – time differences – is missing. Only correct information at the ear can convey the temporal relations in the recording. This explains why every serious speaker producer tries to use the best chassis – the ones already offering the best possible transmission characteristics with their design –, so that corrections can be reduced to a minimum. However, every multi-path system requires that the signal be split up into the different frequencies – bass, mid-range and heights. This filter has all the disadvantages named above. Additionally, filters are used to balance out frequency lows and excess heights. This is where our FIRTEC™ technology comes in. It consists of a combination of a FIR difference frequency switch and a system filter.

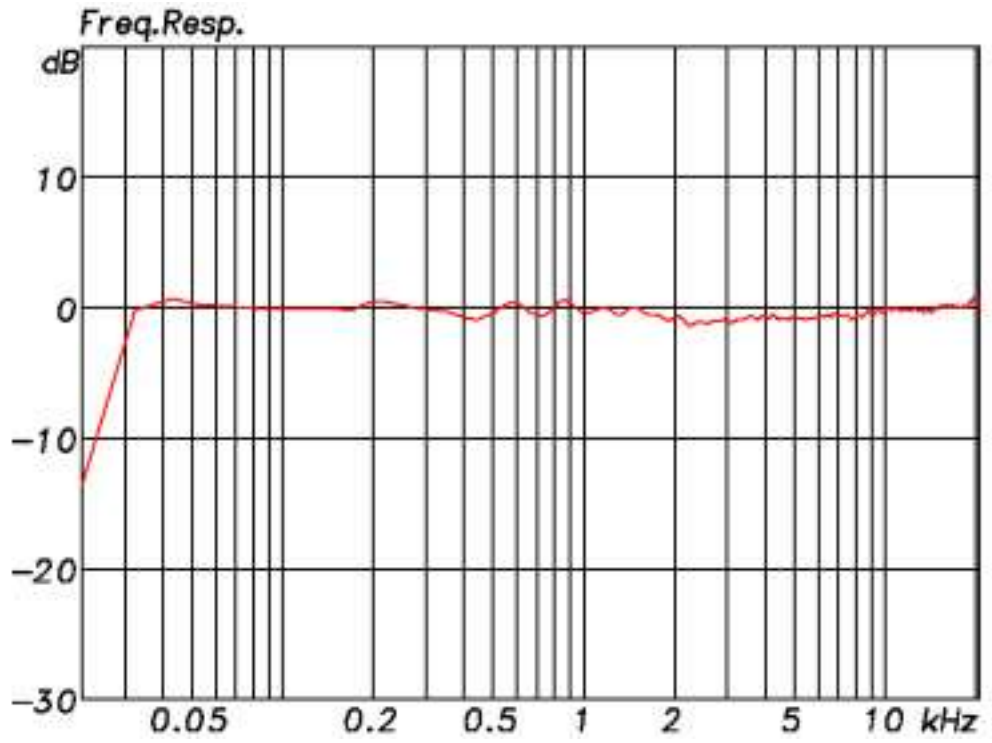
The FIR difference switch separates the paths with an edge steepness that can be set as required. The impulse answer of a system with this kind of frequency switch does not contain any phase-distorted percentage and is therefore extremely clean and without any overshoots. Similarly, the geometric offset of the sound generation position of the different speaker chassis is already balanced out in the housing. The FIR system filter then contains information on the geometric housing dimensions, physical parameters of the speaker components used and, if desired by the listener, even the recording position in space. Every sound converter with FIRTEC™ technology is individually measured so that all production tolerances of the drivers used can be included in the measurement. This system answer is then the basis for the FIR filter dataset. This shows the inverse acoustic behaviour as compared to a real speaker. If a signal is first sent through the FIR filter and then through the speaker itself, it will ideally leave the speaker box in the original state again.

This means that FIRTEC™ technology no longer uses magnitude and phase to optimise a speaker box's transmission characteristics. Rather, the monitor optimises playback of the precise impulse. The speaker box uses digital technology to remove distortions until the temporal course of the input signal is replicated as naturally as possible. If the speaker converts the applied music signal correctly into acoustic sound waves in its temporal course, the frequency response is automatically ideally linear in magnitude and phase.

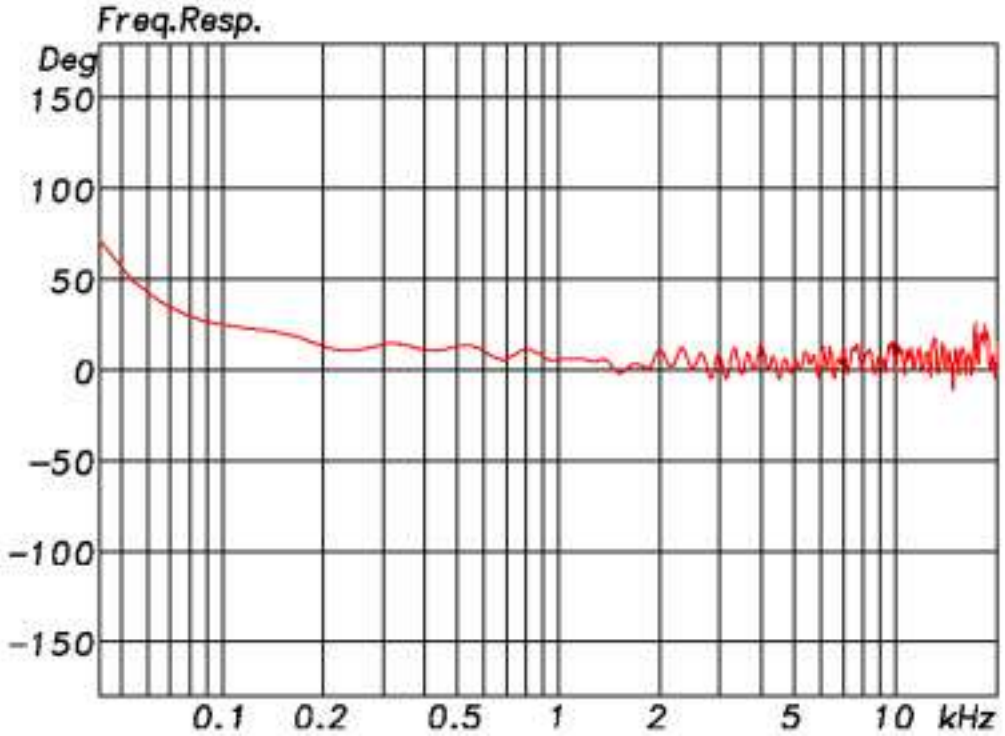
SOUND RADIATION and drivers

Just as important as a correct amplitude and phase in the frequency characteristic is an exact sound radiation, where the acoustic energy is radiated uniformly across the complete frequency range. The principle of directing the sound of the tweeter, guarantees a planar wave at the sound opening. The built-on wave-guide then bundles the radiated sound in exactly the same way as the midrange/bass speaker does in its transition band to the tweeter, guaranteeing a constant radiation behaviour at the crossover frequency. The driver of this tweeter, which is capable of high sound pressure, works with a membrane in ringform. Opposed to normal dome speakers, usually found in hifi and studio systems, this enables the tweeter a distortion free reproduction of impulse peaks even at very high volumes. The result of the correct digital equalization is neither corrupted nor nullified by the drivers components. In case of a complete overload of the input signal, utilization of a limiter in each path protects the components from destruction.
The carbon fiber membrane of the mid-range chassis also fits into this concept. Carbon fiber is an extremely stiff but very light material. It ensures a clean bass reproduction with high impulse fidelity without breaking up in the middle. Together with the neodyn magnet, a remarkably strong impulse and clear bass tones.

FREQUENCY CROSSOVER OF THE ADM22
The frequency crossover in the ADM22 works with a differential filter using FIR technology. The high frequencies are determined as the difference between the input signal and the bass signals ! This guarantees that there is always an ideal addition in the area between high and low frequencies. At the same time, the geometric misalignment of the moving coils of both drivers is exactly compensated utilizing a run time circuit. When combined with the newly designed sound direction principle, an optimal radiation characteristic is guaranteed. The frequency crossover ensures no interference when listening in front of the speaker.



Amplitue Response ADM25



Phasenresponse ADM25

Remote-Input optional Digital Input

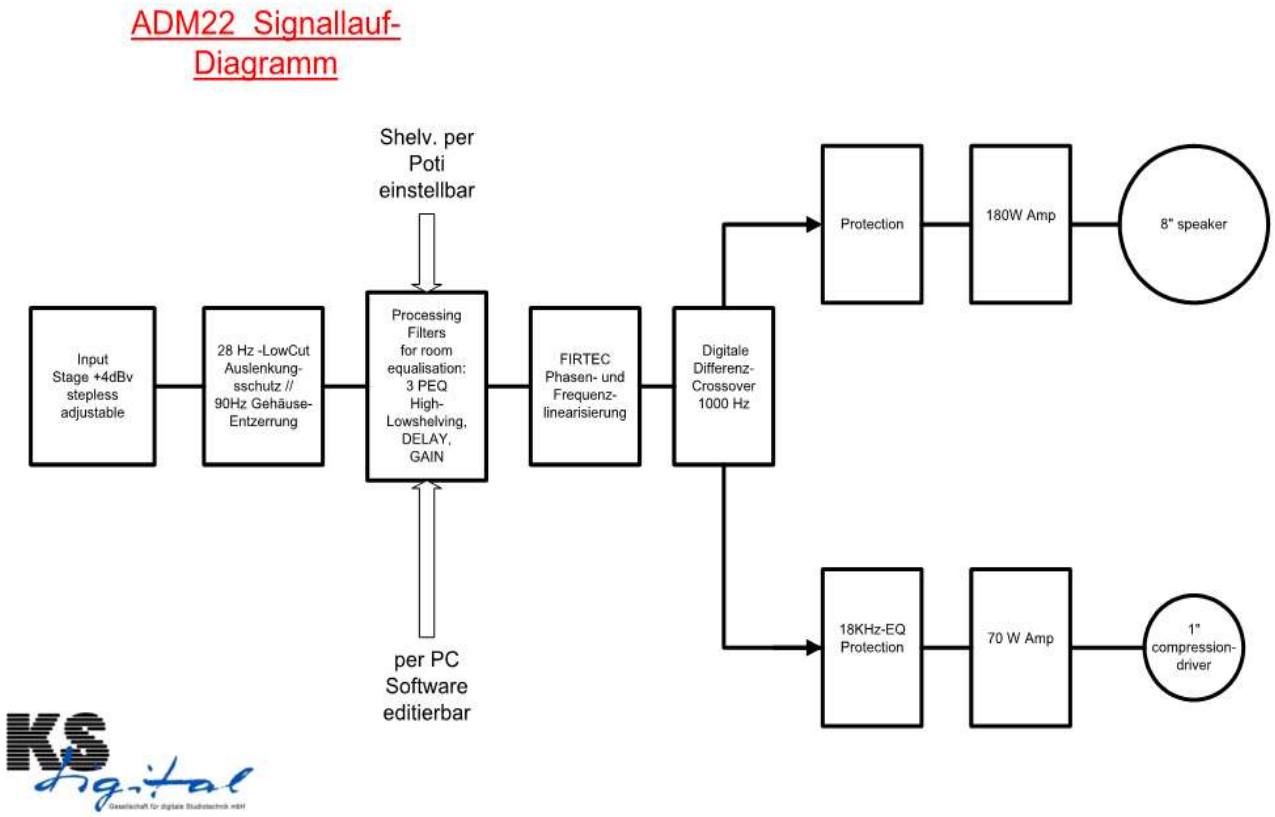
balanced analog Input

High: - Highshelving

Low: - Lowshelving

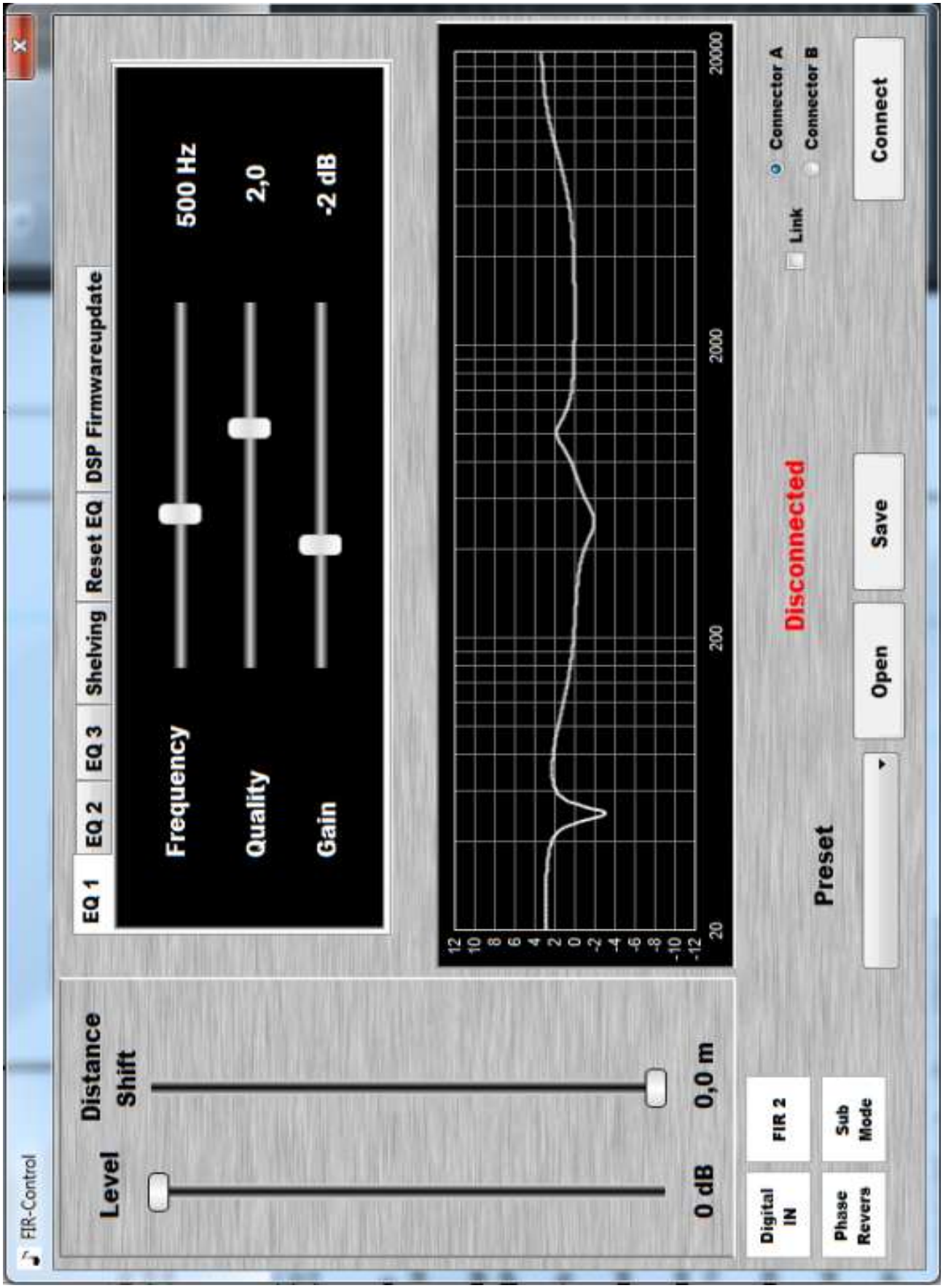
Volume:

Main power switch



technical data::

Input:	XLRsymmetric +4dBv, optional: digital AES3-Input: 32KHz-192KHz, 24Bit
Technology:	FIRTEC(TM) equalization, FIR crossover, limiter, volume, delay, phase revers, subwoofer, 3 parametric eqs, high-, lowshelving, all parameters remotable
Frequency Range:	32 – 24000 Hz (+/- 3dB)
Room adaption:	5 peakfilter and FIRTEC(TM) system-equalisation
Drivers:	1” highrange compression driver 8"” carboncone bass-midrange neodymdriver
Ampification:	70W / 2 x 180W poweramps
Crossover:	1000Hz (digital bessel)
SPL:	120dB (peak pair)
Remote:	Active Remote control (RC-100) or by software FIRControl



FIR-Control:
optionale software for remote control: volume, filter parameter, delay a.so. can be adjust by software control for easy room correction

The best speaker setup – guidelines for best setup

For perfect stereo presentation, speaker setups should observe the following:

1. Setup of an isosceles triangle by speaker and listener, the stereo triangle.

2. Symmetrical acoustic ratio for the first reflection

3. The ratio of sound energy at the ear formed by direct sound should be as large as possible.

4. Select the best rear wall and side wall distance

5. Observe mode formation in the bass range

The objective of setup optimisation for speakers should be a setup where the left and right stereo information meet at the listener's ears to result in a balanced, natural sound. This requires symmetry. Only for acoustically symmetrical setups can be listener expect precise alignment of the centre, distribution of the sound event in the panorama or even spatial depth. This "additional" information will lead to a more authentic musical experience, the creation of a stage before the listener's eyes without it appearing artificially wide or flat.

Ad 1.

This symmetry is best achieved by placing the speakers in the stereo triangle. The basis width, i.e. the distance from speaker to speaker, is identical with the distance between speaker and listener. That means:

Distance listener to left speaker = Distance listener to right speaker = Distance left speaker to right speaker.

Thus, the music signal from the right speaker takes the same time to reach the listener's ear as that from the left speaker. This is important for clear placement.

Our hearing is trained very strongly to perceive the first wave front, i.e. the sound that finds the ear on the direct path from the source. For this, every tiny offset of this wave front between the left and right place are perceived and acoustically placed. The sound event is placed where the first wave front is heard first. This is one reason why a precisely equal distance between the listener's position and the two speakers is all that important. If the spatial conditions make it impossible to keep the distance between the listener and the two speakers equal, some of our speakers offer a compensation option: The "Distance Shift". This sets the distance that should be added between the speaker and the listener to be at the same distance as the other stereo speaker. If the left speaker is 2.6 m away from the listener, but the right one only 2m, the right one can be returned into symmetry using a "Distance Shift" of 0.6m.

Ad 2.

Side reflections are essential for stable formation of the virtual stage before the eyes of the listener.

Ideally, no reflection from the side walls should be added to the direct sound. However, this is completely unrealistic, since most listening rooms have side walls. However, if the room is so large that the side walls and rear wall have a distance of more than 3 meters, this is referred to as a "free field setup". This simply means that the speakers are, acoustically speaking, set up in a free field. No side walls will interfere, and playback is not essentially characterised by the room's character.

While this is generally a desirable situation, such large rooms often have much too long an echo, which distorts the sound. Symmetry offers a way out of this dilemma again. If the reflection from the left side wall is the same as on the right, they no longer cause any displacement or tilting of the sound image into one direction.

Therefore, it is important that studio acoustics not only have an equally short echo duration, but also the same reflexion ratio between the listening monitor and the side wall on the left and right.

Ad 3.

Do not select the listening distance too large. Always adjust it to the speaker's size. A 70cm small speaker heard at a distance of 5m will cause the listener to hear the room, rather than the speaker.

Strictly speaking, the output behaviour of the speaker plays an important role in the determination of the best listening distance.

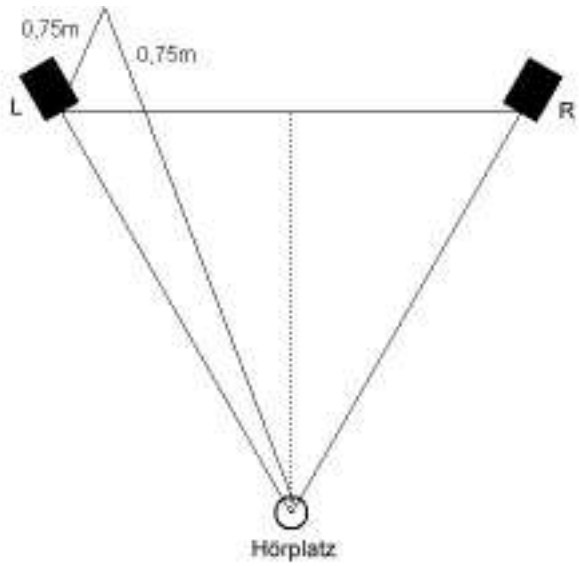
From the horn radiator or our cylindrical wave radiator, a lot more direct sound will reach the listener's ear than from the traditional round radiator. Therefore, the distance can also be increased a little.

Our speakers with D' Appolito setup or dedicated waveguide also radiate more directedly than a traditional round radiator. Therefore, it is important to talk about this aspect with a specialist as well before purchasing a speaker.

Ad 4.

If the rear and side walls (behind or at the side of the speaker) are not indefinitely far away (over 5m), their effect must be considered. The physical basis of these considerations is wavelength. If 2 waves of the same wavelength are added with the same phase, the result will be louder by 6 dB; if they meet with reversed phases (phase offset 180°), they will be cancelled out completely.

Here, close limitation surfaces are added to the equation. Side and rear walls form the perfect reflection surface for low sounds with wavelengths of 10m to 3m. If our bass chassis radiates sound spherically – all bass chassis radiate spherically, no matter if they are installed in the speaker at the rear, side or front –, the wave reaches the ear right from the chassis. At the same time, this wave is also radiated against the walls and reflected to the ear from there. These waves kind of take a detour via the wall to reach the ear "around the corner". This detour causes a phase displacement in the wave.



An example: A 3m long wave is

a.) radiated directly to the ear and

b.) reflected by the rear wall before reaching the ear. The distance between the speaker and the rear wall is 0.75m Now the two waves add up in the listener's ear: the direct and the "detour" wave with a detour of 1.5m. (Detour: Speaker to rear wall = 0.75m + rear wall to speaker = 0.75m, together 1.5m) 1.5m is exactly half the wavelength, cancelling the wave directly radiated as shown in the illustration: Of course this does not cause complete cancelling, since the wave reflected from the rear wall is already dampened and many other reflections weaken this cancelling effect. This tone is nevertheless lower in the listening place than adjacent ones. The effect grows even more extreme if not only the rear wall, but also the side wall is at a distance of 0.75m, and even more so if the same situation is true for both speakers. This leads to a very simple recommendation: The distances from the speakers to the rear and side wall should never bet he same, and the distance of the left speaker to the left side wall and the right speaker to the right side wall should also be different.

Low and high shelving

As we can see here, the energy reflected from the side walls plays a role after all. If the speakers are placed freely in the room, this is the "neutral position" where all filter controllers should be in the "neutral – 12 o'clock position". Setup close to a wall (distance wall-speaker less than 2m) increases bass energy. This can be reduced using the low shelving controller. A corner setup increases this effect, and low shelving can be used more strongly. Accordingly, our speakers' high tone energy radiated can be adjusted to the spatial situation as well.

Ad 5.

Finally, we would like to say something about mode formation in the listening space. Modes are standing waves appearing because the listening space forms too narrow a cage for the radiated wavelengths (low tones). Generally, there is nothing to be done about this. One can only attempt to place this mode formation so that the unpleasant results are not extreme in the listening position. We do not need to care whether or not there is a considerable bass overshoot at the rear wall of the room, i.e. if the bass sounds too loud there. After all, we are not listening from there. A good mode distribution in the room is achieved if the room modes are not generated at a single position. Therefore, we offer many speakers in which the bass membranes are installed at different heights. This generates modes in a more chaotic state and not as strongly. The advice in item 4 on the distance from rear and side walls also has a beneficial influence of mode distribution and intensity. One or several subwoofers may considerably decrease the problem of stationary modes at the listening position.