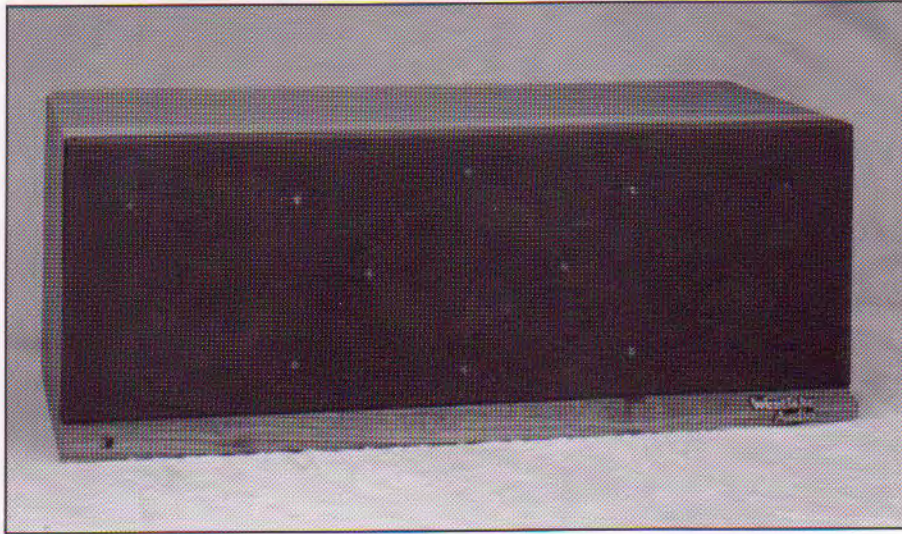


Operating the Lc 265.1 Speaker System



**Westlake
Audio**

Lc265.1
User Manual
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OPERATING THE Lc265.1 SPEAKER SYSTEM

Thank you for your purchase of the Westlake Audio Lc 265.1 loudspeaker system. If you are reading this, you have probably already opened the shipping carton and removed the speaker. Save the box and foam pieces if possible for use during transit of the speakers such as moving or returning to dealer or factory for service. If it is not practical to retain the shipping carton, you may order a replacement through your dealer or directly from Westlake Audio. Units should always be transported in proper cartons to prevent damage.

SETTING UP:

Position the speakers on a stable surface equidistant (+ or - 2mm for multichannel installations) to the listener location, preferably at ear level as referenced to the acoustic center line of the speaker. The acoustic center is the mechanical center of the mid/H.F. driver located between the two woofers. From a practical view, referencing the mechanical center of the front board is advised. If the speakers must be located at a position other than ear level, the speaker should be directed towards the prime listening location with each loudspeaker at the identical elevation, angle of inclination and azimuth (L & R) if at all possible.

For dedicated center channel operations on top of a T.V./video monitor it may be desirable to leave the speaker flat with its face perpendicular to the floor and flush with the video tube's face. However, some experimentation may be required to see if an amount of tilt is required to optimize audio definition. Although the logo is fixed for

horizontal viewing the speakers may be operated on their sides for L/C/R applications (shielded version) around a video monitor. The coaxial nature of the mid/h.f. unit will provide good off axis response from both horizontal and vertical positions.

In the L/C/R applications there are a few additional considerations when placing and aiming the units. If the room usage is to be optimized for multiple viewers it may be best to just face the 3 speakers directly forward (in a straight line) without forming a listening triangle that is focused on the center line of the video monitor/screen. On the other hand, if primary image focus at the center line is of major importance, then aiming the speakers towards this prime location should be considered, along with determining (with a tape measure) that both L & R units are equidistant ($\pm 2mm$ or $1/16''$) to the prime listening locations. This will assure an optimum sound image (particularly if the systems is also used for high quality music playback).

At this point a word about placement of the speakers as they relate to the video screen (or not), the room, and the listener (for music oriented uses, particularly if no video is integrated, refer to the section in the manual "The Listener/Speaker/Room Interface"). Here for a moment let's assume a video oriented application, where a front projection system (onto a perforated screen) is employed. The three (L/C/R) speakers should all be located behind the screen so as to promote the same sound character from all three speakers. Allow at least 6" between the front of the speaker and the rear of the screen to minimize L.F. interaction which can produce screen sway and out of focus visual images. All three speakers

should be at the same height, with speaker center at screen center, to slightly above, so as to promote sound sources at the most likely visual location(s). The L/R units, should be as far to the outside of the screen as practical while still remaining behind the screen. The acoustic center of the speaker can be closer to the screen edge if the L & R units are tipped on their sides in a vertical format. The center image will be slightly more slim or focused if the center Lc265.1 is tipped on its side or in a vertical format. However, used in its normal horizontal mode the center sound image will take on a slightly larger body. Both personal taste and practical mounting conditions should be considerations here.

Regardless of mounting orientation, consideration to aiming and distance to the listener(s) must be given. As previously mentioned in a L/C/R set up, if multiple listeners are of prime consideration then having all three speakers in a straight line may be all that is required. If, however, there is to be an optimized primary viewing location on the screen axis, the L & R speakers should be equal in distance, rotation and inclination to the primary viewing location which should be located on the screen center line. Ideally this should also be the center line of the viewing/listening room. A symmetrical room will be preferable to irregular shaped ones as relates to consistent L/R sound and imaging of phantom sources and/or music. Placing the center speaker at the same distance, elevation and inclination, as the left and right speakers, obviously requires establishing the distance to the primary listening location as well as the fact that this location is on the room center line. Herein lies one of the limiting factors of the three (L/C/R) channel frontal presentations. If identical sound sources emanate from the center and left or right speakers simultaneously the sound will take on a phasy quality if the listener moves forward or back from the primary

listening location (unless the listening room has a very live and diffuse acoustic character effectively masking this effect). This is caused by the fact that while the left and right speakers maintain identical sound propagation time to the listener's locations at any point along the acoustic center line, the center channel can only be correct for one location. We have grown accustomed to finding the "center" or acoustic summing point by pushing the L/R speakers about and moving our bodies in the very familiar "stereo" or 2 channel presentations. Whether we will so accustom ourselves to resolving the "sweet spot" for 3 channel sources remains to be seen. Some film mixers may well be aware of this effect and limit their position changes to fixed transitions as opposed to a panned follow of the screen action. Some music mixers have already noted that the center channel is problematic and may be best used for ambience or special effects, not unlike the surround channel usage. At any rate, points to ponder when choosing speaker locations and software formats.

Considering rear projection of conventional CRT video presentations where speakers must be at the sides and on top or below the picture, note the following:

The Lc265.1 should be the magnetically shielded (has tri-colored badge on front) version or picture distortion will likely occur unless kept 6 to 12" from the T.V./monitor. When setting on top of the video monitor/T.V. place a felt or rubber pad under the speaker to minimize the conduction of structure borne vibration into the video cabinet. Please note that although the shielded version does reduce the stray magnet flux from the driver magnets considerably, it is still in existence (particularly towards the front of the cabinet), albeit at a low level. Some video displays with particularly sensitive receiving mechanisms could conceivably be adversely affected by the speaker's presence. This effect is continuous

and usually shows up as color distortion (or colors in B & W pictures) in the affected areas, in close proximity of the speaker. Less likely, and less obvious is a possible interference on a dynamic (effect changing with sound(s) and level) basis caused by electromagnetic transmission from the air core coils in the speaker's crossover network. This type of interference can produce color and/or geometric distortion of the picture in time to music or voice. It is also possible that video horizontal and vertical sweep signals may couple into the speaker at a high enough level to be audible. The remedy for this condition, if it exists, is a spacer between the video monitor and the speakers. Usually only a few inches will produce adequate performance improvement. Placing the L/R speakers on end (logo vertical) will allow the sound source to be as close to the visual (on screen) cues as possible, with the same magnet interference restrictions as the center channel. Moving the speaker(s) slightly away from the video monitor may mitigate residual magnetic interference factors and produce an emphasized sound field. However, the diffraction from the speaker cabinet edge and/or video cabinet edge may reduce the intelligibility of the dialogue. Use of optional "Super Duper Speaker Muffs" may produce a significant improvement, depending on room acoustics and equipment/listener/room setup. As the center channel speaker in this setup cannot be located at the picture center, the use of dual Lc265.1's located above and below the picture may in some applications improve the presentation, creating a phantom image at picture center.

If the system is used for conventional two-channel stereo reproduction the L/R speaker separation in relation to the distance to the listener should be considered. An equilateral triangle (center line of left to center line of right speaker equals the distance from either to listener) is about as close as the listener

should be. Closer will produce an exaggerated sound field where small amounts of head movement produces large shifts in sound stage. A distance of twice the L/R spacing is about as far as the listener should be from the speakers, as further away will produce a monophonic or homogenized sound field for all but hard left or right pan positions. At the chosen position, tow in or out (angling of the front board location) should be minimal (that is to say the speakers should aim directly towards the primary listening position) taking into account the aforementioned considerations in multichannel use applications or the guidelines discussed in "The Listener/Speaker/Room Interface" portion of this manual for general stereo reproduction.

The imaging of the system will be best with the grill frames off and nearby objects as far away as possible. Keep in mind that the symmetry of the environment around the speakers can affect the L/R balance. Positioning the speakers where one side wall is glass while the other is open or damped, will be difficult (at best) to balance left to right. The closer you are to the speakers (within reason) the better the imaging will be. The optional "Super Duper Speaker Muffs" can add an extra amount of detail to enhance the imaging on well recorded source material. The muffs should be placed flush with the front board, bevel side forward towards the listener if there are no nearby objects. If the speakers are moved near other objects (T.V., on shelf, etc) you may get better results with the grills on and the muffs mounted flat side towards the listening position, flush with the front board (or grill face if used). Some experimentation is recommended. Always transport the speakers with the grill on. Consider putting them back on after listening if there are small children or pets present, being careful not to move the speaker itself after alignment.

THE ENVIRONMENT:

Obviously choosing the proper setting can have a large influence on the perceived performance of the loudspeakers. Choose a quiet, acoustically well dampened location if possible. The noisier the scene is, the harder the speakers have to work to overcome the ambient noise level. Sometimes a little planning can help. Turning off unused equipment (either at home or in the studio) can save money and lower the background noise, particularly if the noise source is near the listening position. An obvious consideration during setup is positioning the listener away from noise sources such as open doors/windows, air conditioners, or noisy audio/video gear. Simply choosing your listening time, i.e., late at night when it's cooler and the air conditioning doesn't run as much or the traffic is lighter, can be a big bonus.

LISTENING ROOM CHARACTERISTICS:

Many different philosophies about listening environments exist, each having its followers, each its benefits and limitations. The live environment is the one most often found at home. It is after all a live almost echoey sound that greets us when we are looking for a new home or apartment or commercial space for a studio. Although we like the sound of ourselves singing in the shower, a little room character goes a long way. At Westlake Audio we feel that a more damped environment will wear better in the long run, aid in keeping ambient noise down and generally allow the listener to savor the intimate recording details more easily. However, having said this, we know that many avid audiophiles and studio engineers alike, will take issue with this position as reflected in their experiences with what they consider to be over-damped rooms. Our experience with this scenario has taught us that upon evaluation,

most of the "bad" over-damped rooms are in fact only damped at mid and high frequencies. This tilts the power response of the room towards the bass end of the spectrum thus calling attention to the under-damped low frequency room modes (standing waves) which always exist and almost always are problematic in the average listening room.

WHAT TO DO AND NOT TO DO TO YOUR ROOM:

Don't cover the majority of your room surfaces with thin, 1" or less, acoustic foam or fiberglass products. This will only succeed in rolling off your mid and high frequencies while having minimal effect on the problematic low frequencies. Use thick materials, 4" (100 mm) or more if possible. Although not fire rated, dacron or polyester (open cell) are available in low fiber form, however, they will not be as effective as fiberglass (R11 or R19) or mineral wool (U.S.G./S.A.F.B.) products which do meet class 1 fire requirements. These materials may require grill frames or draped grill cloth, depending on your aesthetic tastes and/or need to isolate yourself, children, friends, or pets from it. Class 1 products such as Illbruck's Willtec (melamine) material are light weight and self-finishing thus can be hung from wires attached to the ceiling. Unit cost, however, is high and again don't be tempted to simply use the 1" material directly mounted on a large percentage of wall surfaces.

Acoustic reflections are particularly destructive to transient response and therefore the dampening materials can be especially effective if placed in the path of the reflection. I.e., on floor, ceiling or wall areas that enable the reflection from the speaker to reach the listening area. A console top reflection can be problematic as well. However, putting absorption material on top of the recording

board (at least permanently) is not very practical. In this case changing the relationship of the listener's ears to the speakers and console top by changing chair height or speaker position (i.e. move from meter bridge to stands or boost the speaker up on foam spacers, etc.) is the recommended work up. In all cases, enlisting the aid of a piece of mirror placed on the suspected surface(s) while observing the speaker(s) from the listening position will identify the areas in need of treatment.

MORE TIPS:

Although Westlake Audio, ASC, RPG, Illbruck and other companies make prefabricated devices for installation in studios or home listening environments you should be aware that one or two pieces of any product are unlikely to completely address the wide range of acoustic anomalies that exist in a typical listening environment. To effectively attenuate low frequency room modes usually requires a large amount of diffusion and/or absorption. Large pieces of furniture, particularly if the covering is porous (i.e. cloth rather than plastic or leather) can be very effective absorption devices, as can heavy velour drapery.

A consideration in a live room is the basic room dimensions. One with equal (1:1:1) or even multiple (1:2:3, 1:1.25:1.5, etc) dimensions for the length, width, and ceiling height will tend to bunch or accentuate the modes at predetermined frequencies. Therefore a room with dimensions that are not even multiples (1:1.15:1.42, etc) will space the modes more evenly. However, this technique alone is no substitute for adequate amounts of diffusion and absorption. In most rooms, with enough absorption and/or large and irregularly shaped objects, the decay (Rt60) time or room character can be essentially smoothed or neutralized.

Some would advocate the use of nonparallel surfaces. However, it should be pointed out that this technique is not unlike the dimension ration technique. That is, it moves modes around in the frequency domain but does not decrease their number. It is, however, a much more complex job to predict their location. As an element of diffusion and/or reflection control, nonparallel surfaces along with adequate absorption can be part of a total acoustical solution in some applications. Be aware that as a room is dampened, some discrete echoes can develop if absorption and/or diffusion is not applied in all room axes, i.e. floor/ceiling, side wall/side wall, front/back, diagonals, etc.

Westlake Audio offers, for a fee, total acoustic design and consultation for clients requiring a high degree of acoustical performance.

THE LISTENER/SPEAKER/ ROOM INTERFACE:

We have already commented on several aspects related to this LSR relationship but here are some more basics. Always place the speaker system on a secure surface with front board flush with adjoining vertical surfaces. Place a thin rubber or felt mat under the speaker to reduce structure borne transmission. For more bass move the speaker or listener or both closer to large objects or the room boundaries (wall, floor, ceiling, etc.). For less bass move the speakers and/or listener towards the center of the room. One particularly effective setup is to place the listener near the wall at the back of the room and position the speakers 1/3 of the way into the room. This places the listener at the rear wall and thus puts the direct wave and the rear wall reflection essentially in phase at low frequencies. The listener is sitting in a high pressure (low

frequency) area while the speakers are located in an area of neutral or average pressure. This allows the speakers to be tuned to some degree; moving them closer to the front wall will tilt them towards a more bassy sound, moving them towards room center will reduce the bass but increase the direct field over the room character. Moving the speakers towards or away from the side walls will have a similar effect depending on how close they are in relationship to the room size. This is sometimes referred to as the near or close field monitoring situation which is a typical setup used in professional recording studios. This type of setup has the advantage of presenting the direct sound to the listener as quickly as possible thus allowing the listener to get an accurate assessment of the sound field before the room field has a chance to build up, possibly masking details. It also allows the loudest peak levels to be presented to the listener while keeping the average room SPL down. This eases the work the speakers have to do and reduces the neighbor interference factor.

It may also be beneficial to try locating the listener and speakers on the long wall of rectangular rooms. This will put the side wall reflections further away (in time) from the direct signal and obviously promotes a closer field experience. In very small rooms, however, this may preclude the afore mentioned tuning position adjustments due to traffic flow limitations. Besides the afore mentioned bass buildup when the speakers are in close proximity of a wall, there will be a frequency response anomaly (peak and dip) in the lower mid/upper bass area due to reflections directed back to the listener from the wall behind the speaker. When moving the speakers away from the wall is not an option, then placing as much thick absorption material (i.e. R19 flat on the wall or better, stack width wise floor to ceiling, 12,18, & 24" widths, unbacked is best, are readily available) on or in front of the wall

can be effective in minimizing the response error. Alternatively, flushing the speakers into the wall (while maintaining isolation with rubber or felt) or simply placing them on a bookshelf with book backs flush around them may help minimize response irregularities.

Most of the above information is directed at the very attentive and focused listener who will sit at the proper speaker summing location and gain benefit from all this room tweaking. If you are a more casual listener who is likely to move around the room (or even listen from another room) then room dimensions and speaker placement may be all that you need to think about. Of course the most important consideration of all is how you feel about your listening experience. Try by experimentation to take this information and enhance your listening environment.

ASSOCIATED EQUIPMENT SELECTION AND INTERFACING CONSIDERATIONS:

The most important consideration for a speaker system is the amplifier system that drives it. Although the moderate load that the Lc265.1 presents to the amplifier output terminals makes it a possible candidate for high quality receiver type systems, it will likely be best served by a separate stereo or mono power amplifier. Many high quality brands are to be found on the market. The amplifier should have flat frequency response and low distortion, or noise, within the audio bandwidth (20Hz-20KHz) and be capable of driving the Lc265.1 impedance without producing audible distortion. While ultra wide bandwidth/high slew rate amplifiers can have very good sound, this specification alone is not conclusive enough to base selection on. Choose an amplifier that

is the best sounding within your budget that has adequate power reserves to play the Lc265.1 at reasonable levels. Included in the possibilities are both solid state and tube type amplifiers. Generally, but not always, a solid state amplifier will sound tighter, possibly dryer while a tube amplifier will be warmer, fuller or slightly less damped.

Amplifiers can have balanced or unbalanced audio input circuits. In theory the balanced circuits should give more immunity from noise and therefore sound better. In poorly designed units, the additional circuitry in a balanced input may just make sound worse. In well designed units the sound should be the same and only the noise immunity should differ.

The amplifier should have suitable cosmetic appeal for your tastes and inherent mechanical integrity including appropriate input/output terminations for the cabling systems you are considering. The chosen unit should have a good power supply and not emit extraneous noises such as hum, buzz or fan noises that might interfere with low level sound details in the listening environment. If you are on a limited budget and are setting up a stereo music C.D. playback only system you may want to consider an amplifier with front panel input level controls. This would allow you to forego the traditional preamplifier allowing for a budget reduction or alternatively focusing your buying power in a better power amplifier itself. Some C.D. players have internal remote level control which might (depending on range of control in the C.D. unit and amplifier sensitivity) allow you to select an amplifier without input controls. You should, however, be aware that level control within the C.D. player may deteriorate the sound advantage that eliminating the preamp has produced. It depends on the particular method that is employed in the unit to attenuate the signal. A passive level control may be employed if C.D. output level and impedance is appropriate and the cable lengths can be kept

short. Inexpensive passive level control units may not have a high quality control potentiometer and thus may produce noise or channel imbalance at some settings. Try to listen to the exact piece of hardware you will be buying, before you purchase if possible.

The second most important consideration for a speaker system is the speaker/amplifier interface cable itself. Far too much is made of this by most audiophiles and the audiophile press contributes greatly to this puffery for many reasons, the least of which is not the need to feed the voracious appetite of the many monthly press runs. Nevertheless, the speaker cable can affect the sound, more often from just poor connection causes or inappropriate applications than for the pseudo-science reasons dreamed up by the marketing departments of some of the cable manufacturers. Having said that, we would be remiss if we did not point out to you that Westlake Audio manufactures its WI and BWI series of speaker cable assemblies which we feel will provide you with all the electron carrying capacity that your amplifier can throw at a Lc series speaker system. Available in various wire sizes and lengths, contact your dealer or Westlake Audio for price and availability. Where budget considerations affect cable choices, consider that biwiring (or passive biamping for that matter) can often produce a more significant sound improvement than spending money on more esoteric cable assemblies.

Whatever cable you choose, keep the following points (which will affect the speaker performance) in mind as you contemplate your installation. The speaker and the amplifier form a cohesive energy transfer system. The less interference the cable gives during this transfer the better. Keep it simple, short and direct. In general the lower the cable resistance, the better (and louder) the sound will be. Normally a number 10 or 12 gauge (AWG) conductor

size is adequate for short runs of two to eight feet (.6 to 2.4 meters). #7 gauge for runs up to 12 feet (3.3 meters) and #4 gauge for runs over 12 feet. Runs over 20 feet should be avoided if possible. You may use larger gauges for smaller runs although the sonic benefits will be minimal unless the amplifier has a very low output impedance, the connections are extremely good, the source equipment and software are exemplary and the listening environment is unusually quiet. Westlake cables offer an ultra high strand count for any given gauge and an engraved silicone insulation. The two conductor pairs are twisted which means all features combined our cable assemblies are the most flexible in the industry for their current carrying capacity.

Although shorter is better, do not place the speaker closer than 24" (.6 meters) to the power amplifier. The Lc series crossover employs air core inductors which can receive and transmit magnetic signals which may cause distortion if placed too close to associated electronics. On the same line of thinking, do not split the two conductors of a speaker cable apart as this will form a magnetic loop which can also transmit and receive signals which may cause distortion. Do not run the speaker cable within a confined space such as a conduit with other cables including the other channels in a multichannel system. Keep the speaker cable away from signal input cables or power cords. Try to use the same length of cable to each speaker.

Be sure to make a good connection at both ends of the cable. Clean the terminations prior to installing, with alcohol or suitable connection cleaner. Particular attention should be paid to banana type connectors as repeated insertion will cause metal particles to be shredded and imbedded in the female portion of the mating parts. Inserting an alcohol wetted, wooden shank, cotton swab into the female portion while slowly rotating it with your fingers

should produce a sanitary connection. Quite a bit of pressure, while rotating the cotton swab, may be required for successful insertion of the swab depending on the exact size of the shank and head. An appropriate product is shipped with all Westlake cable assemblies or may be ordered from us. Consumer type products (Q-tip, etc.) may or may not be appropriate in this application as the head must be inserted all the way into the connector and rotated several times to be effective. Upon removal of the swab, a grayish look will be testament to a potentially dirty sound. Remember, repeated additional insertions of the banana connector will mandate recleaning. Clean the male portion of the banana plug with the cotton swab around the entire perimeter. Spade lugs and terminal strip terminations are slightly less problematic, but nonetheless should be carefully cleaned before installation, particularly if the components being interfaced have seen prior service. Cleaning the spade lugs themselves is straight forward but placing them on an appropriate work surface where a fair amount of pressure can be applied is helpful. The barrier strip or binding post can be cleaned by employing the cotton end of a moistened swab (if the threads will allow enough expansion to fit) or the bare wooden shank end (moistened) in some instances depending on mounting geometry. Where access to the connection is limited, the cardboard backing of an office memo pad may be employed as an aid. Simply trace the outline of the mating spade lug and cut out a dummy with scissors or razor blade. Lightly moisten with alcohol and then insert into the barrier strip. Apply a slight amount of pressure by partially tightening the screw. Repeatedly tighten and loosen the screw while rotating the cardboard dummy lug to cause the contacting surfaces to be cleaned.

Good connections are paramount to good sound! Double check each screw, nut or banana upon completion of the installation to

make sure each connection is tight! Also check to see that all wiring polarity (+ to +, etc.) has been maintained, especially in multichannel systems.

THE SYSTEM, DEBUG IT BEFORE LISTENING:

Many a good speaker has been unjustly tried and convicted of audio heresy not because of what it does but because of what's going on up stream. So take a little time to determine if the system is interfaced properly and producing the best sonic results. The first rule of good sound is that with things setup and ready to go (normal volume setting) and no source playing, there should be no noise emanating from the speakers that is audible at the listening position. Moving closer to the speaker, nothing should be audible until the ear is within 18" (1/2 meter) and then only slightly if the amplifying electronics are not of the best quality. From the tweeter will come the mid and high frequency noise and from the woofer a light humming. With the best quality electronics the hum and hissing should be all but inaudible unless the ear is placed directly in front of the drivers in a very quiet environment!

If hum, hiss, ticks, pops, buzzing or radio interference signals can be heard, then the system is not ready for prime time listening and some serious trouble shooting needs to take place either by the system user or a qualified technician.

Noise by another name is distortion! You cannot have distortion free reproduction while the afore mentioned sonic gremlins are present. Additionally these items should be observed over some time period as audio interference can be continuous, random or periodic. If a previously good sounding system develops a case of the blase's, "New" noise could be the culprit.

TROUBLE SHOOTING TIPS:

While complete trouble shooting is beyond the scope of this manual the following bit of information may help you look for possible solutions. Noises can be local to the system itself or externally generated. Examples of external noises are hum and buzzes that are not always present, police transmissions, light dimmer buzz and heating/air conditioning noises. Examples of internal noises are hum or noise that is always present or when specific program sources are selected or during specific cycling of equipment in the system (i.e. loading C.D., turning on turntable, etc.)

Noises can be generated from: defective equipment (bad power supply, etc.); improperly installed equipment (wrong voltage selected, incorrect wiring); equipment or physical interference (power amp up too close to turntable pickup, audio equipment located too close to air conditioner or other noise source); too many or not enough ground connections and wire routing. A good method of isolating the problem is to start with the amplifier connected only to the speaker and work upstream as you add each piece of equipment. If it causes a noise or hum there is either a problem in that piece of gear, in the way it is connected (including wire routing, ground looping or defective cables) or its physical location (including the speaker itself) in the system.

Don't discount the possibility that your local A.C. power is too high or low for your equipment, even if it is within the power company specs. Line filter/regulators, although expensive for good ones, may help in some situations. Often once wiring and interface bugs are worked out, the system will operate satisfactorily without outboard line conditioners.

FOR THE LONG TERM, SAFETY AND MAINTENANCE:

In general your Lc system should provide many years of trouble free use. Only the highest quality components are used in all Westlake Audio Speaker Systems. No periodic maintenance is recommended other than cleaning of dust and fingerprints. If stronger cleaning becomes necessary, do not use aggressive cleaning agents. Seek out those products recommended for fine furniture. Pretest a small non-obvious portion of the speaker first. Do not apply cleaning solutions to the tweeter dome under any conditions. Do not leave the system exposed to the elements, including direct sunlight.

In the event that replacement drivers are required, seek out authentic Westlake Audio replacement parts. While other parts may look similar, they are unlikely to possess the exact characteristics necessary to reinstate the original Westlake sound. When replacing the drivers you, or your technician, should note the color coding of the wire (color to + or red terminal) and maintain correct wiring polarity within the speaker itself. Also, it should be noted that the Lc system uses a shock absorbing foam gasket that should only be compressed enough to seal the driver/cabinet interface (usually 10-15% compression). Additionally the mounting screws employ a shock isolation rubber grommet under the head. The grommet will prevent overtightening of the mounting screw as it will distort or be forced out from the head if the screw is overtightened. Be aware that the gasket is self adhering and can hold a driver in place (especially if it has been installed for a long time) even after the screw have been removed. **Caution!** Within a few minutes the driver will usually fall out, potentially damaging the finish or nearby

objects. Putting slight and constant (up to 1 minute) pressure on the driver with fingers or hook at the mounting hole (don't wedge screwdriver under drivers or cosmetic damage may result) will expedite its removal.

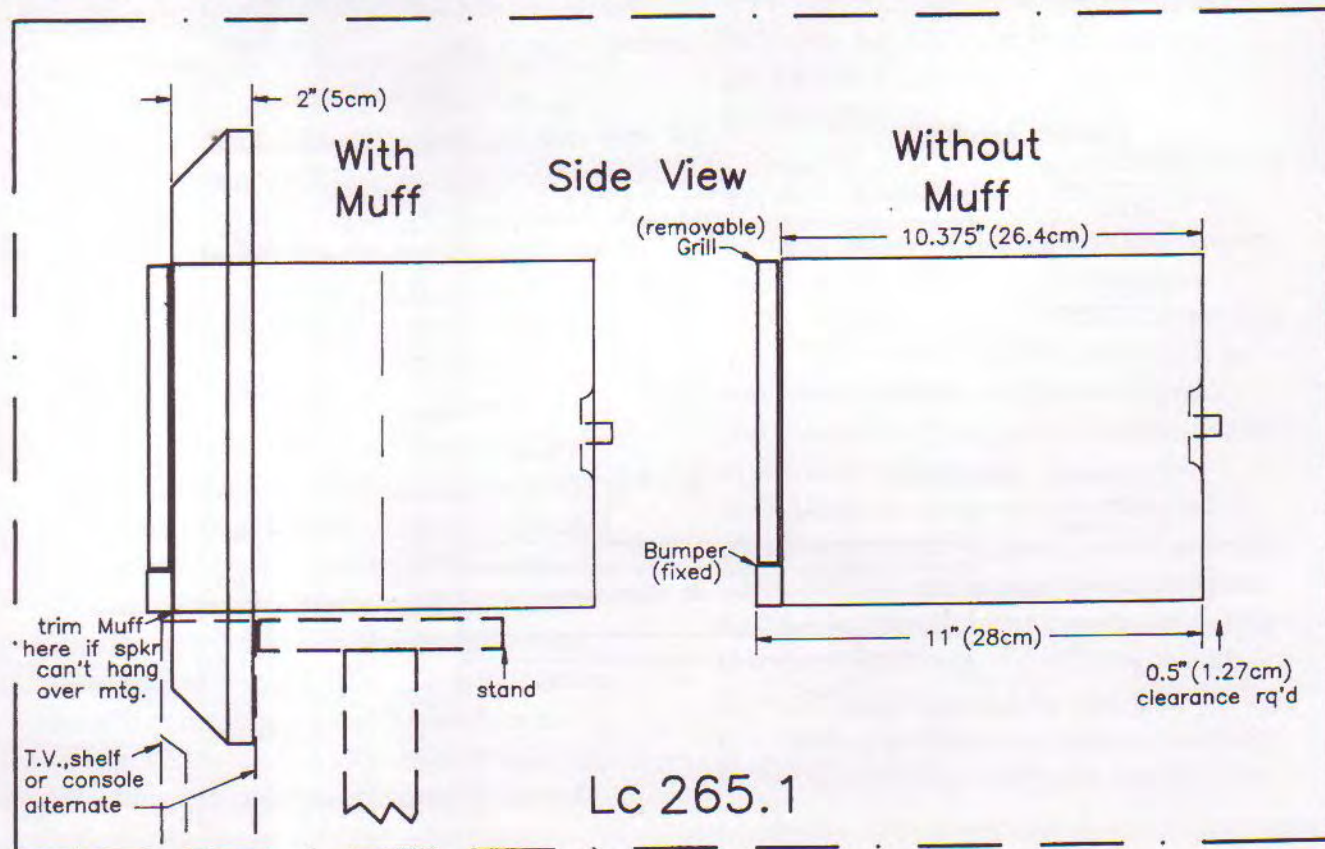
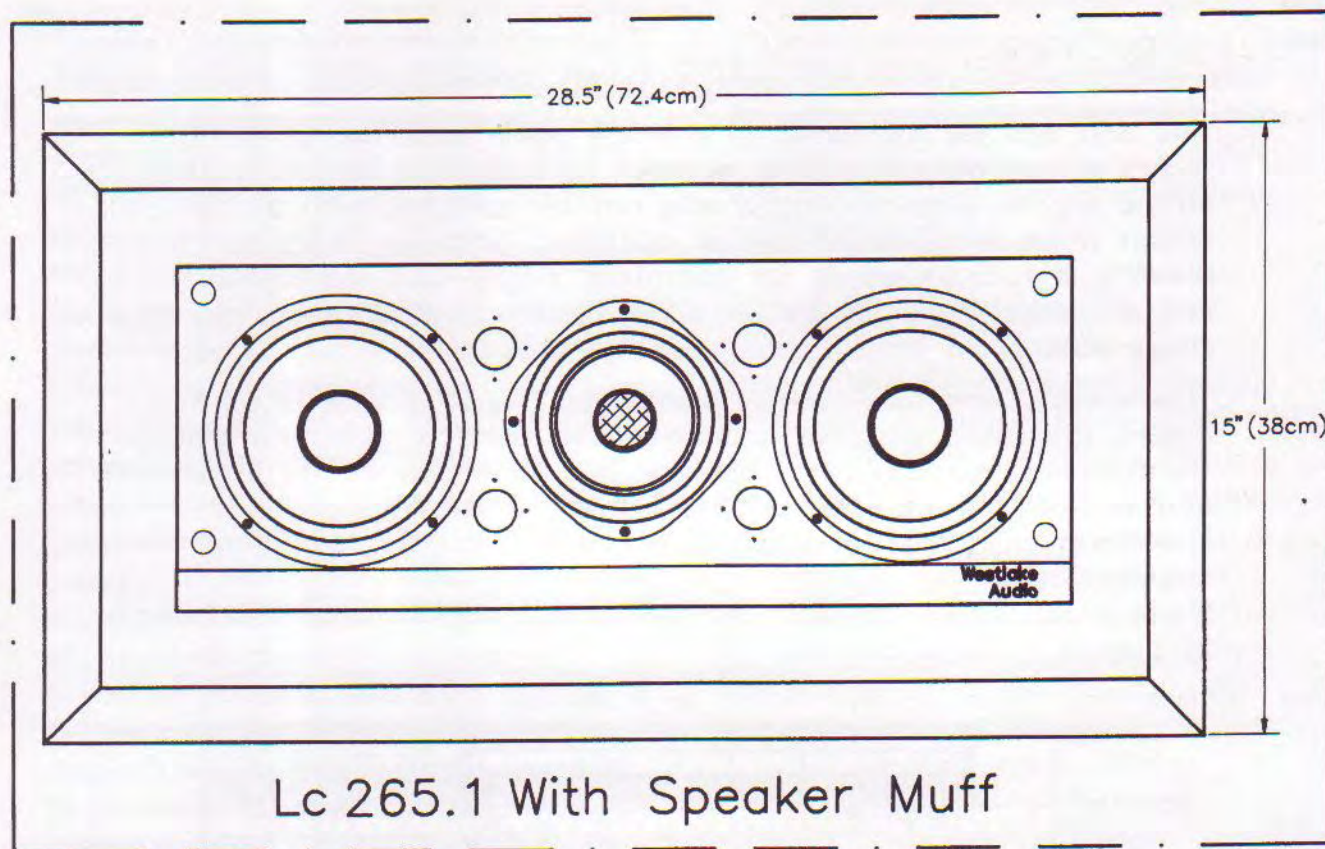
Be careful not to accidentally damage or blow out your speakers. Because it may be beneficial from a sound standpoint, to power your speaker with a power amplifier more powerful than the Lc265.1 can handle on a long term basis, please note the following: Always turn the power amplifier off or disconnect it from the speakers when changing equipment or cables.

Always turn the volume control down on your preamp when selecting different source devices as each may have different levels and some preamps may pop or click loudly when switched. When selecting a new piece of software, reduce and/or readjust the level until it is appropriate. Be careful not to set the level too high at the intro as many performances build up to a crescendo or have unexpected loud transient passages which may or may not be identified in the accompanying literature.

Be careful not to overpower the speakers or your ears. The Lc system is capable of generating sound pressure levels that can produce temporary, or under prolonged use, permanent hearing loss (Particularly in the "close field" listening setup). If after a listening session your ears ring or hurt, you have exposed yourself to too high a sound pressure level and should rest your ears by reducing the level, if not postponing any further use. If at anytime the sound coming out of the Lc systems does not sound good or has changed from its previous character, discontinue operating it until service can be performed on the Lc system or the associated electronics.

Lc265.1 OPTIONS:

- 1) T.V. version: Magnetically shielded woofers and mid/tweeter assembly allows use of the Lc265.1 near video monitors. (The unshielded units may have to be placed 10" or 25 cm away from sensitive video monitors.) Most of the Lc265.1 units produce are shielded units and are identified by the tri-colored badge on the front.
- 2) Super Duper Speaker Muffs: These foam muffs, as described previously, can enhance the stereo image and apparent bass response. Highly recommended for the ultimate listening experience with the Lc system.
- 3) Westlake Audio Speaker Cables:
The ultimate in conductivity and flexibility. Various sizes and lengths of WI (for passive biamp or single wire applications) and BWI (for biwired installations) assemblies are produced. Contact your Westlake Audio dealer for price and availability.



SINGLEWIRE, BIWIRE AND PASSIVE(no active crossover)BIAMP APPLICATIONS

This unit can be interfaced to a single power amplifier using one (fig.1) or two pairs (fig.2) of number 10 gauge (or larger) multi-strand copper wire. Biwiring should not be confused with biamplification which requires the use of additional amplifier channels. Biwiring is recommended for optimized single-amp performance and will usually provide better sonic results than a more esoteric single wire cable assy.

This speaker can be passively biamplified (fig.3) if care is taken to assure that both amplifier channels have identical gain to maintain the high and low frequency balance. Due to the moderate impedance of the crossover network, passive biamplification in many installations will produce better results than a mono bridged installation with the same amplifier. Most often, passive biamplification will produce improved sonic performance over single or biwired installations.

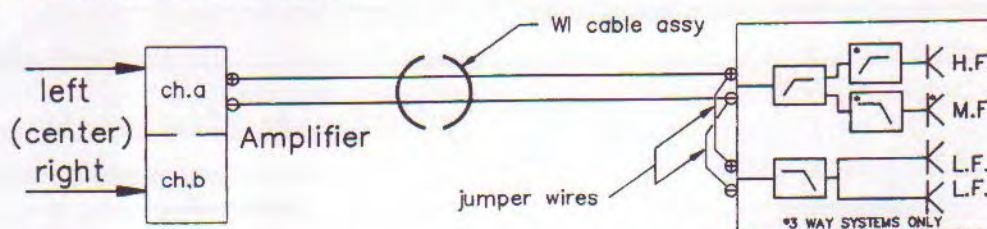


Fig.1 Regular, single pair (WI) wiring interface

Speaker

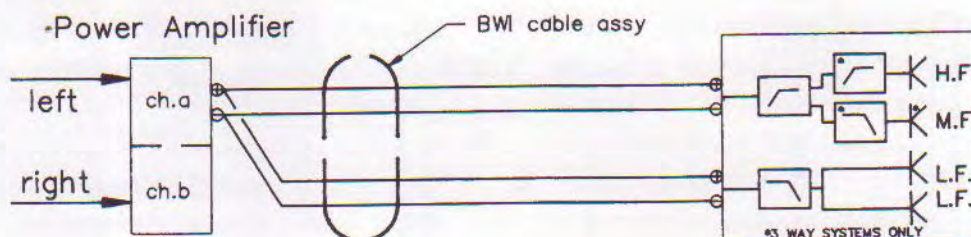


Fig.2 Biwire interface (BWI)

Speaker

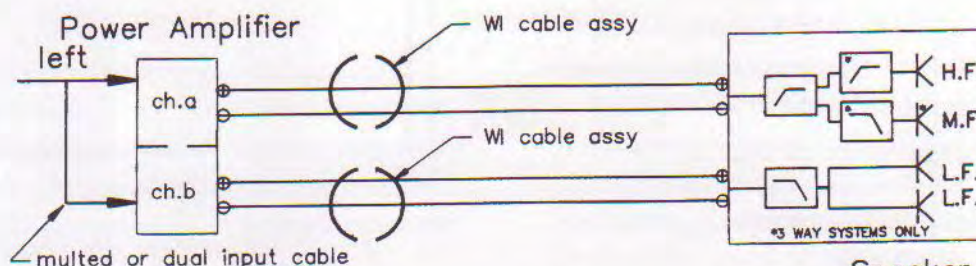


Fig.3 Passive biamplification

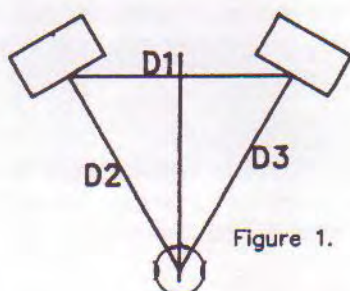
Speaker

OPTIMIZING THE LISTENING TRIANGLE AND TRAVEL PATH TIMING ALIGNMENT

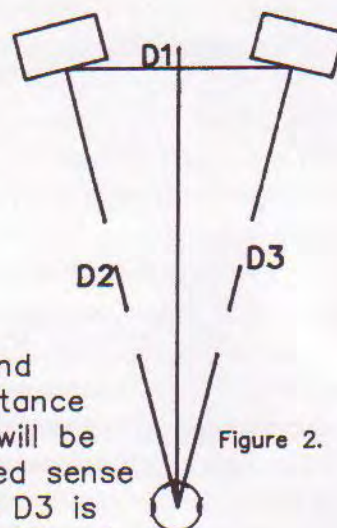
(for two speaker reproduction)

Just as you would not record your master stereo tape without checking your head azimuth to see that it is correct, you should always take a moment to position your Westlake Audio monitors to assure proper power summing and stereo perspective at the listening position.

First consider the relationship that the speaker separation ($D1$) has to the distance(s) ($D2$ & $D3$) between listener and speakers (fig.1&2).



In figure 1 the distance between the left and right speaker (acoustic center) and the distance to the listener is equal. The stereo image will be emphasized or spread out, with a heightened sense of the musicians location. Shortening $D2$ & $D3$ is not recommended as even small amounts of head movement will produce large shifts in the stereo image.



In figure 2 the distance to the listener is twice the distance between the left and right acoustic centers. With this configuration the movement of the head is less restricted and the image more homogenous, the sound stage is however reduced in width. Additional lengthening of $D2$ & $D3$ is not recommended as the image will become monophonic for all but the most emphasized (hard left, hard right etc.) pan locations.

A little bit of experimentation should reveal the triangle that optimizes the stereo view for your particular environment and listening preferences.

It should be pointed out that for each different triangle that is evaluated, it is imperative that D2 & D3 are as close to equal as is possible! If you are an experienced engineer (or audiophile) you may be saying....this is obvious. Just consider though that D2 & D3 must be within 1/16" (1.6mm) so that a 20Khz signal emitting from both speakers will be within 33 degrees of one another.

In a multiway speaker system care must be taken to assure equal travel path distances for each of the driver pairs(tweeters,mids,woofers) to the listening position. This requires the height, focus angle and vertical tilt (if any) should be as equal, left to right, as is possible.

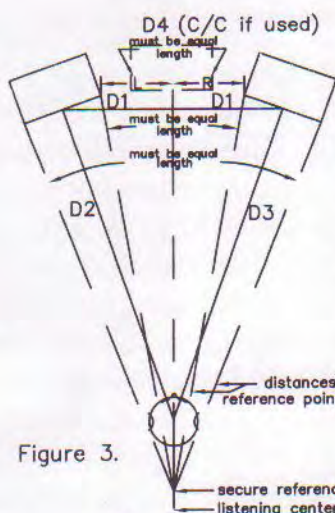


Figure 3.

Determine the listening center line (usually the room center) by pulling a string or tape measure from front to back of the room. Use this line to assure that left and right speakers are kept at an equal distance from center for all listening triangles evaluated (figure 3). For measurement of the travel path(top, bottom & sides) distances use a steel tape with a slotted, right angle end. Hook the end over the head of a screw or nail firmly anchored at or behind the listener (fig.3&4).

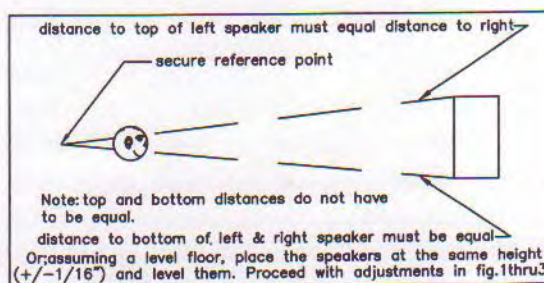


Figure 4. Vertical section view.

While maintaining constant tension adjust the left and right speakers until all related measurements (left versus right) are as equal as practical.

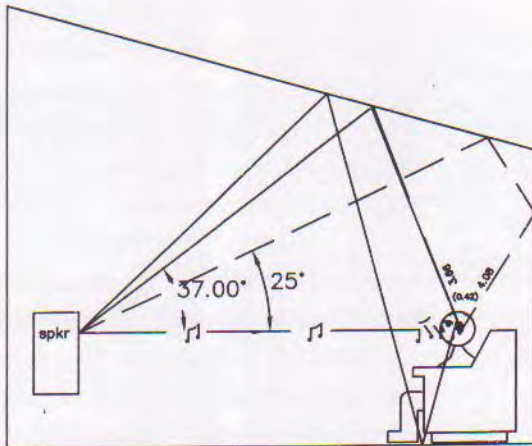
The best sound and imaging will usually occur when the speakers are focused directly at the listener. They may however be spread out to accommodate additional listeners or decorating consideration's

Now of course it is fair to ask ... is this (alignment) audible? *
Yes, presuming a reasonably well damped listening environment and a properly matched pair of monitors reproducing phase coherent (l/r) material. Certainly a misalignment of 1/2" (12.7mm) will produce a considerable power imbalance and image shift of material panned to center.

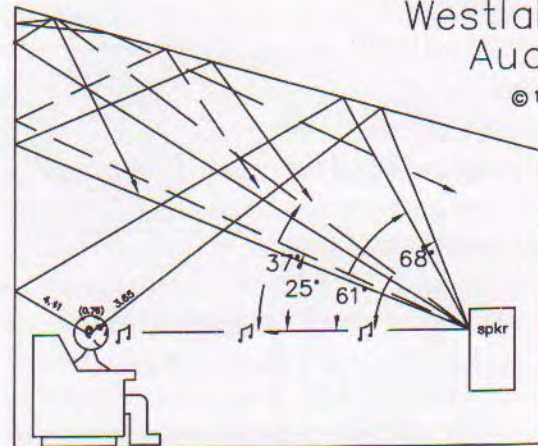
* See separate application note.

Westlake
Audio

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1989
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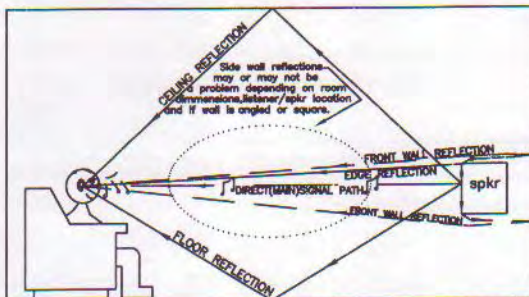
ceiling slopes toward listener, reflections are close in time,
high in amplitude



ceiling slopes away from listener reducing amplitude of first and
2nd order ceiling reflections due to their off axis origination

rotating the listener/speaker relationship only 90° would create an asymmetrical listening space and is less desirable for a proper left/right balance

SETTING UP WITH A SLOPED CEILING

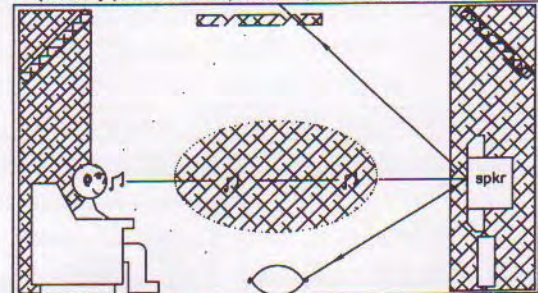


Destructive interference from reflections prevent the listener
from resolving the full definition of the speaker system.

acoustical panels:
1) ceiling or slightly below
2) corner(s)
3) sidewall if req'd

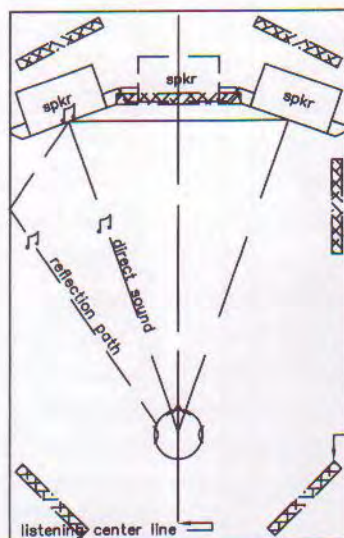
speaker "Muffs" reduce edge reflections
and block wall reflections from behind spkr
Muff filler panel keeps sound from wall
if spkr is on open frame stand

porous throw pillows@floor
(a carefully placed coffee table/console may also work although not as well)



Careful placement of objects within the listening environment can
reduce the amplitude of interfering reflections at the listening position
(a mirror placed on the reflecting surface will
help determine the area needing treatment)

BLOCK/ABSORB THOSE REFLECTIONS!



reflection is strong and close to direct sound

MAIN STEREO PAIR

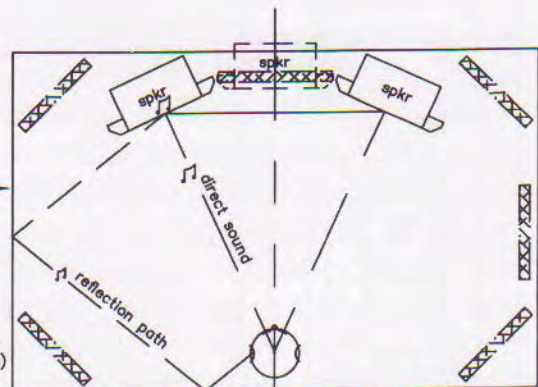
ON SHORT WALL
ON LONG WALL

sound panel@reflection
point can reduce h/f energy

use "spkr Muff" to reduce
edge reflections. Reverse (flat
face forward) installation may
produce better results if
nearby objects (including walls)
are close.

use center fill sound panel
or foam if no center speaker.

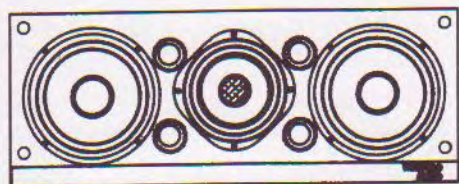
example of corner sound panel
@ wall/wall, wall/ceiling junction.
runs total space, must be
porous; non boomy.



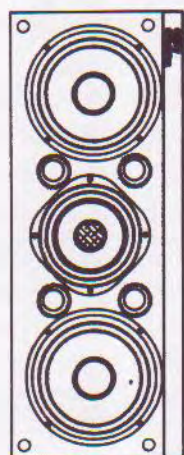
reflection is weaker and further away in time from direct sound

LONG OR SHORT WALL SET-UPS?

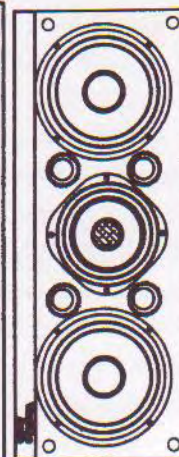
Without
Muff



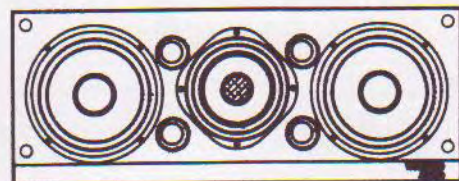
Lc 265.1



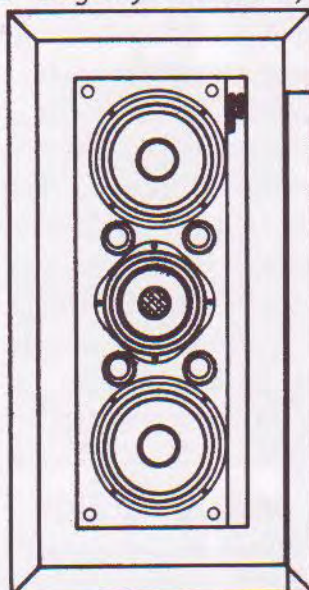
direct view
T.V.
(35" shown)



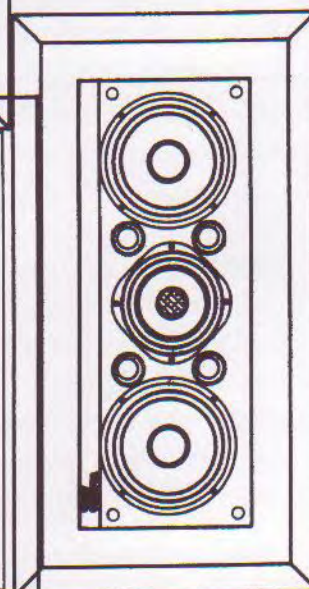
With
Muff
(over hang
and slightly forward)



Lc 265.1



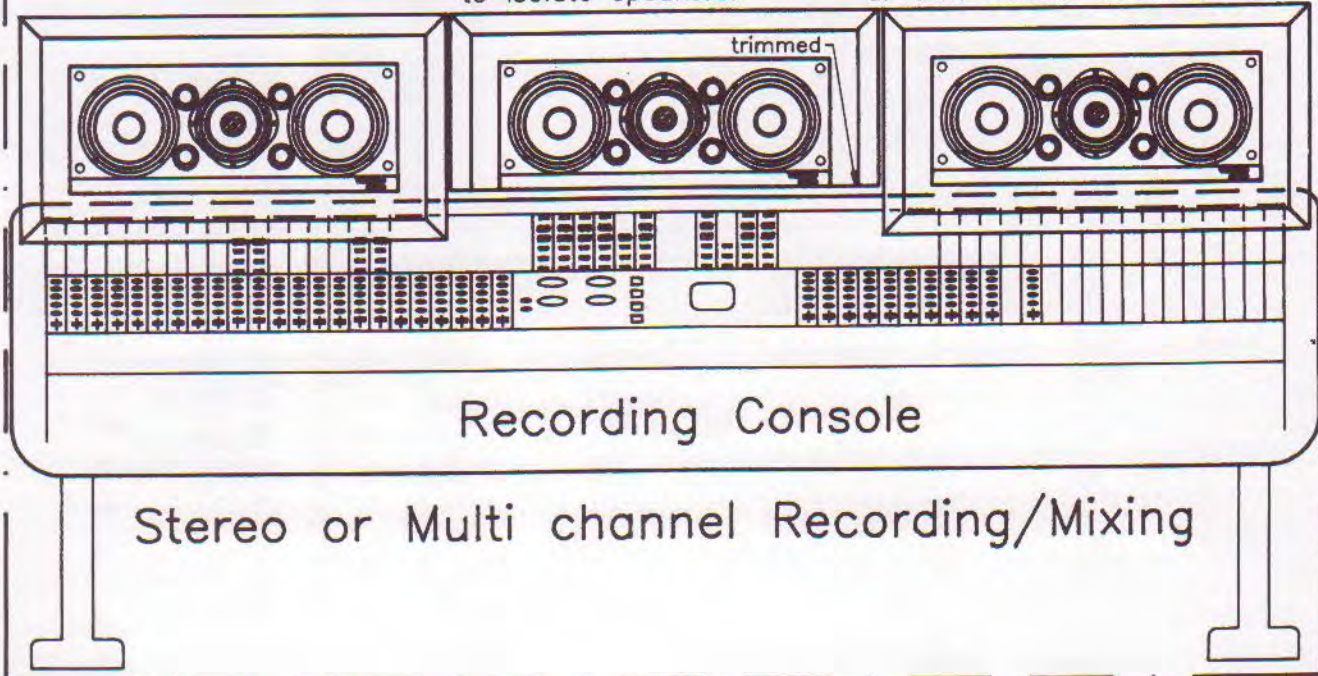
direct view
T.V.
(35" shown)



Lc 265.1 With Muff

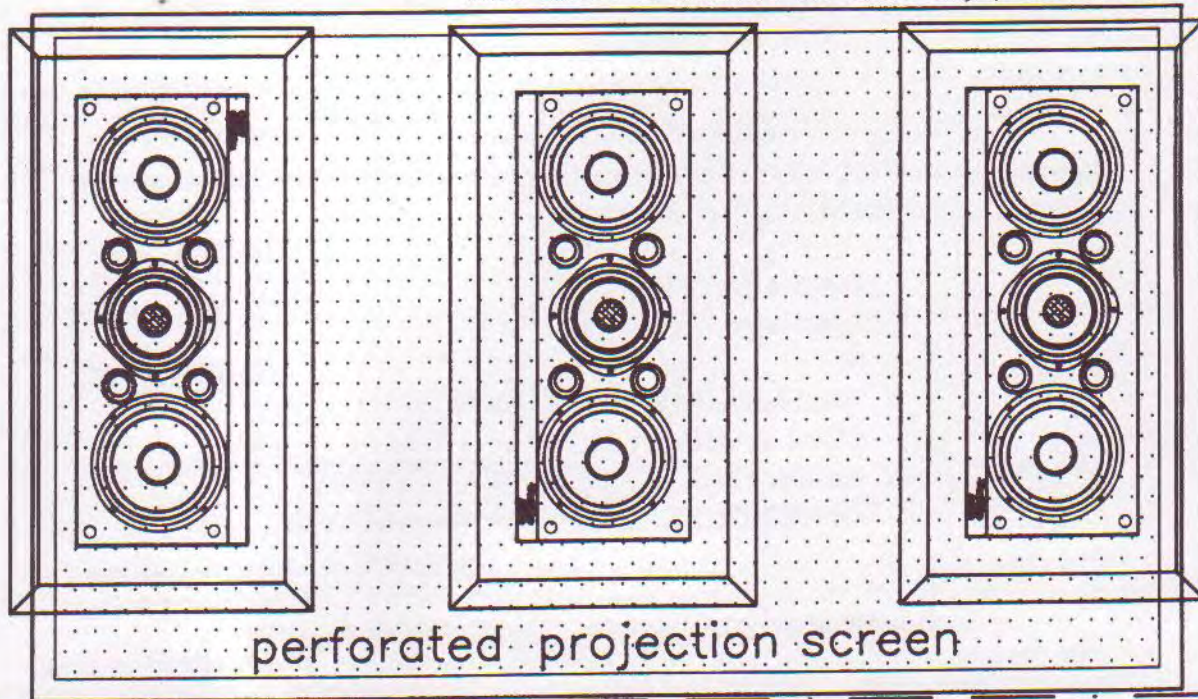
Trim lower part of Muff and place center channel flush with meter bay. Use rubber/felt mat under to isolate speakers.

L/R units are slightly forward. Angle them in and let Muff hang over. Remove Muff to view meters during recording or trim bottom as center unit.



Lc 265.1 With Muff

Center channel or L/R units can be horizontal or vertical as long as all coax drivers are behind screen. Same distance to screen will maintain balance but optimization for single listener@center will be off even when screen is retracted for audio only presentations.



SPECIFICATIONS:

Lc 265.1

- Drivers Dual 6.5" woofers, 5" mid with coaxially mounted 1" dome tweeter
- Frequency response 48 Hz-18 kHz ± 3 dB
- Crossover frequencies 180 Hz, 4kHz
- Power handling long/short term per IEC 268-5
95/255w (h.f.)
120/400w (l.f.)
- Size 8.5"H x 22"W x 11"D (21.6 x 56 x 28 cm)
- Weight 42 lbs. (19 kg)
- Input connectors Dual Banana, 5-way for H.F. and L.F. inputs
- Options Super Flex Speaker Cables, Speaker Muffs,
Shielded Drivers, Biwireable or Passive Biampable

APPLICATIONS:

- Dedicated center channel for video* or multichannel audio
- L/C/R video* or multichannel audio playback, horizontal or vertical orientation
- High quality stereo reproduction, horizontal or vertical orientation
- Low profile stereo playback, reference mixing system

* Shielded version required where close proximity to a C.R.T. is employed.

Thank you for your confidence in Westlake Audio products. If you have any comments, good or bad, or have any suggestions of other products you might like to see us offer please feel free to contact us at:

1-805-499-3686 (Phone)

1-805-498-2571 (Fax)

or

Westlake Audio Manufacturing Group

2696 Lavery Court, Unit 18

Newbury Park, California U.S.A. 91320-1591

info@westlakeaudio.com OR www.westlakeaudio.com

Good luck and good listening!

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