

Operating the Lc-Series Speaker System

Thank you for your purchase of your Westlake Audio Lc-Series loud speaker system. If you are reading this, you have probably already opened the shipping carton and removed the speaker. At this point, please save your purchase documentation with all other important records, especially the serial numbers on the rear of the speaker cabinets. This will be invaluable information to have when ordering replacement parts, insuring your loudspeakers, and making warranty claims. 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) to the listener location, preferably at ear level as referenced to the acoustic center line of the speaker. Use the rubber isolation pad under the speaker to keep it in position and prevent

vibration from exciting the supporting structure. The acoustic center is approximately mid way between the mid/woofer and tweeter. On the 2-way systems with stepped front boards,

referencing the tweeter front board at the point it joins the woofer baffle at 45° 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. The preferred operating position is in the vertical or upright position with the Westlake Audio logo in the horizontal position. However, the speakers may be operated on their sides with the caveat that the off axis listening position will experience some reduction in output level at the crossover frequency. Also, the logos will be difficult to read. With the tweeters towards the inside of the stereo listening triangle the listener can sit closer to the speakers. With the tweeters to the outside, the listener can sit further away. With no position change of the listener, the inside location for the tweeters will present a compressed stereo image, the outside location, an expanded image.

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 Speaker Muffs™ can add an extra amount of detail and 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, side wall etc.) you may get better results with the grills on and the muffs mounted flat side towards the listening position, flush with the tweeter front board or grill face if used. Some experimentation is recommended. Some speaker muffs have integral P.E. antennas™; connect them to the local P.E. bus™, associated audio ground near the power amplifier or its chassis. 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. Some grills have an internal P. E. antenna (foil pattern at rear side). The electrical connections are automatically made through the mounting fasteners as they snap into position. Be careful not to disturb the wiring on the male attachment plugs. Although the imaging (as mentioned above) will probably be best with the grill off, the P.E. antenna may improve some aspects of the sound imaging with the grill on, depending on system configuration including type of amplifier utilized.

THE ENVIRONMENT:

Choosing the best setting for your listening can have a large influence on the perceived performance of the loud speakers. 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 nearby the listening position. An obvious consideration during set-up is

positioning the listener away from noise sources such as open doors/windows, air conditioners or noisy audio 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. Our P.E. Distortion™ research has led us to conclude that as much as possible there should be no un-grounded metal objects in the listening room. The closer the object is to the loudspeakers, the audio components or their wiring, the more important this is. A "P.E. audit" should be performed for optimum results. In a related phenomenon, the metal objects, even if grounded to the earth or P.E. bus, should be symmetrical to the stereo listening geometry if possible.

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 echo-ey 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 detail 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. Selectively place and space thin materials 2-4" off the mounting surface. Or 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, user friendly 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 sound imaging. 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 most 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, Acoustics First, Auralex, ASC, RPG, Illbruck and other companies offer 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 effectively smoothed or neutralized.

Some would advocate the use of non parallel surfaces. However, it should be pointed out that this technique is not unlike the dimension ratio 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 locations. As an element of diffusion and/or reflection control, non parallel 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 set up 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. When the speakers are relatively close to the listener is sometimes referred to as near or close field monitoring, which is often used in professional recording studios. This type of configuration 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 aforementioned bass build up 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 wall or better, stack width-wise floor to ceiling: 12, 18 & 24" widths, un-backed 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 about 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 relatively easy load that

the Lc system 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 (including self) within the audio bandwidth (20Hz-20kHz) and be capable of driving the Lc system 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 and has adequate power reserves to play the Lc system 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 practice, balanced inputs may or may not sound better. In poorly designed units, the additional circuitry in a balanced input may just make the sound worse. In well designed units the sound should be the same and only the noise immunity should differ. Both will have some degree of P. E. Distortion that can manifest itself more or less in any given installation. P. E. Distortion can mimic acoustic distortion and be particularly insidious to ferret out of the system. See separate application notes for methods of control of this elusive problem.

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 noise 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 alternately 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 level controls. You should however be aware that level control within the C.D 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 in your listening environment to the exact piece of hardware you will be buying, before 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. Never the less, 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 good conductivity, low P.E. Distortion and reasonable installation flexibility from the amplifiers to an Lc series speaker system. Available in various wire sizes, lengths, terminations and performance options, contact your dealer or Westlake Audio for price and availability.

Whatever cable you chose, 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. Additionally we offer P.E./3rd wire, shielding and "E-Term" performance enhancing options to maximize the listening detail.

For the maximum fidelity possible, double cabling the Lc speakers input (i.e. using the spade and banana portion of the speaker's input connector simultaneously) will produce the highest resolution that the system can provide. It does so by reducing the load factor being applied to either cable, and this minimizes its sonic character. Caution should be exercised however, to be certain not to reverse the polarity of one of the sets as this would obviously short the output of the power amplifier.

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. Westlake Audio Cable Muffs™ provide effective cable

management tools to aid in optimizing the cable installation.

Be sure to make a good connection at both ends of the cable. Clean the terminations prior to installing, with alcohol or suitable connector 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 complete insertion of the swab into the female contacts 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-tips, 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 re-cleaning. 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 none-the-less 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 wood 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 binding post nut. Repeatedly tighten and loosen the post while rotating the cardboard dummy lug to cause the contacting surface 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 and clean! Also check to see that all wiring polarity (+ to + etc.) has been maintained, especially in multi-channel systems.

THE SYSTEM, DEBUG IT BEFORE LISTENING:

Many a good speaker has been unjustifiably tried and convicted of audio heresy not because of what it does but because of what's going on upstream. So take a little time to determine if the system itself is interfaced properly and producing the best sonic results. The first rule of good sound is that with things set up 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 sounds 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 or buzzing 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 aforementioned 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 blasé'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/cell 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 too close to turntable pick up, audio equipment located too close to air conditioner or other noise sources, audio equipment on same circuit as noise source), too many or not enough ground connections and wiring 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 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. Many claims for sonic improvement of the system comes from self noise reduction (including P. E. Distortion) rather than the imagined external noise sources such as power company and/or neighbor sources.

FOR THE LONG TERM, GOOD SOUND, SAFETY AND MAINTENANCE:

Safety codes require all electrical equipment to possess a high degree of isolation resistance from the power line and/or possess a chassis ground that cannot be broken. However, our listening tests have shown that more than one pathway to the safety ground for the audio ground can be debilitating to the sound. Therefore selecting audio components (turntable, C.D. and pre-amp, etc.) that

have an "audio ground to chassis select (switch or jumper)" system can be beneficial to optimizing your listening experience. Although a "floating" audio system ground can provide an acceptable listening experience, often tying the audio ground to the building safety ground and/or to a purpose installed, low impedance "earth" ground can improve the sonic impression.

In general your Lc system should provide years of trouble free use. Only the highest quality components are used in all Westlake Audio Speaker Systems. Although normally maintenance free, occasional degaussing is recommended (See separate Application Note for methods of degaussing, external and internal/self degaussing). Additionally removal of fibers (however small and seemingly insignificant) from cones and domes can optimize sound definition. Use a can of compressed air, (being careful not to over pressurize the tweeter dome) masking tape lightly applied and non-magnetic tweezers. This requires a steady hand and patience. In a dim room, view using a small flash light skimming the driver surface through a stereo optivisor or other magnifying device. If stronger cleaning than just dust or finger prints becomes necessary, do not use aggressive cleaning agents. Seek out those products recommended for fine furniture. Pre-test a small unobvious 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. Every year or two (or if sound becomes unclear) a close inspection of the tweeter dome, woofer/mid cones and dust caps and surrounds should be made using a magnifying (Optivisor or other) glass to look for any damage

that would produce bad sound. Of particular interest would be loose dust caps or surrounds that could allow air to flow through small holes or cracks, causing spectrum contamination.

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 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 absorbing, isolation rubber grommet under the head. The grommet will prevent over-tightening of the mounting screw as it will distort or be forced out from the head if the screw is over tightened. 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 screws 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 a screw driver under tweeter or cosmetic damage may result) will expedite its removal.

Your unit may have been supplied with a "P.E. Antenna"TM and/or driver muffsTM on some or all of your speaker system drivers. The antenna (wires) should not be disconnected/removed from the

mounting screw heads unless service is required. If they are removed for service, they should be re-installed in the exact same manner. Particular attention to antenna wire routing including passing under the screw head (connect) versus under the grommet (no connect).

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 Lc-Series 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 to a crescendo or have unexpected loud transient passages which may or 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 set up). 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 any time 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.

Lc SERIES OPTIONS:

- 1) **T.V. Version:** A magnetically shielded woofer and compensated tweeter assembly allows use of the Lc Series near C.R.T. video monitors. (The regular units may have to be placed 10" or 25cm or more, away from sensitive video monitors). The Lc265.1 (V and H versions) and Lc24.75 models incorporate these features in all units as standard.
- 2) **Super Duper Speaker Muffs:** These foam muffs as described previously can enhance the stereo image and apparent bass response. Some muffs may have integral P.E. antennas™. Highly recommended for the ultimate listening experience with the Lc system.
- 3) **Dedicated speaker stands:** Designed to optimize listening height, sound isolation and P.E. distortion. Check for availability for particular model specifications, etc.
- 4) **Westlake Audio Speaker Cables:** The ultimate in conductivity flexibility and low P.E. distortion. Various sizes, lengths and performance options. Contact your Westlake Audio dealer for price and availability.
- 5) **Westlake Audio Interconnect Cable Assembly:** Low P.E. signal cables to interface source, pre and power amplifiers in balanced, unbalanced and custom lengths and terminations.
- 6) **Westlake Audio Cable Muffs™:** Cable management and dampening devices in various sizes and shapes assist in optimizing the system performance. Effective tools for extracting the most from your system.

SPECIFICATIONS:

Common to all Lc Series are:

- Extensive electro-mechanical-acoustical dampening
- Integrated, dual path, iso-back™ Low P.E. Distortion™
- Passive crossover for single or bi-amp (3 way models only) operation
- Internally wired with Westlake Audio "Super Flex™ wire
- Integral port buffer-brace™ for high resolution sound field
- Black knit removable grill frame with integral P. E. antenna™
- Warranty is 5 years for Hi Fi applications and 1 year for Professional Studio applications. However, we frequently receive unsolicited comments from long-time owners who attest to complete satisfaction with their Westlake Audio products after decades of continuous use. We are proud of our 40+ years of professional and Hi Fi products' history.

Lc265.1V: Vertical, 3-Way Low "P.E." Distortion™, High Resolution, concentric high and mid frequency loudspeaker, small footprint. Shielded, dual 6 1/2" woofers, 5" mid-range/coaxial 1" dome tweeter.

- Frequency Response.....48Hz-18kHz ± 3dB
- Sensitivity.....91dB @ 1m for 2.83V input
- Impedance.....5 ohms nominal, 3 minimum
- Power Handling.....95W/400W per IEC 268-5
- Size.....27.75"H x 9.25"W x 12"D (70.5x23.5x30.5 cm)
- Weight.....60 lb (27.22 Kg)
- Inputs:2 dual banana, 5 way binding posts

Options.....Westlake Audio speaker and cable muffs, speaker and/or interconnect cables, dedicated speaker stand as well as matching, low profile center channel version (see below).

Lc265.1: Horizontal, Coaxial Mid Tweeter, Dual 6.5" Woofers, 3-Way with Magnetic Shielding (all) for center channel or low profile stereo.

- Frequency Response.....48Hz-20kHz ± 3dB
- Sensitivity.....91dB @ 1m for 2.83V input
- Impedance.....5 ohms nominal, 3 minimum
- Power Handling.....125W/400W per IEC 268-5
- Size.....8"H x 22"W x 11"D (20.3 x 55.9 x 27.9 cm)
- Weight.....42 lb (19 Kg)
- Options.....Isolation pad , speaker muff and cables
- Input Connector.....2 (Bi-wired) dual banana 5-way

Lc24.75: Horizontal, Magnetically Shielded, Dual 4" Woofers and 3/4" Dome Tweeter. Low Profile 2-Way system for Stereo or Center Channel.

- Frequency Response.....65 to 20,000 Hz ±3dB
- Sensitivity.....89dB SPL for 2.83V input @1m
- Impedance.....5 ohms nominal, 3 minimum, 16 max
- Power Handling.....75W long term, 225W short term per IEC 268-5
- Size.....6.25"H x 16.5"W x 7.125"D (15.9x42x18 cm)
- Weight.....18 lbs (8.15Kg)
- Options.....Isolation pad, speaker muffs and cables
- Input Connector.....Single Dual Banana, 5-Way

Lc4.75: Very compact, 2-way, 4" woofer, 3/4" dome tweeter

- Frequency Response.....65 to 20,000 Hz ±3dB

- Sensitivity.....85dB SPL for 2.83V input @1m
- Impedance.....7 ohms nominal, 4 minimum, 16 max
- Power Handling.....60W long term, 200W short term per IEC 268-5
- Size.....12"H x 5.5"W x 7.125"D w/bumper (15.9x42x18 cm)
- Weight.....12 lbs (5.45Kg)
- Options.....Isolation pad, speaker muffs and cables
- Input Connector.....Single Dual Banana, 5-Way

Lc5.75: Compact, 2-way, 5" woofer, 3/4" dome tweeter

- Frequency Response.....60 Hz-20kHz ± 3dB
- Sensitivity.....86dB SPL for 2.83V input @1m
- Impedance.....7 ohms nominal, 4 minimum, 16 max
- Power Handling.....80-200W per IEC 268-5
- Size.....14"Hx6.5"Wx9"D (35.6x16.5x22.9 cm)
- Weight.....18 lbs (8.2Kg)
- Options.....Isolation pad, speaker muffs and cables
- Input Connector.....Dual Banana, 5-Way

Lc6.75: Small, 2-way, 6 1/2" woofer, 3/4" fabric dome tweeter

- Frequency Response.....60Hz-20kHz ± 3dB
- Sensitivity.....88dB @ 1m for 2.83V input
- Impedance..... 7 ohms nominal, 5 minimum
- Power Handling.....80W/200W per IEC 268-5
- Size.....16"Hx8"Wx10"D (40.6 x 20.3 x 25.4 cm)
- Weight.....22 lb (10 Kg)
- Input Connector.....Dual Banana, 5-Way
- Options..... Cables, Speaker Muffs, Shielded Drivers

Lc8.1: Medium size 2-way, 8" woofer with dynamic dampening, 1" dome tweeter

- Frequency Response.....55Hz-20kHz ± 3dB
- Sensitivity.....90.5dB @ 1m for 2.83V input
- Power Handling.....85W/225W per IEC 268-5
- Size.....18"H x 10"W x 11.625"D (45.7 x 25.4 x 29.5 cm)
- Weight.....31 lb (14.1Kg)
- Inputs.....Single Dual Banana, 5-Way
- Options.....Magnetic Shielding, Dedicated Subwoofer/stand

Lc8.1 SW: Dedicated Dual 10" Sub Woofer Pedestal for Lc8.1 System

- Frequency Response (With Lc8.1).....34Hz.20kHz ± 3dB
- Sensitivity.....90.5dB @1m for 2.83V input
- Impedance.....5 nominal / 2.5 minimum
- Power Handling.....180/450W @1m per IEC 268-5
- Size.....26.8"H x 13.7"W x 14.7"D (68.1 H x 38.8 W x 37.3 cm)
- Weight.....100 lbs (45.4 Kg)

- Input Connectors.....2 5-Way Dual Bananas for Bi-Wiring or Passive Bi-Amp
- Options.....Speaker Cables or Muffs

Lc3w10V (Vertical) and LC3W10H (Horizontal) Compact 3-Way (10" Woofer, 4" Mid, 3/4" Tweeter)

- Frequency Response.....42Hz-20kHz \pm 3d/B
- Sensitivity.....88dB @ 1m for 2.83V input
- Impedance.....5 nominal / 3 minimum
- Power Handling.....100/300W @1m per IEC 268-5
- Size Lc3w10V.....24.25"H x 12"W x 14"D (61.5H x 30.5W x 35.6D cm)
Size LC3w10H.....12"H x 21"W x 13"D (30.5 x 53.3 x 33.0 cm)
- Weight Lc3w10V.....71 lbs (32.2 Kg)
Weight Lc3w10H.....69 lbs (31.3 Kg)
- Input Connector.....Bi-Wired Dual Banana
- Options:.....Dedicated Speaker Stand (Lc3w10V), Speaker Muffs and Cables

Lc3w12V (Vertical) and LC3W12H (Horizontal): High Resolution 3-way very low distortion 12" paper cone woofer, 6 1/2" mid with dynamic dampening, 1" fabric dome tweeter

- Frequency Response.....40Hz-18kHz \pm 3dB
- Sensitivity.....91dB @1m for 2.83V Input
- Impedance.....5 nominal / 3 minimum
- Power Handling.....110/300W @1m per IEC 268-5
- Size LC3W12V.....29.5"H x14.5"W x 15.5"D (63.5H x38.1W x 38.1D cm)
Size LC3W12H.....15"H x 25"W x 15"D (38.1 x 63.5 x 38.1 cm)
- Weight.....105 lbs (47.6 Kg)
- Input Connector.....Bi-Wired Dual Banana
- Options.....Dedicated Speaker Stands, (Lc3W12V) Speaker Muffs and Cables

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

1-805-499-3686 (Phone)

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Good luck and good listening!

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